Opportunity cost and social values in health care resource allocation

by

Michael Paulden

A thesis submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Department of Medicine
University of Alberta

Abstract

Background

Health care budgets are limited and under pressure. Funding new health technologies has an opportunity cost – while some patients benefit, others lose out as resources are reallocated away from existing health care services.

This has implications for social value considerations in the assessment of new technologies. Maintaining horizontal equity requires giving similar consideration to individuals with similar characteristics of ethical relevance. Vertical equity allows for differential consideration to be given to individuals with different characteristics of ethical relevance. For example, this might involve applying a greater value to health gains for individuals with more severe illness. Horizontal equity nevertheless requires that equal value be assigned to health gains for individuals with equally severe illnesses, regardless of whether they benefit from the new technology or bear the opportunity cost.

Economic evaluations of health technologies conventionally assume a vertical equity position in which identical value is assigned to all health benefits. This has raised concerns that some patients may be denied access to effective but expensive treatments. In response, some decision makers have modified their methods to assign greater value to health benefits for some patients, implying an alternative vertical equity position.

Objectives

The purpose of this thesis is to consider how social value considerations can be incorporated within the methods used for the economic evaluation of health technologies in a way that accounts for opportunity cost and respects the principles of horizontal and vertical equity.

Methods

The thesis comprises four chapters. In Chapter 1, a conventional vertical equity position is adopted. Using a model of a hypothetical health care system, we derive 'optimal' cost-effectiveness thresholds that respect the principle of horizontal equity under a variety of alternative assumptions regarding the size of the health budget, the divisibility and marginal returns to scale of initial technologies, budget impact, and whether the new technology constitutes a net investment or net disinvestment. In Chapter 2, we build upon this work by modelling interactions between multiple decision makers with imperfect information and potentially conflicting objectives, deriving optimal thresholds under various scenarios regarding each decision maker's information and authority.

In Chapter 3, we consider the possibility that an alternative vertical equity position might be adopted, using orphan drugs as an exemplar. We scope the literature for social value arguments relating to the reimbursement of orphan drugs and develop a decision making framework that takes these into account while respecting the principles of horizontal and vertical equity. In Chapter 4, we critique some amendments that NICE has made to its methods for economic evaluation in order to reflect an alternative vertical equity position.

Results

In Chapter 1, we find that optimal threshold curves are piecewise linear functions under divisibility and constant returns, concave functions under divisibility and diminishing returns, or step functions under non-divisibility. In Chapter 2, we find that optimal threshold curves may pass through all four quadrants of the cost-effectiveness (CE) plane, and there may be a 'kink' at the origin of the CE plane, implying different optimal thresholds for marginal net investments and net disinvestments.

In Chapter 3, we identify 19 candidate decision factors in the orphan drugs literature, most of which can be characterized as "value-bearing" or "opportunity cost-determining", and also a number of value propositions and pertinent sources of preference information. We synthesize these into a decision making framework that respects horizontal and vertical equity. In Chapter 4, we identify a number of inconsistencies in NICE's methodology for the incorporation of social values into resource allocation decision making and offer suggestions for how these may be resolved.

Conclusion

The standard exposition of the threshold is a special case that holds only under specific conditions. Under other conditions, optimal threshold curves may take a variety of different functional forms, with implications for which technologies ought to be considered cost-effective. Maintaining horizontal equity generally requires consideration of an alternative theoretical model to that underlying the conventional exposition. If an alternative vertical equity position is adopted, our proposed decision making framework allows social value considerations to be consistently applied to all affected individuals, respecting horizontal equity. Naïve modifications to methods for economic evaluation – without considering opportunity cost – can violate horizontal equity and result in an inconsistent realization of the decision maker's vertical equity position.

Preface

The research in chapters 1, 2 and 4 of this thesis was conducted as part of the PACEOMICS research collaboration at the University of Alberta, supported by Genome Canada, Canadian Institutes for Health Research, Alberta Innovates Health Solutions, the University of Alberta Capital Health Research Chair in Emergency Medicine Research Endowment, the Faculty of Medicine and Dentistry and the UK National Institutes for Health Research.

The research in chapter 3 of this thesis was conducted as part of the PRISM research collaboration at the University of Alberta, supported by the Canadian Institutes for Health Research.

Publications

Chapter 3 was published as an Original Research Article in Pharmcoeconomics in March 2015: *Paulden M, Stafinski T, Menon D, McCabe C. Value-based reimbursement decisions for orphan drugs: a scoping review and decision framework. Pharmacoeconomics. 2015;33(3):255–69.*[1] The final publication is available at Springer via http://dx.doi.org/10.1007/s40273-014-0235-x.

Chapter 4 was published as a Leading Article in Pharmcoeconomics in November 2014: *Paulden M, O'Mahony JF, Culyer AJ, McCabe C. Some inconsistencies in NICE's consideration of social values. Pharmacoeconomics. 2014;32(11):1043–53.*[2] The final publication is available at Springer via http://dx.doi.org/10.1007/s40273-014-0204-4.

This article was accompanied by a commentary written by Suzanne Hill and Leslie Olson.[3] In December 2014, we published a short letter in response to this commentary, clarifying some of the arguments made in our paper. This letter has been reproduced in Appendix 4.1, and was published as: *Paulden M, O'Mahony JF, Culyer AJ, McCabe C. Objectivity and equity: clarity required. A response to Hill and Olson. Pharmacoeconomics. 2014;32(12):1249–50.*[4] The final publication is available at Springer via http://dx.doi.org/10.1007/s40273-014-0239-6.

This thesis includes the final accepted manuscript for each publication, in accordance with the respective copyright transfer agreements. Changes made to each manuscript after acceptance, including edits made during proof-reading, are not reflected in the manuscripts included in this thesis. The final publications are available from the publisher at the links provided above.

Presentations

The research in Chapters 1 and 2 has been presented at the following workshops, conferences and seminars:

1. Paulden M, McCabe C. *Advancing the standard model of the cost-effectiveness threshold: incorporating diminishing returns, non-divisibility and imperfect information*. Seminar at the University of Leeds, UK, 17 June 2016.
2. Paulden M, McCabe C. *Transforming the cost-effectiveness threshold into a 'value threshold': initial findings from a simulation model*. Poster presented at the 16th Biennial European Meeting of the Society for Medical Decision Making (SMDM) in London, UK, 14 June 2016.
3. Paulden M, O'Mahony JF. *Incorporating social values into cost-effectiveness analysis*. Presented as part of a workshop at the International Society For Pharmacoeconomics and Outcomes Research (ISPOR) 20th Annual International Meeting in Philadelphia, Pennsylvania, USA, 19 May 2015.
4. Paulden M, McCabe C. *Transforming the cost-effectiveness threshold into a 'value threshold': initial findings from a simulation model*. Invited presentation given as part of a panel discussion titled "New Methods in HTA to Support Policy and Practice: Can We Better Understand How Canadians Value Health?" at the 2015 Canadian Agency for Drugs and Technologies in Health (CADTH) Symposium in Saskatoon, Saskatchewan, Canada, 13 April 2015.
5. Paulden M, McCabe C. *Transforming the cost-effectiveness threshold into a 'value threshold': initial findings from a simulation model*. Poster presented at the 2015 Canadian Agency for Drugs and Technologies in Health (CADTH) Symposium in Saskatoon, Saskatchewan, Canada, 12 April 2015.
6. Paulden M, McCabe C. *Transforming the cost-effectiveness threshold into a 'value threshold': initial findings from a simulation model*. Invited presentation at a workshop titled "NICE and the cost-effectiveness thresholds: Can good intentions compensate for bad practice?" at University College London (UCL), London, UK, 15 December 2014.
7. Paulden M, McCabe C. *The Lambda Complex: Knowing Your Place In The Threshold Matrix*. Poster presented at the 36th Annual Meeting of the Society for Medical Decision Making (SMDM) in Miami, Florida, USA, 20 October 2014.

The research in Chapter 3 has been presented at the following workshops and conferences:

1. Paulden M, Stafinski T, Menon D, McCabe C. *Do Social Values Transform the Value-Based Translational Calculus for Regenerative Medicine?* Presented at the "Driving Regenerative Medicine to the Market and Clinic" workshop in Toronto, Ontario, Canada, 6 November 2014.
2. Paulden M, Stafinski T, Menon D, McCabe C. *Towards Planning for Optimal Access to Effective Therapies for Rare and Ultra-Rare Conditions: A Scoping Study*. Presented at the 2014 Canadian Agency for Drugs and Technologies in Health (CADTH) Symposium in Gatineau, Quebec, Canada, 6 April 2014.

Contributions

I made the following contributions towards the collaborative research presented in this thesis:

- Chapters 1 and 2: I was primarily responsible for all aspects of the research, including study design, methodology, conducting analyses, reporting and interpreting results, drawing conclusions, and authoring each chapter.
- Chapter 3: I was jointly responsible for reviewing the papers identified in the scoping review and reporting and interpreting the results of the scoping review, and I was primarily responsible for designing the proposed decision framework, drawing conclusions, and authoring the manuscript prior to publication.
- Chapter 4: I was primarily responsible for constructing the arguments presented, drawing conclusions, and authoring the manuscript prior to publication.

Acknowledgements

I am grateful for the financial support provided by the University of Alberta, Genome Canada, Alberta Innovates Health Solutions, and the Canadian Institutes for Health Research.

I wish to thank my supervisor, Christopher McCabe, my co-supervisor, Jeremy Beach, and the members of my supervisory committee: Anthony J Culyer, Tania Bubela and Fiona Miller.

I also wish to thank my co-authors on Chapters 3 and 4: Tania Stafinski, Devidas Menon and James O'Mahony.

Table of Contents

List of Tables

List of Figures

Glossary of Terms

Agent	Decision maker with responsibility for recommending, or not recommending, new technologies for adoption into the health care system.
Allocator	Decision maker with responsibility for allocating the initial budget among the initial technologies in the pool.
CADTH	Canadian Agency for Drugs and Technologies in Health, an HTA agency in Canada.
Constant marginal returns to scale	Commonly referred to as simply "constant returns". The ratio of a technology's incremental expenditure to its incremental benefit remains constant with increases in incremental expenditure, such that progressive marginal expansions of a technology result in constant marginal incremental benefit. Not relevant if technologies are non-divisible.
Constant returns	See "constant marginal returns to scale".
Cost-effectiveness (CE) plane	A figure which allows for consideration of a technology's incremental benefit (horizontal axis) and incremental cost (vertical axis). Incremental benefit is positive in the eastern half of the plane and negative in the western half, while incremental cost is positive in the northern half of the plane and negative in the southern half. The quadrants are referred to as "north-east", "north-west", "south-east" and "south-west".
Cost-effectiveness threshold (λ)	Commonly referred to as simply the "threshold". A technology's ICER is compared to the threshold to determine if the technology is cost-effective. For different approaches to determining the threshold, see "demand-side threshold" and "supply-side threshold".

Current ICER	The incremental expenditure on a technology divided by the incremental benefit, at a given level of expenditure.
Demand-side threshold	An estimate of the aggregated value that individuals in society assign to a unit of benefit (e.g., a QALY). Often described as society's "willingness-to-pay" for the benefit in question.
Diminishing marginal returns to scale	Commonly referred to as simply "diminishing returns". The ratio of a technology's incremental expenditure to its incremental benefit increases with incremental expenditure, such that progressive marginal expansions of a technology result in diminishing marginal incremental benefit. Not relevant if technologies are non-divisible.
Diminishing returns	See "diminishing marginal returns to scale".
Divisibility (of technologies)	Assumes that technologies may be partially adopted, resulting in a smaller incremental cost and smaller incremental benefit than if technologies are exhausted.
Equity	See "horizontal equity" and "vertical equity".
Exhaustion (of a technology)	Incremental expenditure and incremental benefit are at their highest possible (absolute) values, such that the technology cannot be expanded.
Extra-welfarism	Permits non-utility information such as the 'quality' of individuals' utilities, equity weights, and individuals' characteristics and 'capabilities' to be considered alongside individual utilities.
Horizontal equity	Requires similar treatment of individuals with similar characteristics of ethical relevance.

HTA	Health technology assessment. Methods and processes for assessing the value of new health technologies, including consideration of their opportunity cost. HTA allows decision makers to better understand the implications for population health of alternative allocations of health care resources.
ICER	Incremental cost-effectiveness ratio. The incremental cost of a technology divided by its incremental benefit. If this benefit is measured in terms of QALYs, the ICER is expressed in terms of "dollars per QALY" (or the appropriate local currency).
ICER in exhaustion	The incremental cost on a technology (in exhaustion) divided by the incremental benefit (in exhaustion).
Incremental benefit (of a technology)	Direct benefit from a technology minus the reduction in benefit from basic health care services as a result of adopting the technology.
Incremental cost (of a technology)	Incremental expenditure required to exhaust a technology.
Incremental expenditure (on a technology)	Direct expenditure on a technology minus the reduction in expenditure on basic health care services as a result of adopting the technology.
Knapsack problem	A common problem in combinatorial optimization, in which a decision maker must pack items of different 'size' and 'value' into a knapsack of limited 'capacity', such that the total value of the items in the knapsack is maximized. Analogous to adopting non-divisible technologies within a budget-constrained health care system, where each technology has a different incremental cost and incremental benefit.

Marginal ICER	The marginal change in incremental expenditure on a technology divided by the resulting marginal change in incremental benefit.
Net disinvestment	A new technology with negative incremental costs, which therefore lies in the southern half of the cost-effectiveness plane. Adopting such a technology releases resources, allowing for increased incremental expenditure on initial technologies.
Net investment	A new technology with positive incremental costs, which therefore lies in the northern half of the cost-effectiveness plane. Adopting such a technology requires an additional investment of resources by reducing incremental expenditure on initial technologies.
NHS	National Health Service, the public health care system in the UK.
NICE	National Institute for Health and Care Excellence, an HTA agency in the UK.
Non-adoption (of a technology)	Incremental expenditure and incremental benefit are both zero. The technology is not adopted, even partially, such that the technology cannot be contracted.
Non-divisibility (of technologies)	Assumes that technologies cannot be partially adopted, so must be adopted either until exhaustion or not at all.
Numerical threshold	A representation of the cost-effectiveness threshold in terms of 'dollars per [unit of benefit]' (or the appropriate local currency).
Partial adoption (of a technology)	A technology is adopted but not exhausted, such that it can be either expanded or contracted. Cannot arise under non-divisibility.
QALY	Quality-adjusted life year. A composite of length and quality of life, commonly used as a "utility" measure in economic evaluations of health technologies.

Reallocator	Decision maker with responsibility for reallocating incremental expenditure among initial technologies following adoption of a new technology.
Social decision making (perspective)	Assumes that decision makers are 'agents' of a socially and politically legitimate 'higher authority' that grants each agent the responsibility to pursue a specific and explicit objective, subject to a budget constraint. The budgets it allocates and the objectives it delegates represent a partial expression of some unknown, latent social welfare function.
Supply-side threshold	An estimate of the impact upon an aggregate measure of benefit (e.g., population QALYs) associated with a marginal change in health care expenditure. Often described as the 'shadow price' of the health budget.
Threshold	See "cost-effectiveness threshold".
Threshold curve	A graphical representation of the cost-effectiveness threshold on the cost-effectiveness plane.
Vertical equity	Permits differential treatment of individuals with different characteristics of ethical relevance. There are many possible vertical equity positions that a decision maker might adopt.
Welfarism	Assumes that individuals rationally maximize their 'utility' by ordering the options available to them and acting according to their preferences. Individuals are regarded as the only judges of what contributes to their utility. Social welfare is judged to be nothing more than an aggregation of individual utilities, as defined by a specific 'social welfare function'.

Introduction

Health care budgets within Canada's public health system are limited and under pressure.[5,6] Demand for health care is increasing, resulting in waiting lists for routine treatments.[7,8] In this context, funding health technologies has an opportunity cost.[9] Resources devoted to technologies cannot be used to provide other health care services of value to Canadians. While some patients benefit, other patients lose out as resources are reallocated away from the health care services they need.

This opportunity cost has important implications for ethical considerations in the assessment of health technologies. The Canada Health Act specifies the primary objectives of Canadian health policy, including a concern for improving population health and ensuring equity in the allocation of health care resources.[10] Since the opportunity cost of funding technologies has implications for both of these objectives, it ought to be considered as part of the reimbursement decision making process.

Over recent decades, academics and policy makers have developed methods and processes for assessing the value of health technologies, including consideration of their opportunity cost. The use of these methods and processes is referred to as health technology assessment (HTA).[11] HTA allows decision makers to better understand the implications for population health of alternative allocations of health care resources. An important component of HTA is the economic evaluation of health technologies, which provides decision makers with necessary information for considering their opportunity cost.[12]

Economic evaluations of health technologies

As of 2015, public agencies in a number of countries conduct economic evaluations of health technologies, or review submissions of economic evaluations conducted on their behalf.[13] Perhaps the most well-known example is the UK's National Institute for Health and Care Excellence (NICE), which evaluates new health technologies for potential adoption into the National Health Service (NHS). NICE periodically revises its guidelines for conducting economic evaluations in order to reflect theoretical or empirical advances in the literature, with the most recent published in 2013.[14] In Canada, guidelines for conducting economic evaluations have been published by the Canadian Agency for Drugs and Technologies in Health (CADTH), although these have not been updated since 2006.[15] Agencies in other countries have published similar guidelines.[16,17]

These guidelines typically include a “reference case”, which is a set of basic requirements that all economic evaluations must meet. In the guidelines issued by NICE and CADTH, the reference case requires that analysts conduct a “cost-utility analysis”, in which the incremental cost of funding a new health technology is compared to the incremental “utility” for patients who will benefit.[14] In this context, “utility” is measured in terms of the “quality-adjusted life years” (QALYs) gained by patients, which represents a composite of each patient’s length and quality of life.[18] It should be noted this this concept of “utility” is quite distinct from that used in much of mainstream economics since the 1930s, since the QALY is a cardinal measure of health that permits interpersonal comparisons through aggregation across the relevant population.[19,20]

To estimate the incremental “utility” of funding a technology, a comparison is made between the cumulative QALYs associated with the health states that patients are expected to experience over the time horizon of the analysis (typically each patient’s lifetime) with and without funding for the technology. The costs associated with time in each health state, with and without funding for the technology, are also compared in order to estimate the “incremental cost” of the technology. To determine if the technology is “cost-effective”, the estimated incremental cost is divided by the estimated incremental “utility” in order to derive an “incremental cost-effectiveness ratio” (ICER) for the technology (expressed in terms of “dollars per QALY”, or the appropriate local currency), which is then compared to a “cost-effectiveness threshold”.[21] Deciding upon the appropriate threshold to use is a crucial but controversial step in determining whether a new technology is cost-effective.

The cost-effectiveness ‘threshold’

In determining the threshold, it is important to distinguish between “demand-side” and “supply-side” approaches.[22] Most studies have adopted a demand-side approach, estimating the value individuals assign to health as a means for estimating society’s “willingness-to-pay” for a QALY.[23,24] Supply-side approaches instead consider the impact upon aggregate utility (i.e., population QALYs) associated with marginal changes in health care expenditure, in order to estimate the ‘shadow price’ of the health budget.[25]

Which approach to determining the threshold is appropriate depends upon whether the health budget is constrained.[26] If the health budget is constrained then a supply-side approach should be used.[27] Since the focus of this work is upon health care resource allocation within health care systems subject to constrained budgets, we will adopt a supply-side approach for the remainder of this thesis.

Under the supply-side approach, the threshold is conventionally assumed to represent the ICER of the health care services or technologies displaced if the technology is funded, given the constrained budget.[28] This is very difficult to estimate in practice. The most notable example of a supply-side approach to threshold estimation is the recent UK work by Claxton and colleagues.[27] Appleby and colleagues and Schaffer and colleagues have also conducted empirical research in the UK.[29,30] No comparable empirical research has yet been conducted in any other country. In Canada, an arbitrary threshold of $50,000 per QALY is often cited in the literature, although some have argued for a range between $20,000 and $100,000 per QALY.[31] However, neither this range, nor the often cited $50,000 per QALY, is based upon an empirical estimate of the supply-side threshold.[32]

Social value considerations

Alongside this ongoing research into the cost-effectiveness threshold, there has been growing interest from both policy makers and academics regarding the appropriate role of social values and ethics in the methods and processes of HTA.[33]

DeJean and colleagues note that many of the considerations taking into account in HTA, such as "efficacy, effectiveness, safety and efficiency", are "inherently ethical".[33] Nevertheless, after reviewing the Canadian literature, they argue that most HTAs currently conducted are lacking in "genuine ethical inquiry".

In 2002, NICE established a "Citizens Council", whose purpose is to provide NICE with "a public perspective on overarching moral and ethical issues that NICE has to take account of when producing guidance".[34] The council has produced a number of reports, considering a range of topics including the merit of paying premium prices for orphan drugs, whether preference should be given to saving the lives of people in imminent danger of dying, and the extent to which a patient's age, or the severity of their disease, should be taken into account in NICE's guidance regarding the funding of new technologies.[35–38]

Economics and equity

An important social value consideration identified by NICE's Citizens Council is ensuring "equity" in the allocation of health care resources.[39] Equity is also a key social value in other health care systems, including the provincial and territorial health care systems in Canada.[10,40]

Economists consider equity in two dimensions: horizontal and vertical.[41] Horizontal equity requires similar treatment of individuals with similar characteristics of ethical relevance. Vertical equity permits differential treatment of individuals with different characteristics of ethical relevance. Horizontal and vertical equity were originally considered by Musgrave in his pioneering research on optimal taxation.[42] In this context, horizontal equity requires that individuals with similar incomes be taxed at a similar rate, while vertical equity allows for different tax rates for individuals with different incomes. A particular vertical equity position would be to impose higher tax rates on individuals with higher incomes, resulting in a 'progressive' taxation system, although this is not the only vertical equity position that may be adopted. While vertical equity permits an individual with a high income to be taxed at a different rate than a second individual with a low income, horizontal equity requires that the first individual be taxed at the same rate as a third individual with an equally high income.

Culyer has applied the concepts of horizontal and vertical equity to the allocation of health care resources.[43,44] When considering a reallocation of resources within a budget constrained health care system, maintaining horizontal equity requires that similar consideration be given to all affected individuals with similar characteristics. This requires giving similar consideration to those individuals who stand to benefit (e.g., patients who will use a new health technology if it is adopted) as is given to individuals with similar characteristics who will lose out (e.g., other patients whose health care will be affected by funding the new technology). Vertical equity allows for differential consideration to be given to individuals with different characteristics of ethical relevance. This might involve applying a greater value to health gains for individuals who are more socio-economically marginalized, or who are in a more severe initial state of health, to give just two examples.

Theoretical perspective

An important consideration when discussing the role of social values in the economic evaluation of health technologies – or in the evaluation of other reallocations of health care resources – is the theoretical perspective taken.[45,46] Three alternative perspectives have been debated within the health economics literature: these may be summarized as 'welfarism', 'extra-welfarism', and 'social decision making'.

Welfarism

A welfarist perspective assumes that individuals rationally maximize their 'utility' by ordering the options available to them and acting according to their preferences.[47,48] Individuals are regarded as the *only* judges of what contributes to their utility. The desirability of alternative allocations of health care resources is determined by their impact upon 'social welfare', and the purpose of policy making is assumed to be to improve social welfare. Social welfare is judged to be nothing more than an aggregation of these individual utilities, as defined by a specific 'social welfare function'. This notion of social welfare is restrictive: it cannot take account of outcomes other than 'utilities', and it does not permit the use of sources of valuation other than the individuals affected by the policy decision.

Extra-welfarism

Over recent decades, these limitations with the welfarist perspective have resulted in the rise of the 'extra-welfarist' perspective, in which non-utility information such as the 'quality' of individuals' utilities, equity weights, and individuals' characteristics and 'capabilities' are considered alongside individual utilities.[26,46,47,49–51] The extra-welfarist perspective otherwise retains many features of the welfarist perspective, with the purpose of policy making still assumed to be to improve social welfare, as defined by a social welfare function. The key difference is that this social welfare function is not restricted to the consideration of individual utilities only.

Social decision making

Under a welfarist or extra-welfarist perspective, the desirability of alternative allocations of health care resources requires expression of an explicit and complete social welfare function: a ranking over all conceivable social states. This allows judgements to be made about whether a reallocation of resources (such as the adoption of a new technology) improves 'social welfare'.

Under either perspective, some individual or other entity must take responsibility for specifying the social welfare function.

In a comparison of the welfarist and extra-welfarist perspectives, Birch and Donaldson raised concerns about how the social welfare function is specified under an extra-welfarist perspective, arguing that "the extent to which non-health consequences or opportunity costs are 'considered' in an [extra-welfarist] approach would seem to be determined by the extent to which the [extra-welfarist] analyst, not the individuals, consider them to be important".[50] Nevertheless, as Arrow and Sen have noted, it may not be possible to aggregate individual preferences in a way that satisfies basic democratic values, including non-dictatorship and a respect for 'minimal liberty'.[52,53] It follows that it may not be possible to specify a socially and politically legitimate social welfare function under *either* the welfarist or extra-welfarist perspectives. In both cases the social welfare function may need to be *imposed*, whether by the 'extra-welfarist analyst' or by another individual, and the social and political legitimacy of this is not apparent in either case.

The 'social decision making' perspective reflects a response to these difficulties.[54] Under this perspective, decision makers are seen as 'agents' of a socially and politically legitimate 'higher authority', such as a democratically elected parliament. This 'higher authority' does *not* specify an explicit social welfare function, but nevertheless allocates resources among different sectors (health, education, transport, etc.) and grants each 'agent' the responsibility to pursue a specific and explicit objective, subject to a budget constraint. The objective delegated to a health care decision maker might be to maximize the present value of population health, measured using QALYs, subject to the budget for health allocated by parliament. Alternatively, the higher authority might delegate a different objective to the agent, such as an objective in which QALYs are weighted or which accounts for considerations other than QALYs. In any case, the social and political legitimacy of the preferred objective rests upon the presumed legitimacy of the higher authority. The budgets it allocates and the objectives it delegates to its agents are assumed to represent a partial expression of some unknown, latent social welfare function.[25,26,45]

Since the higher authority is assumed to be legitimate, the shadow prices of the budgets it allocates are judged to have not only positive meaning (reflecting the opportunity cost of marginal activities falling within that budget) but also normative meaning.[55] For example, the shadow price of the health care budget is assumed to represent a legitimate expression of society's marginal willingness-to-pay for improvements in population health through the activities of the public health care system, while the allocation of health budgets over time is assumed to reflect society's rate of time preference for health.[25,26]

"Health maximization"

A commonly assumed objective under an 'extra-welfarist' or 'social decision making' perspective is maximization of the present value of the time stream of QALYs across the population of interest.[26,56] This objective has been described as "health maximization" and criticized by authors such as Coast.[57]

It is worth noting that QALYs are not a direct measure of health, *per se*, and so "QALY maximization" is not the same as "health maximization". QALYs reflect the preferences of the individuals sampled in the relevant scoring algorithm (typically a representative sample of the public) regarding the relative value of alternative 'health states'. If QALYs are calculated using an EQ-5D algorithm with an N3 term, which provides a weight for the added disutility of severe ill health on one or more dimensions, then the use of QALYs may give greater priority to *health* improvements for patients in more severe health states.[58] This is because an improvement in their health, maintained over a given length of time, may result in a greater increase in QALYs than would be provided by a similar improvement in health, maintained over a similar length of time, for someone in a less severe initial health state. Furthermore, the commonly assumed objective is not "QALY maximization", but rather maximization of the *present value* of the time stream of QALYs, where future QALYs are discounted to reflect society's time preferences.[59]

This commonly assumed objective therefore reflects a number of potentially relevant social values, including a preference for health improvement, for prioritizing health gains among patients in more severe initial health states, and for prioritizing QALY gains among the current generation of patients. It is therefore not correct to describe this approach as "health maximization". Nevertheless, decision makers may wish to reflect these social values to a greater or lesser extent, and may wish to take into account additional social value considerations that are not incorporated when estimating the present value of QALYs. An alternative objective may therefore be considered more appropriate.

Perspective adopted in this thesis

Although there is no consensus in the academic literature on the appropriate theoretical perspective to adopt, economic evaluations conducted for decision makers typically adopt a 'social decision making' perspective, since they follow reference case guidelines published by the decision maker that prescribe the objective that is adopted, with no explicit consideration of a social welfare function.

Given its widespread use in current practice, and the difficulties in specifying a social welfare function that carries social and political legitimacy, we adopt a 'social decision making' perspective for the work presented in this thesis. Since this perspective allows for *any* objective to be delegated from the higher authority to the agent, we will *not* assume that this objective is necessarily to maximize the present value of the time stream of QALYs. Our findings will be generalizable to other objectives that might be delegated to the agent by the higher authority.

Outline of the thesis

Given the context outlined above, economic evaluations of health technologies currently face a number of complex, and interrelated, challenges.

There is no consensus on the objective that health care decision makers ought to seek to satisfy. This objective, once determined, implies the decision maker's vertical equity position. For example, if the objective is to "maximize population health", then this implies a vertical equity position in which individuals who are socio-economically marginalized should *not* be treated differently than individuals of different socio-economic status who are similar in all other ethically relevant respects. Alternatively, if the objective is to "maximize the *value* of population health", where this value incorporates consideration of the socio-economic status of individuals, then the implied vertical equity position is that socio-economically marginalized individuals *should* be treated differently to otherwise similar individuals. In the absence of a consensus on the objective, it follows that there is no consensus on the vertical equity position that should be adopted in economic evaluations of health technologies.

Regardless of the objective adopted, horizontal equity requires similar treatment of individuals with similar characteristics of ethical relevance. Nevertheless, the considerations necessary to maintain horizontal equity depend upon the decision maker's objective, and hence the implied vertical equity position. This raises a further challenge: ensuring that every recommendation to adopt new technologies respects the principles of horizontal and vertical equity.

If the decision maker seeks to maximize some measure of 'benefit' across the population (e.g. discounted QALYs), where differential weights are *not* applied to benefits experienced by individuals with different characteristics, then all that is required to maintain horizontal and vertical equity is estimation of the incremental benefit gained by the beneficiaries and the incremental benefit forgone by the bearers of opportunity cost, with equal consideration then given to each. The incremental benefit gained by the beneficiaries is accounted for in the denominator of the ICER of the new technology. In order to give equal consideration to the incremental benefit forgone by the bearers of opportunity cost, this ICER is compared to a threshold that is conventionally assumed to reflect the ICER of the marginal health technology displaced in order to fund the new technology.[46,55,60] Where this threshold is set appropriately, the new technology is considered cost-effective only if the incremental benefit gained by the beneficiaries exceeds the incremental benefit forgone by the bearers of opportunity cost. This is the only decision rule that satisfies this particular objective. Given this objective, it is also the only decision rule that respects horizontal equity and vertical equity – if the incremental benefit forgone by the bearers of the opportunity cost exceeds that gained by the beneficiaries, then the new technology can only be considered cost-effective if differential weights are applied to some benefits but not to others, which violates the decision maker's vertical equity position. Under this objective, it follows that estimation of a threshold that reflects the incremental benefit forgone by the bearers of the opportunity cost is a necessary requirement if the decision maker wishes to respect the principles of horizontal and vertical equity.

Chapter 1

In Chapter 1, we consider the determinants of the optimal threshold for the decision maker to adopt when the objective described above is adopted (i.e., the decision maker seeks to maximize some measure of benefit across the population).

The standard theoretical model of the threshold under this objective makes a number of assumptions, including that health technologies are divisible and exhibit constant returns to scale, and that the budget impact of new technologies is marginal.[21] The most common representation of the threshold is as a single value, represented by linear function cutting through the origin of the cost-effectiveness (CE) plane.[12,61,62] It follows that the same threshold is used to assess new technologies that are 'net investments' (imposing costs upon the health system) and those that are 'net disinvestments' (releasing resources within the health system).

Using a simulation model of a hypothetical health care system, we reconsider whether this conventional representation of the threshold is appropriate. We then consider how the characteristics of the threshold may be expected to change when these assumptions are relaxed.

Research questions

1. Is the conventional exposition of the cost-effectiveness threshold consistent with the assumptions underlying the standard theoretical model?
2. What are the implications for the specification of the optimal cost-effectiveness threshold of relaxing the assumptions of divisibility of technologies and constant returns to scale in the standard model?
3. Should the same cost-effectiveness threshold be used to consider 'net investments' and 'net disinvestments'? If not, under what conditions might these differ?

Chapter 2

In Chapter 2, we build upon our work in Chapter 1 by relaxing two further assumptions of the standard model of the threshold: that there is a single decision maker, and that this decision maker has perfect information. Our revised model allows for consideration of the specification of the optimal threshold when there are multiple decision makers operating within a single health care system, each with potentially different levels of imperfect information.

Following the recent work by Eckermann and Perkarsky, we also consider the specification of the optimal threshold under various alternative assumptions regarding the authority of the decision making 'agent' to propose a net investment or net disinvestment of resources among initial technologies as an *alternative* to adopting a new technology, and/or to mandate reallocation following adoption of the new technology and/or implementation of the proposed alternative.[63–65]

Research questions

4. What are the implications for the specification of the optimal cost-effectiveness threshold of considering multiple decision makers with imperfect information?
5. Does the optimal threshold depend upon the authority of the decision making 'agent'?

Chapter 3

In Chapter 3, we consider the possibility that the decision maker may adopt an alternative objective to that considered in Chapters 1 and 2. Specifically, we assume that the decision maker may wish to apply *differential* weights to benefits experienced by individuals with different characteristics.

Our focus in this chapter is on the assessment of orphan drugs for potential reimbursement by health care systems. Orphan drugs frequently fail to appear cost-effective when compared to a conventional cost-effectiveness threshold.[66] In response, some authors have pointed to characteristics shared by patients with rare diseases, or other value-arguments, that they argue provide justification for their funding.[67,68] The assessment of orphan drugs therefore provides an ideal opportunity to consider some general principles that underlie health care resource allocation if the decision maker adopts an alternative objective to that considered in Chapters 1 and 2.

Our work comprises four parts: first, we scope the social value arguments that have been made relating to the reimbursement of orphan drugs; second, we identify a number of candidate decision factors, stakeholder preferences, value propositions and institutional structures that a decision maker *may* wish to consider when making assessments of orphan drugs; next, we categorize the identified candidate decision factors in a way that is meaningful for decision makers; finally, we develop a framework to aid decision makers in taking these social value arguments into account whilst also considering the opportunity cost of funding orphan drugs, helping to ensure that decisions to fund orphan drugs respect the principles of horizontal and vertical equity.

Research questions

6. What are the social value arguments that have been advanced in the literature relating to the reimbursement of orphan drugs?
7. Can these social value arguments be categorized and synthesized into a coherent decision making framework?

Chapter 4

In Chapter 4, we critique a series of amendments that NICE has recently made, or has proposed to make, to its methods for the economic evaluation of health technologies. This includes NICE's 'end-of-life' and 'selective discounting' guidance, and its proposals for 'value-based pricing'. Each of these amendments and proposals has the effect of modifying the objective, and hence the vertical equity position, adopted in economic evaluations conducted for NICE.

In common with Chapter 3 – where we focus on orphan drugs as a means for exploring some *general* principles that might underlie health care resource allocation – in this chapter we focus upon NICE because it provides for an ideal exemplar of the *general* issues faced by comparable decision makers in their attempts to reflect alternative vertical equity positions in their methods for economic evaluation of health technologies. We consider NICE to be an ideal exemplar because it is relatively transparent in its processes, and it has attempted to incorporate an alternative objective through *explicit* modifications to its methods for the economic evaluation of health technologies.

Consistent with a social decision making perspective, we do not critique this modified objective, and the implied vertical equity position, *per se*. Rather, we demonstrate how NICE's failure to consider opportunity cost in each amendment it has implemented or proposed raises the potential for NICE's objective not to be satisfied, and for the implied vertical equity position not to be realized. We conclude by offering suggestions for how NICE – and comparable decision makers facing similar issues – may resolve these problems in future.

Research questions

8. Are there any inconsistencies in the consideration of social values within NICE's existing methods for the economic evaluation of health technologies?
9. Are there any inconsistencies in the consideration of social values within NICE's proposals for 'value-based pricing', made available for public consultation in 2014?
10. What steps can NICE, as an exemplar decision maker, take to resolve any identified inconsistencies in its consideration of social values?

Bibliography for Preface and Introduction

1. Paulden M, Stafinski T, Menon D, McCabe C. Value-based reimbursement decisions for orphan drugs: a scoping review and decision framework. *Pharmacoeconomics*. 2015;33(3):255–69. doi:10.1007/s40273-014-0235-x.

2. Paulden M, O'Mahony JF, Culyer AJ, McCabe C. Some inconsistencies in NICE's consideration of social values. *Pharmacoeconomics*. 2014;32(11):1043–53. doi:10.1007/s40273-014-0204-4.

3. Hill S, Olson L. NICE, Social Values, and Balancing Objectivity and Equity. *PharmacoEconomics*. 2014;32(11):1039–1041. doi:10.1007/s40273-014-0220-4.

4. Paulden M, O'Mahony JF, Culyer AJ, McCabe C. Objectivity and equity: clarity required. A response to Hill and Olson. *PharmacoEconomics*. 2014;32(12):1249–50. doi:10.1007/s40273-014-0239-6.

5. Boyle T. Budget will see tough decisions in health care. *Toronto Star*. April 4, 2015.

6. Galloway G. Health spending won't meet needs of aging Canadians, report warns. *The Globe and Mail*. July 2, 2015.

7. Wilton S. Long Canadian wait times send patients south for surgery. *Calgary Herald*. April 4, 2014.

8. Health Council of Canada. *Where you live matters: Canadian views on health care quality*. Health Council of Canada; 2014.

9. Palmer S, Raftery J. Economic Notes: opportunity cost. *BMJ*. 1999;318(7197):1551–2.

10. Parliament of Canada. *Canada Health Act*.; 1985.

11. O'Donnell J, Pham S, Pashos C, Miller D, Smith M. Health Technology Assessment: Lessons Learned from Around the World—An Overview. *Value Health*. 2009;12(s2):S1–S5. doi:10.1111/j.1524-4733.2009.00550.x.

12. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. *Methods for the economic evaluation of health care programmes*. 4th ed. Oxford University Press; 2015.

13. World Health Organization. *2015 Global Survey on Health Technology Assessment by National Authorities*. Geneva: World Health Organization; 2015.

14. National Institute for Health and Care Excellence. *Guide to the methods of technology appraisal 2013*.; 2013.

15. Canadian Agency for Drugs and Technologies in Health. *Guidelines for the Economic Evaluation of Health Technologies: Canada*.; 2006.

16. Stephens JM, H B, D JA. International survey of methods used in health technology assessment (HTA): does practice meet the principles proposed for good research? *Comparative Effectiveness Research*. 2012;(2):29–44.

17. Mathes T, Jacobs E, Morfeld J-C, Pieper D. Methods of international health technology assessment agencies for economic evaluations- a comparative analysis. *Bmc Health Serv Res*. 2013;13(1):1–10. doi:10.1186/1472-6963-13-371.

18. Pliskin J, Shepard D, Weinstein M. Utility Functions for Life Years and Health Status. *Oper Res*. 1980;28(1):206–224. doi:10.1287/opre.28.1.206.

19. Black RC. “utility”. The New Palgrave Dictionary of Economics. 2008.

20. Hicks JR, Allen RG. A Reconsideration of the Theory of Value. Part I. *Economica*. 1934;1(1):52–76.

21. Weinstein M, Zeckhauser R. Critical ratios and efficient allocation. *J Public Econ*. 1973;2(2):147–157. doi:10.1016/0047-2727(73)90002-9.

22. Centre for Health Economics. *iDSI Workshop on Cost-Effectiveness Thresholds: Conceptualisation and Estimation*. University of York; 2015.

23. Gyrd-Hansen D. Willingness to pay for a QALY: theoretical and methodological issues. *Pharmacoeconomics*. 2005;23(5):423–32.

24. Dolan P, Shaw R, Tsuchiya A, Williams A. QALY maximisation and people’s preferences: a methodological review of the literature. *Health Econ*. 2005;14(2):197–208. doi:10.1002/hec.924.

25. Paulden M, Claxton K. Budget allocation and the revealed social rate of time preference for health. *Health Econ*. 2012;21(5):612–8. doi:10.1002/hec.1730.

26. Claxton K, Paulden M, Gravelle H, Brouwer W, Culyer AJ. Discounting and decision making in the economic evaluation of health-care technologies. *Health Economics*. 2011;20(1):2–15. doi:10.1002/hec.1612.

27. Claxton K, Martin S, Soares M, et al. Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. *Health Technology Assessment*. 2015;19(14):1–503, v–vi. doi:10.3310/hta19140.

28. Gafni A, Birch S. Incremental cost-effectiveness ratios (ICERs): The silence of the lambda. *Soc Sci Med*. 2006;62(9):2091–2100. doi:10.1016/j.socscimed.2005.10.023.

29. Appleby J, Devlin N, Parkin D, Buxton M, Chalkidou K. Searching for cost effectiveness thresholds in the NHS. *Health Policy*. 2009;91(3):239–45. doi:10.1016/j.healthpol.2008.12.010.

30. Schaffer S, Sussex J, Devlin N, Walker A. Local health care expenditure plans and their opportunity costs. *Health Policy*. 2015;119(9):1237–1244. doi:10.1016/j.healthpol.2015.07.007.

31. Laupacis A, Feeny D, Detsky AS, Tugwell PX. How attractive does a new technology have to be to warrant adoption and utilization? Tentative guidelines for using clinical and economic evaluations. *CMAJ*. 1992;146(4):473–81. Available at: http://europepmc.org/abstract/MED/1306034.

32. Neumann P, Cohen J, Weinstein M. Updating Cost-Effectiveness — The Curious Resilience of the $50,000-per-QALY Threshold. *New Engl J Medicine*. 2014;371(9):796–797. doi:10.1056/NEJMp1405158.

33. DeJean D, Giacomini M, Schwartz L, Miller FA. Ethics in Canadian health technology assessment: a descriptive review. *Int J Technol Assess Health Care*. 2009;25(4):463–9. doi:10.1017/S0266462309990390.

34. National Institute for Health and Care Excellence. Citizens Council. 2016.

35. Citizens Council. *Should NICE and its advisory bodies take into account the severity of a disease when making decisions?* National Institute for Health and Care Excellence; 2008.

36. Citizens Council. *Are there circumstances in which the age of a person should be taken into account when NICE is making a decision about how treatments should be used in the NHS?* National Institute for Health and Care Excellence; 2002.

37. Citizens Council. *NICE's Citizens Council were asked to advise on whether or not the NHS should be prepared to pay premium prices for drugs to treat patients with very rare diseases.* . National Institute for Health and Care Excellence; 2004.

38. Citizens Council. *Is there a preference to save the life of people in imminent danger of dying?* National Institute for Health and Care Excellence; 2006.

39. Citizens Council. *What are the societal values that need to be considered when making decisions about trade-offs between equity and efficiency?* National Institute for Health and Care Excellence; 2014.

40. Miller F, Krahn M, Brooker A. Improving the Appraisal of Non-Drug Technologies: Revising the Ontario Decision Framework. Presentation at the 2015 CADTH Symposium. 2015.
41. Duclos. Horizontal and Vertical Equity. The New Palgrave Dictionary of Economics. In: 2nd Edition, 2012 Version. Palgrave Macmillan; 2016.
42. Musgrave A, Musgrave PB. *Public Finance in Theory and Practice*. New York: McGraw-Hill; 1976.
43. Culyer AJ. Need: The idea won't do—But we still need it. *Soc Sci Med*. 1995;40(6):727–730. doi:10.1016/0277-9536(94)00307-F.
44. Culyer A. Equity - some theory and its policy implications. *J Med Ethics*. 2001;27(4):275–283. doi:10.1136/jme.27.4.275.
45. Claxton K, Walker S, Palmer S, Sculpher M. *Appropriate Perspectives for Health Care Decisions*. York, UK: University of York
46. Sculpher M, Claxton K. Real economics needs to reflect real decisions: a response to Johnson. *PharmacoEconomics*. 2012;30(2):133–6. doi:10.2165/11596660-000000000-00000.
47. Brouwer W, Culyer A, Exel J van, Rutten F. Welfarism vs. extra-welfarism. *J Health Econ*. 2008;27(2):325–338. doi:10.1016/j.jhealeco.2007.07.003.
48. Brouwer WB, Koopmanschap MA. On the economic foundations of CEA. Ladies and gentlemen, take your positions! *J Health Econ*. 2000;19(4):439–59.
49. Coast J, Smith R, Lorgelly P. Welfarism, extra-welfarism and capability: The spread of ideas in health economics. *Soc Sci Med*. 2008;67(7):1190–1198. doi:10.1016/j.socscimed.2008.06.027.
50. Birch S, Donaldson C. Valuing the benefits and costs of health care programmes: where's the "extra" in extra-welfarism? *Soc Sci Med*. 2003;56(5):1121–1133. doi:10.1016/S0277-9536(02)00101-6.
51. Buchanan J, Wordsworth S. Welfarism Versus Extra-Welfarism: Can the Choice of Economic Evaluation Approach Impact on the Adoption Decisions Recommended by Economic Evaluation Studies? *Pharmacoeconomics*. 2015;33(6):571–579. doi:10.1007/s40273-015-0261-3.
52. Arrow KJ. A Difficulty in the Concept of Social Welfare. *Journal of Political Economy*. 1950;58(4):328–346. doi:10.1086/256963.

53. Sen A. The Impossibility of a Paretian Liberal. *J Polit Econ*. 1970;78(1):152–157. doi:10.1086/259614.

54. Sugden R, Williams A. *The Principles of Practical Cost-Benefit Analysis*. Oxford University Press; 1978.

55. Culyer A, McCabe C, Briggs A, et al. Searching for a threshold, not setting one: the role of the National Institute for Health and Clinical Excellence. *Journal of health services research & policy*. 2007;12(1):56–8. doi:10.1258/135581907779497567.

56. Shah, Praet, Devlin, Sussex, Appleby, Parkin. Is the aim of the English health care system to maximize QALYs? *Journal of Health Services Research & Policy*. 2012;17(3):157–163. doi:10.1258/jhsrp.2012.011098.

57. Coast J. Maximisation in extra-welfarism: A critique of the current position in health economics. *Soc Sci Med*. 2009;69(5):786–792. doi:10.1016/j.socscimed.2009.06.026.

58. Dolan P. Modeling valuations for EuroQol health states. *Med Care*. 1997;35(11):1095–108.

59. Paulden M. Time Preference and Discounting. Encyclopedia of Health Economics. In: Elsevier; 2014:395–403. doi:10.1016/B978-0-12-375678-7.00506-X.

60. McCabe C, Claxton K, Culyer A. The NICE Cost-Effectiveness Threshold: What it is and What that Means. *PharmacoEconomics*. 2008;26(9):733–744. doi:10.2165/00019053-200826090-00004.

61. Gold MR, Siegel JE, Russell LB, Weinstein MC. *Cost-effectiveness in health and medicine*. New York: Oxford University Press; 1996.

62. Edlin R, McCabe C, Hulme C, Hall P, Wright J. *Cost E_ffectiveness Modelling for Health Technology Assessment: A Practical Course*. Springer; 2015.

63. Eckermann S, Pekarsky B. Can the Real Opportunity Cost Stand Up: Displaced Services, the Straw Man Outside the Room. *PharmacoEconomics*. 2014. doi:10.1007/s40273-014-0140-3.

64. Paulden M, McCabe C, Karnon J. Achieving allocative efficiency in healthcare: nice in theory, not so NICE in Practice? *Pharmacoeconomics*. 2014;32(4):315–8. doi:10.1007/s40273-014-0146-x.

65. Eckermann S. Kinky Thresholds Revisited: Opportunity Costs Differ in the NE and SW Quadrants. *Appl Heal Econ Heal Policy*. 2015;13(1):7–13. doi:10.1007/s40258-014-0136-3.

66. McCabe C, Claxton K, Tsuchiya A. Orphan drugs and the NHS: should we value rarity. *BMJ*. 2005;331(7523):1016–9.

67. Pinxten W, Denier Y, Dooms M, Cassiman J-JJ, Dierickx K. A fair share for the orphans: ethical guidelines for a fair distribution of resources within the bounds of the 10-year-old European Orphan Drug Regulation. *J Med Ethics*. 2012;38(3):148–53. doi:10.1136/medethics-2011-100094.

68. Clarke J. Is the current approach to reviewing new drugs condemning the victims of rare diseases to death? A call for a national orphan drug review policy. *Can Med Assoc J*. 2006;174(2):189–190. doi:10.1503/cmaj.050706.

Chapter 1: An exploration of the impact of non-divisibility, diminishing marginal returns to scale and non-marginal budget impact on the cost-effectiveness threshold using a simulation modelling approach

Mike Paulden[1] and Christopher McCabe[1]

[1] Department of Emergency Medicine, University of Alberta, Edmonton, AB, Canada

Acknowledgements

Financial support for this study was provided by grants from the Canadian Institutes of Health Research (CIHR), Genome Canada and Alberta Innovates Health Solutions and the University of Alberta. Christopher McCabe's research programme is funded by the Capital Health Research Chair in Emergency Medicine Research Endowment at the University of Alberta. The funding agreement ensured the authors' independence in designing the study, interpreting the data, writing, and publishing the report.

Abstract

Background

The optimal cost-effectiveness threshold to use when considering new health technologies for adoption into a budget-constrained health care system has been subject to much debate. In the standard model, technologies are assumed to be divisible and exhibit constant returns to scale. The threshold is plotted as a linear function through the origin of the cost-effectiveness (CE) plane, implying that the same threshold should be used for both net investments and net disinvestments, regardless of their budget impact.

Objectives

We consider the implications of departures from the assumptions underlying the standard model. In this chapter, we focus upon the possibility of *diminishing* marginal returns to scale or *non-divisibility* of technologies. We also consider if the optimal threshold is dependent upon a new technology's *budget impact* and whether the new technology constitutes a *net investment* or *net disinvestment*.

Methods

We conducted simulations using a *de novo* model of a hypothetical health care system to assess the impact of different combinations of assumptions upon the optimal threshold. The model comprises three stages: allocation of an initial budget among a pool of initial technologies, consideration of a new technology, and reallocation of resources among initial technologies if the new technology is adopted. The optimal threshold ensures that new technologies are adopted only if the net incremental benefit of adoption and reallocation is positive. Three scenarios were considered: divisible technologies exhibiting constant returns; divisible technologies exhibiting diminishing returns; and non-divisible technologies. For each scenario we estimated the optimal thresholds for net investments and net disinvestments at a range of possible budget impacts. We repeated each scenario using three different initial budgets.

Results

The standard exposition of the threshold holds under the following conditions: (a) initial technologies are divisible and exhibit constant returns to scale; (b) a single initial technology remains partially adopted following initial allocation; and (c) the budget impact of each new technology is sufficiently small that reallocation involves expanding or contracting only the partially adopted initial technology. In all other cases, the numerical threshold depends upon

whether the new technology is a net investment or net disinvestment and the magnitude of the budget impact, such that the threshold curves are non-linear. These threshold curves are piecewise linear functions under divisibility and constant returns, concave functions under divisibility and diminishing returns, or step functions under non-divisibility.

Conclusion

The standard exposition of the threshold, as a single value represented by a linear function that passes through the origin of the CE plane, is a special case that holds only under specific conditions. Under other conditions, threshold curves take a different functional form that reduces the scope for new technologies to appear cost-effective.

Introduction

The optimal cost-effectiveness threshold to use when considering new health technologies for adoption into a budget-constrained health care system has been subject to much debate.[55,69–72]

A recent systematic review and workshop identified two alternative conceptual approaches to determining this threshold, with the appropriateness of each dependent upon the context.[22,27] According to this literature, a 'demand-side' estimate of society's willingness-to-pay for health is appropriate if the health system budget is unconstrained.[26] If the budget is constrained, adopting a new technology has implications for the funding of other health technologies, so a 'supply-side' estimate of the threshold is more appropriate.[72]

A conventional exposition of the supply-side approach assumes that adopting a new technology will displace some other technology or health care service.[21] The threshold is assumed to represent the incremental cost-effectiveness ratio (ICER) of this displaced technology – that is, the incremental costs that the displaced technology previously imposed upon the health system, divided by the incremental benefits that were provided by the displaced technology.[28]

The 'standard model'

We refer to this conventional exposition of the supply-side threshold as the 'standard model'. The standard model incorporates some important assumptions:

1. There is a single decision maker, assumed to have a single objective. This objective is typically assumed to be the maximization of some unit of 'benefit', such as the present value of the quality-adjusted life years (QALYs) aggregated over the population of interest.[26,73] It is this unit of benefit that is considered in the denominator of both the threshold and the ICER of each new technology considered for adoption. For example, if QALYs are the preferred unit of benefit, then both the ICER for the technology and the threshold will be expressed in terms of "dollars per QALY" (or the corresponding local currency). If the objective is instead to maximize an alternative unit of benefit, then both the ICER and the threshold will be expressed in terms of "dollars per [unit of benefit]". For the remainder of this chapter, it will be assumed that QALYs are the preferred unit of benefit, although this has no substantive implications for our findings.
2. Technologies are assumed to have constant returns to scale, such that the ICER of each technology is independent of its budget impact.[21] For example, a technology with an

ICER of $50,000 per QALY is assumed to provide an additional incremental QALY for every additional $50,000 of incremental expenditure, regardless of the existing level of incremental expenditure on the technology – that is, the first $50,000 spent on the technology provides the same incremental benefit as the last $50,000.

3. Technologies are assumed to be divisible.[21] This means that technologies might be funded only 'partially', providing a smaller incremental benefit at a smaller incremental cost than if the technology is funded for all relevant patients. This is critical to the concept of 'extended dominance', by which a technology is considered to be dominated by a combination of two partially-funded technologies. New technologies may therefore be funded through the partial, rather than complete, displacement of another technology.

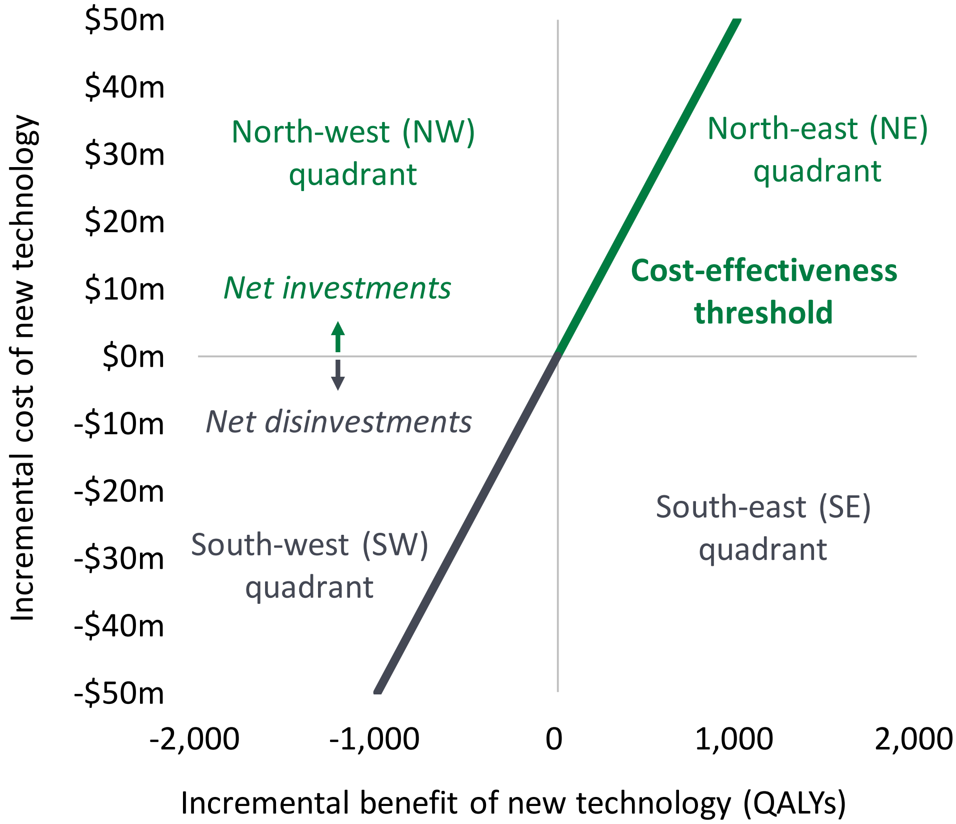
The conventional assumption that the threshold represents the ICER of the displaced technology implies that new technologies generally impose *positive* incremental costs upon the health system – that is, they lie in the northern half of the cost-effectiveness (CE) plane. We will hereafter refer to such technologies as "net investments".

Nevertheless, graphical representations of the standard model typically plot the threshold as a linear function cutting through the origin of the CE plane and passing through both the north-east (NE) and south-west (SW) quadrants (Figure 1.1).[12,61,62] This raises the issue of what threshold should be used when new technologies impose *negative* incremental costs, and hence lie in the southern half of the CE plane. We will refer to such technologies as "net disinvestments".

Adopting a net disinvestment requires no 'displacement' – rather, it *releases* resources, allowing incremental expenditure on other technologies to be increased. Within the standard model, the threshold for technologies in the southern half of the CE plane therefore reflects the ICER of the technology provided with *additional* funding, rather than the ICER of the technology displaced.

Since the standard model plots the threshold as a linear function through the origin of the CE plane, there is an implicit assumption that the ICER of the technology displaced when funding a net investment (in the northern half of the CE plane) is equivalent to the ICER of the technology provided with additional funding when adopting a net disinvestment (in the southern half of the CE plane), implying that the *same* threshold should be used in all circumstances.

Figure 1.1: A conventional exposition of the cost-effectiveness threshold



Criticisms of the standard model

The standard model has been subjected to criticism. Birch and Gafni have made numerous criticisms of the threshold implied by the standard model, including highlighting inefficiencies that arise when technologies are non-divisible or do not exhibit constant marginal returns to scale.[28,50,69,74–76] However, their proposed solution – to use a mathematical programming approach as an alternative to comparing ICERs to a threshold – may be difficult to implement in practice due to the substantial information required.[77,78] Nevertheless, many of their criticisms of the standard model remain valid, and their implications will be considered in this chapter.

Pekarsky and Eckermann have argued that, when the health system is technically inefficient, the threshold ought to be determined by considering not only the ICER of the technology displaced in practice, but also the ICER of the least efficient technology current adopted (i.e., the technology that *ought* to be displaced) and the ICER of the most efficient technology not yet fully adopted (i.e., the technology that *ought* to be invested in as an alternative to investing in the new technology).[63,79] Building upon the same theoretical foundations, Eckermann recently argued that different thresholds ought to be used in the northern and southern halves of the CE plane, implying a 'kink' in the threshold at the origin of the CE plane.[65] Although other authors had previously argued that the threshold ought to be 'kinked' at the origin of the CE plane, these authors did not adopt a 'supply-side' approach to the threshold, and so their findings are not applicable if the health system budget is constrained.[80,81] However, in a commentary on Pekarsky and Eckermann's findings, Paulden and colleagues noted that their theoretical model makes particular assumptions about the authority of the decision maker that might not hold in practice.[64] Specifically, it is implicitly assumed that the decision maker has the authority to implement a net investment or net disinvestment of resources among existing technologies as an *alternative* to adopting a new technology, and to implement an efficient reallocation following implementation of this alternative but *not* following adoption of a new technology. In this chapter, it will be assumed that these specific assumptions do not apply, and so Pekarsky and Eckermann's findings are not relevant – the implications for the threshold when these assumptions apply will be explored in the following chapter.

There have been various efforts, most notably by the UK's National Institute for Health and Care Excellence (NICE), to give additional weight to 'value' arguments that are considered to be inadequately reflected in the specification of QALYs.[57,82–85] However, rather than explicitly modifying its objective – which would require reconsideration of the unit of benefit used in both the technology's ICER and the threshold – NICE has instead attempted to apply 'naïve' weights to the threshold that applies under QALY maximization: since 2009, a weight has been applied to the threshold when assessing technologies that benefit patients at the 'end of life', and NICE recently considered applying additional weights, intended to reflect 'severity of illness' and 'capacity to benefit', as part of a proposed move towards 'value based pricing'.[82,84] Chapter 4 describes some issues with these attempts by NICE to amend its methods in this way.

Finally, Claxton and colleagues have proposed that different thresholds ought to be used when assessing new technologies with non-marginal budget impact.[45] This implies that the threshold should be plotted as a non-linear function on the CE plane. The use of a linear function in the standard exposition implies that the threshold is independent of the budget impact.

Purpose of our work

The purpose of our work is to rethink the assumptions underlying the standard model of the threshold and to consider the implications of departures from these assumptions.

In this chapter, we focus upon the implications for the optimal threshold of incorporating *diminishing* marginal returns to scale or *non-divisibility* of technologies into the standard model. We also consider if the optimal threshold is dependent upon a new technology's *budget impact* and whether the new technology constitutes a *net investment* or *net disinvestment*.

To support our findings, we present results from a model of a small hypothetical health care system in which we simulate the impact of various combinations of assumptions. The results of this simulation work allows us to better understand the logical connections between changes in assumptions and any resulting changes in the optimal threshold.

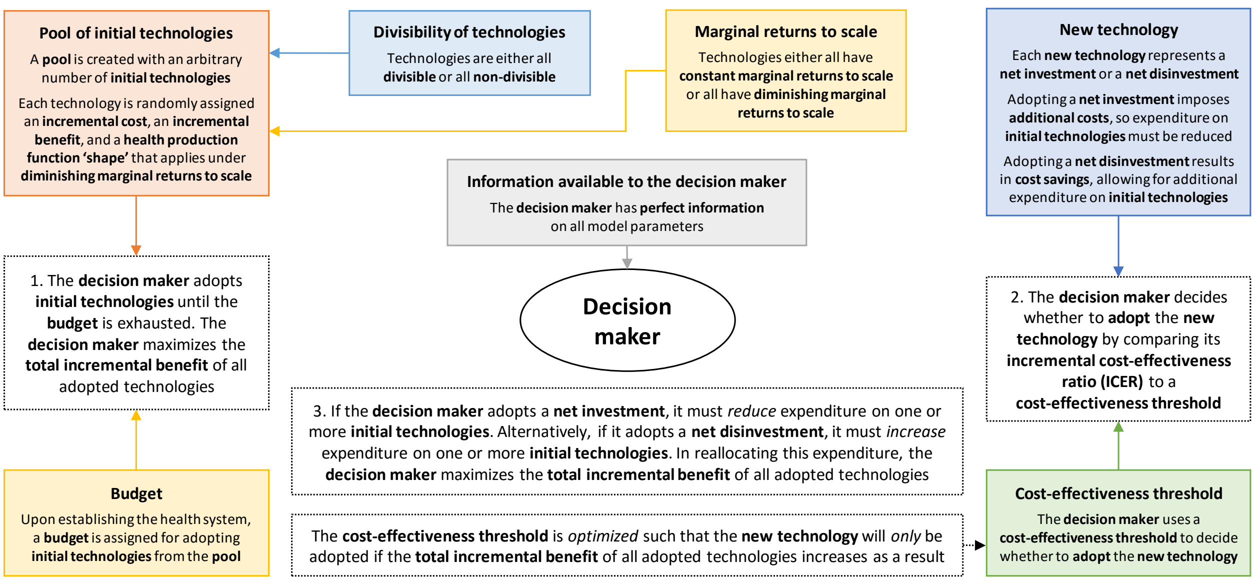
Methods

We constructed a model of a hypothetical health care system using the R programming language and conducted simulations using different combinations of assumptions to assess the impact upon the optimal cost-effectiveness threshold.[86]

Model structure

The model has three stages. A schematic is provided in Figure 1.2.

Figure 1.2: Model schematic



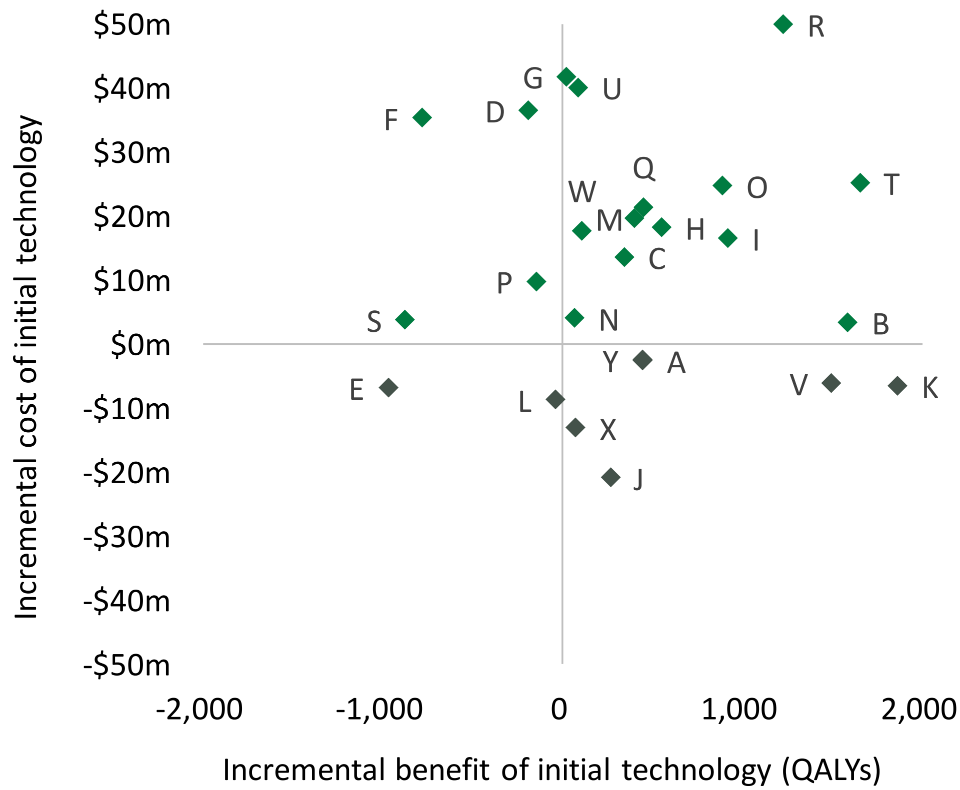
Stage 1: Initial allocation of technologies

A health care system is considered with a fixed budget. Some of this budget is committed to funding *basic health care services*, with the *remainder* available for funding discretionary health technologies; this remainder is hereafter referred to as the 'initial budget' for technologies. A 'pool' of initial technologies is available for adoption, but the initial budget is insufficient to fully fund all available technologies from this pool. In the first stage of the model, a decision maker is responsible for deciding which initial technologies to adopt into the health care system.

Each initial technology is assumed to supplement, or displace, some of the basic health care services already provided, and all technologies are assumed to be independent. The direct cost of most initial technologies in the pool is assumed to exceed the cost of any basic health care services displaced, and hence their ‘incremental cost’ is positive. The direct cost of the remaining technologies is less than the cost of the basic health care services displaced, so their incremental cost is negative. Most technologies are assumed to provide more benefit than the basic health care services they displace, so their ‘incremental benefit’ is positive. The remaining technologies provide less benefit than the basic health care services they displace, and so their incremental benefit is negative.

To generate a sample of initial technologies for our analysis, we assigned an ‘incremental cost’ and ‘incremental benefit’ to each of 25 initial technologies (labeled A to Y). These are plotted on the CE plane in Figure 1.3.

Figure 1.3: Incremental cost and incremental benefit of initial technologies in exhaustion



Note that initial technologies A and Y have similar incremental cost and incremental benefit, such that their markers partially overlap

The assigned incremental costs and incremental benefits apply when each initial technology is fully funded for all patients who can benefit (hereafter referred to as 'exhaustion'), and represent the *total* incremental costs and incremental benefit across all patients provided the technology. Incremental costs were randomly drawn from a normal distribution (mean $10m, SD $20m), subsequently rounded to the nearest $0.1m and constrained to the range -$50m to $50m. Incremental benefits were also randomly drawn from a normal distribution (mean 500 QALYs, SD 1000 QALYs), with no subsequent rounding. These standard deviations resulted in a pool of technologies distributed across all four quadrants of the CE plane in Figure 1.3.

The decision maker is assumed to adopt initial technologies from the pool until the initial budget is exhausted. In making this initial allocation, it is assumed that the decision maker attempts to maximize the total incremental benefit provided by all adopted technologies.

Stage 2: Consideration of a new technology

In the second stage of the model, the decision maker considers a new technology for potential adoption into the health care system. In common with each initial technology, is it assumed that the new technology supplements or displaces some of the *basic health care services* already provided. It follows that the incremental cost and incremental benefit of the new technology may be positive or negative, and hence the new technology may lie in any quadrant of the CE plane.

In line with the standard model, it is assumed that the decision maker decides whether to adopt the new technology by comparing its ICER to a cost-effectiveness threshold. The purpose of our work is to determine the 'optimal' threshold for the decision maker to adopt under various assumptions. The resulting 'sets' of optimal thresholds are the primary output of our analyses.

Stage 3: Reallocation of resources

If the decision maker recommends that a new technology be adopted (in 'stage 2'), this requires a reallocation of resources elsewhere within the health care system. The nature of this reallocation depends upon the region of the CE plane in which the new technology lies.

As noted earlier, we refer to a new technology with positive incremental costs (which therefore lies in the northern half of the CE plane) as a "net investment". This is because adopting such a technology requires an additional investment of resources, even after taking into account any savings that may result from the displacement of basic health care services already provided. Since the budget is constrained, adopting a new technology that constitutes a net investment requires an overall reduction in incremental expenditure on initial technologies. This may be achieved by 'contracting' one or more of the initial technologies *adopted* during the initial allocation of the budget ('stage 1') that lies in the northern half of the CE plane, and/or by 'expanding' one or more initial technologies *not exhausted* during the initial allocation that lies in the southern half of the CE plane – since initial technologies in the southern half of the CE plane have *negative* incremental costs, *expanding* the use of these technologies *releases* resources that may be used for investment in the new technology.

Conversely, we refer to a new technology with negative incremental costs (which lies in the southern half of the CE plane) as a "net disinvestment". This is because adopting such a technology releases more resources than are required to provide the technology. Note that even a technology that requires a direct up-front investment – and so would not conventionally be referred to as a "disinvestment" – may nevertheless be considered a *net disinvestment* if it results in a greater release of resources (whether downstream or from the displacement of basic health care services already provided) than are required for its adoption. Adopting a new technology that constitutes a net disinvestment allows for an *increase* in incremental expenditure on initial technologies. This may be done by expanding one or more initial technologies that lie in the northern half of the CE plane that were *not exhausted* during the initial allocation ('stage 1'), and/or by contracting one or more initial technologies that were *adopted* during the initial allocation and which lie in the southern half of the CE plane – *contracting* technologies in the southern half of the CE plane *reduces* the savings they provide, resulting in an *increase* in incremental expenditure on initial technologies.

The cost-effectiveness threshold

We assume that the objective of the decision maker is to maximize the incremental benefit of all adopted technologies. We also assume that the decision maker has limited authority: it may choose to adopt a new technology, which necessitates a reallocation of resources elsewhere within the health care system, or it may choose to reject a new technology, in which case no reallocation takes place. In this context, the optimal cost-effectiveness threshold ensures that a new technology is recommended *only* if its adoption, and the subsequent reallocation of resources, results in an overall increase in incremental benefit. Note that these assumptions differ from those adopted by Pekarsky and Eckermann – the implications of relaxing these assumptions are explored in the following chapter.[63–65]

Determining the optimal cost-effectiveness threshold to use when considering a new technology for potential adoption (‘stage 2’) therefore requires consideration of any resulting reallocation of resources (‘stage 3’), which in turn depends upon the initial allocation of resources (‘stage 1’). This is because only those initial technologies that were adopted during the initial allocation (‘stage 1’) may be displaced or contracted during reallocation (‘stage 3’), and only those initial technologies that were not exhausted during the initial allocation (‘stage 1’) may be adopted or expanded during reallocation (‘stage 3’). Determining the optimal cost-effectiveness threshold therefore requires looking back at allocation decisions previously made and also looking forward to reallocation decisions yet to be made. To account for this in our model, the optimal threshold is calculated after considering both the initial allocation of resources (‘stage 1’) and the reallocation of resources that would follow adoption of the new technology (‘stage 3’).

Divisibility of technologies

The standard model assumes that technologies are divisible. This means that the decision maker may *partially* adopt one or more initial technologies during the initial allocation (‘stage 1’), and may *partially* expand or contract one or more technologies during reallocation (‘stage 3’).

By contrast, if technologies are non-divisible, then the decision maker may only expand technologies until exhaustion, and may only contract technologies in their entirety.

In our model, we consider divisibility by assuming that each technology may be funded in discrete \$0.1m increments. For example, during the initial allocation (‘stage 1’), an initial technology with an incremental cost in exhaustion of $10.0m may be funded, subject to the available initial budget, at any level between $0.0m (where the technology is not adopted) and $10.0m (where the technology is exhausted), in $0.1m increments. We refer to technologies that are adopted, but not exhausted, as 'partially adopted'. During reallocation ('stage 3'), the decision maker may choose to contract any partially adopted or exhausted technology by any amount (in $0.1m increments) until it is no longer adopted, or expand any partially adopted or not adopted technology by any amount (in $0.1m increments) until it is exhausted. Exhausted technologies cannot be expanded, and technologies that are not adopted cannot be contracted.

Marginal returns to scale

In the standard model, technologies are assumed to have constant marginal returns to scale (hereafter referred to as 'constant returns'). In practice, technologies may exhibit increasing or diminishing marginal returns to scale (hereafter referred to as 'increasing returns' and 'diminishing returns', respectively). In this chapter we consider the implications of constant or diminishing returns only. The possible implications of considering increasing returns, and the challenges of modelling this, are returned to in the Discussion.

If a technology exhibits diminishing returns, the ratio of its incremental expenditure to its incremental benefit increases with incremental expenditure. This means that every additional $0.1m in incremental expenditure on the technology results in less additional incremental benefit than the previous $0.1m increase in incremental expenditure. Note that this is only a relevant consideration if the technology is also divisible. If the technology is indivisible then it may only be funded until exhaustion – since it is not possible to incrementally increase expenditure on the technology, it is irrelevant whether the technology exhibits constant or diminishing returns.

The 'shape' of a technology's production function

It is not informative to refer to the cost-effectiveness of a technology that exhibits diminishing returns using only its ICER. This is because the ICER increases with incremental expenditure on the technology. It is also important to know the 'shape' of the technology's production function – the relationship between incremental expenditure and the resulting incremental benefit. Under constant returns, this relationship is constant so the production function for each technology is linear. Under diminishing returns, this production function is concave; however, there are many possible concave production functions, each of which results in a different incremental benefit (and hence a different ICER) for any given incremental expenditure on the technology.

Since many possible 'ICERs' exist for technologies exhibiting diminishing returns, we will define a technology's 'current ICER' as the ratio of the incremental expenditure to incremental benefit at the *current* level of incremental expenditure, and its 'ICER in exhaustion' as this ratio when the technology is funded to exhaustion. For example, a technology that has an incremental cost of $10m and incremental benefit of 200 QALYs in exhaustion has an 'ICER in exhaustion' of $50,000 per QALY; it follows that if the technology exhibits diminishing returns and is only *partially* funded then its 'current ICER' will be lower than $50,000 per QALY, with the current ICER dependent upon the shape of the technology's production function.

We consider diminishing returns by assigning each initial technology a specific production function 'shape' (ρ). The incremental benefit (ΔE) of a technology at any given level of incremental expenditure (ΔC) is given by

$$\Delta E = \Delta E_x . \left(\frac{\Delta C}{\Delta C_x}\right)^{\frac{1}{\rho}}$$

where ΔC_x and ΔE_x represent the incremental expenditure and incremental benefit of the technology in exhaustion, respectively.

In our model, each initial technology is randomly assigned one of three shapes: $\rho = 1.25$, $\rho = 1.50$, and $\rho = 2.00$. The greater the value of ρ, the greater the concavity in the technology's production function and the greater the degree to which the incremental benefit (ΔE) diminishes with increases in incremental expenditure (ΔC).

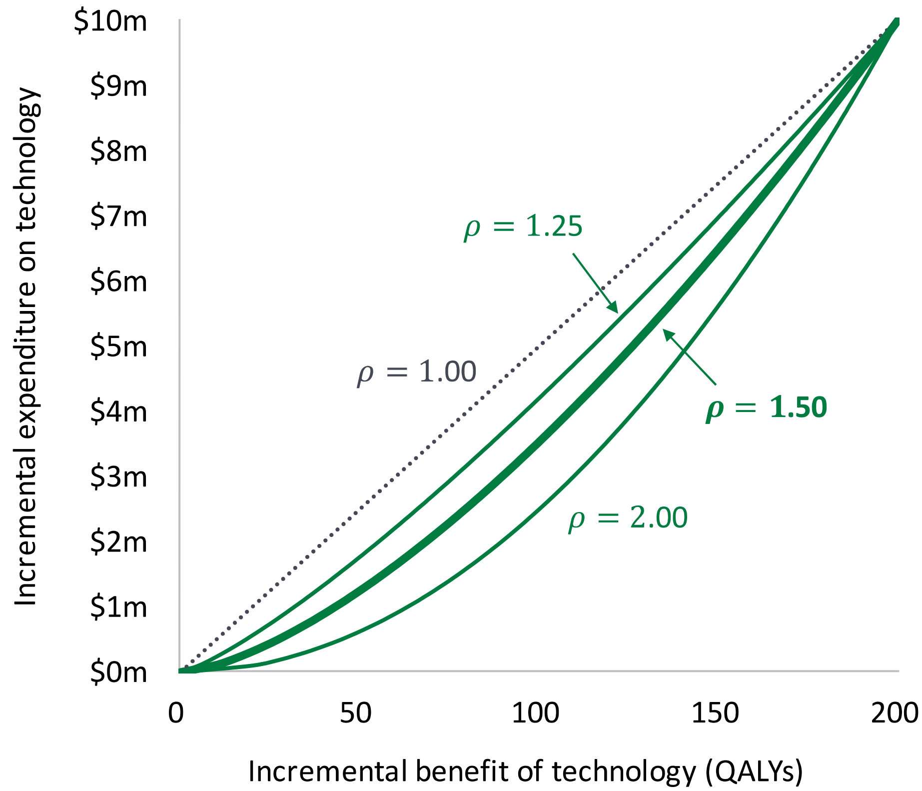
This is demonstrated in Figure 1.4 for a hypothetical technology (not in the initial pool in our model) with an incremental cost of $10m and an incremental benefit of 200 QALYs in exhaustion. Note that constant returns implies $\rho = 1$, such that

$$\frac{\Delta C}{\Delta E} = \frac{\Delta C_x}{\Delta E_x},$$

and hence the current ICER is always equal to the ICER in exhaustion, regardless of the level of incremental expenditure.

Where technologies are non-divisible, the only possible levels of incremental expenditure are $\Delta C = 0$ and $\Delta C = \Delta C_x$. In either case the value of ρ is irrelevant to the determination of ΔE, so there is no need to consider whether returns are constant or diminishing. Since non-divisible technologies can only be adopted until exhaustion, the current ICER and ICER in exhaustion are equivalent.

Figure 1.4: Alternative health production function 'shapes' for a hypothetical technology

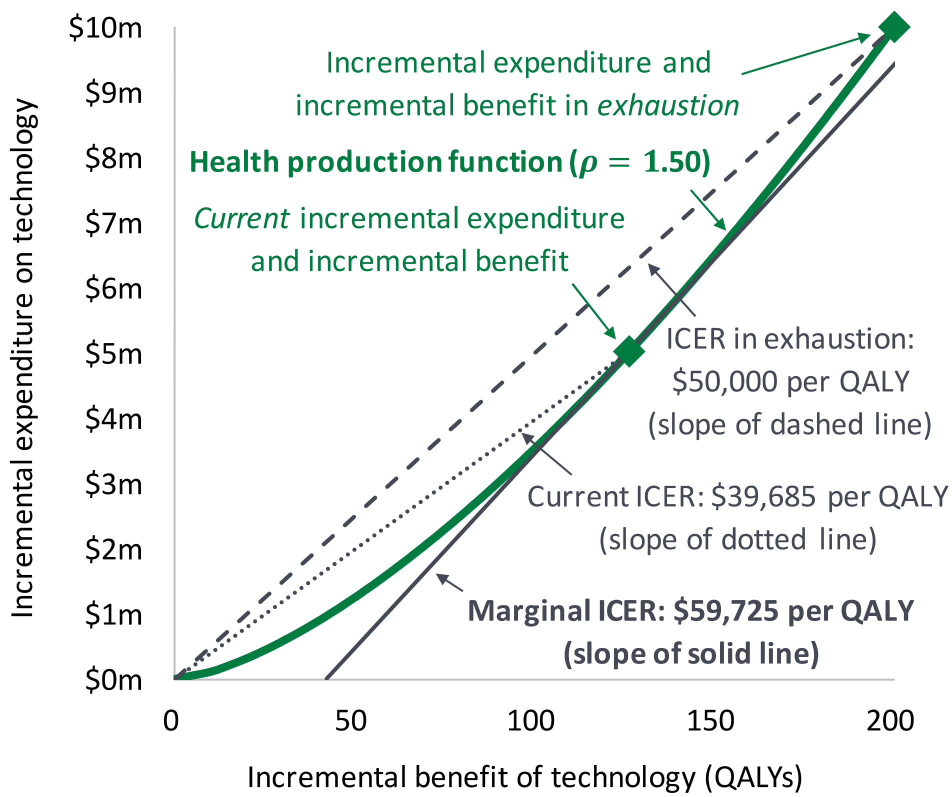


The 'marginal ICER'

In addition to distinguishing between the current ICER and ICER in exhaustion, it is necessary to define a third measure: the ratio of the *marginal change* in incremental expenditure to the *marginal change* in incremental benefit that arises following a *marginal* change in incremental expenditure. We refer to this as the 'marginal ICER'.

The distinction between the current ICER, marginal ICER, and ICER in exhaustion is most easily understood through an example (Figure 1.5). Consider a hypothetical technology (not in the initial pool in our model) that, in exhaustion, has an incremental expenditure of $10.0m and incremental benefit of 200 QALYs, and so has an ICER in exhaustion of $50,000 per QALY. Suppose the technology is partially adopted, such that incremental expenditure is $5.0m, half of that in exhaustion. If the technology exhibits diminishing returns, it follows that its incremental benefit will be *more than* half of that in exhaustion.

Figure 1.5: Marginal ICER, average ICER, and ICER in exhaustion for a hypothetical technology



For example, if the technology's production function shape is $\rho = 1.5$, its incremental benefit is approximately 126 QALYs, so the current ICER is $5m/126 QALYs = $39,685 per QALY. Now suppose the decision maker is considering whether to marginally increase incremental expenditure by \$0.1m (to \$5.1m). This would increase incremental benefit by approximately 1.67 QALYs, so the marginal ICER is approximately \$0.1m/1.67 = \$59,725 per QALY.

If technologies are divisible and exhibit diminishing returns, it is important for decision makers to consider the marginal ICER, rather than the current ICER or ICER in exhaustion, when allocating health care resources. Suppose that the decision maker must decide whether to allocate a \$0.1m increase in incremental expenditure to the technology described above ('Technology 1') or to another technology ('Technology 2', also not in the initial pool). Technology 2 has an incremental expenditure and incremental benefit in exhaustion of \$8.0m and 200 QALYs, respectively, its production function has the shape $\rho = 2$, and its current incremental expenditure is \$6.0m, corresponding to an incremental benefit of approximately 173 QALYs.

Given the decision maker's objective, it ought to provide the \$0.1m increase in incremental expenditure to Technology 1, since this will increase its incremental benefit by 1.67 QALYs, compared to just 1.44 QALYs for Technology 2. Yet, if the decision maker considers only the current ICER or ICER in exhaustion for each technology, it will prefer Technology 2 (Table 1.1). Only when the marginal ICER is considered will the decision maker allocate resources in accordance with its objective.

Table 1.1: Marginal ICER, average ICER, and ICER in exhaustion for two hypothetical technologies

Technology	ρ	ICER in exhaustion			Current ICER			Marginal ICER		
		ΔC_x	ΔE_x (QALYs)	$ICER_x$ (per QALY)	ΔC_c	ΔE_c (QALYs)	$ICER_c$ (per QALY)	ΔC_m	ΔE_m (QALYs)	$ICER_m$ (per QALY)
1	1.5	\$10.0m	200.00	**\$50,000**	\$5.0m	125.99	**\$39,685**	\$0.1m	1.67	**\$59,725**
2	2.0	\$8.0m	200.00	**\$40,000**	\$6.0m	173.21	**\$34,641**	\$0.1m	1.44	**\$69,570**

The intuition for making decisions on the basis of the marginal ICER is straightforward. For the purpose of allocating the additional \$0.1m of incremental expenditure, the focus for the decision maker should be the *additional* incremental benefit that will arise from the *additional* \$0.1m. The incremental benefit provided by *existing* incremental expenditures on each technology, or that would *hypothetically* be provided if incremental expenditure on each technology were to be increased until exhaustion, are both irrelevant. Yet these irrelevant considerations determine the ICER in exhaustion and current ICER. The marginal ICER excludes this irrelevant information and provides an appropriate summary of the additional incremental benefit associated with the additional $0.1m, as required.

Finally, a distinction must be made between marginal ICERs in 'expansion' and 'contraction'. The example above considered a $0.1m *increase* in incremental expenditure, and hence the 'marginal ICER' considered in Table 1.1 and Figure 1.5 was that in *expansion*. But if the decision maker instead had to choose between a $0.1m *reduction* in incremental expenditure on Technology 1 or Technology 2, the relevant marginal ICERs would be those in *contraction*. In this example these are $59,328 for Technology 1 and $68,992 per QALY for Technology 2.

In general, if a technology is *not adopted* then its marginal ICER in *contraction* is undefined, if a technology is *exhausted* then its marginal ICER in *expansion* is undefined, while if a technology is *partially adopted* then both marginal ICERs are defined and the difference between them increases or decreases with the magnitude of the change in incremental expenditure considered (approaching equivalence as the change in incremental expenditure approaches zero).

Analyses conducted

Our model was used to conduct analyses under the following scenarios:

1. Divisible technologies exhibiting constant returns (assumptions of the standard model);
2. Divisible technologies exhibiting diminishing returns;
3. Non-divisible technologies.

To explore the possibility that the threshold is dependent upon the budget impact of the new technology, as well as the region on the CE plane in which the new technology lies, for each scenario we derived a 'set' of optimal thresholds. Each set of thresholds includes 'subsets' for net investments and net disinvestments, and within each of these subsets we report the optimal threshold for each possible budget impact between $0.1m and $50.0m, in $0.1m increments.

To explore whether the threshold is conditional upon the size of the initial budget, we repeated our analyses using three different initial budgets: a "primary" budget of $50m, a "lower" budget of $0m, and a "higher" budget of $100m. In the analysis with a $0m budget, initial technologies in the northern half of the CE plane can be adopted during allocation ('stage 1') *only* if sufficient resources are released by adopting initial technologies in the southern half of the CE plane.

For each scenario, the set of optimal thresholds is plotted on the CE plane. For clarity, we refer to this graphical representation as the "threshold curve", and the numerical representation (in 'dollars per QALY') as the "numerical threshold".

New technologies are cost-effective only if they lie to the *right* of the threshold curve on the CE plane. Equivalently, new technologies in the NE quadrant are cost-effective if their ICERs are *lower* than the numerical threshold for *net investments* corresponding to the budget impact of the new technology, while new technologies in the SW quadrant are cost-effective if their ICERs are *higher* than the corresponding numerical threshold for *net disinvestments*.

Analytical assumptions

Divisibility

Where technologies are divisible, our model assumes that the decision maker allocates the initial budget among the initial technologies ('stage 1') in discrete $0.1m increments. Prior to allocating each subsequent increment, the decision maker reconsiders the marginal ICER in expansion of each initial technology, given the expenditure already allocated, then allocates the next $0.1m to the technology with the lowest marginal ICER in expansion. Similarly, during reallocation ('stage 3'), the decision maker is assumed to make reallocations in discrete $0.1m increments, continuously re-evaluating the marginal ICER of each technology in expansion or contraction (as appropriate) to ensure an optimal reallocation of resources.

Non-divisibility

Where technologies are non-divisible, the decision maker is unable to *incrementally* increase expenditure on each initial technology during the initial allocation ('stage 1'). Rather, the decision maker must decide which initial technologies will be funded until exhaustion, and which will not be adopted at all. In this context, the marginal ICER of each initial technology is undefined and the current ICER for each adopted technology is equivalent to its ICER in exhaustion. A single 'ICER', equivalent to the ICER in exhaustion, may therefore be considered for each technology.

In this context, it is not necessarily optimal to allocate the initial budget by ranking technologies in ascending order of ICERs and then adopting technologies until the budget is exhausted. Under this approach, some budget may remain unspent due to the non-divisibility of technologies, so total incremental benefits may be increased further by instead adopting an alternative subset of technologies that makes better use of the available budget.[74]

For example, consider a hypothetical health system (different to that considered in our model) with a pool of four non-divisible technologies (labelled 1-4, respectively). The incremental cost, incremental benefit, and ICER of each technology are provided in Table 1.2.

Table 1.2: Incremental cost, incremental benefit, and ICER in exhaustion for four hypothetical technologies

Technology	ΔC_x	ΔE_x (QALYs)	$ICER_x$ (per QALY)
1	\$3.0m	120	**\$25,000**
2	\$7.0m	260	**\$26,923**
3	\$6.0m	200	**\$30,000**
4	\$3.9m	130	**\$30,000**

If the initial budget is less than \$3.0m, no technologies can be adopted. If the initial budget is between \$3.0m and \$3.8m, technology 1 will be adopted. However, if the initial budget lies between \$3.9m and \$5.9m then the decision maker will adopt technology 4, despite this having the *highest* ICER of all the technologies available. This is because technology 4 provides greater incremental benefit than technology 1 (despite its higher ICER), and so adopting technology 4 satisfies the decision maker's objective of maximizing total incremental benefit, given the available budget.

To identify the optimal subset of initial technologies, our model incorporates the 'knapsack' algorithm that is included with the 'adagio' add-on package for the R statistical software.[86,87] The 'knapsack problem' is a common problem in combinatorial optimization, in which a decision maker must pack items of different 'size' and 'value' into a knapsack of limited 'capacity', such that the total value of the items in the knapsack is maximized while remaining within the capacity.[88] In our model, the capacity of the knapsack is analogous to the initial budget, while the size and value of each available item is analogous to the incremental cost and incremental benefit in exhaustion of each initial technology in the pool, respectively. Note that initial technologies in the SE and SW quadrants of the CE plane are considered to have negative size (creating additional space in the knapsack for other items), while those in the NW and SW quadrants are considered to have negative value (diminishing the total value of all items in the knapsack). It is assumed that the subset of technologies adopted by the decision maker during allocation ('stage 1') is the 'optimal' subset identified in the solution to the knapsack problem.

Authority of the decision maker

Under the assumption of non-divisibility, the decision maker is unable to make incremental expansions or contractions of initial technologies during reallocation ('stage 3'). Rather, the decision maker may only displace or adopt technologies in their entirety. The optimal way to do this depends upon whether or not the decision maker has the *authority* to make a wholesale reorganization of the health care system in response to each adoption of a new technology.

If the decision maker has this authority, then the optimal approach is for the decision maker to consider the adoption of the new technology as modifying the budget available for initial technologies, use the knapsack algorithm to identify a new optimal subset of technologies corresponding to this modified budget, then adopt and/or displace initial technologies during reallocation in order to achieve this new optimal subset. The difficulty with this approach is that even marginal changes in the budget can result in very different solutions to a knapsack problem, implying a potential wholesale reorganization of the health care system in response to every decision to adopt a new technology.

In the example considered above, if the budget available for spending on initial technologies is \$6.9m, the optimal allocation is to adopt technologies 1 and 4 (Table 1.2). Following adoption of a *net investment* with a budget impact of \$0.1m (which necessitates a marginal reduction in incremental expenditure on initial technologies to \$6.8m), the optimal reallocation is to displace technologies 1 and 4 and adopt technology 3. Following adoption of a *net disinvestment* with a budget impact of \$0.1m (which allows for a marginal increase in incremental expenditure on initial technologies to \$7.0m), the optimal reallocation is to displace technologies 1 and 4 and adopt technology 2. It follows that the optimal response to the adoption of a new technology might be to make a wholesale reorganization of the health care system, even if the budget impact of the new technology is marginal.

If the decision maker does *not* have the authority to make wholesale reorganizations of the health care system following every adoption of a new technology, then it may instead be assumed that the decision maker can *either* reduce incremental expenditure on one or more initial technologies to release resources for a net investment, *or* increase incremental expenditure on one or more initial technologies following a net disinvestment, but *not both*. This assumption was adopted in our analysis, since this was considered to be more representative of the real world – allowing for wholesale reorganizations following every adoption of a new technology would, in practice, result in instability in the health care system. To determine the optimal reallocation under this assumption, the knapsack algorithm was used with a constrained set of initial technologies to determine the optimal means for *either* increasing *or* decreasing incremental expenditure on initial technologies, *given* the set of technologies adopted during the initial allocation ('stage 1').

For example, if a *decrease* in incremental expenditure on initial technologies was required (following adoption of a net investment), then the knapsack algorithm was used to identify the optimal set of previously-adopted NE technologies to displace, and/or not-yet-adopted SW technologies to adopt, in order to meet (or exceed) the required reduction in incremental expenditure while minimizing the loss in incremental benefit. Conversely, if an *increase* in incremental expenditure on initial technologies is possible (following adoption of a net disinvestment), then the knapsack algorithm was used to identify the optimal set of not-yet-adopted NE technologies to adopt, and/or previously-adopted SW technologies to displace, in order to maximize the gain in incremental benefit while not exceeding the maximum possible increase in incremental expenditure.

Note that, if technologies are *divisible*, then, under the assumptions adopted in this chapter, the decision maker has no reason to increase or decrease incremental expenditure on initial technologies by any more than is needed to adopt the technology. The decision maker will therefore *not* implement wholesale reorganizations of the health care system, even if it has the authority to do so.

Results

Initial allocation

The initial allocation of the budget among initial technologies is summarized in Tables 1.3 – 1.5. Exhausted technologies are identified by a 100% ratio of their incremental expenditure following allocation to their incremental expenditure in exhaustion; for technologies not adopted this ratio is 0%, while for partially adopted technologies this ratio lies between 0% and 100%.

Regardless of whether technologies are divisible or non-divisible, or whether they exhibit constant or diminishing returns, the decision maker does not adopt any initial technologies in the north-west (NW) quadrant of the CE plane, since these technologies require positive incremental expenditure yet provide negative incremental benefits. Conversely, the decision maker always exhausts all initial technologies in the south-east (SE) quadrant. These technologies provide positive incremental benefits, while releasing a total of $51.1m for expenditure on other technologies. The available budget for adopting technologies in the other quadrants therefore constitutes both the initial budget and the $51.1m released by adopting SE technologies.

The remaining characteristics of the initial allocation depend upon whether initial technologies are divisible with constant returns, divisible with diminishing returns, or non-divisible.

Divisibility and constant returns

The decision maker adopts NE technologies, until exhaustion, in ascending order of marginal ICER in expansion until the available budget is spent, at which point the last technology generally remains only partially adopted. With the primary initial budget of $50m, this partially adopted NE technology is technology C (marginal ICER in expansion $39,802 per QALY); with the lower initial budget this is technology O ($27,938 per QALY), and with the higher initial budget this is technology R ($40,758 per QALY).

At this point, the SW technology with the highest marginal ICER in expansion is technology L ($200,521 per QALY). Since this marginal ICER is higher than that of the partially adopted NE technology (regardless of the initial budget), the decision maker expands this SW technology in order to *release* resources, allowing for increased incremental expenditure on the NE technology.

Table 1.3: Initial allocation (divisibility and constant returns)

Tech	***Exhaustion***		***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	ΔC_x [a]	ΔE_x [b]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]
Initial technologies in the south-east quadrant (cost saving and more effective)																	
A	-$2.5m	443.9	-$2.5m	443.9	100%	100%	-$5,632	-$2.5m	443.9	100%	100%	-$5,632	-$2.5m	443.9	100%	100%	-$5,632
J	-$20.8m	264.3	-$20.8m	264.3	100%	100%	-$78,700	-$20.8m	264.3	100%	100%	-$78,700	-$20.8m	264.3	100%	100%	-$78,700
K	-$6.4m	1858.7	-$6.4m	1858.7	100%	100%	-$3,443	-$6.4m	1858.7	100%	100%	-$3,443	-$6.4m	1858.7	100%	100%	-$3,443
V	-$6.m	1492.2	-$6.0m	1492.2	100%	100%	-$4,021	-$6.0m	1492.2	100%	100%	-$4,021	-$6.0m	1492.2	100%	100%	-$4,021
X	-$13.m	70.5	-$13.0m	70.5	100%	100%	-$184,431	-$13.0m	70.5	100%	100%	-$184,431	-$13.0m	70.5	100%	100%	-$184,431
Y	-$2.4m	440.7	-$2.4m	440.7	100%	100%	-$5,446	-$2.4m	440.7	100%	100%	-$5,446	-$2.4m	440.7	100%	100%	-$5,446
Sub-total	*-$51.1m*	*4570.2*	*-$51.1m*	*4570.2*	*100%*	*100%*		*-$51.1m*	*4570.2*	*100%*	*100%*		*-$51.1m*	*4570.2*	*100%*	*100%*	
Initial technologies in the south-west quadrant (cost saving and less effective)																	
E	-$6.7m	-970.8	$0.0m	0.0	0%	0%	$6,902	$0.0m	0.0	0%	0%	$6,902	$0.0m	0.0	0%	0%	$6,902
L	-$8.6m	-42.9	-$8.6m	-42.9	100%	100%	$200,521	-$8.6m	-42.9	100%	100%	$200,521	-$8.6m	-42.9	100%	100%	$200,521
Sub-total	*-$15.3m*	*-1013.6*	*-$8.6m*	*-42.9*	*56%*	*4%*		*-$8.6m*	*-42.9*	*56%*	*4%*		*-$8.6m*	*-42.9*	*56%*	*4%*	
Initial technologies in the north-east quadrant (cost increasing and more effective)																	
B	$3.5m	1585.8	$3.5m	1585.8	100%	100%	$2,207	$3.5m	1585.8	100%	100%	$2,207	$3.5m	1585.8	100%	100%	$2,207
C	$13.7m	344.2	$13.7m	344.2	100%	100%	$39,802	$0.0m	0.0	0%	0%	$39,802	$13.7m	344.2	100%	100%	$39,802
G	$41.9m	21.8	$0.0m	0.0	0%	0%	$1.9m	$0.0m	0.0	0%	0%	$1.9m	$0.0m	0.0	0%	0%	$1.9m
H	$18.3m	546.7	$18.3m	546.7	100%	100%	$33,472	$0.0m	0.0	0%	0%	$33,472	$18.3m	546.7	100%	100%	$33,472
I	$16.6m	917.9	$16.6m	917.9	100%	100%	$18,084	$16.6m	917.9	100%	100%	$18,084	$16.6m	917.9	100%	100%	$18,084
M	$19.7m	397.2	$0.0m	0.0	0%	0%	$49,596	$0.0m	0.0	0%	0%	$49,596	$0.0m	0.0	0%	0%	$49,596
N	$4.1m	66.7	$0.0m	0.0	0%	0%	$61,479	$0.0m	0.0	0%	0%	$61,479	$0.0m	0.0	0%	0%	$61,479
O	$24.8m	887.7	$24.8m	887.7	100%	100%	$27,938	$14.3m	511.8	58%	58%	$27,938	$24.8m	887.7	100%	100%	$27,938
Q	$21.5m	446.2	$0.0m	0.0	0%	0%	$48,185	$0.0m	0.0	0%	0%	$48,185	$7.5m	155.6	35%	35%	$48,185
R	$50.m	1226.8	$7.5m	184.0	15%	15%	$40,758	$0.0m	0.0	0%	0%	$40,758	$50.0m	1226.8	100%	100%	$40,758
T	$25.3m	1651.9	$25.3m	1651.9	100%	100%	$15,316	$25.3m	1651.9	100%	100%	$15,316	$25.3m	1651.9	100%	100%	$15,316
U	$40.2m	85.0	$0.0m	0.0	0%	0%	$472,911	$0.0m	0.0	0%	0%	$472,911	$0.0m	0.0	0%	0%	$472,911
W	$17.8m	105.7	$0.0m	0.0	0%	0%	$168,385	$0.0m	0.0	0%	0%	$168,385	$0.0m	0.0	0%	0%	$168,385
Sub-total	*$297.4m*	*8283.6*	*$109.7m*	*6118.2*	*37%*	*74%*		*$59.7m*	*4667.5*	*20%*	*56%*		*$159.7m*	*7316.6*	*54%*	*88%*	
Initial technologies in the north-west quadrant (cost increasing and less effective)																	
D	$36.6m	-191.0	$0.0m	0.0	0%	0%	-$191,669	$0.0m	0.0	0%	0%	-$191,669	$0.0m	0.0	0%	0%	-$191,669
F	$35.4m	-784.6	$0.0m	0.0	0%	0%	-$45,119	$0.0m	0.0	0%	0%	-$45,119	$0.0m	0.0	0%	0%	-$45,119
P	$9.9m	-149.5	$0.0m	0.0	0%	0%	-$66,233	$0.0m	0.0	0%	0%	-$66,233	$0.0m	0.0	0%	0%	-$66,233
S	$3.9m	-877.1	$0.0m	0.0	0%	0%	-$4,447	$0.0m	0.0	0%	0%	-$4,447	$0.0m	0.0	0%	0%	-$4,447
Sub-total	*$85.8m*	*-2002.1*	*$0.0m*	*0.0*	*0%*	*0%*		*$0.0m*	*0.0*	*0%*	*0%*		*$0.0m*	*0.0*	*0%*	*0%*	
Total	***$316.8m***	***9838.1***	***$50.0m***	***10645.5***				***$0.0m***	***9194.8***				***$100.0m***	***11843.9***			

[a] Incremental cost in exhaustion; [b] Incremental benefit (QALYs) in exhaustion; [c] Incremental expenditure following allocation of budget in 'stage 1'; [d] Incremental benefit (QALYs) following allocation of budget in 'stage 1'; [e] Marginal ICER in 'expansion' (per QALY) following allocation of budget in 'stage 1' (for exhausted technologies, the last marginal ICER in expansion prior to exhaustion is reported).

Under the primary initial budget, NE technology C becomes exhausted after an additional $1.1m of incremental expenditure, at which point the NE technology with the lowest marginal ICER in expansion becomes technology R ($40,758 per QALY). Since the marginal ICER of technology R is lower than that of technology L, the decision maker continues to expand technology L to fund additional incremental expenditure on technology R until technology L is exhausted.

The SW technology with the *next* highest marginal ICER in expansion is technology E ($6,902 per QALY). Since this marginal ICER is *lower* than that of technology R, the decision maker does *not* adopt technology E, so the initial allocation is complete with technology R remaining partially (15%) adopted (marginal ICER in expansion $40,758 per QALY) (Table 1.3).

Under the lower or higher initial budget, the initial allocation is also complete when technology L is exhausted. At this point, technology O remains partially (58%) adopted under a lower budget ($27,938 per QALY), while technology Q remains partially (35%) adopted under a higher budget ($48,185 per QALY).

If technologies are divisible and have constant returns, the initial allocation has the following general characteristics:

1. The initial budget is always fully spent.
2. All SE technologies are adopted to exhaustion and no NW technologies are adopted.
3. Once allocation is complete, one technology in *either* the NE or SW quadrant will *generally* remain partially adopted – all remaining technologies are either adopted to exhaustion or not adopted at all. An exception arises if the initial budget is *just sufficient* to exhaust the last technology to be adopted, but not sufficient to begin expansion of another technology (this did not arise in our analyses). In this case, *all* technologies are either adopted to exhaustion or not adopted at all (none is partially adopted).
4. Since marginal returns are constant, the ratio of the partially adopted technology's incremental expenditure following allocation to its incremental expenditure in exhaustion is *identical* to the ratio of its incremental benefit following allocation to its incremental benefit in exhaustion. In the primary analysis, both are 15% for technology R.
5. If the partially adopted technology is in the NE quadrant, it has a higher marginal ICER in expansion than all NE technologies adopted to exhaustion, and a lower marginal ICER in expansion than all NE technologies that are not adopted. Conversely, if the partially

adopted technology is in the SW quadrant, it has a *lower* marginal ICER in expansion than all SW technologies adopted to exhaustion, and a *higher* marginal ICER in expansion than all SW technologies that are not adopted.

6. The higher the initial budget, the larger the marginal ICER in expansion of the partially adopted technology and the greater the number of exhausted technologies.

Divisibility and diminishing returns

The marginal ICER of each technology in expansion increases after an increase in incremental expenditure (Table 1.4). Therefore, unlike under constant returns, the decision maker does not adopt NE technologies one-by-one until exhaustion, but instead allocates the budget in $0.1m increments, constantly switching between technologies following each incremental allocation. When the available budget is spent, the decision maker then considers marginal expansions of pairs of SW and NE technologies, repeatedly switching between these pairs until no further pairs exist which result in a positive net incremental benefit.

If technologies are divisible and have diminishing returns, the initial allocation has the following general characteristics:

1. The initial budget is always fully spent.
2. All SE technologies are adopted to exhaustion and no NW technologies are adopted.
3. Once allocation is complete, multiple technologies in the NE and SW quadrants generally remain partially adopted, with similar marginal ICERs in expansion.
4. The ratio of each partially adopted technology's incremental expenditure following allocation to its incremental expenditure in exhaustion is less than the ratio of its incremental benefit following allocation to its incremental benefit in exhaustion.
5. The higher the initial budget, the larger the marginal ICERs in expansion of the partially adopted technologies and the greater the number of exhausted technologies.

Table 1.4: Initial allocation (divisibility and diminishing returns)

Tech	*Exhaustion*		*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	ΔC_x [a]	ΔE_x [b]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]
Initial technologies in the south-east quadrant (cost saving and more effective)																	
A	-$2.5m	443.9	-$2.5m	443.9	100%	100%	-$8,391	-$2.5m	443.9	100%	100%	-$8,391	-$2.5m	443.9	100%	100%	-$8,391
J	-$20.8m	264.3	-$20.8m	264.3	100%	100%	-$157,211	-$20.8m	264.3	100%	100%	-$157,211	-$20.8m	264.3	100%	100%	-$157,211
K	-$6.4m	1858.7	-$6.4m	1858.7	100%	100%	-$6,860	-$6.4m	1858.7	100%	100%	-$6,860	-$6.4m	1858.7	100%	100%	-$6,860
V	-$6.0m	1492.2	-$6.0m	1492.2	100%	100%	-$5,018	-$6.0m	1492.2	100%	100%	-$5,018	-$6.0m	1492.2	100%	100%	-$5,018
X	-$13.0m	70.5	-$13.0m	70.5	100%	100%	-$368,152	-$13.0m	70.5	100%	100%	-$368,152	-$13.0m	70.5	100%	100%	-$368,152
Y	-$2.4m	440.7	-$2.4m	440.7	100%	100%	-$10,777	-$2.4m	440.7	100%	100%	-$10,777	-$2.4m	440.7	100%	100%	-$10,777
Sub-total	*-$51.1m*	*4570.2*	*-$51.1m*	*4570.2*	*100%*	*100%*		*-$51.1m*	*4570.2*	*100%*	*100%*		*-$51.1m*	*4570.2*	*100%*	*100%*	
Initial technologies in the south-west quadrant (cost saving and less effective)																	
E	-$6.7m	-970.8	-$0.1m	-1.8	1%	0%	$30,898	-$0.2m	-5.0	3%	1%	$23,860	$0.0m	0.0	0%	0%	$56,494
L	-$8.6m	-42.9	-$8.6m	-42.9	100%	100%	$100,847	-$8.6m	-42.9	100%	100%	$100,847	-$8.6m	-42.9	100%	100%	$100,847
Sub-total	*-$15.3m*	*-1013.6*	*-$8.7m*	*-44.7*	*57%*	*4%*		*-$8.8m*	*-47.9*	*58%*	*5%*		*-$8.6m*	*-42.9*	*56%*	*4%*	
Initial technologies in the north-east quadrant (cost increasing and more effective)																	
B	$3.5m	1585.8	$3.5m	1585.8	100%	100%	$2,751	$3.5m	1585.8	100%	100%	$2,751	$3.5m	1585.8	100%	100%	$2,751
C	$13.7m	344.2	$5.2m	180.4	38%	52%	$43,365	$1.0m	60.1	7%	17%	$25,356	$13.7m	344.2	100%	100%	$59,630
G	$41.9m	21.8	$0.0m	0.0	0%	0%	$0.3m	$0.0m	0.0	0%	0%	$0.3m	$0.0m	0.0	0%	0%	$0.3m
H	$18.3m	546.7	$11.7m	405.8	64%	74%	$43,315	$2.2m	133.2	12%	24%	$24,965	$18.3m	546.7	100%	100%	$50,162
I	$16.6m	917.9	$16.6m	917.9	100%	100%	$22,591	$16.6m	917.9	100%	100%	$22,591	$16.6m	917.9	100%	100%	$22,591
M	$19.7m	397.2	$3.3m	95.1	17%	24%	$43,498	$0.2m	10.1	1%	3%	$25,843	$16.7m	348.0	85%	88%	$60,015
N	$4.1m	66.7	$0.5m	23.3	12%	35%	$44,988	$0.2m	14.7	5%	22%	$30,208	$1.0m	32.9	24%	49%	$62,206
O	$24.8m	887.7	$24.8m	887.7	100%	100%	$41,879	$5.2m	313.3	21%	35%	$24,976	$24.8m	887.7	100%	100%	$41,879
Q	$21.5m	446.2	$4.6m	159.6	21%	36%	$43,385	$0.9m	53.8	4%	12%	$25,547	$12.3m	307.5	57%	69%	$60,082
R	$50.0m	1226.8	$14.1m	651.4	28%	53%	$43,365	$4.7m	376.1	9%	31%	$25,125	$27.1m	903.1	54%	74%	$60,068
T	$25.3m	1651.9	$25.3m	1651.9	100%	100%	$22,958	$25.3m	1651.9	100%	100%	$22,958	$25.3m	1651.9	100%	100%	$22,958
U	$40.2m	85.0	$0.1m	4.2	0%	5%	$56,943	$0.1m	4.2	0%	5%	$56,943	$0.2m	6.0	0%	7%	$74,210
W	$17.8m	105.7	$0.1m	3.3	1%	3%	$50,960	$0.0m	0.0	0%	0%	$29,934	$0.2m	5.3	1%	5%	$60,757
Sub-total	*$297.4m*	*8283.6*	*$109.8m*	*6566.5*	*37%*	*79%*		*$59.9m*	*5121.2*	*20%*	*62%*		*$159.7m*	*7537.1*	*54%*	*91%*	
Initial technologies in the north-west quadrant (cost increasing and less effective)																	
D	$36.6m	-191.0	$0.0m	0.0	0%	0%	-$70.2m	$0.0m	0.0	0%	0%	-$70.2m	$0.0m	0.0	0%	0%	-$70.2m
F	$35.4m	-784.6	$0.0m	0.0	0%	0%	-$848,901	$0.0m	0.0	0%	0%	-$848,901	$0.0m	0.0	0%	0%	-$848,901
P	$9.9m	-149.5	$0.0m	0.0	0%	0%	-$6.6m	$0.0m	0.0	0%	0%	-$6.6m	$0.0m	0.0	0%	0%	-$6.6m
S	$3.9m	-877.1	$0.0m	0.0	0%	0%	-$27,769	$0.0m	0.0	0%	0%	-$27,769	$0.0m	0.0	0%	0%	-$27,769
Sub-total	*$85.8m*	*-2002.1*	*$0.0m*	*0.0*	*0%*	*0%*		*$0.0m*	*0.0*	*0%*	*0%*		*$0.0m*	*0.0*	*0%*	*0%*	
Total	**$316.8m**	**9838.1**	**$50.0m**	**11092.1**				**$0.0m**	**9643.5**				**$100.0m**	**12064.4**			

[a] Incremental cost in exhaustion; [b] Incremental benefit (QALYs) in exhaustion; [c] Incremental expenditure following allocation of budget in 'stage 1'; [d] Incremental benefit (QALYs) following allocation of budget in 'stage 1'; [e] Marginal ICER in 'expansion' (per QALY) following allocation of budget in 'stage 1' (for exhausted technologies, the last marginal ICER in expansion prior to exhaustion is reported).

Non-divisibility

The decision maker uses a knapsack algorithm to determine the optimal subset of NE and SW technologies, given the available budget (Table 1.5). Each technology in the optimal subset is adopted until exhaustion; all remaining technologies are not adopted at all.

If technologies are non-divisible, the initial allocation has the following general characteristics:

1. The initial budget is generally *not* fully spent.
2. All SE technologies are adopted to exhaustion and no NW technologies are adopted.
3. All NE or SW technologies are either adopted to exhaustion or not adopted at all – no technologies are partially adopted.
4. The ICERs of adopted technologies are *typically* lower than the ICERs of technologies not adopted, but exceptions may exist. For example, with the primary budget, technology N ($61,479 per QALY) is adopted but technology M ($49,596 per QALY), technology Q ($48,185 per QALY) and technology R ($40,758 per QALY) are not adopted.
5. The higher the initial budget, the larger the maximum ICER among the adopted technologies and the greater the number of exhausted technologies.

Reallocation

The reallocation following adoption of the new technology is summarized in Tables 1.6 – 1.11 Complete tables are provided in Appendix 1.1, Tables A1.1.1 – A1.1.6.

Divisibility and constant returns

If the new technology is a net investment, the decision maker reduces incremental expenditure on initial technologies by contracting adopted NE technologies in descending order of their marginal ICERs in contraction, and/or by expanding non-exhausted SW technologies in ascending order of their marginal ICERs in expansion, depending upon which provides the smallest loss in incremental benefit for the associated reduction in incremental expenditure.

If the new technology is a net disinvestment, the decision maker increases incremental expenditure on initial technologies by expanding non-exhausted NE technologies in ascending order of their marginal ICERs in expansion, and/or by contracting adopted SW technologies in

Table 1.5: Initial allocation (non-divisibility)

Tech	*Exhaustion*		*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	ΔC_x [a]	ΔE_x [b]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$\frac{\Delta E_a}{\Delta E_x}$	$ICER_m$ [e]
Initial technologies in the south-east quadrant (cost saving and more effective)																	
A	-$2.5m	443.9	-$2.5m	443.9	100%	100%	-$5,632	-$2.5m	443.9	100%	100%	-$5,632	-$2.5m	443.9	100%	100%	-$5,632
J	-$20.8m	264.3	-$20.8m	264.3	100%	100%	-$78,700	-$20.8m	264.3	100%	100%	-$78,700	-$20.8m	264.3	100%	100%	-$78,700
K	-$6.4m	1858.7	-$6.4m	1858.7	100%	100%	-$3,443	-$6.4m	1858.7	100%	100%	-$3,443	-$6.4m	1858.7	100%	100%	-$3,443
V	-$6.0m	1492.2	-$6.0m	1492.2	100%	100%	-$4,021	-$6.0m	1492.2	100%	100%	-$4,021	-$6.0m	1492.2	100%	100%	-$4,021
X	-$13.0m	70.5	-$13.0m	70.5	100%	100%	-$184,431	-$13.0m	70.5	100%	100%	-$184,431	-$13.0m	70.5	100%	100%	-$184,431
Y	-$2.4m	440.7	-$2.4m	440.7	100%	100%	-$5,446	-$2.4m	440.7	100%	100%	-$5,446	-$2.4m	440.7	100%	100%	-$5,446
Sub-total	*-$51.1m*	*4570.2*	*-$51.1m*	*4570.2*	*100%*	*100%*		*-$51.1m*	*4570.2*	*100%*	*100%*		*-$51.1m*	*4570.2*	*100%*	*100%*	
Initial technologies in the south-west quadrant (cost saving and less effective)																	
E	-$6.7m	-970.8	$0.0m	0.0	0%	0%	$6,902	$0.0m	0.0	0%	0%	$6,902	$0.0m	0.0	0%	0%	$6,902
L	-$8.6m	-42.9	-$8.6m	-42.9	100%	100%	$200,521	-$8.6m	-42.9	100%	100%	$200,521	-$8.6m	-42.9	100%	100%	$200,521
Sub-total	*-$15.3m*	*-1013.6*	*-$8.6m*	*-42.9*	*56%*	*4%*		*-$8.6m*	*-42.9*	*56%*	*4%*		*-$8.6m*	*-42.9*	*56%*	*4%*	
Initial technologies in the north-east quadrant (cost increasing and more effective)																	
B	$3.5m	1585.8	$3.5m	1585.8	100%	100%	$2,207	$3.5m	1585.8	100%	100%	$2,207	$3.5m	1585.8	100%	100%	$2,207
C	$13.7m	344.2	$13.7m	344.2	100%	100%	$39,802	$13.7m	344.2	100%	100%	$39,802	$13.7m	344.2	100%	100%	$39,802
G	$41.9m	21.8	$0.0m	0.0	0%	0%	$1.9m	$0.0m	0.0	0%	0%	$1.9m	$0.0m	0.0	0%	0%	$1.9m
H	$18.3m	546.7	$18.3m	546.7	100%	100%	$33,472	$0.0m	0.0	0%	0%	$33,472	$18.3m	546.7	100%	100%	$33,472
I	$16.6m	917.9	$16.6m	917.9	100%	100%	$18,084	$16.6m	917.9	100%	100%	$18,084	$16.6m	917.9	100%	100%	$18,084
M	$19.7m	397.2	$0.0m	0.0	0%	0%	$49,596	$0.0m	0.0	0%	0%	$49,596	$0.0m	0.0	0%	0%	$49,596
N	$4.1m	66.7	$4.1m	66.7	100%	100%	$61,479	$0.0m	0.0	0%	0%	$61,479	$4.1m	66.7	100%	100%	$61,479
O	$24.8m	887.7	$24.8m	887.7	100%	100%	$27,938	$0.0m	0.0	0%	0%	$27,938	$24.8m	887.7	100%	100%	$27,938
Q	$21.5m	446.2	$0.0m	0.0	0%	0%	$48,185	$0.0m	0.0	0%	0%	$48,185	$0.0m	0.0	0%	0%	$48,185
R	$50.0m	1226.8	$0.0m	0.0	0%	0%	$40,758	$0.0m	0.0	0%	0%	$40,758	$50.0m	1226.8	100%	100%	$40,758
T	$25.3m	1651.9	$25.3m	1651.9	100%	100%	$15,316	$25.3m	1651.9	100%	100%	$15,316	$25.3m	1651.9	100%	100%	$15,316
U	$40.2m	85.0	$0.0m	0.0	0%	0%	$472,911	$0.0m	0.0	0%	0%	$472,911	$0.0m	0.0	0%	0%	$472,911
W	$17.8m	105.7	$0.0m	0.0	0%	0%	$168,385	$0.0m	0.0	0%	0%	$168,385	$0.0m	0.0	0%	0%	$168,385
Sub-total	*$297.4m*	*8283.6*	*$106.3m*	*6000.9*	*36%*	*72%*		*$59.1m*	*4499.8*	*20%*	*54%*		*$156.3m*	*7227.7*	*53%*	*87%*	
Initial technologies in the north-west quadrant (cost increasing and less effective)																	
D	$36.6m	-191.0	$0.0m	0.0	0%	0%	-$191,669	$0.0m	0.0	0%	0%	-$191,669	$0.0m	0.0	0%	0%	-$191,669
F	$35.4m	-784.6	$0.0m	0.0	0%	0%	-$45,119	$0.0m	0.0	0%	0%	-$45,119	$0.0m	0.0	0%	0%	-$45,119
P	$9.9m	-149.5	$0.0m	0.0	0%	0%	-$66,233	$0.0m	0.0	0%	0%	-$66,233	$0.0m	0.0	0%	0%	-$66,233
S	$3.9m	-877.1	$0.0m	0.0	0%	0%	-$4,447	$0.0m	0.0	0%	0%	-$4,447	$0.0m	0.0	0%	0%	-$4,447
Sub-total	*$85.8m*	*-2002.1*	*$0.0m*	*0.0*	*0%*	*0%*		*$0.0m*	*0.0*	*0%*	*0%*		*$0.0m*	*0.0*	*0%*	*0%*	
Total	**$316.8m**	**9838.1**	**$46.6m**	**10528.2**				**-$0.6m**	**9027.1**				**$96.6m**	**11755.0**			

[a] Incremental cost in exhaustion; [b] Incremental benefit (QALYs) in exhaustion; [c] Incremental expenditure following allocation of budget in ‘stage 1’; [d] Incremental benefit (QALYs) following allocation of budget in ‘stage 1’; [e] Marginal ICER in ‘expansion’ (per QALY) following allocation of budget in ‘stage 1’ (for exhausted technologies, the last marginal ICER in expansion prior to exhaustion is reported).

descending order of their marginal ICERs in contraction, depending upon which provides the greatest gain in incremental benefit for the associated increase in incremental expenditure.

If a technology was partially adopted during the initial allocation, this is the first technology to be contracted or expanded. In the primary analysis this is technology R; with a lower or higher budget this is technology O or technology Q, respectively (Tables 1.6 and 1.7).

Contraction of a technology continues until the budget impact of the new technology is reached (in which case the technology generally remains partially adopted), or the technology is fully contracted (i.e., its incremental expenditure is zero), at which point reallocation switches to another technology. In the primary analysis, following a net investment, technology R is contracted until the budget impact reaches \$7.5m, at which point technology R is fully contracted and reallocation switches to technology C (Table 1.6).

Expansion of a technology continues until the budget impact of the new technology is reached, in which case the technology remains partially adopted, or the technology is exhausted, at which point reallocation switches to another technology. In the primary analysis, following a net disinvestment, technology R is expended until the budget impact reaches \$42.5m, at which point technology R is exhausted and reallocation switches to technology Q (Table 1.7).

If technologies are divisible and have constant returns, reallocation has the following general characteristics:

1. The required reduction or increase in incremental expenditure on initial technologies is always achieved exactly (i.e., no initial budget is left unspent).
2. The marginal ICER of each technology does not change with changes in incremental expenditure. Therefore, the marginal ICER of the *marginal* technology in expansion increases *only* when reallocation switches to a different technology – this switch only occurs when a technology is exhausted. Similarly, the marginal ICER of the *marginal* technology in contraction decreases *only* when reallocation switches to a different technology – this switch only occurs when a technology is fully contracted.
3. Once reallocation is complete, the new allocation has the same general characteristics as the initial allocation, as noted earlier.

Table 1.6: Reallocation following net investment (divisibility and constant returns)

Note: This table is abridged. Complete table provided in Appendix 1.1, Table A1.1.1

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$0.1m	R	-2.5	$40,758	-2.5	$40,758	O	-3.6	$27,938	-3.6	$27,938	Q	-2.1	$48,185	-2.1	$48,185
$0.2m	R	-2.5	$40,758	-4.9	$40,758	O	-3.6	$27,938	-7.2	$27,938	Q	-2.1	$48,185	-4.2	$48,185
$0.3m	R	-2.5	$40,758	-7.4	$40,758	O	-3.6	$27,938	-10.7	$27,938	Q	-2.1	$48,185	-6.2	$48,185
$7.5m	R	-2.5	$40,758	-184.0	$40,758	O	-3.6	$27,938	-268.4	$27,938	Q	-2.1	$48,186	-155.6	$48,185
$7.6m	C	-2.5	$39,802	-186.5	$40,745	O	-3.6	$27,938	-272.0	$27,938	R	-2.5	$40,758	-158.1	$48,070
$7.7m	C	-2.5	$39,802	-189.0	$40,733	O	-3.6	$27,938	-275.6	$27,938	R	-2.5	$40,758	-160.6	$47,958
$14.3m	C	-2.5	$39,803	-354.9	$40,298	O	-3.6	$27,938	-511.8	$27,938	R	-2.5	$40,758	-322.5	$44,343
$14.4m	C	-2.5	$39,801	-357.4	$40,294	I	-5.5	$18,084	-517.4	$27,833	R	-2.5	$40,758	-324.9	$44,316
$14.5m	C	-2.5	$39,803	-359.9	$40,291	I	-5.5	$18,084	-522.9	$27,730	R	-2.5	$40,758	-327.4	$44,289
$21.2m	C	-2.5	$39,803	-528.2	$40,135	I	-5.5	$18,084	-893.4	$23,730	R	-2.5	$40,758	-491.8	$43,109
$21.3m	H	-3.0	$33,472	-531.2	$40,098	I	-5.5	$18,084	-898.9	$23,695	R	-2.5	$40,758	-494.2	$43,097
$21.4m	H	-3.0	$33,472	-534.2	$40,060	I	-5.5	$18,084	-904.5	$23,661	R	-2.5	$40,758	-496.7	$43,086
$30.9m	H	-3.0	$33,473	-818.0	$37,775	I	-5.5	$18,084	-1429.8	$21,612	R	-2.5	$40,756	-729.8	$42,342
$31.0m	H	-3.0	$33,472	-821.0	$37,759	T	-6.5	$15,316	-1436.3	$21,583	R	-2.5	$40,758	-732.2	$42,337
$31.1m	H	-3.0	$33,472	-824.0	$37,743	T	-6.5	$15,316	-1442.8	$21,555	R	-2.5	$40,758	-734.7	$42,332
$39.5m	H	-3.0	$33,472	-1074.9	$36,746	T	-6.5	$15,316	-1991.3	$19,836	R	-2.5	$40,758	-940.8	$41,987
$39.6m	O	-3.6	$27,938	-1078.5	$36,717	T	-6.5	$15,316	-1997.8	$19,821	R	-2.5	$40,758	-943.2	$41,984
$39.7m	O	-3.6	$27,938	-1082.1	$36,688	T	-6.5	$15,316	-2004.4	$19,807	R	-2.5	$40,758	-945.7	$41,981
$49.8m	O	-3.6	$27,938	-1443.6	$34,497	T	-6.5	$15,316	-2663.8	$18,695	R	-2.5	$40,766	-1193.5	$41,727
$49.9m	O	-3.6	$27,938	-1447.2	$34,481	T	-6.5	$15,316	-2670.4	$18,687	R	-2.5	$40,750	-1195.9	$41,725
$50.0m	O	-3.6	$27,938	-1450.8	$34,464	T	-6.5	$15,316	-2676.9	$18,678	R	-2.5	$40,766	-1198.4	$41,723

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $0.1m reduction in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m reduction in incremental expenditure on marginal technology; [c] Marginal ICER in contraction for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net investments.

Table 1.7: Reallocation following net disinvestment (divisibility and constant returns)

Note: This table is abridged. Complete table provided in Appendix 1.1, Table A1.1.2

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$0.1m	R	2.5	$40,758	2.5	$40,758	O	3.6	$27,938	3.6	$27,938	Q	2.1	$48,185	2.1	$48,185
$0.2m	R	2.5	$40,758	4.9	$40,758	O	3.6	$27,938	7.2	$27,938	Q	2.1	$48,185	4.2	$48,185
$0.3m	R	2.5	$40,758	7.4	$40,758	O	3.6	$27,938	10.7	$27,938	Q	2.1	$48,185	6.2	$48,185
$10.5m	R	2.5	$40,758	257.6	$40,758	O	3.6	$27,938	375.8	$27,938	Q	2.1	$48,183	217.9	$48,185
$10.6m	R	2.5	$40,758	260.1	$40,758	H	3.0	$33,472	378.8	$27,982	Q	2.1	$48,186	220.0	$48,185
$10.7m	R	2.5	$40,758	262.5	$40,758	H	3.0	$33,472	381.8	$28,025	Q	2.1	$48,186	222.1	$48,185
$14.0m	R	2.5	$40,758	343.5	$40,758	H	3.0	$33,472	480.4	$29,143	Q	2.1	$48,183	290.5	$48,185
$14.1m	R	2.5	$40,758	345.9	$40,758	H	3.0	$33,472	483.4	$29,170	M	2.0	$49,596	292.6	$48,195
$14.2m	R	2.5	$40,758	348.4	$40,758	H	3.0	$33,472	486.4	$29,196	M	2.0	$49,596	294.6	$48,205
$28.8m	R	2.5	$40,758	706.6	$40,758	H	3.0	$33,472	922.6	$31,218	M	2.0	$49,596	589.0	$48,900
$28.9m	R	2.5	$40,758	709.1	$40,758	C	2.5	$39,802	925.1	$31,241	M	2.0	$49,596	591.0	$48,902
$29.0m	R	2.5	$40,758	711.5	$40,758	C	2.5	$39,802	927.6	$31,264	M	2.0	$49,596	593.0	$48,905
$33.7m	R	2.5	$40,758	826.8	$40,758	C	2.5	$39,803	1045.7	$32,228	M	2.0	$49,596	687.8	$49,000
$33.8m	R	2.5	$40,758	829.3	$40,758	C	2.5	$39,801	1048.2	$32,246	N	1.6	$61,479	689.4	$49,029
$33.9m	R	2.5	$40,758	831.7	$40,758	C	2.5	$39,803	1050.7	$32,265	N	1.6	$61,479	691.0	$49,059
$37.8m	R	2.5	$40,758	927.4	$40,758	C	2.5	$39,803	1148.7	$32,907	N	1.6	$61,479	754.4	$50,103
$37.9m	R	2.5	$40,758	929.9	$40,758	C	2.5	$39,801	1151.2	$32,923	W	0.6	$168,385	755.0	$50,196
$38.0m	R	2.5	$40,758	932.3	$40,758	C	2.5	$39,803	1153.7	$32,938	W	0.6	$168,385	755.6	$50,289
$42.5m	R	2.5	$40,766	1042.7	$40,758	C	2.5	$39,803	1266.8	$33,550	W	0.6	$168,387	782.4	$54,323
$42.6m	Q	2.1	$48,185	1044.8	$40,773	R	2.5	$40,758	1269.2	$33,564	W	0.6	$168,384	783.0	$54,409
$42.7m	Q	2.1	$48,185	1046.9	$40,788	R	2.5	$40,758	1271.7	$33,578	W	0.6	$168,384	783.5	$54,496
$49.8m	Q	2.1	$48,183	1194.2	$41,700	R	2.5	$40,758	1445.9	$34,443	W	0.6	$168,384	825.7	$60,312
$49.9m	Q	2.1	$48,186	1196.3	$41,712	R	2.5	$40,758	1448.3	$34,454	W	0.6	$168,384	826.3	$60,389
$50.0m	Q	2.1	$48,186	1198.4	$41,723	R	2.5	$40,758	1450.8	$34,464	W	0.6	$168,387	826.9	$60,467

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $0.1m increase in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m increase in incremental expenditure on marginal technology; [c] Marginal ICER in expansion for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net disinvestments.

Divisibility and diminishing returns

In common with the ‘constant returns’ scenario, if the new technology is a net investment then the decision maker reduces incremental expenditure on initial technologies by contracting adopted NE technologies in descending order of their marginal ICERs in contraction, and/or by expanding non-exhausted SW technologies in ascending order of their marginal ICERs in expansion, depending upon which provides the smallest loss in incremental benefit for the associated reduction in incremental expenditure. Conversely, if the new technology is a net disinvestment then the decision maker increases incremental expenditure on initial technologies by expanding non-exhausted NE technologies in ascending order of their marginal ICERs in expansion, and/or by contracting adopted SW technologies in descending order of their marginal ICERs in contraction, depending upon which provides the greatest gain in incremental benefit for the associated increase in incremental expenditure.

However, under ‘diminishing returns’, the marginal ICER of each technology in expansion rises with increases in incremental expenditure, while the marginal ICER of each technology in contraction falls with decreases in incremental expenditure.

The marginal ICER of the *marginal* technology in expansion therefore increases *continuously* throughout reallocation, while the marginal ICER of the marginal technology in contraction decreases continuously throughout reallocation, such that reallocation frequently switches between different technologies. The technologies that remained partially adopted following the initial allocation – with similar marginal ICERs in expansion – are among the first to be expanded or contracted during reallocation.

Since expenditure is considered in discrete $0.1m increments, the marginal ICERs in expansion and contraction for each technology are similar but not identical. Since, at any given point during reallocation, several technologies have similar marginal ICERs, it follows that one technology may have the lowest marginal ICER in *expansion* while another technology has the lowest marginal ICER in *contraction*. This is why, in the primary analysis, the first technology to be contracted following a net investment (technology M) differs from the first technology to be expanded following a net disinvestment (technology H) (Tables 1.8 and 1.9).

Table 1.8: Reallocation following net investment (divisibility and diminishing returns)

Note: This table is abridged. Complete table provided in Appendix 1.1, Table A1.1.3

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$0.1m	M	-2.3	$43,235	-2.3	$43,235	R	-4.0	$24,859	-4.0	$24,859	R	-1.7	$59,957	-1.7	$59,957
$0.2m	R	-2.3	$43,211	-4.6	$43,223	O	-4.0	$24,816	-8.1	$24,838	M	-1.7	$59,944	-3.3	$59,950
$0.3m	H	-2.3	$43,191	-6.9	$43,212	O	-4.1	$24,655	-12.1	$24,776	Q	-1.7	$59,920	-5.0	$59,940
$25.0m	O	-2.8	$35,869	-634.2	$39,421	O	-5.1	$19,632	-1158.5	$21,580	Q	-1.9	$51,877	-446.0	$56,053
$25.1m	N	-2.8	$35,833	-637.0	$39,406	T	-5.1	$19,616	-1163.6	$21,571	R	-1.9	$51,875	-447.9	$56,035
$25.2m	H	-2.8	$35,828	-639.8	$39,390	I	-5.1	$19,607	-1168.7	$21,562	M	-1.9	$51,832	-449.9	$56,017
$49.8m	R	-4.0	$25,125	-1440.6	$34,569	T	-8.0	$12,475	-2670.6	$18,647	C	-2.3	$43,365	-967.7	$51,460
$49.9m	O	-4.0	$24,976	-1444.6	$34,543	O	-8.0	$12,443	-2678.7	$18,629	R	-2.3	$43,363	-970.1	$51,440
$50.0m	H	-4.0	$24,965	-1448.6	$34,516	T	-8.1	$12,370	-2686.8	$18,610	H	-2.3	$43,314	-972.4	$51,421

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $0.1m reduction in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m reduction in incremental expenditure on marginal technology; [c] Marginal ICER in contraction for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net investments.

Table 1.9: Reallocation following net disinvestment (divisibility and diminishing returns)

Note: This table is abridged. Complete table provided in Appendix 1.1, Table A1.1.4

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$0.1m	H	2.3	$43,315	2.3	$43,315	H	4.0	$24,965	4.0	$24,965	M	1.7	$60,015	1.7	$60,015
$0.2m	R	2.3	$43,365	4.6	$43,340	O	4.0	$24,976	8.0	$24,971	R	1.7	$60,068	3.3	$60,042
$0.3m	C	2.3	$43,365	6.9	$43,348	R	4.0	$25,125	12.0	$25,022	Q	1.7	$60,082	5.0	$60,055
$25.0m	R	1.9	$51,878	526.4	$47,497	N	2.8	$35,833	814.4	$30,697	R	1.4	$72,228	381.5	$65,534
$25.1m	Q	1.9	$51,877	528.3	$47,513	O	2.8	$35,869	817.2	$30,714	R	1.4	$72,312	382.9	$65,558
$25.2m	M	1.9	$51,962	530.2	$47,529	O	2.8	$35,945	820.0	$30,732	R	1.4	$72,411	384.2	$65,583
$49.8m	Q	1.7	$59,920	969.0	$51,392	H	2.3	$43,191	1444.0	$34,488	L	0.6	$181,524	635.0	$78,425
$49.9m	M	1.7	$59,941	970.7	$51,407	R	2.3	$43,211	1446.3	$34,502	W	0.5	$181,914	635.6	$78,515
$50.0m	R	1.7	$59,956	972.4	$51,421	M	2.3	$43,235	1448.6	$34,516	W	0.5	$182,819	636.1	$78,604

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $0.1m increase in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m increase in incremental expenditure on marginal technology; [c] Marginal ICER in expansion for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net disinvestments.

If technologies are divisible and have diminishing returns, reallocation has the following general characteristics:

1. The required reduction or increase in incremental expenditure on initial technologies is always achieved exactly (i.e., no initial budget is left unspent).
2. The marginal ICER of the marginal technology in expansion increases *continuously* throughout reallocation, while the marginal ICER of the marginal technology in contraction falls continuously throughout reallocation, such that reallocation frequently switches between different marginal technologies.
3. The technology with the lowest marginal ICER in *expansion* is not necessarily the technology with the lowest marginal ICER in *contraction*.
4. Once reallocation is complete, the new allocation has the same general characteristics as the initial allocation, as noted earlier.

Non-divisibility

Following a net investment, the decision maker displaces NE technologies adopted during the initial allocation, and/or adopts SW technologies *not* adopted during the initial allocation, so as to minimize the total loss in incremental benefit while releasing at least enough resources to adopt the new technology (Table 1.10).

Following a net disinvestment, the decision maker adopts NE technologies not adopted during the initial allocation, and/or displaces SW technologies adopted during the initial allocation, so as maximize the total gain in incremental benefit while keeping the increase in incremental expenditure on initial technologies within the amount released by adopting the new technology (Table 1.11).

Since technologies must be displaced or adopted in their entirety, the reduction (increase) in incremental expenditure during reallocation following a net investment (net disinvestment) is generally greater (less) than the budget impact of the new technology. An alternative net investment (net disinvestment) with similar budget impact may therefore result in exactly the same reallocation.

Net investments with small budget impact require displacement of at least one NE technology, or adoption of at least one SW technology, which may result in a greater reduction in incremental expenditure than required for the net investment. It follows that all other net investments with a budget impact less than or equal to this reduction in incremental expenditure are subject to the same reallocation. For example, under the primary budget, a net investment with a budget impact of $0.1m results in the displacement of technology N, which reduces incremental expenditure by $4.1m. It follows that all net investments with a budget impact up to and including $4.1m also result in the displacement of technology N.

Net disinvestments with small budget impact may release too few resources to fund the adoption of a NE technology, or displacement of a SW technology, such that no reallocation is possible. For example, under the primary budget, the smallest incremental expenditure necessary to either adopt a NE technology or displace a SW technology is $8.6m (to displace SW technology L); therefore, all net disinvestments with a budget impact less than $8.6m result in no reallocation.

If technologies are non-divisible, reallocation has the following general characteristics:

1. The required reduction or increase in incremental expenditure on initial technologies is not generally achieved exactly (i.e., some initial budget is generally left unspent).
2. Any NE technologies adopted will *typically* be among those with the lowest ICERs, while NE technologies displaced will *typically* be among those with the highest ICERs. Conversely, any SW technologies adopted will *typically* be among those with the highest ICERs, while SW technologies displaced will *typically* be among those with the lowest ICERs. Exceptions may exist in all cases due to the non-divisibility of technologies.
3. Once reallocation is complete, the new allocation has the same general characteristics as the initial allocation, as noted earlier.

Table 1.10: Reallocation following net investment (non-divisibility)

Note: This table is abridged. Complete table provided in Appendix 1.1, Table A1.1.5

Budget	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
impact	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$0.1m	N	-$4.1m	-66.7	$1,499	C	-$13.7m	-344.2	$291	N	-$4.1m	-66.7	$1,499
$0.2m	N	-$4.1m	-66.7	$2,999	C	-$13.7m	-344.2	$581	N	-$4.1m	-66.7	$2,999
$4.1m	N	-$4.1m	-66.7	$61,479	C	-$13.7m	-344.2	$11,912	N	-$4.1m	-66.7	$61,479
$4.2m	C	-$13.7m	-344.2	$12,202	C	-$13.7m	-344.2	$12,202	C	-$13.7m	-344.2	$12,202
$13.7m	C	-$13.7m	-344.2	$39,802	C	-$13.7m	-344.2	$39,802	C	-$13.7m	-344.2	$39,802
$13.8m	C N	-$17.8m	-410.9	$33,585	I	-$16.6m	-917.9	$15,034	C N	-$17.8m	-410.9	$33,585
$16.6m	C N	-$17.8m	-410.9	$40,400	I	-$16.6m	-917.9	$18,084	C N	-$17.8m	-410.9	$40,400
$16.7m	C N	-$17.8m	-410.9	$40,643	C I	-$30.3m	-1262.1	$13,231	C N	-$17.8m	-410.9	$40,643
$17.8m	C N	-$17.8m	-410.9	$43,320	C I	-$30.3m	-1262.1	$14,103	C N	-$17.8m	-410.9	$43,320
$17.9m	H	-$18.3m	-546.7	$32,740	C I	-$30.3m	-1262.1	$14,182	H	-$18.3m	-546.7	$32,740
$18.3m	H	-$18.3m	-546.7	$33,472	C I	-$30.3m	-1262.1	$14,499	H	-$18.3m	-546.7	$33,472
$18.4m	H N	-$22.4m	-613.4	$29,996	C I	-$30.3m	-1262.1	$14,578	H N	-$22.4m	-613.4	$29,996
$22.4m	H N	-$22.4m	-613.4	$36,517	C I	-$30.3m	-1262.1	$17,748	H N	-$22.4m	-613.4	$36,517
$22.5m	O	-$24.8m	-887.7	$25,347	C I	-$30.3m	-1262.1	$17,827	O	-$24.8m	-887.7	$25,347
$24.8m	O	-$24.8m	-887.7	$27,938	C I	-$30.3m	-1262.1	$19,649	O	-$24.8m	-887.7	$27,938
$24.9m	C H	-$32.0m	-890.9	$27,948	C I	-$30.3m	-1262.1	$19,728	C H	-$32.0m	-890.9	$27,948
$30.3m	C H	-$32.0m	-890.9	$34,009	C I	-$30.3m	-1262.1	$24,007	C H	-$32.0m	-890.9	$34,009
$30.4m	C H	-$32.0m	-890.9	$34,122	C T	-$39.0m	-1996.1	$15,230	C H	-$32.0m	-890.9	$34,122
$32.0m	C H	-$32.0m	-890.9	$35,917	C T	-$39.0m	-1996.1	$16,031	C H	-$32.0m	-890.9	$35,917
$32.1m	C H N	-$36.1m	-957.6	$33,521	C T	-$39.0m	-1996.1	$16,081	C H N	-$36.1m	-957.6	$33,521
$36.1m	C H N	-$36.1m	-957.6	$37,698	C T	-$39.0m	-1996.1	$18,085	C H N	-$36.1m	-957.6	$37,698
$36.2m	C O	-$38.5m	-1231.9	$29,386	C T	-$39.0m	-1996.1	$18,135	R	-$50.0m	-1226.8	$29,509
$38.5m	C O	-$38.5m	-1231.9	$31,253	C T	-$39.0m	-1996.1	$19,287	R	-$50.0m	-1226.8	$31,384
$38.6m	C N O	-$42.6m	-1298.6	$29,725	C T	-$39.0m	-1996.1	$19,338	R	-$50.0m	-1226.8	$31,465
$39.0m	C N O	-$42.6m	-1298.6	$30,033	C T	-$39.0m	-1996.1	$19,538	R	-$50.0m	-1226.8	$31,791
$39.1m	C N O	-$42.6m	-1298.6	$30,110	I T	-$41.9m	-2569.9	$15,215	R	-$50.0m	-1226.8	$31,873
$41.9m	C N O	-$42.6m	-1298.6	$32,266	I T	-$41.9m	-2569.9	$16,304	R	-$50.0m	-1226.8	$34,155
$42.0m	C N O	-$42.6m	-1298.6	$32,343	C I T	-$55.6m	-2914.1	$14,413	R	-$50.0m	-1226.8	$34,237
$42.6m	C N O	-$42.6m	-1298.6	$32,805	C I T	-$55.6m	-2914.1	$14,619	R	-$50.0m	-1226.8	$34,726
$42.7m	H O	-$43.1m	-1434.4	$29,769	C I T	-$55.6m	-2914.1	$14,653	R	-$50.0m	-1226.8	$34,807
$43.1m	H O	-$43.1m	-1434.4	$30,047	C I T	-$55.6m	-2914.1	$14,790	R	-$50.0m	-1226.8	$35,133
$43.2m	H N O	-$47.2m	-1501.1	$28,779	C I T	-$55.6m	-2914.1	$14,825	R	-$50.0m	-1226.8	$35,215
$47.2m	H N O	-$47.2m	-1501.1	$31,444	C I T	-$55.6m	-2914.1	$16,197	R	-$50.0m	-1226.8	$38,476
$47.3m	C H O	-$56.8m	-1778.6	$26,594	C I T	-$55.6m	-2914.1	$16,232	R	-$50.0m	-1226.8	$38,557
$49.9m	C H O	-$56.8m	-1778.6	$28,056	C I T	-$55.6m	-2914.1	$17,124	R	-$50.0m	-1226.8	$40,677
$50.0m	C H O	-$56.8m	-1778.6	$28,112	C I T	-$55.6m	-2914.1	$17,158	R	-$50.0m	-1226.8	$40,758

[a] Technologies displaced; [b] Total change in incremental expenditure across all displaced technologies; [c] Total change in incremental benefit (QALYs) resulting from displacement of technologies; [d] Optimal cost-effectiveness threshold (per QALY) for net investments.

Table 1.11: Reallocation following net disinvestment (non-divisibility)

Note: This table is abridged. Complete table provided in Appendix 1.1, Table A1.1.6

Budget	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
impact	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$0.1m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.2m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$4.0m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$4.1m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$61,479	N/A	$0.0m	0.0	N/A
$8.5m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$127,456	N/A	$0.0m	0.0	N/A
$8.6m	L	$8.6m	42.9	$200,521	N	$4.1m	66.7	$128,955	L	$8.6m	42.9	$200,521
$17.7m	L	$8.6m	42.9	$412,700	N	$4.1m	66.7	$265,408	L	$8.6m	42.9	$412,700
$17.8m	W	$17.8m	105.7	$168,385	W	$17.8m	105.7	$168,385	W	$17.8m	105.7	$168,385
$18.2m	W	$17.8m	105.7	$172,169	W	$17.8m	105.7	$172,169	W	$17.8m	105.7	$172,169
$18.3m	W	$17.8m	105.7	$173,115	H	$18.3m	546.7	$33,472	W	$17.8m	105.7	$173,115
$19.6m	W	$17.8m	105.7	$185,413	H	$18.3m	546.7	$35,850	W	$17.8m	105.7	$185,413
$19.7m	M	$19.7m	397.2	$49,596	H	$18.3m	546.7	$36,033	M	$19.7m	397.2	$49,596
$21.4m	M	$19.7m	397.2	$53,875	H	$18.3m	546.7	$39,142	M	$19.7m	397.2	$53,875
$21.5m	Q	$21.5m	446.2	$48,185	H	$18.3m	546.7	$39,325	Q	$21.5m	446.2	$48,185
$22.3m	Q	$21.5m	446.2	$49,978	H	$18.3m	546.7	$40,788	Q	$21.5m	446.2	$49,978
$22.4m	Q	$21.5m	446.2	$50,202	H N	$22.4m	613.4	$36,517	Q	$21.5m	446.2	$50,202
$24.7m	Q	$21.5m	446.2	$55,357	H N	$22.4m	613.4	$40,266	Q	$21.5m	446.2	$55,357
$24.8m	Q	$21.5m	446.2	$55,581	O	$24.8m	887.7	$27,938	Q	$21.5m	446.2	$55,581
$28.8m	Q	$21.5m	446.2	$64,546	O	$24.8m	887.7	$32,444	Q	$21.5m	446.2	$64,546
$28.9m	Q	$21.5m	446.2	$64,770	N O	$28.9m	954.4	$30,282	Q	$21.5m	446.2	$64,770
$37.4m	Q	$21.5m	446.2	$83,820	N O	$28.9m	954.4	$39,189	Q	$21.5m	446.2	$83,820
$37.5m	M W	$37.5m	502.9	$74,564	N O	$28.9m	954.4	$39,293	M W	$37.5m	502.9	$74,564
$39.2m	M W	$37.5m	502.9	$77,944	N O	$28.9m	954.4	$41,075	M W	$37.5m	502.9	$77,944
$39.3m	Q W	$39.3m	551.9	$71,208	N O	$28.9m	954.4	$41,179	Q W	$39.3m	551.9	$71,208
$39.7m	Q W	$39.3m	551.9	$71,933	N O	$28.9m	954.4	$41,599	Q W	$39.3m	551.9	$71,933
$39.8m	Q W	$39.3m	551.9	$72,114	H Q	$39.8m	992.9	$40,084	Q W	$39.3m	551.9	$72,114
$41.1m	Q W	$39.3m	551.9	$74,469	H Q	$39.8m	992.9	$41,393	Q W	$39.3m	551.9	$74,469
$41.2m	M Q	$41.2m	843.4	$48,849	H Q	$39.8m	992.9	$41,494	M Q	$41.2m	843.4	$48,849
$42.0m	M Q	$41.2m	843.4	$49,798	H Q	$39.8m	992.9	$42,299	M Q	$41.2m	843.4	$49,798
$42.1m	M Q	$41.2m	843.4	$49,917	H M N	$42.1m	1010.6	$41,657	M Q	$41.2m	843.4	$49,917
$43.0m	M Q	$41.2m	843.4	$50,984	H M N	$42.1m	1010.6	$42,548	M Q	$41.2m	843.4	$50,984
$43.1m	M Q	$41.2m	843.4	$51,102	H O	$43.1m	1434.4	$30,047	M Q	$41.2m	843.4	$51,102
$47.1m	M Q	$41.2m	843.4	$55,845	H O	$43.1m	1434.4	$32,836	M Q	$41.2m	843.4	$55,845
$47.2m	M Q	$41.2m	843.4	$55,963	H N O	$47.2m	1501.1	$31,444	M Q	$41.2m	843.4	$55,963
$49.9m	M Q	$41.2m	843.4	$59,165	H N O	$47.2m	1501.1	$33,243	M Q	$41.2m	843.4	$59,165
$50.0m	R	$50.0m	1226.8	$40,758	H N O	$47.2m	1501.1	$33,309	M Q	$41.2m	843.4	$59,283

[a] Technologies adopted; [b] Total change in incremental expenditure across all adopted technologies.; [c] Total change in incremental benefit (QALYs) resulting from adoption of technologies; [d] Optimal cost-effectiveness threshold (per QALY) for net disinvestments.

Optimal cost-effectiveness thresholds

The optimal sets of cost-effectiveness thresholds to use under each scenario are summarized in Tables 1.6 – 1.11. Complete tables are provided in Appendix 1.1, Tables A1.1.1 – A1.1.6.

The corresponding threshold curves are plotted in Figures 1.6 – 1.8. The threshold curve to use for net investments is plotted in the northern half of each CE plane, while the threshold curve for disinvestments is plotted in the southern half of each CE plane.

Divisibility and constant returns

For net investments, the optimal threshold *decreases* with the budget impact of the technology and *increases* with the size of the initial budget. For example, with the primary budget, the optimal threshold falls from $40,758 per QALY (at a budget impact of $0.1m) to $34,464 per QALY (at a budget impact of $50.0m); with the lower budget the threshold also falls but from a lower starting point ($27,938 per QALY), and with the higher budget the threshold falls from a higher starting point ($48,185 per QALY) (Table 1.6).

For net disinvestments, the optimal threshold *increases* with the budget impact of the net technology. In common with net investments, the threshold *increases* with the size of the initial budget. For example, with the primary budget, the optimal threshold increases from $40,758 per QALY (at a budget impact of $0.1m) to $41,723 per QALY (at a budget impact of $50.0m); with the lower budget the threshold increases from a lower starting point ($27,938 per QALY), and with the higher budget the threshold increases from a higher starting point ($48,185 per QALY) (Table 1.7).

For both net investments and net disinvestments, the optimal threshold remains constant until reallocation switches from the first marginal technology to the second; the threshold then *continuously* changes thereafter (falling for net investments, and increasing for net disinvestments). This is because the marginal ICER of the marginal technology remains constant until reallocation switches between technologies. Until this first switch, the threshold is determined by *only* the marginal ICER of the first technology to be reallocated, and so remains constant as the budget impact increases. After this first switch, the threshold represents a weighted average of the marginal ICER of the first technology to be reallocated and the (different) marginal ICERs of any subsequent technologies to be reallocated, with these weights changing with the budget impact. The threshold therefore changes continuously with the budget impact *only* after the first switch between technologies during reallocation.

The optimal thresholds for net investments and net disinvestments of *marginal* budget impact ($0.1m) are generally identical. This finding logically follows from four previous findings:

(i) Net investments or disinvestments of very small budget impact require expansion or contraction of only one initial technology;

(ii) For both net investments and net disinvestments, the threshold remains constant until reallocation switches to the next marginal technology;

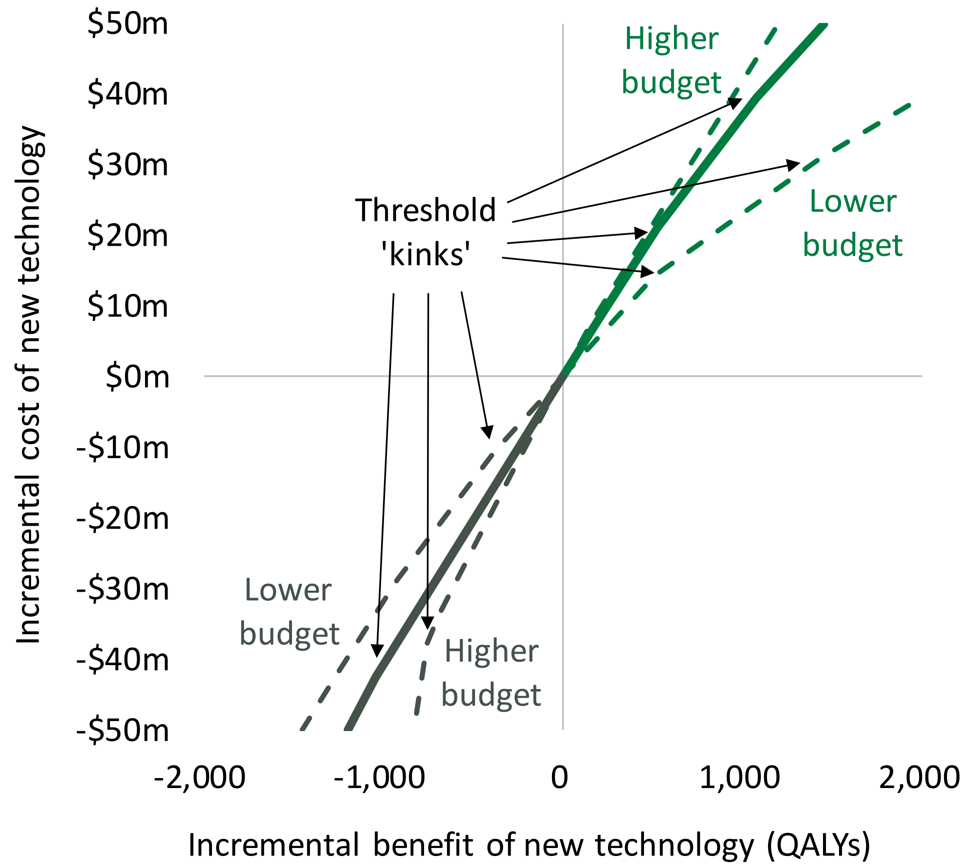
(iii) The first technology to be contracted following a net investment is generally the first to be expanded following a net disinvestment (in both cases this is the technology only partially adopted in the initial allocation); and

(iv) Under constant returns, the marginal ICERs of each technology in expansion and contraction are identical.

The corresponding threshold curves are plotted in Figure 1.6. In common with the standard textbook exposition, these are linear as they pass through the origin of the CE plane. However, there are 'kinks' at multiple points along each threshold curve where reallocation switches between technologies. Between these kinks each threshold curve is linear. The threshold curves are therefore *piecewise linear functions*.

The intuition behind these kinks is that the slope of each threshold curve at any given point is determined by the marginal technology's marginal ICER in contraction (for net investments) or expansion (for net disinvestments). This remains constant as the marginal technology is expanded or contracted, but changes when reallocation switches to a different technology. Thus each threshold curve may be considered as comprising a series of linear curves of different slopes, with a 'kink' at each point where these curves connect.

Figure 1.6: Optimal threshold curves (divisibility and constant returns)



With a lower initial budget, the threshold curve has a shallower slope as it passes through the origin of the CE plane, and is plotted below the primary threshold in the NE quadrant and above the primary threshold in the SW quadrant. Conversely, with a higher initial budget, the threshold curve has a steeper slope as it passes through the origin of the CE plane, and is plotted above the primary threshold in the NE quadrant and below the primary threshold in the SW quadrant.

It follows that net investments in the NE quadrant have greater scope to appear cost-effective with a higher initial budget, but net disinvestments in the SW quadrant have greater scope to appear cost-effective with a lower initial budget.

Divisibility and diminishing returns

For net investments, the optimal threshold *decreases* with the budget impact of the technology and *increases* with the size of the initial budget. For example, with the primary budget, the optimal threshold falls from $43,235 per QALY (at a budget impact of $0.1m) to $24,965 per QALY (at a budget impact of $50.0m); with the lower budget the threshold also falls but from a lower starting point ($24,859 per QALY), and with the higher budget the threshold falls from a higher starting point ($59,957 per QALY) (Table 1.8).

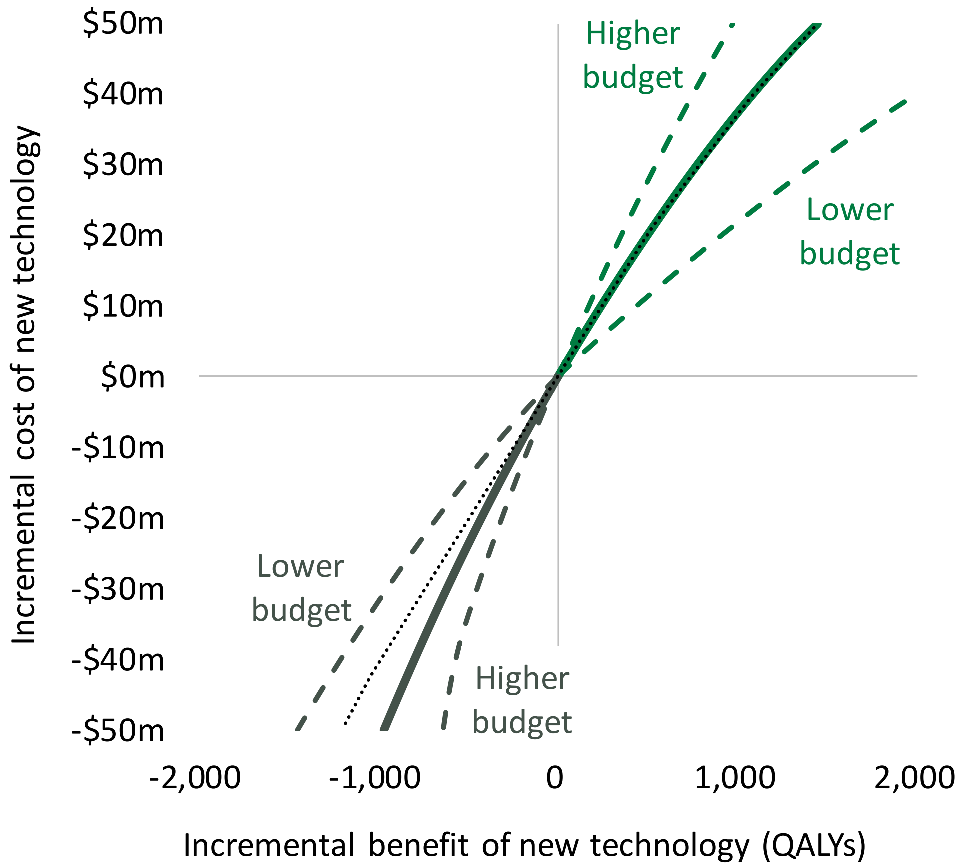
By contrast, the optimal threshold for net disinvestments *increases* with the budget impact of the technology. However, in common with net investments, the threshold *increases* with the size of the initial budget. For example, with the primary budget, the optimal threshold increases from $43,315 per QALY (at a budget impact of $0.1m) to $59,956 per QALY (at a budget impact of $50.0m). With the lower budget the threshold increases but from a lower starting point of $27,938 per QALY, and with the higher budget the threshold increases from a higher starting point of $48,185 per QALY (Table 1.9).

Unlike under constant returns, the optimal thresholds for net investments and net disinvestments change *continuously* as the budget impact increases. This is because reallocation is frequently switching following each incremental reallocation, from one technology to another technology with a similar (but different) marginal ICER. As a result, the threshold curves appear *concave*, such that neither curve exhibits visible 'kinks' (Figure 1.7). It follows that the numerical thresholds for net investments and net disinvestments of marginal budget impact are similar but *not identical*, since the threshold curves are *non-linear* as they pass through the origin.

As under 'constant' returns, a lower (higher) initial budget results in a shallower (steeper) threshold curve which is plotted below (above) the primary threshold in the NE quadrant and above (below) the primary threshold in the SW quadrant.

It follows that, with a higher budget, net investments in the NE quadrant have greater scope to appear cost-effective but net disinvestments in the SW quadrant have less scope to appear cost-effective, with the opposite being true with a lower budget.

Figure 1.7: Optimal threshold curves (divisibility and diminishing returns)



Note: Dotted line represents the optimal threshold under standard assumptions (divisibility and constant returns)

Non-divisibility

For net investments, the threshold increases with the budget impact until the set of initial technologies subject to reallocation changes, at which point the threshold immediately falls and then begins increasing again. This pattern repeats until the maximum budget impact is reached (Table 1.10).

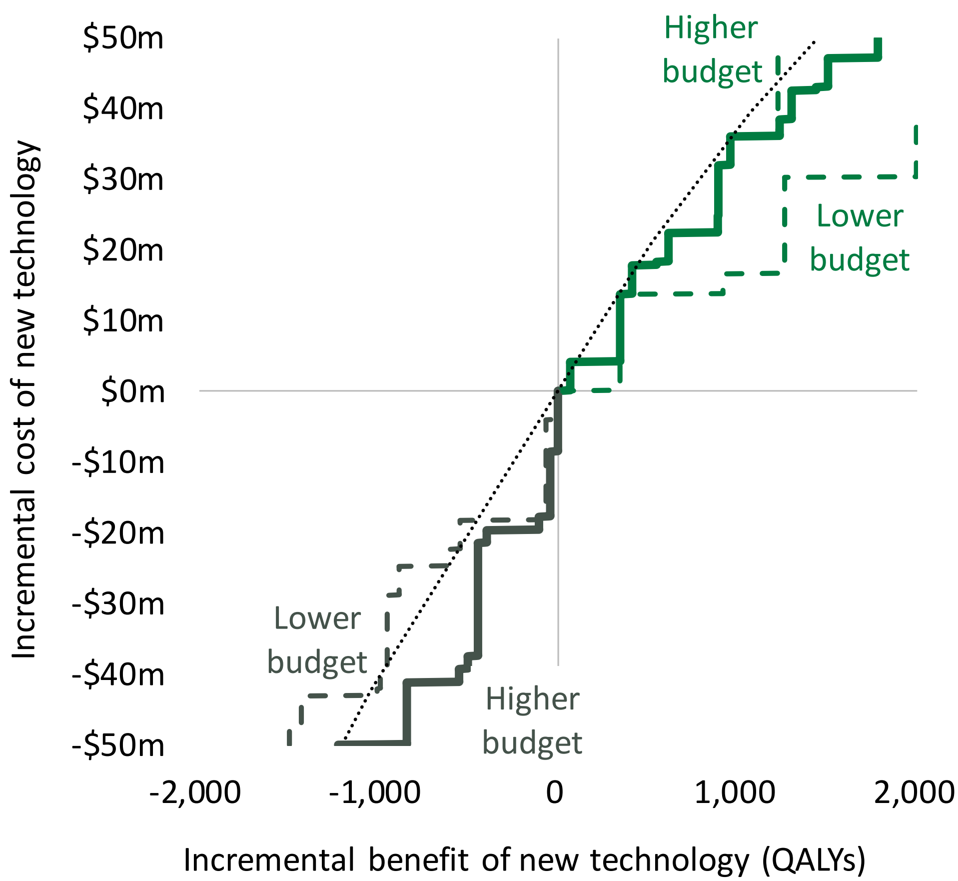
For example, with the primary initial budget, a net investment of $0.1m requires displacement of technology N, resulting in a $4.1m reduction in incremental expenditure and a 66.7 QALYs reduction in incremental benefit. For the net investment to be cost-effective, it must provide an incremental benefit greater than 66.7 QALYs – since the incremental cost is $0.1m, this implies a threshold of $1,499 per QALY. A net investment of $0.2m would result in the same displacement of technology N – since the incremental cost is now $0.2m, the threshold increases to $2,999 per QALY. The threshold continues to increase until the budget impact of the net investment reaches $4.1m (the incremental cost of technology N), at which point the threshold is $61,479 per QALY. A larger net investment of $4.2m requires displacement of a different technology, technology C, resulting in a loss in incremental benefit of 344.2 QALYs. For the $4.2m net investment to be cost-effective, it must therefore provide an incremental benefit of at least 344.2 QALYs, implying a much lower threshold of $12,202 per QALY. The threshold then increases up to a budget impact of $13.8m, beyond which an alternative reallocation is required and the threshold falls once again. This pattern repeats until the maximum budget impact is reached.

For net disinvestments, a similar pattern arises as with net investments: the threshold increases with the budget impact until a different reallocation is required, at which point the threshold suddenly falls and then starts to increase again. This pattern repeats until the maximum budget impact is reached (Table 1.11).

For net disinvestments with small budget impact, *no reallocation is possible* since insufficient resources are released to adopt a NE technology or displace a SW technology. The threshold curve therefore lies on the vertical axis of the CE plane. For such a net disinvestment to be cost-effective, it must provide positive incremental benefits, and hence must lie in the SE quadrant of the CE plane. Since the incremental benefit associated with reallocation – the denominator of the threshold – is zero, the numerical threshold is mathematically undefined.

The threshold curves are plotted in Figure 1.8. The threshold curves for net investments and net disinvestments each resemble a *step function*. Note that, in this analysis, the threshold curves from the analysis with a higher budget largely overlap those from the primary analysis, since the reallocations are identical for many of the possible budget impacts considered.

Figure 1.8: Optimal threshold curves (non-divisibility)



Note: Dotted line represents the optimal threshold under standard assumptions (divisibility and constant returns)

The threshold for net investments cuts right from the origin of the CE plane to the point on the horizontal axis marking the smallest amount of incremental benefit that may be lost through reallocation (for the primary analysis this is 66.7 QALYs, from displacing technology N). The threshold then cuts up the plane to the point representing the reduction in incremental expenditure associated with this reallocation (displacing technology N reduces incremental expenditure by $4.1m). If the incremental cost of the net technology is greater than this then an alternative reallocation is required (in the primary analysis, a budget impact slightly greater than $4.1m requires displacement of technology C), so the threshold then cuts right to the point representing the reduction in incremental expenditure from the *previous* reallocation ($4.1m, from displacing technology N) and the reduction in incremental benefit from the *current* reallocation (344.2 QALYs, from displacing technology C). The threshold then cuts up to the point representing the reduction in incremental benefit and incremental expenditure from the *current* reallocation (344.2 QALYs and $13.7m, from displacing technology C). This pattern repeats itself until the maximum budget impact is reached.

The threshold for net disinvestments cuts down from the origin to the point on the vertical axis marking the incremental cost of the new technology at which reallocation with positive incremental benefit becomes possible (in the primary analysis, technology L can be contracted once the incremental cost falls to -$8.6m). Then the threshold cuts left to the point representing the incremental benefit provided by the technology subject to the current reallocation (technology L provides an incremental benefit of -42.9 QALYs). The threshold then repeatedly cuts down and then left until the maximum budget impact is reached.

For both net investments and net disinvestments, the optimal threshold *tends* to increase with the size of the initial budget, although this relationship may not be observed if the budget impact is small because the number of alternative reallocations is limited. For example, for net investments up to $36.1m, and for net disinvestments up to $49.9m, the same reallocations – and hence the same thresholds – arise with the higher budget than with the primary budget. However, at a budget impact of $50.0m, different reallocations arise with each initial budget and the optimal threshold is greater with a higher initial budget, and smaller with a lower initial budget, for both net investments and net disinvestments.

Discussion

We have considered the characteristics of the optimal cost-effectiveness threshold under a variety of assumptions concerning the divisibility of technologies, marginal returns to scale, the size of the initial budget, and the budget impact of the new technology.

The conventional exposition of the threshold, as a single value represented by a linear function that passes through the origin of the CE plane, is a special case that arises under the following conditions:

a) Initial technologies are *divisible* and exhibit *constant* returns to scale;
b) A single initial technology remains *partially* adopted following initial allocation; and
c) The budget impact of each new technology is sufficiently small that reallocation involves expanding or contracting *only* the partially adopted initial technology.

Under all other conditions, the numerical threshold depends upon whether the new technology is a net investment or net disinvestment and the magnitude of the budget impact, such that the threshold curves are non-linear. These threshold curves are piecewise linear functions under divisibility and constant returns, concave functions under divisibility and diminishing returns, or step functions under non-divisibility. The area to the right of each of these threshold curves is less than it would be if the threshold curves were linear, with this deviation tending to increase with the budget impact. Since new technologies are cost-effective only if they lie to the right of the threshold curve, this reduces the scope for new technologies with substantial budget impact to appear cost-effective compared to that under the standard exposition of the threshold.

This is for good reason: as we have demonstrated, marginal reallocations become progressively less efficient throughout the reallocation process, such that new technologies with substantial budget impact ought to be assessed with a less favourable threshold than those with smaller budget impact. For net investments, the numerical threshold generally falls as the budget impact increases, while for net disinvestments the numerical threshold generally increases. Since technologies in the SW quadrant of the CE plane are considered cost-effective only if their ICER is *greater* than the numerical threshold, this serves to *reduce* the scope for new technologies with substantial budget impact in either quadrant to appear cost-effective.

For new technologies with marginal budget impact, the assumptions regarding the divisibility of technologies and their marginal returns to scale are particularly important for determining the threshold. If technologies are non-divisible, then a marginal net investment requires complete contraction of an initial technology in the NE quadrant or full expansion of an initial technology in the SW quadrant, while a marginal net disinvestment may not release sufficient resources for reinvestment in other technologies (such that it only appears cost-effective if it lies in the SE quadrant). By contrast, if technologies are divisible, then only a marginal change in incremental expenditure on initial technologies is required – compared to non-divisibility, this results in a higher threshold for net investments and a lower threshold for net disinvestments, increasing the scope for a new technology to appear cost-effective in both cases.

Contributions to knowledge

We are unaware of any previous literature which has argued that threshold curves resemble a piecewise linear function if technologies are divisible and exhibit constant returns, or resemble a step function if technologies are non-divisible. In both cases the threshold curves exhibit 'kinks', corresponding to the points where reallocation switches between technologies – in the former case these kinks reflect a switch in the marginal technology during reallocation, while in the latter case they reflect a switch in the subset of technologies subject to expansion or contraction.

With the exception of Eckermann, who made strong assumptions regarding the authority of the decision maker, we also not aware of any authors who have argued that a supply-side estimate of the threshold may differ for *marginal* net investment and net disinvestments.[65] We have demonstrated, under much more general assumptions regarding the decision maker's authority, that these thresholds *generally differ* if technologies are non-divisible, and are generally similar but *not identical* if technologies are divisible and exhibit diminishing returns.

If technologies are divisible and exhibit constant returns, then the optimal thresholds for net investments and net disinvestments of *marginal* budget impact are *generally* the same – however, a special case arises if the initial budget is *just sufficient* to exhaust the last initial technology to be expanded during the initial allocation (this was not observed in our analyses). In such a case, adoption of a marginal net investment will result in contraction of the last initial technology to be adopted, while adoption of a marginal net disinvestment will result in expansion of *another* initial technology. Since the marginal ICERs of these initial technologies will generally differ, this results in *different optimal thresholds* for marginal net investments and net disinvestments. In this special case, the threshold curves continue to resemble a piecewise linear function – however, rather than the threshold curves passing straight through the origin of the CE plane, there is a kink between the threshold curves at the origin.

Our finding that the threshold is conditional upon the budget impact of the new technology conflicts with the standard threshold model but is consistent with recent literature.[25,45]

Strengths and limitations

The simulation results we have presented here represent a first attempt to formalize various assumptions regarding divisibility and marginal returns to scale in a model of the cost-effectiveness threshold. Our model has a number of limitations, many of which can be addressed in future work.

The model assumes perfect information on behalf of the decision maker, and hence efficient allocation and reallocation. Imperfect information would allow for inefficiencies to be considered in allocation and reallocation. This is explored in the following chapter.

The model is deterministic, not probabilistic, and hence all parameters are modelled as fixed, known variables. Probabilistic analysis would allow for *uncertainty* to be considered in the estimate of each model parameter.

Divisibility is approximated by allowing incremental expenditure on technologies to be divided into discrete ‘chunks’ of $0.1m. Perfect divisibility requires that incremental expenditure be considered as continuous.

Our analysis does not consider the possibility of *increasing* returns (i.e., “economies of scale”). This is more challenging to model than diminishing returns, since progressive incremental expansions or contractions of a technology become more, rather than less, desirable. For example, suppose that $0.1m must be allocated, and that the greatest marginal benefit arises from increasing incremental expenditure on technology A by $0.1m. After this $0.1m is allocated to technology A, suppose that *another* $0.1m must be allocate. The greatest marginal benefit will again arise from allocating this $0.1m to technology A, since the marginal benefit of this will be *greater* than for the first allocation while the marginal benefit of allocating $0.1m to all other technologies remains unchanged. However, if it was known from the outset that the *total* increase in incremental expenditure would be $0.2m, then it may have been more desirable to allocate the full $0.2m to *another* technology. This is because the marginal incremental benefit arising from the second $0.1m may have increased by an *even greater* amount if the first $0.1m was allocated to this other technology, such that the *cumulative* incremental benefit from both marginal allocations would have been greater if the full $0.2m had been allocated to the other technology rather than technology A. Unlike under constant or diminishing returns, it follows that it is not possible to consider expansion or contraction in progressive $0.1m increments if marginal returns are increasing. This increases the computational complexity associated with estimating the optimal allocation and reallocation. Addressing this limitation should be the focus of future work.

Bibliography for Chapter 1

12. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. *Methods for the economic evaluation of health care programmes*. 4th ed. Oxford University Press; 2015.

21. Weinstein M, Zeckhauser R. Critical ratios and efficient allocation. *J Public Econ*. 1973;2(2):147–157. doi:10.1016/0047-2727(73)90002-9.

22. Centre for Health Economics. *iDSI Workshop on Cost-Effectiveness Thresholds: Conceptualisation and Estimation*. University of York; 2015.

25. Paulden M, Claxton K. Budget allocation and the revealed social rate of time preference for health. *Health Econ*. 2012;21(5):612–8. doi:10.1002/hec.1730.

26. Claxton K, Paulden M, Gravelle H, Brouwer W, Culyer AJ. Discounting and decision making in the economic evaluation of health-care technologies. *Health Economics*. 2011;20(1):2–15. doi:10.1002/hec.1612.

27. Claxton K, Martin S, Soares M, et al. Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. *Health Technology Assessment*. 2015;19(14):1–503, v–vi. doi:10.3310/hta19140.

28. Gafni A, Birch S. Incremental cost-effectiveness ratios (ICERs): The silence of the lambda. *Soc Sci Med*. 2006;62(9):2091–2100. doi:10.1016/j.socscimed.2005.10.023.

45. Claxton K, Walker S, Palmer S, Sculpher M. *Appropriate Perspectives for Health Care Decisions*. York, UK: University of York

50. Birch S, Donaldson C. Valuing the benefits and costs of health care programmes: where's the "extra" in extra-welfarism? *Soc Sci Med*. 2003;56(5):1121–1133. doi:10.1016/S0277-9536(02)00101-6.

55. Culyer A, McCabe C, Briggs A, et al. Searching for a threshold, not setting one: the role of the National Institute for Health and Clinical Excellence. *Journal of health services research & policy*. 2007;12(1):56–8. doi:10.1258/135581907779497567.

57. Coast J. Maximisation in extra-welfarism: A critique of the current position in health economics. *Soc Sci Med*. 2009;69(5):786–792. doi:10.1016/j.socscimed.2009.06.026.

61. Gold MR, Siegel JE, Russell LB, Weinstein MC. *Cost-effectiveness in health and medicine*. New York: Oxford University Press; 1996.

62. Edlin R, McCabe C, Hulme C, Hall P, Wright J. *Cost E_ffectiveness Modelling for Health Technology Assessment: A Practical Course*. Springer; 2015.

63. Eckermann S, Pekarsky B. Can the Real Opportunity Cost Stand Up: Displaced Services, the Straw Man Outside the Room. *PharmacoEconomics*. 2014. doi:10.1007/s40273-014-0140-3.

64. Paulden M, McCabe C, Karnon J. Achieving allocative efficiency in healthcare: nice in theory, not so NICE in Practice? *Pharmacoeconomics*. 2014;32(4):315–8. doi:10.1007/s40273-014-0146-x.

65. Eckermann S. Kinky Thresholds Revisited: Opportunity Costs Differ in the NE and SW Quadrants. *Appl Heal Econ Heal Policy*. 2015;13(1):7–13. doi:10.1007/s40258-014-0136-3.

69. Birch S, Gafni A. Changing the problem to fit the solution: Johannesson and Weinstein's (mis) application of economics to real world problems. *J Health Econ*. 1993;12(4):469–76.

70. Johannesson M, Weinstein MC. On the decision rules of cost-effectiveness analysis. *J Health Econ*. 1993;12(4):459–67.

71. Garber AM, Phelps CE. Economic foundations of cost-effectiveness analysis. *J Health Econ*. 1997;16(1):1–31.

72. McCabe C, Claxton K, Culyer AJ. The NICE cost-effectiveness threshold: what it is and what that means. *Pharmacoeconomics*. 2008;26(9):733–44.

73. Claxton K, Sculpher M, Drummond M. A rational framework for decision making by the National Institute For Clinical Excellence (NICE). *The Lancet*. 2002;360(9334):711–5. doi:10.1016/s0140-6736(02)09832-x.

74. Birch S, Gafni A. Cost effectiveness/utility analyses. *Journal of Health Economics*. 1992;11(3):279–296. doi:10.1016/0167-6296(92)90004-K.

75. Birch S, Gafni A. Economics and the evaluation of health care programmes: generalisability of methods and implications for generalisability of results. *Health policy*. 2003;64(2):207–219. Available at: http://www.sciencedirect.com/science/article/pii/S0168851002001823.

76. Birch S, Gafni A. Cost effectiveness/utility analyses: Do current decision rules lead us to where we want to be? *Journal of health economics*. 1992. Available at: http://www.sciencedirect.com/science/article/pii/016762969290004K.

77. Birch S, Gafni A. Information created to evade reality (ICER): things we should not look to for answers. *PharmacoEconomics*. 2006;24(11):1121–31.

78. Epstein DM, Chalabi Z, Claxton K, Sculpher M. Efficiency, equity, and budgetary policies: informing decisions using mathematical programming. *Med Decis Making*. 2007;27(2):128–37. doi:10.1177/0272989X06297396.

79. Pekarsky B. Trust, constraints and the counterfactual: Reframing the political economy of new drugs. doi:10.1007/978-3-319-08903-4_3.

80. O'Brien BJ, Gertsen K, Willan AR, Faulkner LA. Is there a kink in consumers' threshold value for cost-effectiveness in health care? *Health Econ*. 2002;11(2):175–80.

81. Willan AR, O'Brien BJ, Leyva RA. Cost-effectiveness analysis when the WTA is greater than the WTP. *Stat Med*. 2001;20(21):3251–9.

82. National Institute for Health and Care Excellence. *Consultation Paper: Value Based Assessment of Health Technologies*.; 2014.

83. National Institute for Health and Care Excellence. *Discounting of health benefits in special circumstances*.; 2011.

84. National Institute for Health and Care Excellence. *Appraising life-extending, end of life treatments*.; 2009.

85. Harris J. NICE and not so nice. *Journal of Medical Ethics*. 2005;31(12):685–688. doi:10.1136/jme.2005.014134.

86. R Core Team. R: A language and environment for statistical computing. 2016.

87. Borchers H. adagio: Discrete and Global Optimization Routines. 2015.

88. Kellerer, Ulrich. *Knapsack Problems*. 1st ed. Berlin: Springer-Verlag Berlin Heidelberg; 2004:548.

Chapter 2: An exploration of the impact of imperfect information and multiple decision makers on the agent's cost-effectiveness threshold using a simulation modelling approach

Mike Paulden[1] and Christopher McCabe[1]

[1] Department of Emergency Medicine, University of Alberta, Edmonton, AB, Canada

Acknowledgements

Financial support for this study was provided by grants from the Canadian Institutes of Health Research (CIHR), Genome Canada, Alberta Innovates Health Solutions and the University of Alberta. Christopher McCabe's research programme is funded by the Capital Health Research Chair in Emergency Medicine Research Endowment at the University of Alberta. The funding agreement ensured the authors' independence in designing the study, interpreting the data, writing, and publishing the report.

Abstract

Background

The previous chapter considered several departures from the standard threshold model. The optimal threshold was found to depend upon a number of factors, including the size of the initial budget, the divisibility of initial technologies, whether initial technologies exhibit constant or diminishing marginal returns to scale, the budget impact of the new technology, and whether the new technology constitutes a net investment or a net disinvestment.

Objectives

The purpose of this chapter is to consider several further departures from the standard model. This includes the explicit consideration of imperfect information and interactions between multiple decision makers with different responsibilities and potentially conflicting objectives. Among these is an 'agent' with responsibility for recommending new technologies for adoption. In this chapter, the optimal threshold is considered from the perspective of this agent.

Methods

We adapted the model developed in the previous chapter to integrate three different decision makers: an 'allocator', with responsibility for allocating the initial budget among the initial technologies in the pool; an 'agent', with responsibility for recommending new technologies for adoption; and a 'reallocator', with responsibility for reallocating resources among initial technologies following adoption of a new technology. Each decision maker has one of two levels of imperfect information regarding the incremental benefit of initial technologies, and acts so as to maximize its own estimate of the aggregate incremental benefit from all adopted technologies. We considered the optimal threshold under 24 alternative scenarios regarding the information held by each decision maker and also the authority of the agent to mandate reallocation and/or implement an alternative to the new technology.

Results

The 24 scenarios resulted in eight unique sets of optimal thresholds. The relevant set of optimal thresholds depends upon the information available to each decision maker and the authority of the agent. In some scenarios, threshold curves pass through the north-west and/or south-east quadrants of the agent's cost-effectiveness (CE) plane. There may also be a 'kink' at the origin of the CE plane, implying different optimal thresholds for marginal net investments and net disinvestments. Under specific conditions, the threshold is not dependent upon the reallocation

that follows adoption of a new technology, but rather the expected incremental benefit of the agent's preferred alternative to the new technology.

Conclusion

Our findings provide novel additions to the literature around the appropriate cost-effectiveness threshold. Our work demonstrates, for the first time, the potential for threshold curves to pass through all four quadrants of the CE plane, requiring a novel interpretation of numerical ICERs. Given the difficulty of empirically estimating the change in incremental benefit associated with reallocation in real world practice, the opportunity to adopt a conceptually different threshold may be worthy of further consideration.

Introduction

The previous chapter considered several departures from the 'standard model' of the cost-effectiveness threshold. This work demonstrated that the optimal threshold to use when considering a new technology for potential adoption into a budget constrained health care system depends upon a number of factors, including the size of the health system budget, the divisibility of initial technologies, whether initial technologies exhibit constant or diminishing marginal returns to scale, the budget impact of the new technology, and whether the new technology constitutes a 'net investment' (imposing positive incremental costs upon the health care system) or a 'net disinvestment' (imposing negative incremental costs).

The purpose of this chapter is to build upon this recent work by considering the implications for the optimal cost-effectiveness threshold of several further departures from the standard model. This includes the explicit consideration of *imperfect information*, as well as modelling the interactions between *multiple decision makers* with different responsibilities and potentially conflicting objectives. Among these multiple decision makers is an 'agent' with responsibility for recommending new technologies for adoption into the health care system. In this chapter, the optimal threshold is therefore considered from the perspective of this agent.

In response to recent theoretical developments by Eckermann & Pekarsky, this chapter will also consider the implications of extending the *authority* of the decision maker responsible for assessing a new technology beyond that assumed in the standard model.[63,64] This includes granting this decision maker the authority to implement a net investment or net disinvestment of resources in other technologies as an *alternative* to adopting the new technology, as well as the authority to *mandate* the reallocation that follows adoption of a new technology and/or implementation of an alternative to the new technology.

We consider the extent to which the optimal threshold – from the perspective of the agent – is dependent upon the agent's authority and the information available to each decision maker. We identify circumstances in which threshold curves may enter the north-west (NW) and/or south-east (SE) quadrants of the cost-effectiveness (CE) plane. This requires a novel interpretation of the ICERs of new technologies in these quadrants. We also find that threshold curves may be 'kinked' at the origin of the CE plane, implying different optimal thresholds for net investments and net disinvestments. Furthermore, we identify specific circumstances in which the optimal threshold is *not* dependent upon the reallocation that follows adoption of the new technology or implementation of an alternative.

Our findings have implications for the estimation and use of thresholds in real world practice, raising the potential for different empirical approaches to estimating thresholds than those used to date. We finish by considering some of the limitations of this work and potential directions for future research in this space.

Methods

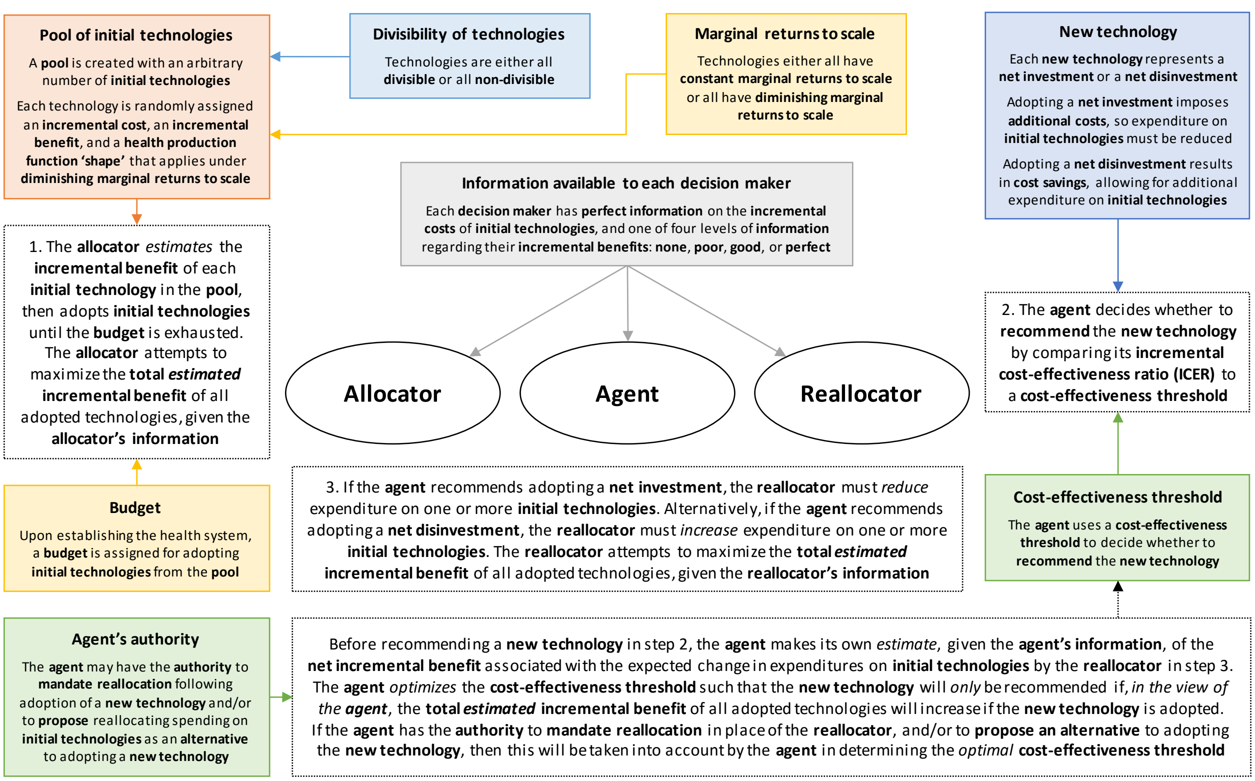
Model structure

We adapted the existing model of a hypothetical health care system developed in the previous chapter. A modified schematic is provided in Figure 2.1.

As before, the model comprises three stages: allocation of resources among a 'pool' of initial technologies, consideration of a new technology for potential adoption into the health care system, and reallocation of resources if the technology is adopted.

Many aspects of the model, including the characteristics of the pool of initial technologies, remain unchanged from those reported in the previous chapter. In this section we report *only* the methodological changes made from the previous chapter.

Figure 2.1: Model schematic



Multiple decision makers

In the previous chapter, a single decision maker was assumed to be responsible for the initial allocation, the decision to adopt a new technology, and any subsequent reallocation.

In practice, different decision makers are responsible for each of these tasks. For example, in the UK, the National Institute for Health and Care Excellence (NICE) provides recommendations on which new technologies should be adopted within the National Health Service (NHS). However, NICE does *not* have authority to mandate which reallocations must be made to accommodate new technologies, nor does NICE bear responsibility for the *existing* allocation of resources within the NHS (save for a narrow range of technologies adopted as a result of previous NICE guidance).[89] Instead, reallocations to accommodate new technologies recommended by NICE are made by local decision makers, while the existing allocation of resources reflects many thousands of historical decisions made by local, regional and national decision makers over previous decades.[90] The authority of comparable agencies is subject to similar constraints. For example, the Canadian Agency for Drugs and Technology in Health (CADTH) issues recommendations on whether new technologies should be adopted within Canada's provincial and territorial health care systems, but CADTH is *not* responsible for any reallocations made by decision makers to accommodate such technologies, nor is CADTH responsible for the prevailing allocation of health care resources in each province or territory.[91]

To reflect this separation of responsibilities, we adapted the model to integrate three different decision makers:

1. An 'allocator', with responsibility for allocating the initial budget among the initial technologies in the pool;
2. An 'agent', with responsibility for recommending, or not recommending, new technologies for adoption into the health care system;
3. A 'reallocator', with responsibility for reallocating incremental expenditure among initial technologies following adoption of a new technology.

While the 'agent' in our model typically represents a single real world decision maker within any particular jurisdiction (e.g., NICE within the UK), the 'allocator' and 'reallocator' in our model may each act as a proxy for *multiple* real world decision makers. These include the many local and national decision makers who have influenced the prevailing allocation of resources, or who determine reallocation following adoption of a new technology. For the purposes of this model, it is assumed that these multiple real world 'allocators' or 'reallocators' are homogeneous, and so can be represented by a single 'allocator' or 'reallocator'.

Imperfect information

In the previous chapter, each initial technology in the 'pool' was randomly assigned an incremental cost and incremental benefit in exhaustion and a specific production function 'shape' that applied if marginal returns were diminishing. Each of these was assumed to be deterministic and the decision maker was assumed to know each with certainty, such that the decision maker could 'optimize' allocation and reallocation by maximizing the aggregate incremental benefit of all adopted technologies.

In practice, information is imperfect. As a result, a decision maker may not know the true value of each decision parameter with certainty. Specifically, imperfect information may result in an inaccurate *expectation* of the true value, *uncertainty* around the expected value, or both. This results in a number of possibilities:

a) A decision maker has an *accurate* and *certain* expectation of the true value (e.g., it correctly estimates the incremental cost of technology B to be $3.5m, and is certain about this estimate). We refer to this as 'perfect information';
b) A decision maker has an *accurate* but *uncertain* expectation of the true value (e.g., it correctly estimates the incremental cost of technology B to be $3.5m, but is *uncertain* so considers this to be a stochastic parameter with a probability distribution);
c) A decision maker has an *inaccurate* but *certain* expectation of the true value (e.g., it *incorrectly* estimates the incremental cost of technology B to be $5.0m, and does not consider the possibility that this estimate may be inaccurate); or
d) A decision maker has an *inaccurate* and *uncertain* expectation of the true value (e.g., it incorrectly estimates the incremental cost of technology B to be $5.0m, but acknowledges this may be inaccurate and so considers this to be a stochastic parameter with a probability distribution).

The previous chapter assumed that possibility (a) applied with respect to all parameters in the model. In this chapter, we assume that (a) applies with respect to all model parameters *except* the incremental benefit of each initial technology, for which (c) applies.

This means that all decision makers have perfect information regarding all model parameters *except* the incremental benefit of each initial technology, for which each decision maker has an *incorrect* estimate that they *believe* to be true. We further assume that these incorrect estimates may *differ* across the three decision makers (allocator, agent and reallocator).

These incorrect estimates are assigned as follows. In the previous chapter, the true incremental benefit of each initial technology was randomly drawn from a normal distribution (mean 500 QALYs, SD 1000 QALYs). In this chapter, we assume that each decision maker *knows* that this is the distribution of incremental benefits across the pool of initial technologies, but does *not* know the specific incremental benefit for each initial technology. We assume that information regarding the incremental benefit for each initial technology can take one of four possible levels: ‘perfect’, ‘good’, ‘poor’, or ‘none’ (no information). With no information, the decision maker estimates the incremental benefit for each technology by randomly drawing a value from the distribution of incremental benefits. With poor information, we assume that the estimated incremental benefit for each technology takes the midpoint of the true value and the estimate with no information. With good information, this estimate is assumed to take the midpoint of the true value and the estimate with poor information. With perfect information, the decision maker is assumed to know the true incremental benefit for each technology.

For example, suppose an initial technology has a true incremental benefit of 150 QALYs, and that, with no information, the decision maker estimates this to be -250 QALYs (by drawing from the same distribution used to assign the true value). With poor information, the decision maker estimates the incremental benefit to be -50 QALYs (the midpoint of -250 and 150 QALYs), and with good information it estimates this to be 50 QALYs (the midpoint of -50 and 150 QALYs).

This has two important implications. First, the ‘better’ the information, the closer the estimated incremental benefit is to the true incremental benefit. Second, with imperfect information, a decision maker may assign a technology to the wrong quadrant of the CE plane. In this example, a decision maker with no information or poor information would assign the technology to the wrong quadrant, while a decision maker with good information would assign the technology to the correct quadrant, despite making an inaccurate estimate of its incremental benefit.

Finally, we assume that all decision makers with the same level of information make the same estimate of the incremental benefit of each initial technology. This allows us to consider scenarios where two or more decision makers have identical information. To implement this, we draw a single 'random' estimate of the incremental benefit for each technology, which is used to derive the estimated incremental benefit under good, poor and no information for all three decision makers (Table 2.1). We assume that each decision maker knows what information each of the other decision makers has, and hence knows what estimate each of the other decision makers has of the incremental benefit of each initial technology.

Objective of each decision maker

The previous chapter considered a single decision maker with perfect information, whose objective was to maximize the aggregate incremental benefit from all adopted technologies. In this chapter, there are multiple decision makers, each of which may have imperfect information. Under imperfect information, decision makers do not know the *true* incremental benefit of each technology. It is therefore assumed that the objective of each decision maker is to maximize *its own estimate* of the aggregate incremental benefit from all adopted technologies.

Although each decision maker shares this common 'meta-objective', if decision makers have *different information* then this results in *different objectives* in operation. The allocator will allocate the initial budget so as to maximize *its* estimate of the aggregate incremental benefit. Following adoption of a new technology, the reallocator will reallocate incremental expenditure among initial technologies so as to maximize *its* estimate of the aggregate incremental benefit. The agent, aware of this process and with knowledge of the information held by the reallocator, will only recommend adoption of a new technology if doing so will maximize *its* estimate of the *net* incremental benefit associated with the new technology and the subsequent reallocation.

Table 2.1: Incremental cost and *estimated* incremental benefit of initial technologies in exhaustion

Tech	ΔC_x [a]	*Perfect information*		*Good information*		*Poor information*		*No information*	
		ΔE_x [b]	*Quadrant* [c]	$E(\Delta E_x)$ [d]	*Quadrant* [e]	$E(\Delta E_x)$ [d]	*Quadrant* [e]	$E(\Delta E_x)$ [d]	*Quadrant* [e]
A	-$2.5m	443.9	SE	767.5	SE	1091.1	SE	1738.3	SE
B	$3.5m	1585.8	NE	1589.3	NE	1592.9	NE	1600.0	NE
C	$13.7m	344.2	NE	313.3	NE	282.4	NE	220.7	NE
D	$36.6m	-191.0	NW	**172.6**	**NE**	**536.1**	**NE**	**1263.2**	**NE**
E	-$6.7m	-970.8	SW	-163.6	SW	**643.6**	**SE**	**2257.9**	**SE**
F	$35.4m	-784.6	NW	-504.6	NW	-224.6	NW	**335.5**	**NE**
G	$41.9m	21.8	NE	281.6	NE	541.3	NE	1060.7	NE
H	$18.3m	546.7	NE	471.7	NE	396.7	NE	246.6	NE
I	$16.6m	917.9	NE	700.3	NE	482.6	NE	47.2	NE
J	-$20.8m	264.3	SE	497.5	SE	730.6	SE	1197.0	SE
K	-$6.4m	1858.7	SE	1311.0	SE	763.3	SE	**-332.0**	**SW**
L	-$8.6m	-42.9	SW	**232.0**	**SE**	**506.9**	**SE**	**1056.7**	**SE**
M	$19.7m	397.2	NE	131.3	NE	**-134.7**	**NW**	**-666.6**	**NW**
N	$4.1m	66.7	NE	2.8	NE	**-61.0**	**NW**	**-188.8**	**NW**
O	$24.8m	887.7	NE	524.4	NE	161.0	NE	**-565.6**	**NW**
P	$9.9m	-149.5	NW	-164.0	NW	-178.5	NW	-207.5	NW
Q	$21.5m	446.2	NE	68.7	NE	**-308.8**	**NW**	**-1063.8**	**NW**
R	$50.m	1226.8	NE	1136.2	NE	1045.7	NE	864.6	NE
S	$3.9m	-877.1	NW	-243.7	NW	**389.7**	**NE**	**1656.5**	**NE**
T	$25.3m	1651.9	NE	1556.1	NE	1460.2	NE	1268.5	NE
U	$40.2m	85.0	NE	396.8	NE	708.5	NE	1332.0	NE
V	-$6.m	1492.2	SE	1216.0	SE	939.9	SE	387.7	SE
W	$17.8m	105.7	NE	147.5	NE	189.2	NE	272.7	NE
X	-$13.m	70.5	SE	398.1	SE	725.8	SE	1381.1	SE
Y	-$2.4m	440.7	SE	522.0	SE	603.4	SE	766.1	SE

[a] Actual incremental cost in exhaustion; [b] Actual incremental benefit in exhaustion; [c] Quadrant of the cost-effectiveness (CE) plane in which the initial technology actually lies. [d] Estimated incremental benefit in exhaustion (given imperfect information); [e] Quadrant of the CE plane in which the initial technology is estimated to lie (given imperfect information).

Authority of the agent

Recent work by Eckermann and Pekarsky has raised important questions about the *authority* of the agent.[63,65,79] The authors assumed that the initial allocation of resources is inefficient, that reallocation following adoption of a new technology is inefficient, that the agent is aware of an *alternative* net investment or net disinvestment of resources among initial technologies that is more efficient than adopting the new technology, and that the agent is also aware of a more efficient reallocation of resources following implementation of this alternative.

Paulden and colleagues questioned the validity of these assumptions in real world practice.[64] For Eckermann and Pekarsky's specification of the threshold to be appropriate, a key assumption is that the agent is not only *aware* of an alternative net investment or net disinvestment opportunity and a more efficient subsequent reallocation of resources, but also has the *authority* to act upon this information in practice.

We can use our model to explore the implications of different assumptions regarding the authority of the agent. If the agent is assumed to have different information to the allocator and reallocator, the agent will *perceive* both the initial allocation of resources and the reallocator's preferred reallocation of resources to be inefficient. To ensure an efficient reallocation of resources from the perspective of the agent, the agent must have the authority to *mandate* reallocation (i.e., overrule the reallocator). In order to recommend a net investment or net disinvestment of resources among initial technologies as an *alternative* to recommending adoption of the new technology, the agent must also have the authority to *implement* such an alternative.

For the purpose of our analysis, there are three specific questions to consider:

1) Can the agent *mandate* reallocation following adoption of a *new technology*?
2) Can the agent *implement* a net investment or net disinvestment of resources among initial technologies as an *alternative* to adopting the new technology?
3) Can the agent *mandate* reallocation following implementation of this *alternative*?

The final question is only applicable if the agent has authority to implement such an alternative.

Authority of the reallocator

In the previous chapter, an assumption was made that the single decision maker could not make a wholesale reorganization of the health care system following each decision to adopt a new technology. Rather, the decision maker could only increase *or* decrease incremental expenditure on initial technologies to the extent necessary to release resources required to adopt a net investment or to use up resources released following adoption of a net disinvestment. This assumption was only necessary if technologies were assumed to be non-divisible, since the optimal solution to the knapsack problem (and hence the optimal subset of initial technologies to adopt) could change substantially in response to the adoption of a new technology with even marginal budget impact. The assumption was not necessary if technologies were assumed to be divisible, because a single decision maker was held responsible for both allocation and reallocation – since the 'reallocator' always regarded the initial allocation as *efficient*, there was no reason to consider a more substantial reallocation of resources than that needed to adopt the new technology.

In this chapter, the allocator and reallocator may have different information, such that the reallocator regards the initial allocation as inefficient. If given the opportunity, the reallocator will therefore conduct a wholesale reallocation of the health care system in response to the adoption of a new technology or implementation of an alternative, regardless of whether technologies are divisible or non-divisible. Given the inherent instability of permitting wholesale reallocation of the health care system in response to the adoption of a single health technology, we again adopt the assumption that the reallocator's authority is limited to making *only* an increase *or* decrease in incremental expenditure on initial technologies to the extent necessary to balance the health system budget following adoption of the new technology or implementation of an alternative to the new technology.

Analysis

The purpose of the analyses conducted in this chapter is to estimate the 'optimal' threshold for the *agent* to adopt in order for the agent to satisfy its objective. This requires that the agent only recommends a new technology for adoption if doing so maximizes the *agent's estimate* of the aggregate incremental benefit associated with all technologies funded by the health care system.

Capabilities of the updated model

Building upon the modelling reported in the previous chapter, the updated model allows for estimation of the optimal threshold under any combination of the following assumptions:

1. The size of the initial budget ('primary' = $50m, 'lower' = $0m or 'higher' = $100m);
2. The characteristics of the pool of initial technologies ('divisible' with 'constant' returns to scale, 'divisible' with 'diminishing' returns to scale, or 'non-divisible');
3. The allocator's information on the incremental benefit of initial technologies ('perfect', 'good', 'poor' or 'none');
4. The budget impact of the new technology ($0.1m to $50.0m, in $0.1m increments);
5. Whether the new technology is a 'net investment' or a 'net disinvestment';
6. The reallocator's information on the incremental benefit of initial technologies ('perfect', 'good', 'poor' or 'none');
7. The agent's information on the incremental benefit of initial technologies ('perfect', 'good', 'poor' or 'none');
8. Whether the agent has authority, or does not have authority, to mandate reallocation following adoption of a new technology;
9. Whether the agent has authority, or does not have authority, to implement an alternative to adopting the new technology;
10. Whether the agent has authority, or does not have authority, to mandate reallocation following implementation of an alternative to the new technology (if applicable).

This corresponds to 864 possible 'sets' of optimal cost-effectiveness thresholds, where each set includes 'subsets' corresponding to each of the four levels of the agent's information, each of which includes subsets for 'net investments' and 'net disinvestments', each of which reports the optimal threshold corresponding to every possible budget impact of the new technology.

Analyses conducted

The previous chapter considered the implications of alternative assumptions regarding the size of the initial budget and whether initial technologies are divisible and exhibit constant or diminishing marginal returns to scale. Since the purpose of this chapter is to consider the implications of modelling multiple decision makers with imperfect information, under various assumptions regarding the authority of the agent, we place the following restrictions on the analyses conducted in this chapter:

1) We consider only the ‘primary’ initial budget of $50m.
2) We assume that technologies are ‘divisible’ and exhibit ‘diminishing’ returns. This is the most general of the scenarios explored in the previous chapter, since it allows for the consideration of partially adopted technologies with a variety of production function shapes. The former is not considered if technologies are assumed to be ‘non-divisible’, while the latter cannot be considered if technologies exhibit ‘constant’ returns.
3) We assume that each decision maker’s information is either ‘good’ or ‘poor’, since ‘perfect’ or ‘no’ information is unlikely to be representative of real world practice.

These restrictions reduce the number of possible threshold sets to 24, each of which includes subsets for two levels of the agent’s information (‘good’ or ‘poor’) and further subsets for ‘net investments’ and ‘net disinvestments’, each of which reports the optimal threshold corresponding to every possible budget impact of the new technology.

Results reported

We consider the initial allocation that arises when the *allocator* has either good or poor information. In both cases, we explain the reasoning behind this allocation and report, for each initial technology, the incremental expenditure following allocation, the incremental benefit corresponding to this incremental expenditure, and the ratio of the incremental expenditure following allocation to the incremental expenditure in exhaustion.

Next, we consider the reallocation that arises when the allocator has good or poor information and the *reallocator* has good or poor information. The marginal technology at each budget impact is reported, along with estimates of the marginal change in incremental benefit, the marginal ICER, and the cumulative change in incremental benefit resulting from the entire reallocation. Since the optimal threshold is determined by the *agent's* estimates of each of these, which may differ from the reallocator's estimates, separate estimates are reported with good or poor information. The reasoning behind this reallocation is then given under each combination of the allocator's information and the reallocator's information, with separate consideration given to net investments and net disinvestments.

Finally, we consider the optimal set of thresholds corresponding to each of the 24 combinations of assumptions described earlier. If two or more threshold sets are found to be identical, we report only one of these sets and provide an explanation for this finding. For each unique threshold set, we plot each threshold subset on the agent's CE plane and report the estimated threshold corresponding to every budget impact within each threshold subset. We then report the general characteristics of the threshold set and explain the reasoning behind these characteristics, with reference to the observed behaviour of the agent and reallocator. This reasoning is reported separately for net investments and net disinvestments, and for when the agent has good or poor information regarding the incremental benefit of initial technologies. We also provide an algebraic specification for each threshold subset (Appendix 2.2).

In common with the previous chapter, we refer to the graphical depictions of the threshold on the CE plane as 'threshold curves' and their numerical representation (in terms of 'dollars per QALY') as 'numerical thresholds'. Each threshold curve reports the minimum incremental benefit required for a new technology to be considered cost-effective by the agent, given its incremental cost. The numerical threshold is calculated by dividing the new technology's incremental cost by this minimum incremental benefit. Note that the numerical threshold is equivalent to the slope of a chord joining the origin of the CE plane to the point on the threshold curve corresponding to the incremental cost of the new technology, while the ICER of a new technology is equivalent to the slope of a chord joining the origin of the CE plane to the point where the new technology is plotted on the CE plane.

Interpreting threshold curves and numerical thresholds

For a new technology to be considered cost-effective, it must lie to the *right* of the threshold curve on the CE plane. This is analogous to considering whether the technology has positive 'incremental net benefit' when calculated using the numerical threshold.[26]

Alternatively, if the agent makes recommendations by comparing the ICER of the new technology to the numerical threshold, then the relevant decision rules are as follows:

- If the new technology lies in the north-east (NE) quadrant, then:
    - If the numerical threshold is positive (i.e., the point on the threshold curve corresponding to the incremental cost of the new technology is also in the NE quadrant), then the new technology is cost-effective only if its ICER is *less* than the numerical threshold.
    - If the numerical threshold is negative (i.e., the respective point on the threshold curve is in the NW quadrant) then the new technology is cost-effective.
- If the new technology lies in the south-west (SW) quadrant, then:
    - If the numerical threshold is positive (i.e., the point on the threshold curve corresponding to the incremental cost of the new technology is also in the SW quadrant), then the new technology is cost-effective only if its ICER is *greater* than the numerical threshold.
    - If the numerical threshold is negative (i.e., the respective point on the threshold curve is in the SE quadrant) then the new technology is *not* cost-effective.
- If the new technology lies in the SE quadrant, then:
    - If the numerical threshold is negative (i.e., the point on the threshold curve corresponding to the incremental cost of the new technology is also in the SE quadrant), then the new technology is cost-effective only if its ICER is *less negative* than the numerical threshold.
    - If the numerical threshold is positive (i.e., the respective point on the threshold curve is in the SW quadrant) then the new technology is cost-effective.
- If the new technology lies in the NW quadrant, then:
    - If the numerical threshold is negative (i.e., the point on the threshold curve corresponding to the incremental cost of the new technology is also in the NW quadrant), then the new technology is cost-effective only if its ICER is *more negative* than the numerical threshold.
    - If the numerical threshold is positive (i.e., the respective point on the threshold curve is in the NE quadrant) then the new technology is *not* cost-effective.

Results

Initial allocation

The allocation of the budget among the initial technologies is summarized in Table 2.1. This allocation depended upon the information available to the allocator (good or poor). The optimal allocation – that which would arise if the allocator had perfect information, as assumed in the previous chapter – is also provided for comparative purposes. In common with the previous chapter, exhausted technologies are identified by a 100% ratio of their incremental expenditure following allocation to their incremental expenditure in exhaustion; for technologies not adopted this ratio is 0%, while for partially adopted technologies this ratio lies between 0% and 100%.

Under imperfect information, the initial allocation has some general characteristics that are similar, but not identical, to those noted in the previous chapter under conditions of perfect information:

1. All technologies *believed to lie* in the SE quadrant of the CE plane were adopted until exhaustion, while all technologies believed to lie in the NW quadrant were not adopted.
2. The decision maker then allocated the budget among technologies believed to lie in the NE quadrant in $0.1m increments, regularly switching between technologies following each incremental allocation (since the marginal ICER of each technology in expansion changes with incremental expenditure).
3. When the available budget was spent, the decision maker considered marginal expansions of pairs of technologies – one believed to lie in the SW quadrant, the other believed to lie in the NE quadrant – repeatedly switching between pairs after each marginal expansion until no further pairs existed with a positive *net* incremental benefit.
4. Following allocation, the initial budget is fully spent; in general, multiple technologies believed to lie in the NE and SW quadrants remain partially adopted with similar marginal ICERs in expansion.

If the allocator has poor information, then the *actual* total incremental benefit across all adopted initial technologies is 8593.8 QALYs. This is less than that if the allocator has good information (10,794.4 QALYs), which is less than that with perfect information (11,092.1 QALYs). Nevertheless, since the allocator maximizes its own *expectation* of the total incremental benefit, given its imperfect information, the allocator *perceives* its allocation to be efficient.

Table 2.2: Initial allocation

Tech			***Optimal allocation***			***Allocation with good information***					***Allocation with poor information***				
	ΔC_x [a]	ΔE_x [b]	ΔC_a [c]	ΔE_a [d]	$\frac{\Delta C_a}{\Delta C_x}$	$E(\Delta E_x)$ [e]	ΔC_a [f]	$E(\Delta E_a)$ [g]	ΔE_a [h]	$\frac{\Delta C_a}{\Delta C_x}$	$E(\Delta E_x)$ [e]	ΔC_a [f]	$E(\Delta E_a)$ [g]	ΔE_a [h]	$\frac{\Delta C_a}{\Delta C_x}$
Initial technologies in the south-east (SE) quadrant															
A	-\$2.5m	443.9	-\$2.5m	443.9	100%	767.5	-\$2.5m	767.5	443.9	100%	1091.1	-\$2.5m	1091.1	443.9	100%
J	-\$20.8m	264.3	-\$20.8m	264.3	100%	497.5	-\$20.8m	497.5	264.3	100%	730.6	-\$20.8m	730.6	264.3	100%
K	-\$6.4m	1858.7	-\$6.4m	1858.7	100%	1311.0	-\$6.4m	1311.0	1858.7	100%	763.3	-\$6.4m	763.3	1858.7	100%
V	-\$6.0m	1492.2	-\$6.0m	1492.2	100%	1216.0	-\$6.0m	1216.0	1492.2	100%	939.9	-\$6.0m	939.9	1492.2	100%
X	-\$13.0m	70.5	-\$13.0m	70.5	100%	398.1	-\$13.0m	398.1	70.5	100%	725.8	-\$13.0m	725.8	70.5	100%
Y	-\$2.4m	440.7	-\$2.4m	440.7	100%	522.0	-\$2.4m	522.0	440.7	100%	603.4	-\$2.4m	603.4	440.7	100%
Total	*-\$51.1m*	*4570.2*	*-\$51.1m*	*4570.2*	*100%*	*4712.2*	*-\$51.1m*	*4712.2*	*4570.2*	*100%*	*4854.2*	*-\$51.1m*	*4854.2*	*4570.2*	*100%*
Initial technologies in the south-west (SW) quadrant															
E	-\$6.7m	-970.8	-\$0.1m	-1.8	1%	-163.6	-\$1.5m	-17.3	-102.8	22%	643.6	-\$6.7m	643.6	-970.8	100%
L	-\$8.6m	-42.9	-\$8.6m	-42.9	100%	232.0	-\$8.6m	232.0	-42.9	100%	506.9	-\$8.6m	506.9	-42.9	100%
Total	*-\$15.3m*	*-1013.6*	*-\$8.7m*	*-44.7*	*57%*	*68.4*	*-\$10.1m*	*214.7*	*-145.7*	*66%*	*1150.5*	*-\$15.3m*	*1150.5*	*-1013.6*	*100%*
Initial technologies in the north-east (NE) quadrant															
B	\$3.5m	1585.8	\$3.5m	1585.8	100%	1589.3	\$3.5m	1589.3	1585.8	100%	1592.9	\$3.5m	1592.9	1585.8	100%
C	\$13.7m	344.2	\$5.2m	180.4	38%	313.3	\$9.1m	238.5	262.0	66%	282.4	\$0.0m	0.0	0.0	0%
G	\$41.9m	21.8	\$0.0m	0.0	0%	281.6	\$0.7m	18.4	1.4	2%	541.3	\$0.0m	0.0	0.0	0%
H	\$18.3m	546.7	\$11.7m	405.8	64%	471.7	\$17.3m	454.4	526.6	95%	396.7	\$18.3m	396.7	546.7	100%
I	\$16.6m	917.9	\$16.6m	917.9	100%	700.3	\$16.6m	700.3	917.9	100%	482.6	\$16.6m	482.6	917.9	100%
M	\$19.7m	397.2	\$3.3m	95.1	17%	131.3	\$0.1m	1.9	5.8	1%	-134.7	\$0.0m	0.0	0.0	0%
N	\$4.1m	66.7	\$0.5m	23.3	12%	2.8	\$0.0m	0.0	0.0	0%	-61.0	\$0.0m	0.0	0.0	0%
O	\$24.8m	887.7	\$24.8m	887.7	100%	524.4	\$12.9m	339.1	574.1	52%	161.0	\$0.0m	0.0	0.0	0%
Q	\$21.5m	446.2	\$4.6m	159.6	21%	68.7	\$0.1m	1.9	12.4	0%	-308.8	\$0.0m	0.0	0.0	0%
R	\$50.0m	1226.8	\$14.1m	651.4	28%	1136.2	\$21.1m	738.1	796.9	42%	1045.7	\$48.8m	1020.6	1211.9	98%
T	\$25.3m	1651.9	\$25.3m	1651.9	100%	1556.1	\$25.3m	1556.1	1651.9	100%	1460.2	\$25.3m	1460.2	1651.9	100%
U	\$40.2m	85.0	\$0.1m	4.2	0%	396.8	\$3.2m	111.9	24.0	8%	708.5	\$0.0m	0.0	0.0	0%
W	\$17.8m	105.7	\$0.1m	3.3	1%	147.5	\$0.6m	15.4	11.0	3%	189.2	\$0.0m	0.0	0.0	0%
Total	*\$297.4m*	*8283.6*	*\$109.8m*	*6566.5*	*37%*	*7319.8*	*\$110.5m*	*5765.3*	*6370.0*	*37%*	*6356.0*	*\$112.5m*	*4953.0*	*5914.3*	*38%*
Initial technologies in the north-west (NW) quadrant															
D	\$36.6m	-191.0	\$0.0m	0.0	0%	172.6	\$0.7m	23.9	-0.1	2%	536.1	\$0.0m	0.0	0.0	0%
F	\$35.4m	-784.6	\$0.0m	0.0	0%	-504.6	\$0.0m	0.0	0.0	0%	-224.6	\$0.0m	0.0	0.0	0%
P	\$9.9m	-149.5	\$0.0m	0.0	0%	-164.0	\$0.0m	0.0	0.0	0%	-178.5	\$0.0m	0.0	0.0	0%
S	\$3.9m	-877.1	\$0.0m	0.0	0%	-243.7	\$0.0m	0.0	0.0	0%	389.7	\$3.9m	389.7	-877.1	100%
Total	*\$85.8m*	*-2002.1*	*\$0.0m*	*0.0*	*0%*	*-739.6*	*\$0.7m*	*23.9*	*-0.1*	*1%*	*522.8*	*\$3.9m*	*389.7*	*-877.1*	*5%*
Total	**\$316.8m**	**9838.1**	**\$50.0m**	**11092.1**		**11360.8**	**\$50.0m**	**10716.0**	**10794.4**		**12883.4**	**\$50.0m**	**11347.3**	**8593.8**	

[a] Actual incremental cost in exhaustion; [b] Actual incremental benefit (QALYs) in exhaustion; [c] Incremental expenditure following allocation of budget under perfect information; [d] Actual/expected incremental benefit (QALYs) following allocation of budget under perfect information; [e] Expected incremental benefit (QALYs) in exhaustion under imperfect information; [f] Incremental expenditure following allocation of budget under imperfect information; [g] Expected incremental benefit (QALYs) following allocation of budget under imperfect information; [h] Actual incremental benefit (QALYs) following allocation of budget under imperfect information.

Allocator has poor information

With poor information, the allocator wrongly assigned technologies E and L to the SE (rather than SW) quadrant of the CE plane, technologies M, N and Q to the NW (rather than NE) quadrant, and technologies D and S to the NE (rather than NW) quadrant (Table 2.1).

This resulted in the initial allocator exhausting technology E (incremental expenditure -$6.7m) under the mistaken belief that this cost-saving technology also has positive incremental benefit. The allocator's *expected* incremental benefit from exhausting E was 643.6 QALYs, but the *actual* incremental benefit was -970.8 QALYs. Under the optimal allocation (with perfect information), incremental expenditure on E would have been just -$0.1m, resulting in an actual incremental benefit of -1.8 QALYs. *Partially* expanding technology E would have been optimal because the reduction in incremental expenditure ($0.1m) could have been used to increase incremental expenditure on another technology, resulting in a greater increase in incremental benefit than was lost through the partial expansion of technology E. However, expanding E until exhaustion was *not* optimal because the reduction in incremental expenditure ($6.7m) was insufficient to compensate for the relatively large 970.9 QALYs loss in incremental benefit.

The other technology wrongly assigned to the SE quadrant was L, which the allocator also exhausted (incremental expenditure -$8.6m). Fortunately, although L actually lies in the SW quadrant, the actual loss in incremental benefit from its exhaustion (42.9 QALYs) was small relative to the reduction in incremental expenditure ($8.6m), such that L would also have been exhausted under the optimal allocation. Therefore, although the allocator's imperfect information led to a false belief about technology L's incremental benefit and its quadrant on the CE plane, in this specific instance it did *not* contribute towards an inefficient allocation of the initial budget.

Wrongly allocating technologies M, N and Q to the NW quadrant resulted in the allocator choosing not to adopt any of these technologies – even partially – under the mistaken belief that these cost-increasing technologies have negative incremental benefit. Under the optimal allocation, all three would have been partially adopted, resulting in an incremental benefit for technologies M, N and Q of 95.1 QALYs, 23.3 QALYs and 159.6 QALYs, at an incremental expenditure of $3.3m, $0.5m and $4.6m, respectively.

By allocating technologies D and S to the NE quadrant, the allocator considered the possibility that each might be sufficiently cost-effective to expand at least partially, when in fact both lie in the NW quadrant and so would not have been adopted under the optimal allocation. Although the allocator did not choose to adopt technology D, the allocator did decide to exhaust technology S (incremental expenditure $3.9m). While the allocator believed this would result in an incremental benefit of 389.7 QALYs, it actually resulted in a loss of 877.1 QALYs.

Among the initial technologies *not* assigned to the wrong quadrant of the CE plane, differences between their actual and expected incremental benefits nevertheless resulted in deviations from the optimal allocation and a resulting reduction in allocative efficiency. In the optimal allocation, technology O would have been exhausted, with an incremental expenditure of $24.8m (the largest of any initial technology) and an incremental benefit of 887.7 QALYs; however, with poor information, the allocator estimated this incremental benefit in exhaustion to be just 161.0 QALYs, so chose not to adopt the technology at all. Similarly, the allocator underestimated the incremental effectiveness of technology C, which would have been partially adopted in the optimal allocation, and so did not adopt it at all. Elsewhere, incremental expenditure was less than optimal for technology W, and more than optimal for technologies H and R.

Nevertheless, despite imperfect information, the allocator matched the optimal allocation in its incremental expenditure on technologies B, I, T, and U. Furthermore, since none of the initial technologies in the SE quadrant was wrongly assigned to a different quadrant, the allocator exhausted all of these technologies, in line with the optimal allocation.

Allocator has good information

With good information, the allocator assigned fewer initial technologies to the incorrect quadrant of the CE plane than under poor information, with technologies E, M, N, Q and S assigned correctly. Nevertheless, the allocator assigned technology L to the SE (rather than SW) quadrant and technology D to the NE (rather than NW) quadrant (Table 2.1).

Since technology L was assigned to the SE quadrant, the allocator chose to exhaust this cost-saving technology, under the misplaced belief that it also had positive incremental benefit. Fortunately, technology L would also have been exhausted under the optimal allocation, so the allocator's imperfect information regarding its incremental benefit did not contribute towards an inefficient allocation of the budget.

The allocator also considered technology D for adoption, since it was wrongly assigned to the NE quadrant; since it actually lies in the NW quadrant, it would not have been adopted under the optimal allocation. The allocator decided to partially adopt D (incremental expenditure \$0.7m), resulting in an expected incremental benefit of 23.9 QALYs but an actual incremental benefit of -0.1 QALYs.

The remaining inefficiencies in the allocation under good information were caused by differences between the actual and expected incremental benefits of initial technologies assigned (correctly) to the NE quadrant. This resulted in an incremental expenditure greater than optimal for technologies C, G, H, R, U and W, and less than optimal for technologies M, N, O and Q.

As under poor information, technologies B, I and T, and all technologies in the SE quadrant, were exhausted, in line with the optimal allocation.

Reallocation

The reallocation that occurs following adoption of a new technology is reported in abridged form in Tables 2.3 to 2.6. Complete tables are provided in Appendix Tables A2.2.1 to A2.2.4.

If the agent does not have the authority to mandate reallocation, the reallocation that follows adoption of a new technology depends upon the following:

1. The size of the initial budget;
2. The characteristics of the pool of initial technologies;
3. The allocator's information on the incremental benefit of initial technologies;
4. The budget impact of the new technology;
5. Whether the new technology is a 'net investment' or a 'net disinvestment';
6. The reallocator's information on the incremental benefit of initial technologies.

The incremental expenditure on each technology during the initial allocation depended upon the size of the *initial budget*, the *characteristics* of each initial technology in the pool, specifically each technology's incremental cost and incremental benefit in exhaustion and the shape of its production function, and the *information* available to the *allocator*. This, in turn, restricted the set of *reallocation* possibilities: exhausted technologies cannot be expanded during reallocation, while technologies not adopted (even partially) cannot be contracted during reallocation.

The greater the *budget impact* of the new technology, the greater the aggregate change in incremental expenditure required during reallocation through expansion and/or contraction of initial technologies. Whether this required change in incremental expenditure is positive or negative depends upon whether the new technology is a *net investment* or *net disinvestment*. A net investment requires a reduction in incremental expenditure on initial technologies in order to release resources for the new technology – this may be done by contracting initial technologies in the northern half of the CE plane that were adopted during allocation, and/or by expanding technologies in the southern half of the CE plane that were not exhausted during allocation. Conversely, a net disinvestment releases resources that may be used to increase incremental expenditure on initial technologies – this requires expanding initial technologies in the northern half of the CE plane that were not exhausted during allocation, and/or contracting technologies in the southern half of the CE plane that were adopted during allocation.

Table 2.3: Reallocation following net investment (allocator has good information)

Note: This table is abridged. Complete table provided in Appendix 2.2, Table A2.2.1

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$0.1m	C	-1.75	$57,122	-1.75	-1.58	$63,369	-1.58	E	-1.76	$56,770	-1.76	10.43	-$9,586	10.43
$0.2m	R	-1.75	$57,106	-3.50	-1.61	$62,051	-3.19	E	-1.82	$55,023	-3.58	10.22	-$9,788	20.65
$0.3m	H	-1.75	$57,058	-5.25	-1.47	$67,849	-4.66	E	-1.87	$53,427	-5.45	10.02	-$9,981	30.67
$5.1m	H	-1.80	$55,471	-90.55	-1.52	$65,962	-67.40	E	-3.62	$27,615	-142.61	6.45	-$15,498	399.87
$5.2m	O	-1.80	$55,463	-92.36	-0.55	$180,591	-67.95	E	-3.65	$27,406	-146.26	6.42	-$15,577	406.29
$5.3m	R	-1.80	$55,455	-94.16	-1.66	$60,256	-69.61	M	-1.92	$52,170	-148.18	0.18	-$548,002	406.47
$5.4m	C	-1.81	$55,387	-95.96	-1.63	$61,444	-71.24	Q	-1.91	$52,239	-150.09	0.10	-$1.02m	406.57
$5.5m	H	-1.81	$55,354	-97.77	-1.52	$65,823	-72.76	O	-1.75	$56,981	-151.85	-0.54	$185,534	406.03
$36.4m	C	-2.35	$42,584	-726.98	-2.12	$47,243	-456.29	C	-2.09	$47,941	-815.17	-1.88	$53,184	0.83
$36.5m	O	-2.35	$42,550	-729.33	-0.72	$138,539	-457.02	R	-2.04	$48,924	-817.21	-1.88	$53,160	-1.05
$36.6m	H	-2.35	$42,542	-731.68	-1.98	$50,587	-458.99	H	-2.24	$44,621	-819.45	-1.88	$53,059	-2.94
$49.8m	O	-2.87	$34,889	-1072.66	-0.88	$113,603	-613.98	H	-2.80	$35,769	-1142.92	-2.35	$42,535	-281.17
$49.9m	D	-2.87	$34,878	-1075.53	-8.91	$11,227	-622.89	I	-3.41	$29,285	-1146.34	-2.35	$42,494	-283.52
$50.0m	R	-2.87	$34,874	-1078.39	-2.64	$37,893	-625.53	R	-2.56	$39,063	-1148.90	-2.36	$42,447	-285.88

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $100,000 reduction in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 reduction in incremental expenditure on marginal technology; [c] Estimate (given imperfect information) of the marginal ICER in contraction for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies.

Table 2.4: Reallocation following net disinvestment (allocator has good information)

Note: This table is abridged. Complete table provided in Appendix 2.2, Table A2.2.2

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$0.1m	O	1.75	$57,129	1.75	0.54	$186,014	0.54	S	-1.00	-$99,957	-1.00	33.89	$2,951	33.89
$0.2m	H	1.75	$57,168	3.50	1.47	$67,980	2.01	S	-1.83	-$54,668	-2.83	19.91	$5,023	53.80
$0.3m	R	1.75	$57,242	5.25	1.61	$62,198	3.62	S	-2.37	-$42,216	-5.20	16.70	$5,989	70.49
$3.8m	R	1.71	$58,447	65.76	1.57	$63,508	51.55	S	-9.19	-$10,882	-234.35	6.75	$14,815	383.05
$3.9m	U	1.71	$58,495	67.47	3.05	$32,756	54.61	S	-9.31	-$10,740	-243.66	6.69	$14,945	389.74
$4.0m	C	1.71	$58,558	69.18	1.54	$64,962	56.15	D	1.65	$60,684	-242.01	5.12	$19,535	394.86
$26.8m	D	1.46	$68,312	429.61	4.55	$21,990	292.24	D	0.52	$193,915	-2.40	1.60	$62,426	892.66
$26.9m	O	1.46	$68,320	431.08	0.45	$222,460	292.69	R	1.74	$57,512	-0.66	1.60	$62,491	894.26
$27.0m	R	1.46	$68,348	432.54	1.35	$74,261	294.04	G	0.83	$120,241	0.17	1.60	$62,551	895.86
$49.8m	M	1.19	$83,712	735.27	-0.31	-$320,726	544.64	U	0.78	$128,436	278.00	1.39	$71,922	1233.89
$49.9m	R	1.19	$83,724	736.46	1.10	$90,975	545.74	C	1.54	$64,862	279.54	1.39	$71,956	1235.28
$50.0m	R	1.19	$83,822	737.65	1.10	$91,083	546.83	R	1.51	$66,269	281.05	1.39	$72,010	1236.67

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $100,000 increase in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 increase in incremental expenditure on marginal technology; [c] Estimate (given imperfect information) of the marginal ICER in expansion for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies.

Table 2.5: Reallocation following net investment (allocator has poor information)

Note: This table is abridged. Complete table provided in Appendix 2.2, Table A2.2.3

	Reallocation with good information							***Reallocation with poor information***						
		Estimates with good information			***Estimates with poor information***				***Estimates with good information***			***Estimates with poor information***		
Budget impact	**Marginal Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	**Marginal Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
\$0.1m	S	9.31	-\$10,740	9.31	-6.69	\$14,945	-6.69	H	-1.96	\$51,044	-1.96	-1.65	\$60,698	-1.65
\$0.2m	S	9.19	-\$10,882	18.50	-6.75	\$14,815	-13.44	C	-1.83	\$54,707	-3.79	-1.65	\$60,690	-3.30
\$0.3m	S	9.07	-\$11,030	27.57	-6.81	\$14,682	-20.25	O	-5.37	\$18,625	-9.16	-1.65	\$60,645	-4.94
\$3.8m	S	1.83	-\$54,669	242.66	-19.91	\$5,023	-355.85	R	-1.83	\$54,610	-61.64	-1.69	\$59,339	-63.32
\$3.9m	S	1.00	-\$99,960	243.66	-33.89	\$2,951	-389.74	U	-0.95	\$105,758	-62.59	-1.69	\$59,223	-65.01
\$4.0m	D	-0.53	\$187,471	243.13	-1.66	\$60,348	-391.40	G	-0.88	\$113,781	-63.47	-1.69	\$59,187	-66.70
\$8.3m	D	-0.84	\$118,356	214.85	-2.62	\$38,100	-479.24	C	-1.93	\$51,803	-130.50	-1.74	\$57,468	-140.39
\$8.4m	G	-0.86	\$116,451	213.99	-1.65	\$60,576	-480.89	R	-1.89	\$52,880	-132.39	-1.74	\$57,459	-142.13
\$8.5m	D	-0.86	\$116,260	213.13	-2.67	\$37,425	-483.56	H	-2.07	\$48,279	-134.46	-1.74	\$57,410	-143.88
\$9.9m	G	-0.92	\$108,781	200.66	-1.77	\$56,586	-510.72	H	-2.09	\$47,813	-155.22	-1.76	\$56,855	-168.39
\$10.0m	U	-0.92	\$108,146	199.73	-1.65	\$60,560	-512.37	R	-1.91	\$52,291	-157.13	-1.76	\$56,819	-170.15
\$10.1m	G	-0.93	\$108,028	198.81	-1.78	\$56,194	-514.15	U	-0.99	\$101,318	-158.12	-1.76	\$56,737	-171.91
\$19.9m	U	-1.29	\$77,301	93.04	-2.31	\$43,286	-724.52	R	-2.07	\$48,287	-323.33	-1.91	\$52,468	-351.34
\$20.0m	W	-1.30	\$76,641	91.73	-1.67	\$59,732	-726.20	H	-2.27	\$44,073	-325.60	-1.91	\$52,409	-353.25
\$20.1m	U	-1.30	\$76,637	90.43	-2.33	\$42,917	-728.53	G	-0.99	\$100,721	-326.59	-1.91	\$52,394	-355.16
\$25.2m	U	-1.79	\$55,816	13.28	-3.20	\$31,256	-874.32	H	-2.38	\$41,939	-415.68	-2.01	\$49,871	-454.93
\$25.3m	R	-1.79	\$55,733	11.48	-1.65	\$60,559	-875.97	U	-1.12	\$88,973	-416.81	-2.01	\$49,824	-456.94
\$25.4m	G	-1.80	\$55,644	9.69	-3.45	\$28,945	-879.42	R	-2.18	\$45,817	-418.99	-2.01	\$49,783	-458.95
\$25.9m	R	-1.82	\$55,034	0.65	-1.67	\$59,799	-887.74	R	-2.19	\$45,648	-433.00	-2.02	\$49,601	-469.02
\$26.0m	R	-1.82	\$54,893	-1.17	-1.68	\$59,646	-889.42	G	-1.05	\$95,191	-434.06	-2.02	\$49,517	-471.04
\$26.1m	U	-1.82	\$54,891	-3.00	-3.25	\$30,738	-892.67	U	-1.13	\$88,397	-435.19	-2.02	\$49,501	-473.06
\$49.8m	C	-2.54	\$39,311	-511.16	-2.29	\$43,611	-1397.37	R	-2.78	\$35,966	-1010.48	-2.56	\$39,081	-1018.65
\$49.9m	R	-2.55	\$39,260	-513.71	-2.34	\$42,660	-1399.72	I	-3.72	\$26,908	-1014.19	-2.56	\$39,046	-1021.22
\$50.0m	H	-2.56	\$39,098	-516.26	-2.15	\$46,492	-1401.87	U	-1.44	\$69,654	-1015.63	-2.56	\$39,006	-1023.78

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a \$100,000 reduction in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from \$100,000 reduction in incremental expenditure on marginal technology; [c] Estimate (given imperfect information) of the marginal ICER in contraction for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies.

Table 2.6: Reallocation following net disinvestment (allocator has poor information)

Note: This table is abridged. Complete table provided in Appendix 2.2, Table A2.2.4

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$0.1m	O	5.02	$19,920	5.02	1.54	$64,860	1.54	R	1.79	$55,872	1.79	1.65	$60,710	1.65
$0.2m	O	4.75	$21,064	9.77	1.46	$68,586	3.00	D	0.53	$188,777	2.32	1.65	$60,769	3.29
$0.3m	O	4.53	$22,096	14.29	1.39	$71,945	4.39	U	0.92	$108,617	3.24	1.64	$60,824	4.94
$8.8m	O	1.96	$51,067	233.83	0.60	$166,279	71.82	W	1.22	$81,945	126.68	1.57	$63,866	141.23
$8.9m	H	1.95	$51,181	235.79	1.64	$60,861	73.46	U	0.88	$114,121	127.56	1.56	$63,906	142.80
$9.0m	O	1.95	$51,251	237.74	0.60	$166,875	74.06	R	1.70	$58,843	129.26	1.56	$63,938	144.36
$10.2m	O	1.92	$52,149	260.93	0.59	$169,799	88.40	H	1.85	$54,157	147.39	1.55	$64,399	163.06
$10.3m	M	1.92	$52,170	262.84	-0.18	-$548,002	88.22	G	0.81	$123,806	148.20	1.55	$64,402	164.62
$10.4m	Q	1.91	$52,239	264.76	-0.10	-$1.02m	88.12	U	0.87	$115,013	149.06	1.55	$64,405	166.17
$49.8m	R	1.38	$72,202	905.40	1.27	$78,456	519.83	R	1.36	$73,373	618.92	1.25	$79,726	719.00
$49.9m	R	1.38	$72,307	906.78	1.27	$78,567	521.10	U	0.70	$142,391	619.62	1.25	$79,738	720.25
$50.0m	R	1.38	$72,417	908.16	1.27	$78,691	522.37	R	1.36	$73,481	620.98	1.25	$79,840	721.51

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $100,000 increase in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 increase in incremental expenditure on marginal technology; [c] Estimate (given imperfect information) of the marginal ICER in expansion for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies.

The *information* available to the *reallocator* determines the reallocator's estimate of the incremental benefit associated with expanding or contracting each initial technology in the pool during reallocation, given the prevailing level of incremental expenditure on each technology. This, in turn, determines the order in which the reallocator makes marginal expansions and/or contractions of initial technologies during reallocation. Since the set of marginal expansions and/or contractions that results in a reduction in incremental expenditure on initial technologies differs from the set that results in an increase in incremental expenditure, a different order exists for net investments than for net disinvestments. The order in which marginal expansions and/or contractions of initial technologies are made during reallocation determines the marginal change in incremental benefit associated with each marginal reallocation, and hence the *cumulative* change in incremental benefit across all initial technologies affected during reallocation.

Reallocator has the same information as the allocator

If the reallocator has identical information to the allocator, then the reallocator *perceives* the initial allocation of resources to be efficient, even if it is actually not. This is true regardless of whether both decision makers have good or poor information.

Net investments

Following a net investment, the reallocator will contract technologies believed to lie in the NE quadrant, and/or expand technologies believed to lie in the SW quadrant, in *reverse* order to that used by the allocator when originally expanding or contracting these technologies.

Reallocator has good information on the incremental benefit of initial technologies

If both the allocator and reallocator have good information, the *last* marginal allocation of the initial budget by the allocator (from \$49.9m to \$50.0m) was to expand technology C by increasing its incremental expenditure from \$9.0m to \$9.1m, resulting in an *expected* marginal increase in incremental benefit of 1.75 QALYs. Conversely, the *first* marginal reallocation by the reallocator following adoption of a net investment is to *contract* technology C by *reducing* its incremental expenditure from \$9.1m to \$9.0m, resulting in an expected marginal *decrease* in incremental benefit of 1.75 QALYs (Table 2.3).

Reallocator has poor information on the incremental benefit of initial technologies

If both the allocator and reallocator have poor information, the last marginal allocation of the initial budget was to expand technology H, resulting in an expected marginal increase in incremental benefit of 1.65 QALYs. Conversely, the first marginal reallocation by the reallocator following adoption of a net investment is to contract technology H, resulting in an expected marginal decrease in incremental benefit of 1.65 QALYs (Table 2.5).

Net disinvestments

Following a net disinvestment, the reallocator *continues* the allocator's expansion of technologies believed to lie in the NE quadrant, and/or contraction of technologies believed to lie in the SW quadrant, in the *same order* as that used by the allocator.

Reallocator has good information on the incremental benefit of initial technologies

If both the allocator and reallocator have good information, the *first* marginal reallocation is to expand technology O, resulting in an expected marginal increase in incremental benefit of 1.75 QALYs (Table 2.4). If, hypothetically, the initial budget had been $50.1m instead of $50.0m, then the *last* marginal allocation made by the allocator (immediately after expanding technology C) would have been this same marginal expansion of technology O.

Reallocator has poor information on the incremental benefit of initial technologies

If both the allocator and reallocator have poor information, the first marginal reallocation is to expand technology R, resulting in an expected marginal increase in incremental benefit of 1.65 QALYs (Table 2.6). If the initial budget had been $50.1m instead of $50.0m, then the last marginal allocation would have been this same marginal expansion of technology R.

Reallocator has different information to the allocator

If the reallocator has different information to the allocator (e.g., the allocator has poor information and the reallocator has good information, or *vice versa*), then reallocation is an opportunity for the reallocator to 'correct' what it *perceives* to be an inefficient initial allocation. This *perception* of inefficiency arises even if the reallocator has poor information and the allocator has good information – provided the allocator has different information to the reallocator, the initial allocation appears inefficient from the perspective of the reallocator.

The specific inefficiencies perceived by the reallocator, and the means by which the reallocator will attempt to address these, depend upon whether the new technology is a net investment or a net disinvestment.

Net investments

If the allocator and reallocator have different information, then the allocator *may* have adopted one or more initial technologies that the *allocator* believed to lie in the NE quadrant, but which the *reallocator* believes to lie in the NW quadrant. If the allocator has good information and the reallocator has poor information then this includes technologies M, N and Q, of which only M and Q were partially adopted in this analysis; if the allocator has poor information and the reallocator has good information then this includes technology S, which the allocator adopted to exhaustion.

Similarly, the allocator *may not* have exhausted one or more initial technologies that the *allocator* believed to lie in the SW quadrant, but which the *reallocator* believes to lie in the SE quadrant. If the allocator has good information and the reallocator has poor information then this includes technology E, which was only partially adopted by the allocator; if the allocator has poor information and the reallocator has good information then there are no such technologies in this analysis.

Following a net investment, the reallocator will release resources for the new technology by expanding technologies it believes to lie in the SE quadrant until exhaustion, and entirely contracting the technologies it believes to lie in the NW quadrant, *before* considering any expansions or contractions of technologies it believes to lie in the NE or SW quadrants. This is because the reallocator believes that such reallocations result in *positive* marginal incremental benefit, and so will prioritize these over all other reallocations (which it believes result in *negative* marginal incremental benefit).

If the budget impact of the net investment is small, reallocation consists (where possible) of *only* expansions or contractions of technologies the reallocator believes to lie in the SE or NW quadrants, such that the reallocator's estimate of the *cumulative* change in incremental benefit associated with the reallocation is *positive*. If the budget impact is larger, reallocation will then move on to contractions of technologies believed to lie in the NE quadrant, and/or expansions of technologies believed to lie in the SW quadrant, each of which results in *negative* expected marginal incremental benefit. If the budget impact of the net investment is sufficiently large, the negative expected incremental benefit associated with these reallocations in the NE or SW quadrants may be sufficient to outweigh the positive expected incremental benefit associated with the reallocations in the SE or NW quadrants, such that the reallocator's estimate of the expected *cumulative* incremental benefit associated with the total reallocation becomes *negative* as the budget impact increases.

Reallocator has poor information on the incremental benefit of initial technologies

If the reallocator has poor information, then the first marginal reallocation following a net investment will be to expand technology E, in the belief that this will provide a positive incremental benefit of 10.43 QALYs (Table 2.3 and Appendix 2.2, Table A2.2.1).

Subsequent marginal reallocation will also expand technology E, with positive but diminishing expected marginal incremental benefit, and positive and increasing expected *cumulative* incremental benefit. After exhausting technology E (at a budget impact of $5.2m), the next marginal reallocation is to fully contract technology M (by reducing its incremental expenditure from $0.1m to zero), which the reallocator believes is associated with a positive incremental benefit of 0.18 QALYs; following this, the reallocator fully contracts technology Q (by reducing its incremental expenditure from $0.1m to zero), which has a positive expected incremental benefit of 0.10 QALYs.

At a budget impact of $5.4m, and an expected cumulative incremental benefit from reallocation of 406.57 QALYs, the reallocator has expended all possible expansions of technologies it believes to lie in the SE quadrant and all possible contractions of technologies it believes to lie in the NW quadrant. Beyond this point, the reallocator conducts marginal expansions or contractions of technologies it believes to lie in the NE or SW quadrants, each of which is associated with negative expected incremental benefit. This causes the expected cumulative incremental benefit to fall at an increasing rate as the budget impact increases, eventually becoming negative above a budget impact of $36.4m.

Reallocator has good information on the incremental benefit of initial technologies

If the reallocator has good information, then the first marginal reallocation following a net investment will be to contract technology S, in the expectation that this will provide a positive incremental benefit of 9.31 QALYs (Table 2.5 and Appendix 2.2, Table A2.2.3). Subsequent marginal reallocation will continue to contract technology S until it is fully contracted at a budget impact of $3.9m, at which point the expected *cumulative* incremental benefit from reallocation is 243.66 QALYs.

Reallocation then switches to marginal contractions of technology D, resulting in *negative* expected marginal incremental benefit; at this point the expected cumulative incremental benefit begins to fall, at an increasing rate. Before technology D is fully contracted, reallocation begins to alternate between technologies D and G at a budget impact of $8.4m. As the budget impact increases further, marginal reallocations begin to alternative between additional technologies, with the first marginal contraction of technology U at a budget impact of $10.0m, the first marginal contraction of technology W at a budget impact of $20.0m, and the first marginal contraction of technology R at a budget impact of $25.3m. The expected cumulative incremental benefit from reallocation becomes *negative* at a budget impact of $26.0m.

Before the maximum budget impact is reached, marginal contractions are also observed in technologies C (at a budget impact of $26.3m and above) and H (at a budget impact of $30.9m and above) (Appendix 2.2, Table A2.2.3).

Net disinvestments

If the allocator and reallocator have different information, then the allocator will *not* have adopted any initial technologies that the *allocator* believed to lie in the NW quadrant, but which the *reallocator* believes to lie in the NE quadrant (if the allocator has good information and the reallocator has poor information then this includes technology S; if the allocator has poor information and the reallocator has good information then this includes technologies M, N and Q). Similarly, the allocator *will* have exhausted any initial technologies that the *allocator* believed to lie in the SE quadrant, but which the *reallocator* believes to lie in the SW quadrant (if the allocator has good information and the reallocator has poor information then there are no such technologies in this analysis; if the allocator has poor information and the reallocator has good information then this includes technology E).

Following a net disinvestment, the reallocator will use the resources released by the new technology to expand non-exhausted technologies it believes to lie in the NE quadrant, and/or to contract adopted technologies it believes to lie in the SW quadrant. However, the reallocator will not *necessarily* prioritize reallocation opportunities resulting from disagreements between the allocator and reallocator regarding a technology's quadrant. This is because (unlike following a net investment) other reallocation opportunities exist that also have *positive* (and possibly *greater*) expected marginal incremental benefit. One implication of this is that (unlike following a net investment) the reallocator's estimate of the *cumulative* incremental benefit from reallocation is generally positive, regardless of the budget impact, since these other reallocation opportunities increase the estimated cumulative incremental benefit rather than diminishing it.

Reallocator has poor information on the incremental benefit of initial technologies

If the reallocator has poor information, then the first marginal reallocation following a net disinvestment will be to expand technology S (Table 2.4 and Appendix 2.2, Table A2.2.2). Subsequent marginal reallocation will also expand technology S, with diminishing marginal incremental benefit, until it is exhausted at a budget impact of \$3.9m.

As the budget impact increases beyond \$3.9m, marginal reallocations among other technologies provide positive but diminishing expected marginal incremental benefit, resulting in positive and increasing expected cumulative incremental benefit.

In this instance, the first marginal reallocation opportunity taken by the reallocator (expanding technology S) did indeed result from a disagreement with the allocator regarding the technology's quadrant on the CE plane.

Reallocator has good information on the incremental benefit of initial technologies

If the reallocator has good information, then the first marginal reallocation following a net disinvestment will be to expand technology O (Table 2.6 and Appendix 2.2, Table A2.2.4). Further marginal reallocations will continue to expand technology O, but before technology O is exhausted reallocation will switch to technology H (at a budget impact of $8.9m) since the expected marginal incremental benefit is greater.

As the budget impact increases further, marginal reallocations alternate between technologies O and H and then among other initial technologies. This provides positive but diminishing expected marginal incremental benefit, resulting in positive and increasing expected cumulative incremental benefit.

Notably, among the reallocation opportunities resulting from disagreements between the allocator and reallocator regarding a technology's quadrant, the first of these (expanding technology M) is not taken until the budget impact reaches $10.3m.

Optimal cost-effectiveness thresholds

The optimal threshold for the agent to adopt depends upon all of the factors that determined reallocation. It also depends upon the following additional factors:

7. The agent's information on the incremental benefit of initial technologies;
8. Whether the agent has authority, or does not have authority, to mandate reallocation following adoption of a new technology;
9. Whether the agent has authority, or does not have authority, to implement an alternative to adopting the new technology;
10. Whether the agent has authority, or does not have authority, to mandate reallocation following implementation of an alternative to the new technology (if applicable).

The agent first considers the *budget impact* of the new technology and whether it constitutes a *net investment* or a *net disinvestment*. Given the initial allocation, the agent then considers what reallocation the *reallocator* will prefer if the new technology is adopted; the former depends upon the *allocator's information*, while the latter depends upon the *reallocator's information*. The agent estimates the *cumulative* incremental benefit associated with this reallocation, given the *agent's information*. The cumulative incremental benefit represents the *sum* of the *marginal* incremental benefits associated with all *marginal* reallocations made throughout reallocation.

If the agent has authority to *mandate* reallocation following adoption of a new technology, the agent then estimates the cumulative incremental benefit associated with the *agent's* preferred reallocation. This will generally exceed the *agent's* estimate of the incremental benefit associated with the *reallocator's* preferred reallocation if, and *only* if, the agent and reallocator have *different* information. The agent will mandate reallocation if doing so increases the *agent's* estimate of the cumulative incremental benefit associated with reallocation.

If the agent has authority to implement an *alternative* to adopting the new technology, the agent then estimates the cumulative incremental benefit associated with *either* the *agent's* preferred net investment of resources among initial technologies (if the new technology is a net investment) *or* the *agent's* preferred net disinvestment of resources among initial technologies (if the new technology is a net disinvestment). This alternative net investment or net disinvestment of resources in initial technologies has the same budget impact as the new technology, such that reallocation is required following its implementation. If the agent has authority to mandate this reallocation then it will do so if this increases the *agent's* estimate of the cumulative incremental benefit associated with reallocation. The agent will implement an alternative to the new technology *only* if the agent's estimate of the *net* incremental benefit associated with implementing this alternative (given the subsequent reallocation) *exceeds* the *net* incremental benefit of adopting the new technology (given the subsequent reallocation). The reallocation following adoption of the new technology may differ from that following implementation of the alternative, depending upon the agent's *authority* to mandate reallocation in each instance.

The optimal threshold is that which ensures that a new technology is adopted *only* if its incremental benefit exceeds the *agent's* estimate of the cumulative incremental benefit forgone through reallocation following its adoption, *and* if the *net* incremental benefit associated with adopting the new technology (given the subsequent reallocation) *exceeds* the *net* incremental benefit associated with implementing this alternative (given the subsequent reallocation).

Unique thresholds sets

There are eight unique sets of optimal cost-effectiveness thresholds among the 24 sets of thresholds considered in this analysis. These are labeled 'λ1' to 'λ8' and are summarized in Figures 2.3 – 2.10, Tables 2.8 – 2.15 and Appendix 2.3, Tables A2.3.1 – A2.3.4.

The flow diagram in Figure 2.2 provides a logical pathway for determining which of the eight unique threshold sets is applicable under each combination of assumptions. The assumptions corresponding to each threshold set are also summarized in Table 2.7. The reasoning behind the duplication of some threshold sets is as follows.

If all three decision makers hold the *same* information (six of the 24 threshold sets considered), then the optimal set of thresholds does *not* depend upon the agent's authority to implement an alternative to the new technology *or* to mandate reallocation. This is because the agent regards the current allocation of resources as efficient, so has no incentive to implement a net investment or net disinvestment of resources among initial technologies as an alternative to adopting the new technology, and also because the agent regards the reallocator's behaviour as efficient, so the authority to overrule the reallocator would make no difference to the resulting reallocation. All six of these threshold sets are therefore identical, and so are reported together as threshold set λ1.

Figure 2.2: Flow diagram to determine the set of optimal cost-effectiveness thresholds

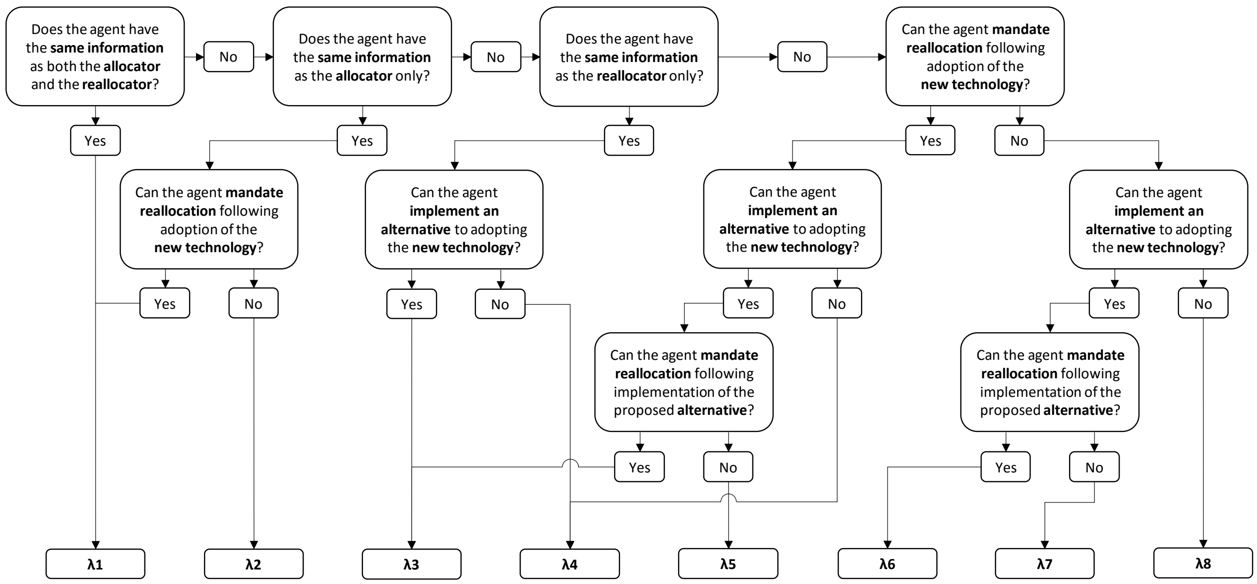


Table 2.7: Optimal threshold set corresponding to each combination of assumptions

Does the agent have the same information as the allocator?	***Does the agent have the same information as the reallocator?***	***Can the agent mandate reallocation following adoption of the new technology?***	***Can the agent implement an alternative to adopting the new technology?***	***Can the agent mandate reallocation following implementation of an alternative?***	***Optimal threshold set***
Yes	Yes	Yes	Yes	Yes	**λ1**
				No	
			No	N/A	
		No	Yes	Yes	
				No	
			No	N/A	
	No	Yes	Yes	Yes	
				No	
			No	N/A	
Yes	No	No	Yes	Yes	**λ2**
				No	
			No	N/A	
No	Yes	Yes	Yes	Yes	**λ3**
				No	
		No	Yes	Yes	
				No	
	No	Yes	Yes	Yes	
No	Yes	Yes	No	N/A	**λ4**
		No	No	N/A	
	No	Yes	No	N/A	
No	No	Yes	Yes	No	**λ5**
No	No	No	Yes	Yes	**λ6**
No	No	No	Yes	No	**λ7**
No	No	No	No	N/A	**λ8**

If the agent and allocator hold the same information, but the reallocator holds different information (six of the 24 threshold sets considered), then the optimal set of thresholds depends upon the authority of the agent to mandate reallocation. This is because the agent generally regards the reallocator's preferred reallocation as inefficient, so will favour a different reallocation. In this case, if the agent has the authority to mandate reallocation (three of the 24 threshold sets considered), then the subsequent reallocation will be informed by the agent's information rather than the reallocator's information; since the initial allocation and reallocation will then be informed by the same information as that held by the agent, all three of these threshold sets are identical to threshold set λ1. Alternatively, if the agent does *not* have the authority to mandate reallocation (three of the 24 threshold sets considered), then the optimal threshold set will differ from threshold set λ1; these three identical threshold sets are reported as threshold set λ2.

If the agent and reallocator hold the same information, but the allocator holds different information (six of the 24 threshold sets considered), then the optimal threshold depends upon whether the agent can implement a net investment or net disinvestment of resources in initial technologies as an *alternative* to adopting the new technology. This is because the agent holds different information to the allocator, so will generally regard the current allocation of resources among initial technologies as inefficient. It follows that the agent may estimate that greater expected incremental benefit will arise by expanding and/or contracting initial technologies than through adoption of the new technology (where both constitute a net investment or disinvestment with the same budget impact). If the agent has the authority to implement such an alternative to adopting the new technology (four of the 24 threshold sets considered), then the optimal threshold set will generally differ from threshold sets λ1 and λ2; these four identical threshold sets are reported as threshold set λ3. If the agent does *not* have this authority (two of the 24 threshold sets considered), then the optimal threshold set will generally differ from threshold sets λ1 to λ3; these two identical threshold sets are reported as threshold set λ4.

If the agent has different information to both the allocator and reallocator (six of the 24 threshold sets considered), then the optimal set of thresholds depends upon: (a) the agent's authority to mandate reallocation following adoption of the new technology; (b) the agent's authority to implement an alternative to the new technology; and (c) the agent's authority to mandate reallocation following implementation of an alternative (if applicable). This is because the agent will generally regard the current allocation of resources as inefficient, so may estimate that an expansion and/or contraction of one or more initial technologies will provide greater expected incremental benefit than adopting the new technology, and also because the agent will generally regard the reallocation favoured by the reallocator as inefficient, so will mandate reallocation if authorized to do so.

Since the agent's authority to mandate reallocation following implementation of an alternative to the new technology is only relevant if the agent also has authority to implement this alternative, there are six possible scenarios resulting from different combinations of (a), (b) and (c), each of which generally results in a different set of optimal thresholds:

1. If the agent has authority to mandate reallocation following adoption of the new technology, authority to implement an alternative to the new technology, and authority to mandate reallocation following implementation of this alternative, then the set of optimal set of thresholds is identical to threshold set λ3. This is because reallocation is always informed by the agent's information (regardless of whether this follows adoption of the new technology or implementation of an alternative), so the set of optimal thresholds is equivalent to that which arises when the agent and reallocator have the *same* information and the agent has authority to implement an alternative to adopting the new technology.
2. If the agent has authority to mandate reallocation following adoption of the new technology and authority to implement an alternative to the new technology, but does *not* have authority to mandate reallocation following implementation of this alternative, then the set of optimal thresholds differs from those considered so far and is reported as set λ5.
3. If the agent has authority to mandate reallocation following adoption of the new technology, but does *not* have authority to implement an alternative to the new technology, then the set of optimal thresholds is identical to threshold set λ4. This is because reallocation is always informed by the agent's information, so the set of optimal thresholds is equivalent to that which arises when the agent and reallocator have the *same* information and the agent does *not* have authority to implement an alternative to adopting the new technology.

4. If the agent does *not* have authority to mandate reallocation following adoption of the new technology, but has authority to implement an alternative to the new technology and to mandate reallocation following implementation of this alternative, then the set of optimal thresholds differs from those considered so far and is reported as set λ6.
5. If the agent does *not* have authority to mandate reallocation following adoption of the new technology, *has* authority to implement an alternative to the new technology, but does *not* have authority to mandate reallocation following implementation of this alternative, then the set of optimal thresholds generally differs from those considered so far; this is reported as threshold set λ7.
6. If the agent does *not* have authority to mandate reallocation following adoption of the new technology, *nor* to implement an alternative to the new technology, then the set of optimal thresholds differs from those considered so far and is reported as set λ8.

Threshold set λ1

Threshold set λ1 is summarized in Figure 2.3, Table 2.8 and Appendix 2.3, Table A2.3.1.

It is applicable under the following assumptions (nine of the 24 threshold sets considered):

1) All decision makers have the same information; *or*
2) a) The agent has the same information as the allocator only; *and*

   b) The agent *can* mandate reallocation following adoption of the new technology.

Figure 2.3: Optimal threshold curves (threshold set λ1)

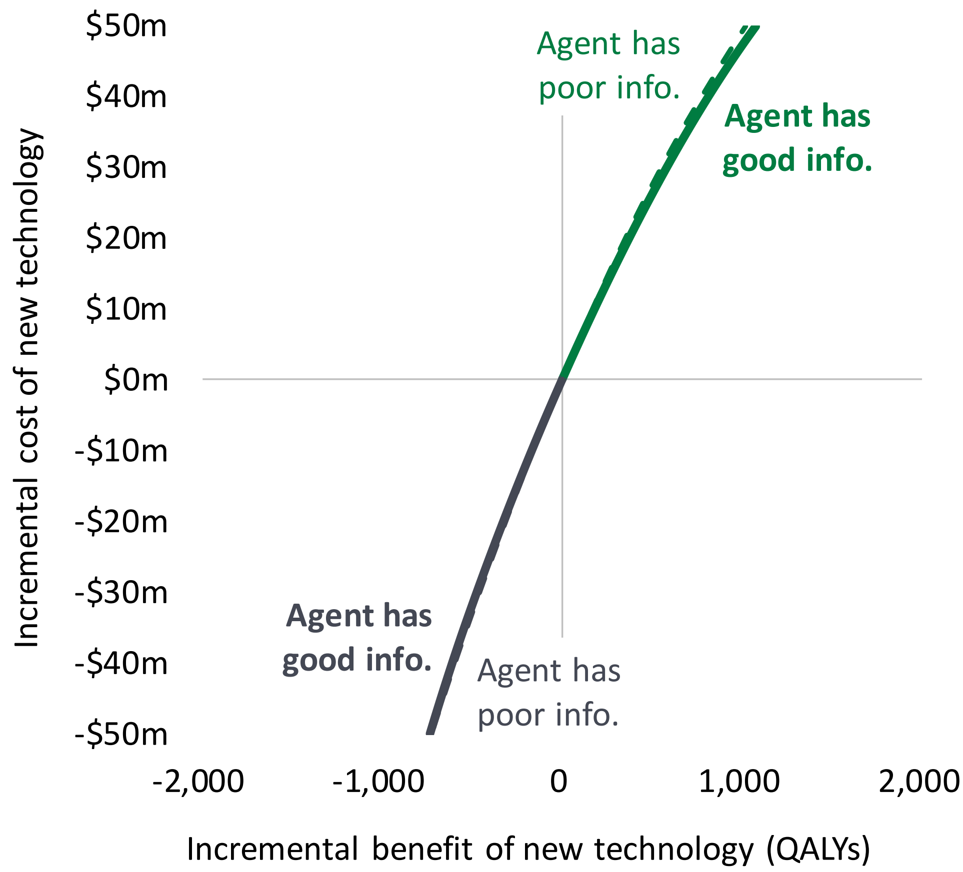


Table 2.8: Optimal numerical thresholds (threshold set λ1)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.1

Budget impact	Threshold set λ1							
	Agent has good information				Agent has poor information			
	Net Investment		Net Disinvestment		Net Investment		Net Disinvestment	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$0.1m	1.75	$57,122	-1.75	$57,129	1.65	$60,698	-1.65	$60,710
$0.2m	3.50	$57,114	-3.50	$57,149	3.30	$60,694	-3.29	$60,739
$0.3m	5.25	$57,095	-5.25	$57,180	4.94	$60,678	-4.94	$60,768
$25.0m	475.15	$52,615	-403.11	$62,017	450.93	$55,441	-384.70	$64,985
$25.1m	477.24	$52,594	-404.60	$62,037	452.93	$55,417	-386.15	$65,001
$25.2m	479.32	$52,574	-406.08	$62,057	454.93	$55,393	-387.59	$65,017
$49.8m	1072.66	$46,427	-735.27	$67,731	1018.65	$48,888	-719.00	$69,263
$49.9m	1075.53	$46,396	-736.46	$67,757	1021.22	$48,863	-720.25	$69,281
$50.0m	1078.39	$46,365	-737.65	$67,783	1023.78	$48,839	-721.51	$69,299

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ1

1) The numerical threshold falls with the budget impact for net investments, but increases with the budget impact for net disinvestments.
2) The threshold curves for net investments and net disinvestments are concave.
3) There is no 'kink' between the threshold curves at the origin of the CE plane.
4) Threshold curves pass through only the NE and SW quadrants. New technologies in the SE quadrant are always cost-effective; those in the NW quadrant are never cost-effective.
5) For new technologies with marginal budget impact, the numerical threshold is similar for net investments and net disinvestments.

Net investments

The reallocator will respond to a net investment by *partially reversing* the initial allocation. Each marginal reallocation will result in a marginal fall in the agent's estimate of the incremental benefit, with the magnitude of this marginal reduction increasing with the budget impact, such the agent's estimate of the *cumulative* incremental benefit falls at an increasing rate with the budget impact. For the new technology to be considered cost-effective by the agent, its incremental benefit must exceed the agent's estimate of the cumulative incremental benefit forgone through reallocation. The minimum incremental benefit that a net investment must provide therefore increases at an increasing rate with the budget impact.

This is reflected by the portion of the threshold curves in the northern half of Figure 2.3, which pass through the NE quadrant, with a shallower slope as the budget impact increases. This corresponds to a *fall* in the numerical threshold for net investments as the budget impact increases.

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, the numerical threshold falls as the budget impact increases, from $57,122 per QALY at a budget impact of $0.1m to $46,365 per QALY at a budget impact of $50.0m (Table 2.8).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, the numerical threshold falls as the budget impact increases, from $60,698 per QALY at a budget impact of $0.1m to $48,839 per QALY at a budget impact of $50.0m (Table 2.8).

Net disinvestments

The reallocator will respond to a net disinvestment by *continuing* the initial allocation, with the agent's estimate of the cumulative incremental benefit gained through reallocation increasing but at a diminishing rate with the budget impact. For the new technology to be considered cost-effective by the agent, it must *displace less* incremental benefit than the agent's estimate of the cumulative incremental benefit *gained* through reallocation. The minimum incremental benefit that a net disinvestment must provide is therefore *negative*, decreasing at a diminishing rate with the budget impact.

This is reflected by the portion of the threshold curves in the southern half of Figure 2.3, which pass through the SW quadrant, with a steeper slope as the budget impact increases. This corresponds to an *increase* in the numerical threshold for net disinvestments as the budget impact increases.

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, the numerical threshold increases with the budget impact, from $57,129 per QALY at a budget impact of $0.1m to $67,783 per QALY at a budget impact of $50.0m (Table 2.8).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, the numerical threshold increases with the budget impact, from $60,710 per QALY at a budget impact of $0.1m to $69,299 per QALY at a budget impact of $50.0m (Table 2.8).

Threshold set λ2

Threshold set λ2 is summarized in Figure 2.4, Table 2.9, and Appendix 2.3, Table A2.3.1.

It is applicable under the following assumptions (three of the 24 threshold sets considered):

1) a) The agent has the same information as the allocator only; *and*

   b) The agent *cannot* mandate reallocation following adoption of the new technology.

Figure 2.4: Optimal threshold curves (threshold set λ2)

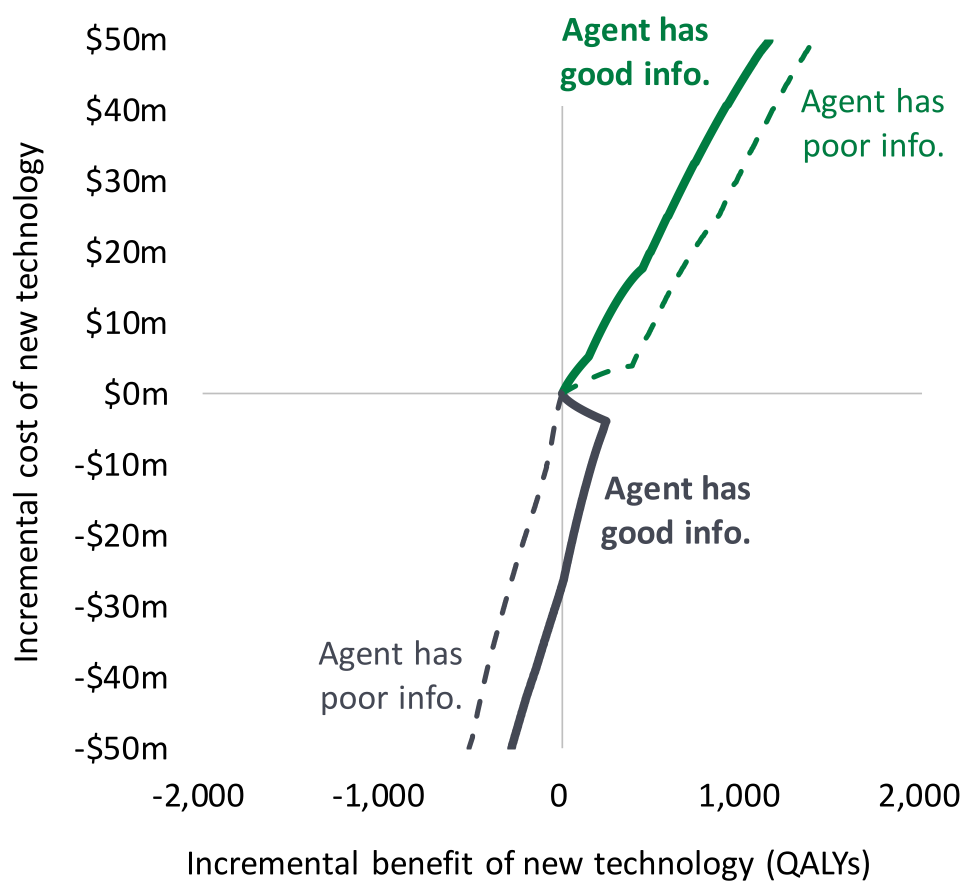


Table 2.9: Optimal numerical thresholds (threshold set λ2)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.1

Budget impact	Threshold set λ2							
	Agent has good information				Agent has poor information			
	Net Investment		Net Disinvestment		Net Investment		Net Disinvestment	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$0.1m	1.76	$56,770	1.00	-$99,957	6.69	$14,945	-1.54	$64,860
$0.2m	3.58	$55,883	2.83	-$70,680	13.44	$14,880	-3.00	$66,671
$0.3m	5.45	$55,040	5.20	-$57,710	20.25	$14,813	-4.39	$68,341
$3.8m	97.77	$38,869	234.35	-$16,215	355.85	$10,679	-38.14	$99,620
$3.9m	101.04	$38,599	243.66	-$16,006	389.74	$10,007	-38.92	$100,210
$4.0m	104.34	$38,336	242.01	-$16,528	391.40	$10,220	-39.69	$100,792
$25.0m	581.97	$42,957	18.91	-$1.32m	865.62	$28,881	-268.87	$92,983
$25.1m	587.34	$42,735	18.06	-$1.39m	871.12	$28,814	-269.38	$93,175
$25.2m	589.14	$42,775	17.14	-$1.47m	874.32	$28,823	-270.93	$93,012
$26.8m	619.26	$43,278	2.40	-$11.17m	904.38	$29,633	-289.25	$92,654
$26.9m	621.25	$43,300	0.66	-$40.73m	906.08	$29,688	-290.74	$92,522
$27.0m	623.08	$43,333	-0.17	$157.74m	907.79	$29,743	-291.25	$92,704
$49.8m	1142.92	$43,573	-278.00	$179,136	1397.37	$35,638	-519.83	$95,801
$49.9m	1146.34	$43,530	-279.54	$178,505	1399.72	$35,650	-521.10	$95,758
$50.0m	1148.90	$43,520	-281.05	$177,903	1401.87	$35,667	-522.37	$95,717

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ2

1) Since the agent regards the reallocation as inefficient, the numerical threshold varies over the budget impact, such that the threshold curves are not smooth.
2) For new technologies with marginal budget impact, different numerical thresholds apply for net investments and net disinvestments.
3) It follows that there is a 'kink' between the threshold curves for net investments and net disinvestments at the origin of the CE plane.
4) The threshold curve for net investments passes through the NE quadrant only. New technologies in the NW quadrant are therefore never cost-effective.

5) The threshold curve for net disinvestments may pass through the SE quadrant, before entering the SW quadrant. This occurs if the reallocator makes marginal reallocations that the agent regards as having *negative* incremental net benefit, such that the agent's estimate of the *cumulative* incremental net benefit associated with reallocation, at any given budget impact, is *negative*. Where this occurs, new technologies in the SW quadrant are not cost-effective, while those in the SE quadrant are cost-effective only if they lie to the right of the threshold curve (which requires that their ICERs are *less negative* than the numerical threshold).
6) If the threshold curve for net disinvestments passes through the SE quadrant before entering the SW quadrant, then the numerical threshold will tend towards negative infinity before discontinuing and then decreasing from positive infinity.

Net investments

Agent has good information on the incremental benefit of initial technologies

If the allocator and agent have good information and the reallocator has poor information, then the first marginal reallocation following a net investment is to expand technology E (Table 2.3). While the reallocator estimates the marginal incremental benefit of this to be 10.43 QALYs, the agent estimates the marginal incremental benefit to be -1.76 QALYs. The minimum incremental benefit that a net investment with a budget impact of $0.1m must provide to be considered cost-effective by the agent is therefore 1.76 QALYs, in order that the *net* incremental benefit of adopting the new technology and the subsequent reallocation is positive (Table 2.9).

In contrast to threshold set λ1, the numerical threshold does not consistently increase or decrease with changes in the budget impact. This is because the agent's estimate of the marginal incremental benefit associated with each marginal reallocation may be less than or greater than the reallocator's estimate, such that the estimated *cumulative* incremental benefit fluctuates with changes in the budget impact. For example, a marginal increase in the budget impact from $25.0m to $25.1m causes the numerical threshold to fall from $42,957 per QALY to $42,735 per QALY, while a subsequent marginal increase in the budget impact to $25.2m causes the numerical threshold to increase to $42,775 per QALY (Table 2.9). The threshold curves in Figure 2.4 are therefore not 'smooth'. Since the agent regards the initial allocation as efficient, the minimum incremental benefit that a net investment must provide is unambiguously positive, such that the threshold curves for net investments lie entirely within the NE quadrant.

Agent has poor information on the incremental benefit of initial technologies

If the allocator and agent have poor information and the reallocator has good information, the first marginal reallocation following a net investment is to contract technology S (Table 2.5). While the reallocator estimates the marginal incremental benefit of this to be 9.31 QALYs, the agent estimates the marginal incremental benefit to be -6.69 QALYs. The minimum incremental benefit that a net investment of $0.1m must provide to be considered cost-effective by the agent is therefore 6.69 QALYs. This compares to 1.76 QALYs if the agent and allocator have good information and the reallocator has poor information – this greater minimum required incremental benefit causes the threshold curve if the agent has poor information to lie to the right of the threshold curve where the agent has good information in the northern half of Figure 2.4.

As when the agent has good information, the numerical threshold does not consistently increase or decrease with changes in the budget impact, such that the threshold curves reported in Figure 2.4 are not smooth. Again, these threshold curves lie entirely within the NE quadrant.

Net disinvestments

Agent has good information on the incremental benefit of initial technologies

If the allocator and agent have good information and the reallocator has poor information, then the first marginal reallocation following a net disinvestment is to expand technology S (Table 2.4). Although the reallocator estimates the marginal incremental benefit of this to be 33.89 QALYs, the agent estimates the marginal incremental benefit to be -1.00 QALYs. It follows that the minimum incremental benefit that a net disinvestment with a budget impact of $0.1m must provide to be considered cost-effective by the agent is 1.00 QALYs.

This has important implications for the cost-effectiveness threshold. Conventionally, all new technologies in the SE quadrant are considered cost-effective. However, as observed here, if the reallocator and agent have different information, then a reallocation that the reallocator considers an efficient means of improving incremental benefit might be considered *harmful* by the agent.

In this example, a net disinvestment that releases $0.1m in resources will result in the reallocator expanding a technology (S) that it believes to lie in the NE quadrant (with positive incremental benefit), but which the agent believes to lie in the NW quadrant (with negative incremental benefit). The agent will therefore consider a net disinvestment of $0.1m to be cost-effective *only* if its incremental benefit is *sufficiently positive* to compensate for the agent's estimate of the reduction in incremental benefit resulting from reallocation (in this case 1.00 QALYs) – it is not sufficient for the new technology to merely lie in the SE quadrant.

At a budget impact of $3.9m, the reallocator exhausts technology S (Table 2.4). At this point, the agent estimates the cumulative incremental benefit from reallocation to be -243.66 QALYs, such that a net disinvestment with a budget impact of $3.9m will only be considered cost-effective if it has an incremental benefit *greater* than 243.66 QALYs (Table 2.9). However, as the budget impact increases further, the reallocator makes marginal expansions or contractions that the agent estimates to have *positive* incremental benefit. This causes the *cumulative* incremental benefit from reallocation to *increase* towards zero, eventually becoming positive above a budget impact of $26.9m (Table 2.4).

Given the above results, the threshold curve for net disinvestments starts at the origin and immediately cuts down and right into the SE quadrant (Figure 2.4). New technologies in the SE quadrant that lie to the *left* of the threshold curve are not considered cost-effective by the agent: although their adoption would release resources and *directly* provide positive incremental benefit, the agent estimates that the use of those released resources by the reallocator (expanding technology S) will *displace* a *greater* amount of incremental benefit, such that the estimated *net* incremental benefit is negative. At a budget impact of $3.9m (the point where technology S is exhausted), the threshold curve 'kinks' sharply, since further marginal reallocations have *positive* expected incremental benefit to the agent. The threshold curve then crosses into the SW quadrant at a budget impact of $26.9m (the point where the cumulative incremental benefit from reallocation becomes positive) and continues to cut in to the SW quadrant until the maximum budget impact is reached.

The numerical threshold also follows an unconventional pattern. At a budget impact of $0.1m, the threshold for disinvestments is -$99,957 per QALY (Table 2.9). A net investment in the SE quadrant with this budget impact is cost-effective only if its ICER is *less negative* than this threshold. The threshold then becomes less negative with increases in the budget impact, until technology S is exhausted (at a budget impact of $3.9m), at which point the threshold is -$16,006 per QALY. As the budget impact continues to increase, the threshold becomes *more negative* as marginal reallocations are made with positive expected marginal incremental benefit.

Logically, the numerical threshold would be expected to increase towards negative infinity as the threshold curve approaches the vertical axis from inside the SE quadrant, discontinue at the vertical axis, and then decrease from positive infinity as it cuts into the SW quadrant. Since the model evaluates incremental expenditure in discrete $0.1m increments, infinite or negative infinite numerical thresholds are not observed. Rather, the most negative numerical threshold observed prior to the threshold curve crossing the vertical axis is -$40.73m per QALY (at a budget impact of $26.9m), while the most positive numerical threshold observed after crossing the axis is $157.74m per QALY (at a budget impact of $27.0m). The numerical threshold then continues to fall with increases in the budget impact, reaching $177,903 per QALY at a budget impact of $50.0m.

Agent has poor information on the incremental benefit of initial technologies

If the allocator and agent have poor information and the reallocator has good information, then the threshold curve for disinvestments does not enter the SE quadrant. This is because the first marginal reallocation is to expand technology O, which both the agent and reallocator estimate has *positive* marginal incremental benefit (Table 2.6).

Subsequent marginal reallocations also have positive expected marginal incremental benefit to the agent, such that the agent's estimate of the cumulative incremental benefit from reallocation is positive across all possible budget impacts. It follows that the threshold curve for net disinvestments remains in the SW quadrant, while the numerical threshold fluctuates over the budget impact, trending upwards from $64,860 per QALY at a budget impact of $0.1m to $95,717 per QALY at a budget impact of $50.0m.

Threshold set λ3

Threshold set λ3 is summarized in Figure 2.5, Table 2.10 and Appendix 2.3, Table A2.3.2.

It is applicable under the following assumptions (five of the 24 threshold sets considered):

1) a) The agent has the same information as the reallocator only; *and*

   b) The agent *can* implement an alternative to adopting the new technology; *or*

2) a) The agent has different information to both the allocator and reallocator; *and*

   b) The agent *can* mandate reallocation following adoption of the new technology; *and*

   c) The agent *can* implement an alternative to adopting the new technology; *and*

   d) The agent *can* mandate reallocation following implementation of the alternative.

Figure 2.5: Optimal threshold curves (threshold set λ3)

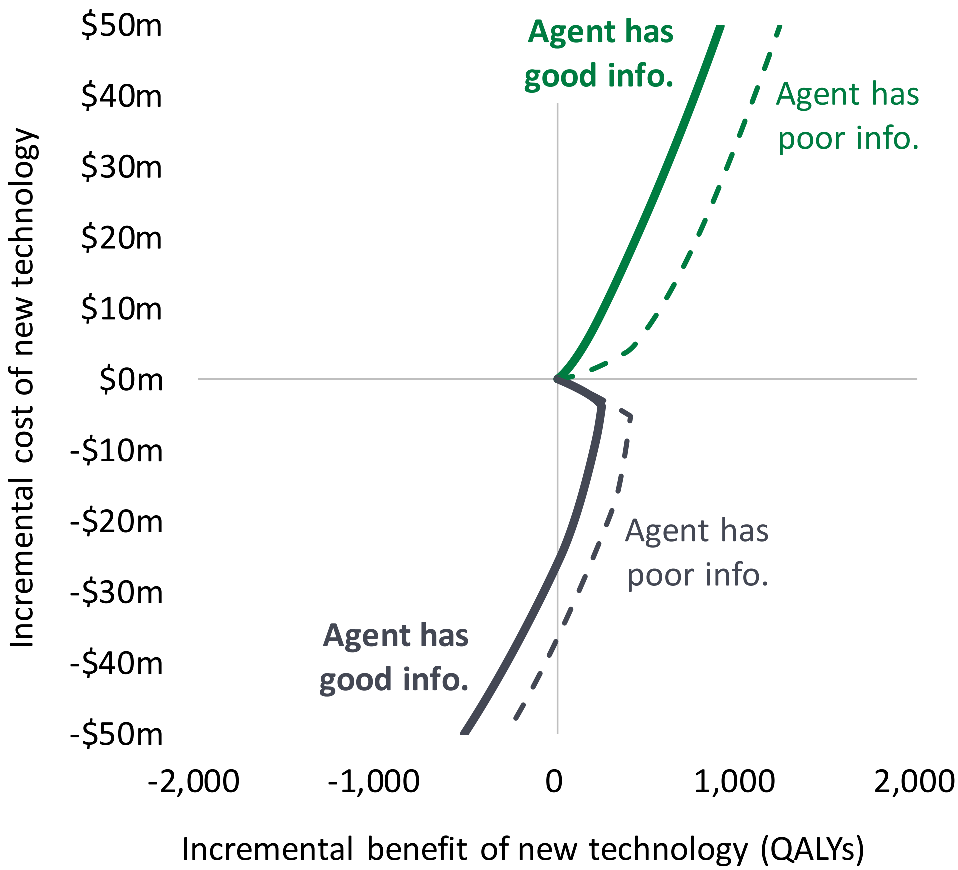


Table 2.10: Optimal numerical thresholds (threshold set λ3)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.2

Budget impact	Threshold set λ3							
	Agent has good information				Agent has poor information			
	Net Investment		Net Disinvestment		Net Investment		Net Disinvestment	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
\$0.1m	5.02	\$19,920	9.31	-\$10,740	33.89	\$2,951	10.43	-\$9,586
\$0.2m	9.77	\$20,476	18.50	-\$10,810	53.80	\$3,718	20.65	-\$9,686
\$0.3m	14.29	\$20,989	27.57	-\$10,883	70.49	\$4,256	30.67	-\$9,782
\$3.8m	124.20	\$30,595	242.66	-\$15,660	383.05	\$9,920	313.18	-\$12,134
\$3.9m	126.72	\$30,777	243.66	-\$16,006	389.74	\$10,007	320.08	-\$12,184
\$4.0m	129.22	\$30,955	243.13	-\$16,452	394.86	\$10,130	326.94	-\$12,235
\$25.9m	539.87	\$47,974	0.65	-\$40.03m	878.18	\$29,493	186.08	-\$139,186
\$26.0m	541.54	\$48,011	-1.17	\$22.13m	879.80	\$29,552	184.42	-\$140,984
\$26.1m	543.21	\$48,048	-3.00	\$8.71m	881.41	\$29,612	182.75	-\$142,816
\$36.4m	708.49	\$51,377	-204.74	\$177,787	1040.84	\$34,972	0.83	-\$43.90m
\$36.5m	710.03	\$51,406	-206.82	\$176,478	1042.33	\$35,018	-1.05	\$34.70m
\$36.6m	711.58	\$51,435	-208.91	\$175,196	1043.82	\$35,063	-2.94	\$12.46m
\$49.8m	905.40	\$55,004	-511.16	\$97,426	1233.89	\$40,360	-281.17	\$177,117
\$49.9m	906.78	\$55,030	-513.71	\$97,137	1235.28	\$40,396	-283.52	\$176,000
\$50.0m	908.16	\$55,056	-516.26	\$96,850	1236.67	\$40,431	-285.88	\$174,899

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ3

1) This threshold set is a special case, where the threshold may be determined *solely* by the expected cumulative incremental benefit of the alternative to the new technology. In this special case, the characteristics of displacement do not determine the threshold.
2) The threshold curves 'kink' at the origin of the CE plane.
3) The threshold curves for net disinvestments begin in the SE quadrant, before entering the SW quadrant, such that some new technologies in the SE quadrant are not cost-effective.
4) Since the agent determines how incremental expenditure is allocated on the alternative, the threshold curves are 'smooth'.

Special note

Under the assumptions applicable *only* to this threshold set and threshold set λ7, the optimal threshold may be determined *solely* by the agent's preferred alternative to adopting the new technology, rather than by the reallocation that follows adoption of the new technology or implementation the alternative. This special case may arise because an alternative to the new technology can be implemented and the reallocation that follows adoption of the new technology is *identical* to that which follows implementation of this alternative.

In order for this special case to arise, the expected cumulative incremental benefit of the alternative to the new technology must *exceed* the expected cumulative incremental benefit *forgone* through reallocation. Under the assumptions corresponding to this threshold set, the agent regards the change in incremental expenditure on initial technologies through implementation of the alternative to the new technology as efficient, and *also* regards the subsequent change in incremental expenditure on initial technologies through reallocation as efficient, such that this special case holds in all circumstances (i.e., regardless of the agent's information, the budget impact of the new technology, and whether the new technology is a net investment or net disinvestment).

Under this special case, the expected change in incremental benefit associated with reallocation is irrelevant for determining the threshold. This is because, under the assumptions adopted here, an *identical* reallocation occurs following adoption of the new technology as following implementation of an alternative to the new technology. This can occur for different reasons:

1. If the agent has the *same* information as the reallocator, the agent has no incentive to mandate reallocation. The reallocator will make an identical reallocation following adoption of the new technology as following implementation of the alternative.
2. If the agent has *different* information to the reallocator, then the authority to mandate reallocation is relevant. However, under the assumptions adopted here, this authority is *consistent* across both the new technology and the alternative. That is, the agent either has the authority to mandate reallocation in *both* cases, or does *not* have the authority to mandate reallocation in *either* case. An identical reallocation will therefore be made following adoption of the new technology as following implementation of the alternative.

Since reallocation is *identical* for the new technology and the alternative, it follows that the expected cumulative incremental benefit associated with reallocation 'nets out' of the calculation of the optimal threshold. The minimum incremental benefit that the new technology must provide to be cost-effective, and hence the optimal threshold, is therefore determined *solely* by the expected cumulative incremental benefit of the alternative to the new technology.

Net investments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, then its preferred alternative to adopting a net investment is to *increase* incremental expenditure on initial technologies in the same order as its preferred reallocation following adoption of a *net disinvestment*. The first marginal increase in incremental expenditure is expansion of technology O, with an expected gain in marginal incremental benefit of 5.02 QALYs (Table 2.6). As the budget impact increases, the expected marginal incremental benefit associated with further increases in incremental expenditure falls but remains positive. The expected *cumulative* incremental benefit – equivalent to the minimum incremental benefit at which a net investment is considered cost-effective – therefore increases, at a diminishing rate, with the budget impact. This causes the numerical threshold to increase, at a diminishing rate, from $19,920 per QALY to $55,056 per QALY (Table 2.10). The threshold curve lies entirely within the NE quadrant, with its slope increasing with the budget impact.

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, then the first marginal increase in incremental expenditure is expansion of technology S, with an expected gain in marginal incremental benefit of 33.89 QALYs (Table 2.4). The expected cumulative incremental benefit increases, at a diminishing rate, with the budget impact, such that the numerical threshold increases, at a diminishing rate, from $2,951 per QALY to $40,431 per QALY. The threshold curve lies entirely within the NE quadrant, with its slope increasing with the budget impact (Figure 2.5).

Since the expected cumulative incremental benefit associated with the alternative to the new technology is greater when the agent has poor information, the threshold curve for poor information lies to the right of that for good information on the CE plane in Figure 2.5.

Net disinvestments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, its preferred alternative to a net disinvestment is to *decrease* incremental expenditure on initial technologies in the same order as its preferred reallocation following adoption of a *net investment*. The first marginal decrease in incremental expenditure is contraction of technology S, with an expected marginal incremental benefit of 9.31 QALYs (Table 2.5). A net disinvestment with a budget impact of $0.1m is therefore considered cost-effective only if its incremental benefit is greater than 9.31 QALYs (Table 2.10). It follows that the threshold curve for net disinvestments cuts down and right into the SE quadrant, while the corresponding numerical threshold at a budget impact of $0.1m is -$10,740 per QALY (Figure 2.5). New technologies in the SE quadrant are cost-effective only if their ICERs are *less negative* than this numerical threshold.

As the budget impact increases, the expected marginal incremental benefit associated with further decreases in incremental expenditure falls, becoming negative after technology S is fully contracted at a budget impact of $3.9m (Table 2.5). The expected *cumulative* incremental benefit then begins to fall, becoming negative at a budget impact of $26.0m. At this point the threshold curve crosses the vertical axis into the SW quadrant (Figure 2.5). The numerical threshold approaches negative infinity, discontinues as the threshold curve crosses the vertical axis, then declines from positive infinity, eventually reaching $96,850 per QALY at a budget impact of $50.0m (Table 2.10).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, its preferred alternative to a net disinvestment begins with a marginal decrease in incremental expenditure on technology E, with an expected gain in marginal incremental benefit of 10.43 QALYs (Table 2.3). As the budget impact increases, the expected cumulative incremental benefit follows a similar pattern as under good information, becoming negative at a budget impact of $36.5m, at which point the threshold curve crosses into the SW quadrant (Figure 2.5). Since the expected cumulative incremental benefit is greater than under good information across all budget impacts, the threshold curve for poor information lies to the right of the threshold curve for good information on the CE plane.

Threshold set λ4

Threshold set λ4 is summarized in Figure 2.6, Table 2.11 and Appendix 2.3, Table A2.3.2.

It is applicable under the following assumptions (three of the 24 threshold sets considered):

1) a) The agent has the same information as the reallocator only; *and*

   b) The agent *cannot* implement an alternative to adopting the new technology; *or*

2) a) The agent has different information to both the allocator and reallocator; *and*

   b) The agent *can* mandate reallocation following adoption of the new technology; *and*

   c) The agent *cannot* implement an alternative to adopting the new technology.

Figure 2.6: Optimal threshold curves (threshold set λ4)

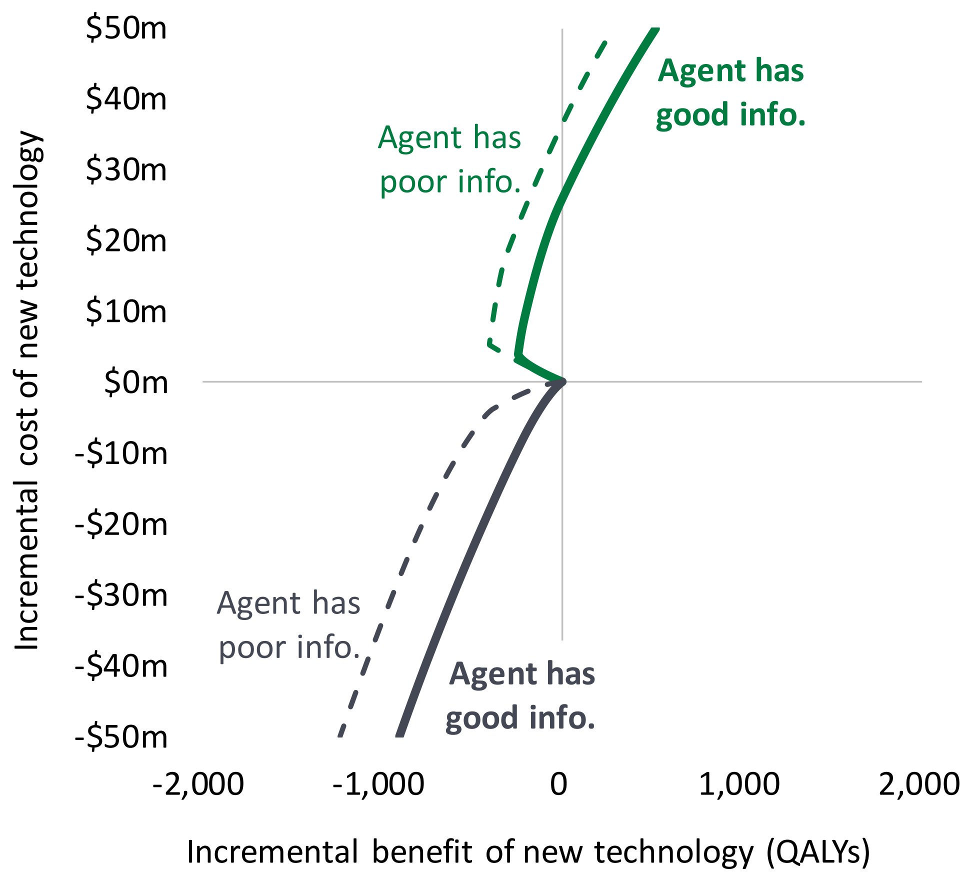


Table 2.11: Optimal numerical thresholds (threshold set λ4)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.2

	Threshold set λ4							
	Agent has good information				*Agent has poor information*			
Budget impact	*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
	$E(\Delta E)$ [a]	$E(\lambda_G^+)$ [b]	$E(\Delta E)$ [c]	$E(\lambda_G^-)$ [d]	$E(\Delta E)$ [a]	$E(\lambda_P^+)$ [b]	$E(\Delta E)$ [c]	$E(\lambda_P^-)$ [d]
$0.1m	-9.31	-$10,740	-5.02	$19,920	-10.43	-$9,586	-33.89	$2,951
$0.2m	-18.50	-$10,810	-9.77	$20,476	-20.65	-$9,686	-53.80	$3,718
$0.3m	-27.57	-$10,883	-14.29	$20,989	-30.67	-$9,782	-70.49	$4,256
$3.8m	-242.66	-$15,660	-124.20	$30,595	-313.18	-$12,134	-383.05	$9,920
$3.9m	-243.66	-$16,006	-126.72	$30,777	-320.08	-$12,184	-389.74	$10,007
$4.0m	-243.13	-$16,452	-129.22	$30,955	-326.94	-$12,235	-394.86	$10,130
$25.9m	-0.65	-$40.03m	-539.87	$47,974	-186.08	-$139,186	-878.18	$29,493
$26.0m	1.17	$22.13m	-541.54	$48,011	-184.42	-$140,984	-879.80	$29,552
$26.1m	3.00	$8.71m	-543.21	$48,048	-182.75	-$142,816	-881.41	$29,612
$36.4m	204.74	$177,787	-708.49	$51,377	-0.83	-$43.90m	-1040.84	$34,972
$36.5m	206.82	$176,478	-710.03	$51,406	1.05	$34.70m	-1042.33	$35,018
$36.6m	208.91	$175,196	-711.58	$51,435	2.94	$12.46m	-1043.82	$35,063
$49.8m	511.16	$97,426	-905.40	$55,004	281.17	$177,117	-1233.89	$40,360
$49.9m	513.71	$97,137	-906.78	$55,030	283.52	$176,000	-1235.28	$40,396
$50.0m	516.26	$96,850	-908.16	$55,056	285.88	$174,899	-1236.67	$40,431

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ4

1) The assumptions applicable to this threshold set are the most favourable for the adoption of new technologies, since recommending their adoption is the *only* opportunity for the agent to 'correct' what it perceives to be an inefficient initial allocation of resources.
2) As a result, the region of the CE plane that the agent regards as cost-effective for new technologies is larger than for any other threshold set considered.
3) The minimum incremental benefit required for a net investment to appear cost-effective is sufficiently low that the agent is potentially willing to adopt some new technologies that lie in the NW quadrant.

4) The threshold curves for net investments and net disinvestments 'kink' at the origin of the CE plane.
5) Since the agent regards the reallocation as efficient, the agent's estimate of the marginal incremental benefit declines consistently throughout reallocation, such that the threshold curves are smooth.

Net investments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information and the allocator has poor information, then the first marginal reallocation following a net investment (which will be made under good information, whether directly by the reallocator or under mandate from the agent) is to contract technology S (Table 2.5). Since the allocator adopted technology S under the belief that it lies in the NE quadrant, while the agent believes it to lie in the NW quadrant, contracting technology S results in *positive* incremental net benefit to the agent. Once technology S is fully contracted, at a budget impact of $3.9m, the agent's estimate of the *cumulative* incremental net benefit from reallocation is 243.66 QALYs (Table 2.5).

It follows that a net investment with a budget impact of $3.9m is considered cost-effective by the agent provided it is not sufficiently *harmful* that it *reduces* incremental benefit by more than 243.66 QALYs (Table 2.11). Even a new technology that lies in the NW quadrant may be considered cost-effective, provided the increase in incremental benefit through the resulting reallocation exceeds the direct reduction in incremental benefit, such that the *net* incremental benefit of its adoption is positive. As a result, the threshold curve for net investments initially cuts up and left with a negative slope into the NW quadrant (Figure 2.6).

Above a budget impact of $3.9m, reallocation switches to other technologies with a *negative* expected incremental benefit to the agent, such that the *cumulative* expected incremental benefit from reallocation begins to fall, causing the threshold curve to bend backwards and cut up and right towards the NE quadrant. At a budget impact of $26.0m, the cumulative expected incremental benefit becomes negative, at which point the threshold curve crosses the vertical axis into the NE quadrant.

The numerical threshold is initially negative (-$10,740 per QALY) as the threshold curve enters the NW quadrant (Table 2.11). At budget impacts for which the threshold curve lies within the NW quadrant, all net investments of the corresponding budget impact in the NE quadrant are cost-effective, while net investments in the NW quadrant are cost-effective only if their ICERs are *more negative* than the numerical threshold. The threshold then becomes more negative as the budget impact increases, tending towards negative infinity as the threshold curve crosses the vertical axis, then discontinuing and restarting from positive infinity as the threshold curve enters the NE quadrant (since incremental expenditure is considered in discrete $0.1m increments, the most negative observed numerical threshold is -$40.03m per QALY, at a budget impact of $25.9m, while the most positive is $22.13m per QALY, at a budget impact of $26.0m). The numerical threshold then falls as the threshold curve cuts across the NE quadrant, reaching $96,850 per QALY at a budget impact of $50.0m.

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information and the allocator has good information, then the first marginal reallocation following a net investment (which will be made under poor information) is to expand technology E (Table 2.3). In common with when the agent has good information, this results in *positive* expected marginal incremental benefit, since the agent believes that technology E lies in the SE quadrant. At a budget impact of $0.1m, the numerical threshold is therefore negative (-$9,586 per QALY) and the threshold curve cuts into the NW quadrant (Table 2.11 and Figure 2.6).

After technology E is exhausted and technologies M and Q are fully contracted (at a budget impact of $5.4m), the expected marginal incremental benefit to the agent of further reallocation becomes *negative* (Table 2.3). The expected *cumulative* incremental benefit to the agent becomes negative at a budget impact of $36.5m, at which point the threshold curve cuts into the NE quadrant. The numerical threshold then falls from positive infinity as the budget impact increases, reaching $174,899 per QALY at a budget impact of $50.0m (Table 2.11).

Net disinvestments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information and the allocator has poor information, then the first marginal reallocation following a net disinvestment (made under good information) is to expand technology O (Table 2.6). This and all subsequent marginal reallocations made until the maximum budget impact is reached have positive expected marginal incremental benefit to the agent, so the cumulative expected incremental benefit is also positive across all budget impacts. The threshold curve for net disinvestments therefore lies within the SW quadrant only, while the numerical threshold is positive and increasing across the entire budget impact, ranging from $19,920 per QALY to $55,056 per QALY (Table 2.11 and Figure 2.6).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information and the allocator has good information, then the first marginal reallocation following a net disinvestment (made under poor information) is to expand technology S (Table 2.4). In common with when the agent has good information, all marginal reallocations have positive expected marginal incremental benefit to the agent, so the cumulative expected incremental benefit is positive across all budget impacts and the threshold curve lies entirely within the SW quadrant (Figure 2.6). The numerical threshold increases across the budget impact from $2,951 per QALY to $40,431 per QALY (Table 2.11).

Threshold set λ5

Threshold set λ5 is summarized in Figure 2.7, Table 2.12, and Appendix 2.3, Table A2.3.3.

It is applicable under the following assumptions (one of the 24 threshold sets considered):

1) a) The agent has different information to both the allocator and reallocator; *and*

   b) The agent *can* mandate reallocation following adoption of the new technology; *and*

   c) The agent *can* implement an alternative to adopting the new technology; *and*

   d) The agent *cannot* mandate reallocation following implementation of the alternative.

Figure 2.7: Optimal threshold curves (threshold set λ5)

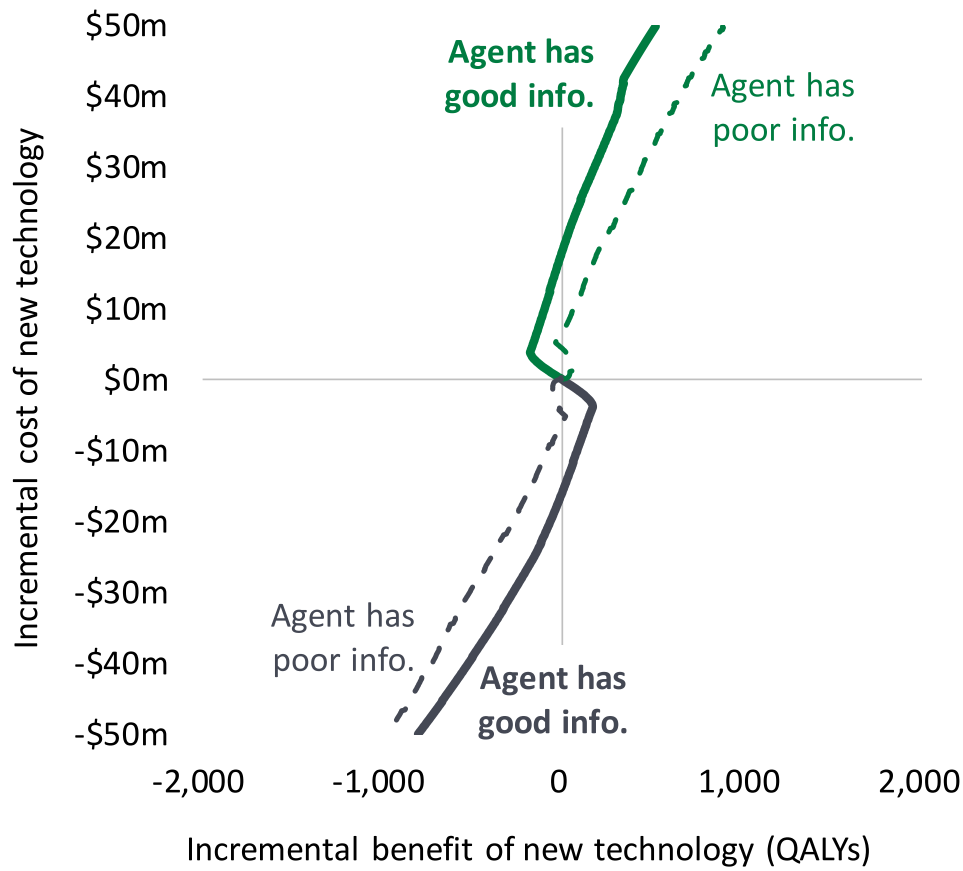


Table 2.12: Optimal numerical thresholds (threshold set λ5)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.3

Budget impact	***Threshold set λ5***							
	Agent has good information				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
\$0.1m	-6.25	-\$15,999	6.08	-\$16,445	21.88	\$4,571	-22.92	\$4,363
\$0.2m	-12.52	-\$15,974	11.05	-\$18,095	29.96	\$6,676	-31.14	\$6,423
\$0.3m	-22.43	-\$13,375	16.51	-\$18,167	35.16	\$8,532	-36.21	\$8,285
\$4.4m	-171.65	-\$25,633	166.30	-\$26,459	3.12	\$1.41m	-10.59	\$415,353
\$4.5m	-170.53	-\$26,389	164.23	-\$27,401	-1.09	-\$4.13m	-6.33	\$711,185
\$4.6m	-169.59	-\$27,124	163.05	-\$28,212	-7.36	-\$625,401	-1.98	\$2.32m
\$4.7m	-167.60	-\$28,043	160.63	-\$29,260	-10.82	-\$434,519	1.45	-\$3.24m
\$6.3m	-147.14	-\$42,817	137.97	-\$45,662	-10.66	-\$590,859	-0.15	\$41.62m
\$6.4m	-146.18	-\$43,781	137.04	-\$46,702	3.03	\$2.11m	-2.08	\$3.07m
\$6.5m	-144.71	-\$44,919	135.95	-\$47,813	4.95	\$1.31m	-5.01	\$1.30m
\$16.1m	-29.02	-\$554,862	0.27	-\$60.54m	171.44	\$93,910	-193.21	\$83,329
\$16.2m	-27.08	-\$598,286	-1.79	\$9.05m	172.64	\$93,837	-194.71	\$83,200
\$16.3m	-25.21	-\$646,487	-2.90	\$5.63m	173.81	\$93,781	-197.18	\$82,664
\$18.3m	-0.26	-\$70.86m	-34.53	\$530,039	206.90	\$88,450	-237.75	\$76,973
\$18.4m	2.11	\$8.74m	-36.66	\$501,904	208.44	\$88,275	-239.71	\$76,760
\$18.5m	3.04	\$6.09m	-37.98	\$487,041	210.14	\$88,038	-238.26	\$77,646
\$42.5m	338.61	\$125,513	-589.70	\$72,070	706.12	\$60,188	-790.55	\$53,760
\$42.6m	338.92	\$125,692	-592.41	\$71,909	707.34	\$60,226	-792.89	\$53,727
\$42.7m	341.18	\$125,153	-595.46	\$71,709	708.51	\$60,267	-794.14	\$53,769
\$49.8m	511.16	\$97,426	-797.64	\$62,434	901.08	\$55,267	-970.42	\$51,318
\$49.9m	513.71	\$97,137	-800.86	\$62,308	895.92	\$55,697	-973.07	\$51,281
\$50.0m	516.26	\$96,850	-803.44	\$62,232	897.02	\$55,740	-975.71	\$51,245

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ5

1) The agent has authority to mandate reallocation following adoption of the new technology, but *not* following implementation of an alternative to the new technology. This partial constraint favours adoption of the new technology, since an efficient reallocation is achievable only if the new technology is adopted.
2) Compared to threshold set λ4, the key difference is that the agent has the authority to implement an alternative to the new technology. The agent will only consider an alternative if the estimated net cumulative incremental benefit of implementing the alternative and the resulting reallocation is positive. If this is positive, the minimum incremental benefit required for the new technology to appear cost-effective is greater than in threshold set λ4; otherwise, the same thresholds apply as in threshold set λ4. It follows that the region of the CE plane in which new technologies are considered cost-effective is smaller than in threshold set λ4.
3) There is a 'kink' at the origin of the CE plane.
4) This is the only threshold set in which threshold curves are found to leave and then re-enter a quadrant of the CE plane. If the agent has poor information, the threshold curve for net investments begins in the NE quadrant, then passes through the NW quadrant before re-entering the NE quadrant, while the threshold curve for net disinvestments begins in the SW quadrant, passes through the SE quadrant, then re-enters the SW quadrant.

Net investments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information then, following adoption of a new technology that is a net investment, the reallocator will prefer to *partially reverse* the initial allocation, starting with a marginal contraction of technology H (Table 2.5). This is because the allocator and reallocator share the same information, such that the reallocator considers the initial allocation to be efficient. The agent regards this reallocation as inefficient, estimating the marginal incremental benefit of the contraction of technology H to be -1.96 QALYs. Instead, the agent will choose to mandate reallocation and contract technology S, which has an estimated marginal incremental benefit of 9.31 QALYs.

An alternative to recommending adoption of a net investment is for the agent to *increase* incremental expenditure on initial technologies. The initial technologies that receive this increase in incremental expenditure are the same as those under the agent's preferred reallocation following adoption of a net disinvestment, starting with a marginal expansion of technology O that results in an expected marginal incremental benefit of 5.02 QALYs (Table 2.6). Since the agent *cannot* mandate reallocation following implementation of this alternative net investment of resources, the reallocator will then carry out its preferred reallocation, starting with marginal contraction of technology H, which the agent estimates to have a marginal incremental benefit of -1.96 QALYs (Table 2.5).

To determine the threshold for net investments, the agent considers the estimated *net cumulative* incremental benefit associated with adopting the new technology and the subsequent reallocation. The new technology is considered cost-effective only if this is both *positive* and *exceeds* the estimated *net* cumulative incremental benefit of the alternative to the new technology and *its* resulting reallocation. If the budget impact is \$0.1m this is 5.02 – 1.96 = 3.06 QALYs, since the agent *cannot* mandate reallocation. Since the agent *can* mandate reallocation following adoption of the new technology, the expected incremental benefit associated with this reallocation is 9.31 QALYs. At this budget impact, the agent will therefore consider the new technology cost-effective only if its incremental benefit is greater than 3.06 - 9.31 = -6.25 QALYs. It follows that the threshold curve for net investments begins by cutting into the NW quadrant (Figure 2.7). Net investments in the NW quadrant will be considered cost-effective only if their ICERs are *more negative* than this numerical threshold. At a budget impact of \$0.1m, the numerical threshold is -\$15,999 per QALY (Table 2.12).

Above a budget impact of \$3.8m, the expected *marginal* incremental benefit of the alternative to the new technology and its resulting reallocation *exceeds* the expected *marginal* incremental benefit of the reallocation that follows adoption of the new technology, such that the minimum incremental benefit required for the new technology to be considered cost-effective begins to increase, eventually becoming *positive* above a budget impact of \$18.4m (Table 2.12). This causes the threshold curve to cross the vertical axis into the NE quadrant (Figure 2.7). As the threshold curve approaches the vertical axis, the numerical threshold approaches negative infinity; as the threshold curve enters the NE quadrant, the numerical threshold restarts at positive infinity and falls thereafter. At the point where the threshold curve touches the vertical axis, the estimated *net cumulative* incremental benefit associated with the alternative to the new technology and its subsequent reallocation is equal to the estimated *cumulative* incremental benefit of reallocation following adoption of the new technology, such that the requirement for the new technology to be cost-effective is that it has *positive* incremental benefit.

Above a budget impact of $42.5m, the estimated net cumulative incremental benefit associated with the alternative to the new technology and its subsequent reallocation becomes *negative*, such that the special case described earlier no longer holds. In this context, the new technology is cost-effective only if its incremental benefit exceeds the estimated net cumulative incremental benefit of the reallocation that follows its adoption (Table 2.5). For net investments with a budget impact above $42.5m, this threshold subset is therefore equivalent to the corresponding subset in threshold set λ4 (Appendix 2.3, Table A2.3.3).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information then the reallocator will prefer to *partially reverse* the initial allocation, starting with a marginal contraction of technology C (Table 2.3). The agent regards this reallocation as inefficient, estimating the marginal incremental benefit to be -1.58 QALYs. Instead, the agent will choose to mandate reallocation and expand technology E, which has an estimated marginal incremental benefit to the agent of 10.43 QALYs.

An as alternative to adopting the net investment, the agent's preferred increase in incremental expenditure on initial technologies begins with a marginal expansion of technology S, which results in an expected marginal incremental benefit of 33.89 QALYs (Table 2.4). Since the agent *cannot* mandate reallocation following implementation of this alternative, the reallocator will then carry out its preferred reallocation, starting with a marginal contraction of technology C, which the agent estimates has a marginal incremental benefit of -1.58 QALYs (Table 2.3).

If the budget impact of a net investment is $0.1m, the estimated *net* cumulative incremental benefit of the alternative to the new technology and *its* resulting reallocation is 33.89 – 1.58 = 32.31 QALYs. Meanwhile, the expected incremental benefit associated with reallocation following adoption of the new technology is 10.43 QALYs. The agent will therefore consider the new technology cost-effective only if its incremental benefit is greater than 32.31 – 10.43 =

21.88 QALYs. As a result, the threshold curve for net investments begins in the NE quadrant (Figure 2.7), while the numerical threshold at a budget impact of $0.1m is $4,571 per QALY (Table 2.12).

As the budget impact increases, the minimum required incremental benefit for the new technology to be considered cost-effective tends to increase up to a budget impact of $1.2m, but then tends to fall, becoming negative for the first time at a budget impact of $4.5m (Table 2.12). At this budget impact, the agent's preferred marginal reallocation following adoption of the new technology is to expand technology E (with an expected gain in marginal incremental benefit of 6.66 QALYs) (Table 2.3), the agent's preferred marginal reallocation while implementing an alternative to the new technology is to expand technology D (with an expected gain in marginal incremental benefit of 3.96 QALYs) (Table 2.4), and the reallocator's preferred marginal reallocation following implementation of this alternative is to contract technology H (with an expected *loss* in marginal incremental benefit to the agent of 1.51 QALYs) (Table 2.3). It follows that the minimum required incremental benefit for the new technology to be considered cost-effective falls with marginal increases in the budget impact, such that the threshold curve enters the NW quadrant (Figure 2.7) and the numerical threshold becomes negative (Table 2.12).

Above a budget impact of $5.2m, this trend reverses and the minimum required incremental benefit *increases*, from a low of -33.20 QALYs, becoming positive above a budget impact of $6.3m (Table 2.12). The threshold curve enters the NE quadrant at this point, while the numerical threshold begins to fall from positive infinity, reaching $55,740 per QALY at a budget impact of $50.0m (Table 2.12 and Figure 2.7).

Net disinvestments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, and the allocator and reallocator have poor information, then the reallocator will prefer to respond to a net disinvestment by *continuing* the initial allocation, starting with a marginal expansion of technology R (Table 2.6). The agent regards this as inefficient, estimating the marginal incremental benefit to be 1.79 QALYs. Instead, the agent will mandate reallocation and expand technology O, which has an estimated marginal incremental benefit of 5.02 QALYs.

An *alternative* to adopting a net disinvestment is for the agent to *reduce* incremental expenditure on initial technologies. The first marginal reallocation preferred by the agent is a contraction of technology S, which the agent estimates has an incremental benefit of 9.31 QALYs (Table 2.5). However, following implementation of this alternative, the subsequent reallocation is that that favoured by the reallocator (since the agent cannot mandate reallocation), starting with a marginal expansion of R that the agent estimates has a marginal incremental benefit of 1.79 QALYs (Table 2.6).

A net disinvestment with a budget impact of $0.1m will therefore be considered cost-effective by the agent only if the estimated *net* incremental benefit of the new technology and the subsequent reallocation is both *positive* and *exceeds* the estimated net incremental benefit from implementing the alternative and its subsequent reallocation (9.31 + 1.79 = 11.10 QALYs). Since reallocation following adoption of a net disinvestment with a budget impact of $0.1m has an expected incremental benefit of 5.02 QALYs, such net investments are only cost-effective if they have an incremental benefit of at least 11.10 – 5.02 = 6.1 QALYs. The threshold curve for net disinvestments therefore cuts into the SE quadrant (Figure 2.7), while the numerical threshold is -$16,445 per QALY (Table 2.12). Net disinvestments in the SE quadrant of this budget impact are cost-effective only if their ICERs are *less negative* than this.

As the budget impact increases, the estimated *net* cumulative incremental benefit associated with the alternative to the new technology and its subsequent reallocation *decreases* relative to the estimated cumulative incremental benefit of reallocation following adoption of the new technology. As a result, the minimum required incremental benefit for the new technology to be cost-effective decreases, becoming *negative* above a budget impact of $16.1m. The threshold curve then crosses the vertical axis into the SW quadrant (Figure 2.7). This causes the numerical threshold to approach negative infinity, before declining from positive infinity, eventually reaching $62,232 per QALY at a budget impact of $50.0m (Table 2.12).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information then the reallocator will prefer to respond to a net disinvestment by *continuing* the initial allocation, starting with a marginal expansion of technology O, with an estimated marginal incremental benefit to the agent of 0.54 QALYs (Table 2.4). If possible, the agent will mandate reallocation and expand technology S, which has an estimated marginal incremental benefit of 33.89 QALYs.

The agent's preferred alternative to adopting a net disinvestment begins with a marginal expansion of technology E, which the agent estimates has a marginal incremental benefit of 10.43 QALYs (Table 2.3). However, the subsequent reallocation would be the marginal expansion of technology O favoured by the reallocator, with an expected marginal incremental benefit to the agent of 0.54 QALYs (Table 2.4).

In common with when the agent has good information, a net disinvestment with a budget impact of $0.1m will be considered cost-effective by the agent only if the estimated *net* incremental benefit of the new technology and the subsequent reallocation is both *positive* and *exceeds* the estimated net incremental benefit from implementing the alternative and its subsequent reallocation (10.43 + 0.54 = 10.97 QALYs). Since reallocation following adoption of a net disinvestment with a budget impact of $0.1m has an expected incremental benefit of 33.89 QALYs, such net investments are only cost-effective if they have an incremental benefit of at least 10.97 – 33.89 = -22.92 QALYs. The threshold curve therefore cuts into the SW quadrant (Figure 2.7), while the numerical threshold is $4,363 per QALY (Table 2.12).

As the budget impact increases, the minimum incremental benefit for the new technology to be cost-effective initially tends to falls, reaching a low of -48.96 QALYs at a budget impact of $1.3m (Table 2.12). It then increases, becoming positive at a budget impact of $4.7m. At this point the threshold curve enters the SE quadrant (Figure 2.7). However, after reaching a high of 23.70 QALYs at a budget impact of $5.2m, the minimum incremental benefit begins to fall again, becoming negative again at a budget impact of $6.3m. The threshold curve re-enters the NW quadrant at this point. Thereafter, the numerical threshold tends to fall, reaching $51,245 per QALY at a budget impact of $50.0m.

Threshold set λ6

Threshold set λ6 is summarized in Figure 2.8, Table 2.13 and Appendix 2.3, Table A2.3.3.

It is applicable under the following assumptions (one of the 24 threshold sets considered):

1) a) The agent has different information to both the allocator and reallocator; *and*

   b) The agent *cannot* mandate reallocation following adoption of the new technology; *and*

   c) The agent *can* implement an alternative to adopting the new technology; *and*

   d) The agent *can* mandate reallocation following implementation of the alternative.

Figure 2.8: Optimal threshold curves (threshold set λ6)

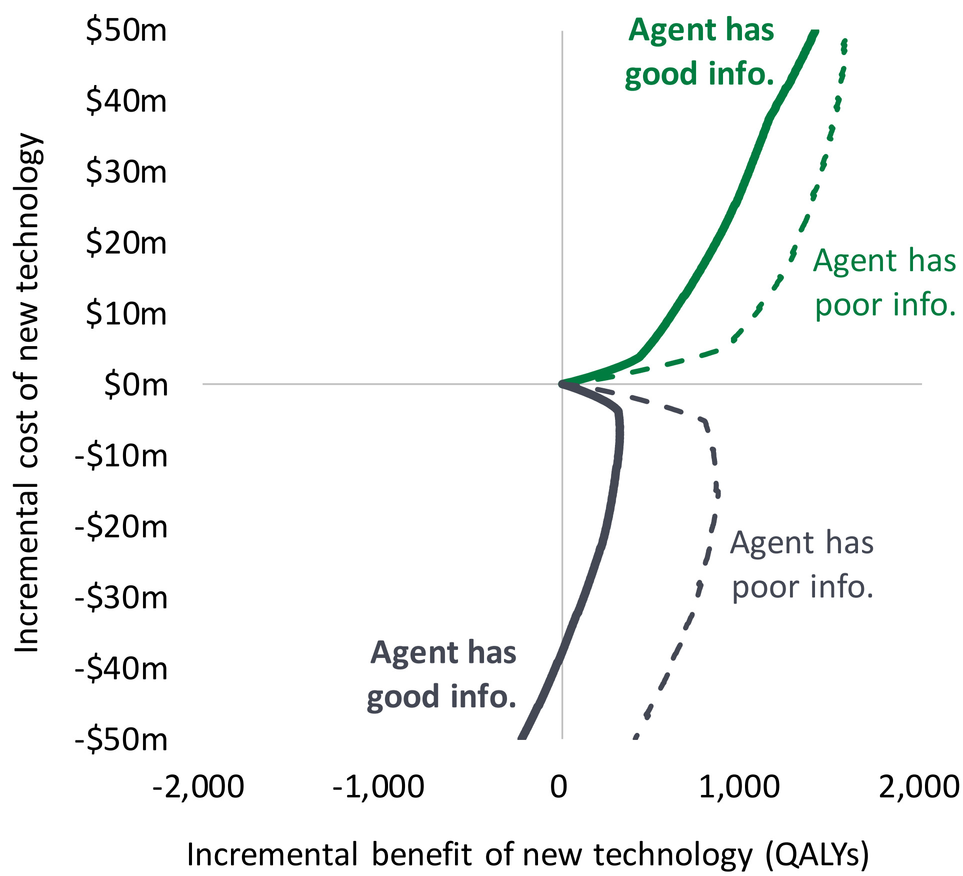


Table 2.13: Optimal numerical thresholds (threshold set λ6)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.3

Budget impact	*Threshold set λ6*							
	Agent has good information				*Agent has poor information*			
	Net Investment		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$0.1m	16.29	$6,139	12.54	-$7,974	45.90	$2,179	43.78	-$2,284
$0.2m	32.06	$6,239	25.95	-$7,708	77.64	$2,576	72.44	-$2,761
$0.3m	51.02	$5,880	38.62	-$7,768	105.82	$2,835	97.54	-$3,076
$37.6m	1152.43	$32,627	0.45	-$83.42m	1516.08	$24,801	635.86	-$59,133
$37.7m	1155.22	$32,634	-0.56	$67.19m	1517.84	$24,838	634.19	-$59,446
$37.8m	1158.02	$32,642	-2.60	$14.53m	1508.89	$25,052	632.53	-$59,760
$49.8m	1404.71	$35,452	-224.68	$221,646	1566.70	$31,787	408.08	-$122,034
$49.9m	1407.27	$35,459	-226.55	$220,261	1574.64	$31,690	406.02	-$122,900
$50.0m	1407.52	$35,523	-229.09	$218,258	1576.32	$31,720	403.96	-$123,776

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ6

1) The agent has authority to mandate reallocation only following implementation of an *alternative* to the new technology. This disadvantages the new technology compared to this alternative, since it must provide additional incremental benefit to compensate for the inefficient reallocation following its adoption.
2) As a result, the region of the CE plane in which new technologies are considered cost-effective is the smallest of any of the threshold sets.
3) The threshold curves 'kink' at the origin of the CE plane.
4) The threshold curves for net disinvestments pass through the SE quadrant. If the agent has poor information, this threshold curve remains in the SE quadrant until the maximum budget impact is reached.

Special note

In threshold set λ5, the agent could mandate what it perceived to be an efficient reallocation only if the new technology is adopted. Here, the agent can mandate reallocation only if an *alternative* to the new technology is implemented. These assumptions correspond to those implied by Eckermann and Pekarsky.[63,65,79]

Net investments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information and recommends adoption of a net investment, then the agent *cannot* mandate the subsequent reallocation. Both the allocator and reallocator have poor information, so the reallocator will *partially reverse* the initial allocation, starting with a marginal contraction of technology H (Table 2.5). The agent estimates the marginal incremental benefit of this to be -1.96 QALYs.

If the agent instead recommends implementation of an *alternative* to the new technology, then this will consist of an increase in incremental expenditure on initial technologies, following the same order as the agent's preferred reallocation following a net disinvestment. The first marginal increase in incremental expenditure will be to expand technology O, resulting in an expected marginal incremental benefit of 5.02 QALYs (Table 2.6). If an alternative to the technology is implemented, the agent can also mandate the subsequent reallocation. The agent's preferred reallocation begins with a marginal contraction of technology S, resulting in an expected marginal incremental benefit of 9.31 QALYs (Table 2.5). The expected *net* marginal incremental benefit of implementing the alternative and the subsequent reallocation is 5.02 + 9.31 = 14.33 QALYs.

For a net investment of $0.1m to be cost-effective, it must therefore have an incremental benefit of at least 14.33 + 1.96 = 16.29 QALYs, such that the expected *net* incremental benefit of the new technology and its subsequent reallocation exceeds that of the alternative to the new technology and *its* subsequent reallocation. The corresponding numerical threshold is $6,139 per QALY (Table 2.13).

As the budget impact increases, the expected marginal incremental benefit of the alternative to the new technology and its subsequent reallocation *each* declines, at a diminishing rate, such that the expected *net marginal* incremental benefit eventually becomes negative. Nevertheless, the expected net *cumulative* incremental benefit remains positive until the maximum budget impact is reached. Meanwhile, the agent's estimate of the marginal incremental benefit of reallocation following adoption of the new technology fluctuates throughout reallocation, since the ordering is that preferred by the reallocator. As a result, the numerical threshold does not consistently change as the budget impact increases, although it tends to increase, reaching $35,523 per QALY at a budget impact of $50.0m (Table 2.13). The threshold curve lies entirely in the NE quadrant but is not smooth due to this inconsistent change in the numerical threshold (Figure 2.8).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, the numerical threshold and the threshold curve follow a similar pattern as under good information, although the minimum incremental benefit at which the new technology is cost-effective is greater. This results in a lower numerical threshold at each budget impact, trending upwards from $2,179 per QALY at $0.1m to $31,720 per QALY at $50.0m, and a threshold curve that lies to the right of that under good information (Table 2.13 and Figure 2.8).

Net disinvestments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information and recommends adoptions of a net disinvestment, the reallocator will *continue* the initial allocation, starting with a marginal expansion of technology R. The agent estimates the marginal incremental benefit of this to be 1.79 QALYs (Table 2.6).

If the agent instead recommends an alternative to the new technology, this will consist of a *decrease* in incremental expenditure on initial technologies, following the same order as the agent's preferred reallocation following a net investment. The first marginal decrease in incremental expenditure will be to contract technology S, resulting in an expected marginal incremental benefit of 9.31 QALYs (Table 2.5). The agent's preferred reallocation then begins with a marginal expansion of technology O, resulting in an expected marginal incremental benefit of 5.02 QALYs (Table 2.6). The expected *net* marginal incremental benefit of implementing the alternative and the subsequent reallocation is therefore 5.02 + 9.31 = 14.33 QALYs (identical to that when considering a net investment).

For a net disinvestment of $0.1m to be cost-effective, it must therefore have an incremental benefit of at least 14.33 - 1.79 = 12.54 QALYs. The threshold curve therefore begins in the SE quadrant, with a corresponding numerical threshold of -$7,974 per QALY. New technologies in the SE quadrant with a budget impact of $0.1m are cost-effective only if their ICERs are *less negative* than this (Table 2.13).

In common with net investments, the expected net marginal incremental benefit of the alternative to the new technology and its subsequent reallocation declines with the budget impact and eventually becomes negative, while the expected net *cumulative* incremental benefit remains positive until the maximum budget impact is reached. At a budget impact of $37.7m, the agent's estimate of the cumulative incremental benefit of reallocation following adoption of the new technology exceeds the expected net cumulative incremental benefit of the alternative and its subsequent reallocation (Table 2.13). At this point, the threshold curve crosses into the SW quadrant, while the numerical threshold discontinues and begins falling from positive infinity, eventually reaching $218,258 per QALY at a budget impact of $50.0m (Figure 2.8).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, then the numerical threshold and the threshold curve follow a similar pattern as under good information, with two exceptions: the minimum incremental benefit at which the new technology is cost-effective is greater, so the threshold curve lies to the right of that for good information on the CE plane; and the threshold curve does not cross the vertical axis. The numerical threshold falls from -$2,284 per QALY at a budget impact of $0.1m, to $123,776 per QALY at a budget impact of $50.0m (Table 2.13).

Among all the threshold subsets considered, this is the only instance where the threshold curve for net disinvestments in this analysis remains entirely within the SE quadrant. This reflects the inefficiency perceived by the agent in both the initial allocation and the reallocator's preferred reallocation, and circumstances (unique to this threshold set) in which both of these can be addressed only by proposing an alternative to the new technology.

Threshold set λ7

Threshold set λ7 is summarized in Figure 2.9, Table 2.14 and Appendix 2.3, Table A2.3.4.

It is applicable under the following assumptions (one of the 24 threshold sets considered):

1) a) The agent has different information to both the allocator and reallocator; *and*

   b) The agent *cannot* mandate reallocation following adoption of the new technology; *and*

   c) The agent *can* implement an alternative to adopting the new technology; *and*

   d) The agent *cannot* mandate reallocation following implementation of the alternative.

Figure 2.9: Optimal threshold curves (threshold set λ7)

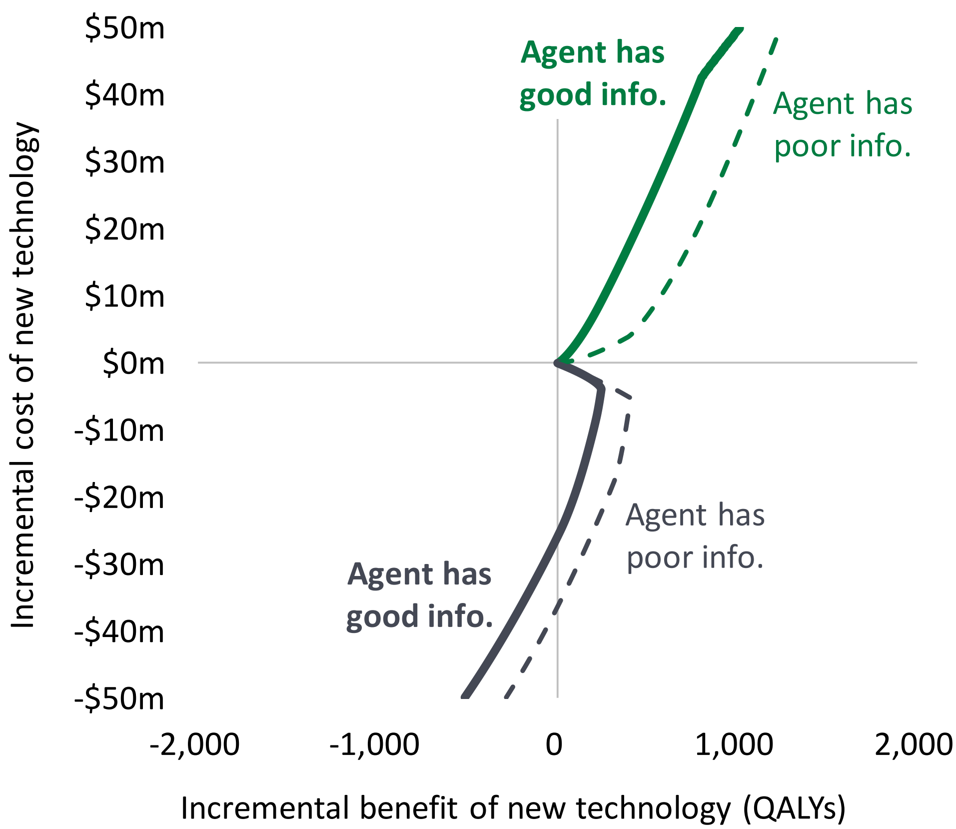


Table 2.14: Optimal numerical thresholds (threshold set λ7)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.4

Budget impact	***Threshold set λ7***							
	Agent has good information				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$0.1m	5.02	$19,920	9.31	-$10,740	33.89	$2,951	10.43	-$9,586
$0.2m	9.77	$20,476	18.50	-$10,810	53.80	$3,718	20.65	-$9,686
$0.3m	14.29	$20,989	27.57	-$10,883	70.49	$4,256	30.67	-$9,782
$42.4m	799.26	$53,049	-334.42	$126,786	1128.96	$37,557	-117.22	$361,720
$42.5m	800.73	$53,076	-336.67	$126,236	1130.40	$37,597	-119.28	$356,302
$42.6m	802.29	$53,098	-338.92	$125,692	1131.85	$37,637	-121.35	$351,056
$49.8m	1010.48	$49,284	-511.16	$97,426	1233.89	$40,360	-281.17	$177,117
$49.9m	1014.19	$49,202	-513.71	$97,137	1235.28	$40,396	-283.52	$176,000
$50.0m	1015.63	$49,231	-516.26	$96,850	1236.67	$40,431	-285.88	$174,899

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ7

1) In common with threshold set λ3, the threshold may be determined *solely* by the expected cumulative incremental benefit provided by the alternative to the new technology.
2) With a single exception, the threshold curves are identical to those in threshold set λ3. Since the agent determines how incremental expenditure is allocated on the alternative, these threshold curves are smooth.
3) The single exception is the part of the threshold curve for net investments above a budget impact of $42.5m, where the agent has good information, which is identical to the corresponding threshold curve in threshold set λ8. Since the agent does *not* determine reallocation, this part of the threshold curve is *not* smooth.
4) The threshold curve for net investments, where the agent has good information, kinks at a budget impact of $42.5m, corresponding to the point where the 'special case' no longer applies and the specification of the optimal threshold changes.

Special note

In common with threshold set λ3, the optimal threshold may be determined *solely* by the incremental benefit associated with the agent's preferred *alternative* to adopting the new technology, rather than by the reallocation that follows adoption of the new technology or implementation the alternative. The key difference to threshold set λ3 is that here the agent regards this reallocation as inefficient.

This special case only arises if the agent has a *positive* estimate of the *net* cumulative incremental benefit associated with implementing the alternative to the new technology and its subsequent reallocation. Since the agent regards reallocation as inefficient, there is greater scope for this condition to fail than under the conditions applicable to threshold set λ3, with this scope increasing with the budget impact.

Net investments

Agent has good information on the incremental benefit of initial technologies

As in threshold set λ3, if the agent has good information, then its preferred alternative to adopting a net investment is to *increase* incremental expenditure on initial technologies, starting with a marginal expansion of technology O (Table 2.6). The expected cumulative incremental benefit of this increases, at a diminishing rate, with the budget impact.

However, the expected cumulative incremental benefit forgone through reallocation also increases with the budget impact, eventually *exceeding* the expected cumulative incremental benefit of implementing the alternative above a budget impact of $42.5m (Table 2.14). Above this budget impact, the agent will *not* implement an alternative to the new technology, and so the new technology will appear cost-effective only if its incremental benefit exceeds the expected cumulative incremental benefit forgone through reallocation. This switch in the specification of the threshold causes the threshold curve to 'kink' at this point.

It follows that the threshold subset for net investments is identical to that in threshold set λ3 up to and including a budget impact of $42.5m (Table 2.10); above this budget impact, this threshold subset is identical to that in threshold set λ8 (Table 2.15).

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, the expected cumulative incremental benefit forgone through reallocation does not exceed the expected cumulative incremental benefit of implementing the alternative at *any* budget impact. The threshold subset for net investments is therefore identical to that in threshold set λ3 (Table 2.10).

Net disinvestments

Regardless of the agent's information, the expected cumulative incremental benefit forgone through reallocation does not exceed the expected cumulative incremental benefit of implementing the agent's preferred alternative to a net disinvestment at *any* budget impact. The threshold subsets for net disinvestments are therefore identical to those in threshold set λ3 (Table 2.10).

Threshold set λ8

Threshold set λ8 is summarized in Figure 2.10, Table 2.15 and Appendix 2.3, Table A2.3.4.

It is applicable under the following assumptions (one of the 24 threshold sets considered):

1) a) The agent has different information to both the allocator and reallocator; and
   b) The agent *cannot* mandate reallocation following adoption of the new technology; *and*
   c) The agent *cannot* implement an alternative to adopting the new technology.

Figure 2.10: Optimal threshold curves (threshold set λ8)

Table 2.15: Optimal numerical thresholds (threshold set λ8)

Note: This table is abridged. Complete table provided in Appendix 2.3, Table A2.3.4

Budget impact	Threshold set λ8							
	Agent has good information				Agent has poor information			
	Net Investment		Net Disinvestment		Net Investment		Net Disinvestment	
	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
\$0.1m	1.96	\$51,044	-1.79	\$55,872	1.58	\$63,369	-0.54	\$186,014
\$0.2m	3.79	\$52,812	-2.32	\$86,224	3.19	\$62,703	-2.01	\$99,571
\$0.3m	9.16	\$32,765	-3.24	\$92,587	4.66	\$64,329	-3.62	\$82,956
\$8.8m	137.83	\$63,849	-126.68	\$69,466	107.47	\$81,884	-104.68	\$84,063
\$8.9m	138.80	\$64,120	-127.56	\$69,773	109.02	\$81,635	-109.80	\$81,055
\$9.0m	140.88	\$63,884	-129.26	\$69,629	110.73	\$81,282	-110.31	\$81,589
\$49.8m	1010.48	\$49,284	-618.92	\$80,463	613.98	\$81,110	-544.64	\$91,437
\$49.9m	1014.19	\$49,202	-619.62	\$80,533	622.89	\$80,111	-545.74	\$91,436
\$50.0m	1015.63	\$49,231	-620.98	\$80,518	625.53	\$79,933	-546.83	\$91,435

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment; [c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

General characteristics of threshold set λ8

1) For new technologies with marginal budget impact, the numerical threshold is similar for net investments and net disinvestments.
2) It follows that there is no 'kink' between the threshold curves for net investments and net disinvestments at the origin of the CE plane.
3) Each threshold curve passes through only the NE and SW quadrants. New technologies in the SE quadrant are always cost-effective, while new technologies in the NW quadrant are never cost-effective.

Net investments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, and the allocator and reallocator have poor information, then the reallocator will respond to the adoption of a net investment by *partially reversing* the initial allocation, starting with a marginal contraction of technology H (Table 2.5). The reallocator estimates the marginal incremental benefit of this to be -1.65 QALYs, while the agent estimates it to be -1.96 QALYs.

Subsequent marginal reallocations have diminishing expected marginal incremental benefit to the reallocator, while the expected marginal incremental benefit to the agent fluctuates (increasing to -1.83 QALYs for the second marginal reallocation, decreasing to -5.37 QALYs for the third marginal reallocation, and so on). The expected *cumulative* incremental benefit to the agent tends to become more negative following each marginal reallocation, such that the threshold curve for net investments lies in the NE quadrant. The numerical threshold fluctuates with the budget impact, falling from $51,044 per QALY at $0.1m to $32,765 per QALY at $0.3m, then increasing to $64,120 per QALY at $8.9m, before falling to $49,231 per QALY at $50.0m.

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, then the threshold curve for net investments follows a similar pattern as with good information, with the numerical threshold also fluctuating with the budget impact. At each budget impact, the agent's estimate of the *cumulative* incremental benefit associated with reallocation is *less negative* than with good information, such that the threshold curve for net investments lies to the left of that for good information on the CE plane (Figure 2.10) and the numerical threshold is higher at each budget impact (Table 2.15).

Net disinvestments

Agent has good information on the incremental benefit of initial technologies

If the agent has good information, the reallocator will respond to the adoption of a net disinvestment by *continuing* the initial allocation, starting with a marginal contraction of technology R (Table 2.6). The reallocator estimates the marginal incremental benefit of this to be 1.65 QALYs – similar in absolute magnitude to that of the first marginal reallocation following a net investment – while the agent estimates it to be 1.79 QALYs.

In common with reallocation following a net investment, subsequent marginal reallocations have diminishing expected marginal incremental benefit to the reallocator, and fluctuating expected marginal incremental benefit to the agent. The expected *cumulative* incremental benefit to the agent tends to become more positive, such that the threshold curve for net disinvestments lies in the SW quadrant. The numerical threshold fluctuates but tends to increase with the budget impact, from $55,872 per QALY at a budget impact of $0.1m to $80,518 per QALY at a budget impact of $50.0m.

Agent has poor information on the incremental benefit of initial technologies

If the agent has poor information, then the threshold curve for net disinvestments follows a similar pattern to that with good information. At each budget impact, the agent's estimate of the cumulative incremental benefit associated with reallocation is *less positive* than with good information, such that the threshold curve for net investments lies to the right of that for good information on the CE plane (Figure 2.10) and the numerical threshold is higher at each budget impact (Table 2.15).

Discussion

Our findings provide novel additions to the literature concerning the appropriate cost-effectiveness threshold to use when considering a new technology for potential adoption into a budget constrained health system. This work represents the first attempt to explore the implications for the optimal threshold of considering interactions between multiple decision makers, each with imperfect information, under various scenarios regarding the authority granted to the decision making 'agent'.

We demonstrate that the optimal threshold depends upon the information available to each decision maker and the authority of the decision making agent: specifically, whether the agent has authority to *mandate* reallocation (or must accept what it perceives to be inefficient reallocations carried out by another decision maker), and also whether the agent has authority to implement a net investment or net disinvestment of resources in initial technologies as an *alternative* to recommending adoption of a new technology (in order to 'correct' perceived inefficiencies in the initial allocation of resources).

Our work demonstrates, for the first time, the potential for threshold curves to pass through the north-west (NW) and/or south-east (SE) quadrants of the agent's cost-effectiveness (CE) plane. This requires a novel interpretation of numerical ICERs, and raises the possibility that 'dominated' technologies may be cost-effective while 'dominant' technologies may not be.

The reason why threshold curves might pass through the NW quadrant differs from why they might pass through the SE quadrant. If the agent and reallocator have similar information, which differs from that available to the allocator, then reallocation following a net investment represents an opportunity to 'correct' what the agent and reallocator *perceive* to be an inefficient initial allocation of resources. Reallocation may therefore be associated with *positive*, rather than negative, expected incremental net benefit to the agent. If so, the agent may be willing to recommend some new technologies that lie within the NW quadrant, provided the expected *net* incremental benefit of their adoption and the subsequent reallocation is positive. Alternatively, if the agent and *allocator* have similar information, which differs from that available to the *reallocator*, then the agent may not 'trust' the reallocator to make an efficient reallocation following adoption of a new technology. If the agent perceives that reallocation following a net disinvestment will result in *negative* expected incremental benefit, then the agent might *not* recommend some technologies that lie in the SE quadrant, since the expected *net* incremental benefit of their adoption and the subsequent reallocation is negative.

Our findings support the arguments of some authors that the threshold may be ‘kinked’ at the origin of the CE plane, with different optimal thresholds for net investments than for net disinvestments. Although previous authors have argued that this ‘kink’ results in a consistently steeper or shallower threshold curve in one half of the CE plane, we find that the direction of this ‘kink’ varies according to the assumptions adopted.

An alternative specification of the threshold?

We also find a specific set of assumptions under which the threshold is *not* dependent upon the reallocation that follows adoption of a new technology. This applies only if *all* of the following conditions apply:

1. The agent *perceives* the initial allocation of resources to be *inefficient*;
2. The agent has the authority to implement an *alternative* net investment or net disinvestment of resources instead of recommending adoption of a new technology;
3. The reallocation following adoption of the new technology is *identical* to that which would follow implementation of this alternative to the new technology; and
4. The expected *net* incremental benefit of implementing an alternative to the new technology, and its subsequent reallocation, is *positive*.

If these conditions hold, the agent considers a new technology cost-effective if it provides greater expected incremental benefit than the agent’s preferred *alternative* to the new technology, *regardless* of the expected incremental benefit gained or forgone through reallocation.

Given the difficulty of empirically estimating the gain or loss in incremental benefit associated with reallocation in real world practice, the opportunity to adopt a conceptually different threshold may be worthy of further consideration, particularly if this alternative specification of the threshold is easier to estimate empirically. In practice, however, this would likely require institutional reform. While the assumption of allocative inefficiency is likely reasonable, reform would be needed to:

i. Implement processes that allow for the identification of possible net investments or net disinvestments of resources among initial technologies within the health care system;
ii. Grant agents the authority to implement these net investments or net disinvestments as an *alternative* to recommending new technologies for adoption;
iii. Ensure *consistent* reallocation following recommendations from the agent, regardless of whether the agent recommends adoption of a new technology or implementation of an alternative to the new technology; and
iv. Ensure that the identified alternatives to new technologies, and the reallocations that follow their implementation or adoption of a new technology, are sufficiently efficient from the perspective of the agent that implementing at least one of these alternatives to is considered cost-effective.

If these reforms were to be achieved, then the cost-effectiveness of a new technology could be determined by comparing its ICER directly to that of the most cost-effective alternative net investment or net disinvestment opportunity. This would, however, raise further questions. For example, if a set of cost-effective alternative net investment and net disinvestment opportunities has been identified, then why should decision makers wait until a new technology is considered before implementing them?

Strengths and limitations

Our findings are based on results from a model of a hypothetical health system, using simulated input data. An obvious limitation of this approach is that the specific numerical thresholds and threshold curves outputted from our analysis cannot be directly used for decision making. Thresholds used in practice should be empirically estimated from real world data. The recent empirical work by Claxton and colleagues provides an example of how this empirical work might be conducted.[27]

Nevertheless, empirical work requires a theoretical basis. Using simulated data allows us to inexpensively explore the implications of different combinations of assumptions, and draw logical connections between changes in these assumptions and changes in the characteristics of the set of optimal thresholds. Our findings have substantive implications for theory in this area, which in turn has important implications for future empirical work. For example, the methods used by Claxton and colleagues – the most extensive empirical work in this area to date – do not allow for the estimation of different thresholds for net investments and net disinvestments, nor do they provide estimates of thresholds that are conditional upon the budget impact of new technologies. By enhancing our understanding of the theoretical basis of the threshold, models using simulated data allow for more sophisticated empirical research in future, leading to the use of more appropriate thresholds in real world practice.

Given this approach, the remaining limitations relate to specific assumptions we adopted. We considered imperfect information for only a single parameter, and we assumed that decision makers had an 'incorrect' estimate of this parameter, rather than an estimate subject to uncertainty. We consider this to be the simplest means for integrating imperfect information into the model in a way that has substantive implications for the determination of the optimal cost-effectiveness threshold. This simple approach allowed for a straightforward exposition of some important implications of imperfect information, including the potential for threshold curves to be kinked and to pass through the NW and/or SE quadrants of the CE plane. Nevertheless, incorporating uncertainty would allow for a more nuanced consideration of imperfect information, and would allow the threshold to be considered as a stochastic parameter. Considering imperfect information in model parameters other than the incremental benefit of initial technologies might also lead to novel results. For example, we assumed that the agent knows what information the reallocator has and so can predict, with certainty, the reallocation that will result if a new technology is adopted. In practice the agent does not know with certainty how the reallocator will respond. If the agent's risk aversion were also to be modelled, then we might find that this uncertainty would make the agent more reluctant to adopt new technologies. Future work will provide an opportunity to build upon the foundations established in this chapter and explore these issues in more depth.

We also considered just three decision makers, including a single 'allocator' and 'reallocator'. This is a simplification of reality. For example, when CADTH makes recommendations on the cost-effectiveness of new technologies, it should take into account the different characteristics of each of Canada's provincial and territorial health care systems. Within each of these health care systems are multiple decision makers with responsibility for allocation and reallocation, each of which has differing information and potentially differing objectives. The implications for the threshold when information differs *between* allocators (or reallocators) within a single health care system is a possible avenue for future research in this area.

Implications for theory

We found that the standard exposition of the cost-effectiveness threshold given in the previous chapter – a single numerical threshold, represented by a linear threshold curve passing through the origin of the CE plane – does not hold under any of the circumstances considered.

Furthermore, the recent alternative specification of the threshold provided by Eckermann and Pekarsky was found to apply in only one of the eight threshold sets considered (Appendix 2.2).[63] This recent work might therefore be considered to reflect a 'special case', since the findings hold only under a narrow set of assumptions. Specifically, Eckermann and Pekarsky assumed that:

a. The health system is allocatively *inefficient*;
b. Reallocation following adoption of the new technology is *inefficient*;
c. An opportunity exists to *efficiently* increase or decrease incremental expenditure on initial technologies as an *alternative* to adopting the new technology; and
d. After implementing this alternative, the subsequent reallocation is *efficient*.

However, assumption (c) has questionable current applicability, since authorities such as NICE typically have a narrow remit that does not provide them with the authority to implement reallocations of the health system as an alternative to recommending adoption of the specific health technology under consideration.[64] Furthermore, assumptions (b) and (d) are seemingly incompatible in practice. Even if the decision making agent *has* the authority to implement an alternative to adopting the new technology, it is not clear why, or under what mechanism, it would be possible to implement an efficient reallocation following implementation of an *alternative* to the new technology but *not* following adoption of the new technology itself.

The assumptions adopted by Eckermann and Pekarsky therefore appear to place an unreasonable burden upon new technologies. For a new technology to be considered cost-effective, it is not sufficient for it to provide more incremental benefit than is forgone through reallocation, nor is it sufficient for it to provide greater incremental benefit than the *most cost-effective alternative* to the new technology. Rather, the new technology must be *substantially* more efficient than both, since reallocation following its adoption is assumed to be subject to an inefficiency that is resolved if, and only if, an alternative to the new technology is implemented instead. Compared to every other set of assumptions considered in this chapter, this results in a smaller area of the CE plane in which new technologies appear cost-effective.

Implications for policy

It is important for decision makers in the real world to consider 'opportunity cost' when determining whether a new technology is cost-effective. However, our findings suggest that these considerations are more complex than would appear from the standard exposition of the cost-effectiveness threshold.

Decision making agents may need to consider not only the expected incremental benefit associated with reallocation following adoption of a new technology, but also whether greater expected incremental benefit might result from implementing an *alternative* net investment or net disinvestment opportunity, and, if so, whether they have the authority to implement such an alternative in any case. Agents may also need to consider which decision maker within the health care system has the authority to determine reallocations following adoption of a new technology or an alternative to the new technology, and whether the reallocations favoured by this decision maker differ from the agent's own preferred reallocations.

Depending upon the authority of the agent, and the information available to each decision maker, the optimal threshold curves may be expected to lie in any quadrant of the agent's CE plane, and may be expected to exhibit 'kinks' at the origin of the CE plane – implying different optimal thresholds for marginal net investments and net disinvestments – or along each threshold curve. Deriving empirical estimates of optimal thresholds suitable for use in practice may therefore require more complex methods than those used in previous empirical studies, such as the recent work by Claxton and colleagues. In the meantime, in the absence of suitable empirical estimates of optimal thresholds, decision making agents will remain unaware of whether adopting new technologies will satisfy their objectives.

Bibliography for Chapter 2

27. Claxton K, Martin S, Soares M, et al. Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. *Health Technology Assessment*. 2015;19(14):1–503, v–vi. doi:10.3310/hta19140.

63. Eckermann S, Pekarsky B. Can the Real Opportunity Cost Stand Up: Displaced Services, the Straw Man Outside the Room. *PharmacoEconomics*. 2014. doi:10.1007/s40273-014-0140-3.

64. Paulden M, McCabe C, Karnon J. Achieving allocative efficiency in healthcare: nice in theory, not so NICE in Practice? *Pharmacoeconomics*. 2014;32(4):315–8. doi:10.1007/s40273-014-0146-x.

65. Eckermann S. Kinky Thresholds Revisited: Opportunity Costs Differ in the NE and SW Quadrants. *Appl Heal Econ Heal Policy*. 2015;13(1):7–13. doi:10.1007/s40258-014-0136-3.

79. Pekarsky B. Trust, constraints and the counterfactual: Reframing the political economy of new drugs. doi:10.1007/978-3-319-08903-4_3.

89. Garner S, Littlejohns P. Disinvestment from low value clinical interventions: NICEly done? *BMJ (Clinical research ed)*. 2011;343:d4519.

90. Klein R. *The New Politics of the NHS: From Creation to Reinvention*. 6th Revised Edition. Radcliffe Publishing Ltd; 2010.

91. CADTH. Programs and Services. 2016.

Chapter 3: Value-Based Reimbursement Decisions for Orphan Drugs: A Scoping Review and Decision Framework

Mike Paulden[1], Tania Stafinski[2], Devidas Menon[2] and Christopher McCabe[1]

[1] Department of Emergency Medicine, University of Alberta, Edmonton, AB, Canada

[2] School of Public Health, University of Alberta, Edmonton, AB, Canada

Acknowledgements

This work was supported by an Emerging Team Grant from the Canadian Institutes of Health Research (CIHR) for "Developing Effective Policies for Managing Technologies for Rare Diseases", and from a grant provided through the Genome Canada-CIHR 2012 Large-Scale Applied Research Project Competition in Genomics and Personalized Health for "PACE-'Omics: Personalized, Accessible, Cost-Effective applications of 'Omics technologies". The authors wish to acknowledge the support provided by the Promoting Rare-disease Innovations through Sustainable Mechanisms (PRISM) Collaborators Network. The authors are grateful to Andrea Dunn for her assistance with data extraction, Leigh-Ann Topfer for her guidance and support during the literature search and retrieval phase of this project, and Kerry Nield for her assistance in preparing the manuscript for submission. The authors have no conflicts of interest.

Author contributions

All authors contributed towards the design of the scoping review, the construction of the decision framework, and the writing of the manuscript. TS and DM conducted article screening for the scoping review. MP and TS were responsible for reviewing each paper, extracting and tabulating data, and identifying the candidate decision factors. MP is the overall guarantor for the paper.

Abstract

Background

The rate of development of new orphan drugs continues to grow. As a result, reimbursing orphan drugs on an exceptional basis is increasingly difficult to sustain from a health system perspective. An understanding of the value that societies attach to providing orphan drugs at the expense of other health technologies is now recognized as an important input to policy debates.

Objectives

To scope the social value arguments that have been advanced relating to the reimbursement of orphan drugs, and to locate these within a coherent decision making framework to aid reimbursement decisions in the presence of limited health care resources.

Methods

A scoping review of the peer reviewed and grey literature was undertaken, consisting of seven phases: identifying the research question; searching for relevant studies; selecting studies; charting, extracting and tabulating data; analyzing data; consulting relevant experts; and presenting results. The points within decision processes where the identified value arguments would be incorporated were then located. This mapping was used to construct a framework characterizing the distinct role of each value in informing decision making.

Results

The scoping review identified 19 candidate decision factors, most of which can be characterized as "value-bearing" or "opportunity cost-determining", and also a number of value propositions and pertinent sources of preference information. We were able to synthesize these into a coherent decision making framework.

Conclusion

Our framework may be used to structure policy discussions and to aid transparency about the values underlying reimbursement decisions for orphan drugs. These values ought to be consistently applied to all technologies and populations affected by the decision.

Key points for decision makers

- Understanding the value that societies attach to reimbursing orphan drugs at the expense of other health technologies is important.
- We have scoped the social value arguments advanced in the literature and located these within a coherent framework. This framework may be used to structure policy discussions and to aid transparency about the values underlying reimbursement decisions for orphan drugs in the presence of limited health care resources.
- Decision makers should seek to identify which value-bearing factors they deem pertinent to their decision, whose preferences they wish to consider, and what value propositions underpin their decisions. These need to be consistently applied to all technologies and populations affected by the decision: the new orphan drug, any existing therapy for the same disease which will be displaced, and any therapies which will be displaced elsewhere in the system to fund any additional costs of a positive coverage decision.

Introduction

Since the passage of orphan drug legislation in the United States (in 1983) and in Europe (in 1999), the rate of development of new orphan drugs has grown rapidly.[92,93] As a result, there are now a greater number of products available for treating rare diseases than were available two decades ago.[94] For example, more than 400 products have been developed and marketed in the United States since 1983, compared to fewer than 10 in the previous decade.[95] Quite separately, there have also been advances in personalized medicine, resulting in the division of some diseases into sub-categories based on genetic and molecular characteristics. Consequently, diseases once considered "common" have become a collection of individual diseases with smaller prevalence rates, some of which meet the regulatory definitions of rarity. This has significant implications for the licensing and adoption of therapies to treat them.[96,97]

These developments have taken place in an environment in which payers are already facing significant challenges in making coverage decisions for non-orphan disease therapies.[98] Ageing populations, combined with increasingly expensive production costs for many innovative technologies, have led to large and sustained increases in health care expenditure. Health care budgets have generally increased faster than economies have grown, leading to genuine concerns about affordability in many countries. In response, health systems have established formal mechanisms for making coverage decisions on new health technologies, including drugs.[99,100] However, stakeholders in these coverage decision processes have expressed criticisms around both the processes and factors considered when deciding whether technologies represent a good investment.[101,102] These concerns have led policy makers and researchers to attempt to specify the characteristics of good decision processes and to be explicit about the factors considered in arriving at their decisions and their rationale.[103]

The growth in both the number and budgetary impact of orphan drugs has accentuated these challenges.[104,105] Each disease is rare, which hampers the ability to generate high quality evidence of value. It also leads manufacturers to seek much higher prices to ensure that expected profits are comparable to those provided by treatments for common diseases.[106] However, rare disease diagnoses are increasingly common, and reimbursement of orphan drugs on an exceptional basis may no longer be intellectually defensible nor economically sustainable.

Further, there is growing recognition of the need to understand the value that societies attach to providing coverage for orphan drugs at the expense of other health technologies as an important input into policy debates in this area.

The objective of this paper is to scope the social value arguments advanced in the academic and policy literature related to the reimbursement of orphan drugs, and then to locate these identified values within a coherent decision making framework applicable for coverage decisions in the context of a limited health care budget.

Methods

To facilitate a structured and transparent approach to identifying the social value arguments advanced in orphan drug policy debates, we adopted the methods of a scoping review for the discovery component of the study.[107] Since several steps in a scoping review are the same as those in a systematic review, we also followed the PRISMA statement for reporting, where relevant.[108] Drawing upon previous work by the authors on the process of health care decision making and decision criteria for coverage decisions in the presence of a fixed budget, we then attempted to locate the points where social values should be incorporated within the decision process.[60,66,103]

Scoping review

Our discovery work consisted of seven phases: identifying the research question; searching for relevant studies; selecting studies; charting, extracting and tabulating the data; analyzing the data; consulting relevant experts; and presenting the results.[109]

Identifying the research question

With input from the team of investigators and collaborators on the Canadian Institutes of Health Research (CIHR) 'Promoting Rare-disease Innovations through Sustainable Mechanisms' (PRISM) grant, the following research question was formulated: *"What is known about societal values for new therapies for rare and ultra-rare diseases and conditions?"* Addressing this question comprised the initial phase of PRISM's research program, which aims to develop policy options that optimize access to effective therapies within a sustainable healthcare system.[110] There is no common definition of a rare or ultra-rare disease, nor a shared understanding of what is meant by 'societal values'. Therefore, to reduce the likelihood of missing relevant studies, a broad approach was adopted. 'Societal values' were, in general terms, any statements regarding how health care resources should be prioritized to reflect public choices or social preferences. Rare or ultra-rare diseases were any conditions that had been described as such by the respective author(s).

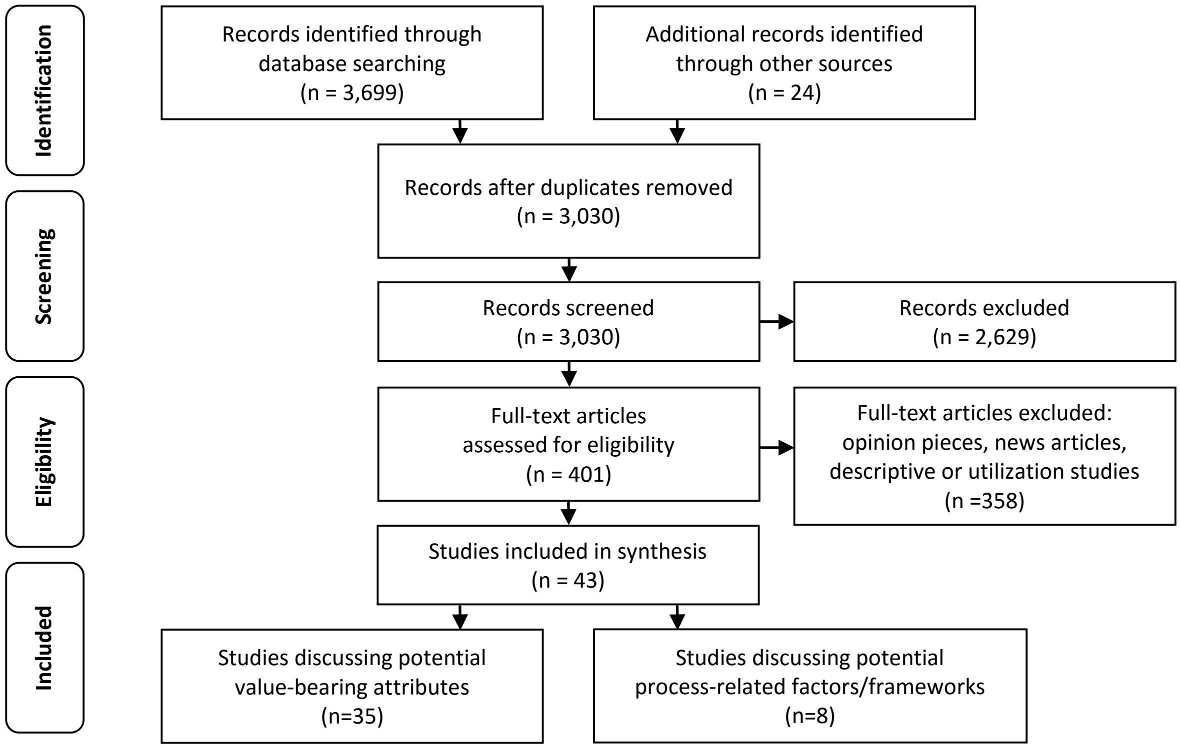
Searching for relevant studies

A comprehensive search strategy for identifying published and unpublished papers that met the inclusion criteria (i.e., any type of paper addressing societal values in the context of therapies for rare diseases) was constructed with support from an experienced research librarian. Because the goal was to capture any information in this area (including think/conceptual pieces, empirical work, reviews, etc.), search parameters were not limited to a particular study design. However, for feasibility reasons, language and date restrictions were applied (papers appearing in English between January of 1990 and October of 2013). This date range was deemed sufficient, since it spanned the points at which the high costs of therapies for treating rare diseases were recognized as imposing a potential burden upon healthcare systems, sparking discussions around values and their place in determining the legitimacy of reimbursement despite limited evidence of effectiveness. The search strategy, which appears in full detail in Appendix 3.1, was applied to the following databases: PubMed (MEDLINE and non-MEDLINE sources), EMBASE, Web of Science, Scopus, ProQuest, Cochrane Library and EconLit. Citation searches were also performed using names of authors and journals of relevant papers, and Google Scholar was searched with combinations of keywords for rare diseases, therapies, and values (Appendix 3.1). For comprehensiveness, reference lists of relevant papers and conference abstracts were manually searched. All of the search results were imported into Reference Manager, and duplicate citations were removed. A detailed breakdown of the number of citations identified through the various information sources in presented in Figure 3.1.

Selecting studies

Inclusion and exclusion criteria were developed at the outset of the review. These were used to create a screening checklist, which was applied to discrete citations or abstracts (where available) by two researchers (TS and DM) independently. Papers addressing *both* of the following were included: a specific rare or ultra-rare disease, or one or both more broadly; *and* specific values or factors that should be taken into account during funding deliberations and decision making around treatments for them (inclusion criteria). Studies presenting multi-country comparisons of access to, or utilization of, specific therapies or centralized drug review processes were excluded (exclusion criteria). The full papers of potentially relevant citations were retrieved for further consideration. Two researchers (MP and TS) independently reviewed full papers using the same criteria and then met to compare findings. Discrepancies were resolved through discussion.

Figure 3.1: PRISMA flow diagram for the scoping review



Charting, extracting and tabulating the data

Key chunks of information from papers selected for inclusion in the scoping study were charted by both researchers using a data charting form (similar to a data extraction form used in systematic reviews). Charting involved sifting through and sorting information according to key aspects or concepts.[111] These key aspects or concepts, identified *a priori,* included author(s), type of paper, country where the paper originated, purpose of the paper, definition of 'rare' or 'ultra-rare' applied, the types of therapies addressed, factors or values-based statements considered, methods or approaches used (including information sources) to arrive at findings or arguments presented, and conclusions. They formed the common analytical framework applied to papers through the data charting form. This component, which is part of the descriptive-analytical method within the narrative review tradition, ensured data were collected in a standard way, enhancing their usefulness.[112] Prior to beginning data extraction, the charting form was pilot-tested on five randomly selected papers (TS and DM). Information from completed forms was entered into tables, with rows representing individual papers and columns representing components of the analytical framework. This was done to assess the nature and distribution of papers comprising the review.

Analyzing the data

The data were analyzed qualitatively using a general inductive approach. This method is commonly applied to research aimed at developing models of the underlying structure of arguments, processes or experiences.[113] Extracted data (raw text from the tables) were read in detail by two researchers (MP and TS) to become familiar with the content and potential themes. Initial coding categories which represented 'meaning units' (themes) were then created. Text segments were assigned to one or more of these categories. If a segment was not relevant to the research objectives, no category was assigned. If sub-themes emerged within a category, sub-categories were created. A sub-theme included items such as points of view on how characteristics of a disease or therapy should be valued in decision making. Once all text was coded, sub-themes were reduced to avoid overlap or redundancy. The placement of different text segments relative to one another was then considered in order to identify important links between themes. This information was used to map out the themes and sub-themes, creating a structure that reflects the relationships between them.

Consulting relevant experts

To optimize the usefulness of the review, a consultation exercise was carried out with relevant key stakeholder communities (patients, providers, industry, and government).[114] The PRISM program includes a network of individuals from across Canada who represent these communities. Each individual was asked to review the draft results and contribute additional references, as well as insights into factors or arguments that had not been captured or appeared to be incomplete. Feedback received was incorporated into the draft results through a similar approach to that applied to the papers. It was first 'charted' using the same analytical framework and then organized by 'theme'. Where a new 'theme' emerged during the consultation, the draft results were re-analyzed through an iterative process to ensure that it or related concepts had not been missed.

Presenting the results

To ensure consistency in the approach to reporting information by theme, a template was created and applied to each theme. It included a description of the theme (e.g., decision making factor, source of preferences, value proposition), arguments supporting or refuting its role in decision making within the context of therapies for rare diseases, empirical work done to inform such arguments (including a comparative analysis of such work, if available, to identify potentially conflicting findings), and a commentary on existing gaps in the evidence base.

Incorporating social values within coverage decisions for orphan drugs

Building on previous work by the authors on the process of health care decision making and decision criteria for coverage decisions in the presence of a fixed budget, points in the decision process where social values would be incorporated were identified.[66,72,103] These points were subsequently used to locate the value arguments identified in the scoping review within the decision process.

The mapping of values on to the decision process formed the basis for a framework characterizing the distinct role of each value in informing decision making. This included consideration of how each value should be incorporated within the decision problem, how decision makers should engage with issues of value, and how value information can be synthesized with other components of the decision problem to arrive at a coverage decision in a consistent and transparent manner.

Results

Scoping review

Description of studies selected

Using the PRISMA diagram format, Figure 3.1 shows the total number of candidate articles through the four phases of the identification and selection process. 3,723 articles were identified, of which 693 were duplicates. Screening of titles and abstracts excluded 2,629 citations, leaving 401 full text articles for eligibility assessment. After assessment, 43 articles were retained for review and synthesis.[66–68,94,103,104,106,115–150] These articles were either conceptual pieces or empirical studies. Several identified one or more attributes or characteristics around which there may be a social preference, such as the prevalence of disease or the extent to which the disease is life-threatening or chronically debilitating; we labelled these as *identified candidate decision factors*. Others identified potential sources of *preferences* or potential *value propositions* that decision makers might consider when making coverage decisions for treatments for rare diseases. Assessing the strength of opinion or empirical evidence supporting the use of each identified candidate decision factor, preference or value proposition was outside the scope of this paper.

Eight papers included in the review made normative recommendations relating to decision processes for orphan drugs, including institutional considerations, proposals for decision making committee membership, or procedural justice arguments.

Extraction and tabulation of the data

The data extracted from each study is reported in Appendix 3.2.

Analysis of the data

A total of 19 identified candidate decision factors were extracted from the 43 studies reviewed. These are summarized in Table 3.1 and described briefly in the following section.

Table 3.1: The 19 identified candidate decision factors

Prevalence (rarity) of disease	Availability of treatment alternatives
Severity (seriousness) of disease	Impact of treatment upon the distribution of health in the population
Identifiability of the beneficiaries of treatment	Socio-economic policy objectives
Extent to which the disease is life-threatening or chronically debilitating	Cost (price) of treatment
Evidence of treatment efficacy or effectiveness	Budget impact of treatment
Magnitude of treatment benefit	Cost-effectiveness of treatment
Safety profile of treatment	Feasibility of diagnosing the disease
Innovation profile of treatment	Feasibility of providing treatment
Societal impact of treatment	Industrial and commercial policy considerations
	Legal considerations

Candidate decision factors

Prevalence (rarity) of the disease

Fifteen papers discussed the relevance of disease prevalence as a factor to be (or not to be) considered during decision making.[66,116,120,121,124,126–128,130,135,140,141,144,147,150] Several authors questioned whether 'rarity' represents a "rational basis for applying a different value to health gain", and argued that society should place a similar value on a health gain, regardless of whether the beneficiaries have rare or common disorders.[66,126,141] The findings of available empirical studies support this position.[147] Survey evidence from Norway found no preference among physicians or the general population for treating patients with rare disorders at the expense of those with common disorders.[130] A Canadian discrete choice experiment found that the probability that participants would prefer funding for a drug was around 30% higher for common diseases than for rare diseases.[147] The West Midlands Specialist Services Agency in the UK, following lengthy deliberations over its approach to funding orphan drugs, concluded that rarity should not be an overriding factor in any funding decision.[126]

Severity (seriousness) of disease

Twelve papers considered the relevance of the seriousness or severity of the disorder to decision making around orphan drugs.[68,94,103,121,128,130,136,138,140,141,144,146] Authors often indicated that it is socially desirable to prioritize conditions with high disease severity or unmet medical need. According to Siddiqui and Rajkumar, "the seriousness of a cancer diagnosis plays a role in how much cost patients and physicians are willing to bear for modest incremental benefits".[121] Clarke questioned whether patients should be "denied access to potentially effective new treatments for formerly untreatable and serious diseases only because it is virtually impossible to evaluate the cost-effectiveness of those treatments using conventional criteria".[68] Proposed frameworks for orphan drugs, as well as actual review bodies, such as the Australian Pharmaceutical Benefits Advisory Committee (PBAC), include gravity of the condition as a consideration during decision making.[103,140,144]

Identifiability of the beneficiaries of treatment

In four papers, 'identifiability', or the tendency to give preference to 'visible' individuals, was discussed as central to definitions of the 'rule of rescue'.[66,126,136,142] Authors questioned whether it should be a consideration, raising the notion of opportunity costs to underpin arguments: "it strains credulity to say that the more caring society is the one that sacrifices several anonymous lives in order to save an identifiable one"; and "special status" for orphan drugs "may impose substantial and increasing costs on the healthcare system" and these costs will be borne by "other, unknown patients, with more common diseases who will be unable to access effective and cost effective treatment as a result".[66,136] One of the studies also mentioned the outcomes of deliberations by the West Midlands Specialist Services Agency in the UK, which concluded that identifiability should not be an overriding factor in any decision to fund treatment.[126]

Extent to which the disease is life-threatening or chronically debilitating

Three papers explicitly addressed the 'life threatening or chronically debilitating' nature of a condition, which forms part of the European Union's orphan drug legislation.[67,120,136] Authors discussed ethical arguments for favouring the worst-off, "even when only minor gains can be achieved and the cost is very high".[136] Pinxten *et al.* argued that developing and supplying orphan drugs complies with the "core biomedical objectives" of health care because "these patients have urgent, objective medical needs and because their lives are in danger when they do not receive the necessary care… from a biomedical perspective, there are no valid reasons to exclude rare diseases from publicly funded healthcare”.[67]

Evidence of treatment efficacy or effectiveness

Eleven papers discussed the role of evidence of clinical efficacy or effectiveness within the context of orphan drugs.[68,94,103,116,117,120,134,137,139,144,150] In general, authors argued that “orphan drugs [should] have to prove effectiveness like any other drug”.[117] Three of the studies presented empirical evidence based upon retrospective analyses of regulatory decisions. The findings were similar: orphan drug trials were more likely to assess disease response rather than overall survival.[117,120,139] While some authors have called for more stringent measures of clinical effectiveness to be adopted, others have indicated that it is difficult to evaluate clinical effectiveness “due in part to the nature of rare diseases”.[68,139] Four of the studies contained proposed decision making frameworks, all of which included evidence of clinical effectiveness as a criterion.[103,116,120,150]

Magnitude of treatment benefit

In ten papers, the importance of considering the amount of individual health gain or magnitude of benefit offered by an orphan drug was discussed.[115,119,121,122,128,136,140,146,147,149] Authors suggested that the impact of treatment on life expectancy and quality of life should be taken into account, as well as whether the therapy “remains a symptomatic therapy rather than a cure”.[115] Others argued that the lack of explicit thresholds of clinical benefit contributes to the high cost of drugs, and supported adopting policies similar to the UK’s proposed ‘value based pricing’ framework, under which drugs demonstrating a greater magnitude of benefit would command higher prices.[149] Other frameworks have also proposed “therapeutic benefit” as a criterion for assessing the value of therapies for rare diseases.[140] Empirical evidence appears to support this view.[128,146]

Availability of treatment alternatives

Seven papers address the availability of alternative treatments as a consideration during the development of funding decisions for orphan drugs.[68,103,120,127,134,138,144] In general, the lack of disease modifying treatment options connoted “unmet need”, and authors argued that “it is socially desirable to develop treatments for conditions carrying very high disease severity or having significant unmet medical need irrespective of their rarity", and that patients should not be denied access to potentially effective new treatments for "formerly untreatable" diseases.[68,138] Empirical studies have demonstrated that the price of an orphan drug appears to be inversely related to the availability of alternative treatments (i.e., prices are higher where no other options exist).[127] Proposed frameworks have also incorporated this factor into decision making criteria.[103,120]

Safety profile of treatment

Three papers addressed safety considerations as an important decision making factor.[120,127,137] Two included 'safety profile' along with other proposed criteria. However, the third presented empirical work comparing characteristics of pivotal trials of orphan versus non-orphan drugs for cancer, the findings of which demonstrated that serious adverse event rates were statistically significantly higher in trials of orphan drugs.[137]

Innovation profile of treatment

In four papers, innovation as a decision making factor was explored.[66,127,140,149] Some authors questioned whether healthcare systems should pay more than the value of the benefits from a new technology in the hope that a more valuable future technology will be developed (i.e., paying twice for innovation).[66,149] Others argued that cost-containment measures, which may be necessary due to the strain that orphan drugs put on national health budgets, will not be productive or appropriate for the long term development of drugs for rare diseases.[127]

Societal impact of treatment

The importance of considering the broader impact of orphan drugs on families, and societies as a whole, was discussed in five papers.[103,118,122,140,144] Concerns over standard methods of assessment, which may not take into account the value of returning patients or carers to work or school, were raised.[144] This point was addressed in two of the proposed funding frameworks for orphan drugs that included societal and familial impact in decision making criteria.[122,140]

Impact of treatment upon the distribution of health

In six papers, authors explored the impact of orphan drugs on the distribution of health across competing patient populations.[66,67,123,126,136,147] It was argued that debates around whether orphan drugs should receive special status must consider opportunity costs.[66] Opportunity cost presents an ethical dilemma, which “has to be assessed according to the various existing concepts of distributive justice”.[67] Those concepts include equal access, equal resources, and equal outcomes, and they often conflict with one another. For example, if a utilitarian view of distributive justice were adopted, it would be difficult to support the development and supply of orphan drugs. Empirical evidence exploring this issue was limited to one paper. This paper comprised a survey of Norwegian doctors, which found little support for prioritizing the treatment of rare diseases, although a preference for allocating resources in accordance with the principle of reserving a small portion of resources for rare disease patients was noted.[147] The authors of two of the papers raised concerns over postcode prescribing and equity in access to orphan drugs across jurisdictions. Different approaches to alleviating these concerns were proposed, including regulation of compassionate access at a multi-jurisdiction (European) level and assignment of equity weights to quality-adjusted life years (QALYs) during the assessment of orphan drugs by decision making bodies.[123,126]

Socio-economic policy objectives

Three papers considered socio-economic policy objectives in the context of rare diseases.[66,130,144] Drummond *et al.* argued that "it does not make much sense (in terms of efficiency) for the public system to fund or subsidize R&D on orphan drugs and later not reimburse the resulting innovations. This strategy will lead to a waste of R&D resources (if the products are finally not used) and discourage future investment on R&D on orphan drugs”.[144] Meanwhile, McCabe *et al.* noted that “many healthcare payers have exempted orphan drugs from formal value assessment, arguing that society values equal opportunity for people with rare and common conditions enough to justify the high costs".[130]

Cost (price) of treatment

The price of orphan drugs was discussed in 19 papers.[104,106,115,121,122,124,125,127,128,130,132,133,135,138,142–144,147,149] Several presented examples of the average per patient treatment costs, concluding that the prices of orphan drugs "poses a substantial challenge for healthcare systems" and are "unsustainable".[115,130] Health insurers cannot, and should not, "be expected to fund, at any price, all effective orphan drugs".[144] In one paper, the authors attributed the high prices to, in part, "the absence of appropriate benchmarks to gauge whether prices are low, high, or too high relative to expectations".[138] Their views were echoed in another paper, which stated that "the price usually has very little to do with the drug's incremental benefit".[135] Empirical work demonstrated that "awarding orphan designation in itself is associated with higher prices for drugs for rare disease indications".[124]

Budget impact of treatment

The relevance of budget impact considerations was discussed in 13 papers.[66,103,104,116,119,121,127,128,140,141,144,148,149] Several authors questioned the need to consider it at all, since the budget impact of many orphan drugs is "modest" due to small patient numbers.[144] Others argued that, while the number of patients with a single rare disease is small, there are thousands of these diseases, and industrial and regulatory policies encouraging R&D in rare diseases have led to a rapidly growing orphan drug market. It has been estimated that, by 2030, "specialty pharmaceuticals will account for up to 44% of a plan's total drug expenditures".[119] Therefore, budget impact must be considered in funding processes. Budget impact was included as a consideration in three of the papers proposing decision making frameworks for rare diseases.[103,116,140]

Cost-effectiveness of treatment

The cost-effectiveness of treatment was considered by 23 papers.[66–68,103,106,116–119,121,122,125,126,128,130,135,136,139,140,144,148–150] Issues raised fell into one of two categories: appropriateness of standard cost-effectiveness methods in assessments of orphan drugs; and use of conventional cost-effectiveness thresholds to determine the cost-effectiveness of orphan drugs. Several authors suggested that standard methodologies of health technology assessments must be updated and tailored to orphan drugs.[122,144] The application of conventional cost-effectiveness thresholds to coverage decisions has generated significant debate. Some authors argued that 'cost-effectiveness' should be treated similarly for orphan and non-orphan drugs and that cost-effectiveness ratios offer an equitable way to guide decision making.[126,135] Others argued that "a complete restriction on the funding of ultra-orphan drugs is not a practical or realistic solution".[141] A number of the papers proposing decision making frameworks included cost-effectiveness as a consideration.[103,106,116,140,150]

Feasibility of diagnosing the disease

In one paper, the authors argued that funding decisions need to consider whether diagnosis of the rare disease is technically feasible.[120] Not all jurisdictions have the infrastructure, resources, or expertise to accurately diagnose some rare diseases.

Feasibility of providing treatment

In one paper, the authors considered the feasibility of treatment as a decision making criterion.[120] They indicated that specialist training and expertise are often required to ensure patients are appropriately managed.

Industrial and commercial policy considerations

Twelve papers addressed commercial considerations as they relate to the reimbursement of orphan drugs.[66,120,121,129,133,134,138,142,143,145,146,149] Some argued that "because of their small market potential, [orphan drugs] are not attractive for pharmaceutical companies to develop and market".[120] Others questioned this position, arguing that the costs of development for orphan drugs are lower, since clinical trials are shorter, regulatory findings are more successful, and Orphan Drug Act benefits such as fee waivers, R&D grants, and tax incentives are available.[129] Citing empirical work, the latter authors argued that "taken together, lower costs, higher rates of regulatory success and parity of revenue-generating potential translate into higher profitability of orphan vs non-orphan drugs".

Legal considerations

Two papers raised legal considerations as potential decision making factors.[121,126] Siddiqui and Rajkumar considered the implications of the patent system, while Moberly explained that "legal concerns over commercial expectations" contributed towards the UK Department of Health moving commissioning away from the West Midlands Specialized Services Agency".[121,126]

Stakeholder preferences, value propositions, and institutional structures

In addition to the 19 candidate decision factors, the review also identified stakeholder preferences, value propositions, and institutional structures as important elements in the reimbursement of orphan drugs.

Stakeholder preferences

Three sources of preferences that decision makers might consider when making coverage decisions for treatments for rare diseases were identified:

1. The preferences of patients;[103,126]
2. The preferences of physicians;[147]
3. The preferences of society.[66,136,144,147]

Value propositions

The following value propositions, comprising statements around how individual or multiple candidate decision factors should be valued or weighed during decision making, were identified:

1. The 'rule of rescue', which supports the non-abandonment – regardless of cost – of identifiable patients with a life-threatening illness if an effective treatment is available. (This addresses 'identifiability of the beneficiaries of treatment', 'severity (seriousness) of disease', 'extent to which the disease is life threatening or chronically debilitating', and 'availability of treatment alternatives', and explicitly excludes 'cost (price) of treatment');[67,136,141,142]
2. The 'equity principle', which argues against special consideration for patients with rare diseases. (This addresses 'societal impact of treatment', 'impact of treatment upon the distribution of health in the population' and 'magnitude of treatment benefit', placing greater weight on the first two factors);[66,132,135,136,141,142,147]
3. The 'rights-based approach', which proposes that individuals have a right to a decent minimum level of health care, implying that treatments for rare diseases should be made available if the respective patients have no other treatment options. (This addresses 'impact of treatment upon the distribution of health in the population' – defining equity in terms of equal access to treatment – and 'availability of treatment alternatives').[141,142]

Institutional structures

Some authors called for a dedicated funding program for rare diseases and the establishment of an independent body responsible for their assessment. A WHO Orphan Medicines Model List was also proposed as a complement to existing Model List of Essential Medicines.[120]

Integrating the identified candidate decision factors, preferences and value propositions into a coherent decision making framework

Categorizing the identified candidate decision factors

Based on qualitative analyses of discussions related to the 19 candidate decision factors in papers, relationships among them were identified. These were used to group the factors into three categories:

a) Those that determine the *opportunity cost* of providing coverage for the orphan therapy or its relevant comparators;
b) Those that bear upon the *value* assigned to the orphan therapy, its comparators, and the opportunity cost of each; and
c) Those factors that are *neither* value-bearing *nor* determining the opportunity cost, but are, nevertheless, relevant for the decision about whether to provide coverage.

'Opportunity cost'-determining factors

The 'opportunity cost'-determining factors identified in the review included:

- Cost (price) of treatment
- Budget impact of treatment

As described in the papers, the budget impact of treatment is a function of the size of the patient population and the cost of treatment per patient, which, in turn, is a function of the treatment's purchase price and any other resources required for the safe and effective delivery of the treatment. The larger the budget impact, the greater the opportunity cost when the treatment is covered by the health care budget, since more treatments will need to be forgone by other patients.

Value-bearing factors

The value-bearing factors were further grouped into four non-mutually exclusive categories:

1. Disease-related factors
2. Technology-related factors
3. Population-related factors
4. Socio-economic-related factors

1. Disease-related factors

The disease-related value-bearing factors identified in the review include:

- Prevalence (rarity) of disease
- Severity (seriousness) of disease
- Identifiability of the beneficiaries of treatment
- Extent to which the disease is life-threatening or chronically debilitating without treatment
- Impact of disease upon the distribution of health in the population
- Availability of treatment alternatives

2. Treatment-related factors

The treatment-related value-bearing factors identified in the review include:

- Evidence of treatment efficacy or effectiveness
- Magnitude of treatment benefit
- Safety profile of treatment
- Innovation profile of treatment
- Societal impact of treatment
- Impact of treatment upon the distribution of health in the population

3. Population-related factors

The population-related value-bearing factors identified in the review included:

- Societal impact of treatment
- Impact of treatment upon the distribution of health in the population
- Socio-economic policy objectives

4. Socio-economic-related factors

The socio-economic-related value-bearing factors identified in the review included:

- Societal impact of treatment
- Impact of treatment upon the distribution of health in the population
- Socio-economic policy objectives
- Industrial and commercial policy considerations
- Legal considerations

Other decision factors

The remaining identified candidate decision factors were neither value-bearing nor 'opportunity cost'-determining, but were viewed as potentially influencing the decision about whether to provide coverage for an orphan therapy. These included:

- Feasibility of diagnosing the disease
- Feasibility of providing treatment
- Cost-effectiveness of treatment

Based on the findings of the review, feasibility of diagnosing the disease and of providing treatment are regarded as *necessary but not sufficient* conditions for the funding of an orphan therapy.

Given considerable debate in the literature around the cost-effectiveness of treatment, it requires careful consideration before integrating it within a decision making framework. This is discussed in further detail later in the paper.

Preferences

The results of the scoping review highlighted the diversity of views around the candidate decision factors and how they should be operationalized in coverage decision making. Views often reflected preferences for how healthcare should be allocated across competing patient populations. As noted in several of the papers, those preferences may vary by stakeholder community. Therefore, decision makers may wish to incorporate the preferences of one or more *stakeholders* when making coverage decisions for orphan therapies. The preferences of patients, physicians and society at large were explicitly identified as possible considerations. However, inferences to input from other stakeholders, such as the members of expert bodies or commercial partners, were made.

Given that preferences may vary, when incorporating these into a coherent decision making framework the preferences of each stakeholder (or stakeholder community) may be considered as representing a unique preference function, f_j, where j denotes the stakeholder in question. Within each preference function are a number of arguments, $v_1, v_2, \ldots, v_n$, representing each of the n value-bearing factors. Each stakeholder may place a different weight – which can include zero – on each of these value-bearing factors. For example, a physician might place a large weight on the safety profile of a treatment, whereas a patient might place a smaller weight on its safety profile but a larger weight on the expected magnitude of benefit.

The value that each stakeholder places on any particular treatment – whether that is the orphan therapy being appraised, a comparator, or a treatment forgone by other patients should it be funded – depends upon the weights placed by the stakeholder on each of the value-bearing factors and the extent to which the each of these value-bearing factors is relevant to the treatment in question. For example, if a stakeholder places a high weight on "severity of disease", then (all else equal) a treatment for patients with more severe disease will be valued more highly by the stakeholder than a treatment for patients with less severe disease. The value placed on treatment i by stakeholder j is denoted by P_j^i, where $P_j^i = f_j(v_1, v_2, \ldots, v_n)$.

Value propositions

As mentioned above, the scoping review identified three value propositions – the 'rule of rescue', the 'equity principle', and the 'rights-based approach'. While this is not an exhaustive list, it provides examples of value propositions that might be considered by decision makers.

Value propositions may be viewed in a similar way to preferences. Each value proposition, k, is a unique function, g_k, of the n value-bearing factors, $v_1, v_2, \ldots, v_n$. Each value proposition places different weights on these factors. For example, the 'rule of rescue' places relatively large weights on 'identifiability of the beneficiaries of treatment' and 'extent to which the disease is life-threatening or chronically debilitating', but relatively little weight on 'impact of treatment upon the distribution of health'. By contrast, the 'equity principle' places no weight on 'identifiability of the beneficiaries of treatment', nor on 'prevalence (rarity) of disease', but a much greater weight upon 'impact of treatment upon the distribution of health in the population'.

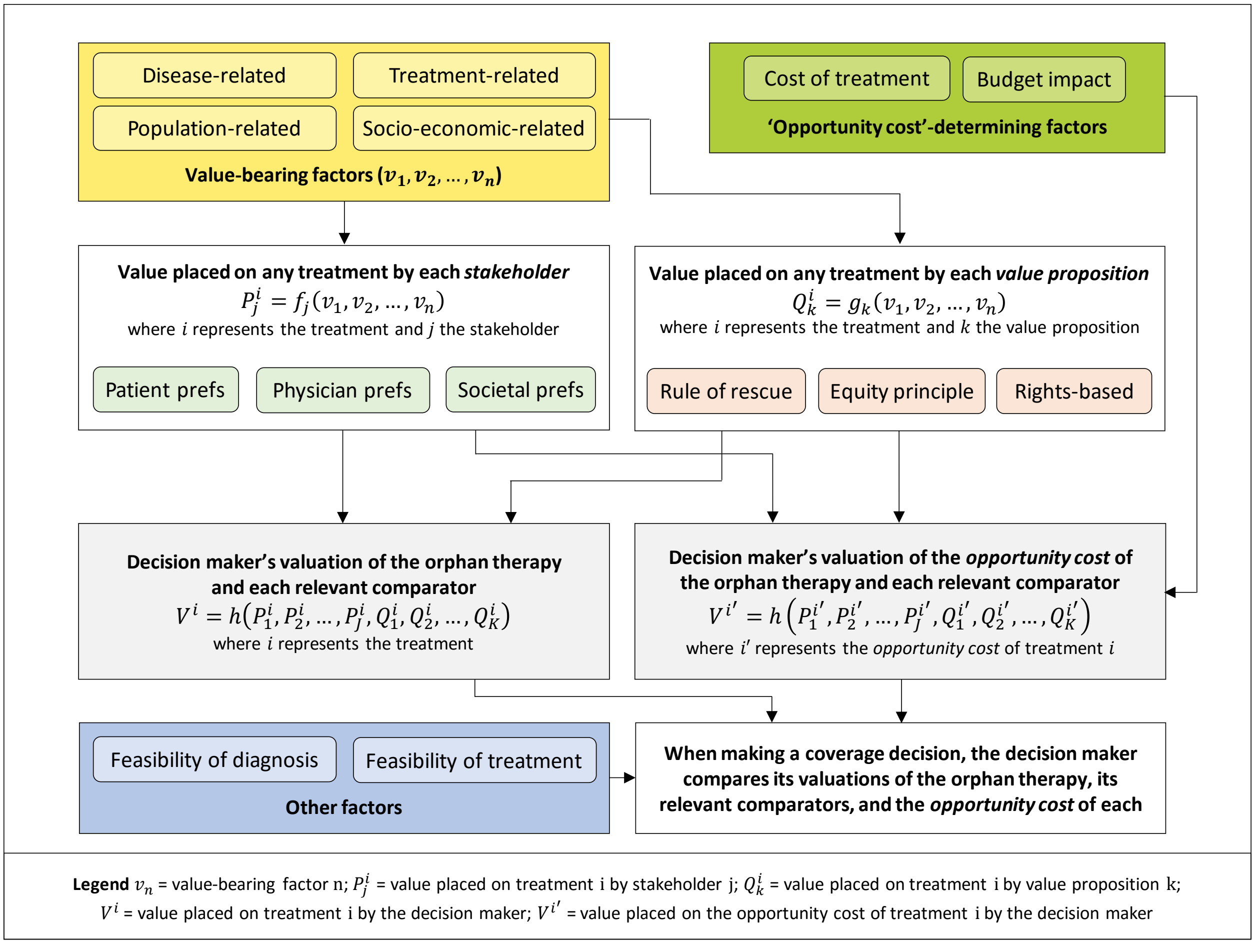
In common with preferences, the value that any particular value proposition assigns to a treatment depends upon the weights placed on each of the value-bearing factors and the extent to which each of these is relevant to the treatment. All else equal, the 'rights-based approach' would assign a greater value to an effective treatment if patients have no other treatment options, whereas the 'equality principle' would not. The value placed on treatment i by value proposition k is denoted by Q_k^i, where $Q_k^i = g_k(v_1, v_2, \dots, v_n)$.

Our proposed framework

The above considerations may be used to map out a coherent decision making *framework*, which incorporates the role that each of the candidate decision factors, preferences and value propositions could play in the decision making process. This framework is summarized in Figure 3.2. The various value-bearing factors are considered in the yellow box at the top-left of the figure. The value placed on any particular treatment by each stakeholder and by each of the various alternative value propositions is a function of these value-bearing factors.

The value placed on treatment i by the *decision maker* is a function, h, of the value placed on treatment i by each stakeholder $(P_1^i, P_2^i, \dots, P_J^i)$ and the value placed on treatment i by each value proposition $(Q_1^i, Q_2^i, \dots, Q_K^i)$, where J is the number of relevant stakeholders and K is the number of relevant value propositions. The decision maker determines how much weight (if any) is placed on the values of each stakeholder and each value proposition. These weights may be reflective of the composition of the committee which makes decisions and of the *process* by which stakeholders are consulted and decisions are made. For example, if patients or advocacy groups are given the opportunity to address the committee prior to the decision, the relative weight assigned to the values of those stakeholders by the decision maker might be increased. The value placed on treatment i by the decision maker is denoted by V^i, where $V^i = h\left(P_1^i, P_2^i, \dots, P_J^i, Q_1^i, Q_2^i, \dots, Q_K^i\right)$.

Figure 3.2: Proposed framework for aiding coverage decisions for orphan therapies



The decision maker's valuation of the orphan therapy and each relevant comparator is considered in the grey box to the lower left of Figure 3.2. Alongside this, in the grey box to its right, the decision maker also considers its valuation of the *opportunity cost* of the orphan therapy and each relevant comparator – that is, its valuation of the treatment(s) that would be forgone by *other* patients if the orphan therapy (or one of its comparators) were to be funded by the public health care system. This opportunity cost is determined by consideration of the 'opportunity cost'-determining factors listed in the green box at the top-right of the figure. The opportunity cost of treatment i is denoted as i'. The value placed on i' by the decision maker is $V^{i'}$, where $V^{i'} = h(P_1^{i'}, P_2^{i'}, \ldots, P_J^{i'}, Q_1^{i'}, Q_2^{i'}, \ldots, Q_K^{i'})$.

When making a coverage decision, the decision maker compares its valuations of the orphan therapy and each of its relevant comparators, V^i, to its valuation of the opportunity cost of each, $V^{i'}$. This enables the decision maker to determine the *net value* of the orphan therapy and each of its comparators, NV^i, where $NV^i = V^i - V^{i'}$. If the net value of the orphan therapy is negative, then it should not be covered by the health care system, since its value is lower than that of the treatment(s) it is expected to displace. If its net value is positive, but lower than that of one or more relevant comparators, then, again, the orphan therapy should not be funded, since greater value can be gained by funding one of its comparators instead. The orphan therapy should only be funded if its net value is positive and greater than that of each relevant comparator.

However, there are other potential decision-bearing factors which the decision maker may wish to consider, listed in the blue box at the bottom-left of Figure 3.2. In particular, if diagnosis or treatment of the orphan disease is not feasible then the orphan therapy should not be covered, since the expected value cannot be realized.

Considering the 'cost-effectiveness of treatment' within a decision making framework

The 'cost-effectiveness of treatment' is the only candidate decision factor identified in the scoping review that is not explicitly considered as a factor within the proposed framework. It requires special consideration for three key reasons:

1. First, the cost-effectiveness of treatment is a composite of (at least) two other identified candidate decision factors: the cost of treatment; and the effectiveness of treatment. The unit of 'effectiveness' used might also be a function of multiple other candidate decision factors; for example, estimation of the QALYs gained with treatment combines consideration of the 'severity (seriousness) of disease' and the 'magnitude of treatment benefit'.
2. Second, the cost-effectiveness of treatment is generally determined using a decision rule, the most common involving the comparison of the incremental cost-effectiveness ratio (ICER) of the treatment to a 'cost-effectiveness threshold'.[60] In the context of a budget constrained health care system, this threshold is an estimate of the opportunity cost of funding the treatment (in terms of the units of 'effectiveness' forgone elsewhere in the system).[26,55,151] Consideration of the cost-effectiveness of treatment therefore also incorporates consideration of 'opportunity cost'-determining factors.

3. Third, by explicitly incorporating consideration of opportunity cost, cost-effectiveness analysis facilitates comparison of the 'effectiveness' of the treatment in question and its comparators to the 'effectiveness' of the treatment(s) forgone as a result of their funding. In valuing these, cost-effectiveness analysis typically assumes that the decision maker adopts the 'equity principle' as a value proposition – all units of 'effectiveness' are valued equally across the treatment, its comparators, and the opportunity cost, regardless of the prevalence (rarity) of disease or the identifiability of the beneficiaries of treatment. Furthermore, the 'value' of any treatment considered in a cost-effectiveness analysis is typically determined *only* in terms of these units of effectiveness – all other value-bearing factors are assumed to have zero weight.

Thus, the 'cost-effectiveness of treatment' (or any measure of the 'efficiency' of treatment which combines multiple value-bearing factors, a consideration of opportunity cost, and/or a specific value proposition) should not be incorporated within a coherent decision making framework as an additional 'factor'. To do so would amount to a partial double counting of opportunity cost and effectiveness, the extent of which depends upon the relative weights attached to cost, effectiveness and efficiency. Under specific circumstances, basing reimbursement decisions upon the results of a cost-effectiveness analysis is *equivalent* to making decisions using the framework proposed. In all other circumstances – including when the decision maker adopts a different value proposition to the 'equity principle', or otherwise applies a different value to each treatment than that implied by the measure of 'effectiveness' used in the cost-effectiveness analysis – this framework provides an *alternative* means to informing decisions that is coherent with the principals underlying cost-effectiveness analysis but which allows for a broader account of value than conventional cost-effectiveness analysis. This is because the proposed framework imposes no constraints upon the value-bearing factors that may be considered, the value propositions that may be adopted by the decision maker, or the relative value that may be placed upon any of these, whilst preserving the consideration of opportunity cost that is central to cost-effectiveness analysis.

Summary of steps required for coherent coverage decisions

As was highlighted in the results of the scoping review, within a budget constrained health care system, any decision to fund therapy for some patients inevitably imposes an *opportunity cost* by displacing treatments that would otherwise be provided to other patients. Providing coverage for any therapy (whether for a rare disease or otherwise) is desirable only if the *value* of doing so is greater than the *value* of this opportunity cost. Taking all of the findings into account, it may therefore be argued that coherent coverage decisions for orphan drugs require the following steps:

1. Establish whether the orphan therapy in question has any *relevant comparators* (treatment alternatives);
2. Estimate the *opportunity cost* (i.e., the other treatments expected to be displaced) resulting from providing coverage for the orphan therapy;
3. Estimate the opportunity cost associated with providing coverage for each relevant comparator;
4. Determine the *value* of the orphan therapy and each comparator;
5. Determine the *value* of the *opportunity cost* of the orphan therapy and each comparator;
6. Calculate the *net value* of the orphan therapy and each comparator by comparing the value of each to the value of their opportunity cost;
7. Provide coverage for the orphan therapy only if its net value is positive *and* exceeds that of each relevant comparator.

Discussion

In this paper, we identified social value arguments in published scholarly papers related to the reimbursement of orphan drugs and key linkages among them in order to construct a coherent decision making framework. Discussions around funding specific orphan drugs and the principles of orphan drug coverage can be characterized as a discussion of values. Advocates of all positions have advanced value-based arguments as to why orphan drugs should or should not be given a special value status in the allocation of limited health care resources.[102] However, based on our scoping review, there is ambiguity around what is being valued and from what perspective. Similarly, the values positions implicitly assumed in constructing arguments are often not acknowledged. We have attempted to parse the literature and offer order to the consideration of the value of orphan drugs in the context of health care coverage decisions in the presence of limited resources.

To this end, we identified a set of candidate decision factors that authors have proposed should or should not be considered. Some of these are value-bearing factors, which we have characterized as disease-related, treatment-related, population-related, and/or socio-economic-related. The latter includes legally mandated policy considerations. The remaining factors are not value-bearing but, nonetheless, important for health care coverage decisions, in particular those which determine the opportunity cost of a decision to provide funding. We also identified three potential sources of preferences – those of patients, physicians, and society – and a number of propositions about how values should be incorporated into the decision making process. The 'rule of rescue' proposes that opportunity cost be given a close to zero weight when there are identifiable victims facing imminent death or substantial disability. The 'equity principle' considers values equally for the beneficiaries of treatment and those bearing the opportunity cost, whilst the 'rights-based approach' disregards the issue of opportunity cost entirely in cases where patients have few alternative treatment options.

We propose that decision makers seek to identify which value-bearing factors they deem pertinent to their decision, whose preferences they wish to consider, and what value propositions underpin their decisions. We have identified how these need to be applied consistently to all technologies and populations affected by the decision: the new orphan drug, any existing therapy for the same disease which will be displaced, and any therapies which will be displaced elsewhere in the system to fund any additional costs of a positive coverage decision (the opportunity cost). This approach enables decision makers to arrive at a coverage decision based upon the value of the orphan therapy and its opportunity cost.

In recent years, many published frameworks for making reimbursement decisions on a range of health technologies have used multi-criteria decision analysis (MCDA). The framework we present highlights a number of issues with existing applications of MCDA. For example, a recent paper by Endrei *et al.* outlines the six major criteria used in the reimbursement of new medical technologies in Hungary: "health care priorities"; "severity of the disease"; "equity"; "cost-effectiveness and quality of life"; "aggregated budget impact"; and "national and international respect".[152] Each of these is given a "points weight" which sums to a total of 100. As described above, 'cost-effectiveness' is a composite of other decision factors. Therefore, its inclusion in an MCDA framework results in 'double-counting'. Furthermore, cost-effectiveness analysis incorporates an explicit consideration of opportunity cost, which in a budget constrained health care system is determined in part by the "aggregated budget impact" of the treatment. It also incorporates an implicit value proposition based upon the 'equity principle'. The consideration of cost-effectiveness within an MCDA, alongside severity of illness, equity, and aggregated budget impact – where each is assigned a relative weight – becomes invalid. MCDA work conducted in the Vancouver Coastal Health Authority suffers from a similar issue by including "efficiency, effectiveness and appropriateness" among the criteria considered.[153] Within the field of rare diseases, Sussex *et al.* recently conducted a pilot study of MCDA methods, identifying eight attributes for establishing the value of an orphan medicine.[154] While the authors appropriately excluded consideration of costs or cost-effectiveness from these criteria, they note that their approach was intended to "focus on the benefits of [orphan drugs], which can then be compared with net costs, including the price of the [orphan drug] itself". The framework presented in this paper suggests that another step is required before the "benefits" of an orphan drug can be compared to its net costs – consideration of the *opportunity cost* resulting from these net costs, and an assessment of the "benefits" forgone as a result. A common theme among these existing implementations of MCDA is that the approach to considering costs appears misplaced. It seems inappropriate to consider costs as an afterthought to compare against the benefits of the treatment in question, or alongside value-bearing factors as an attribute within an MCDA (either as a separate "cost" attribute or embedded within an attribute representing "budget impact", "cost-effectiveness" or "efficiency"). It seems more appropriate to consider costs as a determinant of the opportunity cost of the treatment. This opportunity cost should then be valued by the decision maker in a manner consistent with the valuation of the treatment and its comparators.

We hope that structuring discussions using this framework might also guide the focus and design of future research to ensure that empirical insights into value arguments around the coverage of treatments for rare diseases meet the needs of decision makers. The recent paper by Linley and Hughes highlights the importance of exploring whether perceived societal values, upon which decision-makers have based funding policies, reflect actual societal values; their findings suggest that these often differ.[155] The use of our proposed framework to structure both policy discussions and decisions might aid transparency about the nature of reimbursement decisions for orphan drugs, the values relied upon, and how these values have been implemented.

Bibliography for Chapter 3

26. Claxton K, Paulden M, Gravelle H, Brouwer W, Culyer AJ. Discounting and decision making in the economic evaluation of health-care technologies. *Health Economics*. 2011;20(1):2–15. doi:10.1002/hec.1612.

55. Culyer A, McCabe C, Briggs A, et al. Searching for a threshold, not setting one: the role of the National Institute for Health and Clinical Excellence. *Journal of health services research & policy*. 2007;12(1):56–8. doi:10.1258/135581907779497567.

60. McCabe C, Claxton K, Culyer A. The NICE Cost-Effectiveness Threshold: What it is and What that Means. *PharmacoEconomics*. 2008;26(9):733–744. doi:10.2165/00019053-200826090-00004.

66. McCabe C, Claxton K, Tsuchiya A. Orphan drugs and the NHS: should we value rarity. *BMJ*. 2005;331(7523):1016–9.

67. Pinxten W, Denier Y, Dooms M, Cassiman J-JJ, Dierickx K. A fair share for the orphans: ethical guidelines for a fair distribution of resources within the bounds of the 10-year-old European Orphan Drug Regulation. *J Med Ethics*. 2012;38(3):148–53. doi:10.1136/medethics-2011-100094.

68. Clarke J. Is the current approach to reviewing new drugs condemning the victims of rare diseases to death? A call for a national orphan drug review policy. *Can Med Assoc J*. 2006;174(2):189–190. doi:10.1503/cmaj.050706.

72. McCabe C, Claxton K, Culyer AJ. The NICE cost-effectiveness threshold: what it is and what that means. *Pharmacoeconomics*. 2008;26(9):733–44.

92. Haffner ME. Adopting orphan drugs--two dozen years of treating rare diseases. *N Engl J Med*. 2006;354(5):445–7. doi:10.1056/NEJMp058317.

93. Braun MM, Farag-El-Massah S, Xu K, Coté TR. Emergence of orphan drugs in the United States: a quantitative assessment of the first 25 years. *Nat Rev Drug Discov*. 2010;9(7):519–22. doi:10.1038/nrd3160.

94. Dunoyer M. Accelerating access to treatments for rare diseases. *Nature Reviews Drug Discovery*. 2011. doi:10.1038/nrd3493.

95. Food and Drug Administration. Developing Products for Rare Diseases & Conditions. 2016.

96. Food and Drug Administration. Orphan Drug Regulations. *Federal Register*. 2013;78(113):35117–35135.

97. Salari K, Watkins H, Ashley EA. Personalized medicine: hope or hype? *Eur Heart J*. 2012;33(13):1564–70. doi:10.1093/eurheartj/ehs112.

98. Reeves A, McKee M, Basu S, Stuckler D. The political economy of austerity and healthcare: cross-national analysis of expenditure changes in 27 European nations 1995-2011. *Health Policy*. 2014;115(1):1–8. doi:10.1016/j.healthpol.2013.11.008.

99. Stafinski T. Role of centralized review processes for making reimbursement decisions on new health technologies in Europe. *ClinicoEconomics and Outcomes Research*. 2011:117. doi:10.2147/CEOR.S14407.

100. Stafinski T, Menon D, Philippon DJ, McCabe C. Health technology funding decision-making processes around the world: the same, yet different. *Pharmacoeconomics*. 2011;29(6):475–95. doi:10.2165/11586420-000000000-00000.

101. Simoens S. Pricing and reimbursement of orphan drugs: the need for more transparency. *Orphanet J Rare Dis*. 2011;6:42. doi:10.1186/1750-1172-6-42.

102. Drummond M, Towse A. Orphan drugs policies: a suitable case for treatment. *The European Journal of Health Economics*. 2014. doi:10.1007/s10198-014-0560-1.

103. Stafinski T, Menon D, McCabe C, Philippon DJ. To fund or not to fund: development of a decision-making framework for the coverage of new health technologies. *Pharmacoeconomics*. 2011;29(9):771–80. doi:10.2165/11539840-000000000-00000.

104. Schey C, Milanova T, Hutchings A. Estimating the budget impact of orphan medicines in Europe: 2010 - 2020. *Orphanet Journal of Rare Diseases*. 2011;6(1):62. doi:10.1186/1750-1172-6-62.

105. Hutchings A, Schey C, Dutton R, Achana F, Antonov K. Estimating the budget impact of orphan drugs in Sweden and France 2013-2020. *Orphanet J Rare Dis*. 2014;9:22. doi:10.1186/1750-1172-9-22.

106. Hughes-Wilson W, Palma A, Schuurman A, Simoens S. Paying for the Orphan Drug System: break or bend? Is it time for a new evaluation system for payers in Europe to take account of new rare disease treatments? *Orphanet J Rare Dis*. 2012;7:74. doi:10.1186/1750-1172-7-74.

107. Mays N, Roberts E, Popay J. Synthesising research evidence. In: Routledge London; 2001:188–220.

108. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*. 2009;339:b2535.

109. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*. 2005;8(1):19–32. doi:10.1080/1364557032000119616.

110. PRISM Group. Promoting rare-disease innovations through sustainable mechanisms. 2014.

111. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: ; 2002.

112. Pawson. Evidence-based Policy: In Search of a Method. *Evaluation*. 2002;8(2):157–181. doi:10.1177/1358902002008002512.

113. Bryman, Burgess. *Analyzing qualitative data*.; 1994. doi:10.4324/9780203413081.

114. Oliver S. Making research more useful: integrating different perspectives and different methods. 2001. Available at: http://eprints.ioe.ac.uk/id/eprint/5142.

115. Barrett PM, Alagely A, Topol EJ. Cystic fibrosis in an era of genomically guided therapy. *Hum Mol Genet*. 2012;21(R1):R66–71. doi:10.1093/hmg/dds345.

116. Winquist E, Bell CM, Clarke JT, et al. An evaluation framework for funding drugs for rare diseases. *Value Health*. 2012;15(6):982–6. doi:10.1016/j.jval.2012.06.009.

117. Wild C, Hintringer K, Nachtnebel A. Orphan drugs in oncology. *Pharmaceuticals, Policy and Law*. 2011;13(3,4):223–232. doi:10.3233/PPL-2011-0327.

118. Valverde J-L, Prevot. Editorial. *Pharmaceuticals Policy and Law*. 2011;13(3,4):115–116. doi:10.3233/PPL-2011-0317.

119. Sullivan SD. The promise of specialty pharmaceuticals: are they worth the price? *J Manag Care Pharm*. 2008;14(4 Suppl):S3–6.

120. Stolk P, Willemen MJ, Leufkens HG. Rare essentials: drugs for rare diseases as essential medicines. *Bull World Health Organ*. 2006;84(9):745–51.

121. Siddiqui M, Rajkumar SV. The high cost of cancer drugs and what we can do about it. *Mayo Clin Proc*. 2012;87(10):935–43. doi:10.1016/j.mayocp.2012.07.007.

122. Prevot J, Watters D. HTA's and access to rare diseases therapies: The view from the PID community. *Pharmaceuticals*. 2011. Available at: http://content.iospress.com/articles/pharmaceuticals-policy-and-law/ppl00322.

123. Picavet E, Cassiman D, Simoens S. Evaluating and improving orphan drug regulations in Europe: a Delphi policy study. *Health Policy*. 2012;108(1):1–9. doi:10.1016/j.healthpol.2012.08.023.

124. Picavet E, Dooms M, Cassiman D, Simoens S. Drugs for rare diseases: influence of orphan designation status on price. *Appl Health Econ Health Policy*. 2011;9(4):275–9. doi:10.2165/11590170-000000000-00000.

125. Owen A, Spinks J, Meehan A, et al. A new model to evaluate the long-term cost effectiveness of orphan and highly specialised drugs following listing on the Australian Pharmaceutical Benefits Scheme: the Bosentan Patient Registry. *J Med Econ*. 2008;11(2):235–43. doi:10.3111/13696990802034525.

126. Moberly T. Rationing and access to orphan drugs. *Pharmaceutical journal*. 2005;275(7374):569–570.

127. Michel M, Toumi M. Access to orphan drugs in Europe: current and future issues. *Expert Rev Pharmacoecon Outcomes Res*. 2012;12(1):23–9. doi:10.1586/erp.11.95.

128. Mentzakis E, Stefanowska P, Hurley J. A discrete choice experiment investigating preferences for funding drugs used to treat orphan diseases: an exploratory study. *Health Econ Policy Law*. 2011;6(3):405–33. doi:10.1017/S1744133110000344.

129. Meekings KN, Williams CS, Arrowsmith JE. Orphan drug development: an economically viable strategy for biopharma R&D. *Drug Discov Today*. 2012;17(13-14):660–4. doi:10.1016/j.drudis.2012.02.005.

130. McCabe C, Stafinski T, Menon D. Is it time to revisit orphan drug policies? *BMJ*. 2010;341:c4777.

131. Mavris M, Cam Y Le. Involvement of patient organisations in research and development of orphan drugs for rare diseases in europe. *Mol Syndromol*. 2012;3(5):237–43. doi:10.1159/000342758.

132. Matthews, Glass. The Effect of Market-Based Economic Factors on the Adoption of Orphan Drugs Across Multiple Countries. *Therapeutic Innovation & Regulatory Science*. 2013;47(2):226–234. doi:10.1177/2168479012471945.

133. Luisetti M, Balfour-Lynn IM, Johnson SR, et al. Perspectives for improving the evaluation and access of therapies for rare lung diseases in Europe. *Respir Med*. 2012;106(6):759–68. doi:10.1016/j.rmed.2012.02.016.
134. Liang BA, Mackey T. Health care policy. Reforming off-label promotion to enhance orphan disease treatment. *Science*. 2010;327(5963):273–4. doi:10.1126/science.1181567.
135. Laupacis A. Evidence and values: requirements for public reimbursement of drugs for rare diseases - a case study in oncology - Reply. *Canandian Journal of Clinical Pharmacology*. 2009;16(2):e282–4.
136. Largent EA, Pearson SD. Which orphans will find a home? The rule of rescue in resource allocation for rare diseases. *Hastings Cent Rep*. 2012;42(1):27–34.
137. Kesselheim AS, Myers JA, Avorn J. Characteristics of clinical trials to support approval of orphan vs nonorphan drugs for cancer. *JAMA*. 2011;305(22):2320–6. doi:10.1001/jama.2011.769.
138. Kanavos P, Nicod E. What is wrong with orphan drug policies? Suggestions for ways forward. *Value Health*. 2012;15(8):1182–4. doi:10.1016/j.jval.2012.08.2202.
139. Joppi R, Bertele' V, Garattini S. Orphan drugs, orphan diseases. The first decade of orphan drug legislation in the EU. *Eur J Clin Pharmacol*. 2013;69(4):1009–24. doi:10.1007/s00228-012-1423-2.
140. Hutchings A, Ethgen O, Schmitt C, Rollet P. Defining Elements of Value for Rare Disease Treatments. *Value in Health*. 2012;15(4):A31. doi:10.1016/j.jval.2012.03.176.
141. Hughes DA. Drugs for exceptionally rare diseases: do they deserve special status for funding? *QJM*. 2005;98(11):829–836. doi:10.1093/qjmed/hci128.
142. Gupta S. Rare diseases: Canada's "research orphans." *Open Medicine*. 2012. Available at: http://www.openmedicine.ca/article/viewArticle/482/451.
143. Garattini S. Time to revisit the orphan drug law. *Eur J Clin Pharmacol*. 2012;68(2):113. doi:10.1007/s00228-011-1115-3.
144. Drummond MF, Wilson DA, Kanavos P, Ubel P, Rovira J. Assessing the economic challenges posed by orphan drugs. *Int J Technol Assess Health Care*. 2007;23(1):36–42. doi:10.1017/S0266462307051550.
145. Drakulich A. Global Healthcare on the Ground: NIH Aims to Help Treat 200 Rare Diseases. *Pharmaceutical Technology*. 2011;35(8).

146. Dickson PI, Pariser AR, Groft SC, et al. Research challenges in central nervous system manifestations of inborn errors of metabolism. *Mol Genet Metab*. 2011;102(3):326–38. doi:10.1016/j.ymgme.2010.11.164.
147. Desser AS. Prioritizing treatment of rare diseases: a survey of preferences of Norwegian doctors. *Social Science & Medicine*. 2013. Available at: http://www.sciencedirect.com/science/article/pii/S027795361300350X.
148. Denis A, Mergaert L, Fostier C, Cleemput I, Simoens S. Budget impact analysis of orphan drugs in Belgium: estimates from 2008 to 2013. *J Med Econ*. 2010;13(2):295–301. doi:10.3111/13696998.2010.491427.
149. Claxton K, Lindsay A, Buxton M, et al. Value based pricing for NHS drugs: an opportunity not to be missed? *BMJ: British Medical Journal*. 2008;336(7638):251–254. doi:10.2307/20508852.
150. Clarke J, Bell C, Coyle D, et al. A policy framework for funding drugs for rare diseases. *Value in Health*. 2009;12(7):A243. doi:10.1016/S1098-3015(10)74186-3.
151. Claxton K, Martin S, Soares M, et al. Methods for the Estimation of the NICE Cost Effectiveness Threshold. *CHE Research Paper 81*. 2013.
152. Endrei D, Molics B, Ágoston I. Multicriteria decision analysis in the reimbursement of new medical technologies: real-world experiences from Hungary. *Value in Health*. 2014. Available at: http://www.ajicjournal.org/article/S1098-3015(14)00046-1/abstract.
153. Mitton C, Dionne F, Damji R, Campbell D, Bryan S. Difficult decisions in times of constraint: criteria based resource allocation in the Vancouver Coastal Health Authority. *BMC Health Serv Res*. 2011;11:169. doi:10.1186/1472-6963-11-169.
154. Sussex J, Rollet P, Garau M, Schmitt C, Kent A, Hutchings A. A pilot study of multicriteria decision analysis for valuing orphan medicines. *Value Health*. 2013;16(8):1163–9. doi:10.1016/j.jval.2013.10.002.
155. Linley WG, Hughes DA. Societal views on NICE, cancer drugs fund and value-based pricing criteria for prioritising medicines: a cross-sectional survey of 4118 adults in Great Britain. *Health Econ*. 2013;22(8):948–64. doi:10.1002/hec.2872.

Chapter 4: Some inconsistencies in NICE's consideration of social values

Mike Paulden[1], James F. O'Mahony[2], Anthony J. Culyer[3,4] and Christopher McCabe[1]

[1] Department of Emergency Medicine, University of Alberta, Edmonton, AB, Canada

[2] Department of Health Policy and Management, Trinity College Dublin, Dublin, Ireland

[3] Centre for Health Economics, University of York, Heslington, UK

[4] Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, ON, Canada

Acknowledgements

The authors wish to thank Richard Edlin for providing insightful comments during discussions prior to the preparation of this manuscript. All authors contributed towards the ideas presented in this paper and all authors assisted with the writing and editing of the manuscript. AJC was Vice Chair of NICE from 1999 to 2003 and is currently Chair of NICE's International Advisory Group, but does not consider himself to be conflicted for the purposes of this manuscript. CM was Director of NICE's Decision Support Unit from 2003-2006, and a member of NICE's Medical Technologies Advisory Committee from 2010-2011, but does not consider himself to be conflicted for the purposes of this manuscript. MP and JOM have no conflicts of interest. MP is the overall guarantor of this work.

Abstract

The UK's National Institute for Health and Care Excellence (NICE) recently proposed amendments to its methods for the appraisal of health technologies. Previous amendments in 2009 and 2011 placed a greater value on the health of patients at the "end of life" and in cases where "treatment effects are both substantial in restoring health and sustained over a very long period". Drawing lessons from these previous amendments, we critically appraise NICE's proposals.

The proposals repeal "end of life" considerations but add consideration of the "proportional" and "absolute" QALY loss from illness. NICE's cost-effectiveness threshold may increase from £20,000 to £50,000 per QALY based upon these and four other considerations: "certainty of the ICER"; if health related quality of life is "inadequately captured"; the "innovative nature" of the technology; and "non-health objectives of the NHS".

We demonstrate that NICE's previous amendments are flawed: they contain logical inconsistencies which can result in different values being placed on health gains for identical patients, and they do not apply value weights to patients bearing the opportunity cost of NICE's recommendations. The proposals retain both flaws and are also poorly justified. Applying value weights to patients bearing the opportunity cost would lower NICE's threshold, in some cases to below £20,000 per QALY. Furthermore, this baseline threshold is higher than current estimates of the opportunity cost.

NICE's proposed threshold range is too high, for empirical and methodological reasons. NICE's proposals will harm the health of unidentifiable patients, whilst privileging the identifiable beneficiaries of new health technologies.

Key points for decision makers

- The UK's National Institute for Health and Care Excellence (NICE) recently proposed amendments to its methods for the appraisal of new health technologies.
- The proposals would increase the upper range of NICE's cost-effectiveness range from £30,000 to £50,000 per QALY for all interventions, based upon special considerations: "proportional" and "absolute" QALY loss from illness; "certainty of the ICER"; if health related quality of life is "inadequately captured"; the "innovative nature" of the technology; and "non-health objectives of the NHS".
- NICE's proposals are problematic: there are inconsistencies in the treatment of social values; the special considerations are unquantified and unjustified; and the proposed threshold range is too high, for both empirical and methodological reasons.
- If implemented, the proposals would be destructive of population health, harming unidentified patients in order to privilege the identified beneficiaries of new health technologies.

Introduction

The UK's National Institute for Health and Care Excellence (NICE) recently proposed amendments to its methods for the appraisal of health technologies.[156] These are based upon the "terms of reference" issued to NICE by the UK's Department of Health, following the UK government's response to the 2013 Health Select Committee report into NICE.[157] The Department of Health called for a number of modifications to NICE's methods to allow for "value assessment of branded medicines under Value-Based Pricing [VBP]", and specifically requested that NICE's methods should, among other requirements:

1. "Include a simple system of weighting for burden of illness that appropriately reflects the differential value of treatments for the most serious conditions";
2. "Include a proportionate system for taking account of wider societal benefits";
3. "Not include a further weighting for therapeutic innovation and improvement"; and
4. "Adopt the same benefit perspective for all technologies falling within the scope of VBP, and for displaced treatments".[82]

In response, NICE issued a consultation paper in March 2014 setting out proposals to amend its existing "Guide to the Methods of Technology Appraisal".[82] The consultation paper clarifies that NICE currently adopts a baseline cost-effectiveness threshold of £20,000 per QALY [quality adjusted life-year], representing the "opportunity cost of programmes displaced by new, more costly technologies" (p.27). This threshold may be increased up to £30,000 per QALY upon consideration of four factors: "certainty of the ICER [incremental cost-effectiveness ratio]"; "HRQoL [health-related quality of life] inadequately captured"; "innovative nature of technology"; and "non-health objectives of the NHS" (p.5). The threshold may be further increased up to £50,000 per QALY for technologies providing "life extending treatment at the end of life" (p.5), which were given special consideration by NICE in a 2009 amendment to its guidance.[84] A figure on p.5 separates this final consideration from the others, implying that the first four together cannot increase the threshold by more than £10,000 per QALY, while the "end of life" consideration cannot increase the threshold by more than an additional £20,000 per QALY.

The consultation paper then details NICE's proposed amendments. Consideration of "life extending treatment at the end of life" would be repealed and two new considerations would be added that might justify an increased threshold: "burden of illness" and "wider societal impact". The former is determined by the "proportional QALY loss" resulting from illness, while the latter is proxied by the "absolute QALY loss", in both cases calculated from the present time forwards rather than from the onset of illness.[158,159] Since the proportional QALY loss increases towards 1 as death approaches, "burden of illness" may be viewed as approximating the role of "life extending treatment at the end of life".[159] Meanwhile, the "wider societal impact" consideration favours the young and/or severely ill, for whom the absolute QALY loss tends to be greatest. The proposed amendments maintain a maximum threshold of £50,000 per QALY and retain consideration of "certainty of the ICER", "HRQoL inadequately captured", "innovative nature of technology", and "non-health objectives of the NHS". However, the wall of separation between these and other considerations has been removed, along with the £30,000 per QALY cap on the threshold that may be justified by these four considerations alone (p.13). Instead, these considerations will be grouped alongside "burden of illness" and "wider societal impact" and collectively these may be used to justify a threshold anywhere between £20,000 and £50,000 per QALY (p.13).

Curiously, the consultation makes no mention of a 2011 NICE guidance amendment, whereby it lowered its discount rate on health effects in cases where "treatment effects are both substantial in restoring health and sustained over a very long period", in effect lowering a technology's ICER and increasing the likelihood of adoption.[83] In common with the newly proposed "wider societal impact" consideration, this amendment favoured the young and/or severely ill; indeed, it was implemented specifically so that NICE could recommend an expensive drug for young osteosarcoma patients.[160] Since NICE's consultation does not propose repealing this amendment, NICE's future methods may therefore favour some young and/or severely ill patients in two complementary ways: first by reducing the ICER of treatments through "selective discounting"; and second by allowing for a higher threshold due to "wider societal impact" (and possibly also other considerations).

The purpose of this paper is to appraise NICE's proposals with respect to the consistency of its treatment of social values. First, we review the two previous amendments to NICE's methods, and describe a number of inconsistencies regarding the incorporation of social values in each. We demonstrate these by considering a number of examples in which application of the social values incorporated within NICE's amended guidance results in inconsistent outcomes, including discrimination against the very patients NICE's guidance is intended to benefit. We show that it is not possible for NICE to prioritize some patients without deprioritizing others, and that this deprioritization is not obvious. We also demonstrate that NICE's use of arbitrary criteria in these previous amendments results in discontinuities in NICE's application of social values, with very different values assigned to similar health outcomes for similar patients. Next, we appraise NICE's most recent proposals and consider whether these inconsistencies, or any other issues, are present. We finish by recommending some steps that NICE could take to ensure consistency in its consideration of social values in the future.

Previous amendments to NICE's guidance

Two previous amendments to NICE's guidance focused upon considerations of social value: the 2009 "end of life" amendment, and the 2011 "selective discounting" amendment.[83,84] Prior to these amendments, NICE's guidance recommended that consistent methods be adopted across all cost-effectiveness analyses.[161] NICE's committees were instructed to use a threshold range of £20,000 to £30,000 per QALY in all appraisals, which was intended to represent (in principle) an unmodified estimate of the opportunity cost of adopting technologies within a fixed NHS budget.[60,161] Future costs and health outcomes were discounted at a single rate in all appraisals. Overall, NICE's methods broadly reflected a basic equity position in which each QALY was assigned equal value for all individuals in society (the so-called "a QALY is a QALY" position). Despite concerns raised by Harris and others, NICE's methods did not inherently discriminate on the basis of life expectancy.[85,162]

"End of life" amendment (2009)

NICE's "end of life" amendment marked a change in this basic equity position. It specified the following criteria which justified giving "greater weight to QALYs achieved in the later stages of terminal diseases" when appraising "end of life treatments":

- "The treatment is indicated for patients with a short life expectancy, normally less than 24 months";
- "There is sufficient evidence to indicate that the treatment offers an extension to life, normally of at least an additional 3 months, compared to current NHS treatment"; and
- "The treatment is licensed or otherwise indicated, for small patient populations".[84]

Where these criteria apply, NICE's appraisal committees were to consider "the magnitude of the additional weight that would need to be assigned to the QALY benefits in this patient group for the cost-effectiveness of the technology to fall within the current threshold range".[84] However, NICE's recent consultation notes that, rather than assigning an additional weight to QALY benefits, NICE reinterpreted this amendment as permitting a higher threshold of up to £50,000 per QALY, regarded as equivalent to applying "a maximum weight of 2.5 from a starting point of £20,000 per QALY".[82] Since, at the time of this amendment, NICE's best estimate of the opportunity cost of its decisions was reflected by its threshold range of £20,000 to £30,000 per QALY, its willingness to recommend "end of life" treatments with ICERs of up to £50,000 per QALY implied that NICE no longer valued the QALYs of all individuals equally; instead, providing an additional QALY to an "end of life" patient was assigned approximately twice the value of providing an additional QALY to any other patient. As Paulden & Culyer noted, this increased the potential for NICE's guidance to discriminate against patients with longer life expectancy.[162]

Inconsistencies resulting from the use of arbitrary cut-offs

Although NICE's methods are constructed around the use of the QALY as a measure of effectiveness, the cut-offs specified in the "end of life" amendment are based upon unadjusted life expectancy (LE): typically patients must have "less than 24 months" of remaining LE and be the beneficiary of a treatment appraised by NICE that "offers an extension to life, normally of at least an additional 3 months, compared to current NHS treatment".[84] Thus a treatment for a patient with 3 years of remaining LE of poor quality would not meet the “end of life” criteria, while a treatment for another patient with 18 months of remaining LE of excellent quality might meet them, even if the first patient has fewer remaining QALYs. Similarly, a treatment providing an additional 3 months LE of extremely poor quality might satisfy the criteria, while a treatment providing an additional 2 months LE of excellent quality would not, even if the latter provided a greater QALY benefit. It is not clear why NICE regards quality of life as integral to decisions regarding cost-effectiveness, yet irrelevant to its “end of life” criteria.

In cases where a technology satisfies NICE’s “end of life” criteria by meeting the 3-month cut-off, NICE applies an additional weight to *all* of the health benefits gained, not only to those health benefits experienced beyond the cut-off. The perversity of this is best shown by example. Suppose NICE appraises a technology (A) which provides an additional 2 months of LE of a given quality and which otherwise meets the “end of life” criteria. Since the technology fails to meet the “3 month” cut-off, no additional weight is applied to patients’ QALYs. Now suppose NICE appraises a similar technology (B) for the same patient subgroup which provides 3 months of additional LE of a slightly lower quality than that of technology A. Since technology B meets the “end of life” criteria, NICE would apply a weight to all of the QALYs gained by its beneficiaries, *including those gained during the first 2 months of extended LE*. For those 2 months, NICE may therefore apply a *higher* value to a *lower* quality state of health for *exactly the same patients* – the very patients NICE’s “end of life” amendment was intended to benefit.

Inconsistencies resulting from the failure to consider opportunity cost

Because disinvestment decisions in the NHS are taken by local decision makers, NICE does not know which specific services will be displaced following its recommendations. Nevertheless, given that a substantial proportion of health care resources are used by patients who are approaching death, at least *some* of this opportunity cost must fall upon patients regarded as being at the “end of life”.[163] When NICE recommends a new “end of life” treatment, many of the patients bearing the opportunity cost will therefore be similar to those who stand to benefit. If NICE places a greater value on the health of “end of life” patients, it follows that they must account for those similarly placed patients bearing the opportunity cost. However, the “end of life” amendment only places a greater value on the health of the *beneficiaries* of treatment under review.

While it may seem appropriate to use a higher threshold to account for a greater value placed on the health of the beneficiaries of treatment (an assumption returned to below), there are important implications for the threshold when we consider how a greater value on health might apply to those bearing the opportunity cost. When a greater value is applied to displaced health, this implies that a *lower* threshold should be used. The appropriate threshold depends upon the proportion of those bearing the opportunity cost considered to be at the "end of life" and therefore deserving of special consideration. Given the increasing data on the characteristics of the recipients of NHS care, the resulting threshold can and should be evidence based.[164]

Suppose that NICE is appraising a new treatment for end of life patients, and assume (for now) that the opportunity cost of adopting the treatment is known to fall entirely upon existing services for patients also at the end of life. Suppose that for every £20,000 spent on the new treatment a single QALY is forgone by displacing existing services i.e. the shadow price of the relevant budget is £20,000 per QALY. Finally, suppose that NICE wishes to assign 2.5x the value to additional QALYs for end of life patients as it does to additional QALYs for all other patients. What threshold should NICE use to appraise the new end of life treatment? Following the logic of its "end of life" amendment and subsequent implementation, NICE would adopt a £50,000 per QALY threshold. Yet this would be counterproductive, because a new treatment with an ICER of £40,000 per QALY would displace two QALYs for each QALY gained, and those displaced QALYs would be forgone by end of life patients whose health should *also* be valued 2.5x as highly. Under such guidance, NICE would recommend some new treatments with ICERs above £20,000, even though these would displace more QALYs than they gain *in end of life patients*, the very group NICE ostensibly values more. It logically follows that where every patient is subject to special consideration – including the beneficiaries of treatment and those bearing the opportunity cost – the appropriate threshold to adopt is £20,000 per QALY, exactly the same as the shadow price of the budget. Alternatively, suppose that *none* of the opportunity cost falls on end of life patients, but rather on other patients not considered to be at the end of life. In this case the appropriate threshold to adopt is indeed £50,000 per QALY. Evidently, a far more realistic assumption would be that *some* of those patients bearing the opportunity cost are subject to special consideration but others are not. In this case, the appropriate threshold lies *somewhere between* £20,000 and £50,000 per QALY. The greater the proportion of end of life patients among those bearing the opportunity cost, the closer the threshold should be to £20,000 per QALY.

NICE's decision to assign special consideration to "end of life" patients also has important implications beyond the appraisal of "end of life" treatments. Even when NICE appraises a new technology that does *not* meet the "end of life" criteria, the potential exists for its opportunity cost to be borne by patients who are at the end of life. Returning to the example above, suppose (for now) that *none* of the beneficiaries of the technology, but *all* of the patients bearing the opportunity cost, are considered to be at the end of life and subject to special consideration. One QALY is displaced by end of life patients for every £20,000 spent on the new technology, and each displaced QALY is assigned twice the value of each QALY gained. It follows that the appropriate threshold is £10,000 per QALY. Alternatively, and more realistically, if *some* of those bearing the opportunity cost are subject to special consideration then the appropriate threshold lies *somewhere between* £10,000 and £20,000 per QALY, depending upon the proportion of those bearing the opportunity cost who are subject to special consideration. The critical point is that, by assigning special consideration to one subgroup of patients (in this case those at the "end of life"), NICE must use a threshold *lower* than the shadow price of the budget when appraising technologies that do not benefit this subgroup.

Since NICE's subsequent amendments have broadened the scope for patients to be assigned special consideration beyond "end of life" cases, it is useful to specify generalizable results:

A. The *greater* the weight placed on the health of those provided special consideration, and the *greater* the proportion of such patients among those bearing the opportunity cost of NICE's recommendations, the *lower* the threshold NICE should use in its appraisal of technologies which do not benefit such patients.
B. Where *multiple* avenues exist for assigning special consideration (as under NICE's recently proposed amendments), if the bearers of the opportunity cost are assigned *greater* special consideration than the beneficiaries of treatment then the threshold should be *lower* than the shadow price of the budget, and vice versa.

Three critical results follow from this:

1. The greater the scope for NICE to assign special consideration to patients, the lower the threshold must be for technologies that benefit patients *not* assigned special consideration, since patients given special consideration will constitute a greater proportion of those bearing the opportunity cost.
2. If the case mix of those benefitting from technologies recommended by NICE is similar to the case mix of those bearing the opportunity cost, then the *weighted average* of the thresholds used across all of NICE's appraisals must equal the shadow price of the budget, where this average is weighted by the budget impact of each technology appraised.
3. If NICE specifies a maximum weight that may be assigned to the health of any patient (as it does in its recent proposals), and if *any* of those bearing the opportunity cost are assigned special consideration, then the maximum threshold that NICE may use for any appraisal is *unambiguously lower than* the product of this weight and the shadow price of the budget.

It follows that NICE's current and proposed threshold range is too high: the maximum threshold of £50,000 per QALY is too high in all cases – even when appraising "end of life" treatments – and the minimum threshold of £20,000 per QALY is also too high in many cases. As a result, NICE may be recommending new treatments which displace not only more QALYs but also more *value* than they provide, privileging the identifiable beneficiaries of new interventions recommended by NICE while harming the unidentified users of existing NHS services who bear the opportunity cost of their adoption.

Inconsistencies resulting from the conflation of QALY weights and threshold weights

Although NICE's "end of life" amendment requires appraisal committees to consider "the magnitude of the additional weight that would need to be assigned to the QALY benefits" in order for an "end of life" treatment to appear cost-effective, NICE has reinterpreted this as permitting a higher threshold of £50,000 per QALY, corresponding to a weight of 2.5 applied to a £20,000 per QALY threshold. However, as demonstrated above, if *any* of the patients bearing the opportunity cost are also granted special consideration then the appropriate threshold is not a simple multiple of the shadow price of the budget and the QALY weight.

Even if *none* of those patients bearing the opportunity cost is given special consideration, the reinterpretation of QALY weights as a threshold weight is problematic. Consider a treatment which costs less than its comparator and is less effective (i.e. it lies in the SW quadrant of the cost-effectiveness plane). The treatment should be considered cost-effective only if its ICER lies *above* the threshold, and a weight on the QALYs of the beneficiaries should be accounted for by *lowering* the threshold rather than raising it.

Next, consider a treatment that is more expensive but less effective, or vice versa (i.e. it lies in the NW or SE quadrant). If a higher weight is applied to the QALYs of the beneficiaries, this will move the treatment deeper into its respective quadrant (Figure 4.1). This is clearly of interest to NICE, since this will reduce uncertainty about whether the treatment is cost-effective. Yet there is no means to account for this by adjusting the threshold.

Finally, consider a new treatment for "end of life" patients with two comparators: usual care, which is less expensive and less effective; and an alternative treatment, which is less expensive but more effective. Suppose the alternative treatment provides an additional 2 months of LE compared to usual care at greatly improved HRQoL, whereas the new treatment provides 4 months of additional LE compared to usual care but at a worsened HRQoL. Only the new treatment meets NICE's "end of life" criteria. Suppose that, when a weight is placed on the QALYs of the beneficiaries of the new treatment, it now appears both more effective and more cost-effective than the alternative treatment (Figure 4.2). If NICE were to apply this weight to the threshold instead of the QALYs directly, then the new treatment would appear to be dominated by the alternative treatment and hence appear (incorrectly) to be not cost-effective.

It follows that the use of a threshold weight rather than a QALY weight may result in inconsistencies when appraising technologies with more than one comparator and/or which lie outside of the NE quadrant of the cost-effectiveness plane. A solution to these difficulties is to adopt a "net benefit" framework in which both health benefits and the health expected to be forgone can be weighted directly for each strategy.[26]

Figure 4.1: Potential impact of applying QALY weights to strategies in the NW and SE quadrants

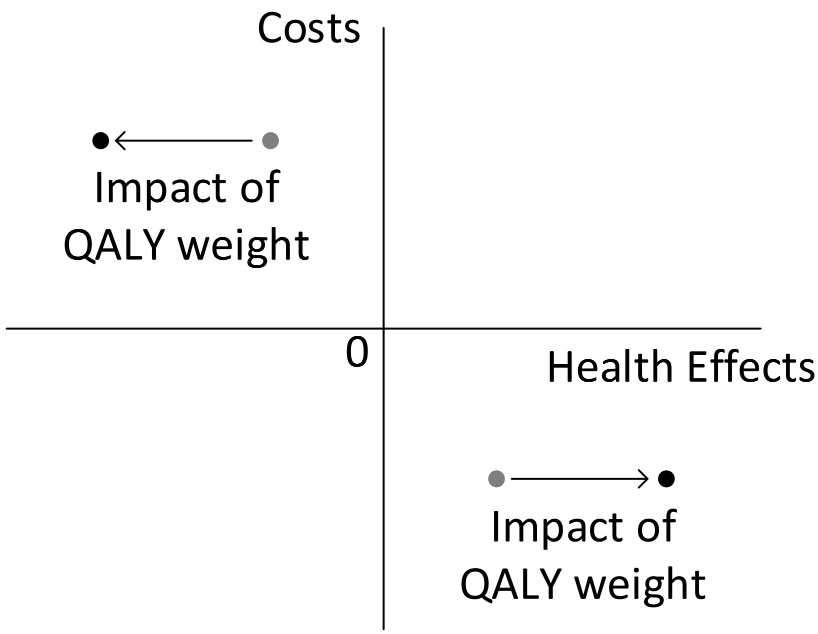
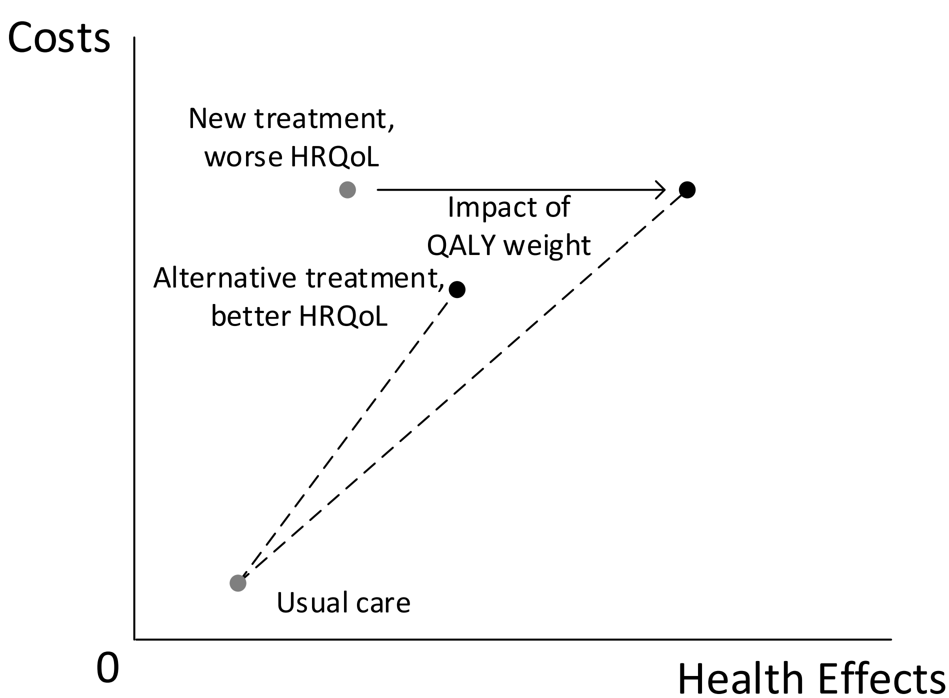


Figure 4.2: Potential impact of applying QALY weights to a dominated strategy in the NE quadrant



"Selective discounting" amendment (2011)

In 2011, NICE made a further amendment to its methods guidance alongside its appraisal of mifamurtide, a drug indicated for osteosarcoma (a rare disease that principally afflicts children and young adults).[83] Under NICE's standard 3.5% per annum discount rate, mifamurtide's estimated ICER was £57,000 per QALY. The appraisal committee noted that applying differential discounting, at 3.5% and 1.5% for costs and health effects respectively, reduced the ICER to £36,000 per QALY. NICE amended its guidance to state that costs and health effects be differentially discounted at 3.5% and 1.5% respectively in selective cases in which "treatment effects are both substantial in restoring health and sustained over a very long period (normally at least 30 years)". Following this amendment, NICE recommended mifamurtide.

O'Mahony and Paulden outlined a number of concerns and inconsistencies with this amendment.[83] Among these was the increased scope for NICE's guidance to discriminate on the basis of life expectancy, since the arbitrary "30 years" cut-off excludes individuals with less than 30 years LE following treatment. In NICE's 2013 Guide to the Methods of Technology Appraisal, the lower 1.5% rate was also applied to costs.[14] While this satisfied one of the concerns expressed by O'Mahony and Paulden, other inconsistencies remained unaddressed.

Inconsistencies resulting from the use of arbitrary cut-offs

In common with the "end of life" amendment, the criteria for NICE's "selective discounting" amendment use an arbitrary cut-off: a technology should provide a treatment effect for "at least 30 years". If a technology meets these criteria, a lower discount rate is applied to health benefits in *all* time periods, not only those after the cut-point. As O'Mahony and Paulden note, this results in potential inconsistencies. Consider two interventions for the same patients, the first yielding benefits for 29 years, the second yielding slightly smaller benefits for 29 years and an additional benefit in the 30th year (and so only the second meets the criteria for selective discounting). Since NICE would apply a lower discount rate to benefits from the second intervention in all 30 years, for the initial 29 years NICE may assign a *higher* value to a *lower* quality state of health for *exactly the same patients*. As in the example from NICE's "end of life" amendment provided earlier, this would harm the very patients the amendment was intended to benefit.

Inconsistencies resulting from the failure to consider opportunity cost

As with the "end of life" amendment, the "selective discounting" amendment fails to consider that similar (or identical) patients to those granted special consideration among the beneficiaries of treatment might bear the opportunity cost of NICE's recommendations. While a solution to this inconsistency in the case of the "end of life" amendment is to reduce the threshold, accounting for opportunity cost within a "selective discounting" framework is not straightforward.

Suppose that the appropriate discount rate for costs and health benefits in "non-special" cases is 3.5%, and that NICE wishes to give special consideration to some patients by applying a lower 1.5% discount rate to their health outcomes. It follows that a lower discount rate should also be applied to the health outcomes *forgone* by those patients subject to special consideration who bear the opportunity cost. Although these benefits forgone are not accounted for directly in the ICER, discounting the health benefits forgone at a lower rate is equivalent to discounting the incremental costs of the technology at a lower rate (assuming the shadow price of the budget remains constant).[26,165] In cases where *every* patient benefiting from treatment and *every* patient bearing the opportunity cost is subject to special consideration, the same lower discount rate may simply be applied to both the incremental costs and incremental health benefits. But if only a proportion of patients who bear the opportunity cost are subject to special consideration, then incremental costs should be discounted at a rate *somewhere between* 1.5% and 3.5% (depending upon this proportion). Furthermore, in cases where the beneficiaries of treatment are *not* subject to special consideration, the potential still exists for some patients bearing the opportunity cost to be subject to special consideration. In such cases, incremental benefits should be discounted at 3.5% and incremental costs at a rate between 1.5% and 3.5%. It follows that neither the original nor the modified amendment appropriately accounted for opportunity cost. It also seems far more straightforward and transparent for NICE to assign a direct weight to the QALYs of patients provided with special consideration than to use "selective discounting".

The proposed amendment to NICE's guidance

The proposals in NICE's consultation suffer from many of the same inconsistencies afflicting NICE's previous amendments. There are specific flaws with the conditions attached to QALY weightings that are analogous to specific flaws with previous amendments. There is also a general flaw in all of NICE's amendments that special considerations are not applied consistently across the beneficiaries and those bearing the opportunity cost.

Issues arising from the use of "absolute QALY loss" as a proxy for "wider societal impact"

NICE was asked by the Department of Health to consider the "wider social impact" associated with a disease; however, it is unclear how this is related to the proposed weighting of "absolute QALY loss" i.e. the health lost by individuals. Considering wider societal impact risks prioritization of those with greater economic or social participation, since restoring the health of such individuals may be associated with greater productivity gains than restoring the health of other individuals. This would appear to be in contravention of the NHS Constitution, which states that "access to NHS services is based on clinical need, not an individual's ability to pay".[166,167] This can be mitigated by applying a common productivity weight to all individuals; however, if the number of beneficiaries and patients bearing the opportunity cost is equal then decisions will be unaffected. It follows that accounting for wider social impact is either unlawfully discriminatory or potentially unnecessary.

Inconsistencies in weighting disease severity from the use of "absolute QALY loss"

The proposed weight for "absolute QALY loss" assigns greater value to treatments for diseases that impose larger QALY losses over a patient's lifetime, irrespective of the health gain per unit of expenditure. This can result in inconsistencies whereby individuals with a disease that persists continuously over many years will benefit from a higher weighting on their health than otherwise similar individuals with multiple independent diseases that impose the same total QALY loss. This may serve to bias health care resource allocation in favour of chronic disease management in a way that would not be justified by an objective of maximizing health gain. Furthermore, it potentially introduces discrimination between patients that have similar capacity to benefit from health care expenditure. It may also result in age-based discrimination: since the absolute QALY loss from a disease tends to be greater with longer remaining life expectancy, and since younger patients usually have longer life expectancy, the absolute QALY weighting stands to favour the young over the old irrespective of their potential health gain per unit of expenditure.

Inconsistent treatment of benefits due to consideration of "proportional QALY loss"

The proposed weighting for "proportional QALY loss" also creates potential for inconsistencies in the weighting of health effects. The proportional QALY loss depends upon the remaining life expectancy *without* the disease in question, generally resulting in a smaller weighting for younger patients. A common health gain – for example the treatment of an acute event without long term health effects – may therefore be weighted differently for young and old patients. It is doubtful if the potential biases of the proportional and absolute QALY loss weights will systematically compensate in a way to allay concerns of age discrimination becoming inherent in NICE's decision making process.

Inconsistencies resulting from capping the threshold weight at 2.5x

NICE's proposed limit of 2.5x on the weight that can be applied to the baseline £20,000 per QALY threshold introduces an apparent inconsistency whereby special considerations may carry more value when applied to independent interventions than when applied simultaneously to a common intervention. Consequently, NICE is advocating explicitly allocating additional resources in response to the presence of specific attributes in some circumstances, but not rewarding the very same attributes in other circumstances. This inconsistency stands to create inefficiencies and potentially unwarranted discrimination between otherwise similar patients.

Inconsistencies between NICE's threshold and empirical estimates of the opportunity cost

Despite acknowledging that the baseline cost-effectiveness threshold of £20,000 per QALY represents the "opportunity cost of programmes displaced by new, more costly technologies", NICE makes no mention of the extensive recent empirical work – supported by NICE – which aimed to estimate this.[151] This work estimated the shadow price of the NHS budget to be below £20,000 per QALY, implying that NICE's proposed threshold is too high and is likely to result in the adoption of technologies which displace more value than they create.

Inconsistencies resulting from the failure to consider opportunity cost

As with previous amendments, NICE's proposals do not apply value considerations consistently to the beneficiaries of new technologies and those who bear the opportunity cost. NICE is proposing to adopt a higher threshold for appraising new technologies depending upon the "certainty of the ICER", whether health related quality of life is "inadequately captured", the "innovative nature" of the technology, and "non-health objectives of the NHS", yet the impact upon each of these from the displacement of existing services will not be considered. Indeed, if a special weight were to be attached to “certainty of the ICER” for both the new technology and the opportunity cost, this might be expected to raise the value of existing services relative to new technologies, because of the greater certainty of the costs and effectiveness of displaced services arising from their use in practice.

Discussion

The recently proposed amendments to NICE’s guidance raise a considerable number of concerns. NICE is proposing a formal system for assigning values to health benefits using weights that are neither explicitly stated nor consensus-based. The quantitative basis for these weights has neither been provided nor evidenced; while NICE has applied implicit weights to certain attributes in the past, this is not a sound rationale for applying such weights in the future. Although the proposed system of weights ostensibly offers a formalization of NICE’s decision criteria, the criteria remain in large part arbitrary and opaque. In essence, the proposals extend the limit of the threshold range for non-“end of life” treatments from £30,000 to £50,000 per QALY, increasing the scope for unaccountable discretion and allocations that are neither efficient nor fair.

The proposals also raise a number of questions. Is NICE’s favouring of the young, those with severe illness, and individuals at the end of life consistent with the values of the UK public? Why has NICE proposed to repeal the “end of life” amendment but not the “selective discounting” amendment, given that the effect of each is approximated through the new “burden of illness” and “wider societal impact” considerations? Why do the proposals extend the scope for the threshold to be increased due to “innovative nature of technology” when the Department of Health’s terms of reference specifically request that NICE “not include a further weighting for therapeutic innovation and improvement”? And why has NICE failed to apply special value weights to those bearing the opportunity cost of its decisions, despite the Department of Health’s request that NICE “adopt the same benefit perspective for all technologies… and for displaced treatments”?

Within a resource constrained health care system, it is not possible to improve treatment access for one group of individuals without curtailing access for other groups. NICE’s apparent favouring of the young and those at the end of life inevitably disadvantages other patients. Even if discrimination on such grounds is consistent with the values of the public, NICE's proposed methods are not. NICE has repeatedly privileged the identified beneficiaries of treatment over those bearing the opportunity cost. As a result, NICE may recommend a treatment which displaces more QALYs than it gains in the very patients whose health it ostensibly values more. This may create the perception that NICE does not value the special value considerations *per se*, but only if doing so favours the adoption of a new technology. Such an approach would be ethically untenable as well as manifestly incompatible with NICE's previous basic equity position and the terms of reference provided by the Department of Health.

This raises the broader issue of whether NICE's revealed values are defensible – specifically, valuing the health of some patients more than others. It might be argued that NICE is an agent of a legitimate and accountable higher authority (the UK's elected parliament), and so its values should be those that prevail.[25,26] Or it might be held that it is the values of the British public, perhaps as revealed by NICE's Citizens Council, that should be reflected in NICE's methods. It is not clear to which possible source of moral authority these various amendments are appealing; nor which would be the more legitimate. Further, it is not apparent whether NICE's interpretation of these unclearly expressed values is reasonable. What is evident, however, is that an inconsistent treatment of social values cannot be sustained. It may therefore be timely for NICE to hold back from a poorly evidenced incorporation of social value arguments in its decision making processes while better evidence is generated regarding the values held by the public and also by social agents. It may be informative to test, for example, the extent to which NICE's previous basic equity position ("a QALY is a QALY") is generally acceptable, and what exceptions (if any) might be widely accepted by the public. The value judgments of policy makers well-versed in seeking solutions that transcend sectional interests may also be revealed through well-conducted experiments (the subjects of which may include parliamentarians and the members of NICE's Appraisal Committees). An appropriate strategy for NICE at this stage might therefore be to seek National Institute for Health Research support for such work.

In light of this, we recommend that NICE should:

1. Eliminate arbitrary cut-offs in the application of value weights;
2. Implement research and public consultation processes to support the development of a broader value framework and associated implementation plans. This would require that NICE:
    a. Specify how it will operationalize the measurement of each of the special value considerations included in the revised methods;
    b. Specify the magnitude of the value weight it will assign to each special value consideration, and the evidence on which that weight is based;
    c. Specify how the value weights assigned to all the special value considerations will be aggregated to arrive at the 'value multiplier' for each specific technology appraisal;
    d. Specify how it will operationalize the assessment of the special value considerations in the patient groups likely to bear the opportunity cost of its recommendations, in order to meet the requirement that it "adopt the same benefit perspective for all technologies… and for displaced treatments".

Satisfying these recommendations will not be straightforward. An expert workshop may be worth convening to resolve the issues we have raised, and, so far as possible, to achieve consensus on future revisions. NICE's accretion of ad hoc adjustments has compounded inconsistency upon inconsistency and, quite apart from being inherently undesirable, the lack of transparency has made it hard for ordinary people to understand NICE's reasoning. It is plain that the current proposals are unlikely to command agreement, not because of disagreement with NICE's social value judgments but because of the inappropriate way in which it treats people having the same characteristics, and hence entitlements, differentially. There is a fairly straightforward remedy for all of these difficulties, whose starting point is to address priorities by attributing weights to those whom NICE wishes especially to protect, rather than by adjusting discount rates or thresholds. Further research relating to those bearing the opportunity cost, and the prevalence of special characteristics amongst them, is required to give reasonable effect to this symmetry of treatment.

Until such research is complete, we recommend that NICE reverts to the basic equity position it adopted prior to the recent amendments, under which all QALYs were assigned equal value ("a QALY is a QALY"). Not only would this reduce the scope for discrimination on the basis of life expectancy, but it would give all patients greater confidence that NICE has consistently considered the impact of its recommendations on their health. It would also satisfy the Department of Health's requirements that NICE "adopt the same benefit perspective for all technologies… and for displaced treatments" and also "not include a further weighting for therapeutic innovation and improvement", neither of which is satisfied by NICE's recent proposals.

It might be argued that reverting to equal value weights would preclude the use of "a simple system of weighting for burden of illness that appropriately reflects the differential value of treatments for the most serious conditions" or "a proportionate system for taking account of wider societal benefits", both of which were also requested by the Department of Health. However, if NICE calculates QALYs using an EQ-5D utility algorithm with an N3 term, which provides a weight for the added disutility of severe ill health on one or more dimensions, then this alone might meet the requirement to account for the burden associated with severe illness through a "simple system of weighting".[58] This approach has the added attraction of being derived from a large survey of UK public values. Furthermore, as we noted earlier, it does not appear possible to account for "wider societal benefits" in a way that would make a difference to NICE's decision making while also remaining consistent with the principles laid out in the NHS Constitution. Since an unlawful system for taking account of wider societal benefits is clearly not "proportional", it may therefore not be feasible for NICE to meet this specific request. It follows that reverting to its previous basic equity position, under which all QALYs were assigned equal value, may be the most appropriate means for NICE to satisfy, in the short term and to the greatest extent possible, the requirements placed upon it by the Department of Health.

Our critique of NICE's proposals should be tempered by an acknowledgement that NICE was placed in a difficult position; it was obliged to modify its methods in a way that was unlikely to be achieved by consensus. Nevertheless, it should be noted that NICE's proposals allow for large additional QALY weights. As such, NICE's proposals do not seem to be a conservative response to the requests made of it. Furthermore, NICE's proposals do not meet the Department of

Health's requirements: they fail to adequately apply the same benefits perspective to health displaced, they maintain a further weighting for therapeutic innovation and improvement, and the absolute QALY loss adjustment does not clearly correspond to "wider social impact".

It was a notable feature of the early years of NICE that difficult questions of method were identified openly so that all who might claim to have relevant expertise were able to fully participate in both the creation of, and subsequent revisions to, the methods guidance. We do not doubt that such transparency continues to be a prime social value of NICE.

Bibliography for Chapter 4

14. National Institute for Health and Care Excellence. *Guide to the methods of technology appraisal 2013*.; 2013.

25. Paulden M, Claxton K. Budget allocation and the revealed social rate of time preference for health. *Health Econ*. 2012;21(5):612–8. doi:10.1002/hec.1730.

26. Claxton K, Paulden M, Gravelle H, Brouwer W, Culyer AJ. Discounting and decision making in the economic evaluation of health-care technologies. *Health Economics*. 2011;20(1):2–15. doi:10.1002/hec.1612.

58. Dolan P. Modeling valuations for EuroQol health states. *Med Care*. 1997;35(11):1095–108.

82. National Institute for Health and Care Excellence. *Consultation Paper: Value Based Assessment of Health Technologies*.; 2014.

83. National Institute for Health and Care Excellence. *Discounting of health benefits in special circumstances*.; 2011.

84. National Institute for Health and Care Excellence. *Appraising life-extending, end of life treatments*.; 2009.

85. Harris J. NICE and not so nice. *Journal of Medical Ethics*. 2005;31(12):685–688. doi:10.1136/jme.2005.014134.

151. Claxton K, Martin S, Soares M, et al. Methods for the Estimation of the NICE Cost Effectiveness Threshold. *CHE Research Paper 81*. 2013.

156. National Institute for Health and Care Excellence. Methods of Technology Appraisal Consultation. 2014.

157. Secretary of State for Health. *The Government's Response to the Health Select Committee's Eighth Report of Session 2012-13 on the National Institute for Health and Clinical Excellence*.; 2013.

158. Stolk EA, Donselaar G van, Brouwer WB, Busschbach JJ. Reconciliation of economic concerns and health policy: illustration of an equity adjustment procedure using proportional shortfall. *Pharmacoeconomics*. 2004;22(17):1097–107.

159. Office of Health Economics. *Clarifying meanings of absolute and proportional shortfall with examples*.; 2013.

160. O'Mahony JF, Paulden M. NICE's selective application of differential discounting: ambiguous, inconsistent, and unjustified. *Value Health*. 2014;17(5):493–6. doi:10.1016/j.jval.2013.02.014.

161. National Institute for Health and Care Excellence. *Guide to the methods of technology appraisal 2008*.; 2008.

162. Paulden M, Culyer AJ. Does cost-effectiveness analysis discriminate against patients with short life expectancy? Matters of logic and matters of context. *CHE Research Paper 55*. 2010.

163. Seshamani M, Gray AM. A longitudinal study of the effects of age and time to death on hospital costs. *J Health Econ*. 2004;23(2):217–35. doi:10.1016/j.jhealeco.2003.08.004.

164. Kasteridis P, Street A, Dolman M, et al. The Importance of Multimorbidity in Explaining Utilisation and Costs Across Health and Social Care Settings: Evidence from South Somerset's Symphony Project. *CHE Research Paper 96*. 2014.

165. Claxton K, Sculpher M, Culyer A, McCabe C. Discounting and cost-effectiveness in NICE–stepping back to sort out a confusion. *Health Economics*. 2006;15(1):1–4. doi:10.1002/hec.1081.

166. Raftery. Value based pricing: can it work? *BMJ*. 2013;347(oct11 3):f5941–f5941. doi:10.1136/bmj.f5941.

167. Department of Health. NHS Constitution for England. 2013.

Conclusion

Contributions to knowledge

This thesis has provided contributions to knowledge in a number of areas.

In Chapters 1 and 2, we developed a model of the cost-effectiveness threshold that incorporates consideration of diminishing marginal returns, non-marginal budget impact, and multiple decision makers with imperfect information and potentially conflicting objectives. This model allowed for separate estimation of optimal thresholds for net investments and net disinvestments, and consideration of different assumptions regarding the decision making agent's authority.

We used this model to derive specifications of the optimal threshold under a range of alternative scenarios, demonstrating the potential for threshold curves to have a variety of functional forms. These results showed, for the first time, that threshold curves may 'kink' in a number of possible directions at the origin of the CE plane, resulting in different optimal thresholds for marginal net investments and net disinvestments. We also found that threshold curves may pass through the NW and/or SE quadrants of the CE plane, with important implications for the cost-effectiveness of technologies conventionally regarded as 'dominant' or 'dominated'.

In Chapter 3, we proposed a decision making framework for new technologies that integrates the social value arguments expressed in the orphan drugs literature while respecting the principles of horizontal and vertical equity. Although the focus of this chapter was upon the assessment of orphan drugs, the principles underlying this framework – including the differentiation between value-bearing decision factors and those that determine the opportunity cost – are also applicable in assessments of technologies for non-orphan diseases.

In Chapter 4, we demonstrated some inconsistencies in NICE's recent attempts at implementing an alternative vertical equity position. Although this work focused upon NICE, our findings have implications for other decision makers who adopt an objective with an implied vertical equity position that assigns greater weight to benefits arising for some individuals than for others.

In the remainder of this section, we will summarize specific contributions to knowledge by providing a response to each of the research questions considered in the Introduction.

Chapter 1

1. Is the conventional exposition of the cost-effectiveness threshold consistent with the assumptions underlying the standard theoretical model?

We found that the conventional exposition of the threshold, as a linear function passing through the origin of the CE plane, is a special case that arises under the following conditions:

a) Initial technologies are *divisible* and exhibit *constant* returns to scale;
b) A single initial technology remains *partially* adopted following initial allocation; and
c) The budget impact of each new technology is sufficiently small that reallocation involves expanding or contracting *only* the partially adopted initial technology.

If condition (a) does not hold, then the threshold curve is not linear. Rather, it will be a concave function if technologies are divisible and exhibit diminishing returns to scale, or a step function if technologies are non-divisible (see p.63).

If condition (a) holds, then (b) will generally hold (see p.46). However, an exception arises if the initial budget is *just sufficient* to exhaust the last initial technology adopted during the initial allocation. In this case, adopting a net investment will result in contraction of this exhausted marginal initial technology, while adopting a net disinvestment will result in expansion of *another* initial technology. Since the marginal ICER in contraction of the exhausted technology will generally differ from the marginal ICER in expansion of the other technology, this results in a special case where the threshold curves for net investments and net disinvestments 'kink' at the origin of the CE plane. We did not observe this special case in the analysis we conducted.

If condition (c) does not hold, then reallocation involves two or more initial technologies. Since their marginal ICERs in expansion or contraction will generally differ, this results in 'kinks' in the threshold curve where reallocation switches from one initial technology to another (see p.60).

The conventional assumption that the numerical threshold represents the ICER of the marginal health technology '*displaced*' in order to fund the new technology is appropriate if, in *addition* to conditions (a), (b) and (c) above, *one* of the following conditions also applies: (d) the new technology is a net investment *and* the most efficient marginal decrease in expenditure on initial technologies is to *contract* an initial technology in the NE quadrant (rather than expand an initial technology in the SW quadrant); or (e) the new technology is a net disinvestment *and* the most efficient marginal increase in expenditure on initial technologies is to *contract* an initial technology in the SW quadrant (rather than expand an initial technology in the NE quadrant). If *neither* (d) *nor* (e) holds, then no initial technologies are '*displaced'* during reallocation. Rather, adopting the new technology results in *expansion* of an initial technology.

2. What are the implications for the specification of the optimal cost-effectiveness threshold of relaxing the assumptions of divisibility of technologies and constant returns to scale in the standard model?

Under the 'standard' assumptions of divisibility and constant returns, the optimal threshold for both net investments and net disinvestments remains *constant* as the budget impact of the new technology increases, *until* reallocation switches from the first initial technology to the next. The threshold then changes *continuously* thereafter, falling for net investments and increasing for net disinvestments. Since the marginal ICER of each initial technology does not change with expansion or contraction, the threshold curves resemble a piecewise linear function, with 'kinks' at the points where reallocation switches from one initial technology to another.

If technologies are divisible but exhibit *diminishing* returns to scale, then the optimal threshold for both net investments and net disinvestments changes *immediately* and *continuously* as the budget impact increases, falling for net investments and increasing for net disinvestments. As a result, the threshold curves are entirely concave with no 'kinks' (see p.63).

If technologies are *non-divisible*, then the threshold curves resemble a step function, with each 'step' corresponding to a different optimal reallocation of initial technologies. For both net investments and net disinvestments, the threshold increases with the budget impact until the set of initial technologies subject to reallocation changes, at which point the threshold immediately falls and then begins increasing again. A special case arises for net disinvestments with a sufficiently small budget impact that no subsequent reallocation is possible. In this case, the threshold curve lies on the vertical axis of the CE plane and the numerical threshold is mathematically undefined (see p.65).

3. Should the same cost-effectiveness threshold be used to consider 'net investments' and 'net disinvestments'? If not, under what conditions might these differ?

If conditions (a), (b) and (c) from the response to question 1 hold, then the same thresholds should be used to consider net investments and net disinvestments.

If initial technologies are divisible and exhibit constant returns to scale, but the budget impact of a new technology violates condition (c), then these thresholds generally differ (see p.60).

If initial technologies are divisible and exhibit diminishing returns to scale, these thresholds are *similar* but *not identical* if the budget impact of a new technology is *marginal*. The thresholds for net investments and net disinvestments diverge as the budget impact increases (see p.63).

If initial technologies are non-divisible, then these thresholds generally differ, regardless of the budget impact (see p.64).

Chapter 2

4. What are the implications for the specification of the optimal cost-effectiveness threshold of considering multiple decision makers with imperfect information?

We found that the optimal threshold depends upon the information available to each decision maker. Our work demonstrates, for the first time, the potential for threshold curves to pass through the NW and/or south-east SE quadrants of the agent's CE plane. This requires a novel interpretation of numerical ICERs, and raises the possibility that 'dominated' technologies may be cost-effective while 'dominant' technologies may not be (see p.109).

If the agent and reallocator have similar information, which differs from that available to the allocator, then reallocation following a net investment represents an opportunity to 'correct' what the agent and reallocator *perceive* to be an inefficient initial allocation of resources. Reallocation may therefore be associated with *positive*, rather than negative, expected incremental net benefit to the agent. If so, the agent may be willing to recommend some new technologies that lie within the NW quadrant, provided the expected *net* incremental benefit of their adoption and the subsequent reallocation is positive.

Alternatively, if the agent and *allocator* have similar information, which differs from that available to the *reallocator*, then the agent may not 'trust' the reallocator to make an efficient reallocation following adoption of a new technology. If the agent perceives that reallocation following a net disinvestment will result in *negative* expected incremental benefit, then the agent might *not* recommend some technologies that lie in the SE quadrant, since the expected *net* incremental benefit of their adoption and the subsequent reallocation is negative.

We also find that the threshold may be 'kinked' at the origin of the CE plane, with different optimal thresholds for net investments than for net disinvestments.

5. Does the optimal threshold depend upon the authority of the decision making 'agent'?

The optimal threshold depends upon whether the agent has authority to implement a net investment or net disinvestment of resources in initial technologies as an *alternative* to recommending adoption of a new technology. If the agent and allocator have different information, the agent may wish to implement such a reallocation in order to 'correct' perceived inefficiencies in the initial allocation of resources.

The optimal threshold also depends upon whether the agent has authority to *mandate* reallocation following adoption of a new technology and/or following implementation of an alternative to the new technology. With this authority, the agent can 'overrule' what it perceives to be inefficient reallocations carried out by the reallocator.

If the agent *has* the authority to implement an alternative net investment or net disinvestment of resources instead of recommending adoption of a new technology, *and* if the agent has the *same* authority to mandate reallocation following adoption of the new technology as it does following implementation of an alternative to the new technology – that is, the agent *has* this authority in *both* cases, or does *not* have this authority in *either* case – then in some cases the threshold is *not* dependent upon the expected incremental benefit gained or forgone through reallocation. Two further conditions must hold for this to be the case: the agent must have *different information* to the *allocator*, such that the agent *perceives* the initial allocation of resources to be inefficient; and the expected *net* incremental benefit of implementing an alternative to the new technology, and its subsequent reallocation, must be *positive*. If these assumptions hold, the agent will consider a new technology cost-effective if it provides greater expected incremental benefit to the agent than the agent's preferred *alternative* to the new technology (see p.127).

Given the difficulty of empirically estimating the gain or loss in incremental benefit associated with reallocation in real world practice, the opportunity to adopt a conceptually different threshold may be worthy of further consideration, particularly if this alternative specification of the threshold is easier to estimate empirically.

Chapter 3

6. What are the social value arguments that have been advanced in the literature relating to the reimbursement of orphan drugs?

We identified 19 'candidate decision factors' in the orphan drugs literature (see p.174):

1. Prevalence (rarity) of disease;
2. Severity (seriousness) of disease;
3. Identifiability of the beneficiaries of treatment;
4. Extent to which the disease is life-threatening or chronically debilitating;
5. Evidence of treatment efficacy or effectiveness;
6. Magnitude of treatment benefit;
7. Safety profile of treatment;
8. Innovation profile of treatment;
9. Societal impact of treatment;
10. Availability of treatment alternatives;
11. Impact of treatment upon the distribution of health in the population;
12. Socio-economic policy objectives;
13. Cost (price) of treatment;
14. Budget impact of treatment;
15. Cost-effectiveness of treatment;
16. Feasibility of diagnosing the disease;
17. Feasibility of providing treatment;
18. Industrial and commercial policy considerations; and
19. Legal considerations.

In addition, we identified three sources of stakeholder preferences (see p.181):

1. The preferences of patients;
2. The preferences of physicians; and
3. The preferences of society.

Finally, we identified three value propositions (see p.181):

1. The 'rule of rescue';
2. The 'equity principle'; and
3. The 'rights-based approach'.

7. Can these social value arguments be categorized and synthesized into a coherent decision making framework?

We categorized the 19 identified candidate decision factors into three groups (see p.182):

a. Those that determine the *opportunity cost* of providing coverage for the orphan therapy or its relevant comparators;
b. Those that bear upon the *value* assigned to the orphan therapy, its comparators, and the opportunity cost of each; and
c. Those factors that are *neither* value-bearing *nor* determine the opportunity cost.

We further categorized the *value*-bearing factors into four non-mutually exclusive groups:

i. Disease-related factors;
ii. Technology-related factors;
iii. Population-related factors; and
iv. Socio-economic-related factors.

Finally, we proposed a means for integrating the identified candidate decision factors, stakeholder preferences and value propositions into a coherent decision making framework (see p.186). The key feature of this framework is that the factors which determine the opportunity cost of a new technology and its comparators (including cost and budget impact) are considered separately to other factors. Once the opportunity cost of each is established, the value-bearing factors, stakeholder preferences and value propositions are then applied consistently across the new technology, its comparators, and the opportunity cost of each. This allows for decisions which maintain horizontal equity, while also respecting the decision maker's vertical equity position.

The principles underlying this decision making framework, and the categories used to group the candidate decision factors, are generalizable beyond the consideration of orphan drugs. The key feature of this framework is that the opportunity cost determining factors are isolated from the remaining factors, allowing the value-bearing factors, stakeholder preferences and value propositions to be applied consistently to both the new technology and its opportunity cost, respecting the principle of horizontal equity.

Chapter 4

8. Are there any inconsistencies in the consideration of social values within NICE's existing methods for the economic evaluation of health technologies?

Prior to 2009, NICE's methods broadly reflected a vertical equity position in which each QALY was assigned equal value for all individuals in society. At this time, NICE's threshold represented, in principle, an unmodified estimate of the opportunity cost of adopting technologies, such that NICE's recommendations maintained horizontal equity and respected this implied vertical equity position.

NICE's 'end-of-life' guidance in 2009, and its introduction of selective discounting in 2011, introduced inconsistencies in its consideration of social values (see p.205). A key inconsistency with both amendments is that they effectively apply an additional weight *only* to the health of the beneficiaries of the technology under assessment, with no consideration made of the individuals who bear the opportunity cost. If those bearing the opportunity cost include any individuals with similar characteristics to the beneficiaries, this not only violates the principle of horizontal equity but also results in an inconsistent application of NICE's vertical equity position. A further inconsistency arises with both amendments due to their use of arbitrary cut-offs. This could potentially result in NICE unwittingly discriminating against the very individuals for whom it wishes to discriminate in favour. Finally, inconsistencies arise from the application of the 'end-of-life' guidance, due to NICE's conflation of QALY weights and threshold weights.

9. Are there any inconsistencies in the consideration of social values within NICE's proposals for 'value-based pricing', made available for public consultation in 2014?

NICE's proposals for 'value-based pricing' suffer from many of the same inconsistencies as its previous amendments (see p.215). In particular, the proposals effectively apply an additional weight *only* to the health of beneficiaries, with no consideration made of those who bear the opportunity cost.

The proposals also introduced a number of additional inconsistencies:

1. The proposed weight for "absolute QALY loss" as a means for accounting for disease severity might result in individuals with a disease that persists continuously over many years benefiting from a higher weighting on their health than otherwise similar individuals with multiple independent diseases that impose the same total QALY loss. This potentially introduces discrimination between patients that have similar capacity to benefit from health care expenditure. It may also result in age-based discrimination: since the absolute QALY loss from a disease tends to be greater with longer remaining life expectancy, this weighting stands to favour the young over the old irrespective of their potential health gain per unit of expenditure.
2. The proposed weighting for "proportional QALY loss" depends upon the remaining life expectancy *without* the disease in question, generally resulting in a smaller weighting for younger patients. A common health gain may therefore be weighted differently for young and old patients, raising concerns about age discrimination.
3. The proposed limit of 2.5x on the weight that can be applied to the baseline £20,000 per QALY threshold introduces an apparent inconsistency whereby special considerations may carry more value when applied to independent interventions than when applied simultaneously to a common intervention. Consequently, NICE is advocating explicitly allocating additional resources in response to the presence of specific attributes in some circumstances, but not rewarding the very same attributes in other circumstances. This inconsistency stands to create inefficiencies and potentially unwarranted discrimination between otherwise similar patients.

10. What steps can NICE, as an exemplar decision maker, take to resolve any identified inconsistencies in its consideration of social values?

We recommended that NICE eliminates arbitrary cut-offs in the application of value weights, and implements research and public consultation processes to support the development of a broader value framework and associated implementation plans (see p.217).

This would require that NICE specifies how it will operationalize the measurement of each special value consideration, the magnitude of the value weight it will assign to each, how these will be aggregated to arrive at the 'value multiplier' for each specific technology appraisal, and how it will operationalize the assessment of the special value considerations in the patient groups likely to bear the opportunity cost of its recommendations.

These recommendations have broader implications for other decision makers who may be considering adopting a vertical equity position that assigns a greater weight to benefits arising to some individuals but not to others. A fundamental requirement for horizontal equity to be maintained is that special value considerations are applied consistently across the beneficiaries of new technologies and those who bear the opportunity cost of their adoption. This is the key principle underlying the decision making framework proposed in Chapter 3. This finding is generalizable to technologies other than orphan drugs, and to decision makers other than NICE.

Implications for health care resource allocation in Canada

We will now consider the implications of our findings for two specific issues in the allocation of health care resources in Canada:

1. Appropriate decision making frameworks for assessing new technologies;
2. Equity in the allocation of health care resources across Canada.

Appropriate decision making frameworks

There are a number of agencies in Canada that conduct assessments of health technologies.[168] The most well-known is CADTH, which "makes reimbursement recommendations to Canada's federal, provincial, and territorial public drug plans" through two channels: the Common Drug Review (CDR) and the pan-Canadian Oncology Drug Review (pCODR).[91] There are also provincial HTA agencies, including the Ontario Health Technology Advisory Committee (OHTAC), which "makes recommendations to Ontario's Ministry of Health and Long-Term Care on whether health interventions should be publicly funded or not".[169]

Each agency adopts its own framework to guide its recommendations. For example, the Canadian Drug Expert Committee (CDEC), which provides advice to CADTH on which new drugs to recommend as part of its CDR process, takes into account the following considerations:

1. "Patient group input";
2. "Clinical studies demonstrating the safety, efficacy, and effectiveness of the drug compared with alternatives";
3. "Therapeutic advantages and disadvantages relative to current accepted therapy"; and
4. "Cost and cost-effectiveness relative to current accepted therapy".[170]

The pCODR Expert Review Committee (pERC), which provides recommendations as part of CADTH's pCODR process, adopts a "deliberative framework" that incorporates four "criteria":

1. "Clinical benefit";
2. "Patient-based values";
3. "Economic evaluation"; and
4. "Adoption feasibility".[171]

The Ontario Health Technology Advisory Committee (OHTAC) is perhaps the most transparent Canadian HTA agency with regards to its decision making framework. In 2009, Johnson and colleagues published a framework of 'decision determinants', subsequently revised in 2010, that included four criteria for OHTAC to consider when making recommendations:

1. "Overall clinical benefit";
2. "Value for money";
3. "Consistency with expected societal and ethical values"; and
4. "Feasibility of adoption into the health system".[172,173]

In 2012, OHTAC established a subcommittee to update this framework. [Disclosure: I was a member of this subcommittee from January 2012 until September 2013]. The revised framework proposed by this subcommittee was based upon a theoretical model in which "bioethics / social science", "evidence based medicine" and "economic evaluation" were regarded as distinct "scientific paradigms".[174] Within this subcommittee, three further subcommittees were formed, with separate responsibility for deriving appropriate criteria within each of these "paradigms".

The "bioethics / social science" subcommittee identified a number of "core values relevant to OHTAC decision making", which were categorized into two groups: those considered to be "traditional in HTA", and those considered to be "not traditional in HTA".[40]

The values considered to be "traditional in HTA" were:

a. "Effectiveness" (considered to be a "clinical" value);
b. "Resource stewardship" and "resource sufficiency" ("economic" values); and
c. "Evidence-informed policy" and "quality" ("over-arching" values).

The values considered to be "not traditional in HTA" (all considered as "social" values) were:

a. "Equity";
b. "Solidarity";
c. "Population health";
d. "Patient-centred care";
e. "Collaboration"; and
f. "Shared responsibility for health".

Although no report has yet been published, the subcommittee's recommendations were presented at a public lecture in March 2015 and at the 2015 CADTH Symposium.[40,174] Similar to existing Canadian frameworks, the proposed framework incorporates four separate "domains":

1. "Benefits and harms" (which includes "effectiveness" and "adverse events");
2. "Economics" (which includes "cost-effectiveness");
3. "Patient centred care" (which includes "patient values and preferences" and "equity in access and outcome", among other considerations); and
4. "Health system feasibility" (which includes "cost considerations", "budget impact estimation", and "organizational implications").

Our work raises questions about the appropriateness of the decision making frameworks used by CDEC, pERC and OHTAC, given their incorporation of specific "domains" or "criteria".

As we found in Chapters 1 and 2, if a vertical equity position is adopted in which incremental benefits for all individuals are given equal value, then the appropriate cost-effectiveness threshold depends upon the budget impact of the technology under consideration. Determining whether a technology is cost-effective also requires consideration of its incremental benefit, which in practice depends upon a number of factors, including its effectiveness and the likelihood, and severity, of any adverse events. In Chapter 3 we then considered a number of social value arguments which might be used to inform an *alternative* vertical equity position. In Chapter 4 we demonstrated how NICE's implicit attempts to reflect such an alternative vertical equity position – by applying modifications to its methods for economic evaluation – may have resulted in a violation of horizontal equity, an inconsistent application of NICE's implied vertical equity position, and the recommendation of technologies that might diminish population health.

It is clear from our work that considerations of incremental benefit, cost-effectiveness, equity, budget impact and population health are intricately related. None of these can be considered in isolation of the others. Yet these considerations are typically separated within Canadian decision making frameworks. In CDEC's framework, these are distributed across considerations 2 to 4. The first of CDEC's considerations, "patient group input", raises equity issues of its own, since the *only* patient groups considered are those representing the beneficiaries of the technology, and not the bearers of the opportunity cost. In the framework used by pERC, and that recently proposed by the OHTAC subcommittee, these considerations are distributed across all four domains. Some considerations are separated from others through the specification of distinct ‘criteria’ for each domain. In OHTAC’s case, these considerations are also explicitly separated in the theoretical underpinnings of the framework, based upon the notion of “scientific paradigms”. A particular concern with this approach is that it might result in decision makers overlooking the implications that considerations in one domain have for related considerations in other domains.

For example, if the OHTAC committee were to consider “patient values and preferences” and “equity in access and outcome” in isolation from economic considerations, then it might not consider the values and preferences of individuals who would bear the opportunity cost of a decision to adopt a new technology, nor might the committee consider the equity implications that arise if individuals who bear the opportunity cost have reduced access to health care and diminished health outcomes. Contrary to the intentions of the subcommittee, this separation of social and ethical values from economic considerations might therefore result in OHTAC making recommendations that exacerbate health inequalities, rather than alleviate them.

It is notable that, in the classification of social values identified by the OHTAC subcommittee, “effectiveness”, “equity” and “population health” were determined not to be “economic” criteria, with the latter two considered to be “not traditional considerations in HTA”. Yet effectiveness is clearly an important contributor to the cost-effectiveness of a technology. Furthermore, as we have shown, the appropriate threshold to use in economic evaluations depends upon the vertical equity position adopted by the decision maker. Finally, one of the standard outputs of economic evaluations conducted for HTA agencies such as NICE is the ‘net health benefit’ of a technology – when derived using an appropriate estimate of the threshold, this represents a direct estimate of the implications of adopting the technology for population health.[46,175] It is therefore incorrect to state that “equity” and “population health” are not traditional considerations in HTA, or that all three social values are not economic criteria.

Given the interconnectedness of the considerations discussed above, decision makers in Canada should develop frameworks that do not rely upon the use of separate ‘domains’ or ‘criteria’. This is not a straightforward task. It will require decision makers to consider what their vertical equity position is (e.g., do they value health gains for all individuals equally, or do they wish to prioritize certain groups?). It will also require decision makers to determine the prevalence of individuals who belong to prioritized groups, not only among the beneficiaries of new health technologies but also among those who bear the opportunity cost of their adoption.

As we noted in Chapter 4, if decision makers choose to prioritize patients in certain groups, and if the prevalence of prioritized individuals among the beneficiaries of a new technology is greater than among the bearers of the opportunity cost, then this will increase the likelihood that the technology appears cost-effective. However, if this prevalence is lower among the beneficiaries, consistency requires that the decision maker considers this technology to be *less* cost-effective than it would if no individuals were to be prioritized.

If horizontal equity is to be maintained, decision makers should not regard the consideration of additional social values – including the prioritization of patients in certain groups – as an opportunity to make some technologies appear *more* cost-effective without considering the possibility that other technologies will appear *less* cost-effective (as NICE attempted to do by raising its cost-effectiveness threshold for some technologies without lowering it for others). Decision makers must instead acknowledge that each additional social value argument that favours adoption of a new technology when applied to the beneficiaries might have an opposing effect – of possibly greater magnitude – when applied to the bearers of the opportunity cost. Canadian decision makers must develop frameworks that reflect this. The framework proposed in Chapter 3 provides a template for developing such frameworks in future.

Equity in the allocation of health care resources across Canada

In Chapter 1, we demonstrated that the set of optimal thresholds depends upon the initial budget of the health care system. Since each Canadian province and territory has its own health care system, and hence its own health budget, it follows that the set of optimal thresholds would be expected to differ across provinces and territories.

For example, suppose that Ontario and Alberta have different health budgets, such that the initial allocation of resources in each health care system differs. Furthermore, suppose that the objective of each health care system is to maximize some measure of 'benefit' (e.g. QALYs) across the respective population, with no weights applied to benefits for different individuals. Finally, suppose that the reallocation that follows adoption of a net investment within Ontario's health care system results in a reduction in incremental benefit that is greater than the reduction in incremental benefit following adoption of a similar net investment in Alberta. It follows that the optimal threshold for net investments, at any given budget impact, is lower in Ontario than in Alberta.[176]

In this context, the use of *different* thresholds by decision makers in each province or territory is required for horizontal equity to be maintained in the allocation of health care resources *within* each province or territory. By way of demonstration, suppose a new technology that constitutes a net investment is simultaneously considered for adoption in both Ontario and Alberta. The ICER of the technology is estimated to be $50,000 per QALY in both provinces. Given the budget impact of the technology, the initial allocation of resources in each province, and the expected reallocation of resources following adoption of the technology, the optimal threshold is estimated to be $40,000 per QALY in Ontario and $60,000 per QALY in Alberta. It follows that adopting the technology would satisfy the Alberta decision maker's objective (since more QALYs would be gained in Alberta by the beneficiaries of the new technology than would be forgone in Alberta by the bearers of the opportunity cost) but would *not* satisfy the Ontario decision maker's objective (since more QALYs would be forgone in Ontario by the bearers of the opportunity cost than would be gained in Ontario by the beneficiaries). Yet, if the same threshold were to be used in Ontario and Alberta, the technology would be declared cost-effective in *both* provinces or in *neither* province. Regarding the technology as cost-effective in Ontario would imply that the decision maker places greater weight on the QALYs of the beneficiaries than on the QALYs of those who bear the opportunity cost – given the decision maker's vertical equity position, this would violate horizontal equity within Ontario. Not regarding the technology as cost-effective in Alberta would imply that the Alberta decision maker places greater weight on the QALYs of patients who bear the opportunity cost than on the QALYs of the beneficiaries – this would violate horizontal equity within Alberta. Maintaining horizontal equity within both provinces requires that the optimal threshold be adopted in each province, resulting in a lower threshold in Ontario than in Alberta.

However, adopting a different set of thresholds in each province and territory *might* be perceived as a violation of horizontal equity *across* Canada. If new technologies are funded in some provinces and territories but not others, then individuals who are identical in every ethically relevant respect except for their province or territory of residence might receive differential access to health technologies, implying a differential valuation on identical benefits for otherwise identical individuals.

If this is perceived to be a violation of horizontal equity, one possible means of addressing this is to use identical thresholds across Canada – however, as noted above, this would violate horizontal equity *within* each province and territory. An alternative means of addressing this perceived violation – which would maintain horizontal equity both *within* and *across* provinces and territories – is to reallocate health care resources across Canada, such that the optimal threshold in each province and territory is identical.

Nevertheless, it is not clear that adopting different thresholds in each province and territory should necessarily be perceived as violating horizontal equity *across* Canada. Since the Canadian constitution assigns most aspects of health care as the responsibility of provinces, and since the constitution permits provinces to raise their own revenues, it is inevitable that there will be differences in the willingness and ability of provinces and territories to fund health care for otherwise identical individuals.[177] These differences were not fully addressed by the constitutional reforms of 1982, nor by transfer payments under the Canada Health Act.[10,178,179] An alternative perception might therefore be that the organization of health care in Canada reflects a vertical equity position in which the health of otherwise identical individuals in different provinces or territories may be assigned unequal value. Under this perception, using different thresholds in each province and territory does *not* necessarily violate horizontal equity *across* Canada.

The appropriate mechanism for maintaining horizontal equity both *within* and *across* provinces and territories therefore depends upon whether the health of otherwise identical individuals in different provinces or territories is assigned equal value. If so, then any differences in estimates of optimal thresholds across provinces or territories should be addressed by reallocating health care resources across Canada until these optimal thresholds equalize, at which point an *identical* threshold may be adopted in each province and territory. If not, then no reallocation of health care resources is necessary, and *different* thresholds should be used for decision making in each province and territory.

Finally, it should be noted that health budgets may be constrained not only at the provincial or territorial level, but also at a more local level. In principle, each part of a health care system that faces a budget constraint has its own set of optimal thresholds, raising potential equity issues.

For example, a rural health care centre that operates from a constrained budget might have a different set of optimal thresholds than a research hospital in an urban centre that also operates from a (different) constrained budget. If funding a net investment results in a greater opportunity cost in the rural health care centre than in the research hospital – that is, if each dollar spent on the new technology results in a greater loss in incremental benefit among other patients – then the optimal threshold for the rural health care centre is lower than for the research hospital. It follows that a new technology might be adopted by the research hospital but not by the rural health care centre. This might seem problematic if the rural community has historically worse health outcomes, since adopting a new technology only in the urban community might exacerbate health inequalities. If equalizing health outcomes across the province is a policy objective, a decision maker might be tempted to apply the same threshold across the province, or even use a higher threshold for the rural health care centre, in order to facilitate the adoption of the new technology in the rural community. However, this would be counterproductive, since funding the new technology in the rural community would result in a greater amount of forgone benefit *among other patients in the rural community* than would be provided by the new technology, worsening health outcomes even further and violating horizontal equity within the rural community.

A more appropriate response would be to acknowledge the difference in the set of optimal thresholds between the two settings. If this difference is considered to be excessive then policy makers should reallocate health care resources from the urban centre to the rural community. This would raise the optimal threshold for the rural health care centre, lower the optimal threshold for the urban research hospital, and reduce health inequalities between the two.

Final remarks

Incorporating social values into the assessment of new health technologies, while respecting the principles of horizontal and vertical equity, is not straightforward.

In the simplest case – where the decision maker adopts a vertical equity position in which benefits for all individuals are assigned the same value – maintaining horizontal equity requires consideration of the benefits forgone by other patients who bear the opportunity cost of adopting the new technology. Estimating these forgone benefits requires a ‘supply-side’ estimate of the cost-effectiveness threshold. With the exception of the UK, no empirical research has yet been conducted into supply-side thresholds in any country.

Even the most sophisticated empirical research into supply-side thresholds so far conducted – that by Claxton and colleagues – adopted a methodology which did not allow for the estimation of different thresholds for net investments and net disinvestments, nor did it allow for estimation of thresholds that are conditional upon the budget impact of the new technology.[27] Our work in Chapters 1 and 2 showed that the optimal thresholds for net investments and net disinvestments may be very different, and that optimal thresholds may also differ substantially between new technologies with large budget impact and those with small budget impact.

It follows that decision makers currently have insufficient evidence to determine whether adopting new technologies will displace more benefits than will be gained, and hence may be unaware as to whether their recommendations are consistent with the principle of horizontal equity. In the absence of empirical evidence on supply-side thresholds, decision makers also have insufficient evidence to determine whether existing allocations of health care resources across different budget holders within the same health care system are equitable. There is a clear and urgent need for further empirical research in this area, and there is also a need to develop more sophisticated methods that allow for estimation of a ‘set’ of optimal thresholds, rather than a single threshold that is assumed to apply in all cases.

In a more complex case – where the decision maker wishes to adopt an alternative vertical equity position in which benefits are valued more highly for some individuals than for others – maintaining horizontal equity requires that the decision maker understands the prevalence of those characteristics judged to be deserving of special consideration, not only among the beneficiaries of the new technology but also among those who will bear the opportunity cost.

This is necessary so that each factor which results in a greater value being assigned to the health benefits arising to the beneficiaries of a new technology may also be applied consistently to those who bear the opportunity cost. The framework we proposed in Chapter 3 provides a template for decision makers who may wish to develop such a framework in practice.

In Chapter 4, we demonstrated how the naïve use of 'threshold weights', assigned without consideration of the opportunity cost, can result in perverse outcomes, including discrimination against the very individuals whom the decision maker wishes to prioritize. This is particularly plausible if the costs associated with a new technology are met by a budget holder with responsibility for patients with specific characteristics, since the bearers of the opportunity cost are more likely to include patients with similar characteristics to the beneficiaries.

For example, suppose that a decision maker in Ontario wishes to assign greater value to health benefits in children compared to similar benefits in adults. If Sick Kids Hospital in Toronto incurs additional costs by adopting a new technology to treat a childhood illness, then the opportunity cost will likely be borne by *other* sick children whose treatment is funded from the same budget. Assessing this new technology using a relatively high cost-effectiveness threshold, on the basis that the beneficiaries are children and so their health benefits should be valued more highly, is counter-productive if it results in a *greater* amount of *forgone* health benefits among *other sick children*. The net result is worsened population health outcomes among the very individuals to whom the decision maker wishes to assign priority.

If equity is an important social value, then it is vital that social value considerations are not made in the absence of economics. Similarly, it is vital that economics is not conducted in isolation of social value considerations. Considering social values and economics within separate 'domains' – as some Canadian decision makers currently do - is conceptually simpler, but it undermines both considerations and results in an inequitable allocation of limited health care resources.

The challenge currently facing researchers and decision makers is to integrate economics and social values into a coherent framework in which opportunity cost is considered appropriately and social values are applied consistently across all individuals in society.

Bibliography for Conclusion

10. Parliament of Canada. *Canada Health Act.*; 1985.

40. Miller F, Krahn M, Brooker A. Improving the Appraisal of Non-Drug Technologies: Revising the Ontario Decision Framework. Presentation at the 2015 CADTH Symposium. 2015.

46. Sculpher M, Claxton K. Real economics needs to reflect real decisions: a response to Johnson. *PharmacoEconomics*. 2012;30(2):133–6. doi:10.2165/11596660-000000000-00000.

91. CADTH. Programs and Services. 2016.

168. Menon D, Stafinski T. Health technology assessment in Canada: 20 years strong? *Value Health*. 2009;12 Suppl 2:S14–9. doi:10.1111/j.1524-4733.2009.00554.x.

169. Health Quality Ontario. Recommendations from the Ontario Health Technology Advisory Committee. 2016.

170. CADTH. *Procedure for the CADTH Common Drug Review*. Ottawa, Canada: CADTH; 2014.

171. CADTH. *Pan-Canadian Oncology Drug Review Deliberative Framework*. Pan-Canadian Oncology Drug Review; 2011.

172. Johnson AP, Sikich NJ, Evans G, et al. Health technology assessment: a comprehensive framework for evidence-based recommendations in Ontario. *Int J Technol Assess Health Care*. 2009;25(2):141–50. doi:10.1017/S0266462309090199.

173. Medical Advisory Secretariat of the Ontario Ministry of Health and Long-Term Care. *Decision Determinants Guidance Document*.

174. Krahn, M. Developing a Values Based Framework for Decision Making in Health Technology Assessment. CADTH Lecture Series. 2015.

175. Stinnett AA, Mullahy J. Net health benefits: a new framework for the analysis of uncertainty in cost-effectiveness analysis. *Med Decis Making*. 1998;18(2 Suppl):S68–80.

176. Paulden M, O'Mahony J, McCabe C. The determinants of change in the cost-effectiveness threshold. *Medical Decision Making (forthcoming)*.

177. Parliament of the United Kingdom. *British North America Act.*; 1867.

178. Parliament of the United Kingdom. *Canada Act 1982.*; 1982.

179. Deraspe R, James. Canada Health Transfer: Equal-per-Capita Cash by 2014. 2011.

Bibliography

1. Paulden M, Stafinski T, Menon D, McCabe C. Value-based reimbursement decisions for orphan drugs: a scoping review and decision framework. *Pharmacoeconomics*. 2015;33(3):255–69. doi:10.1007/s40273-014-0235-x.
2. Paulden M, O'Mahony JF, Culyer AJ, McCabe C. Some inconsistencies in NICE's consideration of social values. *Pharmacoeconomics*. 2014;32(11):1043–53. doi:10.1007/s40273-014-0204-4.
3. Hill S, Olson L. NICE, Social Values, and Balancing Objectivity and Equity. *PharmacoEconomics*. 2014;32(11):1039–1041. doi:10.1007/s40273-014-0220-4.
4. Paulden M, O'Mahony JF, Culyer AJ, McCabe C. Objectivity and equity: clarity required. A response to Hill and Olson. *PharmacoEconomics*. 2014;32(12):1249–50. doi:10.1007/s40273-014-0239-6.
5. Boyle T. Budget will see tough decisions in health care. *Toronto Star*. April 4, 2015.
6. Galloway G. Health spending won't meet needs of aging Canadians, report warns. *The Globe and Mail*. July 2, 2015.
7. Wilton S. Long Canadian wait times send patients south for surgery. *Calgary Herald*. April 4, 2014.
8. Health Council of Canada. *Where you live matters: Canadian views on health care quality*. Health Council of Canada; 2014.
9. Palmer S, Raftery J. Economic Notes: opportunity cost. *BMJ*. 1999;318(7197):1551–2.
10. Parliament of Canada. *Canada Health Act*.; 1985.
11. O'Donnell J, Pham S, Pashos C, Miller D, Smith M. Health Technology Assessment: Lessons Learned from Around the World—An Overview. *Value Health*. 2009;12(s2):S1–S5. doi:10.1111/j.1524-4733.2009.00550.x.
12. Drummond MF, Sculpher MJ, Claxton K, Stoddart GL, Torrance GW. *Methods for the economic evaluation of health care programmes*. 4th ed. Oxford University Press; 2015.
13. World Health Organization. *2015 Global Survey on Health Technology Assessment by National Authorities*. Geneva: World Health Organization; 2015.
14. National Institute for Health and Care Excellence. *Guide to the methods of technology appraisal 2013*.; 2013.

15. Canadian Agency for Drugs and Technologies in Health. *Guidelines for the Economic Evaluation of Health Technologies: Canada*.; 2006.

16. Stephens JM, H B, D JA. International survey of methods used in health technology assessment (HTA): does practice meet the principles proposed for good research? *Comparative Effectiveness Research*. 2012;(2):29–44.

17. Mathes T, Jacobs E, Morfeld J-C, Pieper D. Methods of international health technology assessment agencies for economic evaluations- a comparative analysis. *Bmc Health Serv Res*. 2013;13(1):1–10. doi:10.1186/1472-6963-13-371.

18. Pliskin J, Shepard D, Weinstein M. Utility Functions for Life Years and Health Status. *Oper Res*. 1980;28(1):206–224. doi:10.1287/opre.28.1.206.

19. Black RC. "utility". The New Palgrave Dictionary of Economics. 2008.

20. Hicks JR, Allen RG. A Reconsideration of the Theory of Value. Part I. *Economica*. 1934;1(1):52–76.

21. Weinstein M, Zeckhauser R. Critical ratios and efficient allocation. *J Public Econ*. 1973;2(2):147–157. doi:10.1016/0047-2727(73)90002-9.

22. Centre for Health Economics. *iDSI Workshop on Cost-Effectiveness Thresholds: Conceptualisation and Estimation*. University of York; 2015.

23. Gyrd-Hansen D. Willingness to pay for a QALY: theoretical and methodological issues. *Pharmacoeconomics*. 2005;23(5):423–32.

24. Dolan P, Shaw R, Tsuchiya A, Williams A. QALY maximisation and people's preferences: a methodological review of the literature. *Health Econ*. 2005;14(2):197–208. doi:10.1002/hec.924.

25. Paulden M, Claxton K. Budget allocation and the revealed social rate of time preference for health. *Health Econ*. 2012;21(5):612–8. doi:10.1002/hec.1730.

26. Claxton K, Paulden M, Gravelle H, Brouwer W, Culyer AJ. Discounting and decision making in the economic evaluation of health-care technologies. *Health Economics*. 2011;20(1):2–15. doi:10.1002/hec.1612.

27. Claxton K, Martin S, Soares M, et al. Methods for the estimation of the National Institute for Health and Care Excellence cost-effectiveness threshold. *Health Technology Assessment*. 2015;19(14):1–503, v–vi. doi:10.3310/hta19140.

28. Gafni A, Birch S. Incremental cost-effectiveness ratios (ICERs): The silence of the lambda. *Soc Sci Med*. 2006;62(9):2091–2100. doi:10.1016/j.socscimed.2005.10.023.

29. Appleby J, Devlin N, Parkin D, Buxton M, Chalkidou K. Searching for cost effectiveness thresholds in the NHS. *Health Policy*. 2009;91(3):239–45. doi:10.1016/j.healthpol.2008.12.010.

30. Schaffer S, Sussex J, Devlin N, Walker A. Local health care expenditure plans and their opportunity costs. *Health Policy*. 2015;119(9):1237–1244. doi:10.1016/j.healthpol.2015.07.007.

31. Laupacis A, Feeny D, Detsky AS, Tugwell PX. How attractive does a new technology have to be to warrant adoption and utilization? Tentative guidelines for using clinical and economic evaluations. *CMAJ*. 1992;146(4):473–81. Available at: http://europepmc.org/abstract/MED/1306034.

32. Neumann P, Cohen J, Weinstein M. Updating Cost-Effectiveness — The Curious Resilience of the $50,000-per-QALY Threshold. *New Engl J Medicine*. 2014;371(9):796–797. doi:10.1056/NEJMp1405158.

33. DeJean D, Giacomini M, Schwartz L, Miller FA. Ethics in Canadian health technology assessment: a descriptive review. *Int J Technol Assess Health Care*. 2009;25(4):463–9. doi:10.1017/S0266462309990390.

34. National Institute for Health and Care Excellence. Citizens Council. 2016.

35. Citizens Council. *Should NICE and its advisory bodies take into account the severity of a disease when making decisions?* National Institute for Health and Care Excellence; 2008.

36. Citizens Council. *Are there circumstances in which the age of a person should be taken into account when NICE is making a decision about how treatments should be used in the NHS?* National Institute for Health and Care Excellence; 2002.

37. Citizens Council. *NICE's Citizens Council were asked to advise on whether or not the NHS should be prepared to pay premium prices for drugs to treat patients with very rare diseases.* . National Institute for Health and Care Excellence; 2004.

38. Citizens Council. *Is there a preference to save the life of people in imminent danger of dying?* National Institute for Health and Care Excellence; 2006.

39. Citizens Council. *What are the societal values that need to be considered when making decisions about trade-offs between equity and efficiency?* National Institute for Health and Care Excellence; 2014.

40. Miller F, Krahn M, Brooker A. Improving the Appraisal of Non-Drug Technologies: Revising the Ontario Decision Framework. Presentation at the 2015 CADTH Symposium. 2015.
41. Duclos. Horizontal and Vertical Equity. The New Palgrave Dictionary of Economics. In: 2nd Edition, 2012 Version. Palgrave Macmillan; 2016.
42. Musgrave A, Musgrave PB. *Public Finance in Theory and Practice*. New York: McGraw-Hill; 1976.
43. Culyer AJ. Need: The idea won't do—But we still need it. *Soc Sci Med*. 1995;40(6):727–730. doi:10.1016/0277-9536(94)00307-F.
44. Culyer A. Equity - some theory and its policy implications. *J Med Ethics*. 2001;27(4):275–283. doi:10.1136/jme.27.4.275.
45. Claxton K, Walker S, Palmer S, Sculpher M. *Appropriate Perspectives for Health Care Decisions*. York, UK: University of York
46. Sculpher M, Claxton K. Real economics needs to reflect real decisions: a response to Johnson. *PharmacoEconomics*. 2012;30(2):133–6. doi:10.2165/11596660-000000000-00000.
47. Brouwer W, Culyer A, Exel J van, Rutten F. Welfarism vs. extra-welfarism. *J Health Econ*. 2008;27(2):325–338. doi:10.1016/j.jhealeco.2007.07.003.
48. Brouwer WB, Koopmanschap MA. On the economic foundations of CEA. Ladies and gentlemen, take your positions! *J Health Econ*. 2000;19(4):439–59.
49. Coast J, Smith R, Lorgelly P. Welfarism, extra-welfarism and capability: The spread of ideas in health economics. *Soc Sci Med*. 2008;67(7):1190–1198. doi:10.1016/j.socscimed.2008.06.027.
50. Birch S, Donaldson C. Valuing the benefits and costs of health care programmes: where's the "extra" in extra-welfarism? *Soc Sci Med*. 2003;56(5):1121–1133. doi:10.1016/S0277-9536(02)00101-6.
51. Buchanan J, Wordsworth S. Welfarism Versus Extra-Welfarism: Can the Choice of Economic Evaluation Approach Impact on the Adoption Decisions Recommended by Economic Evaluation Studies? *Pharmacoeconomics*. 2015;33(6):571–579. doi:10.1007/s40273-015-0261-3.
52. Arrow KJ. A Difficulty in the Concept of Social Welfare. *Journal of Political Economy*. 1950;58(4):328–346. doi:10.1086/256963.

53. Sen A. The Impossibility of a Paretian Liberal. *J Polit Econ*. 1970;78(1):152–157. doi:10.1086/259614.

54. Sugden R, Williams A. *The Principles of Practical Cost-Benefit Analysis*. Oxford University Press; 1978.

55. Culyer A, McCabe C, Briggs A, et al. Searching for a threshold, not setting one: the role of the National Institute for Health and Clinical Excellence. *Journal of health services research & policy*. 2007;12(1):56–8. doi:10.1258/135581907779497567.

56. Shah, Praet, Devlin, Sussex, Appleby, Parkin. Is the aim of the English health care system to maximize QALYs? *Journal of Health Services Research & Policy*. 2012;17(3):157–163. doi:10.1258/jhsrp.2012.011098.

57. Coast J. Maximisation in extra-welfarism: A critique of the current position in health economics. *Soc Sci Med*. 2009;69(5):786–792. doi:10.1016/j.socscimed.2009.06.026.

58. Dolan P. Modeling valuations for EuroQol health states. *Med Care*. 1997;35(11):1095–108.

59. Paulden M. Time Preference and Discounting. Encyclopedia of Health Economics. In: Elsevier; 2014:395–403. doi:10.1016/B978-0-12-375678-7.00506-X.

60. McCabe C, Claxton K, Culyer A. The NICE Cost-Effectiveness Threshold: What it is and What that Means. *PharmacoEconomics*. 2008;26(9):733–744. doi:10.2165/00019053-200826090-00004.

61. Gold MR, Siegel JE, Russell LB, Weinstein MC. *Cost-effectiveness in health and medicine*. New York: Oxford University Press; 1996.

62. Edlin R, McCabe C, Hulme C, Hall P, Wright J. *Cost E_ffectiveness Modelling for Health Technology Assessment: A Practical Course*. Springer; 2015.

63. Eckermann S, Pekarsky B. Can the Real Opportunity Cost Stand Up: Displaced Services, the Straw Man Outside the Room. *PharmacoEconomics*. 2014. doi:10.1007/s40273-014-0140-3.

64. Paulden M, McCabe C, Karnon J. Achieving allocative efficiency in healthcare: nice in theory, not so NICE in Practice? *Pharmacoeconomics*. 2014;32(4):315–8. doi:10.1007/s40273-014-0146-x.

65. Eckermann S. Kinky Thresholds Revisited: Opportunity Costs Differ in the NE and SW Quadrants. *Appl Heal Econ Heal Policy*. 2015;13(1):7–13. doi:10.1007/s40258-014-0136-3.

66. McCabe C, Claxton K, Tsuchiya A. Orphan drugs and the NHS: should we value rarity. *BMJ*. 2005;331(7523):1016–9.

67. Pinxten W, Denier Y, Dooms M, Cassiman J-JJ, Dierickx K. A fair share for the orphans: ethical guidelines for a fair distribution of resources within the bounds of the 10-year-old European Orphan Drug Regulation. *J Med Ethics*. 2012;38(3):148–53. doi:10.1136/medethics-2011-100094.

68. Clarke J. Is the current approach to reviewing new drugs condemning the victims of rare diseases to death? A call for a national orphan drug review policy. *Can Med Assoc J*. 2006;174(2):189–190. doi:10.1503/cmaj.050706.

69. Birch S, Gafni A. Changing the problem to fit the solution: Johannesson and Weinstein's (mis) application of economics to real world problems. *J Health Econ*. 1993;12(4):469–76.

70. Johannesson M, Weinstein MC. On the decision rules of cost-effectiveness analysis. *J Health Econ*. 1993;12(4):459–67.

71. Garber AM, Phelps CE. Economic foundations of cost-effectiveness analysis. *J Health Econ*. 1997;16(1):1–31.

72. McCabe C, Claxton K, Culyer AJ. The NICE cost-effectiveness threshold: what it is and what that means. *Pharmacoeconomics*. 2008;26(9):733–44.

73. Claxton K, Sculpher M, Drummond M. A rational framework for decision making by the National Institute For Clinical Excellence (NICE). *The Lancet*. 2002;360(9334):711–5. doi:10.1016/s0140-6736(02)09832-x.

74. Birch S, Gafni A. Cost effectiveness/utility analyses. *Journal of Health Economics*. 1992;11(3):279–296. doi:10.1016/0167-6296(92)90004-K.

75. Birch S, Gafni A. Economics and the evaluation of health care programmes: generalisability of methods and implications for generalisability of results. *Health policy*. 2003;64(2):207–219. Available at: http://www.sciencedirect.com/science/article/pii/S0168851002001823.

76. Birch S, Gafni A. Cost effectiveness/utility analyses: Do current decision rules lead us to where we want to be? *Journal of health economics*. 1992. Available at: http://www.sciencedirect.com/science/article/pii/016762969290004K.

77. Birch S, Gafni A. Information created to evade reality (ICER): things we should not look to for answers. *PharmacoEconomics*. 2006;24(11):1121–31.

78. Epstein DM, Chalabi Z, Claxton K, Sculpher M. Efficiency, equity, and budgetary policies: informing decisions using mathematical programming. *Med Decis Making*. 2007;27(2):128–37. doi:10.1177/0272989X06297396.

79. Pekarsky B. Trust, constraints and the counterfactual: Reframing the political economy of new drugs. doi:10.1007/978-3-319-08903-4_3.

80. O'Brien BJ, Gertsen K, Willan AR, Faulkner LA. Is there a kink in consumers' threshold value for cost-effectiveness in health care? *Health Econ*. 2002;11(2):175–80.

81. Willan AR, O'Brien BJ, Leyva RA. Cost-effectiveness analysis when the WTA is greater than the WTP. *Stat Med*. 2001;20(21):3251–9.

82. National Institute for Health and Care Excellence. *Consultation Paper: Value Based Assessment of Health Technologies*.; 2014.

83. National Institute for Health and Care Excellence. *Discounting of health benefits in special circumstances*.; 2011.

84. National Institute for Health and Care Excellence. *Appraising life-extending, end of life treatments*.; 2009.

85. Harris J. NICE and not so nice. *Journal of Medical Ethics*. 2005;31(12):685–688. doi:10.1136/jme.2005.014134.

86. R Core Team. R: A language and environment for statistical computing. 2016.

87. Borchers H. adagio: Discrete and Global Optimization Routines. 2015.

88. Kellerer, Ulrich. *Knapsack Problems*. 1st ed. Berlin: Springer-Verlag Berlin Heidelberg; 2004:548.

89. Garner S, Littlejohns P. Disinvestment from low value clinical interventions: NICEly done? *BMJ (Clinical research ed)*. 2011;343:d4519.

90. Klein R. *The New Politics of the NHS: From Creation to Reinvention*. 6th Revised Edition. Radcliffe Publishing Ltd; 2010.

91. CADTH. Programs and Services. 2016.

92. Haffner ME. Adopting orphan drugs--two dozen years of treating rare diseases. *N Engl J Med*. 2006;354(5):445–7. doi:10.1056/NEJMp058317.

93. Braun MM, Farag-El-Massah S, Xu K, Coté TR. Emergence of orphan drugs in the United States: a quantitative assessment of the first 25 years. *Nat Rev Drug Discov*. 2010;9(7):519–22. doi:10.1038/nrd3160.

94. Dunoyer M. Accelerating access to treatments for rare diseases. *Nature Reviews Drug Discovery*. 2011. doi:10.1038/nrd3493.

95. Food and Drug Administration. Developing Products for Rare Diseases & Conditions. 2016.

96. Food and Drug Administration. Orphan Drug Regulations. *Federal Register*. 2013;78(113):35117–35135.

97. Salari K, Watkins H, Ashley EA. Personalized medicine: hope or hype? *Eur Heart J*. 2012;33(13):1564–70. doi:10.1093/eurheartj/ehs112.

98. Reeves A, McKee M, Basu S, Stuckler D. The political economy of austerity and healthcare: cross-national analysis of expenditure changes in 27 European nations 1995-2011. *Health Policy*. 2014;115(1):1–8. doi:10.1016/j.healthpol.2013.11.008.

99. Stafinski T. Role of centralized review processes for making reimbursement decisions on new health technologies in Europe. *ClinicoEconomics and Outcomes Research*. 2011:117. doi:10.2147/CEOR.S14407.

100. Stafinski T, Menon D, Philippon DJ, McCabe C. Health technology funding decision-making processes around the world: the same, yet different. *Pharmacoeconomics*. 2011;29(6):475–95. doi:10.2165/11586420-000000000-00000.

101. Simoens S. Pricing and reimbursement of orphan drugs: the need for more transparency. *Orphanet J Rare Dis*. 2011;6:42. doi:10.1186/1750-1172-6-42.

102. Drummond M, Towse A. Orphan drugs policies: a suitable case for treatment. *The European Journal of Health Economics*. 2014. doi:10.1007/s10198-014-0560-1.

103. Stafinski T, Menon D, McCabe C, Philippon DJ. To fund or not to fund: development of a decision-making framework for the coverage of new health technologies. *Pharmacoeconomics*. 2011;29(9):771–80. doi:10.2165/11539840-000000000-00000.

104. Schey C, Milanova T, Hutchings A. Estimating the budget impact of orphan medicines in Europe: 2010 - 2020. *Orphanet Journal of Rare Diseases*. 2011;6(1):62. doi:10.1186/1750-1172-6-62.

105. Hutchings A, Schey C, Dutton R, Achana F, Antonov K. Estimating the budget impact of orphan drugs in Sweden and France 2013-2020. *Orphanet J Rare Dis*. 2014;9:22. doi:10.1186/1750-1172-9-22.

106. Hughes-Wilson W, Palma A, Schuurman A, Simoens S. Paying for the Orphan Drug System: break or bend? Is it time for a new evaluation system for payers in Europe to take account of new rare disease treatments? *Orphanet J Rare Dis*. 2012;7:74. doi:10.1186/1750-1172-7-74.

107. Mays N, Roberts E, Popay J. Synthesising research evidence. In: Routledge London; 2001:188–220.

108. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *BMJ*. 2009;339:b2535.

109. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*. 2005;8(1):19–32. doi:10.1080/1364557032000119616.

110. PRISM Group. Promoting rare-disease innovations through sustainable mechanisms. 2014.

111. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: ; 2002.

112. Pawson. Evidence-based Policy: In Search of a Method. *Evaluation*. 2002;8(2):157–181. doi:10.1177/1358902002008002512.

113. Bryman, Burgess. *Analyzing qualitative data*.; 1994. doi:10.4324/9780203413081.

114. Oliver S. Making research more useful: integrating different perspectives and different methods. 2001. Available at: http://eprints.ioe.ac.uk/id/eprint/5142.

115. Barrett PM, Alagely A, Topol EJ. Cystic fibrosis in an era of genomically guided therapy. *Hum Mol Genet*. 2012;21(R1):R66–71. doi:10.1093/hmg/dds345.

116. Winquist E, Bell CM, Clarke JT, et al. An evaluation framework for funding drugs for rare diseases. *Value Health*. 2012;15(6):982–6. doi:10.1016/j.jval.2012.06.009.

117. Wild C, Hintringer K, Nachtnebel A. Orphan drugs in oncology. *Pharmaceuticals, Policy and Law*. 2011;13(3,4):223–232. doi:10.3233/PPL-2011-0327.

118. Valverde J-L, Prevot. Editorial. *Pharmaceuticals Policy and Law*. 2011;13(3,4):115–116. doi:10.3233/PPL-2011-0317.

119. Sullivan SD. The promise of specialty pharmaceuticals: are they worth the price? *J Manag Care Pharm*. 2008;14(4 Suppl):S3–6.

120. Stolk P, Willemen MJ, Leufkens HG. Rare essentials: drugs for rare diseases as essential medicines. *Bull World Health Organ*. 2006;84(9):745–51.

121. Siddiqui M, Rajkumar SV. The high cost of cancer drugs and what we can do about it. *Mayo Clin Proc*. 2012;87(10):935–43. doi:10.1016/j.mayocp.2012.07.007.

122. Prevot J, Watters D. HTA's and access to rare diseases therapies: The view from the PID community. *Pharmaceuticals*. 2011. Available at: http://content.iospress.com/articles/pharmaceuticals-policy-and-law/ppl00322.

123. Picavet E, Cassiman D, Simoens S. Evaluating and improving orphan drug regulations in Europe: a Delphi policy study. *Health Policy*. 2012;108(1):1–9. doi:10.1016/j.healthpol.2012.08.023.

124. Picavet E, Dooms M, Cassiman D, Simoens S. Drugs for rare diseases: influence of orphan designation status on price. *Appl Health Econ Health Policy*. 2011;9(4):275–9. doi:10.2165/11590170-000000000-00000.

125. Owen A, Spinks J, Meehan A, et al. A new model to evaluate the long-term cost effectiveness of orphan and highly specialised drugs following listing on the Australian Pharmaceutical Benefits Scheme: the Bosentan Patient Registry. *J Med Econ*. 2008;11(2):235–43. doi:10.3111/13696990802034525.

126. Moberly T. Rationing and access to orphan drugs. *Pharmaceutical journal*. 2005;275(7374):569–570.

127. Michel M, Toumi M. Access to orphan drugs in Europe: current and future issues. *Expert Rev Pharmacoecon Outcomes Res*. 2012;12(1):23–9. doi:10.1586/erp.11.95.

128. Mentzakis E, Stefanowska P, Hurley J. A discrete choice experiment investigating preferences for funding drugs used to treat orphan diseases: an exploratory study. *Health Econ Policy Law*. 2011;6(3):405–33. doi:10.1017/S1744133110000344.

129. Meekings KN, Williams CS, Arrowsmith JE. Orphan drug development: an economically viable strategy for biopharma R&D. *Drug Discov Today*. 2012;17(13-14):660–4. doi:10.1016/j.drudis.2012.02.005.

130. McCabe C, Stafinski T, Menon D. Is it time to revisit orphan drug policies? *BMJ*. 2010;341:c4777.

131. Mavris M, Cam Y Le. Involvement of patient organisations in research and development of orphan drugs for rare diseases in europe. *Mol Syndromol*. 2012;3(5):237–43. doi:10.1159/000342758.

132. Matthews, Glass. The Effect of Market-Based Economic Factors on the Adoption of Orphan Drugs Across Multiple Countries. *Therapeutic Innovation & Regulatory Science*. 2013;47(2):226–234. doi:10.1177/2168479012471945.

133. Luisetti M, Balfour-Lynn IM, Johnson SR, et al. Perspectives for improving the evaluation and access of therapies for rare lung diseases in Europe. *Respir Med*. 2012;106(6):759–68. doi:10.1016/j.rmed.2012.02.016.

134. Liang BA, Mackey T. Health care policy. Reforming off-label promotion to enhance orphan disease treatment. *Science*. 2010;327(5963):273–4. doi:10.1126/science.1181567.

135. Laupacis A. Evidence and values: requirements for public reimbursement of drugs for rare diseases - a case study in oncology - Reply. *Canandian Journal of Clinical Pharmacology*. 2009;16(2):e282–4.

136. Largent EA, Pearson SD. Which orphans will find a home? The rule of rescue in resource allocation for rare diseases. *Hastings Cent Rep*. 2012;42(1):27–34.

137. Kesselheim AS, Myers JA, Avorn J. Characteristics of clinical trials to support approval of orphan vs nonorphan drugs for cancer. *JAMA*. 2011;305(22):2320–6. doi:10.1001/jama.2011.769.

138. Kanavos P, Nicod E. What is wrong with orphan drug policies? Suggestions for ways forward. *Value Health*. 2012;15(8):1182–4. doi:10.1016/j.jval.2012.08.2202.

139. Joppi R, Bertele' V, Garattini S. Orphan drugs, orphan diseases. The first decade of orphan drug legislation in the EU. *Eur J Clin Pharmacol*. 2013;69(4):1009–24. doi:10.1007/s00228-012-1423-2.

140. Hutchings A, Ethgen O, Schmitt C, Rollet P. Defining Elements of Value for Rare Disease Treatments. *Value in Health*. 2012;15(4):A31. doi:10.1016/j.jval.2012.03.176.

141. Hughes DA. Drugs for exceptionally rare diseases: do they deserve special status for funding? *QJM*. 2005;98(11):829–836. doi:10.1093/qjmed/hci128.

142. Gupta S. Rare diseases: Canada's "research orphans." *Open Medicine*. 2012. Available at: http://www.openmedicine.ca/article/viewArticle/482/451.

143. Garattini S. Time to revisit the orphan drug law. *Eur J Clin Pharmacol*. 2012;68(2):113. doi:10.1007/s00228-011-1115-3.

144. Drummond MF, Wilson DA, Kanavos P, Ubel P, Rovira J. Assessing the economic challenges posed by orphan drugs. *Int J Technol Assess Health Care*. 2007;23(1):36–42. doi:10.1017/S0266462307051550.

145. Drakulich A. Global Healthcare on the Ground: NIH Aims to Help Treat 200 Rare Diseases. *Pharmaceutical Technology*. 2011;35(8).

146. Dickson PI, Pariser AR, Groft SC, et al. Research challenges in central nervous system manifestations of inborn errors of metabolism. *Mol Genet Metab*. 2011;102(3):326–38. doi:10.1016/j.ymgme.2010.11.164.

147. Desser AS. Prioritizing treatment of rare diseases: a survey of preferences of Norwegian doctors. *Social Science & Medicine*. 2013. Available at: http://www.sciencedirect.com/science/article/pii/S027795361300350X.

148. Denis A, Mergaert L, Fostier C, Cleemput I, Simoens S. Budget impact analysis of orphan drugs in Belgium: estimates from 2008 to 2013. *J Med Econ*. 2010;13(2):295–301. doi:10.3111/13696998.2010.491427.

149. Claxton K, Lindsay A, Buxton M, et al. Value based pricing for NHS drugs: an opportunity not to be missed? *BMJ: British Medical Journal*. 2008;336(7638):251–254. doi:10.2307/20508852.

150. Clarke J, Bell C, Coyle D, et al. A policy framework for funding drugs for rare diseases. *Value in Health*. 2009;12(7):A243. doi:10.1016/S1098-3015(10)74186-3.

151. Claxton K, Martin S, Soares M, et al. Methods for the Estimation of the NICE Cost Effectiveness Threshold. *CHE Research Paper 81*. 2013.

152. Endrei D, Molics B, Ágoston I. Multicriteria decision analysis in the reimbursement of new medical technologies: real-world experiences from Hungary. *Value in Health*. 2014. Available at: http://www.ajicjournal.org/article/S1098-3015(14)00046-1/abstract.

153. Mitton C, Dionne F, Damji R, Campbell D, Bryan S. Difficult decisions in times of constraint: criteria based resource allocation in the Vancouver Coastal Health Authority. *BMC Health Serv Res*. 2011;11:169. doi:10.1186/1472-6963-11-169.

154. Sussex J, Rollet P, Garau M, Schmitt C, Kent A, Hutchings A. A pilot study of multicriteria decision analysis for valuing orphan medicines. *Value Health*. 2013;16(8):1163–9. doi:10.1016/j.jval.2013.10.002.

155. Linley WG, Hughes DA. Societal views on NICE, cancer drugs fund and value-based pricing criteria for prioritising medicines: a cross-sectional survey of 4118 adults in Great Britain. *Health Econ*. 2013;22(8):948–64. doi:10.1002/hec.2872.

156. National Institute for Health and Care Excellence. Methods of Technology Appraisal Consultation. 2014.

157. Secretary of State for Health. *The Government's Response to the Health Select Committee's Eighth Report of Session 2012-13 on the National Institute for Health and Clinical Excellence*.; 2013.

158. Stolk EA, Donselaar G van, Brouwer WB, Busschbach JJ. Reconciliation of economic concerns and health policy: illustration of an equity adjustment procedure using proportional shortfall. *Pharmacoeconomics*. 2004;22(17):1097–107.

159. Office of Health Economics. *Clarifying meanings of absolute and proportional shortfall with examples*.; 2013.

160. O'Mahony JF, Paulden M. NICE's selective application of differential discounting: ambiguous, inconsistent, and unjustified. *Value Health*. 2014;17(5):493–6. doi:10.1016/j.jval.2013.02.014.

161. National Institute for Health and Care Excellence. *Guide to the methods of technology appraisal 2008*.; 2008.

162. Paulden M, Culyer AJ. Does cost-effectiveness analysis discriminate against patients with short life expectancy? Matters of logic and matters of context. *CHE Research Paper 55*. 2010.

163. Seshamani M, Gray AM. A longitudinal study of the effects of age and time to death on hospital costs. *J Health Econ*. 2004;23(2):217–35. doi:10.1016/j.jhealeco.2003.08.004.

164. Kasteridis P, Street A, Dolman M, et al. The Importance of Multimorbidity in Explaining Utilisation and Costs Across Health and Social Care Settings: Evidence from South Somerset's Symphony Project. *CHE Research Paper 96*. 2014.

165. Claxton K, Sculpher M, Culyer A, McCabe C. Discounting and cost-effectiveness in NICE–stepping back to sort out a confusion. *Health Economics*. 2006;15(1):1–4. doi:10.1002/hec.1081.

166. Raftery. Value based pricing: can it work? *BMJ*. 2013;347(oct11 3):f5941–f5941. doi:10.1136/bmj.f5941.

167. Department of Health. NHS Constitution for England. 2013.

168. Menon D, Stafinski T. Health technology assessment in Canada: 20 years strong? *Value Health*. 2009;12 Suppl 2:S14–9. doi:10.1111/j.1524-4733.2009.00554.x.

169. Health Quality Ontario. Recommendations from the Ontario Health Technology Advisory Committee. 2016.

170. CADTH. *Procedure for the CADTH Common Drug Review*. Ottawa, Canada: CADTH; 2014.

171. CADTH. *Pan-Canadian Oncology Drug Review Deliberative Framework*. Pan-Canadian Oncology Drug Review; 2011.

172. Johnson AP, Sikich NJ, Evans G, et al. Health technology assessment: a comprehensive framework for evidence-based recommendations in Ontario. *Int J Technol Assess Health Care*. 2009;25(2):141–50. doi:10.1017/S0266462309090199.

173. Medical Advisory Secretariat of the Ontario Ministry of Health and Long-Term Care. *Decision Determinants Guidance Document*.

174. Krahn, M. Developing a Values Based Framework for Decision Making in Health Technology Assessment. CADTH Lecture Series. 2015.

175. Stinnett AA, Mullahy J. Net health benefits: a new framework for the analysis of uncertainty in cost-effectiveness analysis. *Med Decis Making*. 1998;18(2 Suppl):S68–80.

176. Paulden M, O'Mahony J, McCabe C. The determinants of change in the cost-effectiveness threshold. *Medical Decision Making (forthcoming)*.

177. Parliament of the United Kingdom. *British North America Act*.; 1867.

178. Parliament of the United Kingdom. *Canada Act 1982*.; 1982.

179. Deraspe R, James. Canada Health Transfer: Equal-per-Capita Cash by 2014. 2011.

Appendices

Appendix 1 (Chapter 1)

Appendix 1.1: Reallocation tables and optimal sets of cost-effectiveness thresholds

Table A1.1.1: Reallocation following net investment (divisibility and constant returns)

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$0.1m	R	-2.5	$40,758	-2.5	$40,758	O	-3.6	$27,938	-3.6	$27,938	Q	-2.1	$48,185	-2.1	$48,185
$0.2m	R	-2.5	$40,758	-4.9	$40,758	O	-3.6	$27,938	-7.2	$27,938	Q	-2.1	$48,185	-4.2	$48,185
$0.3m	R	-2.5	$40,758	-7.4	$40,758	O	-3.6	$27,938	-10.7	$27,938	Q	-2.1	$48,185	-6.2	$48,185
$0.4m	R	-2.5	$40,758	-9.8	$40,758	O	-3.6	$27,938	-14.3	$27,938	Q	-2.1	$48,185	-8.3	$48,185
$0.5m	R	-2.5	$40,758	-12.3	$40,758	O	-3.6	$27,938	-17.9	$27,938	Q	-2.1	$48,185	-10.4	$48,185
$0.6m	R	-2.5	$40,758	-14.7	$40,758	O	-3.6	$27,938	-21.5	$27,938	Q	-2.1	$48,185	-12.5	$48,185
$0.7m	R	-2.5	$40,758	-17.2	$40,758	O	-3.6	$27,938	-25.1	$27,938	Q	-2.1	$48,185	-14.5	$48,185
$0.8m	R	-2.5	$40,758	-19.6	$40,758	O	-3.6	$27,938	-28.6	$27,938	Q	-2.1	$48,185	-16.6	$48,185
$0.9m	R	-2.5	$40,758	-22.1	$40,758	O	-3.6	$27,938	-32.2	$27,938	Q	-2.1	$48,185	-18.7	$48,185
$1.0m	R	-2.5	$40,758	-24.5	$40,758	O	-3.6	$27,938	-35.8	$27,938	Q	-2.1	$48,185	-20.8	$48,185
$1.1m	R	-2.5	$40,758	-27.0	$40,758	O	-3.6	$27,938	-39.4	$27,938	Q	-2.1	$48,185	-22.8	$48,185
$1.2m	R	-2.5	$40,758	-29.4	$40,758	O	-3.6	$27,938	-43.0	$27,938	Q	-2.1	$48,185	-24.9	$48,185
$1.3m	R	-2.5	$40,758	-31.9	$40,758	O	-3.6	$27,938	-46.5	$27,938	Q	-2.1	$48,185	-27.0	$48,185
$1.4m	R	-2.5	$40,758	-34.3	$40,758	O	-3.6	$27,938	-50.1	$27,938	Q	-2.1	$48,185	-29.1	$48,185
$1.5m	R	-2.5	$40,758	-36.8	$40,758	O	-3.6	$27,938	-53.7	$27,938	Q	-2.1	$48,185	-31.1	$48,185
$1.6m	R	-2.5	$40,758	-39.3	$40,758	O	-3.6	$27,938	-57.3	$27,938	Q	-2.1	$48,185	-33.2	$48,185
$1.7m	R	-2.5	$40,758	-41.7	$40,758	O	-3.6	$27,938	-60.8	$27,938	Q	-2.1	$48,185	-35.3	$48,185
$1.8m	R	-2.5	$40,758	-44.2	$40,758	O	-3.6	$27,938	-64.4	$27,938	Q	-2.1	$48,185	-37.4	$48,185
$1.9m	R	-2.5	$40,758	-46.6	$40,758	O	-3.6	$27,938	-68.0	$27,938	Q	-2.1	$48,185	-39.4	$48,185
$2.0m	R	-2.5	$40,758	-49.1	$40,758	O	-3.6	$27,938	-71.6	$27,938	Q	-2.1	$48,185	-41.5	$48,185
$2.1m	R	-2.5	$40,758	-51.5	$40,758	O	-3.6	$27,938	-75.2	$27,938	Q	-2.1	$48,185	-43.6	$48,185
$2.2m	R	-2.5	$40,758	-54.0	$40,758	O	-3.6	$27,938	-78.7	$27,938	Q	-2.1	$48,185	-45.7	$48,185
$2.3m	R	-2.5	$40,758	-56.4	$40,758	O	-3.6	$27,938	-82.3	$27,938	Q	-2.1	$48,185	-47.7	$48,185
$2.4m	R	-2.5	$40,758	-58.9	$40,758	O	-3.6	$27,938	-85.9	$27,938	Q	-2.1	$48,185	-49.8	$48,185
$2.5m	R	-2.5	$40,758	-61.3	$40,758	O	-3.6	$27,938	-89.5	$27,938	Q	-2.1	$48,185	-51.9	$48,185
$2.6m	R	-2.5	$40,758	-63.8	$40,758	O	-3.6	$27,938	-93.1	$27,938	Q	-2.1	$48,185	-54.0	$48,185
$2.7m	R	-2.5	$40,758	-66.2	$40,758	O	-3.6	$27,938	-96.6	$27,938	Q	-2.1	$48,185	-56.0	$48,185
$2.8m	R	-2.5	$40,758	-68.7	$40,758	O	-3.6	$27,938	-100.2	$27,938	Q	-2.1	$48,185	-58.1	$48,185
$2.9m	R	-2.5	$40,758	-71.2	$40,758	O	-3.6	$27,938	-103.8	$27,938	Q	-2.1	$48,185	-60.2	$48,185
$3.0m	R	-2.5	$40,758	-73.6	$40,758	O	-3.6	$27,938	-107.4	$27,938	Q	-2.1	$48,185	-62.3	$48,185
$3.1m	R	-2.5	$40,758	-76.1	$40,758	O	-3.6	$27,938	-111.0	$27,938	Q	-2.1	$48,185	-64.3	$48,185
$3.2m	R	-2.5	$40,758	-78.5	$40,758	O	-3.6	$27,938	-114.5	$27,938	Q	-2.1	$48,185	-66.4	$48,185
$3.3m	R	-2.5	$40,758	-81.0	$40,758	O	-3.6	$27,938	-118.1	$27,938	Q	-2.1	$48,185	-68.5	$48,185
$3.4m	R	-2.5	$40,758	-83.4	$40,758	O	-3.6	$27,938	-121.7	$27,938	Q	-2.1	$48,185	-70.6	$48,185
$3.5m	R	-2.5	$40,758	-85.9	$40,758	O	-3.6	$27,938	-125.3	$27,938	Q	-2.1	$48,185	-72.6	$48,185
$3.6m	R	-2.5	$40,758	-88.3	$40,758	O	-3.6	$27,938	-128.9	$27,938	Q	-2.1	$48,185	-74.7	$48,185
$3.7m	R	-2.5	$40,758	-90.8	$40,758	O	-3.6	$27,938	-132.4	$27,938	Q	-2.1	$48,185	-76.8	$48,185
$3.8m	R	-2.5	$40,758	-93.2	$40,758	O	-3.6	$27,938	-136.0	$27,938	Q	-2.1	$48,185	-78.9	$48,185
$3.9m	R	-2.5	$40,758	-95.7	$40,758	O	-3.6	$27,938	-139.6	$27,938	Q	-2.1	$48,185	-80.9	$48,185
$4.0m	R	-2.5	$40,758	-98.1	$40,758	O	-3.6	$27,938	-143.2	$27,938	Q	-2.1	$48,185	-83.0	$48,185
$4.1m	R	-2.5	$40,757	-100.6	$40,758	O	-3.6	$27,938	-146.8	$27,938	Q	-2.1	$48,185	-85.1	$48,185
$4.2m	R	-2.5	$40,758	-103.0	$40,758	O	-3.6	$27,938	-150.3	$27,938	Q	-2.1	$48,185	-87.2	$48,185
$4.3m	R	-2.5	$40,758	-105.5	$40,758	O	-3.6	$27,938	-153.9	$27,938	Q	-2.1	$48,185	-89.2	$48,185
$4.4m	R	-2.5	$40,758	-108.0	$40,758	O	-3.6	$27,938	-157.5	$27,938	Q	-2.1	$48,185	-91.3	$48,185
$4.5m	R	-2.5	$40,758	-110.4	$40,758	O	-3.6	$27,938	-161.1	$27,938	Q	-2.1	$48,185	-93.4	$48,185
$4.6m	R	-2.5	$40,758	-112.9	$40,758	O	-3.6	$27,938	-164.6	$27,938	Q	-2.1	$48,185	-95.5	$48,185
$4.7m	R	-2.5	$40,758	-115.3	$40,758	O	-3.6	$27,938	-168.2	$27,938	Q	-2.1	$48,185	-97.5	$48,185
$4.8m	R	-2.5	$40,758	-117.8	$40,758	O	-3.6	$27,938	-171.8	$27,938	Q	-2.1	$48,185	-99.6	$48,185

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$4.9m	R	-2.5	$40,758	-120.2	$40,758	O	-3.6	$27,938	-175.4	$27,938	Q	-2.1	$48,186	-101.7	$48,185
$5.0m	R	-2.5	$40,758	-122.7	$40,758	O	-3.6	$27,938	-179.0	$27,938	Q	-2.1	$48,183	-103.8	$48,185
$5.1m	R	-2.5	$40,758	-125.1	$40,758	O	-3.6	$27,938	-182.5	$27,938	Q	-2.1	$48,186	-105.8	$48,185
$5.2m	R	-2.5	$40,758	-127.6	$40,758	O	-3.6	$27,938	-186.1	$27,938	Q	-2.1	$48,186	-107.9	$48,185
$5.3m	R	-2.5	$40,758	-130.0	$40,758	O	-3.6	$27,938	-189.7	$27,938	Q	-2.1	$48,186	-110.0	$48,185
$5.4m	R	-2.5	$40,758	-132.5	$40,758	O	-3.6	$27,938	-193.3	$27,938	Q	-2.1	$48,183	-112.1	$48,185
$5.5m	R	-2.5	$40,758	-134.9	$40,758	O	-3.6	$27,938	-196.9	$27,938	Q	-2.1	$48,186	-114.1	$48,185
$5.6m	R	-2.5	$40,758	-137.4	$40,758	O	-3.6	$27,938	-200.4	$27,938	Q	-2.1	$48,186	-116.2	$48,185
$5.7m	R	-2.5	$40,758	-139.8	$40,758	O	-3.6	$27,938	-204.0	$27,938	Q	-2.1	$48,186	-118.3	$48,185
$5.8m	R	-2.5	$40,758	-142.3	$40,758	O	-3.6	$27,938	-207.6	$27,938	Q	-2.1	$48,183	-120.4	$48,185
$5.9m	R	-2.5	$40,758	-144.8	$40,758	O	-3.6	$27,938	-211.2	$27,938	Q	-2.1	$48,186	-122.4	$48,185
$6.0m	R	-2.5	$40,758	-147.2	$40,758	O	-3.6	$27,938	-214.8	$27,938	Q	-2.1	$48,186	-124.5	$48,185
$6.1m	R	-2.5	$40,758	-149.7	$40,758	O	-3.6	$27,938	-218.3	$27,938	Q	-2.1	$48,183	-126.6	$48,185
$6.2m	R	-2.5	$40,758	-152.1	$40,758	O	-3.6	$27,938	-221.9	$27,938	Q	-2.1	$48,186	-128.7	$48,185
$6.3m	R	-2.5	$40,758	-154.6	$40,758	O	-3.6	$27,938	-225.5	$27,938	Q	-2.1	$48,186	-130.7	$48,185
$6.4m	R	-2.5	$40,758	-157.0	$40,758	O	-3.6	$27,938	-229.1	$27,938	Q	-2.1	$48,186	-132.8	$48,185
$6.5m	R	-2.5	$40,758	-159.5	$40,758	O	-3.6	$27,938	-232.7	$27,938	Q	-2.1	$48,183	-134.9	$48,185
$6.6m	R	-2.5	$40,758	-161.9	$40,758	O	-3.6	$27,938	-236.2	$27,938	Q	-2.1	$48,186	-137.0	$48,185
$6.7m	R	-2.5	$40,758	-164.4	$40,758	O	-3.6	$27,938	-239.8	$27,938	Q	-2.1	$48,186	-139.0	$48,185
$6.8m	R	-2.5	$40,758	-166.8	$40,758	O	-3.6	$27,938	-243.4	$27,938	Q	-2.1	$48,186	-141.1	$48,185
$6.9m	R	-2.5	$40,758	-169.3	$40,758	O	-3.6	$27,938	-247.0	$27,938	Q	-2.1	$48,183	-143.2	$48,185
$7.0m	R	-2.5	$40,758	-171.7	$40,758	O	-3.6	$27,938	-250.6	$27,938	Q	-2.1	$48,186	-145.3	$48,185
$7.1m	R	-2.5	$40,758	-174.2	$40,758	O	-3.6	$27,938	-254.1	$27,938	Q	-2.1	$48,186	-147.3	$48,185
$7.2m	R	-2.5	$40,758	-176.7	$40,758	O	-3.6	$27,938	-257.7	$27,938	Q	-2.1	$48,186	-149.4	$48,185
$7.3m	R	-2.5	$40,758	-179.1	$40,758	O	-3.6	$27,938	-261.3	$27,938	Q	-2.1	$48,183	-151.5	$48,185
$7.4m	R	-2.5	$40,758	-181.6	$40,758	O	-3.6	$27,938	-264.9	$27,938	Q	-2.1	$48,186	-153.6	$48,185
$7.5m	R	-2.5	$40,758	-184.0	$40,758	O	-3.6	$27,938	-268.4	$27,938	Q	-2.1	$48,186	-155.6	$48,185
$7.6m	C	-2.5	$39,802	-186.5	$40,745	O	-3.6	$27,938	-272.0	$27,938	R	-2.5	$40,758	-158.1	$48,070
$7.7m	C	-2.5	$39,802	-189.0	$40,733	O	-3.6	$27,938	-275.6	$27,938	R	-2.5	$40,758	-160.6	$47,958
$7.8m	C	-2.5	$39,802	-191.5	$40,720	O	-3.6	$27,938	-279.2	$27,938	R	-2.5	$40,758	-163.0	$47,850
$7.9m	C	-2.5	$39,802	-194.1	$40,709	O	-3.6	$27,938	-282.8	$27,938	R	-2.5	$40,758	-165.5	$47,745
$8.0m	C	-2.5	$39,802	-196.6	$40,697	O	-3.6	$27,938	-286.3	$27,938	R	-2.5	$40,758	-167.9	$47,643
$8.1m	C	-2.5	$39,802	-199.1	$40,686	O	-3.6	$27,938	-289.9	$27,938	R	-2.5	$40,758	-170.4	$47,543
$8.2m	C	-2.5	$39,802	-201.6	$40,675	O	-3.6	$27,938	-293.5	$27,938	R	-2.5	$40,758	-172.8	$47,447
$8.3m	C	-2.5	$39,802	-204.1	$40,664	O	-3.6	$27,938	-297.1	$27,938	R	-2.5	$40,758	-175.3	$47,354
$8.4m	C	-2.5	$39,802	-206.6	$40,653	O	-3.6	$27,938	-300.7	$27,938	R	-2.5	$40,758	-177.7	$47,262
$8.5m	C	-2.5	$39,802	-209.1	$40,643	O	-3.6	$27,938	-304.2	$27,938	R	-2.5	$40,758	-180.2	$47,174
$8.6m	C	-2.5	$39,802	-211.6	$40,633	O	-3.6	$27,938	-307.8	$27,938	R	-2.5	$40,758	-182.6	$47,088
$8.7m	C	-2.5	$39,802	-214.2	$40,623	O	-3.6	$27,938	-311.4	$27,938	R	-2.5	$40,758	-185.1	$47,004
$8.8m	C	-2.5	$39,802	-216.7	$40,614	O	-3.6	$27,938	-315.0	$27,938	R	-2.5	$40,758	-187.5	$46,922
$8.9m	C	-2.5	$39,802	-219.2	$40,605	O	-3.6	$27,938	-318.6	$27,938	R	-2.5	$40,758	-190.0	$46,842
$9.0m	C	-2.5	$39,802	-221.7	$40,596	O	-3.6	$27,938	-322.1	$27,938	R	-2.5	$40,758	-192.5	$46,765
$9.1m	C	-2.5	$39,802	-224.2	$40,587	O	-3.6	$27,938	-325.7	$27,938	R	-2.5	$40,758	-194.9	$46,689
$9.2m	C	-2.5	$39,802	-226.7	$40,578	O	-3.6	$27,938	-329.3	$27,938	R	-2.5	$40,758	-197.4	$46,616
$9.3m	C	-2.5	$39,802	-229.2	$40,569	O	-3.6	$27,938	-332.9	$27,938	R	-2.5	$40,758	-199.8	$46,544
$9.4m	C	-2.5	$39,802	-231.7	$40,561	O	-3.6	$27,938	-336.5	$27,938	R	-2.5	$40,758	-202.3	$46,473
$9.5m	C	-2.5	$39,802	-234.3	$40,553	O	-3.6	$27,938	-340.0	$27,938	R	-2.5	$40,758	-204.7	$46,405
$9.6m	C	-2.5	$39,802	-236.8	$40,545	O	-3.6	$27,938	-343.6	$27,938	R	-2.5	$40,758	-207.2	$46,338
$9.7m	C	-2.5	$39,802	-239.3	$40,537	O	-3.6	$27,938	-347.2	$27,938	R	-2.5	$40,758	-209.6	$46,273
$9.8m	C	-2.5	$39,802	-241.8	$40,530	O	-3.6	$27,938	-350.8	$27,938	R	-2.5	$40,758	-212.1	$46,209
$9.9m	C	-2.5	$39,802	-244.3	$40,522	O	-3.6	$27,938	-354.4	$27,938	R	-2.5	$40,758	-214.5	$46,147

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$10.0m	C	-2.5	$39,802	-246.8	$40,515	O	-3.6	$27,938	-357.9	$27,938	R	-2.5	$40,758	-217.0	$46,086
$10.1m	C	-2.5	$39,802	-249.3	$40,508	O	-3.6	$27,938	-361.5	$27,938	R	-2.5	$40,758	-219.4	$46,026
$10.2m	C	-2.5	$39,802	-251.8	$40,501	O	-3.6	$27,938	-365.1	$27,938	R	-2.5	$40,758	-221.9	$45,968
$10.3m	C	-2.5	$39,802	-254.4	$40,494	O	-3.6	$27,938	-368.7	$27,938	R	-2.5	$40,758	-224.3	$45,911
$10.4m	C	-2.5	$39,802	-256.9	$40,487	O	-3.6	$27,938	-372.2	$27,938	R	-2.5	$40,758	-226.8	$45,855
$10.5m	C	-2.5	$39,802	-259.4	$40,480	O	-3.6	$27,938	-375.8	$27,938	R	-2.5	$40,758	-229.3	$45,801
$10.6m	C	-2.5	$39,802	-261.9	$40,474	O	-3.6	$27,938	-379.4	$27,938	R	-2.5	$40,758	-231.7	$45,747
$10.7m	C	-2.5	$39,802	-264.4	$40,467	O	-3.6	$27,938	-383.0	$27,938	R	-2.5	$40,758	-234.2	$45,695
$10.8m	C	-2.5	$39,802	-266.9	$40,461	O	-3.6	$27,938	-386.6	$27,938	R	-2.5	$40,758	-236.6	$45,644
$10.9m	C	-2.5	$39,802	-269.4	$40,455	O	-3.6	$27,938	-390.1	$27,938	R	-2.5	$40,758	-239.1	$45,594
$11.0m	C	-2.5	$39,802	-271.9	$40,449	O	-3.6	$27,938	-393.7	$27,938	R	-2.5	$40,758	-241.5	$45,545
$11.1m	C	-2.5	$39,802	-274.5	$40,443	O	-3.6	$27,938	-397.3	$27,938	R	-2.5	$40,758	-244.0	$45,496
$11.2m	C	-2.5	$39,802	-277.0	$40,437	O	-3.6	$27,938	-400.9	$27,938	R	-2.5	$40,758	-246.4	$45,449
$11.3m	C	-2.5	$39,802	-279.5	$40,431	O	-3.6	$27,938	-404.5	$27,938	R	-2.5	$40,758	-248.9	$45,403
$11.4m	C	-2.5	$39,802	-282.0	$40,426	O	-3.6	$27,938	-408.0	$27,938	R	-2.5	$40,758	-251.3	$45,358
$11.5m	C	-2.5	$39,801	-284.5	$40,420	O	-3.6	$27,938	-411.6	$27,938	R	-2.5	$40,758	-253.8	$45,313
$11.6m	C	-2.5	$39,803	-287.0	$40,415	O	-3.6	$27,938	-415.2	$27,938	R	-2.5	$40,757	-256.2	$45,270
$11.7m	C	-2.5	$39,803	-289.5	$40,410	O	-3.6	$27,938	-418.8	$27,938	R	-2.5	$40,758	-258.7	$45,227
$11.8m	C	-2.5	$39,801	-292.0	$40,404	O	-3.6	$27,938	-422.4	$27,938	R	-2.5	$40,758	-261.2	$45,185
$11.9m	C	-2.5	$39,803	-294.6	$40,399	O	-3.6	$27,938	-425.9	$27,938	R	-2.5	$40,758	-263.6	$45,144
$12.0m	C	-2.5	$39,801	-297.1	$40,394	O	-3.6	$27,938	-429.5	$27,938	R	-2.5	$40,758	-266.1	$45,103
$12.1m	C	-2.5	$39,803	-299.6	$40,389	O	-3.6	$27,938	-433.1	$27,938	R	-2.5	$40,758	-268.5	$45,063
$12.2m	C	-2.5	$39,801	-302.1	$40,384	O	-3.6	$27,938	-436.7	$27,938	R	-2.5	$40,758	-271.0	$45,024
$12.3m	C	-2.5	$39,803	-304.6	$40,380	O	-3.6	$27,938	-440.3	$27,938	R	-2.5	$40,758	-273.4	$44,986
$12.4m	C	-2.5	$39,803	-307.1	$40,375	O	-3.6	$27,938	-443.8	$27,938	R	-2.5	$40,758	-275.9	$44,949
$12.5m	C	-2.5	$39,801	-309.6	$40,370	O	-3.6	$27,938	-447.4	$27,938	R	-2.5	$40,758	-278.3	$44,912
$12.6m	C	-2.5	$39,803	-312.1	$40,366	O	-3.6	$27,938	-451.0	$27,938	R	-2.5	$40,758	-280.8	$44,875
$12.7m	C	-2.5	$39,801	-314.7	$40,361	O	-3.6	$27,938	-454.6	$27,938	R	-2.5	$40,758	-283.2	$44,840
$12.8m	C	-2.5	$39,803	-317.2	$40,357	O	-3.6	$27,938	-458.2	$27,938	R	-2.5	$40,758	-285.7	$44,805
$12.9m	C	-2.5	$39,803	-319.7	$40,352	O	-3.6	$27,938	-461.7	$27,938	R	-2.5	$40,758	-288.1	$44,770
$13.0m	C	-2.5	$39,801	-322.2	$40,348	O	-3.6	$27,938	-465.3	$27,938	R	-2.5	$40,758	-290.6	$44,736
$13.1m	C	-2.5	$39,803	-324.7	$40,344	O	-3.6	$27,938	-468.9	$27,938	R	-2.5	$40,758	-293.0	$44,703
$13.2m	C	-2.5	$39,801	-327.2	$40,340	O	-3.6	$27,938	-472.5	$27,938	R	-2.5	$40,758	-295.5	$44,670
$13.3m	C	-2.5	$39,803	-329.7	$40,336	O	-3.6	$27,938	-476.0	$27,938	R	-2.5	$40,758	-298.0	$44,638
$13.4m	C	-2.5	$39,801	-332.2	$40,331	O	-3.6	$27,938	-479.6	$27,938	R	-2.5	$40,758	-300.4	$44,606
$13.5m	C	-2.5	$39,803	-334.8	$40,328	O	-3.6	$27,938	-483.2	$27,938	R	-2.5	$40,758	-302.9	$44,575
$13.6m	C	-2.5	$39,803	-337.3	$40,324	O	-3.6	$27,938	-486.8	$27,938	R	-2.5	$40,758	-305.3	$44,544
$13.7m	C	-2.5	$39,801	-339.8	$40,320	O	-3.6	$27,938	-490.4	$27,938	R	-2.5	$40,758	-307.8	$44,514
$13.8m	C	-2.5	$39,803	-342.3	$40,316	O	-3.6	$27,938	-493.9	$27,938	R	-2.5	$40,758	-310.2	$44,485
$13.9m	C	-2.5	$39,801	-344.8	$40,312	O	-3.6	$27,938	-497.5	$27,938	R	-2.5	$40,758	-312.7	$44,455
$14.0m	C	-2.5	$39,803	-347.3	$40,308	O	-3.6	$27,938	-501.1	$27,938	R	-2.5	$40,758	-315.1	$44,427
$14.1m	C	-2.5	$39,803	-349.8	$40,305	O	-3.6	$27,938	-504.7	$27,938	R	-2.5	$40,758	-317.6	$44,398
$14.2m	C	-2.5	$39,801	-352.3	$40,301	O	-3.6	$27,938	-508.3	$27,938	R	-2.5	$40,758	-320.0	$44,370
$14.3m	C	-2.5	$39,803	-354.9	$40,298	O	-3.6	$27,938	-511.8	$27,938	R	-2.5	$40,758	-322.5	$44,343
$14.4m	C	-2.5	$39,801	-357.4	$40,294	I	-5.5	$18,084	-517.4	$27,833	R	-2.5	$40,758	-324.9	$44,316
$14.5m	C	-2.5	$39,803	-359.9	$40,291	I	-5.5	$18,084	-522.9	$27,730	R	-2.5	$40,758	-327.4	$44,289
$14.6m	C	-2.5	$39,801	-362.4	$40,287	I	-5.5	$18,084	-528.4	$27,629	R	-2.5	$40,758	-329.8	$44,263
$14.7m	C	-2.5	$39,803	-364.9	$40,284	I	-5.5	$18,084	-534.0	$27,530	R	-2.5	$40,758	-332.3	$44,237
$14.8m	C	-2.5	$39,803	-367.4	$40,281	I	-5.5	$18,084	-539.5	$27,433	R	-2.5	$40,758	-334.8	$44,211
$14.9m	C	-2.5	$39,801	-369.9	$40,278	I	-5.5	$18,084	-545.0	$27,338	R	-2.5	$40,758	-337.2	$44,186
$15.0m	C	-2.5	$39,803	-372.4	$40,274	I	-5.5	$18,084	-550.6	$27,245	R	-2.5	$40,758	-339.7	$44,162

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$15.1m	C	-2.5	$39,801	-375.0	$40,271	I	-5.5	$18,084	-556.1	$27,154	R	-2.5	$40,758	-342.1	$44,137
$15.2m	C	-2.5	$39,803	-377.5	$40,268	I	-5.5	$18,084	-561.6	$27,065	R	-2.5	$40,758	-344.6	$44,113
$15.3m	C	-2.5	$39,803	-380.0	$40,265	I	-5.5	$18,084	-567.1	$26,977	R	-2.5	$40,758	-347.0	$44,089
$15.4m	C	-2.5	$39,801	-382.5	$40,262	I	-5.5	$18,084	-572.7	$26,892	R	-2.5	$40,758	-349.5	$44,066
$15.5m	C	-2.5	$39,803	-385.0	$40,259	I	-5.5	$18,084	-578.2	$26,807	R	-2.5	$40,758	-351.9	$44,043
$15.6m	C	-2.5	$39,801	-387.5	$40,256	I	-5.5	$18,084	-583.7	$26,725	R	-2.5	$40,758	-354.4	$44,020
$15.7m	C	-2.5	$39,803	-390.0	$40,253	I	-5.5	$18,084	-589.3	$26,644	R	-2.5	$40,758	-356.8	$43,998
$15.8m	C	-2.5	$39,801	-392.5	$40,250	I	-5.5	$18,084	-594.8	$26,564	R	-2.5	$40,758	-359.3	$43,976
$15.9m	C	-2.5	$39,803	-395.1	$40,247	I	-5.5	$18,084	-600.3	$26,486	R	-2.5	$40,758	-361.7	$43,954
$16.0m	C	-2.5	$39,803	-397.6	$40,244	I	-5.5	$18,084	-605.8	$26,409	R	-2.5	$40,758	-364.2	$43,932
$16.1m	C	-2.5	$39,801	-400.1	$40,242	I	-5.5	$18,084	-611.4	$26,334	R	-2.5	$40,758	-366.7	$43,911
$16.2m	C	-2.5	$39,803	-402.6	$40,239	I	-5.5	$18,084	-616.9	$26,260	R	-2.5	$40,758	-369.1	$43,890
$16.3m	C	-2.5	$39,801	-405.1	$40,236	I	-5.5	$18,084	-622.4	$26,187	R	-2.5	$40,758	-371.6	$43,869
$16.4m	C	-2.5	$39,803	-407.6	$40,234	I	-5.5	$18,084	-628.0	$26,116	R	-2.5	$40,758	-374.0	$43,849
$16.5m	C	-2.5	$39,803	-410.1	$40,231	I	-5.5	$18,084	-633.5	$26,046	R	-2.5	$40,758	-376.5	$43,829
$16.6m	C	-2.5	$39,801	-412.6	$40,228	I	-5.5	$18,084	-639.0	$25,977	R	-2.5	$40,758	-378.9	$43,809
$16.7m	C	-2.5	$39,803	-415.2	$40,226	I	-5.5	$18,084	-644.6	$25,909	R	-2.5	$40,758	-381.4	$43,789
$16.8m	C	-2.5	$39,801	-417.7	$40,223	I	-5.5	$18,084	-650.1	$25,843	R	-2.5	$40,758	-383.8	$43,770
$16.9m	C	-2.5	$39,803	-420.2	$40,221	I	-5.5	$18,084	-655.6	$25,777	R	-2.5	$40,758	-386.3	$43,751
$17.0m	C	-2.5	$39,803	-422.7	$40,218	I	-5.5	$18,084	-661.1	$25,713	R	-2.5	$40,758	-388.7	$43,732
$17.1m	C	-2.5	$39,801	-425.2	$40,216	I	-5.5	$18,084	-666.7	$25,650	R	-2.5	$40,758	-391.2	$43,713
$17.2m	C	-2.5	$39,803	-427.7	$40,213	I	-5.5	$18,084	-672.2	$25,587	R	-2.5	$40,758	-393.6	$43,695
$17.3m	C	-2.5	$39,801	-430.2	$40,211	I	-5.5	$18,084	-677.7	$25,526	R	-2.5	$40,758	-396.1	$43,677
$17.4m	C	-2.5	$39,803	-432.7	$40,209	I	-5.5	$18,084	-683.3	$25,466	R	-2.5	$40,758	-398.5	$43,659
$17.5m	C	-2.5	$39,801	-435.3	$40,206	I	-5.5	$18,084	-688.8	$25,407	R	-2.5	$40,758	-401.0	$43,641
$17.6m	C	-2.5	$39,803	-437.8	$40,204	I	-5.5	$18,084	-694.3	$25,348	R	-2.5	$40,756	-403.5	$43,623
$17.7m	C	-2.5	$39,803	-440.3	$40,202	I	-5.5	$18,084	-699.9	$25,291	R	-2.5	$40,758	-405.9	$43,606
$17.8m	C	-2.5	$39,801	-442.8	$40,199	I	-5.5	$18,084	-705.4	$25,234	R	-2.5	$40,758	-408.4	$43,589
$17.9m	C	-2.5	$39,803	-445.3	$40,197	I	-5.5	$18,084	-710.9	$25,179	R	-2.5	$40,758	-410.8	$43,572
$18.0m	C	-2.5	$39,801	-447.8	$40,195	I	-5.5	$18,084	-716.4	$25,124	R	-2.5	$40,758	-413.3	$43,555
$18.1m	C	-2.5	$39,803	-450.3	$40,193	I	-5.5	$18,084	-722.0	$25,070	R	-2.5	$40,758	-415.7	$43,539
$18.2m	C	-2.5	$39,803	-452.8	$40,190	I	-5.5	$18,084	-727.5	$25,017	R	-2.5	$40,758	-418.2	$43,523
$18.3m	C	-2.5	$39,801	-455.4	$40,188	I	-5.5	$18,084	-733.0	$24,965	R	-2.5	$40,758	-420.6	$43,506
$18.4m	C	-2.5	$39,803	-457.9	$40,186	I	-5.5	$18,084	-738.6	$24,913	R	-2.5	$40,758	-423.1	$43,490
$18.5m	C	-2.5	$39,801	-460.4	$40,184	I	-5.5	$18,084	-744.1	$24,862	R	-2.5	$40,758	-425.5	$43,475
$18.6m	C	-2.5	$39,803	-462.9	$40,182	I	-5.5	$18,084	-749.6	$24,812	R	-2.5	$40,758	-428.0	$43,459
$18.7m	C	-2.5	$39,801	-465.4	$40,180	I	-5.5	$18,084	-755.2	$24,763	R	-2.5	$40,758	-430.4	$43,444
$18.8m	C	-2.5	$39,803	-467.9	$40,178	I	-5.5	$18,084	-760.7	$24,715	R	-2.5	$40,758	-432.9	$43,429
$18.9m	C	-2.5	$39,803	-470.4	$40,176	I	-5.5	$18,084	-766.2	$24,667	R	-2.5	$40,758	-435.3	$43,413
$19.0m	C	-2.5	$39,801	-472.9	$40,174	I	-5.5	$18,084	-771.7	$24,620	R	-2.5	$40,758	-437.8	$43,399
$19.1m	C	-2.5	$39,803	-475.5	$40,172	I	-5.5	$18,084	-777.3	$24,573	R	-2.5	$40,758	-440.3	$43,384
$19.2m	C	-2.5	$39,801	-478.0	$40,170	I	-5.5	$18,084	-782.8	$24,527	R	-2.5	$40,758	-442.7	$43,369
$19.3m	C	-2.5	$39,803	-480.5	$40,168	I	-5.5	$18,084	-788.3	$24,482	R	-2.5	$40,758	-445.2	$43,355
$19.4m	C	-2.5	$39,803	-483.0	$40,166	I	-5.5	$18,084	-793.9	$24,438	R	-2.5	$40,758	-447.6	$43,341
$19.5m	C	-2.5	$39,801	-485.5	$40,164	I	-5.5	$18,084	-799.4	$24,394	R	-2.5	$40,758	-450.1	$43,327
$19.6m	C	-2.5	$39,803	-488.0	$40,162	I	-5.5	$18,084	-804.9	$24,350	R	-2.5	$40,758	-452.5	$43,313
$19.7m	C	-2.5	$39,801	-490.5	$40,161	I	-5.5	$18,084	-810.5	$24,307	R	-2.5	$40,758	-455.0	$43,299
$19.8m	C	-2.5	$39,803	-493.0	$40,159	I	-5.5	$18,084	-816.0	$24,265	R	-2.5	$40,758	-457.4	$43,285
$19.9m	C	-2.5	$39,801	-495.6	$40,157	I	-5.5	$18,084	-821.5	$24,224	R	-2.5	$40,758	-459.9	$43,272
$20.0m	C	-2.5	$39,803	-498.1	$40,155	I	-5.5	$18,084	-827.0	$24,183	R	-2.5	$40,758	-462.3	$43,258
$20.1m	C	-2.5	$39,803	-500.6	$40,153	I	-5.5	$18,084	-832.6	$24,142	R	-2.5	$40,758	-464.8	$43,245

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$20.2m	C	-2.5	$39,801	-503.1	$40,152	I	-5.5	$18,084	-838.1	$24,102	R	-2.5	$40,758	-467.2	$43,232
$20.3m	C	-2.5	$39,803	-505.6	$40,150	I	-5.5	$18,084	-843.6	$24,063	R	-2.5	$40,758	-469.7	$43,219
$20.4m	C	-2.5	$39,801	-508.1	$40,148	I	-5.5	$18,084	-849.2	$24,024	R	-2.5	$40,758	-472.2	$43,207
$20.5m	C	-2.5	$39,803	-510.6	$40,146	I	-5.5	$18,084	-854.7	$23,985	R	-2.5	$40,758	-474.6	$43,194
$20.6m	C	-2.5	$39,803	-513.1	$40,145	I	-5.5	$18,084	-860.2	$23,947	R	-2.5	$40,758	-477.1	$43,181
$20.7m	C	-2.5	$39,801	-515.7	$40,143	I	-5.5	$18,084	-865.7	$23,910	R	-2.5	$40,758	-479.5	$43,169
$20.8m	C	-2.5	$39,803	-518.2	$40,141	I	-5.5	$18,084	-871.3	$23,873	R	-2.5	$40,758	-482.0	$43,157
$20.9m	C	-2.5	$39,801	-520.7	$40,140	I	-5.5	$18,084	-876.8	$23,836	R	-2.5	$40,758	-484.4	$43,145
$21.0m	C	-2.5	$39,803	-523.2	$40,138	I	-5.5	$18,084	-882.3	$23,800	R	-2.5	$40,758	-486.9	$43,132
$21.1m	C	-2.5	$39,801	-525.7	$40,137	I	-5.5	$18,084	-887.9	$23,765	R	-2.5	$40,758	-489.3	$43,121
$21.2m	C	-2.5	$39,803	-528.2	$40,135	I	-5.5	$18,084	-893.4	$23,730	R	-2.5	$40,758	-491.8	$43,109
$21.3m	H	-3.0	$33,472	-531.2	$40,098	I	-5.5	$18,084	-898.9	$23,695	R	-2.5	$40,758	-494.2	$43,097
$21.4m	H	-3.0	$33,472	-534.2	$40,060	I	-5.5	$18,084	-904.5	$23,661	R	-2.5	$40,758	-496.7	$43,086
$21.5m	H	-3.0	$33,472	-537.2	$40,024	I	-5.5	$18,084	-910.0	$23,627	R	-2.5	$40,758	-499.1	$43,074
$21.6m	H	-3.0	$33,472	-540.2	$39,988	I	-5.5	$18,084	-915.5	$23,593	R	-2.5	$40,758	-501.6	$43,063
$21.7m	H	-3.0	$33,472	-543.2	$39,952	I	-5.5	$18,084	-921.0	$23,560	R	-2.5	$40,758	-504.0	$43,052
$21.8m	H	-3.0	$33,472	-546.1	$39,916	I	-5.5	$18,084	-926.6	$23,527	R	-2.5	$40,758	-506.5	$43,040
$21.9m	H	-3.0	$33,472	-549.1	$39,881	I	-5.5	$18,084	-932.1	$23,495	R	-2.5	$40,758	-509.0	$43,029
$22.0m	H	-3.0	$33,472	-552.1	$39,847	I	-5.5	$18,084	-937.6	$23,463	R	-2.5	$40,758	-511.4	$43,019
$22.1m	H	-3.0	$33,472	-555.1	$39,812	I	-5.5	$18,084	-943.2	$23,432	R	-2.5	$40,758	-513.9	$43,008
$22.2m	H	-3.0	$33,472	-558.1	$39,778	I	-5.5	$18,084	-948.7	$23,401	R	-2.5	$40,758	-516.3	$42,997
$22.3m	H	-3.0	$33,472	-561.1	$39,745	I	-5.5	$18,084	-954.2	$23,370	R	-2.5	$40,758	-518.8	$42,986
$22.4m	H	-3.0	$33,472	-564.1	$39,712	I	-5.5	$18,084	-959.8	$23,339	R	-2.5	$40,758	-521.2	$42,976
$22.5m	H	-3.0	$33,472	-567.1	$39,679	I	-5.5	$18,084	-965.3	$23,309	R	-2.5	$40,758	-523.7	$42,966
$22.6m	H	-3.0	$33,472	-570.0	$39,646	I	-5.5	$18,084	-970.8	$23,279	R	-2.5	$40,758	-526.1	$42,955
$22.7m	H	-3.0	$33,472	-573.0	$39,614	I	-5.5	$18,084	-976.3	$23,250	R	-2.5	$40,758	-528.6	$42,945
$22.8m	H	-3.0	$33,472	-576.0	$39,582	I	-5.5	$18,084	-981.9	$23,221	R	-2.5	$40,758	-531.0	$42,935
$22.9m	H	-3.0	$33,472	-579.0	$39,551	I	-5.5	$18,084	-987.4	$23,192	R	-2.5	$40,758	-533.5	$42,925
$23.0m	H	-3.0	$33,472	-582.0	$39,519	I	-5.5	$18,084	-992.9	$23,164	R	-2.5	$40,758	-535.9	$42,915
$23.1m	H	-3.0	$33,472	-585.0	$39,488	I	-5.5	$18,084	-998.5	$23,136	R	-2.5	$40,758	-538.4	$42,905
$23.2m	H	-3.0	$33,472	-588.0	$39,458	I	-5.5	$18,084	-1004.0	$23,108	R	-2.5	$40,758	-540.8	$42,896
$23.3m	H	-3.0	$33,472	-591.0	$39,428	I	-5.5	$18,084	-1009.5	$23,080	R	-2.5	$40,758	-543.3	$42,886
$23.4m	H	-3.0	$33,472	-593.9	$39,398	I	-5.5	$18,084	-1015.1	$23,053	R	-2.5	$40,758	-545.8	$42,876
$23.5m	H	-3.0	$33,472	-596.9	$39,368	I	-5.5	$18,084	-1020.6	$23,026	R	-2.5	$40,758	-548.2	$42,867
$23.6m	H	-3.0	$33,472	-599.9	$39,339	I	-5.5	$18,084	-1026.1	$22,999	R	-2.5	$40,758	-550.7	$42,857
$23.7m	H	-3.0	$33,472	-602.9	$39,310	I	-5.5	$18,084	-1031.6	$22,973	R	-2.5	$40,758	-553.1	$42,848
$23.8m	H	-3.0	$33,472	-605.9	$39,281	I	-5.5	$18,084	-1037.2	$22,947	R	-2.5	$40,758	-555.6	$42,839
$23.9m	H	-3.0	$33,472	-608.9	$39,252	I	-5.5	$18,084	-1042.7	$22,921	R	-2.5	$40,758	-558.0	$42,830
$24.0m	H	-3.0	$33,472	-611.9	$39,224	I	-5.5	$18,084	-1048.2	$22,896	R	-2.5	$40,758	-560.5	$42,821
$24.1m	H	-3.0	$33,472	-614.9	$39,196	I	-5.5	$18,084	-1053.8	$22,870	R	-2.5	$40,758	-562.9	$42,812
$24.2m	H	-3.0	$33,472	-617.8	$39,168	I	-5.5	$18,084	-1059.3	$22,845	R	-2.5	$40,756	-565.4	$42,803
$24.3m	H	-3.0	$33,472	-620.8	$39,141	I	-5.5	$18,084	-1064.8	$22,821	R	-2.5	$40,758	-567.8	$42,794
$24.4m	H	-3.0	$33,472	-623.8	$39,114	I	-5.5	$18,084	-1070.3	$22,796	R	-2.5	$40,758	-570.3	$42,785
$24.5m	H	-3.0	$33,472	-626.8	$39,087	I	-5.5	$18,084	-1075.9	$22,772	R	-2.5	$40,758	-572.7	$42,776
$24.6m	H	-3.0	$33,472	-629.8	$39,060	I	-5.5	$18,084	-1081.4	$22,748	R	-2.5	$40,758	-575.2	$42,768
$24.7m	H	-3.0	$33,472	-632.8	$39,034	I	-5.5	$18,084	-1086.9	$22,724	R	-2.5	$40,758	-577.7	$42,759
$24.8m	H	-3.0	$33,472	-635.8	$39,008	I	-5.5	$18,084	-1092.5	$22,701	R	-2.5	$40,758	-580.1	$42,751
$24.9m	H	-3.0	$33,472	-638.8	$38,982	I	-5.5	$18,084	-1098.0	$22,678	R	-2.5	$40,758	-582.6	$42,742
$25.0m	H	-3.0	$33,473	-641.7	$38,956	I	-5.5	$18,084	-1103.5	$22,655	R	-2.5	$40,758	-585.0	$42,734
$25.1m	H	-3.0	$33,472	-644.7	$38,931	I	-5.5	$18,084	-1109.1	$22,632	R	-2.5	$40,758	-587.5	$42,726
$25.2m	H	-3.0	$33,472	-647.7	$38,906	I	-5.5	$18,084	-1114.6	$22,609	R	-2.5	$40,758	-589.9	$42,718

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$25.3m	H	-3.0	$33,472	-650.7	$38,881	I	-5.5	$18,084	-1120.1	$22,587	R	-2.5	$40,758	-592.4	$42,710
$25.4m	H	-3.0	$33,473	-653.7	$38,856	I	-5.5	$18,084	-1125.6	$22,565	R	-2.5	$40,758	-594.8	$42,702
$25.5m	H	-3.0	$33,472	-656.7	$38,832	I	-5.5	$18,084	-1131.2	$22,543	R	-2.5	$40,758	-597.3	$42,694
$25.6m	H	-3.0	$33,472	-659.7	$38,807	I	-5.5	$18,084	-1136.7	$22,521	R	-2.5	$40,758	-599.7	$42,686
$25.7m	H	-3.0	$33,472	-662.7	$38,783	I	-5.5	$18,084	-1142.2	$22,500	R	-2.5	$40,758	-602.2	$42,678
$25.8m	H	-3.0	$33,473	-665.6	$38,759	I	-5.5	$18,084	-1147.8	$22,478	R	-2.5	$40,758	-604.6	$42,670
$25.9m	H	-3.0	$33,472	-668.6	$38,736	I	-5.5	$18,084	-1153.3	$22,457	R	-2.5	$40,758	-607.1	$42,662
$26.0m	H	-3.0	$33,472	-671.6	$38,712	I	-5.5	$18,084	-1158.8	$22,437	R	-2.5	$40,758	-609.5	$42,655
$26.1m	H	-3.0	$33,472	-674.6	$38,689	I	-5.5	$18,084	-1164.4	$22,416	R	-2.5	$40,758	-612.0	$42,647
$26.2m	H	-3.0	$33,473	-677.6	$38,666	I	-5.5	$18,084	-1169.9	$22,395	R	-2.5	$40,758	-614.5	$42,639
$26.3m	H	-3.0	$33,472	-680.6	$38,643	I	-5.5	$18,084	-1175.4	$22,375	R	-2.5	$40,758	-616.9	$42,632
$26.4m	H	-3.0	$33,472	-683.6	$38,621	I	-5.5	$18,084	-1180.9	$22,355	R	-2.5	$40,758	-619.4	$42,625
$26.5m	H	-3.0	$33,472	-686.6	$38,598	I	-5.5	$18,084	-1186.5	$22,335	R	-2.5	$40,758	-621.8	$42,617
$26.6m	H	-3.0	$33,473	-689.5	$38,576	I	-5.5	$18,084	-1192.0	$22,315	R	-2.5	$40,758	-624.3	$42,610
$26.7m	H	-3.0	$33,472	-692.5	$38,554	I	-5.5	$18,084	-1197.5	$22,296	R	-2.5	$40,758	-626.7	$42,603
$26.8m	H	-3.0	$33,472	-695.5	$38,532	I	-5.5	$18,084	-1203.1	$22,276	R	-2.5	$40,758	-629.2	$42,595
$26.9m	H	-3.0	$33,472	-698.5	$38,511	I	-5.5	$18,084	-1208.6	$22,257	R	-2.5	$40,758	-631.6	$42,588
$27.0m	H	-3.0	$33,473	-701.5	$38,489	I	-5.5	$18,084	-1214.1	$22,238	R	-2.5	$40,758	-634.1	$42,581
$27.1m	H	-3.0	$33,472	-704.5	$38,468	I	-5.5	$18,084	-1219.7	$22,219	R	-2.5	$40,758	-636.5	$42,574
$27.2m	H	-3.0	$33,472	-707.5	$38,447	I	-5.5	$18,084	-1225.2	$22,201	R	-2.5	$40,758	-639.0	$42,567
$27.3m	H	-3.0	$33,472	-710.5	$38,426	I	-5.5	$18,084	-1230.7	$22,182	R	-2.5	$40,758	-641.4	$42,560
$27.4m	H	-3.0	$33,473	-713.4	$38,405	I	-5.5	$18,084	-1236.2	$22,164	R	-2.5	$40,758	-643.9	$42,553
$27.5m	H	-3.0	$33,472	-716.4	$38,385	I	-5.5	$18,084	-1241.8	$22,146	R	-2.5	$40,758	-646.3	$42,547
$27.6m	H	-3.0	$33,472	-719.4	$38,364	I	-5.5	$18,084	-1247.3	$22,128	R	-2.5	$40,758	-648.8	$42,540
$27.7m	H	-3.0	$33,472	-722.4	$38,344	I	-5.5	$18,084	-1252.8	$22,110	R	-2.5	$40,758	-651.3	$42,533
$27.8m	H	-3.0	$33,473	-725.4	$38,324	I	-5.5	$18,084	-1258.4	$22,092	R	-2.5	$40,758	-653.7	$42,526
$27.9m	H	-3.0	$33,472	-728.4	$38,304	I	-5.5	$18,084	-1263.9	$22,075	R	-2.5	$40,758	-656.2	$42,520
$28.0m	H	-3.0	$33,472	-731.4	$38,284	I	-5.5	$18,084	-1269.4	$22,057	R	-2.5	$40,758	-658.6	$42,513
$28.1m	H	-3.0	$33,472	-734.4	$38,265	I	-5.5	$18,084	-1275.0	$22,040	R	-2.5	$40,758	-661.1	$42,507
$28.2m	H	-3.0	$33,473	-737.3	$38,245	I	-5.5	$18,084	-1280.5	$22,023	R	-2.5	$40,758	-663.5	$42,500
$28.3m	H	-3.0	$33,472	-740.3	$38,226	I	-5.5	$18,084	-1286.0	$22,006	R	-2.5	$40,758	-666.0	$42,494
$28.4m	H	-3.0	$33,472	-743.3	$38,207	I	-5.5	$18,084	-1291.5	$21,989	R	-2.5	$40,758	-668.4	$42,488
$28.5m	H	-3.0	$33,472	-746.3	$38,188	I	-5.5	$18,084	-1297.1	$21,973	R	-2.5	$40,758	-670.9	$42,481
$28.6m	H	-3.0	$33,473	-749.3	$38,169	I	-5.5	$18,084	-1302.6	$21,956	R	-2.5	$40,758	-673.3	$42,475
$28.7m	H	-3.0	$33,472	-752.3	$38,150	I	-5.5	$18,084	-1308.1	$21,940	R	-2.5	$40,758	-675.8	$42,469
$28.8m	H	-3.0	$33,472	-755.3	$38,132	I	-5.5	$18,084	-1313.7	$21,923	R	-2.5	$40,758	-678.2	$42,463
$28.9m	H	-3.0	$33,472	-758.3	$38,114	I	-5.5	$18,084	-1319.2	$21,907	R	-2.5	$40,758	-680.7	$42,456
$29.0m	H	-3.0	$33,473	-761.2	$38,095	I	-5.5	$18,084	-1324.7	$21,891	R	-2.5	$40,758	-683.2	$42,450
$29.1m	H	-3.0	$33,472	-764.2	$38,077	I	-5.5	$18,084	-1330.2	$21,876	R	-2.5	$40,758	-685.6	$42,444
$29.2m	H	-3.0	$33,472	-767.2	$38,059	I	-5.5	$18,084	-1335.8	$21,860	R	-2.5	$40,758	-688.1	$42,438
$29.3m	H	-3.0	$33,472	-770.2	$38,042	I	-5.5	$18,084	-1341.3	$21,844	R	-2.5	$40,758	-690.5	$42,432
$29.4m	H	-3.0	$33,473	-773.2	$38,024	I	-5.5	$18,084	-1346.8	$21,829	R	-2.5	$40,758	-693.0	$42,426
$29.5m	H	-3.0	$33,472	-776.2	$38,006	I	-5.5	$18,084	-1352.4	$21,814	R	-2.5	$40,758	-695.4	$42,420
$29.6m	H	-3.0	$33,472	-779.2	$37,989	I	-5.5	$18,084	-1357.9	$21,798	R	-2.5	$40,758	-697.9	$42,415
$29.7m	H	-3.0	$33,473	-782.2	$37,972	I	-5.5	$18,084	-1363.4	$21,783	R	-2.5	$40,758	-700.3	$42,409
$29.8m	H	-3.0	$33,472	-785.1	$37,955	I	-5.5	$18,084	-1369.0	$21,768	R	-2.5	$40,758	-702.8	$42,403
$29.9m	H	-3.0	$33,472	-788.1	$37,938	I	-5.5	$18,084	-1374.5	$21,754	R	-2.5	$40,758	-705.2	$42,397
$30.0m	H	-3.0	$33,472	-791.1	$37,921	I	-5.5	$18,084	-1380.0	$21,739	R	-2.5	$40,758	-707.7	$42,392
$30.1m	H	-3.0	$33,473	-794.1	$37,904	I	-5.5	$18,084	-1385.5	$21,724	R	-2.5	$40,758	-710.1	$42,386
$30.2m	H	-3.0	$33,472	-797.1	$37,887	I	-5.5	$18,084	-1391.1	$21,710	R	-2.5	$40,758	-712.6	$42,380
$30.3m	H	-3.0	$33,472	-800.1	$37,871	I	-5.5	$18,084	-1396.6	$21,695	R	-2.5	$40,758	-715.0	$42,375

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^+ [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^+ [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^+ [e]
$30.4m	H	-3.0	$33,472	-803.1	$37,855	I	-5.5	$18,084	-1402.1	$21,681	R	-2.5	$40,758	-717.5	$42,369
$30.5m	H	-3.0	$33,473	-806.1	$37,838	I	-5.5	$18,084	-1407.7	$21,667	R	-2.5	$40,758	-720.0	$42,364
$30.6m	H	-3.0	$33,472	-809.0	$37,822	I	-5.5	$18,084	-1413.2	$21,653	R	-2.5	$40,758	-722.4	$42,358
$30.7m	H	-3.0	$33,472	-812.0	$37,806	I	-5.5	$18,084	-1418.7	$21,639	R	-2.5	$40,758	-724.9	$42,353
$30.8m	H	-3.0	$33,472	-815.0	$37,790	I	-5.5	$18,084	-1424.3	$21,625	R	-2.5	$40,758	-727.3	$42,348
$30.9m	H	-3.0	$33,473	-818.0	$37,775	I	-5.5	$18,084	-1429.8	$21,612	R	-2.5	$40,756	-729.8	$42,342
$31.0m	H	-3.0	$33,472	-821.0	$37,759	T	-6.5	$15,316	-1436.3	$21,583	R	-2.5	$40,758	-732.2	$42,337
$31.1m	H	-3.0	$33,472	-824.0	$37,743	T	-6.5	$15,316	-1442.8	$21,555	R	-2.5	$40,758	-734.7	$42,332
$31.2m	H	-3.0	$33,472	-827.0	$37,728	T	-6.5	$15,316	-1449.4	$21,527	R	-2.5	$40,758	-737.1	$42,326
$31.3m	H	-3.0	$33,473	-830.0	$37,713	T	-6.5	$15,316	-1455.9	$21,499	R	-2.5	$40,758	-739.6	$42,321
$31.4m	H	-3.0	$33,472	-832.9	$37,697	T	-6.5	$15,316	-1462.4	$21,471	R	-2.5	$40,758	-742.0	$42,316
$31.5m	H	-3.0	$33,472	-835.9	$37,682	T	-6.5	$15,316	-1469.0	$21,444	R	-2.5	$40,758	-744.5	$42,311
$31.6m	H	-3.0	$33,472	-838.9	$37,667	T	-6.5	$15,316	-1475.5	$21,417	R	-2.5	$40,758	-746.9	$42,306
$31.7m	H	-3.0	$33,473	-841.9	$37,652	T	-6.5	$15,316	-1482.0	$21,390	R	-2.5	$40,758	-749.4	$42,301
$31.8m	H	-3.0	$33,472	-844.9	$37,638	T	-6.5	$15,316	-1488.5	$21,363	R	-2.5	$40,758	-751.9	$42,296
$31.9m	H	-3.0	$33,472	-847.9	$37,623	T	-6.5	$15,316	-1495.1	$21,337	R	-2.5	$40,758	-754.3	$42,291
$32.0m	H	-3.0	$33,472	-850.9	$37,608	T	-6.5	$15,316	-1501.6	$21,311	R	-2.5	$40,758	-756.8	$42,286
$32.1m	H	-3.0	$33,473	-853.9	$37,594	T	-6.5	$15,316	-1508.1	$21,285	R	-2.5	$40,758	-759.2	$42,281
$32.2m	H	-3.0	$33,472	-856.9	$37,579	T	-6.5	$15,316	-1514.7	$21,259	R	-2.5	$40,758	-761.7	$42,276
$32.3m	H	-3.0	$33,472	-859.8	$37,565	T	-6.5	$15,316	-1521.2	$21,233	R	-2.5	$40,758	-764.1	$42,271
$32.4m	H	-3.0	$33,472	-862.8	$37,551	T	-6.5	$15,316	-1527.7	$21,208	R	-2.5	$40,758	-766.6	$42,266
$32.5m	H	-3.0	$33,473	-865.8	$37,537	T	-6.5	$15,316	-1534.3	$21,183	R	-2.5	$40,758	-769.0	$42,261
$32.6m	H	-3.0	$33,472	-868.8	$37,523	T	-6.5	$15,316	-1540.8	$21,158	R	-2.5	$40,758	-771.5	$42,257
$32.7m	H	-3.0	$33,472	-871.8	$37,509	T	-6.5	$15,316	-1547.3	$21,133	R	-2.5	$40,758	-773.9	$42,252
$32.8m	H	-3.0	$33,472	-874.8	$37,495	T	-6.5	$15,316	-1553.8	$21,109	R	-2.5	$40,758	-776.4	$42,247
$32.9m	H	-3.0	$33,473	-877.8	$37,482	T	-6.5	$15,316	-1560.4	$21,085	R	-2.5	$40,758	-778.8	$42,242
$33.0m	H	-3.0	$33,472	-880.8	$37,468	T	-6.5	$15,316	-1566.9	$21,061	R	-2.5	$40,758	-781.3	$42,238
$33.1m	H	-3.0	$33,472	-883.7	$37,455	T	-6.5	$15,316	-1573.4	$21,037	R	-2.5	$40,758	-783.7	$42,233
$33.2m	H	-3.0	$33,472	-886.7	$37,441	T	-6.5	$15,316	-1580.0	$21,013	R	-2.5	$40,758	-786.2	$42,228
$33.3m	H	-3.0	$33,473	-889.7	$37,428	T	-6.5	$15,316	-1586.5	$20,990	R	-2.5	$40,758	-788.7	$42,224
$33.4m	H	-3.0	$33,472	-892.7	$37,415	T	-6.5	$15,316	-1593.0	$20,967	R	-2.5	$40,758	-791.1	$42,219
$33.5m	H	-3.0	$33,472	-895.7	$37,401	T	-6.5	$15,316	-1599.5	$20,943	R	-2.5	$40,758	-793.6	$42,215
$33.6m	H	-3.0	$33,472	-898.7	$37,388	T	-6.5	$15,316	-1606.1	$20,921	R	-2.5	$40,758	-796.0	$42,210
$33.7m	H	-3.0	$33,473	-901.7	$37,375	T	-6.5	$15,316	-1612.6	$20,898	R	-2.5	$40,758	-798.5	$42,206
$33.8m	H	-3.0	$33,472	-904.7	$37,362	T	-6.5	$15,316	-1619.1	$20,875	R	-2.5	$40,758	-800.9	$42,201
$33.9m	H	-3.0	$33,472	-907.6	$37,350	T	-6.5	$15,316	-1625.7	$20,853	R	-2.5	$40,758	-803.4	$42,197
$34.0m	H	-3.0	$33,472	-910.6	$37,337	T	-6.5	$15,316	-1632.2	$20,831	R	-2.5	$40,758	-805.8	$42,193
$34.1m	H	-3.0	$33,473	-913.6	$37,324	T	-6.5	$15,316	-1638.7	$20,809	R	-2.5	$40,758	-808.3	$42,188
$34.2m	H	-3.0	$33,472	-916.6	$37,312	T	-6.5	$15,316	-1645.3	$20,787	R	-2.5	$40,758	-810.7	$42,184
$34.3m	H	-3.0	$33,472	-919.6	$37,299	T	-6.5	$15,316	-1651.8	$20,765	R	-2.5	$40,758	-813.2	$42,180
$34.4m	H	-3.0	$33,472	-922.6	$37,287	T	-6.5	$15,316	-1658.3	$20,744	R	-2.5	$40,758	-815.6	$42,175
$34.5m	H	-3.0	$33,473	-925.6	$37,275	T	-6.5	$15,316	-1664.8	$20,723	R	-2.5	$40,758	-818.1	$42,171
$34.6m	H	-3.0	$33,472	-928.6	$37,262	T	-6.5	$15,316	-1671.4	$20,702	R	-2.5	$40,758	-820.5	$42,167
$34.7m	H	-3.0	$33,472	-931.5	$37,250	T	-6.5	$15,316	-1677.9	$20,681	R	-2.5	$40,758	-823.0	$42,163
$34.8m	H	-3.0	$33,472	-934.5	$37,238	T	-6.5	$15,316	-1684.4	$20,660	R	-2.5	$40,758	-825.5	$42,159
$34.9m	H	-3.0	$33,473	-937.5	$37,226	T	-6.5	$15,316	-1691.0	$20,639	R	-2.5	$40,758	-827.9	$42,154
$35.0m	H	-3.0	$33,472	-940.5	$37,214	T	-6.5	$15,316	-1697.5	$20,619	R	-2.5	$40,758	-830.4	$42,150
$35.1m	H	-3.0	$33,472	-943.5	$37,202	T	-6.5	$15,316	-1704.0	$20,598	R	-2.5	$40,758	-832.8	$42,146
$35.2m	H	-3.0	$33,472	-946.5	$37,191	T	-6.5	$15,316	-1710.5	$20,578	R	-2.5	$40,758	-835.3	$42,142
$35.3m	H	-3.0	$33,473	-949.5	$37,179	T	-6.5	$15,316	-1717.1	$20,558	R	-2.5	$40,758	-837.7	$42,138
$35.4m	H	-3.0	$33,472	-952.5	$37,167	T	-6.5	$15,316	-1723.6	$20,538	R	-2.5	$40,758	-840.2	$42,134

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$35.5m	H	-3.0	$33,472	-955.4	$37,156	T	-6.5	$15,316	-1730.1	$20,519	R	-2.5	$40,758	-842.6	$42,130
$35.6m	H	-3.0	$33,472	-958.4	$37,144	T	-6.5	$15,316	-1736.7	$20,499	R	-2.5	$40,758	-845.1	$42,126
$35.7m	H	-3.0	$33,473	-961.4	$37,133	T	-6.5	$15,316	-1743.2	$20,480	R	-2.5	$40,758	-847.5	$42,122
$35.8m	H	-3.0	$33,472	-964.4	$37,121	T	-6.5	$15,316	-1749.7	$20,460	R	-2.5	$40,758	-850.0	$42,118
$35.9m	H	-3.0	$33,472	-967.4	$37,110	T	-6.5	$15,316	-1756.2	$20,441	R	-2.5	$40,758	-852.4	$42,114
$36.0m	H	-3.0	$33,472	-970.4	$37,099	T	-6.5	$15,316	-1762.8	$20,422	R	-2.5	$40,758	-854.9	$42,110
$36.1m	H	-3.0	$33,473	-973.4	$37,088	T	-6.5	$15,316	-1769.3	$20,403	R	-2.5	$40,758	-857.4	$42,106
$36.2m	H	-3.0	$33,472	-976.4	$37,077	T	-6.5	$15,316	-1775.8	$20,385	R	-2.5	$40,758	-859.8	$42,103
$36.3m	H	-3.0	$33,472	-979.3	$37,066	T	-6.5	$15,316	-1782.4	$20,366	R	-2.5	$40,758	-862.3	$42,099
$36.4m	H	-3.0	$33,472	-982.3	$37,055	T	-6.5	$15,316	-1788.9	$20,348	R	-2.5	$40,758	-864.7	$42,095
$36.5m	H	-3.0	$33,473	-985.3	$37,044	T	-6.5	$15,316	-1795.4	$20,329	R	-2.5	$40,758	-867.2	$42,091
$36.6m	H	-3.0	$33,472	-988.3	$37,033	T	-6.5	$15,316	-1802.0	$20,311	R	-2.5	$40,758	-869.6	$42,087
$36.7m	H	-3.0	$33,472	-991.3	$37,022	T	-6.5	$15,316	-1808.5	$20,293	R	-2.5	$40,758	-872.1	$42,084
$36.8m	H	-3.0	$33,472	-994.3	$37,012	T	-6.5	$15,316	-1815.0	$20,275	R	-2.5	$40,758	-874.5	$42,080
$36.9m	H	-3.0	$33,473	-997.3	$37,001	T	-6.5	$15,316	-1821.5	$20,258	R	-2.5	$40,758	-877.0	$42,076
$37.0m	H	-3.0	$33,472	-1000.3	$36,991	T	-6.5	$15,316	-1828.1	$20,240	R	-2.5	$40,758	-879.4	$42,073
$37.1m	H	-3.0	$33,472	-1003.2	$36,980	T	-6.5	$15,316	-1834.6	$20,222	R	-2.5	$40,758	-881.9	$42,069
$37.2m	H	-3.0	$33,472	-1006.2	$36,970	T	-6.5	$15,316	-1841.1	$20,205	R	-2.5	$40,758	-884.3	$42,065
$37.3m	H	-3.0	$33,473	-1009.2	$36,959	T	-6.5	$15,316	-1847.7	$20,188	R	-2.5	$40,758	-886.8	$42,062
$37.4m	H	-3.0	$33,472	-1012.2	$36,949	T	-6.5	$15,316	-1854.2	$20,171	R	-2.5	$40,758	-889.2	$42,058
$37.5m	H	-3.0	$33,472	-1015.2	$36,939	T	-6.5	$15,316	-1860.7	$20,154	R	-2.5	$40,758	-891.7	$42,055
$37.6m	H	-3.0	$33,473	-1018.2	$36,929	T	-6.5	$15,316	-1867.2	$20,137	R	-2.5	$40,756	-894.2	$42,051
$37.7m	H	-3.0	$33,472	-1021.2	$36,919	T	-6.5	$15,316	-1873.8	$20,120	R	-2.5	$40,758	-896.6	$42,047
$37.8m	H	-3.0	$33,472	-1024.2	$36,908	T	-6.5	$15,316	-1880.3	$20,103	R	-2.5	$40,758	-899.1	$42,044
$37.9m	H	-3.0	$33,472	-1027.1	$36,898	T	-6.5	$15,316	-1886.8	$20,087	R	-2.5	$40,758	-901.5	$42,040
$38.0m	H	-3.0	$33,473	-1030.1	$36,889	T	-6.5	$15,316	-1893.4	$20,070	R	-2.5	$40,758	-904.0	$42,037
$38.1m	H	-3.0	$33,472	-1033.1	$36,879	T	-6.5	$15,316	-1899.9	$20,054	R	-2.5	$40,758	-906.4	$42,033
$38.2m	H	-3.0	$33,472	-1036.1	$36,869	T	-6.5	$15,316	-1906.4	$20,038	R	-2.5	$40,758	-908.9	$42,030
$38.3m	H	-3.0	$33,472	-1039.1	$36,859	T	-6.5	$15,316	-1913.0	$20,021	R	-2.5	$40,758	-911.3	$42,027
$38.4m	H	-3.0	$33,473	-1042.1	$36,849	T	-6.5	$15,316	-1919.5	$20,005	R	-2.5	$40,758	-913.8	$42,023
$38.5m	H	-3.0	$33,472	-1045.1	$36,840	T	-6.5	$15,316	-1926.0	$19,990	R	-2.5	$40,758	-916.2	$42,020
$38.6m	H	-3.0	$33,472	-1048.1	$36,830	T	-6.5	$15,316	-1932.5	$19,974	R	-2.5	$40,758	-918.7	$42,016
$38.7m	H	-3.0	$33,472	-1051.0	$36,821	T	-6.5	$15,316	-1939.1	$19,958	R	-2.5	$40,758	-921.1	$42,013
$38.8m	H	-3.0	$33,473	-1054.0	$36,811	T	-6.5	$15,316	-1945.6	$19,942	R	-2.5	$40,758	-923.6	$42,010
$38.9m	H	-3.0	$33,472	-1057.0	$36,802	T	-6.5	$15,316	-1952.1	$19,927	R	-2.5	$40,758	-926.0	$42,006
$39.0m	H	-3.0	$33,472	-1060.0	$36,792	T	-6.5	$15,316	-1958.7	$19,912	R	-2.5	$40,758	-928.5	$42,003
$39.1m	H	-3.0	$33,472	-1063.0	$36,783	T	-6.5	$15,316	-1965.2	$19,896	R	-2.5	$40,758	-931.0	$42,000
$39.2m	H	-3.0	$33,473	-1066.0	$36,774	T	-6.5	$15,316	-1971.7	$19,881	R	-2.5	$40,758	-933.4	$41,997
$39.3m	H	-3.0	$33,472	-1069.0	$36,764	T	-6.5	$15,316	-1978.2	$19,866	R	-2.5	$40,758	-935.9	$41,993
$39.4m	H	-3.0	$33,472	-1072.0	$36,755	T	-6.5	$15,316	-1984.8	$19,851	R	-2.5	$40,758	-938.3	$41,990
$39.5m	H	-3.0	$33,472	-1074.9	$36,746	T	-6.5	$15,316	-1991.3	$19,836	R	-2.5	$40,758	-940.8	$41,987
$39.6m	O	-3.6	$27,938	-1078.5	$36,717	T	-6.5	$15,316	-1997.8	$19,821	R	-2.5	$40,758	-943.2	$41,984
$39.7m	O	-3.6	$27,938	-1082.1	$36,688	T	-6.5	$15,316	-2004.4	$19,807	R	-2.5	$40,758	-945.7	$41,981
$39.8m	O	-3.6	$27,938	-1085.7	$36,659	T	-6.5	$15,316	-2010.9	$19,792	R	-2.5	$40,758	-948.1	$41,977
$39.9m	O	-3.6	$27,938	-1089.3	$36,630	T	-6.5	$15,316	-2017.4	$19,778	R	-2.5	$40,758	-950.6	$41,974
$40.0m	O	-3.6	$27,938	-1092.8	$36,602	T	-6.5	$15,316	-2024.0	$19,763	R	-2.5	$40,758	-953.0	$41,971
$40.1m	O	-3.6	$27,938	-1096.4	$36,574	T	-6.5	$15,316	-2030.5	$19,749	R	-2.5	$40,758	-955.5	$41,968
$40.2m	O	-3.6	$27,938	-1100.0	$36,546	T	-6.5	$15,316	-2037.0	$19,735	R	-2.5	$40,758	-957.9	$41,965
$40.3m	O	-3.6	$27,938	-1103.6	$36,518	T	-6.5	$15,316	-2043.5	$19,721	R	-2.5	$40,758	-960.4	$41,962
$40.4m	O	-3.6	$27,938	-1107.2	$36,490	T	-6.5	$15,316	-2050.1	$19,707	R	-2.5	$40,758	-962.9	$41,959
$40.5m	O	-3.6	$27,938	-1110.7	$36,462	T	-6.5	$15,316	-2056.6	$19,693	R	-2.5	$40,758	-965.3	$41,956

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$40.6m	O	-3.6	$27,938	-1114.3	$36,435	T	-6.5	$15,316	-2063.1	$19,679	R	-2.5	$40,758	-967.8	$41,953
$40.7m	O	-3.6	$27,938	-1117.9	$36,408	T	-6.5	$15,316	-2069.7	$19,665	R	-2.5	$40,758	-970.2	$41,950
$40.8m	O	-3.6	$27,938	-1121.5	$36,381	T	-6.5	$15,316	-2076.2	$19,651	R	-2.5	$40,758	-972.7	$41,947
$40.9m	O	-3.6	$27,938	-1125.1	$36,354	T	-6.5	$15,316	-2082.7	$19,638	R	-2.5	$40,758	-975.1	$41,944
$41.0m	O	-3.6	$27,938	-1128.6	$36,327	T	-6.5	$15,316	-2089.2	$19,624	R	-2.5	$40,758	-977.6	$41,941
$41.1m	O	-3.6	$27,938	-1132.2	$36,301	T	-6.5	$15,316	-2095.8	$19,611	R	-2.5	$40,758	-980.0	$41,938
$41.2m	O	-3.6	$27,938	-1135.8	$36,274	T	-6.5	$15,316	-2102.3	$19,598	R	-2.5	$40,758	-982.5	$41,935
$41.3m	O	-3.6	$27,938	-1139.4	$36,248	T	-6.5	$15,316	-2108.8	$19,584	R	-2.5	$40,758	-984.9	$41,932
$41.4m	O	-3.6	$27,938	-1143.0	$36,222	T	-6.5	$15,316	-2115.4	$19,571	R	-2.5	$40,758	-987.4	$41,929
$41.5m	O	-3.6	$27,938	-1146.5	$36,196	T	-6.5	$15,316	-2121.9	$19,558	R	-2.5	$40,758	-989.8	$41,926
$41.6m	O	-3.6	$27,938	-1150.1	$36,170	T	-6.5	$15,316	-2128.4	$19,545	R	-2.5	$40,758	-992.3	$41,923
$41.7m	O	-3.6	$27,938	-1153.7	$36,145	T	-6.5	$15,316	-2134.9	$19,532	R	-2.5	$40,758	-994.7	$41,920
$41.8m	O	-3.6	$27,938	-1157.3	$36,120	T	-6.5	$15,316	-2141.5	$19,519	R	-2.5	$40,758	-997.2	$41,917
$41.9m	O	-3.6	$27,938	-1160.8	$36,094	T	-6.5	$15,316	-2148.0	$19,506	R	-2.5	$40,758	-999.7	$41,915
$42.0m	O	-3.6	$27,938	-1164.4	$36,069	T	-6.5	$15,316	-2154.5	$19,494	R	-2.5	$40,758	-1002.1	$41,912
$42.1m	O	-3.6	$27,938	-1168.0	$36,044	T	-6.5	$15,316	-2161.1	$19,481	R	-2.5	$40,758	-1004.6	$41,909
$42.2m	O	-3.6	$27,938	-1171.6	$36,020	T	-6.5	$15,316	-2167.6	$19,469	R	-2.5	$40,758	-1007.0	$41,906
$42.3m	O	-3.6	$27,938	-1175.2	$35,995	T	-6.5	$15,316	-2174.1	$19,456	R	-2.5	$40,758	-1009.5	$41,903
$42.4m	O	-3.6	$27,938	-1178.7	$35,971	T	-6.5	$15,316	-2180.7	$19,444	R	-2.5	$40,758	-1011.9	$41,900
$42.5m	O	-3.6	$27,938	-1182.3	$35,946	T	-6.5	$15,316	-2187.2	$19,431	R	-2.5	$40,758	-1014.4	$41,898
$42.6m	O	-3.6	$27,938	-1185.9	$35,922	T	-6.5	$15,316	-2193.7	$19,419	R	-2.5	$40,758	-1016.8	$41,895
$42.7m	O	-3.6	$27,938	-1189.5	$35,898	T	-6.5	$15,316	-2200.2	$19,407	R	-2.5	$40,758	-1019.3	$41,892
$42.8m	O	-3.6	$27,938	-1193.1	$35,874	T	-6.5	$15,316	-2206.8	$19,395	R	-2.5	$40,758	-1021.7	$41,890
$42.9m	O	-3.6	$27,938	-1196.6	$35,850	T	-6.5	$15,316	-2213.3	$19,383	R	-2.5	$40,758	-1024.2	$41,887
$43.0m	O	-3.6	$27,938	-1200.2	$35,827	T	-6.5	$15,316	-2219.8	$19,371	R	-2.5	$40,758	-1026.6	$41,884
$43.1m	O	-3.6	$27,938	-1203.8	$35,803	T	-6.5	$15,316	-2226.4	$19,359	R	-2.5	$40,758	-1029.1	$41,881
$43.2m	O	-3.6	$27,938	-1207.4	$35,780	T	-6.5	$15,316	-2232.9	$19,347	R	-2.5	$40,758	-1031.5	$41,879
$43.3m	O	-3.6	$27,938	-1211.0	$35,757	T	-6.5	$15,316	-2239.4	$19,335	R	-2.5	$40,758	-1034.0	$41,876
$43.4m	O	-3.6	$27,938	-1214.5	$35,734	T	-6.5	$15,316	-2245.9	$19,324	R	-2.5	$40,758	-1036.5	$41,873
$43.5m	O	-3.6	$27,938	-1218.1	$35,711	T	-6.5	$15,316	-2252.5	$19,312	R	-2.5	$40,758	-1038.9	$41,871
$43.6m	O	-3.6	$27,938	-1221.7	$35,688	T	-6.5	$15,316	-2259.0	$19,301	R	-2.5	$40,758	-1041.4	$41,868
$43.7m	O	-3.6	$27,938	-1225.3	$35,665	T	-6.5	$15,316	-2265.5	$19,289	R	-2.5	$40,758	-1043.8	$41,866
$43.8m	O	-3.6	$27,938	-1228.9	$35,643	T	-6.5	$15,316	-2272.1	$19,278	R	-2.5	$40,758	-1046.3	$41,863
$43.9m	O	-3.6	$27,938	-1232.4	$35,621	T	-6.5	$15,316	-2278.6	$19,266	R	-2.5	$40,758	-1048.7	$41,860
$44.0m	O	-3.6	$27,938	-1236.0	$35,598	T	-6.5	$15,316	-2285.1	$19,255	R	-2.5	$40,758	-1051.2	$41,858
$44.1m	O	-3.6	$27,938	-1239.6	$35,576	T	-6.5	$15,316	-2291.7	$19,244	R	-2.5	$40,758	-1053.6	$41,855
$44.2m	O	-3.6	$27,938	-1243.2	$35,554	T	-6.5	$15,316	-2298.2	$19,233	R	-2.5	$40,758	-1056.1	$41,853
$44.3m	O	-3.6	$27,938	-1246.8	$35,532	T	-6.5	$15,316	-2304.7	$19,222	R	-2.5	$40,756	-1058.5	$41,850
$44.4m	O	-3.6	$27,938	-1250.3	$35,511	T	-6.5	$15,316	-2311.2	$19,210	R	-2.5	$40,758	-1061.0	$41,848
$44.5m	O	-3.6	$27,938	-1253.9	$35,489	T	-6.5	$15,316	-2317.8	$19,199	R	-2.5	$40,758	-1063.4	$41,845
$44.6m	O	-3.6	$27,938	-1257.5	$35,468	T	-6.5	$15,316	-2324.3	$19,189	R	-2.5	$40,758	-1065.9	$41,843
$44.7m	O	-3.6	$27,938	-1261.1	$35,446	T	-6.5	$15,316	-2330.8	$19,178	R	-2.5	$40,758	-1068.4	$41,840
$44.8m	O	-3.6	$27,938	-1264.6	$35,425	T	-6.5	$15,316	-2337.4	$19,167	R	-2.5	$40,758	-1070.8	$41,838
$44.9m	O	-3.6	$27,938	-1268.2	$35,404	T	-6.5	$15,316	-2343.9	$19,156	R	-2.5	$40,758	-1073.3	$41,835
$45.0m	O	-3.6	$27,938	-1271.8	$35,383	T	-6.5	$15,316	-2350.4	$19,146	R	-2.5	$40,758	-1075.7	$41,833
$45.1m	O	-3.6	$27,938	-1275.4	$35,362	T	-6.5	$15,316	-2356.9	$19,135	R	-2.5	$40,758	-1078.2	$41,830
$45.2m	O	-3.6	$27,938	-1279.0	$35,341	T	-6.5	$15,316	-2363.5	$19,124	R	-2.5	$40,758	-1080.6	$41,828
$45.3m	O	-3.6	$27,938	-1282.5	$35,320	T	-6.5	$15,316	-2370.0	$19,114	R	-2.5	$40,758	-1083.1	$41,825
$45.4m	O	-3.6	$27,938	-1286.1	$35,300	T	-6.5	$15,316	-2376.5	$19,103	R	-2.5	$40,758	-1085.5	$41,823
$45.5m	O	-3.6	$27,938	-1289.7	$35,279	T	-6.5	$15,316	-2383.1	$19,093	R	-2.5	$40,758	-1088.0	$41,821
$45.6m	O	-3.6	$27,938	-1293.3	$35,259	T	-6.5	$15,316	-2389.6	$19,083	R	-2.5	$40,758	-1090.4	$41,818

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$45.7m	O	-3.6	$27,938	-1296.9	$35,239	T	-6.5	$15,316	-2396.1	$19,072	R	-2.5	$40,758	-1092.9	$41,816
$45.8m	O	-3.6	$27,938	-1300.4	$35,219	T	-6.5	$15,316	-2402.6	$19,062	R	-2.5	$40,758	-1095.3	$41,813
$45.9m	O	-3.6	$27,938	-1304.0	$35,199	T	-6.5	$15,316	-2409.2	$19,052	R	-2.5	$40,758	-1097.8	$41,811
$46.0m	O	-3.6	$27,938	-1307.6	$35,179	T	-6.5	$15,316	-2415.7	$19,042	R	-2.5	$40,758	-1100.2	$41,809
$46.1m	O	-3.6	$27,938	-1311.2	$35,159	T	-6.5	$15,316	-2422.2	$19,032	R	-2.5	$40,758	-1102.7	$41,806
$46.2m	O	-3.6	$27,938	-1314.8	$35,140	T	-6.5	$15,316	-2428.8	$19,022	R	-2.5	$40,758	-1105.2	$41,804
$46.3m	O	-3.6	$27,938	-1318.3	$35,120	T	-6.5	$15,317	-2435.3	$19,012	R	-2.5	$40,758	-1107.6	$41,802
$46.4m	O	-3.6	$27,938	-1321.9	$35,101	T	-6.5	$15,314	-2441.8	$19,002	R	-2.5	$40,758	-1110.1	$41,799
$46.5m	O	-3.6	$27,938	-1325.5	$35,081	T	-6.5	$15,316	-2448.4	$18,992	R	-2.5	$40,758	-1112.5	$41,797
$46.6m	O	-3.6	$27,938	-1329.1	$35,062	T	-6.5	$15,316	-2454.9	$18,983	R	-2.5	$40,758	-1115.0	$41,795
$46.7m	O	-3.6	$27,938	-1332.7	$35,043	T	-6.5	$15,314	-2461.4	$18,973	R	-2.5	$40,758	-1117.4	$41,793
$46.8m	O	-3.6	$27,938	-1336.2	$35,024	T	-6.5	$15,316	-2467.9	$18,963	R	-2.5	$40,758	-1119.9	$41,790
$46.9m	O	-3.6	$27,938	-1339.8	$35,005	T	-6.5	$15,316	-2474.5	$18,954	R	-2.5	$40,758	-1122.3	$41,788
$47.0m	O	-3.6	$27,938	-1343.4	$34,986	T	-6.5	$15,314	-2481.0	$18,944	R	-2.5	$40,758	-1124.8	$41,786
$47.1m	O	-3.6	$27,938	-1347.0	$34,967	T	-6.5	$15,316	-2487.5	$18,934	R	-2.5	$40,758	-1127.2	$41,784
$47.2m	O	-3.6	$27,938	-1350.6	$34,949	T	-6.5	$15,316	-2494.1	$18,925	R	-2.5	$40,758	-1129.7	$41,781
$47.3m	O	-3.6	$27,938	-1354.1	$34,930	T	-6.5	$15,316	-2500.6	$18,916	R	-2.5	$40,758	-1132.1	$41,779
$47.4m	O	-3.6	$27,938	-1357.7	$34,912	T	-6.5	$15,314	-2507.1	$18,906	R	-2.5	$40,758	-1134.6	$41,777
$47.5m	O	-3.6	$27,938	-1361.3	$34,893	T	-6.5	$15,316	-2513.6	$18,897	R	-2.5	$40,758	-1137.1	$41,775
$47.6m	O	-3.6	$27,938	-1364.9	$34,875	T	-6.5	$15,316	-2520.2	$18,888	R	-2.5	$40,758	-1139.5	$41,773
$47.7m	O	-3.6	$27,938	-1368.4	$34,857	T	-6.5	$15,314	-2526.7	$18,878	R	-2.5	$40,758	-1142.0	$41,770
$47.8m	O	-3.6	$27,938	-1372.0	$34,839	T	-6.5	$15,316	-2533.2	$18,869	R	-2.5	$40,758	-1144.4	$41,768
$47.9m	O	-3.6	$27,938	-1375.6	$34,821	T	-6.5	$15,316	-2539.8	$18,860	R	-2.5	$40,758	-1146.9	$41,766
$48.0m	O	-3.6	$27,938	-1379.2	$34,803	T	-6.5	$15,314	-2546.3	$18,851	R	-2.5	$40,758	-1149.3	$41,764
$48.1m	O	-3.6	$27,938	-1382.8	$34,785	T	-6.5	$15,316	-2552.8	$18,842	R	-2.5	$40,758	-1151.8	$41,762
$48.2m	O	-3.6	$27,938	-1386.3	$34,768	T	-6.5	$15,316	-2559.4	$18,833	R	-2.5	$40,758	-1154.2	$41,760
$48.3m	O	-3.6	$27,938	-1389.9	$34,750	T	-6.5	$15,316	-2565.9	$18,824	R	-2.5	$40,751	-1156.7	$41,758
$48.4m	O	-3.6	$27,938	-1393.5	$34,733	T	-6.5	$15,314	-2572.4	$18,815	R	-2.5	$40,766	-1159.1	$41,755
$48.5m	O	-3.6	$27,938	-1397.1	$34,715	T	-6.5	$15,316	-2578.9	$18,806	R	-2.5	$40,750	-1161.6	$41,753
$48.6m	O	-3.6	$27,938	-1400.7	$34,698	T	-6.5	$15,316	-2585.5	$18,797	R	-2.5	$40,766	-1164.0	$41,751
$48.7m	O	-3.6	$27,938	-1404.2	$34,681	T	-6.5	$15,314	-2592.0	$18,789	R	-2.5	$40,750	-1166.5	$41,749
$48.8m	O	-3.6	$27,938	-1407.8	$34,664	T	-6.5	$15,316	-2598.5	$18,780	R	-2.5	$40,766	-1168.9	$41,747
$48.9m	O	-3.6	$27,938	-1411.4	$34,646	T	-6.5	$15,316	-2605.1	$18,771	R	-2.5	$40,750	-1171.4	$41,745
$49.0m	O	-3.6	$27,938	-1415.0	$34,629	T	-6.5	$15,316	-2611.6	$18,763	R	-2.5	$40,766	-1173.9	$41,743
$49.1m	O	-3.6	$27,938	-1418.6	$34,613	T	-6.5	$15,314	-2618.1	$18,754	R	-2.5	$40,750	-1176.3	$41,741
$49.2m	O	-3.6	$27,938	-1422.1	$34,596	T	-6.5	$15,316	-2624.6	$18,745	R	-2.5	$40,766	-1178.8	$41,739
$49.3m	O	-3.6	$27,938	-1425.7	$34,579	T	-6.5	$15,316	-2631.2	$18,737	R	-2.5	$40,750	-1181.2	$41,737
$49.4m	O	-3.6	$27,938	-1429.3	$34,562	T	-6.5	$15,314	-2637.7	$18,728	R	-2.5	$40,766	-1183.7	$41,735
$49.5m	O	-3.6	$27,938	-1432.9	$34,546	T	-6.5	$15,316	-2644.2	$18,720	R	-2.5	$40,750	-1186.1	$41,733
$49.6m	O	-3.6	$27,938	-1436.5	$34,529	T	-6.5	$15,316	-2650.8	$18,712	R	-2.5	$40,766	-1188.6	$41,731
$49.7m	O	-3.6	$27,938	-1440.0	$34,513	T	-6.5	$15,314	-2657.3	$18,703	R	-2.5	$40,750	-1191.0	$41,729
$49.8m	O	-3.6	$27,938	-1443.6	$34,497	T	-6.5	$15,316	-2663.8	$18,695	R	-2.5	$40,766	-1193.5	$41,727
$49.9m	O	-3.6	$27,938	-1447.2	$34,481	T	-6.5	$15,316	-2670.4	$18,687	R	-2.5	$40,750	-1195.9	$41,725
$50.0m	O	-3.6	$27,938	-1450.8	$34,464	T	-6.5	$15,316	-2676.9	$18,678	R	-2.5	$40,766	-1198.4	$41,723

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $0.1m reduction in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m reduction in incremental expenditure on marginal technology; [c] Marginal ICER in contraction for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net investments.

Table A1.1.2: Reallocation following net disinvestment (divisibility and constant returns)

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$0.1m	R	2.5	$40,758	2.5	$40,758	O	3.6	$27,938	3.6	$27,938	Q	2.1	$48,185	2.1	$48,185
$0.2m	R	2.5	$40,758	4.9	$40,758	O	3.6	$27,938	7.2	$27,938	Q	2.1	$48,185	4.2	$48,185
$0.3m	R	2.5	$40,758	7.4	$40,758	O	3.6	$27,938	10.7	$27,938	Q	2.1	$48,185	6.2	$48,185
$0.4m	R	2.5	$40,758	9.8	$40,758	O	3.6	$27,938	14.3	$27,938	Q	2.1	$48,185	8.3	$48,185
$0.5m	R	2.5	$40,758	12.3	$40,758	O	3.6	$27,938	17.9	$27,938	Q	2.1	$48,185	10.4	$48,185
$0.6m	R	2.5	$40,758	14.7	$40,758	O	3.6	$27,938	21.5	$27,938	Q	2.1	$48,185	12.5	$48,185
$0.7m	R	2.5	$40,758	17.2	$40,758	O	3.6	$27,938	25.1	$27,938	Q	2.1	$48,185	14.5	$48,185
$0.8m	R	2.5	$40,758	19.6	$40,758	O	3.6	$27,938	28.6	$27,938	Q	2.1	$48,185	16.6	$48,185
$0.9m	R	2.5	$40,758	22.1	$40,758	O	3.6	$27,938	32.2	$27,938	Q	2.1	$48,185	18.7	$48,185
$1.0m	R	2.5	$40,758	24.5	$40,758	O	3.6	$27,938	35.8	$27,938	Q	2.1	$48,185	20.8	$48,185
$1.1m	R	2.5	$40,758	27.0	$40,758	O	3.6	$27,938	39.4	$27,938	Q	2.1	$48,185	22.8	$48,185
$1.2m	R	2.5	$40,758	29.4	$40,758	O	3.6	$27,938	43.0	$27,938	Q	2.1	$48,185	24.9	$48,185
$1.3m	R	2.5	$40,758	31.9	$40,758	O	3.6	$27,938	46.5	$27,938	Q	2.1	$48,185	27.0	$48,185
$1.4m	R	2.5	$40,758	34.3	$40,758	O	3.6	$27,938	50.1	$27,938	Q	2.1	$48,185	29.1	$48,185
$1.5m	R	2.5	$40,758	36.8	$40,758	O	3.6	$27,938	53.7	$27,938	Q	2.1	$48,185	31.1	$48,185
$1.6m	R	2.5	$40,758	39.3	$40,758	O	3.6	$27,938	57.3	$27,938	Q	2.1	$48,185	33.2	$48,185
$1.7m	R	2.5	$40,758	41.7	$40,758	O	3.6	$27,938	60.8	$27,938	Q	2.1	$48,185	35.3	$48,185
$1.8m	R	2.5	$40,758	44.2	$40,758	O	3.6	$27,938	64.4	$27,938	Q	2.1	$48,185	37.4	$48,185
$1.9m	R	2.5	$40,758	46.6	$40,758	O	3.6	$27,938	68.0	$27,938	Q	2.1	$48,185	39.4	$48,185
$2.0m	R	2.5	$40,758	49.1	$40,758	O	3.6	$27,938	71.6	$27,938	Q	2.1	$48,185	41.5	$48,185
$2.1m	R	2.5	$40,758	51.5	$40,758	O	3.6	$27,938	75.2	$27,938	Q	2.1	$48,185	43.6	$48,185
$2.2m	R	2.5	$40,758	54.0	$40,758	O	3.6	$27,938	78.7	$27,938	Q	2.1	$48,185	45.7	$48,185
$2.3m	R	2.5	$40,758	56.4	$40,758	O	3.6	$27,938	82.3	$27,938	Q	2.1	$48,185	47.7	$48,185
$2.4m	R	2.5	$40,758	58.9	$40,758	O	3.6	$27,938	85.9	$27,938	Q	2.1	$48,185	49.8	$48,185
$2.5m	R	2.5	$40,758	61.3	$40,758	O	3.6	$27,938	89.5	$27,938	Q	2.1	$48,185	51.9	$48,185
$2.6m	R	2.5	$40,758	63.8	$40,758	O	3.6	$27,938	93.1	$27,938	Q	2.1	$48,185	54.0	$48,185
$2.7m	R	2.5	$40,758	66.2	$40,758	O	3.6	$27,938	96.6	$27,938	Q	2.1	$48,185	56.0	$48,185
$2.8m	R	2.5	$40,758	68.7	$40,758	O	3.6	$27,938	100.2	$27,938	Q	2.1	$48,185	58.1	$48,185
$2.9m	R	2.5	$40,758	71.2	$40,758	O	3.6	$27,938	103.8	$27,938	Q	2.1	$48,185	60.2	$48,185
$3.0m	R	2.5	$40,758	73.6	$40,758	O	3.6	$27,938	107.4	$27,938	Q	2.1	$48,185	62.3	$48,185
$3.1m	R	2.5	$40,758	76.1	$40,758	O	3.6	$27,938	111.0	$27,938	Q	2.1	$48,185	64.3	$48,185
$3.2m	R	2.5	$40,758	78.5	$40,758	O	3.6	$27,938	114.5	$27,938	Q	2.1	$48,185	66.4	$48,185
$3.3m	R	2.5	$40,758	81.0	$40,758	O	3.6	$27,938	118.1	$27,938	Q	2.1	$48,185	68.5	$48,185
$3.4m	R	2.5	$40,758	83.4	$40,758	O	3.6	$27,938	121.7	$27,938	Q	2.1	$48,185	70.6	$48,185
$3.5m	R	2.5	$40,758	85.9	$40,758	O	3.6	$27,938	125.3	$27,938	Q	2.1	$48,185	72.6	$48,185
$3.6m	R	2.5	$40,758	88.3	$40,758	O	3.6	$27,938	128.9	$27,938	Q	2.1	$48,185	74.7	$48,185
$3.7m	R	2.5	$40,758	90.8	$40,758	O	3.6	$27,938	132.4	$27,938	Q	2.1	$48,185	76.8	$48,185
$3.8m	R	2.5	$40,758	93.2	$40,758	O	3.6	$27,938	136.0	$27,938	Q	2.1	$48,185	78.9	$48,185
$3.9m	R	2.5	$40,758	95.7	$40,758	O	3.6	$27,938	139.6	$27,938	Q	2.1	$48,185	80.9	$48,185
$4.0m	R	2.5	$40,758	98.1	$40,758	O	3.6	$27,938	143.2	$27,938	Q	2.1	$48,185	83.0	$48,185
$4.1m	R	2.5	$40,757	100.6	$40,758	O	3.6	$27,938	146.8	$27,938	Q	2.1	$48,185	85.1	$48,185
$4.2m	R	2.5	$40,758	103.0	$40,758	O	3.6	$27,938	150.3	$27,938	Q	2.1	$48,185	87.2	$48,185
$4.3m	R	2.5	$40,758	105.5	$40,758	O	3.6	$27,938	153.9	$27,938	Q	2.1	$48,185	89.2	$48,185
$4.4m	R	2.5	$40,758	108.0	$40,758	O	3.6	$27,938	157.5	$27,938	Q	2.1	$48,185	91.3	$48,185
$4.5m	R	2.5	$40,758	110.4	$40,758	O	3.6	$27,938	161.1	$27,938	Q	2.1	$48,185	93.4	$48,185
$4.6m	R	2.5	$40,758	112.9	$40,758	O	3.6	$27,938	164.6	$27,938	Q	2.1	$48,185	95.5	$48,185
$4.7m	R	2.5	$40,758	115.3	$40,758	O	3.6	$27,938	168.2	$27,938	Q	2.1	$48,185	97.5	$48,185
$4.8m	R	2.5	$40,758	117.8	$40,758	O	3.6	$27,938	171.8	$27,938	Q	2.1	$48,185	99.6	$48,185

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$4.9m	R	2.5	$40,758	120.2	$40,758	O	3.6	$27,938	175.4	$27,938	Q	2.1	$48,186	101.7	$48,185
$5.0m	R	2.5	$40,758	122.7	$40,758	O	3.6	$27,938	179.0	$27,938	Q	2.1	$48,183	103.8	$48,185
$5.1m	R	2.5	$40,758	125.1	$40,758	O	3.6	$27,938	182.5	$27,938	Q	2.1	$48,186	105.8	$48,185
$5.2m	R	2.5	$40,758	127.6	$40,758	O	3.6	$27,938	186.1	$27,938	Q	2.1	$48,186	107.9	$48,185
$5.3m	R	2.5	$40,758	130.0	$40,758	O	3.6	$27,938	189.7	$27,938	Q	2.1	$48,186	110.0	$48,185
$5.4m	R	2.5	$40,758	132.5	$40,758	O	3.6	$27,938	193.3	$27,938	Q	2.1	$48,183	112.1	$48,185
$5.5m	R	2.5	$40,758	134.9	$40,758	O	3.6	$27,938	196.9	$27,938	Q	2.1	$48,186	114.1	$48,185
$5.6m	R	2.5	$40,758	137.4	$40,758	O	3.6	$27,938	200.4	$27,938	Q	2.1	$48,186	116.2	$48,185
$5.7m	R	2.5	$40,758	139.8	$40,758	O	3.6	$27,938	204.0	$27,938	Q	2.1	$48,186	118.3	$48,185
$5.8m	R	2.5	$40,758	142.3	$40,758	O	3.6	$27,938	207.6	$27,938	Q	2.1	$48,183	120.4	$48,185
$5.9m	R	2.5	$40,758	144.8	$40,758	O	3.6	$27,938	211.2	$27,938	Q	2.1	$48,186	122.4	$48,185
$6.0m	R	2.5	$40,758	147.2	$40,758	O	3.6	$27,938	214.8	$27,938	Q	2.1	$48,186	124.5	$48,185
$6.1m	R	2.5	$40,758	149.7	$40,758	O	3.6	$27,938	218.3	$27,938	Q	2.1	$48,183	126.6	$48,185
$6.2m	R	2.5	$40,758	152.1	$40,758	O	3.6	$27,938	221.9	$27,938	Q	2.1	$48,186	128.7	$48,185
$6.3m	R	2.5	$40,758	154.6	$40,758	O	3.6	$27,938	225.5	$27,938	Q	2.1	$48,186	130.7	$48,185
$6.4m	R	2.5	$40,758	157.0	$40,758	O	3.6	$27,938	229.1	$27,938	Q	2.1	$48,186	132.8	$48,185
$6.5m	R	2.5	$40,758	159.5	$40,758	O	3.6	$27,938	232.7	$27,938	Q	2.1	$48,183	134.9	$48,185
$6.6m	R	2.5	$40,758	161.9	$40,758	O	3.6	$27,938	236.2	$27,938	Q	2.1	$48,186	137.0	$48,185
$6.7m	R	2.5	$40,758	164.4	$40,758	O	3.6	$27,938	239.8	$27,938	Q	2.1	$48,186	139.0	$48,185
$6.8m	R	2.5	$40,758	166.8	$40,758	O	3.6	$27,938	243.4	$27,938	Q	2.1	$48,186	141.1	$48,185
$6.9m	R	2.5	$40,758	169.3	$40,758	O	3.6	$27,938	247.0	$27,938	Q	2.1	$48,183	143.2	$48,185
$7.0m	R	2.5	$40,758	171.7	$40,758	O	3.6	$27,938	250.6	$27,938	Q	2.1	$48,186	145.3	$48,185
$7.1m	R	2.5	$40,758	174.2	$40,758	O	3.6	$27,938	254.1	$27,938	Q	2.1	$48,186	147.3	$48,185
$7.2m	R	2.5	$40,758	176.7	$40,758	O	3.6	$27,938	257.7	$27,938	Q	2.1	$48,186	149.4	$48,185
$7.3m	R	2.5	$40,758	179.1	$40,758	O	3.6	$27,938	261.3	$27,938	Q	2.1	$48,183	151.5	$48,185
$7.4m	R	2.5	$40,758	181.6	$40,758	O	3.6	$27,938	264.9	$27,938	Q	2.1	$48,186	153.6	$48,185
$7.5m	R	2.5	$40,758	184.0	$40,758	O	3.6	$27,938	268.4	$27,938	Q	2.1	$48,186	155.6	$48,185
$7.6m	R	2.5	$40,758	186.5	$40,758	O	3.6	$27,938	272.0	$27,938	Q	2.1	$48,186	157.7	$48,185
$7.7m	R	2.5	$40,758	188.9	$40,758	O	3.6	$27,938	275.6	$27,938	Q	2.1	$48,183	159.8	$48,185
$7.8m	R	2.5	$40,758	191.4	$40,758	O	3.6	$27,938	279.2	$27,938	Q	2.1	$48,186	161.9	$48,185
$7.9m	R	2.5	$40,758	193.8	$40,758	O	3.6	$27,938	282.8	$27,938	Q	2.1	$48,186	164.0	$48,185
$8.0m	R	2.5	$40,758	196.3	$40,758	O	3.6	$27,938	286.3	$27,938	Q	2.1	$48,186	166.0	$48,185
$8.1m	R	2.5	$40,758	198.7	$40,758	O	3.6	$27,938	289.9	$27,938	Q	2.1	$48,183	168.1	$48,185
$8.2m	R	2.5	$40,758	201.2	$40,758	O	3.6	$27,938	293.5	$27,938	Q	2.1	$48,186	170.2	$48,185
$8.3m	R	2.5	$40,758	203.6	$40,758	O	3.6	$27,938	297.1	$27,938	Q	2.1	$48,186	172.3	$48,185
$8.4m	R	2.5	$40,758	206.1	$40,758	O	3.6	$27,938	300.7	$27,938	Q	2.1	$48,186	174.3	$48,185
$8.5m	R	2.5	$40,758	208.5	$40,758	O	3.6	$27,938	304.2	$27,938	Q	2.1	$48,183	176.4	$48,185
$8.6m	R	2.5	$40,758	211.0	$40,758	O	3.6	$27,938	307.8	$27,938	Q	2.1	$48,186	178.5	$48,185
$8.7m	R	2.5	$40,758	213.5	$40,758	O	3.6	$27,938	311.4	$27,938	Q	2.1	$48,186	180.6	$48,185
$8.8m	R	2.5	$40,758	215.9	$40,758	O	3.6	$27,938	315.0	$27,938	Q	2.1	$48,186	182.6	$48,185
$8.9m	R	2.5	$40,758	218.4	$40,758	O	3.6	$27,938	318.6	$27,938	Q	2.1	$48,183	184.7	$48,185
$9.0m	R	2.5	$40,758	220.8	$40,758	O	3.6	$27,938	322.1	$27,938	Q	2.1	$48,186	186.8	$48,185
$9.1m	R	2.5	$40,758	223.3	$40,758	O	3.6	$27,938	325.7	$27,938	Q	2.1	$48,186	188.9	$48,185
$9.2m	R	2.5	$40,758	225.7	$40,758	O	3.6	$27,938	329.3	$27,938	Q	2.1	$48,186	190.9	$48,185
$9.3m	R	2.5	$40,758	228.2	$40,758	O	3.6	$27,938	332.9	$27,938	Q	2.1	$48,183	193.0	$48,185
$9.4m	R	2.5	$40,758	230.6	$40,758	O	3.6	$27,938	336.5	$27,938	Q	2.1	$48,186	195.1	$48,185
$9.5m	R	2.5	$40,758	233.1	$40,758	O	3.6	$27,938	340.0	$27,938	Q	2.1	$48,186	197.2	$48,185
$9.6m	R	2.5	$40,758	235.5	$40,758	O	3.6	$27,938	343.6	$27,938	Q	2.1	$48,186	199.2	$48,185
$9.7m	R	2.5	$40,758	238.0	$40,758	O	3.6	$27,938	347.2	$27,938	Q	2.1	$48,183	201.3	$48,185
$9.8m	R	2.5	$40,758	240.4	$40,758	O	3.6	$27,938	350.8	$27,938	Q	2.1	$48,186	203.4	$48,185
$9.9m	R	2.5	$40,758	242.9	$40,758	O	3.6	$27,938	354.4	$27,938	Q	2.1	$48,186	205.5	$48,185

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$10.0m	R	2.5	$40,758	245.4	$40,758	O	3.6	$27,938	357.9	$27,938	Q	2.1	$48,186	207.5	$48,185
$10.1m	R	2.5	$40,756	247.8	$40,758	O	3.6	$27,938	361.5	$27,938	Q	2.1	$48,183	209.6	$48,185
$10.2m	R	2.5	$40,758	250.3	$40,758	O	3.6	$27,938	365.1	$27,938	Q	2.1	$48,186	211.7	$48,185
$10.3m	R	2.5	$40,758	252.7	$40,758	O	3.6	$27,938	368.7	$27,938	Q	2.1	$48,186	213.8	$48,185
$10.4m	R	2.5	$40,758	255.2	$40,758	O	3.6	$27,938	372.2	$27,938	Q	2.1	$48,186	215.8	$48,185
$10.5m	R	2.5	$40,758	257.6	$40,758	O	3.6	$27,938	375.8	$27,938	Q	2.1	$48,183	217.9	$48,185
$10.6m	R	2.5	$40,758	260.1	$40,758	H	3.0	$33,472	378.8	$27,982	Q	2.1	$48,186	220.0	$48,185
$10.7m	R	2.5	$40,758	262.5	$40,758	H	3.0	$33,472	381.8	$28,025	Q	2.1	$48,186	222.1	$48,185
$10.8m	R	2.5	$40,758	265.0	$40,758	H	3.0	$33,472	384.8	$28,067	Q	2.1	$48,186	224.1	$48,185
$10.9m	R	2.5	$40,758	267.4	$40,758	H	3.0	$33,472	387.8	$28,109	Q	2.1	$48,183	226.2	$48,185
$11.0m	R	2.5	$40,758	269.9	$40,758	H	3.0	$33,472	390.8	$28,150	Q	2.1	$48,186	228.3	$48,185
$11.1m	R	2.5	$40,758	272.3	$40,758	H	3.0	$33,472	393.8	$28,190	Q	2.1	$48,186	230.4	$48,185
$11.2m	R	2.5	$40,758	274.8	$40,758	H	3.0	$33,472	396.7	$28,230	Q	2.1	$48,186	232.4	$48,185
$11.3m	R	2.5	$40,758	277.2	$40,758	H	3.0	$33,472	399.7	$28,269	Q	2.1	$48,183	234.5	$48,185
$11.4m	R	2.5	$40,758	279.7	$40,758	H	3.0	$33,472	402.7	$28,308	Q	2.1	$48,186	236.6	$48,185
$11.5m	R	2.5	$40,758	282.2	$40,758	H	3.0	$33,472	405.7	$28,346	Q	2.1	$48,186	238.7	$48,185
$11.6m	R	2.5	$40,758	284.6	$40,758	H	3.0	$33,472	408.7	$28,383	Q	2.1	$48,186	240.7	$48,185
$11.7m	R	2.5	$40,758	287.1	$40,758	H	3.0	$33,472	411.7	$28,420	Q	2.1	$48,183	242.8	$48,185
$11.8m	R	2.5	$40,758	289.5	$40,758	H	3.0	$33,472	414.7	$28,457	Q	2.1	$48,186	244.9	$48,185
$11.9m	R	2.5	$40,758	292.0	$40,758	H	3.0	$33,472	417.7	$28,492	Q	2.1	$48,186	247.0	$48,185
$12.0m	R	2.5	$40,758	294.4	$40,758	H	3.0	$33,472	420.6	$28,528	Q	2.1	$48,186	249.0	$48,185
$12.1m	R	2.5	$40,758	296.9	$40,758	H	3.0	$33,472	423.6	$28,563	Q	2.1	$48,183	251.1	$48,185
$12.2m	R	2.5	$40,758	299.3	$40,758	H	3.0	$33,472	426.6	$28,597	Q	2.1	$48,186	253.2	$48,185
$12.3m	R	2.5	$40,758	301.8	$40,758	H	3.0	$33,472	429.6	$28,631	Q	2.1	$48,186	255.3	$48,185
$12.4m	R	2.5	$40,758	304.2	$40,758	H	3.0	$33,472	432.6	$28,664	Q	2.1	$48,183	257.3	$48,185
$12.5m	R	2.5	$40,758	306.7	$40,758	H	3.0	$33,472	435.6	$28,697	Q	2.1	$48,186	259.4	$48,185
$12.6m	R	2.5	$40,758	309.1	$40,758	H	3.0	$33,472	438.6	$28,730	Q	2.1	$48,186	261.5	$48,185
$12.7m	R	2.5	$40,758	311.6	$40,758	H	3.0	$33,472	441.6	$28,762	Q	2.1	$48,186	263.6	$48,185
$12.8m	R	2.5	$40,758	314.0	$40,758	H	3.0	$33,472	444.5	$28,794	Q	2.1	$48,183	265.6	$48,185
$12.9m	R	2.5	$40,758	316.5	$40,758	H	3.0	$33,472	447.5	$28,825	Q	2.1	$48,186	267.7	$48,185
$13.0m	R	2.5	$40,758	319.0	$40,758	H	3.0	$33,472	450.5	$28,856	Q	2.1	$48,186	269.8	$48,185
$13.1m	R	2.5	$40,758	321.4	$40,758	H	3.0	$33,472	453.5	$28,886	Q	2.1	$48,186	271.9	$48,185
$13.2m	R	2.5	$40,758	323.9	$40,758	H	3.0	$33,472	456.5	$28,916	Q	2.1	$48,183	273.9	$48,185
$13.3m	R	2.5	$40,758	326.3	$40,758	H	3.0	$33,472	459.5	$28,946	Q	2.1	$48,186	276.0	$48,185
$13.4m	R	2.5	$40,758	328.8	$40,758	H	3.0	$33,472	462.5	$28,975	Q	2.1	$48,186	278.1	$48,185
$13.5m	R	2.5	$40,758	331.2	$40,758	H	3.0	$33,472	465.5	$29,004	Q	2.1	$48,186	280.2	$48,185
$13.6m	R	2.5	$40,758	333.7	$40,758	H	3.0	$33,472	468.4	$29,032	Q	2.1	$48,183	282.2	$48,185
$13.7m	R	2.5	$40,758	336.1	$40,758	H	3.0	$33,472	471.4	$29,060	Q	2.1	$48,186	284.3	$48,185
$13.8m	R	2.5	$40,758	338.6	$40,758	H	3.0	$33,472	474.4	$29,088	Q	2.1	$48,186	286.4	$48,185
$13.9m	R	2.5	$40,758	341.0	$40,758	H	3.0	$33,472	477.4	$29,116	Q	2.1	$48,186	288.5	$48,185
$14.0m	R	2.5	$40,758	343.5	$40,758	H	3.0	$33,472	480.4	$29,143	Q	2.1	$48,183	290.5	$48,185
$14.1m	R	2.5	$40,758	345.9	$40,758	H	3.0	$33,472	483.4	$29,170	M	2.0	$49,596	292.6	$48,195
$14.2m	R	2.5	$40,758	348.4	$40,758	H	3.0	$33,472	486.4	$29,196	M	2.0	$49,596	294.6	$48,205
$14.3m	R	2.5	$40,758	350.9	$40,758	H	3.0	$33,473	489.4	$29,222	M	2.0	$49,596	296.6	$48,214
$14.4m	R	2.5	$40,758	353.3	$40,758	H	3.0	$33,472	492.3	$29,248	M	2.0	$49,596	298.6	$48,223
$14.5m	R	2.5	$40,758	355.8	$40,758	H	3.0	$33,472	495.3	$29,273	M	2.0	$49,596	300.6	$48,233
$14.6m	R	2.5	$40,758	358.2	$40,758	H	3.0	$33,472	498.3	$29,298	M	2.0	$49,596	302.6	$48,242
$14.7m	R	2.5	$40,758	360.7	$40,758	H	3.0	$33,473	501.3	$29,323	M	2.0	$49,596	304.7	$48,251
$14.8m	R	2.5	$40,758	363.1	$40,758	H	3.0	$33,472	504.3	$29,348	M	2.0	$49,596	306.7	$48,259
$14.9m	R	2.5	$40,758	365.6	$40,758	H	3.0	$33,472	507.3	$29,372	M	2.0	$49,596	308.7	$48,268
$15.0m	R	2.5	$40,758	368.0	$40,758	H	3.0	$33,472	510.3	$29,396	M	2.0	$49,596	310.7	$48,277

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$15.1m	R	2.5	$40,758	370.5	$40,758	H	3.0	$33,473	513.3	$29,420	M	2.0	$49,596	312.7	$48,285
$15.2m	R	2.5	$40,758	372.9	$40,758	H	3.0	$33,472	516.2	$29,443	M	2.0	$49,596	314.7	$48,294
$15.3m	R	2.5	$40,758	375.4	$40,758	H	3.0	$33,472	519.2	$29,467	M	2.0	$49,596	316.8	$48,302
$15.4m	R	2.5	$40,758	377.8	$40,758	H	3.0	$33,472	522.2	$29,489	M	2.0	$49,596	318.8	$48,310
$15.5m	R	2.5	$40,758	380.3	$40,758	H	3.0	$33,473	525.2	$29,512	M	2.0	$49,596	320.8	$48,318
$15.6m	R	2.5	$40,758	382.7	$40,758	H	3.0	$33,472	528.2	$29,535	M	2.0	$49,596	322.8	$48,326
$15.7m	R	2.5	$40,758	385.2	$40,758	H	3.0	$33,472	531.2	$29,557	M	2.0	$49,596	324.8	$48,334
$15.8m	R	2.5	$40,758	387.7	$40,758	H	3.0	$33,472	534.2	$29,579	M	2.0	$49,596	326.8	$48,342
$15.9m	R	2.5	$40,758	390.1	$40,758	H	3.0	$33,473	537.2	$29,600	M	2.0	$49,596	328.9	$48,350
$16.0m	R	2.5	$40,758	392.6	$40,758	H	3.0	$33,472	540.1	$29,622	M	2.0	$49,596	330.9	$48,357
$16.1m	R	2.5	$40,758	395.0	$40,758	H	3.0	$33,472	543.1	$29,643	M	2.0	$49,596	332.9	$48,365
$16.2m	R	2.5	$40,758	397.5	$40,758	H	3.0	$33,472	546.1	$29,664	M	2.0	$49,596	334.9	$48,372
$16.3m	R	2.5	$40,758	399.9	$40,758	H	3.0	$33,473	549.1	$29,685	M	2.0	$49,596	336.9	$48,379
$16.4m	R	2.5	$40,758	402.4	$40,758	H	3.0	$33,472	552.1	$29,705	M	2.0	$49,596	338.9	$48,387
$16.5m	R	2.5	$40,758	404.8	$40,758	H	3.0	$33,472	555.1	$29,725	M	2.0	$49,596	341.0	$48,394
$16.6m	R	2.5	$40,758	407.3	$40,758	H	3.0	$33,472	558.1	$29,745	M	2.0	$49,596	343.0	$48,401
$16.7m	R	2.5	$40,756	409.7	$40,758	H	3.0	$33,473	561.1	$29,765	M	2.0	$49,596	345.0	$48,408
$16.8m	R	2.5	$40,758	412.2	$40,758	H	3.0	$33,472	564.0	$29,785	M	2.0	$49,596	347.0	$48,415
$16.9m	R	2.5	$40,758	414.6	$40,758	H	3.0	$33,472	567.0	$29,804	M	2.0	$49,596	349.0	$48,422
$17.0m	R	2.5	$40,758	417.1	$40,758	H	3.0	$33,472	570.0	$29,823	M	2.0	$49,596	351.0	$48,428
$17.1m	R	2.5	$40,758	419.5	$40,758	H	3.0	$33,473	573.0	$29,842	M	2.0	$49,596	353.1	$48,435
$17.2m	R	2.5	$40,758	422.0	$40,758	H	3.0	$33,472	576.0	$29,861	M	2.0	$49,596	355.1	$48,442
$17.3m	R	2.5	$40,758	424.5	$40,758	H	3.0	$33,472	579.0	$29,880	M	2.0	$49,596	357.1	$48,448
$17.4m	R	2.5	$40,758	426.9	$40,758	H	3.0	$33,472	582.0	$29,898	M	2.0	$49,596	359.1	$48,454
$17.5m	R	2.5	$40,758	429.4	$40,758	H	3.0	$33,473	585.0	$29,917	M	2.0	$49,596	361.1	$48,461
$17.6m	R	2.5	$40,758	431.8	$40,758	H	3.0	$33,472	587.9	$29,935	M	2.0	$49,596	363.1	$48,467
$17.7m	R	2.5	$40,758	434.3	$40,758	H	3.0	$33,472	590.9	$29,953	M	2.0	$49,596	365.1	$48,473
$17.8m	R	2.5	$40,758	436.7	$40,758	H	3.0	$33,472	593.9	$29,970	M	2.0	$49,596	367.2	$48,480
$17.9m	R	2.5	$40,758	439.2	$40,758	H	3.0	$33,473	596.9	$29,988	M	2.0	$49,596	369.2	$48,486
$18.0m	R	2.5	$40,758	441.6	$40,758	H	3.0	$33,472	599.9	$30,005	M	2.0	$49,596	371.2	$48,492
$18.1m	R	2.5	$40,758	444.1	$40,758	H	3.0	$33,472	602.9	$30,022	M	2.0	$49,596	373.2	$48,498
$18.2m	R	2.5	$40,758	446.5	$40,758	H	3.0	$33,472	605.9	$30,039	M	2.0	$49,596	375.2	$48,504
$18.3m	R	2.5	$40,758	449.0	$40,758	H	3.0	$33,473	608.9	$30,056	M	2.0	$49,596	377.2	$48,509
$18.4m	R	2.5	$40,758	451.4	$40,758	H	3.0	$33,472	611.8	$30,073	M	2.0	$49,596	379.3	$48,515
$18.5m	R	2.5	$40,758	453.9	$40,758	H	3.0	$33,472	614.8	$30,089	M	2.0	$49,596	381.3	$48,521
$18.6m	R	2.5	$40,758	456.4	$40,758	H	3.0	$33,472	617.8	$30,106	M	2.0	$49,596	383.3	$48,527
$18.7m	R	2.5	$40,758	458.8	$40,758	H	3.0	$33,473	620.8	$30,122	M	2.0	$49,596	385.3	$48,532
$18.8m	R	2.5	$40,758	461.3	$40,758	H	3.0	$33,472	623.8	$30,138	M	2.0	$49,596	387.3	$48,538
$18.9m	R	2.5	$40,758	463.7	$40,758	H	3.0	$33,472	626.8	$30,154	M	2.0	$49,596	389.3	$48,543
$19.0m	R	2.5	$40,758	466.2	$40,758	H	3.0	$33,473	629.8	$30,170	M	2.0	$49,596	391.4	$48,549
$19.1m	R	2.5	$40,758	468.6	$40,758	H	3.0	$33,472	632.8	$30,185	M	2.0	$49,596	393.4	$48,554
$19.2m	R	2.5	$40,758	471.1	$40,758	H	3.0	$33,472	635.7	$30,201	M	2.0	$49,596	395.4	$48,559
$19.3m	R	2.5	$40,758	473.5	$40,758	H	3.0	$33,472	638.7	$30,216	M	2.0	$49,596	397.4	$48,564
$19.4m	R	2.5	$40,758	476.0	$40,758	H	3.0	$33,473	641.7	$30,231	M	2.0	$49,596	399.4	$48,570
$19.5m	R	2.5	$40,758	478.4	$40,758	H	3.0	$33,472	644.7	$30,246	M	2.0	$49,596	401.4	$48,575
$19.6m	R	2.5	$40,758	480.9	$40,758	H	3.0	$33,472	647.7	$30,261	M	2.0	$49,596	403.5	$48,580
$19.7m	R	2.5	$40,758	483.3	$40,758	H	3.0	$33,472	650.7	$30,276	M	2.0	$49,596	405.5	$48,585
$19.8m	R	2.5	$40,758	485.8	$40,758	H	3.0	$33,473	653.7	$30,290	M	2.0	$49,596	407.5	$48,590
$19.9m	R	2.5	$40,758	488.2	$40,758	H	3.0	$33,472	656.7	$30,305	M	2.0	$49,593	409.5	$48,595
$20.0m	R	2.5	$40,758	490.7	$40,758	H	3.0	$33,472	659.6	$30,319	M	2.0	$49,596	411.5	$48,600
$20.1m	R	2.5	$40,758	493.2	$40,758	H	3.0	$33,472	662.6	$30,333	M	2.0	$49,596	413.5	$48,605

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$20.2m	R	2.5	$40,758	495.6	$40,758	H	3.0	$33,473	665.6	$30,347	M	2.0	$49,596	415.6	$48,610
$20.3m	R	2.5	$40,758	498.1	$40,758	H	3.0	$33,472	668.6	$30,361	M	2.0	$49,596	417.6	$48,614
$20.4m	R	2.5	$40,758	500.5	$40,758	H	3.0	$33,472	671.6	$30,375	M	2.0	$49,596	419.6	$48,619
$20.5m	R	2.5	$40,758	503.0	$40,758	H	3.0	$33,472	674.6	$30,389	M	2.0	$49,596	421.6	$48,624
$20.6m	R	2.5	$40,758	505.4	$40,758	H	3.0	$33,473	677.6	$30,403	M	2.0	$49,596	423.6	$48,628
$20.7m	R	2.5	$40,758	507.9	$40,758	H	3.0	$33,472	680.6	$30,416	M	2.0	$49,596	425.6	$48,633
$20.8m	R	2.5	$40,758	510.3	$40,758	H	3.0	$33,472	683.5	$30,429	M	2.0	$49,596	427.7	$48,637
$20.9m	R	2.5	$40,758	512.8	$40,758	H	3.0	$33,472	686.5	$30,443	M	2.0	$49,596	429.7	$48,642
$21.0m	R	2.5	$40,758	515.2	$40,758	H	3.0	$33,473	689.5	$30,456	M	2.0	$49,596	431.7	$48,646
$21.1m	R	2.5	$40,758	517.7	$40,758	H	3.0	$33,472	692.5	$30,469	M	2.0	$49,596	433.7	$48,651
$21.2m	R	2.5	$40,758	520.1	$40,758	H	3.0	$33,472	695.5	$30,482	M	2.0	$49,596	435.7	$48,655
$21.3m	R	2.5	$40,758	522.6	$40,758	H	3.0	$33,472	698.5	$30,494	M	2.0	$49,596	437.7	$48,659
$21.4m	R	2.5	$40,758	525.0	$40,758	H	3.0	$33,473	701.5	$30,507	M	2.0	$49,596	439.8	$48,664
$21.5m	R	2.5	$40,758	527.5	$40,758	H	3.0	$33,472	704.5	$30,520	M	2.0	$49,596	441.8	$48,668
$21.6m	R	2.5	$40,758	530.0	$40,758	H	3.0	$33,472	707.4	$30,532	M	2.0	$49,593	443.8	$48,672
$21.7m	R	2.5	$40,758	532.4	$40,758	H	3.0	$33,472	710.4	$30,545	M	2.0	$49,596	445.8	$48,676
$21.8m	R	2.5	$40,758	534.9	$40,758	H	3.0	$33,473	713.4	$30,557	M	2.0	$49,596	447.8	$48,681
$21.9m	R	2.5	$40,758	537.3	$40,758	H	3.0	$33,472	716.4	$30,569	M	2.0	$49,596	449.8	$48,685
$22.0m	R	2.5	$40,758	539.8	$40,758	H	3.0	$33,472	719.4	$30,581	M	2.0	$49,596	451.9	$48,689
$22.1m	R	2.5	$40,758	542.2	$40,758	H	3.0	$33,472	722.4	$30,593	M	2.0	$49,596	453.9	$48,693
$22.2m	R	2.5	$40,758	544.7	$40,758	H	3.0	$33,473	725.4	$30,605	M	2.0	$49,596	455.9	$48,697
$22.3m	R	2.5	$40,758	547.1	$40,758	H	3.0	$33,472	728.4	$30,617	M	2.0	$49,596	457.9	$48,701
$22.4m	R	2.5	$40,758	549.6	$40,758	H	3.0	$33,472	731.4	$30,628	M	2.0	$49,596	459.9	$48,705
$22.5m	R	2.5	$40,758	552.0	$40,758	H	3.0	$33,472	734.3	$30,640	M	2.0	$49,596	461.9	$48,709
$22.6m	R	2.5	$40,758	554.5	$40,758	H	3.0	$33,473	737.3	$30,651	M	2.0	$49,596	463.9	$48,712
$22.7m	R	2.5	$40,758	556.9	$40,758	H	3.0	$33,472	740.3	$30,663	M	2.0	$49,596	466.0	$48,716
$22.8m	R	2.5	$40,758	559.4	$40,758	H	3.0	$33,472	743.3	$30,674	M	2.0	$49,596	468.0	$48,720
$22.9m	R	2.5	$40,758	561.9	$40,758	H	3.0	$33,472	746.3	$30,685	M	2.0	$49,596	470.0	$48,724
$23.0m	R	2.5	$40,758	564.3	$40,758	H	3.0	$33,473	749.3	$30,696	M	2.0	$49,596	472.0	$48,727
$23.1m	R	2.5	$40,758	566.8	$40,758	H	3.0	$33,472	752.3	$30,707	M	2.0	$49,596	474.0	$48,731
$23.2m	R	2.5	$40,758	569.2	$40,758	H	3.0	$33,472	755.3	$30,718	M	2.0	$49,593	476.0	$48,735
$23.3m	R	2.5	$40,758	571.7	$40,758	H	3.0	$33,472	758.2	$30,729	M	2.0	$49,596	478.1	$48,738
$23.4m	R	2.5	$40,756	574.1	$40,758	H	3.0	$33,473	761.2	$30,740	M	2.0	$49,596	480.1	$48,742
$23.5m	R	2.5	$40,758	576.6	$40,758	H	3.0	$33,472	764.2	$30,751	M	2.0	$49,596	482.1	$48,746
$23.6m	R	2.5	$40,758	579.0	$40,758	H	3.0	$33,472	767.2	$30,761	M	2.0	$49,596	484.1	$48,749
$23.7m	R	2.5	$40,758	581.5	$40,758	H	3.0	$33,472	770.2	$30,772	M	2.0	$49,596	486.1	$48,753
$23.8m	R	2.5	$40,758	583.9	$40,758	H	3.0	$33,473	773.2	$30,782	M	2.0	$49,596	488.1	$48,756
$23.9m	R	2.5	$40,758	586.4	$40,758	H	3.0	$33,472	776.2	$30,792	M	2.0	$49,596	490.2	$48,760
$24.0m	R	2.5	$40,758	588.8	$40,758	H	3.0	$33,472	779.2	$30,803	M	2.0	$49,596	492.2	$48,763
$24.1m	R	2.5	$40,758	591.3	$40,758	H	3.0	$33,472	782.1	$30,813	M	2.0	$49,596	494.2	$48,766
$24.2m	R	2.5	$40,758	593.7	$40,758	H	3.0	$33,473	785.1	$30,823	M	2.0	$49,596	496.2	$48,770
$24.3m	R	2.5	$40,758	596.2	$40,758	H	3.0	$33,472	788.1	$30,833	M	2.0	$49,596	498.2	$48,773
$24.4m	R	2.5	$40,758	598.7	$40,758	H	3.0	$33,472	791.1	$30,843	M	2.0	$49,596	500.2	$48,776
$24.5m	R	2.5	$40,758	601.1	$40,758	H	3.0	$33,472	794.1	$30,853	M	2.0	$49,596	502.3	$48,780
$24.6m	R	2.5	$40,758	603.6	$40,758	H	3.0	$33,473	797.1	$30,863	M	2.0	$49,596	504.3	$48,783
$24.7m	R	2.5	$40,758	606.0	$40,758	H	3.0	$33,472	800.1	$30,873	M	2.0	$49,596	506.3	$48,786
$24.8m	R	2.5	$40,758	608.5	$40,758	H	3.0	$33,472	803.1	$30,882	M	2.0	$49,596	508.3	$48,789
$24.9m	R	2.5	$40,758	610.9	$40,758	H	3.0	$33,472	806.0	$30,892	M	2.0	$49,593	510.3	$48,793
$25.0m	R	2.5	$40,758	613.4	$40,758	H	3.0	$33,473	809.0	$30,901	M	2.0	$49,596	512.3	$48,796
$25.1m	R	2.5	$40,758	615.8	$40,758	H	3.0	$33,472	812.0	$30,911	M	2.0	$49,596	514.4	$48,799
$25.2m	R	2.5	$40,758	618.3	$40,758	H	3.0	$33,472	815.0	$30,920	M	2.0	$49,596	516.4	$48,802

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$25.3m	R	2.5	$40,758	620.7	$40,758	H	3.0	$33,472	818.0	$30,929	M	2.0	$49,596	518.4	$48,805
$25.4m	R	2.5	$40,758	623.2	$40,758	H	3.0	$33,473	821.0	$30,939	M	2.0	$49,596	520.4	$48,808
$25.5m	R	2.5	$40,758	625.6	$40,758	H	3.0	$33,472	824.0	$30,948	M	2.0	$49,596	522.4	$48,811
$25.6m	R	2.5	$40,758	628.1	$40,758	H	3.0	$33,472	827.0	$30,957	M	2.0	$49,596	524.4	$48,814
$25.7m	R	2.5	$40,758	630.5	$40,758	H	3.0	$33,472	829.9	$30,966	M	2.0	$49,596	526.5	$48,817
$25.8m	R	2.5	$40,758	633.0	$40,758	H	3.0	$33,473	832.9	$30,975	M	2.0	$49,596	528.5	$48,820
$25.9m	R	2.5	$40,758	635.5	$40,758	H	3.0	$33,472	835.9	$30,984	M	2.0	$49,596	530.5	$48,823
$26.0m	R	2.5	$40,758	637.9	$40,758	H	3.0	$33,472	838.9	$30,993	M	2.0	$49,596	532.5	$48,826
$26.1m	R	2.5	$40,758	640.4	$40,758	H	3.0	$33,472	841.9	$31,002	M	2.0	$49,596	534.5	$48,829
$26.2m	R	2.5	$40,758	642.8	$40,758	H	3.0	$33,473	844.9	$31,010	M	2.0	$49,596	536.5	$48,832
$26.3m	R	2.5	$40,758	645.3	$40,758	H	3.0	$33,472	847.9	$31,019	M	2.0	$49,596	538.6	$48,835
$26.4m	R	2.5	$40,758	647.7	$40,758	H	3.0	$33,472	850.9	$31,028	M	2.0	$49,596	540.6	$48,838
$26.5m	R	2.5	$40,758	650.2	$40,758	H	3.0	$33,472	853.8	$31,036	M	2.0	$49,596	542.6	$48,840
$26.6m	R	2.5	$40,758	652.6	$40,758	H	3.0	$33,473	856.8	$31,045	M	2.0	$49,593	544.6	$48,843
$26.7m	R	2.5	$40,758	655.1	$40,758	H	3.0	$33,472	859.8	$31,053	M	2.0	$49,596	546.6	$48,846
$26.8m	R	2.5	$40,758	657.5	$40,758	H	3.0	$33,472	862.8	$31,062	M	2.0	$49,596	548.6	$48,849
$26.9m	R	2.5	$40,758	660.0	$40,758	H	3.0	$33,473	865.8	$31,070	M	2.0	$49,596	550.6	$48,851
$27.0m	R	2.5	$40,758	662.4	$40,758	H	3.0	$33,472	868.8	$31,078	M	2.0	$49,596	552.7	$48,854
$27.1m	R	2.5	$40,758	664.9	$40,758	H	3.0	$33,472	871.8	$31,086	M	2.0	$49,596	554.7	$48,857
$27.2m	R	2.5	$40,758	667.4	$40,758	H	3.0	$33,472	874.8	$31,094	M	2.0	$49,596	556.7	$48,860
$27.3m	R	2.5	$40,758	669.8	$40,758	H	3.0	$33,473	877.7	$31,103	M	2.0	$49,596	558.7	$48,862
$27.4m	R	2.5	$40,758	672.3	$40,758	H	3.0	$33,472	880.7	$31,111	M	2.0	$49,596	560.7	$48,865
$27.5m	R	2.5	$40,758	674.7	$40,758	H	3.0	$33,472	883.7	$31,119	M	2.0	$49,596	562.7	$48,867
$27.6m	R	2.5	$40,758	677.2	$40,758	H	3.0	$33,472	886.7	$31,127	M	2.0	$49,596	564.8	$48,870
$27.7m	R	2.5	$40,758	679.6	$40,758	H	3.0	$33,473	889.7	$31,134	M	2.0	$49,596	566.8	$48,873
$27.8m	R	2.5	$40,758	682.1	$40,758	H	3.0	$33,472	892.7	$31,142	M	2.0	$49,596	568.8	$48,875
$27.9m	R	2.5	$40,758	684.5	$40,758	H	3.0	$33,472	895.7	$31,150	M	2.0	$49,596	570.8	$48,878
$28.0m	R	2.5	$40,758	687.0	$40,758	H	3.0	$33,472	898.7	$31,158	M	2.0	$49,596	572.8	$48,880
$28.1m	R	2.5	$40,758	689.4	$40,758	H	3.0	$33,473	901.6	$31,165	M	2.0	$49,596	574.8	$48,883
$28.2m	R	2.5	$40,758	691.9	$40,758	H	3.0	$33,472	904.6	$31,173	M	2.0	$49,593	576.9	$48,885
$28.3m	R	2.5	$40,758	694.3	$40,758	H	3.0	$33,472	907.6	$31,181	M	2.0	$49,596	578.9	$48,888
$28.4m	R	2.5	$40,758	696.8	$40,758	H	3.0	$33,472	910.6	$31,188	M	2.0	$49,596	580.9	$48,890
$28.5m	R	2.5	$40,758	699.2	$40,758	H	3.0	$33,473	913.6	$31,196	M	2.0	$49,596	582.9	$48,893
$28.6m	R	2.5	$40,758	701.7	$40,758	H	3.0	$33,472	916.6	$31,203	M	2.0	$49,596	584.9	$48,895
$28.7m	R	2.5	$40,758	704.2	$40,758	H	3.0	$33,472	919.6	$31,210	M	2.0	$49,596	586.9	$48,897
$28.8m	R	2.5	$40,758	706.6	$40,758	H	3.0	$33,472	922.6	$31,218	M	2.0	$49,596	589.0	$48,900
$28.9m	R	2.5	$40,758	709.1	$40,758	C	2.5	$39,802	925.1	$31,241	M	2.0	$49,596	591.0	$48,902
$29.0m	R	2.5	$40,758	711.5	$40,758	C	2.5	$39,802	927.6	$31,264	M	2.0	$49,596	593.0	$48,905
$29.1m	R	2.5	$40,758	714.0	$40,758	C	2.5	$39,802	930.1	$31,287	M	2.0	$49,596	595.0	$48,907
$29.2m	R	2.5	$40,758	716.4	$40,758	C	2.5	$39,802	932.6	$31,310	M	2.0	$49,596	597.0	$48,909
$29.3m	R	2.5	$40,758	718.9	$40,758	C	2.5	$39,802	935.1	$31,333	M	2.0	$49,596	599.0	$48,912
$29.4m	R	2.5	$40,758	721.3	$40,758	C	2.5	$39,802	937.6	$31,356	M	2.0	$49,596	601.1	$48,914
$29.5m	R	2.5	$40,758	723.8	$40,758	C	2.5	$39,802	940.1	$31,378	M	2.0	$49,596	603.1	$48,916
$29.6m	R	2.5	$40,758	726.2	$40,758	C	2.5	$39,802	942.7	$31,401	M	2.0	$49,596	605.1	$48,918
$29.7m	R	2.5	$40,758	728.7	$40,758	C	2.5	$39,802	945.2	$31,423	M	2.0	$49,596	607.1	$48,921
$29.8m	R	2.5	$40,758	731.1	$40,758	C	2.5	$39,802	947.7	$31,445	M	2.0	$49,596	609.1	$48,923
$29.9m	R	2.5	$40,758	733.6	$40,758	C	2.5	$39,802	950.2	$31,467	M	2.0	$49,593	611.1	$48,925
$30.0m	R	2.5	$40,758	736.1	$40,758	C	2.5	$39,802	952.7	$31,489	M	2.0	$49,596	613.2	$48,927
$30.1m	R	2.5	$40,756	738.5	$40,758	C	2.5	$39,802	955.2	$31,511	M	2.0	$49,596	615.2	$48,929
$30.2m	R	2.5	$40,758	741.0	$40,758	C	2.5	$39,802	957.7	$31,533	M	2.0	$49,596	617.2	$48,932
$30.3m	R	2.5	$40,758	743.4	$40,758	C	2.5	$39,802	960.2	$31,555	M	2.0	$49,596	619.2	$48,934

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$30.4m	R	2.5	$40,758	745.9	$40,758	C	2.5	$39,802	962.8	$31,576	M	2.0	$49,596	621.2	$48,936
$30.5m	R	2.5	$40,758	748.3	$40,758	C	2.5	$39,802	965.3	$31,597	M	2.0	$49,596	623.2	$48,938
$30.6m	R	2.5	$40,758	750.8	$40,758	C	2.5	$39,802	967.8	$31,619	M	2.0	$49,596	625.3	$48,940
$30.7m	R	2.5	$40,758	753.2	$40,758	C	2.5	$39,802	970.3	$31,640	M	2.0	$49,596	627.3	$48,942
$30.8m	R	2.5	$40,758	755.7	$40,758	C	2.5	$39,802	972.8	$31,661	M	2.0	$49,596	629.3	$48,944
$30.9m	R	2.5	$40,758	758.1	$40,758	C	2.5	$39,802	975.3	$31,682	M	2.0	$49,596	631.3	$48,947
$31.0m	R	2.5	$40,758	760.6	$40,758	C	2.5	$39,802	977.8	$31,703	M	2.0	$49,596	633.3	$48,949
$31.1m	R	2.5	$40,758	763.0	$40,758	C	2.5	$39,802	980.3	$31,724	M	2.0	$49,596	635.3	$48,951
$31.2m	R	2.5	$40,758	765.5	$40,758	C	2.5	$39,802	982.9	$31,744	M	2.0	$49,596	637.4	$48,953
$31.3m	R	2.5	$40,758	767.9	$40,758	C	2.5	$39,802	985.4	$31,765	M	2.0	$49,596	639.4	$48,955
$31.4m	R	2.5	$40,758	770.4	$40,758	C	2.5	$39,802	987.9	$31,785	M	2.0	$49,596	641.4	$48,957
$31.5m	R	2.5	$40,758	772.9	$40,758	C	2.5	$39,802	990.4	$31,806	M	2.0	$49,596	643.4	$48,959
$31.6m	R	2.5	$40,758	775.3	$40,758	C	2.5	$39,802	992.9	$31,826	M	2.0	$49,593	645.4	$48,961
$31.7m	R	2.5	$40,758	777.8	$40,758	C	2.5	$39,802	995.4	$31,846	M	2.0	$49,596	647.4	$48,963
$31.8m	R	2.5	$40,758	780.2	$40,758	C	2.5	$39,802	997.9	$31,866	M	2.0	$49,596	649.4	$48,965
$31.9m	R	2.5	$40,758	782.7	$40,758	C	2.5	$39,802	1000.4	$31,886	M	2.0	$49,596	651.5	$48,967
$32.0m	R	2.5	$40,758	785.1	$40,758	C	2.5	$39,802	1003.0	$31,906	M	2.0	$49,596	653.5	$48,969
$32.1m	R	2.5	$40,758	787.6	$40,758	C	2.5	$39,802	1005.5	$31,926	M	2.0	$49,596	655.5	$48,970
$32.2m	R	2.5	$40,758	790.0	$40,758	C	2.5	$39,802	1008.0	$31,945	M	2.0	$49,596	657.5	$48,972
$32.3m	R	2.5	$40,758	792.5	$40,758	C	2.5	$39,802	1010.5	$31,965	M	2.0	$49,596	659.5	$48,974
$32.4m	R	2.5	$40,758	794.9	$40,758	C	2.5	$39,802	1013.0	$31,984	M	2.0	$49,596	661.5	$48,976
$32.5m	R	2.5	$40,758	797.4	$40,758	C	2.5	$39,802	1015.5	$32,003	M	2.0	$49,596	663.6	$48,978
$32.6m	R	2.5	$40,758	799.8	$40,758	C	2.5	$39,802	1018.0	$32,023	M	2.0	$49,596	665.6	$48,980
$32.7m	R	2.5	$40,758	802.3	$40,758	C	2.5	$39,802	1020.5	$32,042	M	2.0	$49,596	667.6	$48,982
$32.8m	R	2.5	$40,758	804.7	$40,758	C	2.5	$39,801	1023.1	$32,061	M	2.0	$49,596	669.6	$48,984
$32.9m	R	2.5	$40,758	807.2	$40,758	C	2.5	$39,803	1025.6	$32,080	M	2.0	$49,596	671.6	$48,985
$33.0m	R	2.5	$40,758	809.7	$40,758	C	2.5	$39,803	1028.1	$32,099	M	2.0	$49,596	673.6	$48,987
$33.1m	R	2.5	$40,758	812.1	$40,758	C	2.5	$39,801	1030.6	$32,118	M	2.0	$49,596	675.7	$48,989
$33.2m	R	2.5	$40,758	814.6	$40,758	C	2.5	$39,803	1033.1	$32,136	M	2.0	$49,593	677.7	$48,991
$33.3m	R	2.5	$40,758	817.0	$40,758	C	2.5	$39,801	1035.6	$32,155	M	2.0	$49,596	679.7	$48,993
$33.4m	R	2.5	$40,758	819.5	$40,758	C	2.5	$39,803	1038.1	$32,173	M	2.0	$49,596	681.7	$48,995
$33.5m	R	2.5	$40,758	821.9	$40,758	C	2.5	$39,801	1040.6	$32,192	M	2.0	$49,596	683.7	$48,996
$33.6m	R	2.5	$40,758	824.4	$40,758	C	2.5	$39,803	1043.2	$32,210	M	2.0	$49,596	685.7	$48,998
$33.7m	R	2.5	$40,758	826.8	$40,758	C	2.5	$39,803	1045.7	$32,228	M	2.0	$49,596	687.8	$49,000
$33.8m	R	2.5	$40,758	829.3	$40,758	C	2.5	$39,801	1048.2	$32,246	N	1.6	$61,479	689.4	$49,029
$33.9m	R	2.5	$40,758	831.7	$40,758	C	2.5	$39,803	1050.7	$32,265	N	1.6	$61,479	691.0	$49,059
$34.0m	R	2.5	$40,758	834.2	$40,758	C	2.5	$39,801	1053.2	$32,283	N	1.6	$61,479	692.6	$49,088
$34.1m	R	2.5	$40,758	836.6	$40,758	C	2.5	$39,803	1055.7	$32,300	N	1.6	$61,479	694.3	$49,117
$34.2m	R	2.5	$40,758	839.1	$40,758	C	2.5	$39,803	1058.2	$32,318	N	1.6	$61,479	695.9	$49,146
$34.3m	R	2.5	$40,758	841.6	$40,758	C	2.5	$39,801	1060.7	$32,336	N	1.6	$61,479	697.5	$49,174
$34.4m	R	2.5	$40,758	844.0	$40,758	C	2.5	$39,803	1063.3	$32,354	N	1.6	$61,479	699.1	$49,203
$34.5m	R	2.5	$40,758	846.5	$40,758	C	2.5	$39,801	1065.8	$32,371	N	1.6	$61,479	700.8	$49,232
$34.6m	R	2.5	$40,758	848.9	$40,758	C	2.5	$39,803	1068.3	$32,389	N	1.6	$61,479	702.4	$49,260
$34.7m	R	2.5	$40,758	851.4	$40,758	C	2.5	$39,801	1070.8	$32,406	N	1.6	$61,479	704.0	$49,288
$34.8m	R	2.5	$40,758	853.8	$40,758	C	2.5	$39,803	1073.3	$32,423	N	1.6	$61,479	705.7	$49,316
$34.9m	R	2.5	$40,758	856.3	$40,758	C	2.5	$39,803	1075.8	$32,441	N	1.6	$61,479	707.3	$49,344
$35.0m	R	2.5	$40,758	858.7	$40,758	C	2.5	$39,801	1078.3	$32,458	N	1.6	$61,479	708.9	$49,372
$35.1m	R	2.5	$40,758	861.2	$40,758	C	2.5	$39,803	1080.8	$32,475	N	1.6	$61,479	710.5	$49,400
$35.2m	R	2.5	$40,758	863.6	$40,758	C	2.5	$39,801	1083.4	$32,492	N	1.6	$61,479	712.2	$49,427
$35.3m	R	2.5	$40,758	866.1	$40,758	C	2.5	$39,803	1085.9	$32,509	N	1.6	$61,479	713.8	$49,455
$35.4m	R	2.5	$40,758	868.5	$40,758	C	2.5	$39,803	1088.4	$32,526	N	1.6	$61,479	715.4	$49,482

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$35.5m	R	2.5	$40,758	871.0	$40,758	C	2.5	$39,801	1090.9	$32,542	N	1.6	$61,479	717.0	$49,509
$35.6m	R	2.5	$40,758	873.4	$40,758	C	2.5	$39,803	1093.4	$32,559	N	1.6	$61,479	718.7	$49,536
$35.7m	R	2.5	$40,758	875.9	$40,758	C	2.5	$39,801	1095.9	$32,576	N	1.6	$61,479	720.3	$49,563
$35.8m	R	2.5	$40,758	878.4	$40,758	C	2.5	$39,803	1098.4	$32,592	N	1.6	$61,479	721.9	$49,590
$35.9m	R	2.5	$40,758	880.8	$40,758	C	2.5	$39,801	1100.9	$32,609	N	1.6	$61,479	723.5	$49,617
$36.0m	R	2.5	$40,758	883.3	$40,758	C	2.5	$39,803	1103.5	$32,625	N	1.6	$61,479	725.2	$49,644
$36.1m	R	2.5	$40,758	885.7	$40,758	C	2.5	$39,803	1106.0	$32,641	N	1.6	$61,479	726.8	$49,670
$36.2m	R	2.5	$40,758	888.2	$40,758	C	2.5	$39,801	1108.5	$32,657	N	1.6	$61,479	728.4	$49,696
$36.3m	R	2.5	$40,758	890.6	$40,758	C	2.5	$39,803	1111.0	$32,674	N	1.6	$61,479	730.0	$49,723
$36.4m	R	2.5	$40,758	893.1	$40,758	C	2.5	$39,801	1113.5	$32,690	N	1.6	$61,479	731.7	$49,749
$36.5m	R	2.5	$40,758	895.5	$40,758	C	2.5	$39,803	1116.0	$32,706	N	1.6	$61,479	733.3	$49,775
$36.6m	R	2.5	$40,758	898.0	$40,758	C	2.5	$39,803	1118.5	$32,722	N	1.6	$61,479	734.9	$49,801
$36.7m	R	2.5	$40,758	900.4	$40,758	C	2.5	$39,801	1121.0	$32,738	N	1.6	$61,479	736.6	$49,827
$36.8m	R	2.5	$40,756	902.9	$40,758	C	2.5	$39,803	1123.6	$32,753	N	1.6	$61,479	738.2	$49,852
$36.9m	R	2.5	$40,758	905.3	$40,758	C	2.5	$39,801	1126.1	$32,769	N	1.6	$61,479	739.8	$49,878
$37.0m	R	2.5	$40,758	907.8	$40,758	C	2.5	$39,803	1128.6	$32,785	N	1.6	$61,479	741.4	$49,903
$37.1m	R	2.5	$40,758	910.2	$40,758	C	2.5	$39,801	1131.1	$32,800	N	1.6	$61,479	743.1	$49,929
$37.2m	R	2.5	$40,758	912.7	$40,758	C	2.5	$39,803	1133.6	$32,816	N	1.6	$61,479	744.7	$49,954
$37.3m	R	2.5	$40,758	915.2	$40,758	C	2.5	$39,803	1136.1	$32,831	N	1.6	$61,479	746.3	$49,979
$37.4m	R	2.5	$40,758	917.6	$40,758	C	2.5	$39,801	1138.6	$32,847	N	1.6	$61,479	747.9	$50,004
$37.5m	R	2.5	$40,758	920.1	$40,758	C	2.5	$39,803	1141.1	$32,862	N	1.6	$61,479	749.6	$50,029
$37.6m	R	2.5	$40,758	922.5	$40,758	C	2.5	$39,801	1143.6	$32,877	N	1.6	$61,479	751.2	$50,054
$37.7m	R	2.5	$40,758	925.0	$40,758	C	2.5	$39,803	1146.2	$32,892	N	1.6	$61,479	752.8	$50,078
$37.8m	R	2.5	$40,758	927.4	$40,758	C	2.5	$39,803	1148.7	$32,907	N	1.6	$61,479	754.4	$50,103
$37.9m	R	2.5	$40,758	929.9	$40,758	C	2.5	$39,801	1151.2	$32,923	W	0.6	$168,385	755.0	$50,196
$38.0m	R	2.5	$40,758	932.3	$40,758	C	2.5	$39,803	1153.7	$32,938	W	0.6	$168,385	755.6	$50,289
$38.1m	R	2.5	$40,758	934.8	$40,758	C	2.5	$39,801	1156.2	$32,952	W	0.6	$168,385	756.2	$50,382
$38.2m	R	2.5	$40,758	937.2	$40,758	C	2.5	$39,803	1158.7	$32,967	W	0.6	$168,385	756.8	$50,474
$38.3m	R	2.5	$40,758	939.7	$40,758	C	2.5	$39,803	1161.2	$32,982	W	0.6	$168,385	757.4	$50,567
$38.4m	R	2.5	$40,758	942.1	$40,758	C	2.5	$39,801	1163.7	$32,997	W	0.6	$168,385	758.0	$50,659
$38.5m	R	2.5	$40,758	944.6	$40,758	C	2.5	$39,803	1166.3	$33,011	W	0.6	$168,385	758.6	$50,751
$38.6m	R	2.5	$40,758	947.1	$40,758	C	2.5	$39,801	1168.8	$33,026	W	0.6	$168,385	759.2	$50,843
$38.7m	R	2.5	$40,758	949.5	$40,758	C	2.5	$39,803	1171.3	$33,041	W	0.6	$168,385	759.8	$50,935
$38.8m	R	2.5	$40,758	952.0	$40,758	C	2.5	$39,801	1173.8	$33,055	W	0.6	$168,385	760.4	$51,027
$38.9m	R	2.5	$40,758	954.4	$40,758	C	2.5	$39,803	1176.3	$33,069	W	0.6	$168,385	761.0	$51,118
$39.0m	R	2.5	$40,758	956.9	$40,758	C	2.5	$39,803	1178.8	$33,084	W	0.6	$168,385	761.6	$51,210
$39.1m	R	2.5	$40,758	959.3	$40,758	C	2.5	$39,801	1181.3	$33,098	W	0.6	$168,385	762.2	$51,301
$39.2m	R	2.5	$40,758	961.8	$40,758	C	2.5	$39,803	1183.8	$33,112	W	0.6	$168,385	762.8	$51,392
$39.3m	R	2.5	$40,758	964.2	$40,758	C	2.5	$39,801	1186.4	$33,127	W	0.6	$168,385	763.4	$51,483
$39.4m	R	2.5	$40,758	966.7	$40,758	C	2.5	$39,803	1188.9	$33,141	W	0.6	$168,385	763.9	$51,574
$39.5m	R	2.5	$40,758	969.1	$40,758	C	2.5	$39,803	1191.4	$33,155	W	0.6	$168,386	764.5	$51,665
$39.6m	R	2.5	$40,758	971.6	$40,758	C	2.5	$39,801	1193.9	$33,169	W	0.6	$168,384	765.1	$51,755
$39.7m	R	2.5	$40,758	974.0	$40,758	C	2.5	$39,803	1196.4	$33,183	W	0.6	$168,384	765.7	$51,846
$39.8m	R	2.5	$40,758	976.5	$40,758	C	2.5	$39,801	1198.9	$33,196	W	0.6	$168,387	766.3	$51,936
$39.9m	R	2.5	$40,758	978.9	$40,758	C	2.5	$39,803	1201.4	$33,210	W	0.6	$168,384	766.9	$52,026
$40.0m	R	2.5	$40,758	981.4	$40,758	C	2.5	$39,801	1203.9	$33,224	W	0.6	$168,384	767.5	$52,116
$40.1m	R	2.5	$40,758	983.9	$40,758	C	2.5	$39,803	1206.5	$33,238	W	0.6	$168,387	768.1	$52,206
$40.2m	R	2.5	$40,758	986.3	$40,758	C	2.5	$39,803	1209.0	$33,251	W	0.6	$168,384	768.7	$52,296
$40.3m	R	2.5	$40,758	988.8	$40,758	C	2.5	$39,801	1211.5	$33,265	W	0.6	$168,384	769.3	$52,386
$40.4m	R	2.5	$40,758	991.2	$40,758	C	2.5	$39,803	1214.0	$33,278	W	0.6	$168,387	769.9	$52,475
$40.5m	R	2.5	$40,758	993.7	$40,758	C	2.5	$39,801	1216.5	$33,292	W	0.6	$168,384	770.5	$52,564

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$40.6m	R	2.5	$40,758	996.1	$40,758	C	2.5	$39,803	1219.0	$33,305	W	0.6	$168,384	771.1	$52,654
$40.7m	R	2.5	$40,758	998.6	$40,758	C	2.5	$39,803	1221.5	$33,319	W	0.6	$168,387	771.7	$52,743
$40.8m	R	2.5	$40,751	1001.0	$40,758	C	2.5	$39,801	1224.0	$33,332	W	0.6	$168,384	772.3	$52,832
$40.9m	R	2.5	$40,766	1003.5	$40,758	C	2.5	$39,803	1226.6	$33,345	W	0.6	$168,384	772.9	$52,920
$41.0m	R	2.5	$40,750	1005.9	$40,758	C	2.5	$39,801	1229.1	$33,358	W	0.6	$168,387	773.5	$53,009
$41.1m	R	2.5	$40,766	1008.4	$40,758	C	2.5	$39,803	1231.6	$33,372	W	0.6	$168,384	774.0	$53,098
$41.2m	R	2.5	$40,750	1010.8	$40,758	C	2.5	$39,801	1234.1	$33,385	W	0.6	$168,384	774.6	$53,186
$41.3m	R	2.5	$40,766	1013.3	$40,758	C	2.5	$39,803	1236.6	$33,398	W	0.6	$168,387	775.2	$53,274
$41.4m	R	2.5	$40,750	1015.8	$40,758	C	2.5	$39,803	1239.1	$33,411	W	0.6	$168,384	775.8	$53,362
$41.5m	R	2.5	$40,766	1018.2	$40,758	C	2.5	$39,801	1241.6	$33,424	W	0.6	$168,384	776.4	$53,450
$41.6m	R	2.5	$40,750	1020.7	$40,758	C	2.5	$39,803	1244.1	$33,437	W	0.6	$168,387	777.0	$53,538
$41.7m	R	2.5	$40,766	1023.1	$40,758	C	2.5	$39,801	1246.7	$33,449	W	0.6	$168,384	777.6	$53,626
$41.8m	R	2.5	$40,750	1025.6	$40,758	C	2.5	$39,803	1249.2	$33,462	W	0.6	$168,384	778.2	$53,714
$41.9m	R	2.5	$40,766	1028.0	$40,758	C	2.5	$39,803	1251.7	$33,475	W	0.6	$168,387	778.8	$53,801
$42.0m	R	2.5	$40,750	1030.5	$40,758	C	2.5	$39,801	1254.2	$33,488	W	0.6	$168,384	779.4	$53,888
$42.1m	R	2.5	$40,766	1032.9	$40,758	C	2.5	$39,803	1256.7	$33,500	W	0.6	$168,384	780.0	$53,975
$42.2m	R	2.5	$40,750	1035.4	$40,758	C	2.5	$39,801	1259.2	$33,513	W	0.6	$168,387	780.6	$54,062
$42.3m	R	2.5	$40,766	1037.8	$40,758	C	2.5	$39,803	1261.7	$33,525	W	0.6	$168,384	781.2	$54,149
$42.4m	R	2.5	$40,750	1040.3	$40,758	C	2.5	$39,801	1264.2	$33,538	W	0.6	$168,384	781.8	$54,236
$42.5m	R	2.5	$40,766	1042.7	$40,758	C	2.5	$39,803	1266.8	$33,550	W	0.6	$168,387	782.4	$54,323
$42.6m	Q	2.1	$48,185	1044.8	$40,773	R	2.5	$40,758	1269.2	$33,564	W	0.6	$168,384	783.0	$54,409
$42.7m	Q	2.1	$48,185	1046.9	$40,788	R	2.5	$40,758	1271.7	$33,578	W	0.6	$168,384	783.5	$54,496
$42.8m	Q	2.1	$48,185	1049.0	$40,802	R	2.5	$40,758	1274.1	$33,592	W	0.6	$168,387	784.1	$54,582
$42.9m	Q	2.1	$48,185	1051.0	$40,817	R	2.5	$40,758	1276.6	$33,606	W	0.6	$168,384	784.7	$54,668
$43.0m	Q	2.1	$48,185	1053.1	$40,831	R	2.5	$40,758	1279.0	$33,619	W	0.6	$168,384	785.3	$54,754
$43.1m	Q	2.1	$48,185	1055.2	$40,846	R	2.5	$40,758	1281.5	$33,633	W	0.6	$168,387	785.9	$54,840
$43.2m	Q	2.1	$48,185	1057.3	$40,860	R	2.5	$40,758	1283.9	$33,647	W	0.6	$168,384	786.5	$54,926
$43.3m	Q	2.1	$48,185	1059.3	$40,874	R	2.5	$40,758	1286.4	$33,660	W	0.6	$168,384	787.1	$55,011
$43.4m	Q	2.1	$48,185	1061.4	$40,889	R	2.5	$40,758	1288.8	$33,674	W	0.6	$168,387	787.7	$55,097
$43.5m	Q	2.1	$48,185	1063.5	$40,903	R	2.5	$40,758	1291.3	$33,687	W	0.6	$168,384	788.3	$55,182
$43.6m	Q	2.1	$48,185	1065.6	$40,917	R	2.5	$40,758	1293.7	$33,701	W	0.6	$168,384	788.9	$55,267
$43.7m	Q	2.1	$48,185	1067.6	$40,931	R	2.5	$40,758	1296.2	$33,714	W	0.6	$168,387	789.5	$55,352
$43.8m	Q	2.1	$48,185	1069.7	$40,945	R	2.5	$40,758	1298.7	$33,727	W	0.6	$168,384	790.1	$55,437
$43.9m	Q	2.1	$48,185	1071.8	$40,959	R	2.5	$40,758	1301.1	$33,740	W	0.6	$168,384	790.7	$55,522
$44.0m	Q	2.1	$48,185	1073.9	$40,973	R	2.5	$40,758	1303.6	$33,754	W	0.6	$168,387	791.3	$55,607
$44.1m	Q	2.1	$48,185	1075.9	$40,987	R	2.5	$40,758	1306.0	$33,767	W	0.6	$168,384	791.9	$55,692
$44.2m	Q	2.1	$48,185	1078.0	$41,001	R	2.5	$40,758	1308.5	$33,780	W	0.6	$168,384	792.5	$55,776
$44.3m	Q	2.1	$48,185	1080.1	$41,015	R	2.5	$40,758	1310.9	$33,793	W	0.6	$168,387	793.0	$55,860
$44.4m	Q	2.1	$48,185	1082.2	$41,029	R	2.5	$40,758	1313.4	$33,806	W	0.6	$168,384	793.6	$55,945
$44.5m	Q	2.1	$48,185	1084.2	$41,042	R	2.5	$40,758	1315.8	$33,819	W	0.6	$168,384	794.2	$56,029
$44.6m	Q	2.1	$48,185	1086.3	$41,056	R	2.5	$40,758	1318.3	$33,832	W	0.6	$168,387	794.8	$56,113
$44.7m	Q	2.1	$48,185	1088.4	$41,070	R	2.5	$40,758	1320.7	$33,845	W	0.6	$168,384	795.4	$56,196
$44.8m	Q	2.1	$48,185	1090.5	$41,083	R	2.5	$40,758	1323.2	$33,858	W	0.6	$168,384	796.0	$56,280
$44.9m	Q	2.1	$48,185	1092.5	$41,097	R	2.5	$40,758	1325.6	$33,870	W	0.6	$168,387	796.6	$56,364
$45.0m	Q	2.1	$48,185	1094.6	$41,110	R	2.5	$40,758	1328.1	$33,883	W	0.6	$168,384	797.2	$56,447
$45.1m	Q	2.1	$48,185	1096.7	$41,124	R	2.5	$40,758	1330.6	$33,896	W	0.6	$168,384	797.8	$56,530
$45.2m	Q	2.1	$48,185	1098.8	$41,137	R	2.5	$40,758	1333.0	$33,908	W	0.6	$168,387	798.4	$56,614
$45.3m	Q	2.1	$48,185	1100.8	$41,150	R	2.5	$40,758	1335.5	$33,921	W	0.6	$168,384	799.0	$56,697
$45.4m	Q	2.1	$48,185	1102.9	$41,163	R	2.5	$40,758	1337.9	$33,933	W	0.6	$168,384	799.6	$56,780
$45.5m	Q	2.1	$48,185	1105.0	$41,177	R	2.5	$40,758	1340.4	$33,946	W	0.6	$168,387	800.2	$56,862
$45.6m	Q	2.1	$48,185	1107.1	$41,190	R	2.5	$40,758	1342.8	$33,958	W	0.6	$168,384	800.8	$56,945

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$45.7m	Q	2.1	$48,185	1109.1	$41,203	R	2.5	$40,758	1345.3	$33,971	W	0.6	$168,384	801.4	$57,028
$45.8m	Q	2.1	$48,185	1111.2	$41,216	R	2.5	$40,758	1347.7	$33,983	W	0.6	$168,387	802.0	$57,110
$45.9m	Q	2.1	$48,185	1113.3	$41,229	R	2.5	$40,758	1350.2	$33,996	W	0.6	$168,384	802.6	$57,193
$46.0m	Q	2.1	$48,185	1115.4	$41,242	R	2.5	$40,758	1352.6	$34,008	W	0.6	$168,384	803.1	$57,275
$46.1m	Q	2.1	$48,185	1117.4	$41,255	R	2.5	$40,758	1355.1	$34,020	W	0.6	$168,387	803.7	$57,357
$46.2m	Q	2.1	$48,185	1119.5	$41,268	R	2.5	$40,758	1357.5	$34,032	W	0.6	$168,384	804.3	$57,439
$46.3m	Q	2.1	$48,185	1121.6	$41,280	R	2.5	$40,758	1360.0	$34,044	W	0.6	$168,384	804.9	$57,521
$46.4m	Q	2.1	$48,185	1123.7	$41,293	R	2.5	$40,758	1362.4	$34,056	W	0.6	$168,387	805.5	$57,602
$46.5m	Q	2.1	$48,185	1125.8	$41,306	R	2.5	$40,758	1364.9	$34,068	W	0.6	$168,384	806.1	$57,684
$46.6m	Q	2.1	$48,185	1127.8	$41,318	R	2.5	$40,757	1367.4	$34,080	W	0.6	$168,384	806.7	$57,766
$46.7m	Q	2.1	$48,185	1129.9	$41,331	R	2.5	$40,758	1369.8	$34,092	W	0.6	$168,387	807.3	$57,847
$46.8m	Q	2.1	$48,185	1132.0	$41,344	R	2.5	$40,758	1372.3	$34,104	W	0.6	$168,384	807.9	$57,928
$46.9m	Q	2.1	$48,185	1134.1	$41,356	R	2.5	$40,758	1374.7	$34,116	W	0.6	$168,384	808.5	$58,009
$47.0m	Q	2.1	$48,185	1136.1	$41,369	R	2.5	$40,758	1377.2	$34,128	W	0.6	$168,387	809.1	$58,090
$47.1m	Q	2.1	$48,185	1138.2	$41,381	R	2.5	$40,758	1379.6	$34,140	W	0.6	$168,384	809.7	$58,171
$47.2m	Q	2.1	$48,185	1140.3	$41,393	R	2.5	$40,758	1382.1	$34,152	W	0.6	$168,384	810.3	$58,252
$47.3m	Q	2.1	$48,185	1142.4	$41,406	R	2.5	$40,758	1384.5	$34,163	W	0.6	$168,387	810.9	$58,333
$47.4m	Q	2.1	$48,186	1144.4	$41,418	R	2.5	$40,758	1387.0	$34,175	W	0.6	$168,384	811.5	$58,413
$47.5m	Q	2.1	$48,183	1146.5	$41,430	R	2.5	$40,758	1389.4	$34,187	W	0.6	$168,384	812.1	$58,494
$47.6m	Q	2.1	$48,186	1148.6	$41,442	R	2.5	$40,758	1391.9	$34,198	W	0.6	$168,387	812.6	$58,574
$47.7m	Q	2.1	$48,186	1150.7	$41,455	R	2.5	$40,758	1394.3	$34,210	W	0.6	$168,384	813.2	$58,654
$47.8m	Q	2.1	$48,186	1152.7	$41,467	R	2.5	$40,758	1396.8	$34,221	W	0.6	$168,384	813.8	$58,734
$47.9m	Q	2.1	$48,183	1154.8	$41,479	R	2.5	$40,758	1399.2	$34,233	W	0.6	$168,387	814.4	$58,814
$48.0m	Q	2.1	$48,186	1156.9	$41,491	R	2.5	$40,758	1401.7	$34,244	W	0.6	$168,384	815.0	$58,894
$48.1m	Q	2.1	$48,186	1159.0	$41,503	R	2.5	$40,758	1404.2	$34,255	W	0.6	$168,384	815.6	$58,974
$48.2m	Q	2.1	$48,186	1161.0	$41,515	R	2.5	$40,758	1406.6	$34,267	W	0.6	$168,387	816.2	$59,053
$48.3m	Q	2.1	$48,183	1163.1	$41,527	R	2.5	$40,758	1409.1	$34,278	W	0.6	$168,384	816.8	$59,133
$48.4m	Q	2.1	$48,186	1165.2	$41,539	R	2.5	$40,758	1411.5	$34,289	W	0.6	$168,384	817.4	$59,212
$48.5m	Q	2.1	$48,186	1167.3	$41,550	R	2.5	$40,758	1414.0	$34,301	W	0.6	$168,387	818.0	$59,292
$48.6m	Q	2.1	$48,183	1169.3	$41,562	R	2.5	$40,758	1416.4	$34,312	W	0.6	$168,384	818.6	$59,371
$48.7m	Q	2.1	$48,186	1171.4	$41,574	R	2.5	$40,758	1418.9	$34,323	W	0.6	$168,384	819.2	$59,450
$48.8m	Q	2.1	$48,186	1173.5	$41,586	R	2.5	$40,758	1421.3	$34,334	W	0.6	$168,387	819.8	$59,529
$48.9m	Q	2.1	$48,186	1175.6	$41,597	R	2.5	$40,758	1423.8	$34,345	W	0.6	$168,384	820.4	$59,607
$49.0m	Q	2.1	$48,183	1177.6	$41,609	R	2.5	$40,758	1426.2	$34,356	W	0.6	$168,384	821.0	$59,686
$49.1m	Q	2.1	$48,186	1179.7	$41,620	R	2.5	$40,758	1428.7	$34,367	W	0.6	$168,387	821.6	$59,765
$49.2m	Q	2.1	$48,186	1181.8	$41,632	R	2.5	$40,758	1431.1	$34,378	W	0.6	$168,384	822.1	$59,843
$49.3m	Q	2.1	$48,186	1183.9	$41,643	R	2.5	$40,758	1433.6	$34,389	W	0.6	$168,384	822.7	$59,921
$49.4m	Q	2.1	$48,183	1185.9	$41,655	R	2.5	$40,758	1436.1	$34,400	W	0.6	$168,387	823.3	$60,000
$49.5m	Q	2.1	$48,186	1188.0	$41,666	R	2.5	$40,758	1438.5	$34,411	W	0.6	$168,384	823.9	$60,078
$49.6m	Q	2.1	$48,186	1190.1	$41,678	R	2.5	$40,758	1441.0	$34,422	W	0.6	$168,384	824.5	$60,156
$49.7m	Q	2.1	$48,186	1192.2	$41,689	R	2.5	$40,758	1443.4	$34,432	W	0.6	$168,387	825.1	$60,234
$49.8m	Q	2.1	$48,183	1194.2	$41,700	R	2.5	$40,758	1445.9	$34,443	W	0.6	$168,384	825.7	$60,312
$49.9m	Q	2.1	$48,186	1196.3	$41,712	R	2.5	$40,758	1448.3	$34,454	W	0.6	$168,384	826.3	$60,389
$50.0m	Q	2.1	$48,186	1198.4	$41,723	R	2.5	$40,758	1450.8	$34,464	W	0.6	$168,387	826.9	$60,467

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $0.1m increase in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m increase in incremental expenditure on marginal technology; [c] Marginal ICER in expansion for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net disinvestments.

Table A1.1.3: Reallocation following net investment (divisibility and diminishing returns)

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$0.1m	M	-2.3	$43,235	-2.3	$43,235	R	-4.0	$48,185	-4.0	$24,859	R	-1.7	$59,957	-1.7	$59,957
$0.2m	R	-2.3	$43,211	-4.6	$43,223	O	-4.0	$48,185	-8.1	$24,838	M	-1.7	$59,944	-3.3	$59,950
$0.3m	H	-2.3	$43,191	-6.9	$43,212	O	-4.1	$48,185	-12.1	$24,776	Q	-1.7	$59,920	-5.0	$59,940
$0.4m	C	-2.3	$43,088	-9.3	$43,181	Q	-4.1	$48,185	-16.2	$24,736	M	-1.7	$59,871	-6.7	$59,923
$0.5m	Q	-2.3	$43,072	-11.6	$43,159	R	-4.1	$48,185	-20.2	$24,707	R	-1.7	$59,846	-8.3	$59,908
$0.6m	H	-2.3	$43,067	-13.9	$43,144	H	-4.1	$48,185	-24.3	$24,687	M	-1.7	$59,799	-10.0	$59,890
$0.7m	R	-2.3	$43,057	-16.2	$43,132	C	-4.1	$48,185	-28.4	$24,664	Q	-1.7	$59,756	-11.7	$59,870
$0.8m	M	-2.3	$42,965	-18.6	$43,111	O	-4.1	$48,185	-32.5	$24,642	R	-1.7	$59,735	-13.4	$59,854
$0.9m	H	-2.3	$42,943	-20.9	$43,092	O	-4.1	$48,185	-36.6	$24,606	M	-1.7	$59,726	-15.0	$59,839
$1.0m	R	-2.3	$42,903	-23.2	$43,073	R	-4.1	$48,185	-40.7	$24,577	M	-1.7	$59,653	-16.7	$59,821
$1.1m	H	-2.3	$42,817	-25.6	$43,050	H	-4.1	$48,185	-44.8	$24,543	C	-1.7	$59,630	-18.4	$59,803
$1.2m	C	-2.3	$42,807	-27.9	$43,029	O	-4.1	$48,185	-49.0	$24,510	R	-1.7	$59,624	-20.1	$59,788
$1.3m	Q	-2.3	$42,754	-30.2	$43,008	R	-4.2	$48,185	-53.1	$24,473	Q	-1.7	$59,592	-21.7	$59,773
$1.4m	R	-2.3	$42,747	-32.6	$42,989	O	-4.2	$48,185	-57.3	$24,438	M	-1.7	$59,579	-23.4	$59,759
$1.5m	H	-2.3	$42,691	-34.9	$42,969	E	-4.2	$48,185	-61.5	$24,399	R	-1.7	$59,512	-25.1	$59,743
$1.6m	M	-2.3	$42,689	-37.3	$42,952	O	-4.2	$48,185	-65.7	$24,361	M	-1.7	$59,505	-26.8	$59,728
$1.7m	R	-2.3	$42,592	-39.6	$42,930	H	-4.2	$48,185	-69.9	$24,327	C	-1.7	$59,484	-28.5	$59,713
$1.8m	H	-2.3	$42,564	-41.9	$42,910	R	-4.2	$48,185	-74.1	$24,296	M	-1.7	$59,431	-30.2	$59,698
$1.9m	C	-2.4	$42,523	-44.3	$42,889	O	-4.2	$48,185	-78.3	$24,260	Q	-1.7	$59,427	-31.8	$59,683
$2.0m	H	-2.4	$42,437	-46.7	$42,866	C	-4.2	$48,185	-82.6	$24,228	R	-1.7	$59,401	-33.5	$59,669
$2.1m	R	-2.4	$42,435	-49.0	$42,846	Q	-4.2	$48,185	-86.8	$24,197	M	-1.7	$59,356	-35.2	$59,654
$2.2m	Q	-2.4	$42,431	-51.4	$42,827	U	-4.2	$48,185	-91.0	$24,169	C	-1.7	$59,337	-36.9	$59,640
$2.3m	M	-2.4	$42,405	-53.7	$42,808	R	-4.3	$48,185	-95.3	$24,138	R	-1.7	$59,289	-38.6	$59,624
$2.4m	H	-2.4	$42,308	-56.1	$42,787	O	-4.3	$48,185	-99.5	$24,109	M	-1.7	$59,281	-40.3	$59,610
$2.5m	R	-2.4	$42,278	-58.5	$42,766	H	-4.3	$48,185	-103.8	$24,080	Q	-1.7	$59,260	-41.9	$59,596
$2.6m	C	-2.4	$42,234	-60.8	$42,746	O	-4.3	$48,185	-108.1	$24,048	M	-1.7	$59,206	-43.6	$59,581
$2.7m	H	-2.4	$42,179	-63.2	$42,725	M	-4.3	$48,185	-112.4	$24,018	C	-1.7	$59,190	-45.3	$59,566
$2.8m	R	-2.4	$42,121	-65.6	$42,703	R	-4.3	$48,185	-116.7	$23,987	R	-1.7	$59,176	-47.0	$59,552
$2.9m	M	-2.4	$42,114	-67.9	$42,682	N	-4.3	$48,185	-121.0	$23,959	N	-1.7	$59,166	-48.7	$59,539
$3.0m	Q	-2.4	$42,103	-70.3	$42,663	O	-4.3	$48,185	-125.4	$23,929	M	-1.7	$59,130	-50.4	$59,525
$3.1m	H	-2.4	$42,049	-72.7	$42,642	H	-4.4	$48,185	-129.7	$23,896	Q	-1.7	$59,093	-52.1	$59,511
$3.2m	R	-2.4	$41,963	-75.1	$42,621	T	-4.4	$48,185	-134.1	$23,866	R	-1.7	$59,064	-53.8	$59,497
$3.3m	C	-2.4	$41,942	-77.5	$42,600	T	-4.4	$48,185	-138.4	$23,836	M	-1.7	$59,053	-55.5	$59,483
$3.4m	H	-2.4	$41,918	-79.9	$42,580	R	-4.4	$48,185	-142.8	$23,808	C	-1.7	$59,042	-57.2	$59,470
$3.5m	O	-2.4	$41,879	-82.2	$42,559	O	-4.4	$48,185	-147.2	$23,781	M	-1.7	$58,977	-58.9	$59,456
$3.6m	O	-2.4	$41,823	-84.6	$42,538	T	-4.4	$48,185	-151.5	$23,756	R	-1.7	$58,951	-60.6	$59,442
$3.7m	M	-2.4	$41,814	-87.0	$42,519	T	-4.4	$48,185	-155.9	$23,731	Q	-1.7	$58,925	-62.3	$59,428
$3.8m	R	-2.4	$41,804	-89.4	$42,499	T	-4.4	$48,185	-160.3	$23,706	M	-1.7	$58,900	-64.0	$59,414
$3.9m	H	-2.4	$41,787	-91.8	$42,481	T	-4.4	$48,185	-164.7	$23,682	C	-1.7	$58,893	-65.7	$59,400
$4.0m	Q	-2.4	$41,771	-94.2	$42,463	T	-4.4	$48,185	-169.1	$23,659	R	-1.7	$58,839	-67.4	$59,386
$4.1m	O	-2.4	$41,766	-96.6	$42,446	T	-4.4	$48,185	-173.5	$23,636	M	-1.7	$58,822	-69.1	$59,372
$4.2m	O	-2.4	$41,709	-99.0	$42,428	O	-4.4	$48,185	-177.9	$23,613	Q	-1.7	$58,756	-70.8	$59,358
$4.3m	H	-2.4	$41,654	-101.4	$42,409	T	-4.4	$48,185	-182.3	$23,591	M	-1.7	$58,744	-72.5	$59,343
$4.4m	O	-2.4	$41,652	-103.8	$42,392	T	-4.4	$48,185	-186.7	$23,570	C	-1.7	$58,743	-74.2	$59,329
$4.5m	C	-2.4	$41,646	-106.2	$42,375	C	-4.4	$48,185	-191.1	$23,549	R	-1.7	$58,725	-75.9	$59,316
$4.6m	R	-2.4	$41,645	-108.6	$42,359	T	-4.4	$48,185	-195.5	$23,528	M	-1.7	$58,666	-77.6	$59,302
$4.7m	O	-2.4	$41,595	-111.0	$42,342	T	-4.4	$48,185	-199.9	$23,508	R	-1.7	$58,613	-79.3	$59,287
$4.8m	O	-2.4	$41,538	-113.4	$42,325	R	-4.4	$48,185	-204.4	$23,489	C	-1.7	$58,593	-81.0	$59,272

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$4.9m	H	-2.4	$41,521	-115.8	$42,309	I	-4.4	$48,186	-208.8	$23,470	M	-1.7	$58,588	-82.7	$59,258
$5.0m	M	-2.4	$41,505	-118.2	$42,292	T	-4.4	$48,183	-213.2	$23,452	Q	-1.7	$58,586	-84.4	$59,244
$5.1m	R	-2.4	$41,485	-120.6	$42,276	I	-4.4	$48,186	-217.6	$23,434	M	-1.7	$58,508	-86.1	$59,230
$5.2m	O	-2.4	$41,481	-123.0	$42,260	T	-4.4	$48,186	-222.1	$23,416	R	-1.7	$58,499	-87.8	$59,216
$5.3m	Q	-2.4	$41,432	-125.5	$42,245	I	-4.4	$48,186	-226.5	$23,399	C	-1.7	$58,442	-89.5	$59,201
$5.4m	O	-2.4	$41,423	-127.9	$42,229	T	-4.4	$48,183	-230.9	$23,382	M	-1.7	$58,429	-91.2	$59,186
$5.5m	H	-2.4	$41,387	-130.3	$42,213	O	-4.4	$48,186	-235.4	$23,366	Q	-1.7	$58,415	-92.9	$59,172
$5.6m	O	-2.4	$41,365	-132.7	$42,198	H	-4.4	$48,186	-239.8	$23,350	R	-1.7	$58,385	-94.7	$59,158
$5.7m	C	-2.4	$41,345	-135.1	$42,183	I	-4.4	$48,186	-244.3	$23,335	M	-1.7	$58,349	-96.4	$59,143
$5.8m	R	-2.4	$41,325	-137.5	$42,168	Q	-4.4	$48,183	-248.7	$23,320	C	-1.7	$58,290	-98.1	$59,129
$5.9m	O	-2.4	$41,307	-140.0	$42,153	T	-4.4	$48,186	-253.2	$23,306	R	-1.7	$58,271	-99.8	$59,114
$6.0m	H	-2.4	$41,252	-142.4	$42,137	I	-4.4	$48,186	-257.6	$23,291	M	-1.7	$58,269	-101.5	$59,099
$6.1m	O	-2.4	$41,249	-144.8	$42,123	T	-4.5	$48,183	-262.1	$23,277	Q	-1.7	$58,243	-103.2	$59,085
$6.2m	O	-2.4	$41,191	-147.2	$42,107	I	-4.5	$48,186	-266.5	$23,263	M	-1.7	$58,188	-105.0	$59,071
$6.3m	M	-2.4	$41,187	-149.7	$42,092	T	-4.5	$48,186	-271.0	$23,250	R	-1.7	$58,157	-106.7	$59,056
$6.4m	R	-2.4	$41,164	-152.1	$42,077	I	-4.5	$48,186	-275.4	$23,236	C	-1.7	$58,137	-108.4	$59,041
$6.5m	O	-2.4	$41,133	-154.5	$42,063	T	-4.5	$48,183	-279.9	$23,223	M	-1.7	$58,106	-110.1	$59,027
$6.6m	H	-2.4	$41,116	-157.0	$42,048	I	-4.5	$48,186	-284.4	$23,210	Q	-1.7	$58,070	-111.8	$59,012
$6.7m	Q	-2.4	$41,088	-159.4	$42,033	I	-4.5	$48,186	-288.8	$23,197	R	-1.7	$58,043	-113.6	$58,997
$6.8m	O	-2.4	$41,074	-161.8	$42,019	T	-4.5	$48,186	-293.3	$23,184	M	-1.7	$58,024	-115.3	$58,983
$6.9m	C	-2.4	$41,040	-164.3	$42,004	I	-4.5	$48,183	-297.8	$23,172	C	-1.7	$57,983	-117.0	$58,968
$7.0m	O	-2.4	$41,015	-166.7	$41,990	T	-4.5	$48,186	-302.3	$23,159	M	-1.7	$57,942	-118.7	$58,953
$7.1m	R	-2.4	$41,002	-169.1	$41,976	O	-4.5	$48,186	-306.7	$23,147	R	-1.7	$57,928	-120.5	$58,938
$7.2m	H	-2.4	$40,979	-171.6	$41,961	R	-4.5	$48,186	-311.2	$23,135	Q	-1.7	$57,895	-122.2	$58,924
$7.3m	O	-2.4	$40,957	-174.0	$41,947	I	-4.5	$48,183	-315.7	$23,124	M	-1.7	$57,859	-123.9	$58,909
$7.4m	O	-2.4	$40,897	-176.5	$41,933	T	-4.5	$48,186	-320.2	$23,112	C	-1.7	$57,829	-125.6	$58,894
$7.5m	M	-2.4	$40,859	-178.9	$41,918	I	-4.5	$48,186	-324.7	$23,101	R	-1.7	$57,813	-127.4	$58,879
$7.6m	H	-2.4	$40,841	-181.4	$41,904	T	-4.5	$48,186	-329.2	$23,089	M	-1.7	$57,776	-129.1	$58,864
$7.7m	R	-2.4	$40,839	-183.8	$41,889	I	-4.5	$48,183	-333.7	$23,078	Q	-1.7	$57,720	-130.8	$58,849
$7.8m	O	-2.4	$40,838	-186.3	$41,876	T	-4.5	$48,186	-338.1	$23,067	R	-1.7	$57,698	-132.6	$58,834
$7.9m	O	-2.5	$40,779	-188.7	$41,861	I	-4.5	$48,186	-342.6	$23,056	M	-1.7	$57,693	-134.3	$58,819
$8.0m	Q	-2.5	$40,739	-191.2	$41,847	T	-4.5	$48,186	-347.1	$23,045	C	-1.7	$57,673	-136.0	$58,805
$8.1m	C	-2.5	$40,730	-193.6	$41,833	I	-4.5	$48,183	-351.7	$23,034	M	-1.7	$57,608	-137.8	$58,790
$8.2m	O	-2.5	$40,719	-196.1	$41,819	T	-4.5	$48,186	-356.2	$23,023	R	-1.7	$57,583	-139.5	$58,775
$8.3m	H	-2.5	$40,703	-198.5	$41,805	I	-4.5	$48,186	-360.7	$23,012	Q	-1.7	$57,544	-141.3	$58,760
$8.4m	R	-2.5	$40,676	-201.0	$41,791	T	-4.5	$48,186	-365.2	$23,002	M	-1.7	$57,524	-143.0	$58,745
$8.5m	N	-2.5	$40,672	-203.5	$41,778	I	-4.5	$48,183	-369.7	$22,991	C	-1.7	$57,518	-144.7	$58,730
$8.6m	O	-2.5	$40,660	-205.9	$41,764	O	-4.5	$48,186	-374.2	$22,981	R	-1.7	$57,467	-146.5	$58,715
$8.7m	O	-2.5	$40,600	-208.4	$41,751	T	-4.5	$48,186	-378.8	$22,970	M	-1.7	$57,439	-148.2	$58,700
$8.8m	H	-2.5	$40,563	-210.8	$41,737	I	-4.5	$48,186	-383.3	$22,960	Q	-1.7	$57,367	-150.0	$58,684
$8.9m	O	-2.5	$40,539	-213.3	$41,723	I	-4.5	$48,183	-387.8	$22,950	C	-1.7	$57,360	-151.7	$58,669
$9.0m	M	-2.5	$40,520	-215.8	$41,709	T	-4.5	$48,186	-392.3	$22,940	M	-1.7	$57,353	-153.4	$58,654
$9.1m	R	-2.5	$40,513	-218.2	$41,695	H	-4.5	$48,186	-396.9	$22,929	R	-1.7	$57,352	-155.2	$58,640
$9.2m	O	-2.5	$40,479	-220.7	$41,682	I	-4.5	$48,186	-401.4	$22,919	M	-1.7	$57,267	-156.9	$58,624
$9.3m	H	-2.5	$40,422	-223.2	$41,668	T	-4.5	$48,183	-405.9	$22,910	R	-1.7	$57,235	-158.7	$58,609
$9.4m	O	-2.5	$40,419	-225.7	$41,654	R	-4.5	$48,186	-410.5	$22,900	C	-1.7	$57,203	-160.4	$58,594
$9.5m	C	-2.5	$40,415	-228.1	$41,641	I	-4.5	$48,186	-415.0	$22,890	Q	-1.7	$57,188	-162.2	$58,579
$9.6m	Q	-2.5	$40,383	-230.6	$41,627	T	-4.5	$48,186	-419.6	$22,881	M	-1.7	$57,180	-163.9	$58,564
$9.7m	O	-2.5	$40,358	-233.1	$41,614	I	-4.5	$48,183	-424.1	$22,871	R	-1.8	$57,120	-165.7	$58,548
$9.8m	R	-2.5	$40,348	-235.6	$41,600	T	-4.6	$48,186	-428.7	$22,862	M	-1.8	$57,093	-167.4	$58,533
$9.9m	O	-2.5	$40,297	-238.1	$41,587	I	-4.6	$48,186	-433.2	$22,852	C	-1.8	$57,044	-169.2	$58,518

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$10.0m	H	-2.5	$40,281	-240.5	$41,573	T	-4.6	$48,186	-437.8	$22,843	Q	-1.8	$57,009	-170.9	$58,502
$10.1m	O	-2.5	$40,236	-243.0	$41,560	I	-4.6	$48,183	-442.3	$22,833	M	-1.8	$57,005	-172.7	$58,487
$10.2m	R	-2.5	$40,183	-245.5	$41,546	O	-4.6	$48,186	-446.9	$22,824	R	-1.8	$57,003	-174.4	$58,472
$10.3m	O	-2.5	$40,175	-248.0	$41,532	T	-4.6	$48,186	-451.5	$22,815	U	-1.8	$56,943	-176.2	$58,457
$10.4m	M	-2.5	$40,169	-250.5	$41,518	I	-4.6	$48,186	-456.0	$22,805	M	-1.8	$56,917	-178.0	$58,442
$10.5m	H	-2.5	$40,138	-253.0	$41,505	T	-4.6	$48,183	-460.6	$22,796	R	-1.8	$56,886	-179.7	$58,426
$10.6m	O	-2.5	$40,114	-255.5	$41,491	I	-4.6	$48,186	-465.2	$22,787	C	-1.8	$56,885	-181.5	$58,412
$10.7m	C	-2.5	$40,096	-258.0	$41,478	T	-4.6	$48,186	-469.8	$22,778	Q	-1.8	$56,828	-183.2	$58,396
$10.8m	O	-2.5	$40,052	-260.5	$41,464	I	-4.6	$48,186	-474.3	$22,769	M	-1.8	$56,828	-185.0	$58,381
$10.9m	Q	-2.5	$40,021	-263.0	$41,450	T	-4.6	$48,183	-478.9	$22,760	R	-1.8	$56,769	-186.8	$58,366
$11.0m	R	-2.5	$40,018	-265.5	$41,437	I	-4.6	$48,186	-483.5	$22,750	M	-1.8	$56,739	-188.5	$58,351
$11.1m	H	-2.5	$39,995	-268.0	$41,423	T	-4.6	$48,186	-488.1	$22,741	C	-1.8	$56,724	-190.3	$58,336
$11.2m	O	-2.5	$39,990	-270.5	$41,410	I	-4.6	$48,186	-492.7	$22,732	R	-1.8	$56,652	-192.0	$58,320
$11.3m	O	-2.5	$39,928	-273.0	$41,397	T	-4.6	$48,183	-497.3	$22,723	M	-1.8	$56,649	-193.8	$58,305
$11.4m	O	-2.5	$39,866	-275.5	$41,383	I	-4.6	$48,186	-501.9	$22,714	Q	-1.8	$56,646	-195.6	$58,290
$11.5m	R	-2.5	$39,851	-278.0	$41,369	R	-4.6	$48,186	-506.5	$22,705	C	-1.8	$56,562	-197.3	$58,275
$11.6m	H	-2.5	$39,850	-280.5	$41,355	O	-4.6	$48,186	-511.1	$22,696	M	-1.8	$56,558	-199.1	$58,259
$11.7m	M	-2.5	$39,805	-283.0	$41,342	T	-4.6	$48,183	-515.7	$22,687	R	-1.8	$56,535	-200.9	$58,244
$11.8m	O	-2.5	$39,804	-285.5	$41,328	I	-4.6	$48,186	-520.3	$22,679	E	-1.8	$56,494	-202.6	$58,229
$11.9m	C	-2.5	$39,771	-288.0	$41,314	T	-4.6	$48,186	-524.9	$22,670	M	-1.8	$56,467	-204.4	$58,214
$12.0m	O	-2.5	$39,742	-290.6	$41,301	I	-4.6	$48,186	-529.5	$22,661	Q	-1.8	$56,463	-206.2	$58,199
$12.1m	H	-2.5	$39,704	-293.1	$41,287	T	-4.6	$48,183	-534.2	$22,652	R	-1.8	$56,417	-208.0	$58,184
$12.2m	R	-2.5	$39,684	-295.6	$41,273	I	-4.6	$48,186	-538.8	$22,644	C	-1.8	$56,401	-209.7	$58,168
$12.3m	O	-2.5	$39,679	-298.1	$41,260	I	-4.6	$48,186	-543.4	$22,635	M	-1.8	$56,375	-211.5	$58,153
$12.4m	Q	-2.5	$39,652	-300.6	$41,246	T	-4.6	$48,183	-548.0	$22,626	R	-1.8	$56,299	-213.3	$58,138
$12.5m	O	-2.5	$39,616	-303.2	$41,233	C	-4.6	$48,186	-552.7	$22,618	M	-1.8	$56,283	-215.1	$58,123
$12.6m	H	-2.5	$39,558	-305.7	$41,219	I	-4.6	$48,186	-557.3	$22,609	Q	-1.8	$56,279	-216.8	$58,108
$12.7m	O	-2.5	$39,553	-308.2	$41,205	T	-4.6	$48,186	-561.9	$22,600	C	-1.8	$56,237	-218.6	$58,092
$12.8m	R	-2.5	$39,516	-310.7	$41,192	H	-4.6	$48,183	-566.6	$22,592	M	-1.8	$56,190	-220.4	$58,077
$12.9m	O	-2.5	$39,489	-313.3	$41,178	I	-4.6	$48,186	-571.2	$22,583	R	-1.8	$56,181	-222.2	$58,062
$13.0m	C	-2.5	$39,441	-315.8	$41,164	T	-4.6	$48,186	-575.9	$22,575	M	-1.8	$56,096	-224.0	$58,046
$13.1m	M	-2.5	$39,428	-318.3	$41,150	I	-4.6	$48,186	-580.5	$22,566	Q	-1.8	$56,093	-225.7	$58,031
$13.2m	O	-2.5	$39,426	-320.9	$41,136	T	-4.7	$48,183	-585.2	$22,558	C	-1.8	$56,073	-227.5	$58,015
$13.3m	H	-2.5	$39,409	-323.4	$41,123	O	-4.7	$48,186	-589.8	$22,550	R	-1.8	$56,063	-229.3	$58,000
$13.4m	O	-2.5	$39,362	-326.0	$41,109	I	-4.7	$48,186	-594.5	$22,541	M	-1.8	$56,002	-231.1	$57,985
$13.5m	R	-2.5	$39,348	-328.5	$41,096	T	-4.7	$48,186	-599.1	$22,533	N	-1.8	$55,961	-232.9	$57,969
$13.6m	O	-2.5	$39,299	-331.0	$41,082	I	-4.7	$48,183	-603.8	$22,524	R	-1.8	$55,944	-234.7	$57,954
$13.7m	Q	-2.5	$39,276	-333.6	$41,068	T	-4.7	$48,186	-608.5	$22,516	C	-1.8	$55,908	-236.5	$57,938
$13.8m	H	-2.5	$39,261	-336.1	$41,054	R	-4.7	$48,186	-613.1	$22,508	M	-1.8	$55,907	-238.2	$57,923
$13.9m	O	-2.5	$39,233	-338.7	$41,041	I	-4.7	$48,186	-617.8	$22,499	Q	-1.8	$55,907	-240.0	$57,908
$14.0m	R	-2.6	$39,179	-341.2	$41,027	T	-4.7	$48,183	-622.5	$22,491	R	-1.8	$55,825	-241.8	$57,893
$14.1m	O	-2.6	$39,170	-343.8	$41,013	I	-4.7	$49,596	-627.1	$22,483	M	-1.8	$55,812	-243.6	$57,877
$14.2m	H	-2.6	$39,110	-346.4	$40,999	T	-4.7	$49,596	-631.8	$22,474	C	-1.8	$55,742	-245.4	$57,862
$14.3m	C	-2.6	$39,105	-348.9	$40,985	I	-4.7	$49,596	-636.5	$22,466	Q	-1.8	$55,719	-247.2	$57,846
$14.4m	O	-2.6	$39,105	-351.5	$40,971	T	-4.7	$49,596	-641.2	$22,458	M	-1.8	$55,716	-249.0	$57,831
$14.5m	O	-2.6	$39,040	-354.0	$40,957	I	-4.7	$49,596	-645.9	$22,449	R	-1.8	$55,706	-250.8	$57,816
$14.6m	M	-2.6	$39,035	-356.6	$40,943	T	-4.7	$49,596	-650.6	$22,441	M	-1.8	$55,619	-252.6	$57,800
$14.7m	R	-2.6	$39,009	-359.2	$40,930	O	-4.7	$49,596	-655.3	$22,433	R	-1.8	$55,586	-254.4	$57,784
$14.8m	O	-2.6	$38,976	-361.7	$40,916	Q	-4.7	$49,596	-660.0	$22,425	C	-1.8	$55,574	-256.2	$57,769
$14.9m	H	-2.6	$38,959	-364.3	$40,902	I	-4.7	$49,596	-664.7	$22,417	Q	-1.8	$55,530	-258.0	$57,753
$15.0m	O	-2.6	$38,911	-366.9	$40,888	T	-4.7	$49,596	-669.4	$22,408	M	-1.8	$55,521	-259.8	$57,738

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$15.1m	Q	-2.6	$38,892	-369.4	$40,874	I	-4.7	$49,596	-674.1	$22,400	R	-1.8	$55,467	-261.6	$57,722
$15.2m	O	-2.6	$38,844	-372.0	$40,860	T	-4.7	$49,596	-678.8	$22,392	M	-1.8	$55,423	-263.4	$57,706
$15.3m	R	-2.6	$38,838	-374.6	$40,846	I	-4.7	$49,596	-683.5	$22,384	C	-1.8	$55,406	-265.2	$57,691
$15.4m	H	-2.6	$38,807	-377.2	$40,832	T	-4.7	$49,596	-688.2	$22,376	R	-1.8	$55,347	-267.0	$57,675
$15.5m	O	-2.6	$38,779	-379.7	$40,818	I	-4.7	$49,596	-693.0	$22,367	Q	-1.8	$55,339	-268.8	$57,659
$15.6m	C	-2.6	$38,764	-382.3	$40,804	T	-4.7	$49,596	-697.7	$22,359	M	-1.8	$55,324	-270.6	$57,643
$15.7m	O	-2.6	$38,712	-384.9	$40,790	I	-4.7	$49,596	-702.4	$22,351	C	-1.8	$55,237	-272.4	$57,627
$15.8m	R	-2.6	$38,666	-387.5	$40,776	T	-4.7	$49,596	-707.2	$22,343	R	-1.8	$55,227	-274.3	$57,612
$15.9m	H	-2.6	$38,653	-390.1	$40,762	R	-4.7	$49,596	-711.9	$22,334	M	-1.8	$55,225	-276.1	$57,596
$16.0m	O	-2.6	$38,647	-392.7	$40,748	I	-4.7	$49,596	-716.6	$22,326	Q	-1.8	$55,147	-277.9	$57,580
$16.1m	M	-2.6	$38,626	-395.2	$40,734	T	-4.7	$49,596	-721.4	$22,318	M	-1.8	$55,123	-279.7	$57,564
$16.2m	O	-2.6	$38,580	-397.8	$40,720	O	-4.7	$49,596	-726.1	$22,310	R	-1.8	$55,106	-281.5	$57,548
$16.3m	O	-2.6	$38,513	-400.4	$40,706	I	-4.7	$49,596	-730.9	$22,302	C	-1.8	$55,067	-283.3	$57,532
$16.4m	Q	-2.6	$38,502	-403.0	$40,692	H	-4.7	$49,596	-735.6	$22,294	M	-1.8	$55,024	-285.1	$57,516
$16.5m	H	-2.6	$38,498	-405.6	$40,678	T	-4.8	$49,596	-740.4	$22,286	R	-1.8	$54,986	-287.0	$57,500
$16.6m	R	-2.6	$38,494	-408.2	$40,664	I	-4.8	$49,596	-745.1	$22,278	Q	-1.8	$54,954	-288.8	$57,484
$16.7m	O	-2.6	$38,448	-410.8	$40,650	T	-4.8	$49,596	-749.9	$22,269	M	-1.8	$54,921	-290.6	$57,468
$16.8m	C	-2.6	$38,416	-413.4	$40,636	I	-4.8	$49,596	-754.7	$22,261	C	-1.8	$54,896	-292.4	$57,452
$16.9m	O	-2.6	$38,379	-416.0	$40,622	T	-4.8	$49,596	-759.4	$22,253	R	-1.8	$54,865	-294.2	$57,436
$17.0m	H	-2.6	$38,342	-418.6	$40,607	I	-4.8	$49,596	-764.2	$22,245	M	-1.8	$54,819	-296.1	$57,420
$17.1m	R	-2.6	$38,321	-421.3	$40,593	T	-4.8	$49,596	-769.0	$22,237	Q	-1.8	$54,760	-297.9	$57,404
$17.2m	O	-2.6	$38,313	-423.9	$40,579	I	-4.8	$49,596	-773.8	$22,229	R	-1.8	$54,743	-299.7	$57,387
$17.3m	O	-2.6	$38,245	-426.5	$40,565	T	-4.8	$49,596	-778.6	$22,221	C	-1.8	$54,723	-301.5	$57,371
$17.4m	M	-2.6	$38,199	-429.1	$40,550	I	-4.8	$49,596	-783.3	$22,212	M	-1.8	$54,717	-303.4	$57,355
$17.5m	H	-2.6	$38,184	-431.7	$40,536	T	-4.8	$49,596	-788.1	$22,204	R	-1.8	$54,622	-305.2	$57,339
$17.6m	O	-2.6	$38,178	-434.3	$40,522	O	-4.8	$49,596	-792.9	$22,196	M	-1.8	$54,612	-307.0	$57,323
$17.7m	R	-2.6	$38,147	-437.0	$40,508	I	-4.8	$49,596	-797.7	$22,188	Q	-1.8	$54,564	-308.9	$57,306
$17.8m	O	-2.6	$38,110	-439.6	$40,493	T	-4.8	$49,596	-802.5	$22,180	C	-1.8	$54,550	-310.7	$57,290
$17.9m	Q	-2.6	$38,102	-442.2	$40,479	I	-4.8	$49,596	-807.3	$22,171	M	-1.8	$54,505	-312.5	$57,274
$18.0m	C	-2.6	$38,062	-444.8	$40,465	T	-4.8	$49,596	-812.2	$22,163	R	-1.8	$54,500	-314.4	$57,257
$18.1m	O	-2.6	$38,040	-447.5	$40,451	R	-4.8	$49,596	-817.0	$22,155	M	-1.8	$54,401	-316.2	$57,241
$18.2m	H	-2.6	$38,026	-450.1	$40,436	I	-4.8	$49,596	-821.8	$22,147	R	-1.8	$54,378	-318.0	$57,224
$18.3m	R	-2.6	$37,973	-452.7	$40,422	T	-4.8	$49,596	-826.6	$22,139	C	-1.8	$54,375	-319.9	$57,208
$18.4m	O	-2.6	$37,974	-455.4	$40,408	I	-4.8	$49,596	-831.4	$22,131	Q	-1.8	$54,367	-321.7	$57,192
$18.5m	O	-2.6	$37,903	-458.0	$40,394	T	-4.8	$49,596	-836.3	$22,122	M	-1.8	$54,295	-323.6	$57,175
$18.6m	H	-2.6	$37,865	-460.6	$40,379	I	-4.8	$49,596	-841.1	$22,114	R	-1.8	$54,256	-325.4	$57,159
$18.7m	O	-2.6	$37,836	-463.3	$40,364	T	-4.8	$49,596	-845.9	$22,106	C	-1.8	$54,200	-327.3	$57,142
$18.8m	R	-2.6	$37,797	-465.9	$40,350	I	-4.8	$49,596	-850.8	$22,098	M	-1.8	$54,186	-329.1	$57,125
$18.9m	O	-2.6	$37,766	-468.6	$40,335	T	-4.8	$49,596	-855.6	$22,089	Q	-1.8	$54,168	-330.9	$57,109
$19.0m	M	-2.6	$37,752	-471.2	$40,321	O	-4.9	$49,596	-860.5	$22,081	R	-1.8	$54,133	-332.8	$57,092
$19.1m	H	-2.7	$37,704	-473.9	$40,306	I	-4.9	$49,596	-865.3	$22,073	M	-1.8	$54,080	-334.6	$57,076
$19.2m	C	-2.7	$37,701	-476.5	$40,292	T	-4.9	$49,596	-870.2	$22,065	C	-1.9	$54,023	-336.5	$57,059
$19.3m	O	-2.7	$37,696	-479.2	$40,277	I	-4.9	$49,596	-875.0	$22,056	R	-1.9	$54,010	-338.3	$57,042
$19.4m	Q	-2.7	$37,695	-481.8	$40,263	T	-4.9	$49,596	-879.9	$22,048	M	-1.9	$53,969	-340.2	$57,026
$19.5m	O	-2.7	$37,627	-484.5	$40,249	T	-4.9	$49,596	-884.8	$22,040	Q	-1.9	$53,967	-342.1	$57,009
$19.6m	R	-2.7	$37,621	-487.1	$40,234	I	-4.9	$49,596	-889.6	$22,031	R	-1.9	$53,887	-343.9	$56,992
$19.7m	O	-2.7	$37,556	-489.8	$40,220	H	-4.9	$49,596	-894.5	$22,023	M	-1.9	$53,859	-345.8	$56,975
$19.8m	H	-2.7	$37,542	-492.5	$40,205	T	-4.9	$49,596	-899.4	$22,015	C	-1.9	$53,845	-347.6	$56,959
$19.9m	O	-2.7	$37,487	-495.1	$40,191	I	-4.9	$49,593	-904.3	$22,007	Q	-1.9	$53,766	-349.5	$56,942
$20.0m	R	-2.7	$37,444	-497.8	$40,176	R	-4.9	$49,596	-909.2	$21,998	R	-1.9	$53,763	-351.3	$56,925
$20.1m	O	-2.7	$37,415	-500.5	$40,161	T	-4.9	$49,596	-914.1	$21,990	M	-1.9	$53,749	-353.2	$56,908

Budget impact	***Primary budget ($50m)***					***Lower budget ($0m)***					***Higher budget ($100m)***				
	Marginal			***Cumulative***		***Marginal***			***Cumulative***		***Marginal***			***Cumulative***	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	**Tech** [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$20.2m	H	-2.7	$37,376	-503.2	$40,146	I	-4.9	$49,596	-918.9	$21,982	C	-1.9	$53,666	-355.1	$56,891
$20.3m	O	-2.7	$37,345	-505.8	$40,131	C	-4.9	$49,596	-923.8	$21,974	R	-1.9	$53,640	-356.9	$56,874
$20.4m	C	-2.7	$37,333	-508.5	$40,117	T	-4.9	$49,596	-928.7	$21,965	M	-1.9	$53,637	-358.8	$56,857
$20.5m	M	-2.7	$37,283	-511.2	$40,102	I	-4.9	$49,596	-933.6	$21,957	Q	-1.9	$53,562	-360.7	$56,840
$20.6m	Q	-2.7	$37,278	-513.9	$40,087	T	-4.9	$49,596	-938.5	$21,949	M	-1.9	$53,522	-362.5	$56,823
$20.7m	O	-2.7	$37,274	-516.6	$40,073	O	-4.9	$49,596	-943.5	$21,941	R	-1.9	$53,516	-364.4	$56,806
$20.8m	R	-2.7	$37,266	-519.2	$40,058	I	-4.9	$49,596	-948.4	$21,933	C	-1.9	$53,485	-366.3	$56,789
$20.9m	H	-2.7	$37,211	-521.9	$40,043	T	-4.9	$49,596	-953.3	$21,924	M	-1.9	$53,410	-368.1	$56,772
$21.0m	O	-2.7	$37,202	-524.6	$40,029	I	-4.9	$49,596	-958.2	$21,916	R	-1.9	$53,390	-370.0	$56,755
$21.1m	O	-2.7	$37,131	-527.3	$40,014	T	-4.9	$49,596	-963.1	$21,908	Q	-1.9	$53,358	-371.9	$56,738
$21.2m	R	-2.7	$37,087	-530.0	$39,999	I	-4.9	$49,596	-968.1	$21,900	C	-1.9	$53,303	-373.8	$56,720
$21.3m	O	-2.7	$37,059	-532.7	$39,984	T	-4.9	$49,596	-973.0	$21,891	M	-1.9	$53,296	-375.6	$56,703
$21.4m	H	-2.7	$37,044	-535.4	$39,969	I	-4.9	$49,596	-977.9	$21,883	R	-1.9	$53,268	-377.5	$56,686
$21.5m	O	-2.7	$36,986	-538.1	$39,954	T	-4.9	$49,596	-982.9	$21,874	M	-1.9	$53,180	-379.4	$56,669
$21.6m	C	-2.7	$36,958	-540.8	$39,939	I	-5.0	$49,593	-987.8	$21,866	Q	-1.9	$53,151	-381.3	$56,652
$21.7m	O	-2.7	$36,915	-543.5	$39,924	T	-5.0	$49,596	-992.8	$21,858	R	-1.9	$53,141	-383.2	$56,634
$21.8m	R	-2.7	$36,908	-546.2	$39,909	I	-5.0	$49,596	-997.7	$21,849	C	-1.9	$53,121	-385.0	$56,617
$21.9m	H	-2.7	$36,876	-548.9	$39,894	E	-5.0	$49,596	-1002.7	$21,841	M	-1.9	$53,062	-386.9	$56,600
$22.0m	Q	-2.7	$36,852	-551.7	$39,879	T	-5.0	$49,596	-1007.7	$21,832	R	-1.9	$53,019	-388.8	$56,582
$22.1m	O	-2.7	$36,842	-554.4	$39,865	O	-5.0	$49,596	-1012.6	$21,824	M	-1.9	$52,944	-390.7	$56,565
$22.2m	M	-2.7	$36,789	-557.1	$39,850	R	-5.0	$49,596	-1017.6	$21,816	Q	-1.9	$52,943	-392.6	$56,547
$22.3m	O	-2.7	$36,769	-559.8	$39,835	I	-5.0	$49,596	-1022.6	$21,808	C	-1.9	$52,937	-394.5	$56,530
$22.4m	R	-2.7	$36,728	-562.5	$39,820	T	-5.0	$49,596	-1027.6	$21,799	R	-1.9	$52,890	-396.4	$56,513
$22.5m	H	-2.7	$36,704	-565.3	$39,805	I	-5.0	$49,596	-1032.5	$21,791	M	-1.9	$52,826	-398.3	$56,495
$22.6m	O	-2.7	$36,695	-568.0	$39,790	T	-5.0	$49,596	-1037.5	$21,783	R	-1.9	$52,765	-400.2	$56,478
$22.7m	O	-2.7	$36,622	-570.7	$39,774	T	-5.0	$49,596	-1042.5	$21,774	C	-1.9	$52,751	-402.1	$56,460
$22.8m	C	-2.7	$36,575	-573.5	$39,759	I	-5.0	$49,596	-1047.5	$21,766	Q	-1.9	$52,733	-404.0	$56,443
$22.9m	O	-2.7	$36,548	-576.2	$39,744	T	-5.0	$49,596	-1052.5	$21,757	M	-1.9	$52,706	-405.8	$56,425
$23.0m	R	-2.7	$36,546	-578.9	$39,729	I	-5.0	$49,596	-1057.5	$21,749	R	-1.9	$52,640	-407.7	$56,407
$23.1m	H	-2.7	$36,534	-581.7	$39,714	H	-5.0	$49,596	-1062.5	$21,740	M	-1.9	$52,585	-409.6	$56,390
$23.2m	O	-2.7	$36,472	-584.4	$39,699	T	-5.0	$49,593	-1067.5	$21,732	C	-1.9	$52,564	-411.6	$56,372
$23.3m	Q	-2.7	$36,416	-587.1	$39,683	I	-5.0	$49,596	-1072.6	$21,724	N	-1.9	$52,560	-413.5	$56,354
$23.4m	O	-2.7	$36,399	-589.9	$39,668	T	-5.0	$49,596	-1077.6	$21,715	Q	-1.9	$52,522	-415.4	$56,337
$23.5m	R	-2.8	$36,364	-592.6	$39,653	Q	-5.0	$49,596	-1082.6	$21,707	R	-1.9	$52,513	-417.3	$56,319
$23.6m	H	-2.8	$36,360	-595.4	$39,637	I	-5.0	$49,596	-1087.6	$21,698	M	-1.9	$52,463	-419.2	$56,302
$23.7m	O	-2.8	$36,325	-598.2	$39,622	O	-5.0	$49,596	-1092.7	$21,690	R	-1.9	$52,386	-421.1	$56,284
$23.8m	M	-2.8	$36,266	-600.9	$39,607	T	-5.0	$49,596	-1097.7	$21,682	C	-1.9	$52,376	-423.0	$56,267
$23.9m	O	-2.8	$36,249	-603.7	$39,591	I	-5.0	$49,596	-1102.7	$21,673	M	-1.9	$52,340	-424.9	$56,249
$24.0m	H	-2.8	$36,183	-606.4	$39,576	T	-5.0	$49,596	-1107.8	$21,665	Q	-1.9	$52,309	-426.8	$56,231
$24.1m	C	-2.8	$36,184	-609.2	$39,560	R	-5.1	$49,596	-1112.8	$21,656	R	-1.9	$52,260	-428.7	$56,213
$24.2m	R	-2.8	$36,181	-612.0	$39,545	I	-5.1	$49,596	-1117.9	$21,648	M	-1.9	$52,217	-430.6	$56,196
$24.3m	O	-2.8	$36,173	-614.7	$39,530	T	-5.1	$49,596	-1122.9	$21,639	C	-1.9	$52,187	-432.6	$56,178
$24.4m	O	-2.8	$36,098	-617.5	$39,515	I	-5.1	$49,596	-1128.0	$21,631	R	-1.9	$52,132	-434.5	$56,160
$24.5m	O	-2.8	$36,022	-620.3	$39,499	T	-5.1	$49,596	-1133.1	$21,623	Q	-1.9	$52,094	-436.4	$56,142
$24.6m	H	-2.8	$36,007	-623.0	$39,483	I	-5.1	$49,596	-1138.2	$21,614	M	-1.9	$52,089	-438.3	$56,124
$24.7m	R	-2.8	$35,997	-625.8	$39,468	T	-5.1	$49,596	-1143.2	$21,605	R	-1.9	$52,005	-440.2	$56,106
$24.8m	Q	-2.8	$35,969	-628.6	$39,453	T	-5.1	$49,596	-1148.3	$21,597	C	-1.9	$51,996	-442.2	$56,089
$24.9m	O	-2.8	$35,945	-631.4	$39,437	I	-5.1	$49,593	-1153.4	$21,588	M	-1.9	$51,964	-444.1	$56,071
$25.0m	O	-2.8	$35,869	-634.2	$39,421	O	-5.1	$49,596	-1158.5	$21,580	Q	-1.9	$51,877	-446.0	$56,053
$25.1m	N	-2.8	$35,833	-637.0	$39,406	T	-5.1	$49,596	-1163.6	$21,571	R	-1.9	$51,875	-447.9	$56,035
$25.2m	H	-2.8	$35,828	-639.8	$39,390	I	-5.1	$49,596	-1168.7	$21,562	M	-1.9	$51,832	-449.9	$56,017

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$25.3m	R	-2.8	$35,810	-642.5	$39,374	T	-5.1	$49,596	-1173.8	$21,554	C	-1.9	$51,804	-451.8	$55,999
$25.4m	O	-2.8	$35,791	-645.3	$39,359	I	-5.1	$49,596	-1178.9	$21,545	R	-1.9	$51,749	-453.7	$55,980
$25.5m	C	-2.8	$35,784	-648.1	$39,344	T	-5.1	$49,596	-1184.0	$21,536	M	-1.9	$51,706	-455.7	$55,962
$25.6m	O	-2.8	$35,714	-650.9	$39,328	I	-5.1	$49,596	-1189.2	$21,528	Q	-1.9	$51,659	-457.6	$55,944
$25.7m	M	-2.8	$35,712	-653.7	$39,312	T	-5.1	$49,596	-1194.3	$21,519	R	-1.9	$51,618	-459.5	$55,926
$25.8m	H	-2.8	$35,648	-656.5	$39,297	R	-5.1	$49,596	-1199.4	$21,510	C	-1.9	$51,610	-461.5	$55,908
$25.9m	O	-2.8	$35,637	-659.3	$39,281	I	-5.1	$49,596	-1204.6	$21,501	M	-1.9	$51,573	-463.4	$55,890
$26.0m	R	-2.8	$35,626	-662.2	$39,266	T	-5.1	$49,596	-1209.7	$21,493	R	-1.9	$51,491	-465.4	$55,871
$26.1m	O	-2.8	$35,559	-665.0	$39,250	I	-5.2	$49,596	-1214.9	$21,484	M	-1.9	$51,443	-467.3	$55,853
$26.2m	Q	-2.8	$35,511	-667.8	$39,234	T	-5.2	$49,596	-1220.0	$21,475	Q	-1.9	$51,439	-469.2	$55,835
$26.3m	O	-2.8	$35,480	-670.6	$39,219	O	-5.2	$49,596	-1225.2	$21,466	C	-1.9	$51,415	-471.2	$55,816
$26.4m	H	-2.8	$35,465	-673.4	$39,203	T	-5.2	$49,596	-1230.3	$21,457	R	-1.9	$51,364	-473.1	$55,798
$26.5m	R	-2.8	$35,438	-676.2	$39,187	H	-5.2	$49,596	-1235.5	$21,449	M	-1.9	$51,308	-475.1	$55,780
$26.6m	O	-2.8	$35,401	-679.1	$39,171	I	-5.2	$49,593	-1240.7	$21,440	R	-2.0	$51,232	-477.0	$55,761
$26.7m	C	-2.8	$35,375	-681.9	$39,156	T	-5.2	$49,596	-1245.9	$21,431	C	-2.0	$51,218	-479.0	$55,742
$26.8m	O	-2.8	$35,323	-684.7	$39,140	I	-5.2	$49,596	-1251.0	$21,422	Q	-2.0	$51,217	-480.9	$55,724
$26.9m	H	-2.8	$35,282	-687.6	$39,124	T	-5.2	$49,596	-1256.2	$21,414	M	-2.0	$51,174	-482.9	$55,706
$27.0m	R	-2.8	$35,250	-690.4	$39,108	I	-5.2	$49,596	-1261.4	$21,405	R	-2.0	$51,101	-484.9	$55,687
$27.1m	O	-2.8	$35,242	-693.2	$39,092	T	-5.2	$49,596	-1266.6	$21,396	M	-2.0	$51,039	-486.8	$55,668
$27.2m	O	-2.8	$35,163	-696.1	$39,076	I	-5.2	$49,596	-1271.8	$21,387	C	-2.0	$51,020	-488.8	$55,650
$27.3m	M	-2.8	$35,121	-698.9	$39,060	T	-5.2	$49,596	-1277.0	$21,378	Q	-2.0	$50,993	-490.7	$55,631
$27.4m	H	-2.8	$35,095	-701.8	$39,044	I	-5.2	$49,596	-1282.2	$21,369	R	-2.0	$50,971	-492.7	$55,613
$27.5m	O	-2.9	$35,083	-704.6	$39,028	T	-5.2	$49,596	-1287.5	$21,360	W	-2.0	$50,960	-494.7	$55,594
$27.6m	R	-2.9	$35,062	-707.5	$39,012	R	-5.2	$49,596	-1292.7	$21,351	M	-2.0	$50,898	-496.6	$55,576
$27.7m	Q	-2.9	$35,040	-710.3	$38,996	O	-5.2	$49,596	-1297.9	$21,342	R	-2.0	$50,841	-498.6	$55,557
$27.8m	O	-2.9	$35,002	-713.2	$38,980	T	-5.2	$49,596	-1303.2	$21,333	C	-2.0	$50,820	-500.6	$55,538
$27.9m	C	-2.9	$34,956	-716.0	$38,964	C	-5.2	$49,596	-1308.4	$21,324	Q	-2.0	$50,766	-502.5	$55,520
$28.0m	O	-2.9	$34,922	-718.9	$38,948	I	-5.2	$49,596	-1313.6	$21,315	M	-2.0	$50,761	-504.5	$55,501
$28.1m	H	-2.9	$34,906	-721.8	$38,932	T	-5.2	$49,596	-1318.9	$21,306	R	-2.0	$50,713	-506.5	$55,482
$28.2m	R	-2.9	$34,871	-724.6	$38,916	I	-5.3	$49,593	-1324.1	$21,297	M	-2.0	$50,620	-508.4	$55,463
$28.3m	O	-2.9	$34,840	-727.5	$38,900	T	-5.3	$49,596	-1329.4	$21,288	C	-2.0	$50,619	-510.4	$55,445
$28.4m	O	-2.9	$34,758	-730.4	$38,883	I	-5.3	$49,596	-1334.7	$21,279	R	-2.0	$50,579	-512.4	$55,426
$28.5m	H	-2.9	$34,717	-733.3	$38,867	T	-5.3	$49,596	-1339.9	$21,270	Q	-2.0	$50,538	-514.4	$55,407
$28.6m	R	-2.9	$34,680	-736.2	$38,850	I	-5.3	$49,596	-1345.2	$21,261	M	-2.0	$50,477	-516.4	$55,388
$28.7m	O	-2.9	$34,676	-739.0	$38,834	T	-5.3	$49,596	-1350.5	$21,251	R	-2.0	$50,446	-518.3	$55,369
$28.8m	O	-2.9	$34,594	-741.9	$38,818	T	-5.3	$49,596	-1355.8	$21,242	C	-2.0	$50,416	-520.3	$55,350
$28.9m	Q	-2.9	$34,557	-744.8	$38,801	I	-5.3	$49,596	-1361.1	$21,233	M	-2.0	$50,335	-522.3	$55,331
$29.0m	C	-2.9	$34,527	-747.7	$38,785	T	-5.3	$49,596	-1366.4	$21,224	R	-2.0	$50,317	-524.3	$55,312
$29.1m	H	-2.9	$34,524	-750.6	$38,768	O	-5.3	$49,596	-1371.7	$21,214	Q	-2.0	$50,308	-526.3	$55,293
$29.2m	O	-2.9	$34,510	-753.5	$38,752	I	-5.3	$49,596	-1377.0	$21,205	C	-2.0	$50,211	-528.3	$55,274
$29.3m	R	-2.9	$34,488	-756.4	$38,735	T	-5.3	$49,596	-1382.3	$21,196	M	-2.0	$50,186	-530.3	$55,255
$29.4m	M	-2.9	$34,487	-759.3	$38,719	I	-5.3	$49,596	-1387.7	$21,187	R	-2.0	$50,183	-532.3	$55,236
$29.5m	O	-2.9	$34,428	-762.2	$38,703	R	-5.3	$49,596	-1393.0	$21,177	H	-2.0	$50,162	-534.3	$55,217
$29.6m	O	-2.9	$34,344	-765.1	$38,686	T	-5.3	$49,596	-1398.3	$21,168	Q	-2.0	$50,075	-536.3	$55,198
$29.7m	H	-2.9	$34,329	-768.0	$38,670	H	-5.3	$49,596	-1403.7	$21,159	H	-2.0	$50,070	-538.2	$55,179
$29.8m	R	-2.9	$34,295	-771.0	$38,653	I	-5.3	$49,596	-1409.0	$21,150	R	-2.0	$50,050	-540.2	$55,160
$29.9m	O	-2.9	$34,259	-773.9	$38,637	T	-5.3	$49,593	-1414.4	$21,140	M	-2.0	$50,043	-542.2	$55,141
$30.0m	O	-2.9	$34,175	-776.8	$38,620	T	-5.4	$49,596	-1419.7	$21,131	C	-2.0	$50,008	-544.2	$55,122
$30.1m	H	-2.9	$34,133	-779.7	$38,603	I	-5.4	$49,596	-1425.1	$21,122	H	-2.0	$49,978	-546.2	$55,104
$30.2m	R	-2.9	$34,101	-782.7	$38,586	T	-5.4	$49,596	-1430.5	$21,112	R	-2.0	$49,920	-548.2	$55,085
$30.3m	O	-2.9	$34,091	-785.6	$38,569	I	-5.4	$49,596	-1435.8	$21,103	M	-2.0	$49,890	-550.3	$55,066

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$30.4m	C	-2.9	$34,087	-788.5	$38,553	T	-5.4	$49,596	-1441.2	$21,093	H	-2.0	$49,886	-552.3	$55,047
$30.5m	Q	-2.9	$34,059	-791.5	$38,536	O	-5.4	$49,596	-1446.6	$21,084	Q	-2.0	$49,841	-554.3	$55,028
$30.6m	O	-2.9	$34,004	-794.4	$38,519	I	-5.4	$49,596	-1452.0	$21,074	C	-2.0	$49,796	-556.3	$55,009
$30.7m	H	-2.9	$33,934	-797.4	$38,502	T	-5.4	$49,596	-1457.4	$21,065	H	-2.0	$49,793	-558.3	$54,990
$30.8m	O	-2.9	$33,920	-800.3	$38,485	I	-5.4	$49,596	-1462.8	$21,055	R	-2.0	$49,783	-560.3	$54,972
$30.9m	R	-2.9	$33,905	-803.3	$38,468	T	-5.4	$49,596	-1468.2	$21,046	M	-2.0	$49,739	-562.3	$54,953
$31.0m	O	-3.0	$33,833	-806.2	$38,451	T	-5.4	$49,596	-1473.7	$21,036	H	-2.0	$49,700	-564.3	$54,934
$31.1m	M	-3.0	$33,803	-809.2	$38,434	I	-5.4	$49,596	-1479.1	$21,026	R	-2.0	$49,652	-566.3	$54,915
$31.2m	O	-3.0	$33,746	-812.1	$38,417	R	-5.4	$49,596	-1484.5	$21,017	H	-2.0	$49,606	-568.3	$54,897
$31.3m	H	-3.0	$33,734	-815.1	$38,400	T	-5.4	$49,596	-1490.0	$21,007	Q	-2.0	$49,604	-570.4	$54,878
$31.4m	R	-3.0	$33,709	-818.1	$38,383	I	-5.4	$49,596	-1495.4	$20,997	C	-2.0	$49,588	-572.4	$54,859
$31.5m	O	-3.0	$33,660	-821.0	$38,366	T	-5.5	$49,596	-1500.9	$20,988	M	-2.0	$49,588	-574.4	$54,841
$31.6m	C	-3.0	$33,635	-824.0	$38,349	Q	-5.5	$49,593	-1506.3	$20,978	R	-2.0	$49,517	-576.4	$54,822
$31.7m	O	-3.0	$33,572	-827.0	$38,332	I	-5.5	$49,596	-1511.8	$20,968	H	-2.0	$49,512	-578.4	$54,804
$31.8m	Q	-3.0	$33,547	-830.0	$38,315	T	-5.5	$49,596	-1517.3	$20,959	M	-2.0	$49,432	-580.5	$54,785
$31.9m	H	-3.0	$33,528	-832.9	$38,298	O	-5.5	$49,596	-1522.8	$20,949	H	-2.0	$49,418	-582.5	$54,766
$32.0m	R	-3.0	$33,511	-835.9	$38,281	T	-5.5	$49,596	-1528.2	$20,939	R	-2.0	$49,383	-584.5	$54,748
$32.1m	O	-3.0	$33,484	-838.9	$38,263	I	-5.5	$49,596	-1533.7	$20,929	C	-2.0	$49,378	-586.5	$54,729
$32.2m	O	-3.0	$33,396	-841.9	$38,246	T	-5.5	$49,596	-1539.2	$20,920	Q	-2.0	$49,366	-588.6	$54,711
$32.3m	H	-3.0	$33,323	-844.9	$38,229	I	-5.5	$49,596	-1544.7	$20,910	H	-2.0	$49,324	-590.6	$54,692
$32.4m	R	-3.0	$33,312	-847.9	$38,211	T	-5.5	$49,596	-1550.2	$20,900	M	-2.0	$49,278	-592.6	$54,674
$32.5m	O	-3.0	$33,307	-850.9	$38,194	I	-5.5	$49,596	-1555.8	$20,890	R	-2.0	$49,249	-594.6	$54,655
$32.6m	O	-3.0	$33,217	-853.9	$38,176	T	-5.5	$49,596	-1561.3	$20,880	H	-2.0	$49,229	-596.7	$54,637
$32.7m	C	-3.0	$33,171	-856.9	$38,159	R	-5.5	$49,596	-1566.8	$20,870	C	-2.0	$49,162	-598.7	$54,618
$32.8m	O	-3.0	$33,127	-860.0	$38,141	H	-5.5	$49,596	-1572.4	$20,860	H	-2.0	$49,134	-600.7	$54,599
$32.9m	H	-3.0	$33,114	-863.0	$38,124	T	-5.5	$49,596	-1577.9	$20,850	Q	-2.0	$49,123	-602.8	$54,581
$33.0m	R	-3.0	$33,111	-866.0	$38,106	I	-5.5	$49,596	-1583.5	$20,840	M	-2.0	$49,116	-604.8	$54,562
$33.1m	M	-3.0	$33,059	-869.0	$38,089	T	-5.6	$49,596	-1589.0	$20,830	R	-2.0	$49,111	-606.8	$54,544
$33.2m	O	-3.0	$33,037	-872.1	$38,071	I	-5.6	$49,593	-1594.6	$20,820	H	-2.0	$49,038	-608.9	$54,526
$33.3m	Q	-3.0	$33,019	-875.1	$38,053	O	-5.6	$49,596	-1600.2	$20,810	R	-2.0	$48,979	-610.9	$54,507
$33.4m	O	-3.0	$32,946	-878.1	$38,036	T	-5.6	$49,596	-1605.8	$20,800	M	-2.0	$48,957	-613.0	$54,489
$33.5m	R	-3.0	$32,911	-881.2	$38,018	T	-5.6	$49,596	-1611.3	$20,790	C	-2.0	$48,950	-615.0	$54,470
$33.6m	H	-3.0	$32,901	-884.2	$38,001	I	-5.6	$49,596	-1616.9	$20,780	H	-2.0	$48,942	-617.1	$54,452
$33.7m	O	-3.0	$32,855	-887.2	$37,983	T	-5.6	$49,596	-1622.5	$20,770	N	-2.0	$48,921	-619.1	$54,434
$33.8m	O	-3.1	$32,762	-890.3	$37,965	I	-5.6	$61,479	-1628.2	$20,760	Q	-2.0	$48,881	-621.1	$54,415
$33.9m	R	-3.1	$32,708	-893.4	$37,947	T	-5.6	$61,479	-1633.8	$20,750	H	-2.0	$48,845	-623.2	$54,397
$34.0m	C	-3.1	$32,694	-896.4	$37,929	E	-5.6	$61,479	-1639.4	$20,739	R	-2.0	$48,842	-625.2	$54,379
$34.1m	H	-3.1	$32,688	-899.5	$37,911	I	-5.6	$61,479	-1645.0	$20,729	M	-2.0	$48,792	-627.3	$54,361
$34.2m	O	-3.1	$32,670	-902.5	$37,894	T	-5.6	$61,479	-1650.7	$20,719	H	-2.1	$48,748	-629.3	$54,342
$34.3m	O	-3.1	$32,578	-905.6	$37,875	T	-5.7	$61,479	-1656.3	$20,708	C	-2.1	$48,731	-631.4	$54,324
$34.4m	R	-3.1	$32,504	-908.7	$37,857	I	-5.7	$61,479	-1662.0	$20,698	R	-2.1	$48,704	-633.4	$54,306
$34.5m	O	-3.1	$32,483	-911.8	$37,839	R	-5.7	$61,479	-1667.6	$20,688	H	-2.1	$48,651	-635.5	$54,288
$34.6m	Q	-3.1	$32,473	-914.8	$37,821	O	-5.7	$61,479	-1673.3	$20,678	Q	-2.1	$48,633	-637.6	$54,269
$34.7m	H	-3.1	$32,470	-917.9	$37,803	T	-5.7	$61,479	-1679.0	$20,667	M	-2.1	$48,629	-639.6	$54,251
$34.8m	O	-3.1	$32,391	-921.0	$37,785	I	-5.7	$61,479	-1684.7	$20,657	R	-2.1	$48,570	-641.7	$54,233
$34.9m	R	-3.1	$32,299	-924.1	$37,767	T	-5.7	$61,479	-1690.3	$20,647	H	-2.1	$48,554	-643.7	$54,215
$35.0m	O	-3.1	$32,295	-927.2	$37,748	C	-5.7	$61,479	-1696.0	$20,636	C	-2.1	$48,511	-645.8	$54,197
$35.1m	H	-3.1	$32,251	-930.3	$37,730	T	-5.7	$61,479	-1701.7	$20,626	M	-2.1	$48,461	-647.9	$54,178
$35.2m	M	-3.1	$32,240	-933.4	$37,712	I	-5.7	$61,479	-1707.5	$20,615	H	-2.1	$48,456	-649.9	$54,160
$35.3m	C	-3.1	$32,202	-936.5	$37,693	T	-5.7	$61,479	-1713.2	$20,605	R	-2.1	$48,431	-652.0	$54,142
$35.4m	O	-3.1	$32,200	-939.6	$37,675	I	-5.7	$61,479	-1718.9	$20,595	Q	-2.1	$48,384	-654.1	$54,124

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$35.5m	O	-3.1	$32,105	-942.7	$37,657	T	-5.7	$61,479	-1724.6	$20,584	H	-2.1	$48,357	-656.1	$54,106
$35.6m	R	-3.1	$32,093	-945.8	$37,639	T	-5.8	$61,479	-1730.4	$20,573	R	-2.1	$48,295	-658.2	$54,087
$35.7m	H	-3.1	$32,027	-949.0	$37,620	I	-5.8	$61,479	-1736.2	$20,563	M	-2.1	$48,291	-660.3	$54,069
$35.8m	O	-3.1	$32,008	-952.1	$37,602	T	-5.8	$61,479	-1741.9	$20,552	C	-2.1	$48,293	-662.3	$54,051
$35.9m	O	-3.1	$31,911	-955.2	$37,583	O	-5.8	$61,479	-1747.7	$20,541	H	-2.1	$48,258	-664.4	$54,033
$36.0m	Q	-3.1	$31,907	-958.4	$37,564	H	-5.8	$61,479	-1753.5	$20,531	H	-2.1	$48,159	-666.5	$54,015
$36.1m	R	-3.1	$31,885	-961.5	$37,546	I	-5.8	$61,479	-1759.3	$20,520	R	-2.1	$48,156	-668.6	$53,997
$36.2m	O	-3.1	$31,814	-964.6	$37,527	R	-5.8	$61,479	-1765.0	$20,509	Q	-2.1	$48,135	-670.6	$53,978
$36.3m	H	-3.1	$31,801	-967.8	$37,509	T	-5.8	$61,479	-1770.8	$20,499	M	-2.1	$48,121	-672.7	$53,960
$36.4m	O	-3.2	$31,716	-970.9	$37,490	M	-5.8	$61,479	-1776.6	$20,488	C	-2.1	$48,068	-674.8	$53,942
$36.5m	C	-3.2	$31,695	-974.1	$37,471	T	-5.8	$61,479	-1782.4	$20,478	H	-2.1	$48,060	-676.9	$53,924
$36.6m	R	-3.2	$31,676	-977.2	$37,452	I	-5.8	$61,479	-1788.3	$20,467	R	-2.1	$48,019	-679.0	$53,906
$36.7m	O	-3.2	$31,618	-980.4	$37,434	T	-5.8	$61,479	-1794.1	$20,456	H	-2.1	$47,960	-681.0	$53,888
$36.8m	H	-3.2	$31,572	-983.6	$37,415	I	-5.8	$61,479	-1799.9	$20,445	M	-2.1	$47,943	-683.1	$53,870
$36.9m	O	-3.2	$31,518	-986.7	$37,396	T	-5.8	$61,479	-1805.8	$20,435	R	-2.1	$47,879	-685.2	$53,851
$37.0m	R	-3.2	$31,465	-989.9	$37,377	T	-5.9	$61,479	-1811.6	$20,424	Q	-2.1	$47,879	-687.3	$53,833
$37.1m	O	-3.2	$31,418	-993.1	$37,358	I	-5.9	$61,479	-1817.5	$20,413	H	-2.1	$47,859	-689.4	$53,815
$37.2m	H	-3.2	$31,337	-996.3	$37,338	T	-5.9	$61,479	-1823.4	$20,402	C	-2.1	$47,842	-691.5	$53,797
$37.3m	M	-3.2	$31,329	-999.5	$37,319	O	-5.9	$61,479	-1829.3	$20,391	M	-2.1	$47,767	-693.6	$53,779
$37.4m	Q	-3.2	$31,322	-1002.7	$37,300	I	-5.9	$61,479	-1835.2	$20,380	H	-2.1	$47,758	-695.7	$53,761
$37.5m	O	-3.2	$31,318	-1005.9	$37,281	T	-5.9	$61,479	-1841.1	$20,369	R	-2.1	$47,742	-697.8	$53,743
$37.6m	R	-3.2	$31,254	-1009.1	$37,262	R	-5.9	$61,479	-1847.0	$20,358	H	-2.1	$47,657	-699.9	$53,724
$37.7m	O	-3.2	$31,216	-1012.3	$37,243	T	-5.9	$61,479	-1852.9	$20,347	Q	-2.1	$47,624	-702.0	$53,706
$37.8m	C	-3.2	$31,171	-1015.5	$37,224	I	-5.9	$61,479	-1858.8	$20,335	C	-2.1	$47,615	-704.1	$53,688
$37.9m	O	-3.2	$31,115	-1018.7	$37,204	T	-5.9	$168,385	-1864.8	$20,324	R	-2.1	$47,601	-706.2	$53,670
$38.0m	H	-3.2	$31,102	-1021.9	$37,185	I	-6.0	$168,385	-1870.7	$20,313	M	-2.1	$47,587	-708.3	$53,652
$38.1m	R	-3.2	$31,040	-1025.1	$37,166	T	-6.0	$168,385	-1876.7	$20,302	H	-2.1	$47,555	-710.4	$53,634
$38.2m	O	-3.2	$31,012	-1028.4	$37,147	T	-6.0	$168,385	-1882.7	$20,290	R	-2.1	$47,461	-712.5	$53,616
$38.3m	O	-3.2	$30,908	-1031.6	$37,127	I	-6.0	$168,385	-1888.7	$20,279	H	-2.1	$47,453	-714.6	$53,597
$38.4m	E	-3.2	$30,898	-1034.8	$37,107	T	-6.0	$168,385	-1894.7	$20,268	M	-2.1	$47,405	-716.7	$53,579
$38.5m	H	-3.2	$30,861	-1038.1	$37,088	O	-6.0	$168,385	-1900.7	$20,256	C	-2.1	$47,387	-718.8	$53,561
$38.6m	R	-3.2	$30,825	-1041.3	$37,068	I	-6.0	$168,385	-1906.7	$20,244	Q	-2.1	$47,362	-720.9	$53,543
$38.7m	O	-3.2	$30,805	-1044.6	$37,049	T	-6.0	$168,385	-1912.7	$20,233	H	-2.1	$47,351	-723.0	$53,525
$38.8m	Q	-3.3	$30,713	-1047.8	$37,029	T	-6.0	$168,385	-1918.8	$20,221	R	-2.1	$47,322	-725.1	$53,507
$38.9m	O	-3.3	$30,700	-1051.1	$37,010	I	-6.1	$168,385	-1924.8	$20,210	H	-2.1	$47,247	-727.3	$53,488
$39.0m	C	-3.3	$30,628	-1054.3	$36,990	R	-6.1	$168,385	-1930.9	$20,198	M	-2.1	$47,219	-729.4	$53,470
$39.1m	H	-3.3	$30,617	-1057.6	$36,970	H	-6.1	$168,385	-1936.9	$20,187	R	-2.1	$47,181	-731.5	$53,452
$39.2m	R	-3.3	$30,609	-1060.9	$36,951	T	-6.1	$168,385	-1943.0	$20,175	C	-2.1	$47,154	-733.6	$53,434
$39.3m	O	-3.3	$30,595	-1064.1	$36,931	T	-6.1	$168,385	-1949.1	$20,163	H	-2.1	$47,144	-735.7	$53,416
$39.4m	O	-3.3	$30,489	-1067.4	$36,911	I	-6.1	$168,385	-1955.2	$20,152	Q	-2.1	$47,101	-737.9	$53,398
$39.5m	R	-3.3	$30,391	-1070.7	$36,891	T	-6.1	$168,386	-1961.3	$20,140	H	-2.1	$47,040	-740.0	$53,379
$39.6m	O	-3.3	$30,381	-1074.0	$36,871	Q	-6.1	$168,384	-1967.4	$20,128	R	-2.1	$47,041	-742.1	$53,361
$39.7m	H	-3.3	$30,369	-1077.3	$36,851	I	-6.1	$168,384	-1973.5	$20,116	M	-2.1	$47,032	-744.2	$53,343
$39.8m	M	-3.3	$30,296	-1080.6	$36,831	T	-6.1	$168,387	-1979.7	$20,104	H	-2.1	$46,936	-746.4	$53,325
$39.9m	O	-3.3	$30,275	-1083.9	$36,811	O	-6.1	$168,384	-1985.8	$20,092	C	-2.1	$46,920	-748.5	$53,307
$40.0m	N	-3.3	$30,208	-1087.2	$36,791	T	-6.2	$168,384	-1992.0	$20,081	R	-2.1	$46,898	-750.6	$53,288
$40.1m	R	-3.3	$30,171	-1090.5	$36,771	I	-6.2	$168,387	-1998.1	$20,069	M	-2.1	$46,838	-752.8	$53,270
$40.2m	O	-3.3	$30,167	-1093.8	$36,751	T	-6.2	$168,384	-2004.3	$20,057	Q	-2.1	$46,836	-754.9	$53,252
$40.3m	H	-3.3	$30,118	-1097.2	$36,731	T	-6.2	$168,384	-2010.5	$20,044	H	-2.1	$46,831	-757.0	$53,234
$40.4m	Q	-3.3	$30,079	-1100.5	$36,711	I	-6.2	$168,387	-2016.7	$20,032	R	-2.1	$46,755	-759.2	$53,215
$40.5m	C	-3.3	$30,066	-1103.8	$36,691	R	-6.2	$168,384	-2022.9	$20,020	H	-2.1	$46,725	-761.3	$53,197

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$40.6m	O	-3.3	$30,056	-1107.1	$36,671	E	-6.2	$168,384	-2029.2	$20,008	C	-2.1	$46,685	-763.5	$53,179
$40.7m	R	-3.3	$29,951	-1110.5	$36,651	T	-6.2	$168,387	-2035.4	$19,996	M	-2.1	$46,644	-765.6	$53,161
$40.8m	O	-3.3	$29,947	-1113.8	$36,631	T	-6.2	$168,384	-2041.6	$19,984	H	-2.1	$46,619	-767.7	$53,142
$40.9m	W	-3.3	$29,934	-1117.2	$36,611	I	-6.2	$168,384	-2047.9	$19,972	R	-2.1	$46,616	-769.9	$53,124
$41.0m	H	-3.3	$29,861	-1120.5	$36,591	T	-6.3	$168,387	-2054.2	$19,959	Q	-2.1	$46,568	-772.0	$53,106
$41.1m	O	-3.4	$29,836	-1123.9	$36,570	I	-6.3	$168,384	-2060.5	$19,947	H	-2.1	$46,513	-774.2	$53,088
$41.2m	R	-3.4	$29,728	-1127.2	$36,550	O	-6.3	$168,384	-2066.8	$19,935	R	-2.2	$46,471	-776.3	$53,069
$41.3m	O	-3.4	$29,725	-1130.6	$36,530	T	-6.3	$168,387	-2073.1	$19,922	M	-2.2	$46,447	-778.5	$53,051
$41.4m	O	-3.4	$29,613	-1134.0	$36,509	T	-6.3	$168,384	-2079.4	$19,910	C	-2.2	$46,445	-780.6	$53,033
$41.5m	H	-3.4	$29,601	-1137.3	$36,489	I	-6.3	$168,384	-2085.7	$19,897	H	-2.2	$46,406	-782.8	$53,015
$41.6m	R	-3.4	$29,504	-1140.7	$36,468	T	-6.3	$168,387	-2092.1	$19,885	R	-2.2	$46,328	-785.0	$52,996
$41.7m	O	-3.4	$29,499	-1144.1	$36,447	T	-6.4	$168,384	-2098.4	$19,872	H	-2.2	$46,299	-787.1	$52,978
$41.8m	C	-3.4	$29,482	-1147.5	$36,427	R	-6.4	$168,384	-2104.8	$19,859	Q	-2.2	$46,294	-789.3	$52,959
$41.9m	Q	-3.4	$29,418	-1150.9	$36,406	C	-6.4	$168,387	-2111.2	$19,846	M	-2.2	$46,243	-791.4	$52,941
$42.0m	O	-3.4	$29,385	-1154.3	$36,385	I	-6.4	$168,384	-2117.6	$19,834	C	-2.2	$46,204	-793.6	$52,923
$42.1m	H	-3.4	$29,334	-1157.7	$36,364	T	-6.4	$168,384	-2124.0	$19,821	H	-2.2	$46,191	-795.8	$52,904
$42.2m	R	-3.4	$29,277	-1161.1	$36,344	H	-6.4	$168,387	-2130.4	$19,808	R	-2.2	$46,185	-797.9	$52,886
$42.3m	O	-3.4	$29,270	-1164.6	$36,323	T	-6.4	$168,384	-2136.8	$19,796	H	-2.2	$46,083	-800.1	$52,868
$42.4m	O	-3.4	$29,155	-1168.0	$36,302	I	-6.4	$168,384	-2143.3	$19,783	R	-2.2	$46,038	-802.3	$52,849
$42.5m	M	-3.4	$29,100	-1171.4	$36,281	T	-6.5	$168,387	-2149.7	$19,770	M	-2.2	$46,041	-804.5	$52,831
$42.6m	H	-3.4	$29,065	-1174.9	$36,260	O	-6.5	$168,384	-2156.2	$19,757	Q	-2.2	$46,021	-806.6	$52,813
$42.7m	R	-3.4	$29,050	-1178.3	$36,238	T	-6.5	$168,384	-2162.7	$19,744	H	-2.2	$45,974	-808.8	$52,794
$42.8m	O	-3.4	$29,037	-1181.7	$36,217	I	-6.5	$168,387	-2169.2	$19,731	C	-2.2	$45,960	-811.0	$52,776
$42.9m	O	-3.5	$28,920	-1185.2	$36,196	T	-6.5	$168,384	-2175.7	$19,718	R	-2.2	$45,897	-813.2	$52,757
$43.0m	C	-3.5	$28,873	-1188.7	$36,175	I	-6.5	$168,384	-2182.2	$19,705	H	-2.2	$45,865	-815.3	$52,739
$43.1m	R	-3.5	$28,820	-1192.1	$36,153	T	-6.5	$168,387	-2188.8	$19,692	M	-2.2	$45,830	-817.5	$52,720
$43.2m	O	-3.5	$28,800	-1195.6	$36,132	R	-6.6	$168,384	-2195.3	$19,678	H	-2.2	$45,755	-819.7	$52,702
$43.3m	H	-3.5	$28,789	-1199.1	$36,111	T	-6.6	$168,384	-2201.9	$19,665	R	-2.2	$45,750	-821.9	$52,683
$43.4m	Q	-3.5	$28,725	-1202.6	$36,089	I	-6.6	$168,387	-2208.5	$19,651	Q	-2.2	$45,744	-824.1	$52,665
$43.5m	O	-3.5	$28,681	-1206.1	$36,068	T	-6.6	$168,384	-2215.1	$19,638	C	-2.2	$45,712	-826.3	$52,647
$43.6m	R	-3.5	$28,589	-1209.6	$36,046	T	-6.6	$168,384	-2221.7	$19,624	H	-2.2	$45,645	-828.5	$52,628
$43.7m	O	-3.5	$28,561	-1213.1	$36,025	O	-6.6	$168,387	-2228.4	$19,611	M	-2.2	$45,618	-830.6	$52,610
$43.8m	H	-3.5	$28,508	-1216.6	$36,003	I	-6.7	$168,384	-2235.0	$19,597	R	-2.2	$45,606	-832.8	$52,591
$43.9m	O	-3.5	$28,438	-1220.1	$35,981	T	-6.7	$168,384	-2241.7	$19,583	H	-2.2	$45,534	-835.0	$52,573
$44.0m	R	-3.5	$28,355	-1223.6	$35,959	T	-6.7	$168,387	-2248.4	$19,570	C	-2.2	$45,465	-837.2	$52,554
$44.1m	O	-3.5	$28,316	-1227.1	$35,937	I	-6.7	$168,384	-2255.1	$19,556	Q	-2.2	$45,461	-839.4	$52,535
$44.2m	C	-3.5	$28,239	-1230.7	$35,915	T	-6.7	$168,384	-2261.8	$19,542	R	-2.2	$45,459	-841.6	$52,517
$44.3m	H	-3.5	$28,221	-1234.2	$35,893	R	-6.8	$168,387	-2268.6	$19,528	H	-2.2	$45,423	-843.8	$52,498
$44.4m	O	-3.5	$28,191	-1237.8	$35,871	T	-6.8	$168,384	-2275.3	$19,514	M	-2.2	$45,401	-846.0	$52,480
$44.5m	R	-3.6	$28,120	-1241.3	$35,849	E	-6.8	$168,384	-2282.1	$19,499	R	-2.2	$45,314	-848.2	$52,461
$44.6m	O	-3.6	$28,067	-1244.9	$35,827	I	-6.8	$168,387	-2288.9	$19,485	H	-2.2	$45,310	-850.5	$52,443
$44.7m	Q	-3.6	$27,997	-1248.5	$35,804	T	-6.8	$168,384	-2295.7	$19,471	C	-2.2	$45,212	-852.7	$52,424
$44.8m	O	-3.6	$27,940	-1252.0	$35,782	T	-6.8	$168,384	-2302.5	$19,457	H	-2.2	$45,198	-854.9	$52,405
$44.9m	H	-3.6	$27,929	-1255.6	$35,759	O	-6.8	$168,387	-2309.4	$19,442	M	-2.2	$45,181	-857.1	$52,387
$45.0m	R	-3.6	$27,883	-1259.2	$35,737	H	-6.9	$168,384	-2316.2	$19,428	Q	-2.2	$45,175	-859.3	$52,368
$45.1m	O	-3.6	$27,813	-1262.8	$35,714	I	-6.9	$168,384	-2323.1	$19,414	R	-2.2	$45,165	-861.5	$52,349
$45.2m	O	-3.6	$27,685	-1266.4	$35,691	T	-6.9	$168,387	-2330.0	$19,399	H	-2.2	$45,084	-863.7	$52,331
$45.3m	M	-3.6	$27,664	-1270.0	$35,669	T	-6.9	$168,384	-2336.9	$19,385	R	-2.2	$45,019	-866.0	$52,312
$45.4m	R	-3.6	$27,643	-1273.6	$35,646	T	-6.9	$168,384	-2343.8	$19,370	N	-2.2	$44,988	-868.2	$52,293
$45.5m	H	-3.6	$27,630	-1277.3	$35,623	I	-6.9	$168,387	-2350.7	$19,356	H	-2.2	$44,970	-870.4	$52,275
$45.6m	C	-3.6	$27,573	-1280.9	$35,600	R	-7.0	$168,384	-2357.7	$19,341	C	-2.2	$44,958	-872.6	$52,256

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{+} [e]
$45.7m	O	-3.6	$27,555	-1284.5	$35,578	T	-7.0	$168,384	-2364.7	$19,326	M	-2.2	$44,954	-874.9	$52,237
$45.8m	O	-3.6	$27,424	-1288.2	$35,554	T	-7.0	$168,387	-2371.7	$19,311	Q	-2.2	$44,887	-877.1	$52,219
$45.9m	R	-3.6	$27,402	-1291.8	$35,531	I	-7.0	$168,384	-2378.7	$19,296	R	-2.2	$44,871	-879.3	$52,200
$46.0m	H	-3.7	$27,325	-1295.5	$35,508	T	-7.1	$168,384	-2385.8	$19,281	H	-2.2	$44,857	-881.5	$52,181
$46.1m	O	-3.7	$27,292	-1299.1	$35,485	O	-7.1	$168,387	-2392.8	$19,266	H	-2.2	$44,743	-883.8	$52,163
$46.2m	Q	-3.7	$27,229	-1302.8	$35,462	T	-7.1	$168,384	-2399.9	$19,251	M	-2.2	$44,725	-886.0	$52,144
$46.3m	O	-3.7	$27,158	-1306.5	$35,438	I	-7.1	$168,384	-2407.0	$19,235	R	-2.2	$44,723	-888.2	$52,125
$46.4m	R	-3.7	$27,158	-1310.2	$35,415	T	-7.1	$168,387	-2414.2	$19,220	C	-2.2	$44,701	-890.5	$52,107
$46.5m	O	-3.7	$27,024	-1313.9	$35,391	T	-7.2	$168,384	-2421.4	$19,204	H	-2.2	$44,625	-892.7	$52,088
$46.6m	H	-3.7	$27,012	-1317.6	$35,368	I	-7.2	$168,384	-2428.6	$19,188	Q	-2.2	$44,595	-895.0	$52,069
$46.7m	R	-3.7	$26,912	-1321.3	$35,344	R	-7.2	$168,387	-2435.8	$19,173	R	-2.2	$44,573	-897.2	$52,050
$46.8m	O	-3.7	$26,888	-1325.0	$35,320	T	-7.2	$168,384	-2443.0	$19,157	H	-2.2	$44,510	-899.5	$52,031
$46.9m	C	-3.7	$26,874	-1328.7	$35,297	T	-7.3	$168,384	-2450.2	$19,141	M	-2.2	$44,490	-901.7	$52,013
$47.0m	O	-3.7	$26,750	-1332.5	$35,273	E	-7.3	$168,387	-2457.5	$19,125	C	-2.3	$44,439	-904.0	$51,994
$47.1m	H	-3.7	$26,692	-1336.2	$35,249	Q	-7.3	$168,384	-2464.8	$19,109	R	-2.3	$44,425	-906.2	$51,975
$47.2m	R	-3.8	$26,665	-1340.0	$35,225	T	-7.3	$168,384	-2472.1	$19,093	H	-2.3	$44,393	-908.5	$51,956
$47.3m	O	-3.8	$26,611	-1343.7	$35,201	I	-7.3	$168,387	-2479.4	$19,077	Q	-2.3	$44,299	-910.7	$51,937
$47.4m	O	-3.8	$26,470	-1347.5	$35,176	O	-7.3	$168,384	-2486.8	$19,061	H	-2.3	$44,277	-913.0	$51,918
$47.5m	Q	-3.8	$26,415	-1351.3	$35,152	T	-7.4	$168,384	-2494.1	$19,045	R	-2.3	$44,275	-915.2	$51,899
$47.6m	R	-3.8	$26,414	-1355.1	$35,127	T	-7.4	$168,387	-2501.5	$19,028	M	-2.3	$44,252	-917.5	$51,881
$47.7m	H	-3.8	$26,365	-1358.9	$35,103	I	-7.4	$168,384	-2508.9	$19,012	C	-2.3	$44,175	-919.8	$51,862
$47.8m	O	-3.8	$26,329	-1362.7	$35,078	T	-7.4	$168,384	-2516.4	$18,995	H	-2.3	$44,158	-922.0	$51,843
$47.9m	O	-3.8	$26,185	-1366.5	$35,053	H	-7.5	$168,387	-2523.9	$18,979	R	-2.3	$44,123	-924.3	$51,824
$48.0m	R	-3.8	$26,162	-1370.3	$35,029	R	-7.5	$168,384	-2531.3	$18,962	H	-2.3	$44,039	-926.6	$51,805
$48.1m	C	-3.8	$26,137	-1374.1	$35,004	T	-7.5	$168,384	-2538.8	$18,946	M	-2.3	$44,004	-928.8	$51,786
$48.2m	O	-3.8	$26,040	-1378.0	$34,979	I	-7.5	$168,387	-2546.4	$18,929	Q	-2.3	$43,999	-931.1	$51,767
$48.3m	H	-3.8	$26,029	-1381.8	$34,954	T	-7.5	$168,384	-2553.9	$18,912	R	-2.3	$43,973	-933.4	$51,748
$48.4m	R	-3.9	$25,906	-1385.7	$34,929	T	-7.6	$168,384	-2561.5	$18,895	H	-2.3	$43,921	-935.7	$51,729
$48.5m	O	-3.9	$25,893	-1389.5	$34,904	C	-7.6	$168,387	-2569.1	$18,878	C	-2.3	$43,910	-937.9	$51,710
$48.6m	M	-3.9	$25,843	-1393.4	$34,878	T	-7.7	$168,384	-2576.8	$18,861	R	-2.3	$43,823	-940.2	$51,690
$48.7m	O	-3.9	$25,745	-1397.3	$34,853	O	-7.7	$168,384	-2584.4	$18,844	H	-2.3	$43,800	-942.5	$51,671
$48.8m	H	-3.9	$25,684	-1401.2	$34,828	I	-7.7	$168,387	-2592.1	$18,826	M	-2.3	$43,754	-944.8	$51,652
$48.9m	R	-3.9	$25,648	-1405.1	$34,802	T	-7.7	$168,384	-2599.8	$18,809	Q	-2.3	$43,693	-947.1	$51,633
$49.0m	O	-3.9	$25,594	-1409.0	$34,777	E	-7.7	$168,384	-2607.6	$18,791	H	-2.3	$43,680	-949.4	$51,614
$49.1m	Q	-3.9	$25,547	-1412.9	$34,751	R	-7.8	$168,387	-2615.3	$18,774	R	-2.3	$43,670	-951.6	$51,595
$49.2m	O	-3.9	$25,443	-1416.8	$34,725	T	-7.8	$168,384	-2623.1	$18,756	C	-2.3	$43,638	-953.9	$51,576
$49.3m	R	-3.9	$25,388	-1420.8	$34,699	T	-7.8	$168,384	-2630.9	$18,739	H	-2.3	$43,560	-956.2	$51,556
$49.4m	C	-3.9	$25,356	-1424.7	$34,673	I	-7.8	$168,387	-2638.8	$18,721	R	-2.3	$43,518	-958.5	$51,537
$49.5m	H	-3.9	$25,330	-1428.7	$34,648	T	-7.9	$168,384	-2646.7	$18,703	M	-2.3	$43,497	-960.8	$51,518
$49.6m	O	-4.0	$25,289	-1432.6	$34,622	T	-8.0	$168,384	-2654.6	$18,684	H	-2.3	$43,437	-963.1	$51,498
$49.7m	O	-4.0	$25,134	-1436.6	$34,596	I	-8.0	$168,387	-2662.6	$18,666	Q	-2.3	$43,386	-965.4	$51,479
$49.8m	R	-4.0	$25,125	-1440.6	$34,569	T	-8.0	$168,384	-2670.6	$18,647	C	-2.3	$43,365	-967.7	$51,460
$49.9m	O	-4.0	$24,976	-1444.6	$34,543	O	-8.0	$168,384	-2678.7	$18,629	R	-2.3	$43,363	-970.1	$51,440
$50.0m	H	-4.0	$24,965	-1448.6	$34,516	T	-8.1	$168,387	-2686.8	$18,610	H	-2.3	$43,314	-972.4	$51,421

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $0.1m reduction in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m reduction in incremental expenditure on marginal technology; [c] Marginal ICER in contraction for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net investments.

Table A1.1.4: Reallocation following net disinvestment (divisibility and diminishing returns)

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$0.1m	H	2.3	$43,315	2.3	$43,315	H	4.0	$24,965	4.0	$24,965	M	1.7	$60,015	1.7	$60,015
$0.2m	R	2.3	$43,365	4.6	$43,340	O	4.0	$24,976	8.0	$24,971	R	1.7	$60,068	3.3	$60,042
$0.3m	C	2.3	$43,365	6.9	$43,348	R	4.0	$25,125	12.0	$25,022	Q	1.7	$60,082	5.0	$60,055
$0.4m	Q	2.3	$43,385	9.2	$43,357	O	4.0	$25,134	16.0	$25,050	M	1.7	$60,087	6.7	$60,063
$0.5m	H	2.3	$43,437	11.5	$43,373	O	4.0	$25,289	19.9	$25,097	M	1.7	$60,158	8.3	$60,082
$0.6m	M	2.3	$43,498	13.8	$43,394	H	3.9	$25,330	23.9	$25,136	R	1.7	$60,179	10.0	$60,098
$0.7m	R	2.3	$43,518	16.1	$43,412	C	3.9	$25,356	27.8	$25,167	M	1.7	$60,229	11.6	$60,117
$0.8m	H	2.3	$43,559	18.4	$43,430	R	3.9	$25,388	31.8	$25,194	Q	1.7	$60,244	13.3	$60,133
$0.9m	C	2.3	$43,639	20.7	$43,453	O	3.9	$25,443	35.7	$25,222	R	1.7	$60,289	15.0	$60,150
$1.0m	R	2.3	$43,670	23.0	$43,475	Q	3.9	$25,547	39.6	$25,254	M	1.7	$60,299	16.6	$60,165
$1.1m	H	2.3	$43,680	25.3	$43,493	O	3.9	$25,595	43.5	$25,284	M	1.7	$60,370	18.3	$60,183
$1.2m	Q	2.3	$43,694	27.6	$43,510	R	3.9	$25,648	47.4	$25,314	R	1.7	$60,399	19.9	$60,201
$1.3m	M	2.3	$43,754	29.9	$43,529	H	3.9	$25,684	51.3	$25,342	Q	1.7	$60,405	21.6	$60,217
$1.4m	H	2.3	$43,801	32.1	$43,548	O	3.9	$25,745	55.2	$25,371	M	1.7	$60,439	23.2	$60,233
$1.5m	R	2.3	$43,822	34.4	$43,566	M	3.9	$25,843	59.1	$25,402	M	1.7	$60,509	24.9	$60,251
$1.6m	C	2.3	$43,909	36.7	$43,587	O	3.9	$25,893	62.9	$25,432	R	1.7	$60,509	26.5	$60,267
$1.7m	H	2.3	$43,921	39.0	$43,607	R	3.9	$25,906	66.8	$25,459	Q	1.7	$60,565	28.2	$60,285
$1.8m	R	2.3	$43,973	41.3	$43,627	H	3.8	$26,029	70.6	$25,490	M	1.7	$60,578	29.9	$60,301
$1.9m	Q	2.3	$43,998	43.5	$43,646	O	3.8	$26,040	74.5	$25,519	R	1.6	$60,619	31.5	$60,318
$2.0m	M	2.3	$44,005	45.8	$43,664	C	3.8	$26,137	78.3	$25,549	M	1.6	$60,647	33.1	$60,334
$2.1m	H	2.3	$44,040	48.1	$43,682	R	3.8	$26,161	82.1	$25,577	M	1.6	$60,715	34.8	$60,352
$2.2m	R	2.3	$44,124	50.3	$43,702	O	3.8	$26,185	85.9	$25,604	Q	1.6	$60,724	36.4	$60,369
$2.3m	H	2.3	$44,158	52.6	$43,721	O	3.8	$26,329	89.7	$25,635	R	1.6	$60,728	38.1	$60,384
$2.4m	C	2.3	$44,176	54.9	$43,740	H	3.8	$26,365	93.5	$25,665	W	1.6	$60,757	39.7	$60,400
$2.5m	M	2.3	$44,250	57.1	$43,760	R	3.8	$26,414	97.3	$25,694	M	1.6	$60,784	41.4	$60,415
$2.6m	R	2.3	$44,274	59.4	$43,780	Q	3.8	$26,415	101.1	$25,721	R	1.6	$60,838	43.0	$60,431
$2.7m	H	2.3	$44,276	61.6	$43,798	O	3.8	$26,471	104.9	$25,748	M	1.6	$60,852	44.7	$60,447
$2.8m	Q	2.3	$44,299	63.9	$43,816	O	3.8	$26,611	108.6	$25,778	Q	1.6	$60,883	46.3	$60,462
$2.9m	H	2.3	$44,393	66.2	$43,835	R	3.8	$26,664	112.4	$25,807	M	1.6	$60,919	48.0	$60,478
$3.0m	R	2.3	$44,424	68.4	$43,855	H	3.7	$26,692	116.1	$25,836	R	1.6	$60,947	49.6	$60,493
$3.1m	C	2.3	$44,440	70.7	$43,873	O	3.7	$26,750	119.9	$25,864	M	1.6	$60,987	51.2	$60,509
$3.2m	M	2.2	$44,490	72.9	$43,892	C	3.7	$26,875	123.6	$25,895	Q	1.6	$61,040	52.9	$60,526
$3.3m	H	2.2	$44,510	75.2	$43,911	O	3.7	$26,888	127.3	$25,924	M	1.6	$61,054	54.5	$60,541
$3.4m	R	2.2	$44,574	77.4	$43,930	R	3.7	$26,912	131.0	$25,952	R	1.6	$61,055	56.1	$60,556
$3.5m	Q	2.2	$44,595	79.6	$43,949	H	3.7	$27,012	134.7	$25,981	M	1.6	$61,121	57.8	$60,572
$3.6m	H	2.2	$44,626	81.9	$43,967	O	3.7	$27,024	138.4	$26,009	R	1.6	$61,164	59.4	$60,589
$3.7m	C	2.2	$44,700	84.1	$43,987	R	3.7	$27,158	142.1	$26,039	M	1.6	$61,187	61.1	$60,605
$3.8m	R	2.2	$44,723	86.4	$44,006	O	3.7	$27,159	145.8	$26,067	Q	1.6	$61,197	62.7	$60,620
$3.9m	M	2.2	$44,725	88.6	$44,024	Q	3.7	$27,229	149.5	$26,095	M	1.6	$61,253	64.3	$60,636
$4.0m	H	2.2	$44,742	90.8	$44,042	O	3.7	$27,292	153.1	$26,124	R	1.6	$61,273	66.0	$60,652
$4.1m	H	2.2	$44,857	93.1	$44,061	H	3.7	$27,325	156.8	$26,152	M	1.6	$61,319	67.6	$60,668
$4.2m	R	2.2	$44,871	95.3	$44,080	R	3.6	$27,402	160.4	$26,181	Q	1.6	$61,353	69.2	$60,684
$4.3m	Q	2.2	$44,888	97.5	$44,099	O	3.6	$27,424	164.1	$26,208	R	1.6	$61,381	70.8	$60,700
$4.4m	M	2.2	$44,955	99.7	$44,118	O	3.6	$27,555	167.7	$26,237	M	1.6	$61,385	72.5	$60,716
$4.5m	C	2.2	$44,958	102.0	$44,136	C	3.6	$27,573	171.3	$26,266	M	1.6	$61,450	74.1	$60,732
$4.6m	H	2.2	$44,971	104.2	$44,154	H	3.6	$27,630	174.9	$26,294	R	1.6	$61,489	75.7	$60,748
$4.7m	N	2.2	$44,988	106.4	$44,171	R	3.6	$27,643	178.6	$26,321	Q	1.6	$61,508	77.3	$60,764
$4.8m	R	2.2	$45,019	108.6	$44,189	M	3.6	$27,664	182.2	$26,348	M	1.6	$61,515	79.0	$60,779

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$4.9m	H	2.2	$45,084	110.8	$44,207	O	3.6	$27,685	185.8	$26,374	M	1.6	$61,580	80.6	$60,796
$5.0m	R	2.2	$45,166	113.1	$44,225	O	3.6	$27,813	189.4	$26,401	R	1.6	$61,597	82.2	$60,811
$5.1m	Q	2.2	$45,176	115.3	$44,244	R	3.6	$27,883	193.0	$26,429	M	1.6	$61,645	83.8	$60,827
$5.2m	M	2.2	$45,180	117.5	$44,261	H	3.6	$27,929	196.6	$26,456	Q	1.6	$61,662	85.5	$60,843
$5.3m	H	2.2	$45,198	119.7	$44,279	O	3.6	$27,941	200.1	$26,483	R	1.6	$61,705	87.1	$60,859
$5.4m	C	2.2	$45,212	121.9	$44,296	Q	3.6	$27,997	203.7	$26,509	M	1.6	$61,709	88.7	$60,875
$5.5m	H	2.2	$45,310	124.1	$44,314	O	3.6	$28,067	207.3	$26,536	M	1.6	$61,773	90.3	$60,891
$5.6m	R	2.2	$45,313	126.3	$44,331	R	3.6	$28,120	210.8	$26,563	R	1.6	$61,813	91.9	$60,907
$5.7m	M	2.2	$45,401	128.5	$44,349	O	3.5	$28,192	214.4	$26,590	Q	1.6	$61,816	93.6	$60,923
$5.8m	H	2.2	$45,422	130.7	$44,367	H	3.5	$28,221	217.9	$26,616	M	1.6	$61,836	95.2	$60,938
$5.9m	R	2.2	$45,459	132.9	$44,385	C	3.5	$28,238	221.5	$26,642	M	1.6	$61,900	96.8	$60,954
$6.0m	Q	2.2	$45,461	135.1	$44,403	O	3.5	$28,316	225.0	$26,668	R	1.6	$61,920	98.4	$60,970
$6.1m	C	2.2	$45,464	137.3	$44,420	R	3.5	$28,355	228.5	$26,694	M	1.6	$61,963	100.0	$60,986
$6.2m	H	2.2	$45,534	139.5	$44,438	O	3.5	$28,438	232.0	$26,721	Q	1.6	$61,969	101.6	$61,002
$6.3m	R	2.2	$45,605	141.7	$44,456	H	3.5	$28,508	235.5	$26,747	R	1.6	$62,027	103.2	$61,018
$6.4m	M	2.2	$45,618	143.9	$44,473	O	3.5	$28,560	239.0	$26,774	Q	1.6	$62,121	104.9	$61,035
$6.5m	H	2.2	$45,645	146.1	$44,491	R	3.5	$28,589	242.5	$26,800	R	1.6	$62,134	106.5	$61,051
$6.6m	C	2.2	$45,714	148.3	$44,509	O	3.5	$28,681	246.0	$26,827	N	1.6	$62,206	108.1	$61,069
$6.7m	Q	2.2	$45,743	150.5	$44,527	Q	3.5	$28,725	249.5	$26,853	R	1.6	$62,241	109.7	$61,086
$6.8m	R	2.2	$45,751	152.7	$44,544	H	3.5	$28,789	253.0	$26,880	Q	1.6	$62,272	111.3	$61,103
$6.9m	H	2.2	$45,755	154.8	$44,561	O	3.5	$28,801	256.4	$26,906	R	1.6	$62,348	112.9	$61,121
$7.0m	M	2.2	$45,831	157.0	$44,579	R	3.5	$28,820	259.9	$26,931	Q	1.6	$62,423	114.5	$61,139
$7.1m	H	2.2	$45,865	159.2	$44,597	C	3.5	$28,873	263.4	$26,957	R	1.6	$62,454	116.1	$61,157
$7.2m	R	2.2	$45,896	161.4	$44,614	O	3.5	$28,919	266.8	$26,982	R	1.6	$62,561	117.7	$61,176
$7.3m	C	2.2	$45,960	163.6	$44,632	O	3.4	$29,038	270.3	$27,009	Q	1.6	$62,572	119.3	$61,195
$7.4m	H	2.2	$45,974	165.7	$44,650	R	3.4	$29,050	273.7	$27,034	R	1.6	$62,666	120.9	$61,214
$7.5m	Q	2.2	$46,021	167.9	$44,667	H	3.4	$29,064	277.2	$27,059	Q	1.6	$62,721	122.5	$61,234
$7.6m	M	2.2	$46,039	170.1	$44,685	M	3.4	$29,100	280.6	$27,084	R	1.6	$62,773	124.1	$61,254
$7.7m	R	2.2	$46,040	172.3	$44,702	O	3.4	$29,154	284.0	$27,109	Q	1.6	$62,870	125.7	$61,274
$7.8m	H	2.2	$46,083	174.4	$44,719	O	3.4	$29,271	287.5	$27,135	R	1.6	$62,878	127.3	$61,294
$7.9m	R	2.2	$46,184	176.6	$44,737	R	3.4	$29,278	290.9	$27,160	R	1.6	$62,984	128.8	$61,315
$8.0m	H	2.2	$46,191	178.8	$44,755	H	3.4	$29,335	294.3	$27,185	Q	1.6	$63,018	130.4	$61,336
$8.1m	C	2.2	$46,204	180.9	$44,772	O	3.4	$29,385	297.7	$27,211	R	1.6	$63,089	132.0	$61,357
$8.2m	M	2.2	$46,244	183.1	$44,790	Q	3.4	$29,418	301.1	$27,235	Q	1.6	$63,165	133.6	$61,378
$8.3m	Q	2.2	$46,295	185.2	$44,807	C	3.4	$29,482	304.5	$27,261	R	1.6	$63,195	135.2	$61,399
$8.4m	H	2.2	$46,299	187.4	$44,824	O	3.4	$29,499	307.9	$27,285	R	1.6	$63,300	136.8	$61,421
$8.5m	R	2.2	$46,328	189.6	$44,841	R	3.4	$29,504	311.2	$27,309	Q	1.6	$63,311	138.3	$61,443
$8.6m	H	2.2	$46,407	191.7	$44,859	H	3.4	$29,600	314.6	$27,334	R	1.6	$63,405	139.9	$61,465
$8.7m	C	2.2	$46,445	193.9	$44,877	O	3.4	$29,612	318.0	$27,358	Q	1.6	$63,457	141.5	$61,487
$8.8m	M	2.2	$46,446	196.0	$44,894	O	3.4	$29,726	321.4	$27,383	R	1.6	$63,509	143.1	$61,509
$8.9m	R	2.2	$46,471	198.2	$44,911	R	3.4	$29,728	324.7	$27,407	Q	1.6	$63,602	144.6	$61,532
$9.0m	H	2.1	$46,513	200.3	$44,928	O	3.4	$29,836	328.1	$27,432	R	1.6	$63,614	146.2	$61,555
$9.1m	Q	2.1	$46,567	202.5	$44,946	H	3.3	$29,861	331.4	$27,457	R	1.6	$63,718	147.8	$61,578
$9.2m	R	2.1	$46,614	204.6	$44,963	W	3.3	$29,934	334.8	$27,481	Q	1.6	$63,746	149.3	$61,600
$9.3m	H	2.1	$46,619	206.8	$44,980	O	3.3	$29,947	338.1	$27,506	R	1.6	$63,823	150.9	$61,623
$9.4m	M	2.1	$46,644	208.9	$44,997	R	3.3	$29,951	341.5	$27,530	Q	1.6	$63,890	152.5	$61,647
$9.5m	C	2.1	$46,684	211.0	$45,014	O	3.3	$30,057	344.8	$27,554	R	1.6	$63,926	154.0	$61,670
$9.6m	H	2.1	$46,725	213.2	$45,032	C	3.3	$30,066	348.1	$27,578	R	1.6	$64,030	155.6	$61,694
$9.7m	R	2.1	$46,756	215.3	$45,049	Q	3.3	$30,079	351.4	$27,602	Q	1.6	$64,034	157.2	$61,717
$9.8m	H	2.1	$46,831	217.5	$45,066	H	3.3	$30,117	354.7	$27,625	R	1.6	$64,134	158.7	$61,741
$9.9m	Q	2.1	$46,836	219.6	$45,083	O	3.3	$30,166	358.1	$27,649	Q	1.6	$64,175	160.3	$61,764

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$10.0m	M	2.1	$46,839	221.7	$45,100	R	3.3	$30,172	361.4	$27,672	R	1.6	$64,238	161.8	$61,788
$10.1m	R	2.1	$46,898	223.9	$45,118	N	3.3	$30,208	364.7	$27,695	Q	1.6	$64,318	163.4	$61,812
$10.2m	C	2.1	$46,920	226.0	$45,135	O	3.3	$30,275	368.0	$27,718	R	1.6	$64,341	165.0	$61,836
$10.3m	H	2.1	$46,936	228.1	$45,151	M	3.3	$30,296	371.3	$27,741	R	1.6	$64,444	166.5	$61,860
$10.4m	M	2.1	$47,030	230.2	$45,169	H	3.3	$30,369	374.6	$27,764	Q	1.6	$64,459	168.1	$61,884
$10.5m	R	2.1	$47,040	232.4	$45,186	O	3.3	$30,382	377.9	$27,787	R	1.5	$64,547	169.6	$61,909
$10.6m	H	2.1	$47,040	234.5	$45,203	R	3.3	$30,391	381.2	$27,809	Q	1.5	$64,599	171.2	$61,933
$10.7m	Q	2.1	$47,101	236.6	$45,220	O	3.3	$30,489	384.4	$27,832	R	1.5	$64,650	172.7	$61,957
$10.8m	H	2.1	$47,144	238.7	$45,237	O	3.3	$30,595	387.7	$27,855	Q	1.5	$64,740	174.2	$61,982
$10.9m	C	2.1	$47,154	240.9	$45,254	R	3.3	$30,609	391.0	$27,878	R	1.5	$64,753	175.8	$62,006
$11.0m	R	2.1	$47,181	243.0	$45,270	H	3.3	$30,617	394.2	$27,901	R	1.5	$64,855	177.3	$62,031
$11.1m	M	2.1	$47,219	245.1	$45,287	C	3.3	$30,628	397.5	$27,924	Q	1.5	$64,879	178.9	$62,056
$11.2m	H	2.1	$47,248	247.2	$45,304	O	3.3	$30,700	400.8	$27,946	R	1.5	$64,957	180.4	$62,080
$11.3m	R	2.1	$47,321	249.3	$45,321	Q	3.3	$30,713	404.0	$27,968	Q	1.5	$65,017	181.9	$62,105
$11.4m	H	2.1	$47,351	251.4	$45,338	O	3.2	$30,804	407.3	$27,991	R	1.5	$65,060	183.5	$62,130
$11.5m	Q	2.1	$47,363	253.6	$45,355	R	3.2	$30,825	410.5	$28,013	N	1.5	$65,104	185.0	$62,155
$11.6m	C	2.1	$47,386	255.7	$45,372	H	3.2	$30,861	413.8	$28,036	Q	1.5	$65,156	186.6	$62,179
$11.7m	M	2.1	$47,405	257.8	$45,388	E	3.2	$30,898	417.0	$28,058	R	1.5	$65,162	188.1	$62,204
$11.8m	H	2.1	$47,453	259.9	$45,405	O	3.2	$30,909	420.2	$28,080	R	1.5	$65,264	189.6	$62,228
$11.9m	R	2.1	$47,462	262.0	$45,422	O	3.2	$31,012	423.5	$28,102	Q	1.5	$65,293	191.2	$62,253
$12.0m	H	2.1	$47,555	264.1	$45,439	R	3.2	$31,040	426.7	$28,124	R	1.5	$65,366	192.7	$62,278
$12.1m	M	2.1	$47,587	266.2	$45,456	H	3.2	$31,101	429.9	$28,147	Q	1.5	$65,430	194.2	$62,302
$12.2m	R	2.1	$47,601	268.3	$45,472	O	3.2	$31,115	433.1	$28,169	R	1.5	$65,467	195.7	$62,327
$12.3m	C	2.1	$47,615	270.4	$45,489	C	3.2	$31,171	436.3	$28,191	Q	1.5	$65,567	197.3	$62,352
$12.4m	Q	2.1	$47,623	272.5	$45,506	O	3.2	$31,216	439.5	$28,213	R	1.5	$65,569	198.8	$62,377
$12.5m	H	2.1	$47,657	274.6	$45,522	R	3.2	$31,254	442.7	$28,235	R	1.5	$65,670	200.3	$62,402
$12.6m	R	2.1	$47,741	276.7	$45,539	O	3.2	$31,318	445.9	$28,257	Q	1.5	$65,703	201.8	$62,427
$12.7m	H	2.1	$47,758	278.8	$45,555	Q	3.2	$31,322	449.1	$28,279	R	1.5	$65,771	203.4	$62,452
$12.8m	M	2.1	$47,767	280.9	$45,572	M	3.2	$31,329	452.3	$28,300	Q	1.5	$65,838	204.9	$62,477
$12.9m	C	2.1	$47,843	283.0	$45,589	H	3.2	$31,338	455.5	$28,321	R	1.5	$65,872	206.4	$62,502
$13.0m	H	2.1	$47,859	285.1	$45,605	O	3.2	$31,418	458.7	$28,343	R	1.5	$65,973	207.9	$62,527
$13.1m	Q	2.1	$47,880	287.1	$45,622	R	3.2	$31,466	461.8	$28,364	Q	1.5	$65,973	209.4	$62,552
$13.2m	R	2.1	$47,880	289.2	$45,638	O	3.2	$31,518	465.0	$28,386	R	1.5	$66,073	210.9	$62,577
$13.3m	M	2.1	$47,944	291.3	$45,655	H	3.2	$31,571	468.2	$28,407	Q	1.5	$66,107	212.5	$62,602
$13.4m	H	2.1	$47,960	293.4	$45,671	O	3.2	$31,618	471.3	$28,429	R	1.5	$66,174	214.0	$62,628
$13.5m	R	2.1	$48,018	295.5	$45,688	R	3.2	$31,676	474.5	$28,451	Q	1.5	$66,241	215.5	$62,653
$13.6m	H	2.1	$48,060	297.6	$45,704	C	3.2	$31,695	477.7	$28,472	R	1.5	$66,274	217.0	$62,678
$13.7m	C	2.1	$48,068	299.6	$45,721	O	3.2	$31,716	480.8	$28,493	Q	1.5	$66,374	218.5	$62,704
$13.8m	M	2.1	$48,119	301.7	$45,737	H	3.1	$31,801	484.0	$28,515	R	1.5	$66,375	220.0	$62,729
$13.9m	Q	2.1	$48,134	303.8	$45,754	O	3.1	$31,814	487.1	$28,536	R	1.5	$66,474	221.5	$62,754
$14.0m	R	2.1	$48,157	305.9	$45,770	R	3.1	$31,885	490.2	$28,558	Q	1.5	$66,507	223.0	$62,780
$14.1m	H	2.1	$48,159	308.0	$45,786	Q	3.1	$31,907	493.4	$28,579	R	1.5	$66,574	224.5	$62,805
$14.2m	H	2.1	$48,258	310.0	$45,803	O	3.1	$31,911	496.5	$28,600	Q	1.5	$66,639	226.0	$62,830
$14.3m	C	2.1	$48,291	312.1	$45,819	O	3.1	$32,008	499.6	$28,621	R	1.5	$66,674	227.5	$62,856
$14.4m	M	2.1	$48,291	314.2	$45,835	H	3.1	$32,027	502.8	$28,642	Q	1.5	$66,770	229.0	$62,881
$14.5m	R	2.1	$48,294	316.2	$45,851	R	3.1	$32,092	505.9	$28,664	R	1.5	$66,774	230.5	$62,907
$14.6m	H	2.1	$48,358	318.3	$45,868	O	3.1	$32,104	509.0	$28,685	R	1.5	$66,872	232.0	$62,932
$14.7m	Q	2.1	$48,385	320.4	$45,884	O	3.1	$32,201	512.1	$28,706	Q	1.5	$66,901	233.5	$62,958
$14.8m	R	2.1	$48,432	322.4	$45,900	C	3.1	$32,202	515.2	$28,727	R	1.5	$66,975	235.0	$62,983
$14.9m	H	2.1	$48,454	324.5	$45,917	M	3.1	$32,240	518.3	$28,748	Q	1.5	$67,031	236.5	$63,009
$15.0m	M	2.1	$48,461	326.6	$45,933	H	3.1	$32,250	521.4	$28,769	R	1.5	$67,069	238.0	$63,034

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$15.1m	C	2.1	$48,512	328.6	$45,949	O	3.1	$32,295	524.5	$28,790	Q	1.5	$67,162	239.5	$63,060
$15.2m	H	2.1	$48,553	330.7	$45,965	R	3.1	$32,300	527.6	$28,810	R	1.5	$67,173	240.9	$63,085
$15.3m	R	2.1	$48,569	332.7	$45,981	O	3.1	$32,390	530.7	$28,831	R	1.5	$67,268	242.4	$63,111
$15.4m	M	2.1	$48,628	334.8	$45,997	H	3.1	$32,470	533.8	$28,852	Q	1.5	$67,291	243.9	$63,136
$15.5m	Q	2.1	$48,634	336.9	$46,013	Q	3.1	$32,472	536.8	$28,873	R	1.5	$67,367	245.4	$63,162
$15.6m	H	2.1	$48,652	338.9	$46,029	O	3.1	$32,484	539.9	$28,893	Q	1.5	$67,420	246.9	$63,187
$15.7m	R	2.1	$48,705	341.0	$46,046	R	3.1	$32,504	543.0	$28,914	R	1.5	$67,467	248.4	$63,213
$15.8m	C	2.1	$48,731	343.0	$46,062	O	3.1	$32,576	546.1	$28,935	Q	1.5	$67,549	249.8	$63,239
$15.9m	H	2.1	$48,747	345.1	$46,078	O	3.1	$32,670	549.1	$28,955	R	1.5	$67,568	251.3	$63,264
$16.0m	M	2.0	$48,794	347.1	$46,094	H	3.1	$32,688	552.2	$28,976	R	1.5	$67,664	252.8	$63,290
$16.1m	R	2.0	$48,842	349.2	$46,110	C	3.1	$32,694	555.2	$28,996	Q	1.5	$67,677	254.3	$63,315
$16.2m	H	2.0	$48,847	351.2	$46,126	R	3.1	$32,708	558.3	$29,017	R	1.5	$67,760	255.8	$63,341
$16.3m	Q	2.0	$48,880	353.3	$46,142	O	3.1	$32,763	561.3	$29,037	Q	1.5	$67,804	257.2	$63,367
$16.4m	N	2.0	$48,921	355.3	$46,158	O	3.0	$32,855	564.4	$29,058	R	1.5	$67,861	258.7	$63,392
$16.5m	H	2.0	$48,940	357.3	$46,174	H	3.0	$32,902	567.4	$29,078	N	1.5	$67,878	260.2	$63,418
$16.6m	C	2.0	$48,948	359.4	$46,189	R	3.0	$32,911	570.5	$29,099	Q	1.5	$67,932	261.7	$63,443
$16.7m	M	2.0	$48,956	361.4	$46,205	O	3.0	$32,946	573.5	$29,119	R	1.5	$67,953	263.1	$63,468
$16.8m	R	2.0	$48,977	363.5	$46,221	Q	3.0	$33,019	576.5	$29,140	R	1.5	$68,055	264.6	$63,494
$16.9m	H	2.0	$49,039	365.5	$46,236	O	3.0	$33,037	579.6	$29,160	Q	1.5	$68,058	266.1	$63,519
$17.0m	R	2.0	$49,113	367.6	$46,252	M	3.0	$33,059	582.6	$29,180	W	1.5	$68,069	267.5	$63,544
$17.1m	M	2.0	$49,117	369.6	$46,268	R	3.0	$33,111	585.6	$29,200	R	1.5	$68,157	269.0	$63,569
$17.2m	Q	2.0	$49,124	371.6	$46,284	H	3.0	$33,114	588.6	$29,221	Q	1.5	$68,184	270.5	$63,594
$17.3m	H	2.0	$49,133	373.7	$46,299	O	3.0	$33,127	591.6	$29,240	R	1.5	$68,250	271.9	$63,619
$17.4m	C	2.0	$49,163	375.7	$46,315	C	3.0	$33,171	594.7	$29,260	Q	1.5	$68,310	273.4	$63,644
$17.5m	H	2.0	$49,227	377.7	$46,330	O	3.0	$33,217	597.7	$29,280	R	1.5	$68,343	274.9	$63,669
$17.6m	R	2.0	$49,248	379.8	$46,346	O	3.0	$33,307	600.7	$29,300	Q	1.5	$68,435	276.3	$63,695
$17.7m	M	2.0	$49,276	381.8	$46,361	R	3.0	$33,312	603.7	$29,320	R	1.5	$68,446	277.8	$63,719
$17.8m	H	2.0	$49,324	383.8	$46,377	H	3.0	$33,322	606.7	$29,340	R	1.5	$68,540	279.2	$63,745
$17.9m	Q	2.0	$49,365	385.8	$46,393	O	3.0	$33,396	609.7	$29,360	Q	1.5	$68,560	280.7	$63,770
$18.0m	C	2.0	$49,377	387.9	$46,408	O	3.0	$33,484	612.7	$29,380	R	1.5	$68,639	282.2	$63,795
$18.1m	R	2.0	$49,383	389.9	$46,424	R	3.0	$33,511	615.6	$29,400	Q	1.5	$68,685	283.6	$63,820
$18.2m	H	2.0	$49,419	391.9	$46,439	H	3.0	$33,529	618.6	$29,420	R	1.5	$68,738	285.1	$63,845
$18.3m	M	2.0	$49,433	393.9	$46,455	Q	3.0	$33,547	621.6	$29,440	Q	1.5	$68,808	286.5	$63,870
$18.4m	H	2.0	$49,512	396.0	$46,470	O	3.0	$33,572	624.6	$29,460	R	1.5	$68,828	288.0	$63,895
$18.5m	R	2.0	$49,517	398.0	$46,486	C	3.0	$33,635	627.6	$29,479	R	1.5	$68,927	289.4	$63,920
$18.6m	M	2.0	$49,587	400.0	$46,501	O	3.0	$33,660	630.5	$29,499	Q	1.5	$68,932	290.9	$63,945
$18.7m	C	2.0	$49,588	402.0	$46,517	R	3.0	$33,709	633.5	$29,519	R	1.4	$69,027	292.3	$63,971
$18.8m	Q	2.0	$49,604	404.0	$46,532	H	3.0	$33,733	636.5	$29,538	Q	1.4	$69,056	293.8	$63,996
$18.9m	H	2.0	$49,606	406.0	$46,548	O	3.0	$33,746	639.4	$29,558	R	1.4	$69,118	295.2	$64,021
$19.0m	R	2.0	$49,651	408.1	$46,563	M	3.0	$33,803	642.4	$29,578	Q	1.4	$69,175	296.7	$64,046
$19.1m	H	2.0	$49,699	410.1	$46,578	O	3.0	$33,833	645.3	$29,597	R	1.4	$69,219	298.1	$64,071
$19.2m	M	2.0	$49,740	412.1	$46,594	R	2.9	$33,904	648.3	$29,617	Q	1.4	$69,300	299.5	$64,096
$19.3m	R	2.0	$49,785	414.1	$46,609	O	2.9	$33,919	651.2	$29,636	R	1.4	$69,314	301.0	$64,121
$19.4m	H	2.0	$49,793	416.1	$46,625	H	2.9	$33,934	654.2	$29,655	R	1.4	$69,406	302.4	$64,146
$19.5m	C	2.0	$49,798	418.1	$46,640	O	2.9	$34,006	657.1	$29,675	Q	1.4	$69,420	303.9	$64,171
$19.6m	Q	2.0	$49,841	420.1	$46,655	Q	2.9	$34,059	660.1	$29,694	R	1.4	$69,507	305.3	$64,197
$19.7m	H	2.0	$49,885	422.1	$46,670	C	2.9	$34,087	663.0	$29,714	Q	1.4	$69,541	306.8	$64,222
$19.8m	M	2.0	$49,891	424.1	$46,686	O	2.9	$34,090	665.9	$29,733	R	1.4	$69,599	308.2	$64,247
$19.9m	R	2.0	$49,919	426.1	$46,701	R	2.9	$34,101	668.9	$29,752	Q	1.4	$69,662	309.6	$64,272
$20.0m	H	2.0	$49,980	428.1	$46,716	H	2.9	$34,133	671.8	$29,771	R	1.4	$69,691	311.1	$64,297
$20.1m	C	2.0	$50,006	430.1	$46,731	O	2.9	$34,176	674.7	$29,790	Q	1.4	$69,784	312.5	$64,322

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^{-} [e]
$20.2m	M	2.0	$50,041	432.1	$46,747	O	2.9	$34,259	677.6	$29,810	R	1.4	$69,793	313.9	$64,347
$20.3m	R	2.0	$50,050	434.1	$46,762	R	2.9	$34,295	680.5	$29,829	R	1.4	$69,886	315.4	$64,372
$20.4m	H	2.0	$50,070	436.1	$46,777	H	2.9	$34,330	683.5	$29,848	Q	1.4	$69,906	316.8	$64,397
$20.5m	Q	2.0	$50,076	438.1	$46,792	O	2.9	$34,344	686.4	$29,867	R	1.4	$69,979	318.2	$64,422
$20.6m	H	2.0	$50,161	440.1	$46,807	O	2.9	$34,427	689.3	$29,886	Q	1.4	$70,023	319.6	$64,447
$20.7m	R	2.0	$50,183	442.1	$46,823	M	2.9	$34,487	692.2	$29,906	R	1.4	$70,077	321.1	$64,472
$20.8m	M	2.0	$50,188	444.1	$46,838	R	2.9	$34,489	695.1	$29,925	Q	1.4	$70,141	322.5	$64,497
$20.9m	C	2.0	$50,212	446.1	$46,853	O	2.9	$34,511	698.0	$29,944	R	1.4	$70,171	323.9	$64,522
$21.0m	Q	2.0	$50,308	448.1	$46,868	H	2.9	$34,524	700.9	$29,963	Q	1.4	$70,259	325.3	$64,547
$21.1m	R	2.0	$50,317	450.1	$46,883	C	2.9	$34,527	703.8	$29,982	R	1.4	$70,264	326.8	$64,572
$21.2m	M	2.0	$50,333	452.0	$46,898	Q	2.9	$34,557	706.7	$30,000	R	1.4	$70,358	328.2	$64,597
$21.3m	C	2.0	$50,416	454.0	$46,914	O	2.9	$34,594	709.5	$30,019	Q	1.4	$70,383	329.6	$64,622
$21.4m	R	2.0	$50,449	456.0	$46,929	O	2.9	$34,676	712.4	$30,038	R	1.4	$70,452	331.0	$64,647
$21.5m	M	2.0	$50,478	458.0	$46,945	R	2.9	$34,680	715.3	$30,057	Q	1.4	$70,497	332.4	$64,672
$21.6m	Q	2.0	$50,538	460.0	$46,960	H	2.9	$34,716	718.2	$30,075	N	1.4	$70,543	333.9	$64,697
$21.7m	R	2.0	$50,579	461.9	$46,976	O	2.9	$34,758	721.1	$30,094	R	1.4	$70,552	335.3	$64,722
$21.8m	C	2.0	$50,619	463.9	$46,991	O	2.9	$34,840	723.9	$30,113	Q	1.4	$70,616	336.7	$64,747
$21.9m	M	2.0	$50,620	465.9	$47,006	R	2.9	$34,871	726.8	$30,132	R	1.4	$70,641	338.1	$64,771
$22.0m	R	2.0	$50,710	467.9	$47,022	H	2.9	$34,906	729.7	$30,150	Q	1.4	$70,731	339.5	$64,796
$22.1m	M	2.0	$50,761	469.8	$47,038	O	2.9	$34,921	732.5	$30,169	R	1.4	$70,736	340.9	$64,821
$22.2m	Q	2.0	$50,767	471.8	$47,053	C	2.9	$34,956	735.4	$30,188	R	1.4	$70,827	342.4	$64,845
$22.3m	C	2.0	$50,820	473.8	$47,069	O	2.9	$35,003	738.3	$30,206	Q	1.4	$70,847	343.8	$64,870
$22.4m	R	2.0	$50,841	475.7	$47,085	Q	2.9	$35,040	741.1	$30,225	R	1.4	$70,927	345.2	$64,895
$22.5m	M	2.0	$50,900	477.7	$47,100	R	2.9	$35,062	744.0	$30,243	Q	1.4	$70,967	346.6	$64,920
$22.6m	W	2.0	$50,960	479.7	$47,116	O	2.9	$35,083	746.8	$30,262	R	1.4	$71,018	348.0	$64,944
$22.7m	R	2.0	$50,971	481.6	$47,132	H	2.8	$35,095	749.7	$30,280	Q	1.4	$71,078	349.4	$64,969
$22.8m	Q	2.0	$50,993	483.6	$47,147	M	2.8	$35,121	752.5	$30,299	R	1.4	$71,109	350.8	$64,994
$22.9m	C	2.0	$51,020	485.6	$47,163	O	2.8	$35,163	755.4	$30,317	Q	1.4	$71,200	352.2	$65,018
$23.0m	M	2.0	$51,038	487.5	$47,179	O	2.8	$35,242	758.2	$30,335	R	1.4	$71,205	353.6	$65,043
$23.1m	R	2.0	$51,104	489.5	$47,194	R	2.8	$35,250	761.0	$30,354	R	1.4	$71,296	355.0	$65,068
$23.2m	M	2.0	$51,174	491.4	$47,210	H	2.8	$35,282	763.9	$30,372	Q	1.4	$71,311	356.4	$65,092
$23.3m	Q	2.0	$51,217	493.4	$47,226	O	2.8	$35,322	766.7	$30,390	R	1.4	$71,393	357.8	$65,117
$23.4m	C	2.0	$51,218	495.3	$47,242	C	2.8	$35,375	769.5	$30,408	Q	1.4	$71,429	359.2	$65,141
$23.5m	R	2.0	$51,232	497.3	$47,257	O	2.8	$35,402	772.3	$30,427	R	1.4	$71,485	360.6	$65,166
$23.6m	M	1.9	$51,309	499.2	$47,273	R	2.8	$35,438	775.2	$30,445	Q	1.4	$71,541	362.0	$65,191
$23.7m	R	1.9	$51,361	501.2	$47,289	H	2.8	$35,465	778.0	$30,463	R	1.4	$71,572	363.4	$65,215
$23.8m	C	1.9	$51,415	503.1	$47,305	O	2.8	$35,480	780.8	$30,481	Q	1.4	$71,659	364.8	$65,240
$23.9m	Q	1.9	$51,439	505.1	$47,321	Q	2.8	$35,511	783.6	$30,499	R	1.4	$71,674	366.2	$65,264
$24.0m	M	1.9	$51,442	507.0	$47,337	O	2.8	$35,558	786.4	$30,517	R	1.4	$71,762	367.6	$65,289
$24.1m	R	1.9	$51,491	508.9	$47,353	R	2.8	$35,625	789.2	$30,536	Q	1.4	$71,767	369.0	$65,313
$24.2m	M	1.9	$51,574	510.9	$47,369	O	2.8	$35,637	792.0	$30,554	R	1.4	$71,855	370.4	$65,338
$24.3m	C	1.9	$51,610	512.8	$47,385	H	2.8	$35,648	794.9	$30,572	Q	1.4	$71,886	371.8	$65,362
$24.4m	R	1.9	$51,621	514.8	$47,401	M	2.8	$35,712	797.7	$30,590	R	1.4	$71,942	373.2	$65,387
$24.5m	Q	1.9	$51,659	516.7	$47,417	O	2.8	$35,714	800.5	$30,608	Q	1.4	$71,994	374.6	$65,411
$24.6m	M	1.9	$51,705	518.6	$47,432	C	2.8	$35,784	803.2	$30,626	R	1.4	$72,041	375.9	$65,436
$24.7m	R	1.9	$51,746	520.6	$47,449	O	2.8	$35,792	806.0	$30,644	Q	1.4	$72,108	377.3	$65,460
$24.8m	C	1.9	$51,804	522.5	$47,465	R	2.8	$35,811	808.8	$30,661	R	1.4	$72,129	378.7	$65,485
$24.9m	M	1.9	$51,834	524.4	$47,481	H	2.8	$35,829	811.6	$30,679	Q	1.4	$72,223	380.1	$65,509
$25.0m	R	1.9	$51,878	526.4	$47,497	N	2.8	$35,833	814.4	$30,697	R	1.4	$72,228	381.5	$65,534
$25.1m	Q	1.9	$51,877	528.3	$47,513	O	2.8	$35,869	817.2	$30,714	R	1.4	$72,312	382.9	$65,558
$25.2m	M	1.9	$51,962	530.2	$47,529	O	2.8	$35,945	820.0	$30,732	R	1.4	$72,411	384.2	$65,583

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$25.3m	C	1.9	$51,996	532.1	$47,545	Q	2.8	$35,969	822.8	$30,750	R	1.4	$72,495	385.6	$65,608
$25.4m	R	1.9	$52,005	534.0	$47,561	R	2.8	$35,996	825.5	$30,768	R	1.4	$72,590	387.0	$65,633
$25.5m	M	1.9	$52,089	536.0	$47,577	H	2.8	$36,006	828.3	$30,785	R	1.4	$72,685	388.4	$65,658
$25.6m	Q	1.9	$52,094	537.9	$47,593	O	2.8	$36,022	831.1	$30,803	R	1.4	$72,770	389.8	$65,683
$25.7m	R	1.9	$52,132	539.8	$47,610	O	2.8	$36,097	833.9	$30,820	R	1.4	$72,865	391.1	$65,708
$25.8m	C	1.9	$52,187	541.7	$47,626	O	2.8	$36,174	836.6	$30,838	R	1.4	$72,955	392.5	$65,733
$25.9m	M	1.9	$52,217	543.6	$47,642	R	2.8	$36,181	839.4	$30,855	R	1.4	$73,051	393.9	$65,759
$26.0m	R	1.9	$52,258	545.6	$47,658	C	2.8	$36,184	842.2	$30,873	N	1.4	$73,111	395.2	$65,784
$26.1m	Q	1.9	$52,309	547.5	$47,674	H	2.8	$36,185	844.9	$30,890	R	1.4	$73,137	396.6	$65,809
$26.2m	M	1.9	$52,340	549.4	$47,691	O	2.8	$36,249	847.7	$30,908	R	1.4	$73,228	398.0	$65,835
$26.3m	C	1.9	$52,376	551.3	$47,707	M	2.8	$36,266	850.4	$30,925	R	1.4	$73,319	399.3	$65,860
$26.4m	R	1.9	$52,386	553.2	$47,723	O	2.8	$36,324	853.2	$30,943	R	1.4	$73,411	400.7	$65,886
$26.5m	M	1.9	$52,463	555.1	$47,739	H	2.8	$36,358	855.9	$30,960	R	1.4	$73,497	402.1	$65,912
$26.6m	R	1.9	$52,513	557.0	$47,756	R	2.8	$36,364	858.7	$30,977	R	1.4	$73,594	403.4	$65,938
$26.7m	Q	1.9	$52,522	558.9	$47,772	O	2.7	$36,399	861.4	$30,995	R	1.4	$73,681	404.8	$65,964
$26.8m	N	1.9	$52,560	560.8	$47,788	Q	2.7	$36,416	864.2	$31,012	R	1.4	$73,768	406.1	$65,990
$26.9m	C	1.9	$52,564	562.7	$47,804	O	2.7	$36,474	866.9	$31,029	R	1.4	$73,861	407.5	$66,016
$27.0m	M	1.9	$52,585	564.6	$47,820	H	2.7	$36,534	869.7	$31,046	R	1.4	$73,954	408.8	$66,042
$27.1m	R	1.9	$52,640	566.5	$47,836	R	2.7	$36,547	872.4	$31,064	R	1.4	$74,041	410.2	$66,068
$27.2m	M	1.9	$52,706	568.4	$47,853	O	2.7	$36,548	875.1	$31,081	W	1.4	$74,062	411.5	$66,095
$27.3m	Q	1.9	$52,733	570.3	$47,869	C	2.7	$36,575	877.9	$31,098	R	1.3	$74,129	412.9	$66,121
$27.4m	C	1.9	$52,751	572.2	$47,885	O	2.7	$36,622	880.6	$31,115	U	1.3	$74,210	414.2	$66,147
$27.5m	R	1.9	$52,765	574.1	$47,901	O	2.7	$36,695	883.3	$31,132	R	1.3	$74,217	415.6	$66,173
$27.6m	M	1.9	$52,826	576.0	$47,917	H	2.7	$36,704	886.1	$31,149	R	1.3	$74,311	416.9	$66,200
$27.7m	R	1.9	$52,893	577.9	$47,934	R	2.7	$36,727	888.8	$31,166	R	1.3	$74,399	418.3	$66,226
$27.8m	C	1.9	$52,937	579.8	$47,950	O	2.7	$36,769	891.5	$31,184	R	1.3	$74,488	419.6	$66,252
$27.9m	Q	1.9	$52,943	581.7	$47,966	M	2.7	$36,789	894.2	$31,201	R	1.3	$74,577	420.9	$66,279
$28.0m	M	1.9	$52,944	583.5	$47,982	O	2.7	$36,842	896.9	$31,218	R	1.3	$74,666	422.3	$66,306
$28.1m	R	1.9	$53,017	585.4	$47,999	Q	2.7	$36,852	899.6	$31,235	R	1.3	$74,755	423.6	$66,332
$28.2m	M	1.9	$53,064	587.3	$48,015	H	2.7	$36,876	902.4	$31,252	R	1.3	$74,845	425.0	$66,359
$28.3m	C	1.9	$53,121	589.2	$48,031	R	2.7	$36,909	905.1	$31,269	R	1.3	$74,934	426.3	$66,386
$28.4m	R	1.9	$53,141	591.1	$48,047	O	2.7	$36,914	907.8	$31,285	R	1.3	$75,019	427.6	$66,413
$28.5m	Q	1.9	$53,151	593.0	$48,064	C	2.7	$36,958	910.5	$31,302	R	1.3	$75,115	429.0	$66,440
$28.6m	M	1.9	$53,180	594.8	$48,080	O	2.7	$36,988	913.2	$31,319	R	1.3	$75,194	430.3	$66,467
$28.7m	R	1.9	$53,268	596.7	$48,096	H	2.7	$37,044	915.9	$31,336	R	1.3	$75,290	431.6	$66,494
$28.8m	M	1.9	$53,294	598.6	$48,112	O	2.7	$37,059	918.6	$31,353	R	1.3	$75,375	432.9	$66,521
$28.9m	C	1.9	$53,303	600.5	$48,129	R	2.7	$37,086	921.3	$31,370	R	1.3	$75,460	434.3	$66,548
$29.0m	Q	1.9	$53,358	602.3	$48,145	O	2.7	$37,131	924.0	$31,386	R	1.3	$75,552	435.6	$66,576
$29.1m	R	1.9	$53,390	604.2	$48,161	O	2.7	$37,202	926.7	$31,403	N	1.3	$75,591	436.9	$66,603
$29.2m	M	1.9	$53,410	606.1	$48,177	H	2.7	$37,211	929.3	$31,420	R	1.3	$75,643	438.2	$66,630
$29.3m	C	1.9	$53,485	608.0	$48,194	R	2.7	$37,266	932.0	$31,437	R	1.3	$75,723	439.6	$66,658
$29.4m	R	1.9	$53,516	609.8	$48,210	O	2.7	$37,274	934.7	$31,454	R	1.3	$75,815	440.9	$66,685
$29.5m	M	1.9	$53,525	611.7	$48,226	Q	2.7	$37,278	937.4	$31,470	R	1.3	$75,901	442.2	$66,713
$29.6m	Q	1.9	$53,563	613.6	$48,242	M	2.7	$37,283	940.1	$31,487	R	1.3	$75,988	443.5	$66,740
$29.7m	M	1.9	$53,637	615.4	$48,259	C	2.7	$37,333	942.8	$31,503	R	1.3	$76,080	444.8	$66,768
$29.8m	R	1.9	$53,639	617.3	$48,275	O	2.7	$37,344	945.4	$31,520	R	1.3	$76,161	446.1	$66,795
$29.9m	C	1.9	$53,666	619.2	$48,291	H	2.7	$37,378	948.1	$31,537	R	1.3	$76,254	447.5	$66,823
$30.0m	M	1.9	$53,749	621.0	$48,308	O	2.7	$37,417	950.8	$31,553	R	1.3	$76,336	448.8	$66,851
$30.1m	R	1.9	$53,763	622.9	$48,324	R	2.7	$37,445	953.4	$31,570	R	1.3	$76,429	450.1	$66,879
$30.2m	Q	1.9	$53,765	624.7	$48,340	O	2.7	$37,485	956.1	$31,586	R	1.3	$76,511	451.4	$66,907
$30.3m	C	1.9	$53,845	626.6	$48,356	H	2.7	$37,540	958.8	$31,603	R	1.3	$76,599	452.7	$66,934

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$30.4m	M	1.9	$53,859	628.5	$48,373	O	2.7	$37,557	961.4	$31,619	R	1.3	$76,687	454.0	$66,962
$30.5m	R	1.9	$53,888	630.3	$48,389	R	2.7	$37,621	964.1	$31,636	R	1.3	$76,770	455.3	$66,991
$30.6m	Q	1.9	$53,968	632.2	$48,405	O	2.7	$37,627	966.8	$31,652	R	1.3	$76,858	456.6	$67,019
$30.7m	M	1.9	$53,969	634.0	$48,422	Q	2.7	$37,695	969.4	$31,669	R	1.3	$76,947	457.9	$67,047
$30.8m	R	1.9	$54,010	635.9	$48,438	O	2.7	$37,696	972.1	$31,685	R	1.3	$77,030	459.2	$67,075
$30.9m	C	1.9	$54,022	637.7	$48,454	C	2.7	$37,701	974.7	$31,702	R	1.3	$77,119	460.5	$67,103
$31.0m	M	1.8	$54,077	639.6	$48,470	H	2.7	$37,705	977.4	$31,718	R	1.3	$77,202	461.8	$67,132
$31.1m	R	1.8	$54,133	641.4	$48,487	M	2.6	$37,752	980.0	$31,734	R	1.3	$77,292	463.1	$67,160
$31.2m	Q	1.8	$54,168	643.3	$48,503	O	2.6	$37,766	982.7	$31,750	R	1.3	$77,375	464.4	$67,188
$31.3m	M	1.8	$54,186	645.1	$48,519	R	2.6	$37,797	985.3	$31,767	R	1.3	$77,465	465.7	$67,217
$31.4m	C	1.8	$54,201	647.0	$48,535	O	2.6	$37,836	988.0	$31,783	R	1.3	$77,543	466.9	$67,246
$31.5m	R	1.8	$54,256	648.8	$48,552	H	2.6	$37,866	990.6	$31,799	R	1.3	$77,634	468.2	$67,274
$31.6m	M	1.8	$54,295	650.6	$48,568	O	2.6	$37,903	993.2	$31,815	R	1.3	$77,718	469.5	$67,303
$31.7m	Q	1.8	$54,366	652.5	$48,584	O	2.6	$37,972	995.9	$31,832	R	1.3	$77,809	470.8	$67,331
$31.8m	C	1.8	$54,374	654.3	$48,600	R	2.6	$37,974	998.5	$31,848	R	1.3	$77,888	472.1	$67,360
$31.9m	R	1.8	$54,377	656.2	$48,617	H	2.6	$38,026	1001.1	$31,864	R	1.3	$77,973	473.4	$67,389
$32.0m	M	1.8	$54,401	658.0	$48,633	O	2.6	$38,042	1003.8	$31,880	N	1.3	$77,993	474.7	$67,417
$32.1m	R	1.8	$54,499	659.8	$48,649	C	2.6	$38,062	1006.4	$31,896	R	1.3	$78,064	475.9	$67,446
$32.2m	M	1.8	$54,508	661.7	$48,665	Q	2.6	$38,103	1009.0	$31,912	R	1.3	$78,143	477.2	$67,475
$32.3m	C	1.8	$54,549	663.5	$48,682	O	2.6	$38,110	1011.6	$31,929	R	1.3	$78,229	478.5	$67,504
$32.4m	Q	1.8	$54,564	665.3	$48,698	R	2.6	$38,148	1014.3	$31,945	R	1.3	$78,315	479.8	$67,532
$32.5m	M	1.8	$54,609	667.2	$48,714	O	2.6	$38,177	1016.9	$31,961	R	1.3	$78,401	481.0	$67,561
$32.6m	R	1.8	$54,624	669.0	$48,730	H	2.6	$38,184	1019.5	$31,977	R	1.3	$78,487	482.3	$67,590
$32.7m	M	1.8	$54,717	670.8	$48,747	M	2.6	$38,199	1022.1	$31,993	R	1.3	$78,567	483.6	$67,619
$32.8m	C	1.8	$54,723	672.6	$48,763	O	2.6	$38,245	1024.7	$32,009	R	1.3	$78,653	484.9	$67,648
$32.9m	R	1.8	$54,744	674.5	$48,779	O	2.6	$38,313	1027.3	$32,025	R	1.3	$78,740	486.1	$67,677
$33.0m	Q	1.8	$54,760	676.3	$48,795	R	2.6	$38,320	1029.9	$32,040	R	1.3	$78,821	487.4	$67,706
$33.1m	M	1.8	$54,819	678.1	$48,811	H	2.6	$38,342	1032.6	$32,056	R	1.3	$78,908	488.7	$67,735
$33.2m	R	1.8	$54,864	679.9	$48,828	O	2.6	$38,380	1035.2	$32,072	R	1.3	$78,989	489.9	$67,764
$33.3m	C	1.8	$54,897	681.8	$48,844	C	2.6	$38,416	1037.8	$32,088	R	1.3	$79,076	491.2	$67,793
$33.4m	M	1.8	$54,921	683.6	$48,860	O	2.6	$38,447	1040.4	$32,104	R	1.3	$79,158	492.5	$67,822
$33.5m	Q	1.8	$54,954	685.4	$48,876	R	2.6	$38,494	1043.0	$32,120	W	1.3	$79,209	493.7	$67,851
$33.6m	R	1.8	$54,984	687.2	$48,892	H	2.6	$38,497	1045.6	$32,136	R	1.3	$79,239	495.0	$67,880
$33.7m	M	1.8	$55,024	689.0	$48,908	Q	2.6	$38,502	1048.2	$32,152	R	1.3	$79,327	496.2	$67,909
$33.8m	C	1.8	$55,066	690.9	$48,925	O	2.6	$38,515	1050.8	$32,167	R	1.3	$79,409	497.5	$67,939
$33.9m	R	1.8	$55,109	692.7	$48,941	O	2.6	$38,580	1053.3	$32,183	R	1.3	$79,498	498.8	$67,968
$34.0m	M	1.8	$55,124	694.5	$48,957	M	2.6	$38,626	1055.9	$32,199	R	1.3	$79,573	500.0	$67,997
$34.1m	Q	1.8	$55,147	696.3	$48,973	O	2.6	$38,646	1058.5	$32,215	R	1.3	$79,662	501.3	$68,026
$34.2m	M	1.8	$55,224	698.1	$48,989	H	2.6	$38,653	1061.1	$32,230	R	1.3	$79,745	502.5	$68,055
$34.3m	R	1.8	$55,227	699.9	$49,005	R	2.6	$38,667	1063.7	$32,246	R	1.3	$79,828	503.8	$68,085
$34.4m	C	1.8	$55,236	701.7	$49,022	O	2.6	$38,713	1066.3	$32,262	R	1.3	$79,911	505.0	$68,114
$34.5m	M	1.8	$55,325	703.5	$49,038	C	2.6	$38,764	1068.9	$32,277	R	1.3	$79,994	506.3	$68,143
$34.6m	Q	1.8	$55,340	705.3	$49,054	O	2.6	$38,779	1071.4	$32,293	R	1.2	$80,077	507.5	$68,173
$34.7m	R	1.8	$55,346	707.2	$49,070	H	2.6	$38,806	1074.0	$32,309	R	1.2	$80,160	508.8	$68,202
$34.8m	C	1.8	$55,408	709.0	$49,086	R	2.6	$38,838	1076.6	$32,324	R	1.2	$80,244	510.0	$68,231
$34.9m	M	1.8	$55,423	710.8	$49,102	O	2.6	$38,844	1079.2	$32,340	N	1.2	$80,323	511.3	$68,261
$35.0m	R	1.8	$55,466	712.6	$49,118	Q	2.6	$38,893	1081.7	$32,355	R	1.2	$80,328	512.5	$68,290
$35.1m	M	1.8	$55,522	714.4	$49,134	O	2.6	$38,911	1084.3	$32,371	R	1.2	$80,405	513.8	$68,320
$35.2m	Q	1.8	$55,528	716.2	$49,151	H	2.6	$38,961	1086.9	$32,387	R	1.2	$80,489	515.0	$68,349
$35.3m	C	1.8	$55,574	718.0	$49,167	O	2.6	$38,974	1089.4	$32,402	R	1.2	$80,574	516.2	$68,378
$35.4m	R	1.8	$55,586	719.8	$49,183	R	2.6	$39,009	1092.0	$32,418	R	1.2	$80,658	517.5	$68,408

Budget impact	*Primary budget ($50m)*					*Lower budget ($0m)*					*Higher budget ($100m)*				
	Marginal			*Cumulative*		*Marginal*			*Cumulative*		*Marginal*			*Cumulative*	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$35.5m	M	1.8	$55,617	721.6	$49,199	M	2.6	$39,035	1094.6	$32,433	R	1.2	$80,736	518.7	$68,437
$35.6m	R	1.8	$55,707	723.4	$49,215	O	2.6	$39,041	1097.1	$32,448	R	1.2	$80,821	520.0	$68,467
$35.7m	M	1.8	$55,717	725.2	$49,231	O	2.6	$39,104	1099.7	$32,464	R	1.2	$80,900	521.2	$68,496
$35.8m	Q	1.8	$55,720	726.9	$49,247	C	2.6	$39,105	1102.2	$32,479	R	1.2	$80,985	522.4	$68,526
$35.9m	C	1.8	$55,741	728.7	$49,263	H	2.6	$39,110	1104.8	$32,495	R	1.2	$81,070	523.7	$68,555
$36.0m	M	1.8	$55,813	730.5	$49,279	O	2.6	$39,170	1107.3	$32,510	R	1.2	$81,149	524.9	$68,585
$36.1m	R	1.8	$55,825	732.3	$49,295	R	2.6	$39,179	1109.9	$32,525	R	1.2	$81,228	526.1	$68,614
$36.2m	Q	1.8	$55,907	734.1	$49,311	O	2.5	$39,234	1112.4	$32,541	R	1.2	$81,314	527.4	$68,644
$36.3m	M	1.8	$55,907	735.9	$49,327	H	2.5	$39,260	1115.0	$32,556	R	1.2	$81,393	528.6	$68,674
$36.4m	C	1.8	$55,910	737.7	$49,343	Q	2.5	$39,276	1117.5	$32,571	R	1.2	$81,473	529.8	$68,703
$36.5m	R	1.8	$55,944	739.5	$49,359	O	2.5	$39,299	1120.1	$32,587	N	1.2	$82,586	531.0	$68,735
$36.6m	N	1.8	$55,961	741.3	$49,375	R	2.5	$39,347	1122.6	$32,602	W	1.2	$83,760	532.2	$68,769
$36.7m	M	1.8	$56,000	743.1	$49,391	O	2.5	$39,361	1125.2	$32,617	N	1.2	$84,790	533.4	$68,804
$36.8m	R	1.8	$56,060	744.8	$49,407	H	2.5	$39,410	1127.7	$32,633	N	1.2	$86,938	534.5	$68,843
$36.9m	C	1.8	$56,073	746.6	$49,423	O	2.5	$39,426	1130.2	$32,648	W	1.1	$87,861	535.7	$68,883
$37.0m	Q	1.8	$56,095	748.4	$49,439	M	2.5	$39,428	1132.8	$32,663	U	1.1	$88,027	536.8	$68,924
$37.1m	M	1.8	$56,098	750.2	$49,455	C	2.5	$39,441	1135.3	$32,678	N	1.1	$89,034	537.9	$68,966
$37.2m	R	1.8	$56,183	752.0	$49,470	O	2.5	$39,490	1137.8	$32,693	N	1.1	$91,080	539.0	$69,011
$37.3m	M	1.8	$56,189	753.7	$49,486	R	2.5	$39,516	1140.4	$32,708	W	1.1	$91,612	540.1	$69,057
$37.4m	C	1.8	$56,237	755.5	$49,502	O	2.5	$39,552	1142.9	$32,724	N	1.1	$93,084	541.2	$69,104
$37.5m	Q	1.8	$56,278	757.3	$49,518	H	2.5	$39,557	1145.4	$32,739	N	1.1	$95,043	542.3	$69,155
$37.6m	M	1.8	$56,284	759.1	$49,534	O	2.5	$39,617	1148.0	$32,754	W	1.1	$95,076	543.3	$69,205
$37.7m	R	1.8	$56,300	760.9	$49,550	Q	2.5	$39,652	1150.5	$32,769	N	1.0	$96,965	544.3	$69,257
$37.8m	M	1.8	$56,373	762.6	$49,566	O	2.5	$39,678	1153.0	$32,784	W	1.0	$98,306	545.4	$69,312
$37.9m	C	1.8	$56,398	764.4	$49,581	R	2.5	$39,684	1155.5	$32,799	N	1.0	$98,847	546.4	$69,366
$38.0m	R	1.8	$56,414	766.2	$49,597	H	2.5	$39,705	1158.0	$32,814	U	1.0	$99,915	547.4	$69,422
$38.1m	Q	1.8	$56,465	767.9	$49,613	O	2.5	$39,742	1160.6	$32,829	N	1.0	$100,696	548.4	$69,479
$38.2m	M	1.8	$56,468	769.7	$49,629	C	2.5	$39,771	1163.1	$32,844	L	1.0	$100,847	549.4	$69,535
$38.3m	E	1.8	$56,494	771.5	$49,645	O	2.5	$39,803	1165.6	$32,859	W	1.0	$101,335	550.3	$69,592
$38.4m	R	1.8	$56,536	773.3	$49,660	M	2.5	$39,805	1168.1	$32,874	L	1.0	$102,040	551.3	$69,650
$38.5m	M	1.8	$56,558	775.0	$49,676	H	2.5	$39,850	1170.6	$32,889	N	1.0	$102,510	552.3	$69,708
$38.6m	C	1.8	$56,564	776.8	$49,692	R	2.5	$39,852	1173.1	$32,904	L	1.0	$103,262	553.3	$69,767
$38.7m	Q	1.8	$56,644	778.6	$49,708	O	2.5	$39,868	1175.6	$32,919	W	1.0	$104,194	554.2	$69,826
$38.8m	M	1.8	$56,648	780.3	$49,723	O	2.5	$39,928	1178.1	$32,934	N	1.0	$104,294	555.2	$69,886
$38.9m	R	1.8	$56,654	782.1	$49,739	O	2.5	$39,990	1180.6	$32,949	L	1.0	$104,514	556.1	$69,946
$39.0m	C	1.8	$56,725	783.8	$49,755	H	2.5	$39,994	1183.1	$32,964	L	0.9	$105,796	557.1	$70,006
$39.1m	M	1.8	$56,738	785.6	$49,770	R	2.5	$40,018	1185.6	$32,978	N	0.9	$106,047	558.0	$70,067
$39.2m	R	1.8	$56,770	787.4	$49,786	Q	2.5	$40,021	1188.1	$32,993	W	0.9	$106,903	559.0	$70,129
$39.3m	M	1.8	$56,828	789.1	$49,802	O	2.5	$40,051	1190.6	$33,008	L	0.9	$107,111	559.9	$70,191
$39.4m	Q	1.8	$56,828	790.9	$49,817	C	2.5	$40,096	1193.1	$33,023	N	0.9	$107,773	560.8	$70,253
$39.5m	C	1.8	$56,883	792.6	$49,833	O	2.5	$40,114	1195.6	$33,038	L	0.9	$108,458	561.8	$70,316
$39.6m	R	1.8	$56,886	794.4	$49,849	H	2.5	$40,138	1198.1	$33,052	N	0.9	$109,469	562.7	$70,379
$39.7m	M	1.8	$56,918	796.2	$49,864	M	2.5	$40,169	1200.6	$33,067	W	0.9	$109,481	563.6	$70,442
$39.8m	U	1.8	$56,943	797.9	$49,880	O	2.5	$40,175	1203.1	$33,082	L	0.9	$109,840	564.5	$70,506
$39.9m	R	1.8	$57,003	799.7	$49,895	R	2.5	$40,183	1205.6	$33,096	U	0.9	$110,517	565.4	$70,570
$40.0m	M	1.8	$57,006	801.4	$49,911	O	2.5	$40,237	1208.1	$33,111	N	0.9	$111,141	566.3	$70,634
$40.1m	Q	1.8	$57,009	803.2	$49,926	H	2.5	$40,282	1210.5	$33,126	L	0.9	$111,257	567.2	$70,699
$40.2m	C	1.8	$57,045	804.9	$49,942	O	2.5	$40,297	1213.0	$33,141	W	0.9	$111,943	568.1	$70,764
$40.3m	M	1.8	$57,091	806.7	$49,957	R	2.5	$40,349	1215.5	$33,155	L	0.9	$112,711	569.0	$70,829
$40.4m	R	1.8	$57,120	808.4	$49,973	O	2.5	$40,358	1218.0	$33,170	N	0.9	$112,788	569.9	$70,894
$40.5m	M	1.7	$57,182	810.2	$49,989	Q	2.5	$40,383	1220.4	$33,185	L	0.9	$114,205	570.7	$70,961

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$40.6m	Q	1.7	$57,189	811.9	$50,004	C	2.5	$40,415	1222.9	$33,199	W	0.9	$114,303	571.6	$71,027
$40.7m	C	1.7	$57,202	813.7	$50,019	O	2.5	$40,419	1225.4	$33,214	N	0.9	$114,410	572.5	$71,093
$40.8m	R	1.7	$57,234	815.4	$50,035	H	2.5	$40,422	1227.9	$33,228	L	0.9	$115,737	573.4	$71,161
$40.9m	M	1.7	$57,267	817.2	$50,050	O	2.5	$40,479	1230.3	$33,243	N	0.9	$116,012	574.2	$71,228
$41.0m	R	1.7	$57,353	818.9	$50,066	R	2.5	$40,512	1232.8	$33,257	W	0.9	$116,566	575.1	$71,296
$41.1m	M	1.7	$57,353	820.7	$50,081	M	2.5	$40,520	1235.3	$33,272	L	0.9	$117,312	575.9	$71,364
$41.2m	C	1.7	$57,362	822.4	$50,097	O	2.5	$40,540	1237.7	$33,286	N	0.9	$117,589	576.8	$71,432
$41.3m	Q	1.7	$57,369	824.1	$50,112	H	2.5	$40,563	1240.2	$33,301	W	0.8	$118,747	577.6	$71,501
$41.4m	M	1.7	$57,438	825.9	$50,128	O	2.5	$40,599	1242.7	$33,315	L	0.8	$118,930	578.5	$71,570
$41.5m	R	1.7	$57,465	827.6	$50,143	O	2.5	$40,660	1245.1	$33,330	N	0.8	$119,147	579.3	$71,639
$41.6m	C	1.7	$57,518	829.4	$50,159	N	2.5	$40,672	1247.6	$33,344	U	0.8	$120,180	580.1	$71,708
$41.7m	M	1.7	$57,524	831.1	$50,174	R	2.5	$40,677	1250.0	$33,359	L	0.8	$120,592	581.0	$71,778
$41.8m	Q	1.7	$57,544	832.8	$50,189	H	2.5	$40,703	1252.5	$33,373	N	0.8	$120,685	581.8	$71,848
$41.9m	R	1.7	$57,584	834.6	$50,205	O	2.5	$40,718	1255.0	$33,387	W	0.8	$120,850	582.6	$71,917
$42.0m	M	1.7	$57,607	836.3	$50,220	C	2.5	$40,730	1257.4	$33,402	N	0.8	$122,203	583.4	$71,988
$42.1m	C	1.7	$57,673	838.1	$50,236	Q	2.5	$40,739	1259.9	$33,416	L	0.8	$122,303	584.2	$72,058
$42.2m	M	1.7	$57,693	839.8	$50,251	O	2.5	$40,780	1262.3	$33,430	W	0.8	$122,882	585.1	$72,129
$42.3m	R	1.7	$57,700	841.5	$50,266	O	2.4	$40,838	1264.8	$33,445	L	0.8	$124,065	585.9	$72,201
$42.4m	Q	1.7	$57,720	843.3	$50,282	R	2.4	$40,840	1267.2	$33,459	W	0.8	$124,849	586.7	$72,272
$42.5m	M	1.7	$57,777	845.0	$50,297	H	2.4	$40,841	1269.7	$33,473	L	0.8	$125,873	587.5	$72,345
$42.6m	R	1.7	$57,813	846.7	$50,312	M	2.4	$40,859	1272.1	$33,487	W	0.8	$126,756	588.3	$72,418
$42.7m	C	1.7	$57,827	848.4	$50,328	O	2.4	$40,898	1274.6	$33,502	L	0.8	$127,740	589.0	$72,491
$42.8m	M	1.7	$57,860	850.2	$50,343	O	2.4	$40,957	1277.0	$33,516	W	0.8	$128,606	589.8	$72,565
$42.9m	Q	1.7	$57,894	851.9	$50,358	H	2.4	$40,979	1279.4	$33,530	U	0.8	$129,118	590.6	$72,640
$43.0m	R	1.7	$57,927	853.6	$50,374	R	2.4	$41,002	1281.9	$33,544	L	0.8	$129,660	591.4	$72,714
$43.1m	M	1.7	$57,941	855.3	$50,389	O	2.4	$41,016	1284.3	$33,559	W	0.8	$130,405	592.1	$72,789
$43.2m	C	1.7	$57,984	857.1	$50,404	C	2.4	$41,039	1286.8	$33,573	L	0.8	$131,641	592.9	$72,864
$43.3m	M	1.7	$58,025	858.8	$50,419	O	2.4	$41,073	1289.2	$33,587	W	0.8	$132,158	593.6	$72,940
$43.4m	R	1.7	$58,042	860.5	$50,435	Q	2.4	$41,089	1291.6	$33,601	L	0.7	$133,679	594.4	$73,016
$43.5m	Q	1.7	$58,072	862.2	$50,450	H	2.4	$41,115	1294.1	$33,615	W	0.7	$133,862	595.1	$73,092
$43.6m	M	1.7	$58,106	864.0	$50,465	O	2.4	$41,134	1296.5	$33,629	W	0.7	$135,525	595.9	$73,170
$43.7m	C	1.7	$58,136	865.7	$50,480	R	2.4	$41,162	1298.9	$33,643	L	0.7	$135,787	596.6	$73,247
$43.8m	R	1.7	$58,156	867.4	$50,496	M	2.4	$41,187	1301.3	$33,657	W	0.7	$137,150	597.3	$73,325
$43.9m	M	1.7	$58,187	869.1	$50,511	O	2.4	$41,191	1303.8	$33,671	U	0.7	$137,473	598.1	$73,403
$44.0m	Q	1.7	$58,241	870.8	$50,526	O	2.4	$41,249	1306.2	$33,686	L	0.7	$137,960	598.8	$73,481
$44.1m	M	1.7	$58,268	872.6	$50,541	H	2.4	$41,252	1308.6	$33,700	W	0.7	$138,735	599.5	$73,560
$44.2m	R	1.7	$58,272	874.3	$50,556	O	2.4	$41,307	1311.0	$33,714	L	0.7	$140,201	600.2	$73,639
$44.3m	C	1.7	$58,289	876.0	$50,572	R	2.4	$41,326	1313.5	$33,728	W	0.7	$140,286	600.9	$73,718
$44.4m	M	1.7	$58,350	877.7	$50,587	C	2.4	$41,345	1315.9	$33,742	W	0.7	$141,802	601.6	$73,798
$44.5m	R	1.7	$58,384	879.4	$50,602	O	2.4	$41,365	1318.3	$33,756	L	0.7	$142,519	602.3	$73,878
$44.6m	Q	1.7	$58,415	881.1	$50,617	H	2.4	$41,387	1320.7	$33,770	W	0.7	$143,289	603.0	$73,958
$44.7m	M	1.7	$58,428	882.8	$50,632	O	2.4	$41,423	1323.1	$33,784	W	0.7	$144,743	603.7	$74,039
$44.8m	C	1.7	$58,442	884.5	$50,647	Q	2.4	$41,432	1325.5	$33,797	L	0.7	$144,915	604.4	$74,120
$44.9m	R	1.7	$58,500	886.3	$50,663	O	2.4	$41,480	1328.0	$33,811	U	0.7	$145,348	605.1	$74,201
$45.0m	M	1.7	$58,510	888.0	$50,678	R	2.4	$41,485	1330.4	$33,825	W	0.7	$146,167	605.8	$74,282
$45.1m	Q	1.7	$58,586	889.7	$50,693	M	2.4	$41,505	1332.8	$33,839	L	0.7	$147,390	606.5	$74,364
$45.2m	M	1.7	$58,586	891.4	$50,708	H	2.4	$41,521	1335.2	$33,853	W	0.7	$147,569	607.2	$74,446
$45.3m	C	1.7	$58,593	893.1	$50,723	O	2.4	$41,539	1337.6	$33,867	W	0.7	$148,940	607.8	$74,528
$45.4m	R	1.7	$58,613	894.8	$50,738	O	2.4	$41,596	1340.0	$33,881	L	0.7	$149,954	608.5	$74,611
$45.5m	M	1.7	$58,668	896.5	$50,753	R	2.4	$41,644	1342.4	$33,895	W	0.7	$150,290	609.2	$74,693
$45.6m	R	1.7	$58,727	898.2	$50,768	C	2.4	$41,646	1344.8	$33,908	W	0.7	$151,612	609.8	$74,777

Budget impact	Primary budget ($50m)					Lower budget ($0m)					Higher budget ($100m)				
	Marginal			Cumulative		Marginal			Cumulative		Marginal			Cumulative	
	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]	Tech [a]	ΔE_m [b]	$ICER_m$ [c]	ΔE [d]	λ^- [e]
$45.7m	C	1.7	$58,744	899.9	$50,783	O	2.4	$41,653	1347.2	$33,922	L	0.7	$152,609	610.5	$74,860
$45.8m	M	1.7	$58,744	901.6	$50,798	H	2.4	$41,655	1349.6	$33,936	U	0.7	$152,816	611.1	$74,944
$45.9m	Q	1.7	$58,758	903.3	$50,813	O	2.4	$41,708	1352.0	$33,950	W	0.7	$152,915	611.8	$75,027
$46.0m	M	1.7	$58,824	905.0	$50,828	O	2.4	$41,766	1354.4	$33,964	W	0.6	$154,195	612.4	$75,111
$46.1m	R	1.7	$58,837	906.7	$50,843	Q	2.4	$41,771	1356.8	$33,977	L	0.6	$155,359	613.1	$75,195
$46.2m	C	1.7	$58,893	908.4	$50,858	H	2.4	$41,785	1359.2	$33,991	W	0.6	$155,453	613.7	$75,279
$46.3m	M	1.7	$58,900	910.1	$50,873	R	2.4	$41,804	1361.6	$34,005	W	0.6	$156,691	614.4	$75,364
$46.4m	Q	1.7	$58,924	911.8	$50,888	M	2.4	$41,814	1364.0	$34,019	W	0.6	$157,913	615.0	$75,449
$46.5m	R	1.7	$58,952	913.5	$50,903	O	2.4	$41,824	1366.4	$34,032	L	0.6	$158,210	615.6	$75,534
$46.6m	M	1.7	$58,976	915.2	$50,918	O	2.4	$41,880	1368.7	$34,046	W	0.6	$159,112	616.2	$75,619
$46.7m	C	1.7	$59,042	916.9	$50,933	H	2.4	$41,920	1371.1	$34,060	U	0.6	$159,935	616.9	$75,704
$46.8m	M	1.7	$59,053	918.6	$50,948	C	2.4	$41,943	1373.5	$34,073	W	0.6	$160,295	617.5	$75,790
$46.9m	R	1.7	$59,063	920.3	$50,963	R	2.4	$41,964	1375.9	$34,087	L	0.6	$161,166	618.1	$75,876
$47.0m	Q	1.7	$59,095	922.0	$50,978	H	2.4	$42,049	1378.3	$34,101	W	0.6	$161,462	618.7	$75,961
$47.1m	M	1.7	$59,130	923.7	$50,993	Q	2.4	$42,103	1380.6	$34,114	W	0.6	$162,612	619.4	$76,047
$47.2m	N	1.7	$59,166	925.3	$51,008	M	2.4	$42,114	1383.0	$34,128	W	0.6	$163,744	620.0	$76,134
$47.3m	R	1.7	$59,175	927.0	$51,023	R	2.4	$42,119	1385.4	$34,142	L	0.6	$164,236	620.6	$76,220
$47.4m	C	1.7	$59,189	928.7	$51,038	H	2.4	$42,180	1387.8	$34,156	W	0.6	$164,861	621.2	$76,307
$47.5m	M	1.7	$59,207	930.4	$51,053	C	2.4	$42,233	1390.1	$34,169	W	0.6	$165,964	621.8	$76,394
$47.6m	Q	1.7	$59,259	932.1	$51,067	R	2.4	$42,280	1392.5	$34,183	U	0.6	$166,749	622.4	$76,481
$47.7m	M	1.7	$59,280	933.8	$51,082	H	2.4	$42,308	1394.9	$34,197	W	0.6	$167,054	623.0	$76,568
$47.8m	R	1.7	$59,291	935.5	$51,097	M	2.4	$42,405	1397.2	$34,211	L	0.6	$167,426	623.6	$76,655
$47.9m	C	1.7	$59,337	937.2	$51,112	Q	2.4	$42,431	1399.6	$34,225	W	0.6	$168,127	624.2	$76,742
$48.0m	M	1.7	$59,358	938.8	$51,127	R	2.4	$42,434	1401.9	$34,238	W	0.6	$169,188	624.8	$76,829
$48.1m	R	1.7	$59,400	940.5	$51,142	H	2.4	$42,436	1404.3	$34,252	W	0.6	$170,236	625.3	$76,917
$48.2m	Q	1.7	$59,425	942.2	$51,156	C	2.4	$42,524	1406.6	$34,266	L	0.6	$170,742	625.9	$77,005
$48.3m	M	1.7	$59,428	943.9	$51,171	H	2.3	$42,564	1409.0	$34,280	W	0.6	$171,271	626.5	$77,093
$48.4m	C	1.7	$59,485	945.6	$51,186	R	2.3	$42,593	1411.3	$34,294	W	0.6	$172,295	627.1	$77,181
$48.5m	M	1.7	$59,506	947.3	$51,201	M	2.3	$42,689	1413.7	$34,308	U	0.6	$173,296	627.7	$77,269
$48.6m	R	1.7	$59,513	948.9	$51,215	H	2.3	$42,691	1416.0	$34,321	W	0.6	$173,304	628.3	$77,357
$48.7m	M	1.7	$59,581	950.6	$51,230	R	2.3	$42,746	1418.4	$34,335	L	0.6	$174,189	628.8	$77,446
$48.8m	Q	1.7	$59,595	952.3	$51,245	Q	2.3	$42,753	1420.7	$34,349	W	0.6	$174,301	629.4	$77,534
$48.9m	R	1.7	$59,623	954.0	$51,260	C	2.3	$42,806	1423.0	$34,363	W	0.6	$175,291	630.0	$77,623
$49.0m	C	1.7	$59,630	955.6	$51,274	H	2.3	$42,817	1425.4	$34,377	W	0.6	$176,267	630.5	$77,711
$49.1m	M	1.7	$59,652	957.3	$51,289	R	2.3	$42,904	1427.7	$34,391	W	0.6	$177,233	631.1	$77,800
$49.2m	M	1.7	$59,726	959.0	$51,304	H	2.3	$42,942	1430.0	$34,405	L	0.6	$177,784	631.7	$77,889
$49.3m	R	1.7	$59,734	960.7	$51,318	M	2.3	$42,965	1432.4	$34,419	W	0.6	$178,190	632.2	$77,978
$49.4m	Q	1.7	$59,755	962.3	$51,333	R	2.3	$43,057	1434.7	$34,433	W	0.6	$179,134	632.8	$78,068
$49.5m	M	1.7	$59,798	964.0	$51,348	H	2.3	$43,068	1437.0	$34,447	U	0.6	$179,604	633.3	$78,157
$49.6m	R	1.7	$59,848	965.7	$51,362	Q	2.3	$43,072	1439.3	$34,461	W	0.6	$180,067	633.9	$78,246
$49.7m	M	1.7	$59,873	967.4	$51,377	C	2.3	$43,089	1441.6	$34,474	W	0.6	$180,995	634.4	$78,336
$49.8m	Q	1.7	$59,920	969.0	$51,392	H	2.3	$43,191	1444.0	$34,488	L	0.6	$181,524	635.0	$78,425
$49.9m	M	1.7	$59,941	970.7	$51,407	R	2.3	$43,211	1446.3	$34,502	W	0.5	$181,914	635.6	$78,515
$50.0m	R	1.7	$59,956	972.4	$51,421	M	2.3	$43,235	1448.6	$34,516	W	0.5	$182,819	636.1	$78,604

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $0.1m increase in incremental expenditure compared to the previous (smaller) level of budget impact; [b] Marginal change in incremental benefit (QALYs) resulting from $0.1m increase in incremental expenditure on marginal technology; [c] Marginal ICER in expansion for marginal technology (note: subject to small fluctuations due to rounding error); [d] Cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies; [e] Optimal cost-effectiveness threshold (per QALY) for net disinvestments.

Table A1.1.5: Reallocation following net investment (non-divisibility)

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$0.1m	N	-$4.1m	-66.7	$1,499	C	-$13.7m	-344.2	$291	N	-$4.1m	-66.7	$1,499
$0.2m	N	-$4.1m	-66.7	$2,999	C	-$13.7m	-344.2	$581	N	-$4.1m	-66.7	$2,999
$0.3m	N	-$4.1m	-66.7	$4,498	C	-$13.7m	-344.2	$872	N	-$4.1m	-66.7	$4,498
$0.4m	N	-$4.1m	-66.7	$5,998	C	-$13.7m	-344.2	$1,162	N	-$4.1m	-66.7	$5,998
$0.5m	N	-$4.1m	-66.7	$7,497	C	-$13.7m	-344.2	$1,453	N	-$4.1m	-66.7	$7,497
$0.6m	N	-$4.1m	-66.7	$8,997	C	-$13.7m	-344.2	$1,743	N	-$4.1m	-66.7	$8,997
$0.7m	N	-$4.1m	-66.7	$10,496	C	-$13.7m	-344.2	$2,034	N	-$4.1m	-66.7	$10,496
$0.8m	N	-$4.1m	-66.7	$11,996	C	-$13.7m	-344.2	$2,324	N	-$4.1m	-66.7	$11,996
$0.9m	N	-$4.1m	-66.7	$13,495	C	-$13.7m	-344.2	$2,615	N	-$4.1m	-66.7	$13,495
$1.0m	N	-$4.1m	-66.7	$14,995	C	-$13.7m	-344.2	$2,905	N	-$4.1m	-66.7	$14,995
$1.1m	N	-$4.1m	-66.7	$16,494	C	-$13.7m	-344.2	$3,196	N	-$4.1m	-66.7	$16,494
$1.2m	N	-$4.1m	-66.7	$17,994	C	-$13.7m	-344.2	$3,486	N	-$4.1m	-66.7	$17,994
$1.3m	N	-$4.1m	-66.7	$19,493	C	-$13.7m	-344.2	$3,777	N	-$4.1m	-66.7	$19,493
$1.4m	N	-$4.1m	-66.7	$20,993	C	-$13.7m	-344.2	$4,067	N	-$4.1m	-66.7	$20,993
$1.5m	N	-$4.1m	-66.7	$22,492	C	-$13.7m	-344.2	$4,358	N	-$4.1m	-66.7	$22,492
$1.6m	N	-$4.1m	-66.7	$23,992	C	-$13.7m	-344.2	$4,648	N	-$4.1m	-66.7	$23,992
$1.7m	N	-$4.1m	-66.7	$25,491	C	-$13.7m	-344.2	$4,939	N	-$4.1m	-66.7	$25,491
$1.8m	N	-$4.1m	-66.7	$26,991	C	-$13.7m	-344.2	$5,229	N	-$4.1m	-66.7	$26,991
$1.9m	N	-$4.1m	-66.7	$28,490	C	-$13.7m	-344.2	$5,520	N	-$4.1m	-66.7	$28,490
$2.0m	N	-$4.1m	-66.7	$29,990	C	-$13.7m	-344.2	$5,810	N	-$4.1m	-66.7	$29,990
$2.1m	N	-$4.1m	-66.7	$31,489	C	-$13.7m	-344.2	$6,101	N	-$4.1m	-66.7	$31,489
$2.2m	N	-$4.1m	-66.7	$32,989	C	-$13.7m	-344.2	$6,392	N	-$4.1m	-66.7	$32,989
$2.3m	N	-$4.1m	-66.7	$34,488	C	-$13.7m	-344.2	$6,682	N	-$4.1m	-66.7	$34,488
$2.4m	N	-$4.1m	-66.7	$35,988	C	-$13.7m	-344.2	$6,973	N	-$4.1m	-66.7	$35,988
$2.5m	N	-$4.1m	-66.7	$37,487	C	-$13.7m	-344.2	$7,263	N	-$4.1m	-66.7	$37,487
$2.6m	N	-$4.1m	-66.7	$38,987	C	-$13.7m	-344.2	$7,554	N	-$4.1m	-66.7	$38,987
$2.7m	N	-$4.1m	-66.7	$40,486	C	-$13.7m	-344.2	$7,844	N	-$4.1m	-66.7	$40,486
$2.8m	N	-$4.1m	-66.7	$41,986	C	-$13.7m	-344.2	$8,135	N	-$4.1m	-66.7	$41,986
$2.9m	N	-$4.1m	-66.7	$43,485	C	-$13.7m	-344.2	$8,425	N	-$4.1m	-66.7	$43,485
$3.0m	N	-$4.1m	-66.7	$44,984	C	-$13.7m	-344.2	$8,716	N	-$4.1m	-66.7	$44,984
$3.1m	N	-$4.1m	-66.7	$46,484	C	-$13.7m	-344.2	$9,006	N	-$4.1m	-66.7	$46,484
$3.2m	N	-$4.1m	-66.7	$47,983	C	-$13.7m	-344.2	$9,297	N	-$4.1m	-66.7	$47,983
$3.3m	N	-$4.1m	-66.7	$49,483	C	-$13.7m	-344.2	$9,587	N	-$4.1m	-66.7	$49,483
$3.4m	N	-$4.1m	-66.7	$50,982	C	-$13.7m	-344.2	$9,878	N	-$4.1m	-66.7	$50,982
$3.5m	N	-$4.1m	-66.7	$52,482	C	-$13.7m	-344.2	$10,168	N	-$4.1m	-66.7	$52,482
$3.6m	N	-$4.1m	-66.7	$53,981	C	-$13.7m	-344.2	$10,459	N	-$4.1m	-66.7	$53,981
$3.7m	N	-$4.1m	-66.7	$55,481	C	-$13.7m	-344.2	$10,749	N	-$4.1m	-66.7	$55,481
$3.8m	N	-$4.1m	-66.7	$56,980	C	-$13.7m	-344.2	$11,040	N	-$4.1m	-66.7	$56,980
$3.9m	N	-$4.1m	-66.7	$58,480	C	-$13.7m	-344.2	$11,330	N	-$4.1m	-66.7	$58,480
$4.0m	N	-$4.1m	-66.7	$59,979	C	-$13.7m	-344.2	$11,621	N	-$4.1m	-66.7	$59,979
$4.1m	N	-$4.1m	-66.7	$61,479	C	-$13.7m	-344.2	$11,912	N	-$4.1m	-66.7	$61,479
$4.2m	C	-$13.7m	-344.2	$12,202	C	-$13.7m	-344.2	$12,202	C	-$13.7m	-344.2	$12,202
$4.3m	C	-$13.7m	-344.2	$12,493	C	-$13.7m	-344.2	$12,493	C	-$13.7m	-344.2	$12,493
$4.4m	C	-$13.7m	-344.2	$12,783	C	-$13.7m	-344.2	$12,783	C	-$13.7m	-344.2	$12,783
$4.5m	C	-$13.7m	-344.2	$13,074	C	-$13.7m	-344.2	$13,074	C	-$13.7m	-344.2	$13,074
$4.6m	C	-$13.7m	-344.2	$13,364	C	-$13.7m	-344.2	$13,364	C	-$13.7m	-344.2	$13,364
$4.7m	C	-$13.7m	-344.2	$13,655	C	-$13.7m	-344.2	$13,655	C	-$13.7m	-344.2	$13,655
$4.8m	C	-$13.7m	-344.2	$13,945	C	-$13.7m	-344.2	$13,945	C	-$13.7m	-344.2	$13,945
$4.9m	C	-$13.7m	-344.2	$14,236	C	-$13.7m	-344.2	$14,236	C	-$13.7m	-344.2	$14,236

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+d}	Tech [a]	ΔC [b]	ΔE [c]	λ^{+d}	Tech [a]	ΔC [b]	ΔE [c]	λ^{+d}
$5.0m	C	-$13.7m	-344.2	$14,526	C	-$13.7m	-344.2	$14,526	C	-$13.7m	-344.2	$14,526
$5.1m	C	-$13.7m	-344.2	$14,817	C	-$13.7m	-344.2	$14,817	C	-$13.7m	-344.2	$14,817
$5.2m	C	-$13.7m	-344.2	$15,107	C	-$13.7m	-344.2	$15,107	C	-$13.7m	-344.2	$15,107
$5.3m	C	-$13.7m	-344.2	$15,398	C	-$13.7m	-344.2	$15,398	C	-$13.7m	-344.2	$15,398
$5.4m	C	-$13.7m	-344.2	$15,688	C	-$13.7m	-344.2	$15,688	C	-$13.7m	-344.2	$15,688
$5.5m	C	-$13.7m	-344.2	$15,979	C	-$13.7m	-344.2	$15,979	C	-$13.7m	-344.2	$15,979
$5.6m	C	-$13.7m	-344.2	$16,269	C	-$13.7m	-344.2	$16,269	C	-$13.7m	-344.2	$16,269
$5.7m	C	-$13.7m	-344.2	$16,560	C	-$13.7m	-344.2	$16,560	C	-$13.7m	-344.2	$16,560
$5.8m	C	-$13.7m	-344.2	$16,850	C	-$13.7m	-344.2	$16,850	C	-$13.7m	-344.2	$16,850
$5.9m	C	-$13.7m	-344.2	$17,141	C	-$13.7m	-344.2	$17,141	C	-$13.7m	-344.2	$17,141
$6.0m	C	-$13.7m	-344.2	$17,431	C	-$13.7m	-344.2	$17,431	C	-$13.7m	-344.2	$17,431
$6.1m	C	-$13.7m	-344.2	$17,722	C	-$13.7m	-344.2	$17,722	C	-$13.7m	-344.2	$17,722
$6.2m	C	-$13.7m	-344.2	$18,013	C	-$13.7m	-344.2	$18,013	C	-$13.7m	-344.2	$18,013
$6.3m	C	-$13.7m	-344.2	$18,303	C	-$13.7m	-344.2	$18,303	C	-$13.7m	-344.2	$18,303
$6.4m	C	-$13.7m	-344.2	$18,594	C	-$13.7m	-344.2	$18,594	C	-$13.7m	-344.2	$18,594
$6.5m	C	-$13.7m	-344.2	$18,884	C	-$13.7m	-344.2	$18,884	C	-$13.7m	-344.2	$18,884
$6.6m	C	-$13.7m	-344.2	$19,175	C	-$13.7m	-344.2	$19,175	C	-$13.7m	-344.2	$19,175
$6.7m	C	-$13.7m	-344.2	$19,465	C	-$13.7m	-344.2	$19,465	C	-$13.7m	-344.2	$19,465
$6.8m	C	-$13.7m	-344.2	$19,756	C	-$13.7m	-344.2	$19,756	C	-$13.7m	-344.2	$19,756
$6.9m	C	-$13.7m	-344.2	$20,046	C	-$13.7m	-344.2	$20,046	C	-$13.7m	-344.2	$20,046
$7.0m	C	-$13.7m	-344.2	$20,337	C	-$13.7m	-344.2	$20,337	C	-$13.7m	-344.2	$20,337
$7.1m	C	-$13.7m	-344.2	$20,627	C	-$13.7m	-344.2	$20,627	C	-$13.7m	-344.2	$20,627
$7.2m	C	-$13.7m	-344.2	$20,918	C	-$13.7m	-344.2	$20,918	C	-$13.7m	-344.2	$20,918
$7.3m	C	-$13.7m	-344.2	$21,208	C	-$13.7m	-344.2	$21,208	C	-$13.7m	-344.2	$21,208
$7.4m	C	-$13.7m	-344.2	$21,499	C	-$13.7m	-344.2	$21,499	C	-$13.7m	-344.2	$21,499
$7.5m	C	-$13.7m	-344.2	$21,789	C	-$13.7m	-344.2	$21,789	C	-$13.7m	-344.2	$21,789
$7.6m	C	-$13.7m	-344.2	$22,080	C	-$13.7m	-344.2	$22,080	C	-$13.7m	-344.2	$22,080
$7.7m	C	-$13.7m	-344.2	$22,370	C	-$13.7m	-344.2	$22,370	C	-$13.7m	-344.2	$22,370
$7.8m	C	-$13.7m	-344.2	$22,661	C	-$13.7m	-344.2	$22,661	C	-$13.7m	-344.2	$22,661
$7.9m	C	-$13.7m	-344.2	$22,951	C	-$13.7m	-344.2	$22,951	C	-$13.7m	-344.2	$22,951
$8.0m	C	-$13.7m	-344.2	$23,242	C	-$13.7m	-344.2	$23,242	C	-$13.7m	-344.2	$23,242
$8.1m	C	-$13.7m	-344.2	$23,533	C	-$13.7m	-344.2	$23,533	C	-$13.7m	-344.2	$23,533
$8.2m	C	-$13.7m	-344.2	$23,823	C	-$13.7m	-344.2	$23,823	C	-$13.7m	-344.2	$23,823
$8.3m	C	-$13.7m	-344.2	$24,114	C	-$13.7m	-344.2	$24,114	C	-$13.7m	-344.2	$24,114
$8.4m	C	-$13.7m	-344.2	$24,404	C	-$13.7m	-344.2	$24,404	C	-$13.7m	-344.2	$24,404
$8.5m	C	-$13.7m	-344.2	$24,695	C	-$13.7m	-344.2	$24,695	C	-$13.7m	-344.2	$24,695
$8.6m	C	-$13.7m	-344.2	$24,985	C	-$13.7m	-344.2	$24,985	C	-$13.7m	-344.2	$24,985
$8.7m	C	-$13.7m	-344.2	$25,276	C	-$13.7m	-344.2	$25,276	C	-$13.7m	-344.2	$25,276
$8.8m	C	-$13.7m	-344.2	$25,566	C	-$13.7m	-344.2	$25,566	C	-$13.7m	-344.2	$25,566
$8.9m	C	-$13.7m	-344.2	$25,857	C	-$13.7m	-344.2	$25,857	C	-$13.7m	-344.2	$25,857
$9.0m	C	-$13.7m	-344.2	$26,147	C	-$13.7m	-344.2	$26,147	C	-$13.7m	-344.2	$26,147
$9.1m	C	-$13.7m	-344.2	$26,438	C	-$13.7m	-344.2	$26,438	C	-$13.7m	-344.2	$26,438
$9.2m	C	-$13.7m	-344.2	$26,728	C	-$13.7m	-344.2	$26,728	C	-$13.7m	-344.2	$26,728
$9.3m	C	-$13.7m	-344.2	$27,019	C	-$13.7m	-344.2	$27,019	C	-$13.7m	-344.2	$27,019
$9.4m	C	-$13.7m	-344.2	$27,309	C	-$13.7m	-344.2	$27,309	C	-$13.7m	-344.2	$27,309
$9.5m	C	-$13.7m	-344.2	$27,600	C	-$13.7m	-344.2	$27,600	C	-$13.7m	-344.2	$27,600
$9.6m	C	-$13.7m	-344.2	$27,890	C	-$13.7m	-344.2	$27,890	C	-$13.7m	-344.2	$27,890
$9.7m	C	-$13.7m	-344.2	$28,181	C	-$13.7m	-344.2	$28,181	C	-$13.7m	-344.2	$28,181
$9.8m	C	-$13.7m	-344.2	$28,471	C	-$13.7m	-344.2	$28,471	C	-$13.7m	-344.2	$28,471
$9.9m	C	-$13.7m	-344.2	$28,762	C	-$13.7m	-344.2	$28,762	C	-$13.7m	-344.2	$28,762
$10.0m	C	-$13.7m	-344.2	$29,052	C	-$13.7m	-344.2	$29,052	C	-$13.7m	-344.2	$29,052
$10.1m	C	-$13.7m	-344.2	$29,343	C	-$13.7m	-344.2	$29,343	C	-$13.7m	-344.2	$29,343

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$10.2m	C	-$13.7m	-344.2	$29,634	C	-$13.7m	-344.2	$29,634	C	-$13.7m	-344.2	$29,634
$10.3m	C	-$13.7m	-344.2	$29,924	C	-$13.7m	-344.2	$29,924	C	-$13.7m	-344.2	$29,924
$10.4m	C	-$13.7m	-344.2	$30,215	C	-$13.7m	-344.2	$30,215	C	-$13.7m	-344.2	$30,215
$10.5m	C	-$13.7m	-344.2	$30,505	C	-$13.7m	-344.2	$30,505	C	-$13.7m	-344.2	$30,505
$10.6m	C	-$13.7m	-344.2	$30,796	C	-$13.7m	-344.2	$30,796	C	-$13.7m	-344.2	$30,796
$10.7m	C	-$13.7m	-344.2	$31,086	C	-$13.7m	-344.2	$31,086	C	-$13.7m	-344.2	$31,086
$10.8m	C	-$13.7m	-344.2	$31,377	C	-$13.7m	-344.2	$31,377	C	-$13.7m	-344.2	$31,377
$10.9m	C	-$13.7m	-344.2	$31,667	C	-$13.7m	-344.2	$31,667	C	-$13.7m	-344.2	$31,667
$11.0m	C	-$13.7m	-344.2	$31,958	C	-$13.7m	-344.2	$31,958	C	-$13.7m	-344.2	$31,958
$11.1m	C	-$13.7m	-344.2	$32,248	C	-$13.7m	-344.2	$32,248	C	-$13.7m	-344.2	$32,248
$11.2m	C	-$13.7m	-344.2	$32,539	C	-$13.7m	-344.2	$32,539	C	-$13.7m	-344.2	$32,539
$11.3m	C	-$13.7m	-344.2	$32,829	C	-$13.7m	-344.2	$32,829	C	-$13.7m	-344.2	$32,829
$11.4m	C	-$13.7m	-344.2	$33,120	C	-$13.7m	-344.2	$33,120	C	-$13.7m	-344.2	$33,120
$11.5m	C	-$13.7m	-344.2	$33,410	C	-$13.7m	-344.2	$33,410	C	-$13.7m	-344.2	$33,410
$11.6m	C	-$13.7m	-344.2	$33,701	C	-$13.7m	-344.2	$33,701	C	-$13.7m	-344.2	$33,701
$11.7m	C	-$13.7m	-344.2	$33,991	C	-$13.7m	-344.2	$33,991	C	-$13.7m	-344.2	$33,991
$11.8m	C	-$13.7m	-344.2	$34,282	C	-$13.7m	-344.2	$34,282	C	-$13.7m	-344.2	$34,282
$11.9m	C	-$13.7m	-344.2	$34,572	C	-$13.7m	-344.2	$34,572	C	-$13.7m	-344.2	$34,572
$12.0m	C	-$13.7m	-344.2	$34,863	C	-$13.7m	-344.2	$34,863	C	-$13.7m	-344.2	$34,863
$12.1m	C	-$13.7m	-344.2	$35,154	C	-$13.7m	-344.2	$35,154	C	-$13.7m	-344.2	$35,154
$12.2m	C	-$13.7m	-344.2	$35,444	C	-$13.7m	-344.2	$35,444	C	-$13.7m	-344.2	$35,444
$12.3m	C	-$13.7m	-344.2	$35,735	C	-$13.7m	-344.2	$35,735	C	-$13.7m	-344.2	$35,735
$12.4m	C	-$13.7m	-344.2	$36,025	C	-$13.7m	-344.2	$36,025	C	-$13.7m	-344.2	$36,025
$12.5m	C	-$13.7m	-344.2	$36,316	C	-$13.7m	-344.2	$36,316	C	-$13.7m	-344.2	$36,316
$12.6m	C	-$13.7m	-344.2	$36,606	C	-$13.7m	-344.2	$36,606	C	-$13.7m	-344.2	$36,606
$12.7m	C	-$13.7m	-344.2	$36,897	C	-$13.7m	-344.2	$36,897	C	-$13.7m	-344.2	$36,897
$12.8m	C	-$13.7m	-344.2	$37,187	C	-$13.7m	-344.2	$37,187	C	-$13.7m	-344.2	$37,187
$12.9m	C	-$13.7m	-344.2	$37,478	C	-$13.7m	-344.2	$37,478	C	-$13.7m	-344.2	$37,478
$13.0m	C	-$13.7m	-344.2	$37,768	C	-$13.7m	-344.2	$37,768	C	-$13.7m	-344.2	$37,768
$13.1m	C	-$13.7m	-344.2	$38,059	C	-$13.7m	-344.2	$38,059	C	-$13.7m	-344.2	$38,059
$13.2m	C	-$13.7m	-344.2	$38,349	C	-$13.7m	-344.2	$38,349	C	-$13.7m	-344.2	$38,349
$13.3m	C	-$13.7m	-344.2	$38,640	C	-$13.7m	-344.2	$38,640	C	-$13.7m	-344.2	$38,640
$13.4m	C	-$13.7m	-344.2	$38,930	C	-$13.7m	-344.2	$38,930	C	-$13.7m	-344.2	$38,930
$13.5m	C	-$13.7m	-344.2	$39,221	C	-$13.7m	-344.2	$39,221	C	-$13.7m	-344.2	$39,221
$13.6m	C	-$13.7m	-344.2	$39,511	C	-$13.7m	-344.2	$39,511	C	-$13.7m	-344.2	$39,511
$13.7m	C	-$13.7m	-344.2	$39,802	C	-$13.7m	-344.2	$39,802	C	-$13.7m	-344.2	$39,802
$13.8m	C N	-$17.8m	-410.9	$33,585	I	-$16.6m	-917.9	$15,034	C N	-$17.8m	-410.9	$33,585
$13.9m	C N	-$17.8m	-410.9	$33,829	I	-$16.6m	-917.9	$15,143	C N	-$17.8m	-410.9	$33,829
$14.0m	C N	-$17.8m	-410.9	$34,072	I	-$16.6m	-917.9	$15,252	C N	-$17.8m	-410.9	$34,072
$14.1m	C N	-$17.8m	-410.9	$34,315	I	-$16.6m	-917.9	$15,360	C N	-$17.8m	-410.9	$34,315
$14.2m	C N	-$17.8m	-410.9	$34,559	I	-$16.6m	-917.9	$15,469	C N	-$17.8m	-410.9	$34,559
$14.3m	C N	-$17.8m	-410.9	$34,802	I	-$16.6m	-917.9	$15,578	C N	-$17.8m	-410.9	$34,802
$14.4m	C N	-$17.8m	-410.9	$35,046	I	-$16.6m	-917.9	$15,687	C N	-$17.8m	-410.9	$35,046
$14.5m	C N	-$17.8m	-410.9	$35,289	I	-$16.6m	-917.9	$15,796	C N	-$17.8m	-410.9	$35,289
$14.6m	C N	-$17.8m	-410.9	$35,532	I	-$16.6m	-917.9	$15,905	C N	-$17.8m	-410.9	$35,532
$14.7m	C N	-$17.8m	-410.9	$35,776	I	-$16.6m	-917.9	$16,014	C N	-$17.8m	-410.9	$35,776
$14.8m	C N	-$17.8m	-410.9	$36,019	I	-$16.6m	-917.9	$16,123	C N	-$17.8m	-410.9	$36,019
$14.9m	C N	-$17.8m	-410.9	$36,262	I	-$16.6m	-917.9	$16,232	C N	-$17.8m	-410.9	$36,262
$15.0m	C N	-$17.8m	-410.9	$36,506	I	-$16.6m	-917.9	$16,341	C N	-$17.8m	-410.9	$36,506
$15.1m	C N	-$17.8m	-410.9	$36,749	I	-$16.6m	-917.9	$16,450	C N	-$17.8m	-410.9	$36,749
$15.2m	C N	-$17.8m	-410.9	$36,992	I	-$16.6m	-917.9	$16,559	C N	-$17.8m	-410.9	$36,992
$15.3m	C N	-$17.8m	-410.9	$37,236	I	-$16.6m	-917.9	$16,668	C N	-$17.8m	-410.9	$37,236

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$15.4m	C N	-$17.8m	-410.9	$37,479	I	-$16.6m	-917.9	$16,777	C N	-$17.8m	-410.9	$37,479
$15.5m	C N	-$17.8m	-410.9	$37,723	I	-$16.6m	-917.9	$16,886	C N	-$17.8m	-410.9	$37,723
$15.6m	C N	-$17.8m	-410.9	$37,966	I	-$16.6m	-917.9	$16,995	C N	-$17.8m	-410.9	$37,966
$15.7m	C N	-$17.8m	-410.9	$38,209	I	-$16.6m	-917.9	$17,103	C N	-$17.8m	-410.9	$38,209
$15.8m	C N	-$17.8m	-410.9	$38,453	I	-$16.6m	-917.9	$17,212	C N	-$17.8m	-410.9	$38,453
$15.9m	C N	-$17.8m	-410.9	$38,696	I	-$16.6m	-917.9	$17,321	C N	-$17.8m	-410.9	$38,696
$16.0m	C N	-$17.8m	-410.9	$38,939	I	-$16.6m	-917.9	$17,430	C N	-$17.8m	-410.9	$38,939
$16.1m	C N	-$17.8m	-410.9	$39,183	I	-$16.6m	-917.9	$17,539	C N	-$17.8m	-410.9	$39,183
$16.2m	C N	-$17.8m	-410.9	$39,426	I	-$16.6m	-917.9	$17,648	C N	-$17.8m	-410.9	$39,426
$16.3m	C N	-$17.8m	-410.9	$39,670	I	-$16.6m	-917.9	$17,757	C N	-$17.8m	-410.9	$39,670
$16.4m	C N	-$17.8m	-410.9	$39,913	I	-$16.6m	-917.9	$17,866	C N	-$17.8m	-410.9	$39,913
$16.5m	C N	-$17.8m	-410.9	$40,156	I	-$16.6m	-917.9	$17,975	C N	-$17.8m	-410.9	$40,156
$16.6m	C N	-$17.8m	-410.9	$40,400	I	-$16.6m	-917.9	$18,084	C N	-$17.8m	-410.9	$40,400
$16.7m	C N	-$17.8m	-410.9	$40,643	C I	-$30.3m	-1262.1	$13,231	C N	-$17.8m	-410.9	$40,643
$16.8m	C N	-$17.8m	-410.9	$40,886	C I	-$30.3m	-1262.1	$13,311	C N	-$17.8m	-410.9	$40,886
$16.9m	C N	-$17.8m	-410.9	$41,130	C I	-$30.3m	-1262.1	$13,390	C N	-$17.8m	-410.9	$41,130
$17.0m	C N	-$17.8m	-410.9	$41,373	C I	-$30.3m	-1262.1	$13,469	C N	-$17.8m	-410.9	$41,373
$17.1m	C N	-$17.8m	-410.9	$41,617	C I	-$30.3m	-1262.1	$13,548	C N	-$17.8m	-410.9	$41,617
$17.2m	C N	-$17.8m	-410.9	$41,860	C I	-$30.3m	-1262.1	$13,628	C N	-$17.8m	-410.9	$41,860
$17.3m	C N	-$17.8m	-410.9	$42,103	C I	-$30.3m	-1262.1	$13,707	C N	-$17.8m	-410.9	$42,103
$17.4m	C N	-$17.8m	-410.9	$42,347	C I	-$30.3m	-1262.1	$13,786	C N	-$17.8m	-410.9	$42,347
$17.5m	C N	-$17.8m	-410.9	$42,590	C I	-$30.3m	-1262.1	$13,865	C N	-$17.8m	-410.9	$42,590
$17.6m	C N	-$17.8m	-410.9	$42,833	C I	-$30.3m	-1262.1	$13,945	C N	-$17.8m	-410.9	$42,833
$17.7m	C N	-$17.8m	-410.9	$43,077	C I	-$30.3m	-1262.1	$14,024	C N	-$17.8m	-410.9	$43,077
$17.8m	C N	-$17.8m	-410.9	$43,320	C I	-$30.3m	-1262.1	$14,103	C N	-$17.8m	-410.9	$43,320
$17.9m	H	-$18.3m	-546.7	$32,740	C I	-$30.3m	-1262.1	$14,182	H	-$18.3m	-546.7	$32,740
$18.0m	H	-$18.3m	-546.7	$32,923	C I	-$30.3m	-1262.1	$14,261	H	-$18.3m	-546.7	$32,923
$18.1m	H	-$18.3m	-546.7	$33,106	C I	-$30.3m	-1262.1	$14,341	H	-$18.3m	-546.7	$33,106
$18.2m	H	-$18.3m	-546.7	$33,289	C I	-$30.3m	-1262.1	$14,420	H	-$18.3m	-546.7	$33,289
$18.3m	H	-$18.3m	-546.7	$33,472	C I	-$30.3m	-1262.1	$14,499	H	-$18.3m	-546.7	$33,472
$18.4m	H N	-$22.4m	-613.4	$29,996	C I	-$30.3m	-1262.1	$14,578	H N	-$22.4m	-613.4	$29,996
$18.5m	H N	-$22.4m	-613.4	$30,159	C I	-$30.3m	-1262.1	$14,658	H N	-$22.4m	-613.4	$30,159
$18.6m	H N	-$22.4m	-613.4	$30,322	C I	-$30.3m	-1262.1	$14,737	H N	-$22.4m	-613.4	$30,322
$18.7m	H N	-$22.4m	-613.4	$30,485	C I	-$30.3m	-1262.1	$14,816	H N	-$22.4m	-613.4	$30,485
$18.8m	H N	-$22.4m	-613.4	$30,648	C I	-$30.3m	-1262.1	$14,895	H N	-$22.4m	-613.4	$30,648
$18.9m	H N	-$22.4m	-613.4	$30,811	C I	-$30.3m	-1262.1	$14,974	H N	-$22.4m	-613.4	$30,811
$19.0m	H N	-$22.4m	-613.4	$30,974	C I	-$30.3m	-1262.1	$15,054	H N	-$22.4m	-613.4	$30,974
$19.1m	H N	-$22.4m	-613.4	$31,137	C I	-$30.3m	-1262.1	$15,133	H N	-$22.4m	-613.4	$31,137
$19.2m	H N	-$22.4m	-613.4	$31,300	C I	-$30.3m	-1262.1	$15,212	H N	-$22.4m	-613.4	$31,300
$19.3m	H N	-$22.4m	-613.4	$31,463	C I	-$30.3m	-1262.1	$15,291	H N	-$22.4m	-613.4	$31,463
$19.4m	H N	-$22.4m	-613.4	$31,626	C I	-$30.3m	-1262.1	$15,371	H N	-$22.4m	-613.4	$31,626
$19.5m	H N	-$22.4m	-613.4	$31,789	C I	-$30.3m	-1262.1	$15,450	H N	-$22.4m	-613.4	$31,789
$19.6m	H N	-$22.4m	-613.4	$31,952	C I	-$30.3m	-1262.1	$15,529	H N	-$22.4m	-613.4	$31,952
$19.7m	H N	-$22.4m	-613.4	$32,115	C I	-$30.3m	-1262.1	$15,608	H N	-$22.4m	-613.4	$32,115
$19.8m	H N	-$22.4m	-613.4	$32,278	C I	-$30.3m	-1262.1	$15,688	H N	-$22.4m	-613.4	$32,278
$19.9m	H N	-$22.4m	-613.4	$32,441	C I	-$30.3m	-1262.1	$15,767	H N	-$22.4m	-613.4	$32,441
$20.0m	H N	-$22.4m	-613.4	$32,604	C I	-$30.3m	-1262.1	$15,846	H N	-$22.4m	-613.4	$32,604
$20.1m	H N	-$22.4m	-613.4	$32,767	C I	-$30.3m	-1262.1	$15,925	H N	-$22.4m	-613.4	$32,767
$20.2m	H N	-$22.4m	-613.4	$32,930	C I	-$30.3m	-1262.1	$16,004	H N	-$22.4m	-613.4	$32,930
$20.3m	H N	-$22.4m	-613.4	$33,093	C I	-$30.3m	-1262.1	$16,084	H N	-$22.4m	-613.4	$33,093
$20.4m	H N	-$22.4m	-613.4	$33,256	C I	-$30.3m	-1262.1	$16,163	H N	-$22.4m	-613.4	$33,256
$20.5m	H N	-$22.4m	-613.4	$33,419	C I	-$30.3m	-1262.1	$16,242	H N	-$22.4m	-613.4	$33,419

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$20.6m	H N	-$22.4m	-613.4	$33,582	C I	-$30.3m	-1262.1	$16,321	H N	-$22.4m	-613.4	$33,582
$20.7m	H N	-$22.4m	-613.4	$33,745	C I	-$30.3m	-1262.1	$16,401	H N	-$22.4m	-613.4	$33,745
$20.8m	H N	-$22.4m	-613.4	$33,908	C I	-$30.3m	-1262.1	$16,480	H N	-$22.4m	-613.4	$33,908
$20.9m	H N	-$22.4m	-613.4	$34,072	C I	-$30.3m	-1262.1	$16,559	H N	-$22.4m	-613.4	$34,072
$21.0m	H N	-$22.4m	-613.4	$34,235	C I	-$30.3m	-1262.1	$16,638	H N	-$22.4m	-613.4	$34,235
$21.1m	H N	-$22.4m	-613.4	$34,398	C I	-$30.3m	-1262.1	$16,718	H N	-$22.4m	-613.4	$34,398
$21.2m	H N	-$22.4m	-613.4	$34,561	C I	-$30.3m	-1262.1	$16,797	H N	-$22.4m	-613.4	$34,561
$21.3m	H N	-$22.4m	-613.4	$34,724	C I	-$30.3m	-1262.1	$16,876	H N	-$22.4m	-613.4	$34,724
$21.4m	H N	-$22.4m	-613.4	$34,887	C I	-$30.3m	-1262.1	$16,955	H N	-$22.4m	-613.4	$34,887
$21.5m	H N	-$22.4m	-613.4	$35,050	C I	-$30.3m	-1262.1	$17,034	H N	-$22.4m	-613.4	$35,050
$21.6m	H N	-$22.4m	-613.4	$35,213	C I	-$30.3m	-1262.1	$17,114	H N	-$22.4m	-613.4	$35,213
$21.7m	H N	-$22.4m	-613.4	$35,376	C I	-$30.3m	-1262.1	$17,193	H N	-$22.4m	-613.4	$35,376
$21.8m	H N	-$22.4m	-613.4	$35,539	C I	-$30.3m	-1262.1	$17,272	H N	-$22.4m	-613.4	$35,539
$21.9m	H N	-$22.4m	-613.4	$35,702	C I	-$30.3m	-1262.1	$17,351	H N	-$22.4m	-613.4	$35,702
$22.0m	H N	-$22.4m	-613.4	$35,865	C I	-$30.3m	-1262.1	$17,431	H N	-$22.4m	-613.4	$35,865
$22.1m	H N	-$22.4m	-613.4	$36,028	C I	-$30.3m	-1262.1	$17,510	H N	-$22.4m	-613.4	$36,028
$22.2m	H N	-$22.4m	-613.4	$36,191	C I	-$30.3m	-1262.1	$17,589	H N	-$22.4m	-613.4	$36,191
$22.3m	H N	-$22.4m	-613.4	$36,354	C I	-$30.3m	-1262.1	$17,668	H N	-$22.4m	-613.4	$36,354
$22.4m	H N	-$22.4m	-613.4	$36,517	C I	-$30.3m	-1262.1	$17,748	H N	-$22.4m	-613.4	$36,517
$22.5m	O	-$24.8m	-887.7	$25,347	C I	-$30.3m	-1262.1	$17,827	O	-$24.8m	-887.7	$25,347
$22.6m	O	-$24.8m	-887.7	$25,460	C I	-$30.3m	-1262.1	$17,906	O	-$24.8m	-887.7	$25,460
$22.7m	O	-$24.8m	-887.7	$25,573	C I	-$30.3m	-1262.1	$17,985	O	-$24.8m	-887.7	$25,573
$22.8m	O	-$24.8m	-887.7	$25,685	C I	-$30.3m	-1262.1	$18,064	O	-$24.8m	-887.7	$25,685
$22.9m	O	-$24.8m	-887.7	$25,798	C I	-$30.3m	-1262.1	$18,144	O	-$24.8m	-887.7	$25,798
$23.0m	O	-$24.8m	-887.7	$25,910	C I	-$30.3m	-1262.1	$18,223	O	-$24.8m	-887.7	$25,910
$23.1m	O	-$24.8m	-887.7	$26,023	C I	-$30.3m	-1262.1	$18,302	O	-$24.8m	-887.7	$26,023
$23.2m	O	-$24.8m	-887.7	$26,136	C I	-$30.3m	-1262.1	$18,381	O	-$24.8m	-887.7	$26,136
$23.3m	O	-$24.8m	-887.7	$26,248	C I	-$30.3m	-1262.1	$18,461	O	-$24.8m	-887.7	$26,248
$23.4m	O	-$24.8m	-887.7	$26,361	C I	-$30.3m	-1262.1	$18,540	O	-$24.8m	-887.7	$26,361
$23.5m	O	-$24.8m	-887.7	$26,474	C I	-$30.3m	-1262.1	$18,619	O	-$24.8m	-887.7	$26,474
$23.6m	O	-$24.8m	-887.7	$26,586	C I	-$30.3m	-1262.1	$18,698	O	-$24.8m	-887.7	$26,586
$23.7m	O	-$24.8m	-887.7	$26,699	C I	-$30.3m	-1262.1	$18,778	O	-$24.8m	-887.7	$26,699
$23.8m	O	-$24.8m	-887.7	$26,812	C I	-$30.3m	-1262.1	$18,857	O	-$24.8m	-887.7	$26,812
$23.9m	O	-$24.8m	-887.7	$26,924	C I	-$30.3m	-1262.1	$18,936	O	-$24.8m	-887.7	$26,924
$24.0m	O	-$24.8m	-887.7	$27,037	C I	-$30.3m	-1262.1	$19,015	O	-$24.8m	-887.7	$27,037
$24.1m	O	-$24.8m	-887.7	$27,150	C I	-$30.3m	-1262.1	$19,094	O	-$24.8m	-887.7	$27,150
$24.2m	O	-$24.8m	-887.7	$27,262	C I	-$30.3m	-1262.1	$19,174	O	-$24.8m	-887.7	$27,262
$24.3m	O	-$24.8m	-887.7	$27,375	C I	-$30.3m	-1262.1	$19,253	O	-$24.8m	-887.7	$27,375
$24.4m	O	-$24.8m	-887.7	$27,488	C I	-$30.3m	-1262.1	$19,332	O	-$24.8m	-887.7	$27,488
$24.5m	O	-$24.8m	-887.7	$27,600	C I	-$30.3m	-1262.1	$19,411	O	-$24.8m	-887.7	$27,600
$24.6m	O	-$24.8m	-887.7	$27,713	C I	-$30.3m	-1262.1	$19,491	O	-$24.8m	-887.7	$27,713
$24.7m	O	-$24.8m	-887.7	$27,826	C I	-$30.3m	-1262.1	$19,570	O	-$24.8m	-887.7	$27,826
$24.8m	O	-$24.8m	-887.7	$27,938	C I	-$30.3m	-1262.1	$19,649	O	-$24.8m	-887.7	$27,938
$24.9m	C H	-$32.0m	-890.9	$27,948	C I	-$30.3m	-1262.1	$19,728	C H	-$32.0m	-890.9	$27,948
$25.0m	C H	-$32.0m	-890.9	$28,061	C I	-$30.3m	-1262.1	$19,808	C H	-$32.0m	-890.9	$28,061
$25.1m	C H	-$32.0m	-890.9	$28,173	C I	-$30.3m	-1262.1	$19,887	C H	-$32.0m	-890.9	$28,173
$25.2m	C H	-$32.0m	-890.9	$28,285	C I	-$30.3m	-1262.1	$19,966	C H	-$32.0m	-890.9	$28,285
$25.3m	C H	-$32.0m	-890.9	$28,397	C I	-$30.3m	-1262.1	$20,045	C H	-$32.0m	-890.9	$28,397
$25.4m	C H	-$32.0m	-890.9	$28,510	C I	-$30.3m	-1262.1	$20,124	C H	-$32.0m	-890.9	$28,510
$25.5m	C H	-$32.0m	-890.9	$28,622	C I	-$30.3m	-1262.1	$20,204	C H	-$32.0m	-890.9	$28,622
$25.6m	C H	-$32.0m	-890.9	$28,734	C I	-$30.3m	-1262.1	$20,283	C H	-$32.0m	-890.9	$28,734
$25.7m	C H	-$32.0m	-890.9	$28,846	C I	-$30.3m	-1262.1	$20,362	C H	-$32.0m	-890.9	$28,846

Budget impact	***Primary budget ($50m)***				***Lower budget ($0m)***				***Higher budget ($100m)***			
	Tech [a]	$\Delta\boldsymbol{C}$ [b]	$\Delta\boldsymbol{E}$ [c]	$\boldsymbol{\lambda}^{+}$ [d]	**Tech** [a]	$\Delta\boldsymbol{C}$ [b]	$\Delta\boldsymbol{E}$ [c]	$\boldsymbol{\lambda}^{+}$ [d]	**Tech** [a]	$\Delta\boldsymbol{C}$ [b]	$\Delta\boldsymbol{E}$ [c]	$\boldsymbol{\lambda}^{+}$ [d]
$25.8m	C H	-$32.0m	-890.9	$28,958	C I	-$30.3m	-1262.1	$20,441	C H	-$32.0m	-890.9	$28,958
$25.9m	C H	-$32.0m	-890.9	$29,071	C I	-$30.3m	-1262.1	$20,521	C H	-$32.0m	-890.9	$29,071
$26.0m	C H	-$32.0m	-890.9	$29,183	C I	-$30.3m	-1262.1	$20,600	C H	-$32.0m	-890.9	$29,183
$26.1m	C H	-$32.0m	-890.9	$29,295	C I	-$30.3m	-1262.1	$20,679	C H	-$32.0m	-890.9	$29,295
$26.2m	C H	-$32.0m	-890.9	$29,407	C I	-$30.3m	-1262.1	$20,758	C H	-$32.0m	-890.9	$29,407
$26.3m	C H	-$32.0m	-890.9	$29,520	C I	-$30.3m	-1262.1	$20,838	C H	-$32.0m	-890.9	$29,520
$26.4m	C H	-$32.0m	-890.9	$29,632	C I	-$30.3m	-1262.1	$20,917	C H	-$32.0m	-890.9	$29,632
$26.5m	C H	-$32.0m	-890.9	$29,744	C I	-$30.3m	-1262.1	$20,996	C H	-$32.0m	-890.9	$29,744
$26.6m	C H	-$32.0m	-890.9	$29,856	C I	-$30.3m	-1262.1	$21,075	C H	-$32.0m	-890.9	$29,856
$26.7m	C H	-$32.0m	-890.9	$29,969	C I	-$30.3m	-1262.1	$21,154	C H	-$32.0m	-890.9	$29,969
$26.8m	C H	-$32.0m	-890.9	$30,081	C I	-$30.3m	-1262.1	$21,234	C H	-$32.0m	-890.9	$30,081
$26.9m	C H	-$32.0m	-890.9	$30,193	C I	-$30.3m	-1262.1	$21,313	C H	-$32.0m	-890.9	$30,193
$27.0m	C H	-$32.0m	-890.9	$30,305	C I	-$30.3m	-1262.1	$21,392	C H	-$32.0m	-890.9	$30,305
$27.1m	C H	-$32.0m	-890.9	$30,418	C I	-$30.3m	-1262.1	$21,471	C H	-$32.0m	-890.9	$30,418
$27.2m	C H	-$32.0m	-890.9	$30,530	C I	-$30.3m	-1262.1	$21,551	C H	-$32.0m	-890.9	$30,530
$27.3m	C H	-$32.0m	-890.9	$30,642	C I	-$30.3m	-1262.1	$21,630	C H	-$32.0m	-890.9	$30,642
$27.4m	C H	-$32.0m	-890.9	$30,754	C I	-$30.3m	-1262.1	$21,709	C H	-$32.0m	-890.9	$30,754
$27.5m	C H	-$32.0m	-890.9	$30,867	C I	-$30.3m	-1262.1	$21,788	C H	-$32.0m	-890.9	$30,867
$27.6m	C H	-$32.0m	-890.9	$30,979	C I	-$30.3m	-1262.1	$21,868	C H	-$32.0m	-890.9	$30,979
$27.7m	C H	-$32.0m	-890.9	$31,091	C I	-$30.3m	-1262.1	$21,947	C H	-$32.0m	-890.9	$31,091
$27.8m	C H	-$32.0m	-890.9	$31,203	C I	-$30.3m	-1262.1	$22,026	C H	-$32.0m	-890.9	$31,203
$27.9m	C H	-$32.0m	-890.9	$31,316	C I	-$30.3m	-1262.1	$22,105	C H	-$32.0m	-890.9	$31,316
$28.0m	C H	-$32.0m	-890.9	$31,428	C I	-$30.3m	-1262.1	$22,184	C H	-$32.0m	-890.9	$31,428
$28.1m	C H	-$32.0m	-890.9	$31,540	C I	-$30.3m	-1262.1	$22,264	C H	-$32.0m	-890.9	$31,540
$28.2m	C H	-$32.0m	-890.9	$31,652	C I	-$30.3m	-1262.1	$22,343	C H	-$32.0m	-890.9	$31,652
$28.3m	C H	-$32.0m	-890.9	$31,765	C I	-$30.3m	-1262.1	$22,422	C H	-$32.0m	-890.9	$31,765
$28.4m	C H	-$32.0m	-890.9	$31,877	C I	-$30.3m	-1262.1	$22,501	C H	-$32.0m	-890.9	$31,877
$28.5m	C H	-$32.0m	-890.9	$31,989	C I	-$30.3m	-1262.1	$22,581	C H	-$32.0m	-890.9	$31,989
$28.6m	C H	-$32.0m	-890.9	$32,101	C I	-$30.3m	-1262.1	$22,660	C H	-$32.0m	-890.9	$32,101
$28.7m	C H	-$32.0m	-890.9	$32,214	C I	-$30.3m	-1262.1	$22,739	C H	-$32.0m	-890.9	$32,214
$28.8m	C H	-$32.0m	-890.9	$32,326	C I	-$30.3m	-1262.1	$22,818	C H	-$32.0m	-890.9	$32,326
$28.9m	C H	-$32.0m	-890.9	$32,438	C I	-$30.3m	-1262.1	$22,898	C H	-$32.0m	-890.9	$32,438
$29.0m	C H	-$32.0m	-890.9	$32,550	C I	-$30.3m	-1262.1	$22,977	C H	-$32.0m	-890.9	$32,550
$29.1m	C H	-$32.0m	-890.9	$32,662	C I	-$30.3m	-1262.1	$23,056	C H	-$32.0m	-890.9	$32,662
$29.2m	C H	-$32.0m	-890.9	$32,775	C I	-$30.3m	-1262.1	$23,135	C H	-$32.0m	-890.9	$32,775
$29.3m	C H	-$32.0m	-890.9	$32,887	C I	-$30.3m	-1262.1	$23,214	C H	-$32.0m	-890.9	$32,887
$29.4m	C H	-$32.0m	-890.9	$32,999	C I	-$30.3m	-1262.1	$23,294	C H	-$32.0m	-890.9	$32,999
$29.5m	C H	-$32.0m	-890.9	$33,111	C I	-$30.3m	-1262.1	$23,373	C H	-$32.0m	-890.9	$33,111
$29.6m	C H	-$32.0m	-890.9	$33,224	C I	-$30.3m	-1262.1	$23,452	C H	-$32.0m	-890.9	$33,224
$29.7m	C H	-$32.0m	-890.9	$33,336	C I	-$30.3m	-1262.1	$23,531	C H	-$32.0m	-890.9	$33,336
$29.8m	C H	-$32.0m	-890.9	$33,448	C I	-$30.3m	-1262.1	$23,611	C H	-$32.0m	-890.9	$33,448
$29.9m	C H	-$32.0m	-890.9	$33,560	C I	-$30.3m	-1262.1	$23,690	C H	-$32.0m	-890.9	$33,560
$30.0m	C H	-$32.0m	-890.9	$33,673	C I	-$30.3m	-1262.1	$23,769	C H	-$32.0m	-890.9	$33,673
$30.1m	C H	-$32.0m	-890.9	$33,785	C I	-$30.3m	-1262.1	$23,848	C H	-$32.0m	-890.9	$33,785
$30.2m	C H	-$32.0m	-890.9	$33,897	C I	-$30.3m	-1262.1	$23,927	C H	-$32.0m	-890.9	$33,897
$30.3m	C H	-$32.0m	-890.9	$34,009	C I	-$30.3m	-1262.1	$24,007	C H	-$32.0m	-890.9	$34,009
$30.4m	C H	-$32.0m	-890.9	$34,122	C T	-$39.0m	-1996.1	$15,230	C H	-$32.0m	-890.9	$34,122
$30.5m	C H	-$32.0m	-890.9	$34,234	C T	-$39.0m	-1996.1	$15,280	C H	-$32.0m	-890.9	$34,234
$30.6m	C H	-$32.0m	-890.9	$34,346	C T	-$39.0m	-1996.1	$15,330	C H	-$32.0m	-890.9	$34,346
$30.7m	C H	-$32.0m	-890.9	$34,458	C T	-$39.0m	-1996.1	$15,380	C H	-$32.0m	-890.9	$34,458
$30.8m	C H	-$32.0m	-890.9	$34,571	C T	-$39.0m	-1996.1	$15,430	C H	-$32.0m	-890.9	$34,571
$30.9m	C H	-$32.0m	-890.9	$34,683	C T	-$39.0m	-1996.1	$15,480	C H	-$32.0m	-890.9	$34,683

Budget impact	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$31.0m	C H	-$32.0m	-890.9	$34,795	C T	-$39.0m	-1996.1	$15,530	C H	-$32.0m	-890.9	$34,795
$31.1m	C H	-$32.0m	-890.9	$34,907	C T	-$39.0m	-1996.1	$15,580	C H	-$32.0m	-890.9	$34,907
$31.2m	C H	-$32.0m	-890.9	$35,020	C T	-$39.0m	-1996.1	$15,630	C H	-$32.0m	-890.9	$35,020
$31.3m	C H	-$32.0m	-890.9	$35,132	C T	-$39.0m	-1996.1	$15,680	C H	-$32.0m	-890.9	$35,132
$31.4m	C H	-$32.0m	-890.9	$35,244	C T	-$39.0m	-1996.1	$15,731	C H	-$32.0m	-890.9	$35,244
$31.5m	C H	-$32.0m	-890.9	$35,356	C T	-$39.0m	-1996.1	$15,781	C H	-$32.0m	-890.9	$35,356
$31.6m	C H	-$32.0m	-890.9	$35,469	C T	-$39.0m	-1996.1	$15,831	C H	-$32.0m	-890.9	$35,469
$31.7m	C H	-$32.0m	-890.9	$35,581	C T	-$39.0m	-1996.1	$15,881	C H	-$32.0m	-890.9	$35,581
$31.8m	C H	-$32.0m	-890.9	$35,693	C T	-$39.0m	-1996.1	$15,931	C H	-$32.0m	-890.9	$35,693
$31.9m	C H	-$32.0m	-890.9	$35,805	C T	-$39.0m	-1996.1	$15,981	C H	-$32.0m	-890.9	$35,805
$32.0m	C H	-$32.0m	-890.9	$35,917	C T	-$39.0m	-1996.1	$16,031	C H	-$32.0m	-890.9	$35,917
$32.1m	C H N	-$36.1m	-957.6	$33,521	C T	-$39.0m	-1996.1	$16,081	C H N	-$36.1m	-957.6	$33,521
$32.2m	C H N	-$36.1m	-957.6	$33,625	C T	-$39.0m	-1996.1	$16,131	C H N	-$36.1m	-957.6	$33,625
$32.3m	C H N	-$36.1m	-957.6	$33,729	C T	-$39.0m	-1996.1	$16,181	C H N	-$36.1m	-957.6	$33,729
$32.4m	C H N	-$36.1m	-957.6	$33,834	C T	-$39.0m	-1996.1	$16,232	C H N	-$36.1m	-957.6	$33,834
$32.5m	C H N	-$36.1m	-957.6	$33,938	C T	-$39.0m	-1996.1	$16,282	C H N	-$36.1m	-957.6	$33,938
$32.6m	C H N	-$36.1m	-957.6	$34,043	C T	-$39.0m	-1996.1	$16,332	C H N	-$36.1m	-957.6	$34,043
$32.7m	C H N	-$36.1m	-957.6	$34,147	C T	-$39.0m	-1996.1	$16,382	C H N	-$36.1m	-957.6	$34,147
$32.8m	C H N	-$36.1m	-957.6	$34,252	C T	-$39.0m	-1996.1	$16,432	C H N	-$36.1m	-957.6	$34,252
$32.9m	C H N	-$36.1m	-957.6	$34,356	C T	-$39.0m	-1996.1	$16,482	C H N	-$36.1m	-957.6	$34,356
$33.0m	C H N	-$36.1m	-957.6	$34,460	C T	-$39.0m	-1996.1	$16,532	C H N	-$36.1m	-957.6	$34,460
$33.1m	C H N	-$36.1m	-957.6	$34,565	C T	-$39.0m	-1996.1	$16,582	C H N	-$36.1m	-957.6	$34,565
$33.2m	C H N	-$36.1m	-957.6	$34,669	C T	-$39.0m	-1996.1	$16,632	C H N	-$36.1m	-957.6	$34,669
$33.3m	C H N	-$36.1m	-957.6	$34,774	C T	-$39.0m	-1996.1	$16,682	C H N	-$36.1m	-957.6	$34,774
$33.4m	C H N	-$36.1m	-957.6	$34,878	C T	-$39.0m	-1996.1	$16,732	C H N	-$36.1m	-957.6	$34,878
$33.5m	C H N	-$36.1m	-957.6	$34,983	C T	-$39.0m	-1996.1	$16,783	C H N	-$36.1m	-957.6	$34,983
$33.6m	C H N	-$36.1m	-957.6	$35,087	C T	-$39.0m	-1996.1	$16,833	C H N	-$36.1m	-957.6	$35,087
$33.7m	C H N	-$36.1m	-957.6	$35,191	C T	-$39.0m	-1996.1	$16,883	C H N	-$36.1m	-957.6	$35,191
$33.8m	C H N	-$36.1m	-957.6	$35,296	C T	-$39.0m	-1996.1	$16,933	C H N	-$36.1m	-957.6	$35,296
$33.9m	C H N	-$36.1m	-957.6	$35,400	C T	-$39.0m	-1996.1	$16,983	C H N	-$36.1m	-957.6	$35,400
$34.0m	C H N	-$36.1m	-957.6	$35,505	C T	-$39.0m	-1996.1	$17,033	C H N	-$36.1m	-957.6	$35,505
$34.1m	C H N	-$36.1m	-957.6	$35,609	C T	-$39.0m	-1996.1	$17,083	C H N	-$36.1m	-957.6	$35,609
$34.2m	C H N	-$36.1m	-957.6	$35,714	C T	-$39.0m	-1996.1	$17,133	C H N	-$36.1m	-957.6	$35,714
$34.3m	C H N	-$36.1m	-957.6	$35,818	C T	-$39.0m	-1996.1	$17,183	C H N	-$36.1m	-957.6	$35,818
$34.4m	C H N	-$36.1m	-957.6	$35,922	C T	-$39.0m	-1996.1	$17,233	C H N	-$36.1m	-957.6	$35,922
$34.5m	C H N	-$36.1m	-957.6	$36,027	C T	-$39.0m	-1996.1	$17,284	C H N	-$36.1m	-957.6	$36,027
$34.6m	C H N	-$36.1m	-957.6	$36,131	C T	-$39.0m	-1996.1	$17,334	C H N	-$36.1m	-957.6	$36,131
$34.7m	C H N	-$36.1m	-957.6	$36,236	C T	-$39.0m	-1996.1	$17,384	C H N	-$36.1m	-957.6	$36,236
$34.8m	C H N	-$36.1m	-957.6	$36,340	C T	-$39.0m	-1996.1	$17,434	C H N	-$36.1m	-957.6	$36,340
$34.9m	C H N	-$36.1m	-957.6	$36,445	C T	-$39.0m	-1996.1	$17,484	C H N	-$36.1m	-957.6	$36,445
$35.0m	C H N	-$36.1m	-957.6	$36,549	C T	-$39.0m	-1996.1	$17,534	C H N	-$36.1m	-957.6	$36,549
$35.1m	C H N	-$36.1m	-957.6	$36,653	C T	-$39.0m	-1996.1	$17,584	C H N	-$36.1m	-957.6	$36,653
$35.2m	C H N	-$36.1m	-957.6	$36,758	C T	-$39.0m	-1996.1	$17,634	C H N	-$36.1m	-957.6	$36,758
$35.3m	C H N	-$36.1m	-957.6	$36,862	C T	-$39.0m	-1996.1	$17,684	C H N	-$36.1m	-957.6	$36,862
$35.4m	C H N	-$36.1m	-957.6	$36,967	C T	-$39.0m	-1996.1	$17,734	C H N	-$36.1m	-957.6	$36,967
$35.5m	C H N	-$36.1m	-957.6	$37,071	C T	-$39.0m	-1996.1	$17,785	C H N	-$36.1m	-957.6	$37,071
$35.6m	C H N	-$36.1m	-957.6	$37,175	C T	-$39.0m	-1996.1	$17,835	C H N	-$36.1m	-957.6	$37,175
$35.7m	C H N	-$36.1m	-957.6	$37,280	C T	-$39.0m	-1996.1	$17,885	C H N	-$36.1m	-957.6	$37,280
$35.8m	C H N	-$36.1m	-957.6	$37,384	C T	-$39.0m	-1996.1	$17,935	C H N	-$36.1m	-957.6	$37,384
$35.9m	C H N	-$36.1m	-957.6	$37,489	C T	-$39.0m	-1996.1	$17,985	C H N	-$36.1m	-957.6	$37,489
$36.0m	C H N	-$36.1m	-957.6	$37,593	C T	-$39.0m	-1996.1	$18,035	C H N	-$36.1m	-957.6	$37,593
$36.1m	C H N	-$36.1m	-957.6	$37,698	C T	-$39.0m	-1996.1	$18,085	C H N	-$36.1m	-957.6	$37,698

Budget impact	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$36.2m	C O	-$38.5m	-1231.9	$29,386	C T	-$39.0m	-1996.1	$18,135	R	-$50.0m	-1226.8	$29,509
$36.3m	C O	-$38.5m	-1231.9	$29,467	C T	-$39.0m	-1996.1	$18,185	R	-$50.0m	-1226.8	$29,590
$36.4m	C O	-$38.5m	-1231.9	$29,548	C T	-$39.0m	-1996.1	$18,235	R	-$50.0m	-1226.8	$29,672
$36.5m	C O	-$38.5m	-1231.9	$29,630	C T	-$39.0m	-1996.1	$18,286	R	-$50.0m	-1226.8	$29,753
$36.6m	C O	-$38.5m	-1231.9	$29,711	C T	-$39.0m	-1996.1	$18,336	R	-$50.0m	-1226.8	$29,835
$36.7m	C O	-$38.5m	-1231.9	$29,792	C T	-$39.0m	-1996.1	$18,386	R	-$50.0m	-1226.8	$29,916
$36.8m	C O	-$38.5m	-1231.9	$29,873	C T	-$39.0m	-1996.1	$18,436	R	-$50.0m	-1226.8	$29,998
$36.9m	C O	-$38.5m	-1231.9	$29,954	C T	-$39.0m	-1996.1	$18,486	R	-$50.0m	-1226.8	$30,079
$37.0m	C O	-$38.5m	-1231.9	$30,035	C T	-$39.0m	-1996.1	$18,536	R	-$50.0m	-1226.8	$30,161
$37.1m	C O	-$38.5m	-1231.9	$30,117	C T	-$39.0m	-1996.1	$18,586	R	-$50.0m	-1226.8	$30,242
$37.2m	C O	-$38.5m	-1231.9	$30,198	C T	-$39.0m	-1996.1	$18,636	R	-$50.0m	-1226.8	$30,324
$37.3m	C O	-$38.5m	-1231.9	$30,279	C T	-$39.0m	-1996.1	$18,686	R	-$50.0m	-1226.8	$30,406
$37.4m	C O	-$38.5m	-1231.9	$30,360	C T	-$39.0m	-1996.1	$18,736	R	-$50.0m	-1226.8	$30,487
$37.5m	C O	-$38.5m	-1231.9	$30,441	C T	-$39.0m	-1996.1	$18,786	R	-$50.0m	-1226.8	$30,569
$37.6m	C O	-$38.5m	-1231.9	$30,523	C T	-$39.0m	-1996.1	$18,837	R	-$50.0m	-1226.8	$30,650
$37.7m	C O	-$38.5m	-1231.9	$30,604	C T	-$39.0m	-1996.1	$18,887	R	-$50.0m	-1226.8	$30,732
$37.8m	C O	-$38.5m	-1231.9	$30,685	C T	-$39.0m	-1996.1	$18,937	R	-$50.0m	-1226.8	$30,813
$37.9m	C O	-$38.5m	-1231.9	$30,766	C T	-$39.0m	-1996.1	$18,987	R	-$50.0m	-1226.8	$30,895
$38.0m	C O	-$38.5m	-1231.9	$30,847	C T	-$39.0m	-1996.1	$19,037	R	-$50.0m	-1226.8	$30,976
$38.1m	C O	-$38.5m	-1231.9	$30,928	C T	-$39.0m	-1996.1	$19,087	R	-$50.0m	-1226.8	$31,058
$38.2m	C O	-$38.5m	-1231.9	$31,010	C T	-$39.0m	-1996.1	$19,137	R	-$50.0m	-1226.8	$31,139
$38.3m	C O	-$38.5m	-1231.9	$31,091	C T	-$39.0m	-1996.1	$19,187	R	-$50.0m	-1226.8	$31,221
$38.4m	C O	-$38.5m	-1231.9	$31,172	C T	-$39.0m	-1996.1	$19,237	R	-$50.0m	-1226.8	$31,302
$38.5m	C O	-$38.5m	-1231.9	$31,253	C T	-$39.0m	-1996.1	$19,287	R	-$50.0m	-1226.8	$31,384
$38.6m	C N O	-$42.6m	-1298.6	$29,725	C T	-$39.0m	-1996.1	$19,338	R	-$50.0m	-1226.8	$31,465
$38.7m	C N O	-$42.6m	-1298.6	$29,802	C T	-$39.0m	-1996.1	$19,388	R	-$50.0m	-1226.8	$31,547
$38.8m	C N O	-$42.6m	-1298.6	$29,879	C T	-$39.0m	-1996.1	$19,438	R	-$50.0m	-1226.8	$31,628
$38.9m	C N O	-$42.6m	-1298.6	$29,956	C T	-$39.0m	-1996.1	$19,488	R	-$50.0m	-1226.8	$31,710
$39.0m	C N O	-$42.6m	-1298.6	$30,033	C T	-$39.0m	-1996.1	$19,538	R	-$50.0m	-1226.8	$31,791
$39.1m	C N O	-$42.6m	-1298.6	$30,110	I T	-$41.9m	-2569.9	$15,215	R	-$50.0m	-1226.8	$31,873
$39.2m	C N O	-$42.6m	-1298.6	$30,187	I T	-$41.9m	-2569.9	$15,254	R	-$50.0m	-1226.8	$31,954
$39.3m	C N O	-$42.6m	-1298.6	$30,264	I T	-$41.9m	-2569.9	$15,293	R	-$50.0m	-1226.8	$32,036
$39.4m	C N O	-$42.6m	-1298.6	$30,341	I T	-$41.9m	-2569.9	$15,332	R	-$50.0m	-1226.8	$32,117
$39.5m	C N O	-$42.6m	-1298.6	$30,418	I T	-$41.9m	-2569.9	$15,371	R	-$50.0m	-1226.8	$32,199
$39.6m	C N O	-$42.6m	-1298.6	$30,495	I T	-$41.9m	-2569.9	$15,409	R	-$50.0m	-1226.8	$32,280
$39.7m	C N O	-$42.6m	-1298.6	$30,572	I T	-$41.9m	-2569.9	$15,448	R	-$50.0m	-1226.8	$32,362
$39.8m	C N O	-$42.6m	-1298.6	$30,649	I T	-$41.9m	-2569.9	$15,487	R	-$50.0m	-1226.8	$32,443
$39.9m	C N O	-$42.6m	-1298.6	$30,726	I T	-$41.9m	-2569.9	$15,526	R	-$50.0m	-1226.8	$32,525
$40.0m	C N O	-$42.6m	-1298.6	$30,803	I T	-$41.9m	-2569.9	$15,565	R	-$50.0m	-1226.8	$32,606
$40.1m	C N O	-$42.6m	-1298.6	$30,880	I T	-$41.9m	-2569.9	$15,604	R	-$50.0m	-1226.8	$32,688
$40.2m	C N O	-$42.6m	-1298.6	$30,957	I T	-$41.9m	-2569.9	$15,643	R	-$50.0m	-1226.8	$32,769
$40.3m	C N O	-$42.6m	-1298.6	$31,034	I T	-$41.9m	-2569.9	$15,682	R	-$50.0m	-1226.8	$32,851
$40.4m	C N O	-$42.6m	-1298.6	$31,111	I T	-$41.9m	-2569.9	$15,721	R	-$50.0m	-1226.8	$32,933
$40.5m	C N O	-$42.6m	-1298.6	$31,188	I T	-$41.9m	-2569.9	$15,760	R	-$50.0m	-1226.8	$33,014
$40.6m	C N O	-$42.6m	-1298.6	$31,265	I T	-$41.9m	-2569.9	$15,799	R	-$50.0m	-1226.8	$33,096
$40.7m	C N O	-$42.6m	-1298.6	$31,342	I T	-$41.9m	-2569.9	$15,837	R	-$50.0m	-1226.8	$33,177
$40.8m	C N O	-$42.6m	-1298.6	$31,419	I T	-$41.9m	-2569.9	$15,876	R	-$50.0m	-1226.8	$33,259
$40.9m	C N O	-$42.6m	-1298.6	$31,496	I T	-$41.9m	-2569.9	$15,915	R	-$50.0m	-1226.8	$33,340
$41.0m	C N O	-$42.6m	-1298.6	$31,573	I T	-$41.9m	-2569.9	$15,954	R	-$50.0m	-1226.8	$33,422
$41.1m	C N O	-$42.6m	-1298.6	$31,650	I T	-$41.9m	-2569.9	$15,993	R	-$50.0m	-1226.8	$33,503
$41.2m	C N O	-$42.6m	-1298.6	$31,727	I T	-$41.9m	-2569.9	$16,032	R	-$50.0m	-1226.8	$33,585
$41.3m	C N O	-$42.6m	-1298.6	$31,804	I T	-$41.9m	-2569.9	$16,071	R	-$50.0m	-1226.8	$33,666

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$41.4m	C N O	-$42.6m	-1298.6	$31,881	I T	-$41.9m	-2569.9	$16,110	R	-$50.0m	-1226.8	$33,748
$41.5m	C N O	-$42.6m	-1298.6	$31,958	I T	-$41.9m	-2569.9	$16,149	R	-$50.0m	-1226.8	$33,829
$41.6m	C N O	-$42.6m	-1298.6	$32,035	I T	-$41.9m	-2569.9	$16,188	R	-$50.0m	-1226.8	$33,911
$41.7m	C N O	-$42.6m	-1298.6	$32,112	I T	-$41.9m	-2569.9	$16,227	R	-$50.0m	-1226.8	$33,992
$41.8m	C N O	-$42.6m	-1298.6	$32,189	I T	-$41.9m	-2569.9	$16,266	R	-$50.0m	-1226.8	$34,074
$41.9m	C N O	-$42.6m	-1298.6	$32,266	I T	-$41.9m	-2569.9	$16,304	R	-$50.0m	-1226.8	$34,155
$42.0m	C N O	-$42.6m	-1298.6	$32,343	C I T	-$55.6m	-2914.1	$14,413	R	-$50.0m	-1226.8	$34,237
$42.1m	C N O	-$42.6m	-1298.6	$32,420	C I T	-$55.6m	-2914.1	$14,447	R	-$50.0m	-1226.8	$34,318
$42.2m	C N O	-$42.6m	-1298.6	$32,497	C I T	-$55.6m	-2914.1	$14,482	R	-$50.0m	-1226.8	$34,400
$42.3m	C N O	-$42.6m	-1298.6	$32,574	C I T	-$55.6m	-2914.1	$14,516	R	-$50.0m	-1226.8	$34,481
$42.4m	C N O	-$42.6m	-1298.6	$32,651	C I T	-$55.6m	-2914.1	$14,550	R	-$50.0m	-1226.8	$34,563
$42.5m	C N O	-$42.6m	-1298.6	$32,728	C I T	-$55.6m	-2914.1	$14,584	R	-$50.0m	-1226.8	$34,644
$42.6m	C N O	-$42.6m	-1298.6	$32,805	C I T	-$55.6m	-2914.1	$14,619	R	-$50.0m	-1226.8	$34,726
$42.7m	H O	-$43.1m	-1434.4	$29,769	C I T	-$55.6m	-2914.1	$14,653	R	-$50.0m	-1226.8	$34,807
$42.8m	H O	-$43.1m	-1434.4	$29,838	C I T	-$55.6m	-2914.1	$14,687	R	-$50.0m	-1226.8	$34,889
$42.9m	H O	-$43.1m	-1434.4	$29,908	C I T	-$55.6m	-2914.1	$14,722	R	-$50.0m	-1226.8	$34,970
$43.0m	H O	-$43.1m	-1434.4	$29,978	C I T	-$55.6m	-2914.1	$14,756	R	-$50.0m	-1226.8	$35,052
$43.1m	H O	-$43.1m	-1434.4	$30,047	C I T	-$55.6m	-2914.1	$14,790	R	-$50.0m	-1226.8	$35,133
$43.2m	H N O	-$47.2m	-1501.1	$28,779	C I T	-$55.6m	-2914.1	$14,825	R	-$50.0m	-1226.8	$35,215
$43.3m	H N O	-$47.2m	-1501.1	$28,846	C I T	-$55.6m	-2914.1	$14,859	R	-$50.0m	-1226.8	$35,296
$43.4m	H N O	-$47.2m	-1501.1	$28,912	C I T	-$55.6m	-2914.1	$14,893	R	-$50.0m	-1226.8	$35,378
$43.5m	H N O	-$47.2m	-1501.1	$28,979	C I T	-$55.6m	-2914.1	$14,928	R	-$50.0m	-1226.8	$35,460
$43.6m	H N O	-$47.2m	-1501.1	$29,046	C I T	-$55.6m	-2914.1	$14,962	R	-$50.0m	-1226.8	$35,541
$43.7m	H N O	-$47.2m	-1501.1	$29,112	C I T	-$55.6m	-2914.1	$14,996	R	-$50.0m	-1226.8	$35,623
$43.8m	H N O	-$47.2m	-1501.1	$29,179	C I T	-$55.6m	-2914.1	$15,031	R	-$50.0m	-1226.8	$35,704
$43.9m	H N O	-$47.2m	-1501.1	$29,245	C I T	-$55.6m	-2914.1	$15,065	R	-$50.0m	-1226.8	$35,786
$44.0m	H N O	-$47.2m	-1501.1	$29,312	C I T	-$55.6m	-2914.1	$15,099	R	-$50.0m	-1226.8	$35,867
$44.1m	H N O	-$47.2m	-1501.1	$29,379	C I T	-$55.6m	-2914.1	$15,134	R	-$50.0m	-1226.8	$35,949
$44.2m	H N O	-$47.2m	-1501.1	$29,445	C I T	-$55.6m	-2914.1	$15,168	R	-$50.0m	-1226.8	$36,030
$44.3m	H N O	-$47.2m	-1501.1	$29,512	C I T	-$55.6m	-2914.1	$15,202	R	-$50.0m	-1226.8	$36,112
$44.4m	H N O	-$47.2m	-1501.1	$29,579	C I T	-$55.6m	-2914.1	$15,236	R	-$50.0m	-1226.8	$36,193
$44.5m	H N O	-$47.2m	-1501.1	$29,645	C I T	-$55.6m	-2914.1	$15,271	R	-$50.0m	-1226.8	$36,275
$44.6m	H N O	-$47.2m	-1501.1	$29,712	C I T	-$55.6m	-2914.1	$15,305	R	-$50.0m	-1226.8	$36,356
$44.7m	H N O	-$47.2m	-1501.1	$29,778	C I T	-$55.6m	-2914.1	$15,339	R	-$50.0m	-1226.8	$36,438
$44.8m	H N O	-$47.2m	-1501.1	$29,845	C I T	-$55.6m	-2914.1	$15,374	R	-$50.0m	-1226.8	$36,519
$44.9m	H N O	-$47.2m	-1501.1	$29,912	C I T	-$55.6m	-2914.1	$15,408	R	-$50.0m	-1226.8	$36,601
$45.0m	H N O	-$47.2m	-1501.1	$29,978	C I T	-$55.6m	-2914.1	$15,442	R	-$50.0m	-1226.8	$36,682
$45.1m	H N O	-$47.2m	-1501.1	$30,045	C I T	-$55.6m	-2914.1	$15,477	R	-$50.0m	-1226.8	$36,764
$45.2m	H N O	-$47.2m	-1501.1	$30,112	C I T	-$55.6m	-2914.1	$15,511	R	-$50.0m	-1226.8	$36,845
$45.3m	H N O	-$47.2m	-1501.1	$30,178	C I T	-$55.6m	-2914.1	$15,545	R	-$50.0m	-1226.8	$36,927
$45.4m	H N O	-$47.2m	-1501.1	$30,245	C I T	-$55.6m	-2914.1	$15,580	R	-$50.0m	-1226.8	$37,008
$45.5m	H N O	-$47.2m	-1501.1	$30,311	C I T	-$55.6m	-2914.1	$15,614	R	-$50.0m	-1226.8	$37,090
$45.6m	H N O	-$47.2m	-1501.1	$30,378	C I T	-$55.6m	-2914.1	$15,648	R	-$50.0m	-1226.8	$37,171
$45.7m	H N O	-$47.2m	-1501.1	$30,445	C I T	-$55.6m	-2914.1	$15,683	R	-$50.0m	-1226.8	$37,253
$45.8m	H N O	-$47.2m	-1501.1	$30,511	C I T	-$55.6m	-2914.1	$15,717	R	-$50.0m	-1226.8	$37,334
$45.9m	H N O	-$47.2m	-1501.1	$30,578	C I T	-$55.6m	-2914.1	$15,751	R	-$50.0m	-1226.8	$37,416
$46.0m	H N O	-$47.2m	-1501.1	$30,644	C I T	-$55.6m	-2914.1	$15,786	R	-$50.0m	-1226.8	$37,497
$46.1m	H N O	-$47.2m	-1501.1	$30,711	C I T	-$55.6m	-2914.1	$15,820	R	-$50.0m	-1226.8	$37,579
$46.2m	H N O	-$47.2m	-1501.1	$30,778	C I T	-$55.6m	-2914.1	$15,854	R	-$50.0m	-1226.8	$37,660
$46.3m	H N O	-$47.2m	-1501.1	$30,844	C I T	-$55.6m	-2914.1	$15,888	R	-$50.0m	-1226.8	$37,742
$46.4m	H N O	-$47.2m	-1501.1	$30,911	C I T	-$55.6m	-2914.1	$15,923	R	-$50.0m	-1226.8	$37,823
$46.5m	H N O	-$47.2m	-1501.1	$30,978	C I T	-$55.6m	-2914.1	$15,957	R	-$50.0m	-1226.8	$37,905

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{+} [d]
$46.6m	H N O	-$47.2m	-1501.1	$31,044	C I T	-$55.6m	-2914.1	$15,991	R	-$50.0m	-1226.8	$37,987
$46.7m	H N O	-$47.2m	-1501.1	$31,111	C I T	-$55.6m	-2914.1	$16,026	R	-$50.0m	-1226.8	$38,068
$46.8m	H N O	-$47.2m	-1501.1	$31,177	C I T	-$55.6m	-2914.1	$16,060	R	-$50.0m	-1226.8	$38,150
$46.9m	H N O	-$47.2m	-1501.1	$31,244	C I T	-$55.6m	-2914.1	$16,094	R	-$50.0m	-1226.8	$38,231
$47.0m	H N O	-$47.2m	-1501.1	$31,311	C I T	-$55.6m	-2914.1	$16,129	R	-$50.0m	-1226.8	$38,313
$47.1m	H N O	-$47.2m	-1501.1	$31,377	C I T	-$55.6m	-2914.1	$16,163	R	-$50.0m	-1226.8	$38,394
$47.2m	H N O	-$47.2m	-1501.1	$31,444	C I T	-$55.6m	-2914.1	$16,197	R	-$50.0m	-1226.8	$38,476
$47.3m	C H O	-$56.8m	-1778.6	$26,594	C I T	-$55.6m	-2914.1	$16,232	R	-$50.0m	-1226.8	$38,557
$47.4m	C H O	-$56.8m	-1778.6	$26,650	C I T	-$55.6m	-2914.1	$16,266	R	-$50.0m	-1226.8	$38,639
$47.5m	C H O	-$56.8m	-1778.6	$26,706	C I T	-$55.6m	-2914.1	$16,300	R	-$50.0m	-1226.8	$38,720
$47.6m	C H O	-$56.8m	-1778.6	$26,763	C I T	-$55.6m	-2914.1	$16,335	R	-$50.0m	-1226.8	$38,802
$47.7m	C H O	-$56.8m	-1778.6	$26,819	C I T	-$55.6m	-2914.1	$16,369	R	-$50.0m	-1226.8	$38,883
$47.8m	C H O	-$56.8m	-1778.6	$26,875	C I T	-$55.6m	-2914.1	$16,403	R	-$50.0m	-1226.8	$38,965
$47.9m	C H O	-$56.8m	-1778.6	$26,931	C I T	-$55.6m	-2914.1	$16,438	R	-$50.0m	-1226.8	$39,046
$48.0m	C H O	-$56.8m	-1778.6	$26,987	C I T	-$55.6m	-2914.1	$16,472	R	-$50.0m	-1226.8	$39,128
$48.1m	C H O	-$56.8m	-1778.6	$27,044	C I T	-$55.6m	-2914.1	$16,506	R	-$50.0m	-1226.8	$39,209
$48.2m	C H O	-$56.8m	-1778.6	$27,100	C I T	-$55.6m	-2914.1	$16,541	R	-$50.0m	-1226.8	$39,291
$48.3m	C H O	-$56.8m	-1778.6	$27,156	C I T	-$55.6m	-2914.1	$16,575	R	-$50.0m	-1226.8	$39,372
$48.4m	C H O	-$56.8m	-1778.6	$27,212	C I T	-$55.6m	-2914.1	$16,609	R	-$50.0m	-1226.8	$39,454
$48.5m	C H O	-$56.8m	-1778.6	$27,269	C I T	-$55.6m	-2914.1	$16,643	R	-$50.0m	-1226.8	$39,535
$48.6m	C H O	-$56.8m	-1778.6	$27,325	C I T	-$55.6m	-2914.1	$16,678	R	-$50.0m	-1226.8	$39,617
$48.7m	C H O	-$56.8m	-1778.6	$27,381	C I T	-$55.6m	-2914.1	$16,712	R	-$50.0m	-1226.8	$39,698
$48.8m	C H O	-$56.8m	-1778.6	$27,437	C I T	-$55.6m	-2914.1	$16,746	R	-$50.0m	-1226.8	$39,780
$48.9m	C H O	-$56.8m	-1778.6	$27,493	C I T	-$55.6m	-2914.1	$16,781	R	-$50.0m	-1226.8	$39,861
$49.0m	C H O	-$56.8m	-1778.6	$27,550	C I T	-$55.6m	-2914.1	$16,815	R	-$50.0m	-1226.8	$39,943
$49.1m	C H O	-$56.8m	-1778.6	$27,606	C I T	-$55.6m	-2914.1	$16,849	R	-$50.0m	-1226.8	$40,024
$49.2m	C H O	-$56.8m	-1778.6	$27,662	C I T	-$55.6m	-2914.1	$16,884	R	-$50.0m	-1226.8	$40,106
$49.3m	C H O	-$56.8m	-1778.6	$27,718	C I T	-$55.6m	-2914.1	$16,918	R	-$50.0m	-1226.8	$40,187
$49.4m	C H O	-$56.8m	-1778.6	$27,775	C I T	-$55.6m	-2914.1	$16,952	R	-$50.0m	-1226.8	$40,269
$49.5m	C H O	-$56.8m	-1778.6	$27,831	C I T	-$55.6m	-2914.1	$16,987	R	-$50.0m	-1226.8	$40,350
$49.6m	C H O	-$56.8m	-1778.6	$27,887	C I T	-$55.6m	-2914.1	$17,021	R	-$50.0m	-1226.8	$40,432
$49.7m	C H O	-$56.8m	-1778.6	$27,943	C I T	-$55.6m	-2914.1	$17,055	R	-$50.0m	-1226.8	$40,514
$49.8m	C H O	-$56.8m	-1778.6	$28,000	C I T	-$55.6m	-2914.1	$17,090	R	-$50.0m	-1226.8	$40,595
$49.9m	C H O	-$56.8m	-1778.6	$28,056	C I T	-$55.6m	-2914.1	$17,124	R	-$50.0m	-1226.8	$40,677
$50.0m	C H O	-$56.8m	-1778.6	$28,112	C I T	-$55.6m	-2914.1	$17,158	R	-$50.0m	-1226.8	$40,758

[a] Technologies displaced; [b] Total change in incremental expenditure across all displaced technologies; [c] Total change in incremental benefit (QALYs) resulting from displacement of technologies; [d] Optimal cost-effectiveness threshold (per QALY) for net investments.

Table A1.1.6: Reallocation following net disinvestment (non-divisibility)

Budget impact	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$0.1m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.2m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.3m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.4m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.5m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.6m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.7m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.8m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$0.9m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.0m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.1m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.2m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.3m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.4m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.5m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.6m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.7m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.8m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$1.9m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.0m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.1m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.2m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.3m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.4m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.5m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.6m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.7m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.8m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$2.9m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.0m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.1m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.2m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.3m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.4m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.5m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.6m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.7m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.8m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$3.9m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$4.0m	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A	N/A	$0.0m	0.0	N/A
$4.1m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$61,479	N/A	$0.0m	0.0	N/A
$4.2m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$62,978	N/A	$0.0m	0.0	N/A
$4.3m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$64,478	N/A	$0.0m	0.0	N/A
$4.4m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$65,977	N/A	$0.0m	0.0	N/A
$4.5m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$67,477	N/A	$0.0m	0.0	N/A
$4.6m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$68,976	N/A	$0.0m	0.0	N/A
$4.7m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$70,476	N/A	$0.0m	0.0	N/A
$4.8m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$71,975	N/A	$0.0m	0.0	N/A
$4.9m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$73,475	N/A	$0.0m	0.0	N/A

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$5.0m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$74,974	N/A	$0.0m	0.0	N/A
$5.1m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$76,474	N/A	$0.0m	0.0	N/A
$5.2m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$77,973	N/A	$0.0m	0.0	N/A
$5.3m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$79,473	N/A	$0.0m	0.0	N/A
$5.4m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$80,972	N/A	$0.0m	0.0	N/A
$5.5m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$82,472	N/A	$0.0m	0.0	N/A
$5.6m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$83,971	N/A	$0.0m	0.0	N/A
$5.7m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$85,470	N/A	$0.0m	0.0	N/A
$5.8m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$86,970	N/A	$0.0m	0.0	N/A
$5.9m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$88,469	N/A	$0.0m	0.0	N/A
$6.0m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$89,969	N/A	$0.0m	0.0	N/A
$6.1m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$91,468	N/A	$0.0m	0.0	N/A
$6.2m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$92,968	N/A	$0.0m	0.0	N/A
$6.3m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$94,467	N/A	$0.0m	0.0	N/A
$6.4m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$95,967	N/A	$0.0m	0.0	N/A
$6.5m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$97,466	N/A	$0.0m	0.0	N/A
$6.6m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$98,966	N/A	$0.0m	0.0	N/A
$6.7m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$100,465	N/A	$0.0m	0.0	N/A
$6.8m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$101,965	N/A	$0.0m	0.0	N/A
$6.9m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$103,464	N/A	$0.0m	0.0	N/A
$7.0m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$104,964	N/A	$0.0m	0.0	N/A
$7.1m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$106,463	N/A	$0.0m	0.0	N/A
$7.2m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$107,963	N/A	$0.0m	0.0	N/A
$7.3m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$109,462	N/A	$0.0m	0.0	N/A
$7.4m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$110,962	N/A	$0.0m	0.0	N/A
$7.5m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$112,461	N/A	$0.0m	0.0	N/A
$7.6m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$113,961	N/A	$0.0m	0.0	N/A
$7.7m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$115,460	N/A	$0.0m	0.0	N/A
$7.8m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$116,960	N/A	$0.0m	0.0	N/A
$7.9m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$118,459	N/A	$0.0m	0.0	N/A
$8.0m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$119,959	N/A	$0.0m	0.0	N/A
$8.1m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$121,458	N/A	$0.0m	0.0	N/A
$8.2m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$122,958	N/A	$0.0m	0.0	N/A
$8.3m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$124,457	N/A	$0.0m	0.0	N/A
$8.4m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$125,957	N/A	$0.0m	0.0	N/A
$8.5m	N/A	$0.0m	0.0	N/A	N	$4.1m	66.7	$127,456	N/A	$0.0m	0.0	N/A
$8.6m	L	$8.6m	42.9	$200,521	N	$4.1m	66.7	$128,955	L	$8.6m	42.9	$200,521
$8.7m	L	$8.6m	42.9	$202,853	N	$4.1m	66.7	$130,455	L	$8.6m	42.9	$202,853
$8.8m	L	$8.6m	42.9	$205,184	N	$4.1m	66.7	$131,954	L	$8.6m	42.9	$205,184
$8.9m	L	$8.6m	42.9	$207,516	N	$4.1m	66.7	$133,454	L	$8.6m	42.9	$207,516
$9.0m	L	$8.6m	42.9	$209,848	N	$4.1m	66.7	$134,953	L	$8.6m	42.9	$209,848
$9.1m	L	$8.6m	42.9	$212,179	N	$4.1m	66.7	$136,453	L	$8.6m	42.9	$212,179
$9.2m	L	$8.6m	42.9	$214,511	N	$4.1m	66.7	$137,952	L	$8.6m	42.9	$214,511
$9.3m	L	$8.6m	42.9	$216,843	N	$4.1m	66.7	$139,452	L	$8.6m	42.9	$216,843
$9.4m	L	$8.6m	42.9	$219,174	N	$4.1m	66.7	$140,951	L	$8.6m	42.9	$219,174
$9.5m	L	$8.6m	42.9	$221,506	N	$4.1m	66.7	$142,451	L	$8.6m	42.9	$221,506
$9.6m	L	$8.6m	42.9	$223,838	N	$4.1m	66.7	$143,950	L	$8.6m	42.9	$223,838
$9.7m	L	$8.6m	42.9	$226,169	N	$4.1m	66.7	$145,450	L	$8.6m	42.9	$226,169
$9.8m	L	$8.6m	42.9	$228,501	N	$4.1m	66.7	$146,949	L	$8.6m	42.9	$228,501
$9.9m	L	$8.6m	42.9	$230,832	N	$4.1m	66.7	$148,449	L	$8.6m	42.9	$230,832
$10.0m	L	$8.6m	42.9	$233,164	N	$4.1m	66.7	$149,948	L	$8.6m	42.9	$233,164
$10.1m	L	$8.6m	42.9	$235,496	N	$4.1m	66.7	$151,448	L	$8.6m	42.9	$235,496

Budget impact	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$10.2m	L	$8.6m	42.9	$237,827	N	$4.1m	66.7	$152,947	L	$8.6m	42.9	$237,827
$10.3m	L	$8.6m	42.9	$240,159	N	$4.1m	66.7	$154,447	L	$8.6m	42.9	$240,159
$10.4m	L	$8.6m	42.9	$242,491	N	$4.1m	66.7	$155,946	L	$8.6m	42.9	$242,491
$10.5m	L	$8.6m	42.9	$244,822	N	$4.1m	66.7	$157,446	L	$8.6m	42.9	$244,822
$10.6m	L	$8.6m	42.9	$247,154	N	$4.1m	66.7	$158,945	L	$8.6m	42.9	$247,154
$10.7m	L	$8.6m	42.9	$249,486	N	$4.1m	66.7	$160,445	L	$8.6m	42.9	$249,486
$10.8m	L	$8.6m	42.9	$251,817	N	$4.1m	66.7	$161,944	L	$8.6m	42.9	$251,817
$10.9m	L	$8.6m	42.9	$254,149	N	$4.1m	66.7	$163,444	L	$8.6m	42.9	$254,149
$11.0m	L	$8.6m	42.9	$256,481	N	$4.1m	66.7	$164,943	L	$8.6m	42.9	$256,481
$11.1m	L	$8.6m	42.9	$258,812	N	$4.1m	66.7	$166,443	L	$8.6m	42.9	$258,812
$11.2m	L	$8.6m	42.9	$261,144	N	$4.1m	66.7	$167,942	L	$8.6m	42.9	$261,144
$11.3m	L	$8.6m	42.9	$263,475	N	$4.1m	66.7	$169,441	L	$8.6m	42.9	$263,475
$11.4m	L	$8.6m	42.9	$265,807	N	$4.1m	66.7	$170,941	L	$8.6m	42.9	$265,807
$11.5m	L	$8.6m	42.9	$268,139	N	$4.1m	66.7	$172,440	L	$8.6m	42.9	$268,139
$11.6m	L	$8.6m	42.9	$270,470	N	$4.1m	66.7	$173,940	L	$8.6m	42.9	$270,470
$11.7m	L	$8.6m	42.9	$272,802	N	$4.1m	66.7	$175,439	L	$8.6m	42.9	$272,802
$11.8m	L	$8.6m	42.9	$275,134	N	$4.1m	66.7	$176,939	L	$8.6m	42.9	$275,134
$11.9m	L	$8.6m	42.9	$277,465	N	$4.1m	66.7	$178,438	L	$8.6m	42.9	$277,465
$12.0m	L	$8.6m	42.9	$279,797	N	$4.1m	66.7	$179,938	L	$8.6m	42.9	$279,797
$12.1m	L	$8.6m	42.9	$282,129	N	$4.1m	66.7	$181,437	L	$8.6m	42.9	$282,129
$12.2m	L	$8.6m	42.9	$284,460	N	$4.1m	66.7	$182,937	L	$8.6m	42.9	$284,460
$12.3m	L	$8.6m	42.9	$286,792	N	$4.1m	66.7	$184,436	L	$8.6m	42.9	$286,792
$12.4m	L	$8.6m	42.9	$289,123	N	$4.1m	66.7	$185,936	L	$8.6m	42.9	$289,123
$12.5m	L	$8.6m	42.9	$291,455	N	$4.1m	66.7	$187,435	L	$8.6m	42.9	$291,455
$12.6m	L	$8.6m	42.9	$293,787	N	$4.1m	66.7	$188,935	L	$8.6m	42.9	$293,787
$12.7m	L	$8.6m	42.9	$296,118	N	$4.1m	66.7	$190,434	L	$8.6m	42.9	$296,118
$12.8m	L	$8.6m	42.9	$298,450	N	$4.1m	66.7	$191,934	L	$8.6m	42.9	$298,450
$12.9m	L	$8.6m	42.9	$300,782	N	$4.1m	66.7	$193,433	L	$8.6m	42.9	$300,782
$13.0m	L	$8.6m	42.9	$303,113	N	$4.1m	66.7	$194,933	L	$8.6m	42.9	$303,113
$13.1m	L	$8.6m	42.9	$305,445	N	$4.1m	66.7	$196,432	L	$8.6m	42.9	$305,445
$13.2m	L	$8.6m	42.9	$307,777	N	$4.1m	66.7	$197,932	L	$8.6m	42.9	$307,777
$13.3m	L	$8.6m	42.9	$310,108	N	$4.1m	66.7	$199,431	L	$8.6m	42.9	$310,108
$13.4m	L	$8.6m	42.9	$312,440	N	$4.1m	66.7	$200,931	L	$8.6m	42.9	$312,440
$13.5m	L	$8.6m	42.9	$314,772	N	$4.1m	66.7	$202,430	L	$8.6m	42.9	$314,772
$13.6m	L	$8.6m	42.9	$317,103	N	$4.1m	66.7	$203,930	L	$8.6m	42.9	$317,103
$13.7m	L	$8.6m	42.9	$319,435	N	$4.1m	66.7	$205,429	L	$8.6m	42.9	$319,435
$13.8m	L	$8.6m	42.9	$321,766	N	$4.1m	66.7	$206,929	L	$8.6m	42.9	$321,766
$13.9m	L	$8.6m	42.9	$324,098	N	$4.1m	66.7	$208,428	L	$8.6m	42.9	$324,098
$14.0m	L	$8.6m	42.9	$326,430	N	$4.1m	66.7	$209,928	L	$8.6m	42.9	$326,430
$14.1m	L	$8.6m	42.9	$328,761	N	$4.1m	66.7	$211,427	L	$8.6m	42.9	$328,761
$14.2m	L	$8.6m	42.9	$331,093	N	$4.1m	66.7	$212,926	L	$8.6m	42.9	$331,093
$14.3m	L	$8.6m	42.9	$333,425	N	$4.1m	66.7	$214,426	L	$8.6m	42.9	$333,425
$14.4m	L	$8.6m	42.9	$335,756	N	$4.1m	66.7	$215,925	L	$8.6m	42.9	$335,756
$14.5m	L	$8.6m	42.9	$338,088	N	$4.1m	66.7	$217,425	L	$8.6m	42.9	$338,088
$14.6m	L	$8.6m	42.9	$340,420	N	$4.1m	66.7	$218,924	L	$8.6m	42.9	$340,420
$14.7m	L	$8.6m	42.9	$342,751	N	$4.1m	66.7	$220,424	L	$8.6m	42.9	$342,751
$14.8m	L	$8.6m	42.9	$345,083	N	$4.1m	66.7	$221,923	L	$8.6m	42.9	$345,083
$14.9m	L	$8.6m	42.9	$347,415	N	$4.1m	66.7	$223,423	L	$8.6m	42.9	$347,415
$15.0m	L	$8.6m	42.9	$349,746	N	$4.1m	66.7	$224,922	L	$8.6m	42.9	$349,746
$15.1m	L	$8.6m	42.9	$352,078	N	$4.1m	66.7	$226,422	L	$8.6m	42.9	$352,078
$15.2m	L	$8.6m	42.9	$354,409	N	$4.1m	66.7	$227,921	L	$8.6m	42.9	$354,409
$15.3m	L	$8.6m	42.9	$356,741	N	$4.1m	66.7	$229,421	L	$8.6m	42.9	$356,741

Budget impact	***Primary budget ($50m)***				***Lower budget ($0m)***				***Higher budget ($100m)***			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$15.4m	L	$8.6m	42.9	$359,073	N	$4.1m	66.7	$230,920	L	$8.6m	42.9	$359,073
$15.5m	L	$8.6m	42.9	$361,404	N	$4.1m	66.7	$232,420	L	$8.6m	42.9	$361,404
$15.6m	L	$8.6m	42.9	$363,736	N	$4.1m	66.7	$233,919	L	$8.6m	42.9	$363,736
$15.7m	L	$8.6m	42.9	$366,068	N	$4.1m	66.7	$235,419	L	$8.6m	42.9	$366,068
$15.8m	L	$8.6m	42.9	$368,399	N	$4.1m	66.7	$236,918	L	$8.6m	42.9	$368,399
$15.9m	L	$8.6m	42.9	$370,731	N	$4.1m	66.7	$238,418	L	$8.6m	42.9	$370,731
$16.0m	L	$8.6m	42.9	$373,063	N	$4.1m	66.7	$239,917	L	$8.6m	42.9	$373,063
$16.1m	L	$8.6m	42.9	$375,394	N	$4.1m	66.7	$241,417	L	$8.6m	42.9	$375,394
$16.2m	L	$8.6m	42.9	$377,726	N	$4.1m	66.7	$242,916	L	$8.6m	42.9	$377,726
$16.3m	L	$8.6m	42.9	$380,057	N	$4.1m	66.7	$244,416	L	$8.6m	42.9	$380,057
$16.4m	L	$8.6m	42.9	$382,389	N	$4.1m	66.7	$245,915	L	$8.6m	42.9	$382,389
$16.5m	L	$8.6m	42.9	$384,721	N	$4.1m	66.7	$247,415	L	$8.6m	42.9	$384,721
$16.6m	L	$8.6m	42.9	$387,052	N	$4.1m	66.7	$248,914	L	$8.6m	42.9	$387,052
$16.7m	L	$8.6m	42.9	$389,384	N	$4.1m	66.7	$250,414	L	$8.6m	42.9	$389,384
$16.8m	L	$8.6m	42.9	$391,716	N	$4.1m	66.7	$251,913	L	$8.6m	42.9	$391,716
$16.9m	L	$8.6m	42.9	$394,047	N	$4.1m	66.7	$253,412	L	$8.6m	42.9	$394,047
$17.0m	L	$8.6m	42.9	$396,379	N	$4.1m	66.7	$254,912	L	$8.6m	42.9	$396,379
$17.1m	L	$8.6m	42.9	$398,711	N	$4.1m	66.7	$256,411	L	$8.6m	42.9	$398,711
$17.2m	L	$8.6m	42.9	$401,042	N	$4.1m	66.7	$257,911	L	$8.6m	42.9	$401,042
$17.3m	L	$8.6m	42.9	$403,374	N	$4.1m	66.7	$259,410	L	$8.6m	42.9	$403,374
$17.4m	L	$8.6m	42.9	$405,706	N	$4.1m	66.7	$260,910	L	$8.6m	42.9	$405,706
$17.5m	L	$8.6m	42.9	$408,037	N	$4.1m	66.7	$262,409	L	$8.6m	42.9	$408,037
$17.6m	L	$8.6m	42.9	$410,369	N	$4.1m	66.7	$263,909	L	$8.6m	42.9	$410,369
$17.7m	L	$8.6m	42.9	$412,700	N	$4.1m	66.7	$265,408	L	$8.6m	42.9	$412,700
$17.8m	W	$17.8m	105.7	$168,385	W	$17.8m	105.7	$168,385	W	$17.8m	105.7	$168,385
$17.9m	W	$17.8m	105.7	$169,331	W	$17.8m	105.7	$169,331	W	$17.8m	105.7	$169,331
$18.0m	W	$17.8m	105.7	$170,277	W	$17.8m	105.7	$170,277	W	$17.8m	105.7	$170,277
$18.1m	W	$17.8m	105.7	$171,223	W	$17.8m	105.7	$171,223	W	$17.8m	105.7	$171,223
$18.2m	W	$17.8m	105.7	$172,169	W	$17.8m	105.7	$172,169	W	$17.8m	105.7	$172,169
$18.3m	W	$17.8m	105.7	$173,115	H	$18.3m	546.7	$33,472	W	$17.8m	105.7	$173,115
$18.4m	W	$17.8m	105.7	$174,061	H	$18.3m	546.7	$33,655	W	$17.8m	105.7	$174,061
$18.5m	W	$17.8m	105.7	$175,007	H	$18.3m	546.7	$33,838	W	$17.8m	105.7	$175,007
$18.6m	W	$17.8m	105.7	$175,953	H	$18.3m	546.7	$34,021	W	$17.8m	105.7	$175,953
$18.7m	W	$17.8m	105.7	$176,899	H	$18.3m	546.7	$34,204	W	$17.8m	105.7	$176,899
$18.8m	W	$17.8m	105.7	$177,845	H	$18.3m	546.7	$34,386	W	$17.8m	105.7	$177,845
$18.9m	W	$17.8m	105.7	$178,791	H	$18.3m	546.7	$34,569	W	$17.8m	105.7	$178,791
$19.0m	W	$17.8m	105.7	$179,737	H	$18.3m	546.7	$34,752	W	$17.8m	105.7	$179,737
$19.1m	W	$17.8m	105.7	$180,683	H	$18.3m	546.7	$34,935	W	$17.8m	105.7	$180,683
$19.2m	W	$17.8m	105.7	$181,629	H	$18.3m	546.7	$35,118	W	$17.8m	105.7	$181,629
$19.3m	W	$17.8m	105.7	$182,575	H	$18.3m	546.7	$35,301	W	$17.8m	105.7	$182,575
$19.4m	W	$17.8m	105.7	$183,521	H	$18.3m	546.7	$35,484	W	$17.8m	105.7	$183,521
$19.5m	W	$17.8m	105.7	$184,467	H	$18.3m	546.7	$35,667	W	$17.8m	105.7	$184,467
$19.6m	W	$17.8m	105.7	$185,413	H	$18.3m	546.7	$35,850	W	$17.8m	105.7	$185,413
$19.7m	M	$19.7m	397.2	$49,596	H	$18.3m	546.7	$36,033	M	$19.7m	397.2	$49,596
$19.8m	M	$19.7m	397.2	$49,847	H	$18.3m	546.7	$36,216	M	$19.7m	397.2	$49,847
$19.9m	M	$19.7m	397.2	$50,099	H	$18.3m	546.7	$36,398	M	$19.7m	397.2	$50,099
$20.0m	M	$19.7m	397.2	$50,351	H	$18.3m	546.7	$36,581	M	$19.7m	397.2	$50,351
$20.1m	M	$19.7m	397.2	$50,603	H	$18.3m	546.7	$36,764	M	$19.7m	397.2	$50,603
$20.2m	M	$19.7m	397.2	$50,854	H	$18.3m	546.7	$36,947	M	$19.7m	397.2	$50,854
$20.3m	M	$19.7m	397.2	$51,106	H	$18.3m	546.7	$37,130	M	$19.7m	397.2	$51,106
$20.4m	M	$19.7m	397.2	$51,358	H	$18.3m	546.7	$37,313	M	$19.7m	397.2	$51,358
$20.5m	M	$19.7m	397.2	$51,610	H	$18.3m	546.7	$37,496	M	$19.7m	397.2	$51,610

Budget impact	*Primary budget ($50m)*				*Lower budget ($0m)*				*Higher budget ($100m)*			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$20.6m	M	$19.7m	397.2	$51,861	H	$18.3m	546.7	$37,679	M	$19.7m	397.2	$51,861
$20.7m	M	$19.7m	397.2	$52,113	H	$18.3m	546.7	$37,862	M	$19.7m	397.2	$52,113
$20.8m	M	$19.7m	397.2	$52,365	H	$18.3m	546.7	$38,045	M	$19.7m	397.2	$52,365
$20.9m	M	$19.7m	397.2	$52,617	H	$18.3m	546.7	$38,228	M	$19.7m	397.2	$52,617
$21.0m	M	$19.7m	397.2	$52,868	H	$18.3m	546.7	$38,410	M	$19.7m	397.2	$52,868
$21.1m	M	$19.7m	397.2	$53,120	H	$18.3m	546.7	$38,593	M	$19.7m	397.2	$53,120
$21.2m	M	$19.7m	397.2	$53,372	H	$18.3m	546.7	$38,776	M	$19.7m	397.2	$53,372
$21.3m	M	$19.7m	397.2	$53,624	H	$18.3m	546.7	$38,959	M	$19.7m	397.2	$53,624
$21.4m	M	$19.7m	397.2	$53,875	H	$18.3m	546.7	$39,142	M	$19.7m	397.2	$53,875
$21.5m	Q	$21.5m	446.2	$48,185	H	$18.3m	546.7	$39,325	Q	$21.5m	446.2	$48,185
$21.6m	Q	$21.5m	446.2	$48,409	H	$18.3m	546.7	$39,508	Q	$21.5m	446.2	$48,409
$21.7m	Q	$21.5m	446.2	$48,633	H	$18.3m	546.7	$39,691	Q	$21.5m	446.2	$48,633
$21.8m	Q	$21.5m	446.2	$48,858	H	$18.3m	546.7	$39,874	Q	$21.5m	446.2	$48,858
$21.9m	Q	$21.5m	446.2	$49,082	H	$18.3m	546.7	$40,057	Q	$21.5m	446.2	$49,082
$22.0m	Q	$21.5m	446.2	$49,306	H	$18.3m	546.7	$40,240	Q	$21.5m	446.2	$49,306
$22.1m	Q	$21.5m	446.2	$49,530	H	$18.3m	546.7	$40,422	Q	$21.5m	446.2	$49,530
$22.2m	Q	$21.5m	446.2	$49,754	H	$18.3m	546.7	$40,605	Q	$21.5m	446.2	$49,754
$22.3m	Q	$21.5m	446.2	$49,978	H	$18.3m	546.7	$40,788	Q	$21.5m	446.2	$49,978
$22.4m	Q	$21.5m	446.2	$50,202	H N	$22.4m	613.4	$36,517	Q	$21.5m	446.2	$50,202
$22.5m	Q	$21.5m	446.2	$50,426	H N	$22.4m	613.4	$36,680	Q	$21.5m	446.2	$50,426
$22.6m	Q	$21.5m	446.2	$50,651	H N	$22.4m	613.4	$36,843	Q	$21.5m	446.2	$50,651
$22.7m	Q	$21.5m	446.2	$50,875	H N	$22.4m	613.4	$37,006	Q	$21.5m	446.2	$50,875
$22.8m	Q	$21.5m	446.2	$51,099	H N	$22.4m	613.4	$37,169	Q	$21.5m	446.2	$51,099
$22.9m	Q	$21.5m	446.2	$51,323	H N	$22.4m	613.4	$37,332	Q	$21.5m	446.2	$51,323
$23.0m	Q	$21.5m	446.2	$51,547	H N	$22.4m	613.4	$37,495	Q	$21.5m	446.2	$51,547
$23.1m	Q	$21.5m	446.2	$51,771	H N	$22.4m	613.4	$37,658	Q	$21.5m	446.2	$51,771
$23.2m	Q	$21.5m	446.2	$51,995	H N	$22.4m	613.4	$37,821	Q	$21.5m	446.2	$51,995
$23.3m	Q	$21.5m	446.2	$52,219	H N	$22.4m	613.4	$37,984	Q	$21.5m	446.2	$52,219
$23.4m	Q	$21.5m	446.2	$52,443	H N	$22.4m	613.4	$38,147	Q	$21.5m	446.2	$52,443
$23.5m	Q	$21.5m	446.2	$52,668	H N	$22.4m	613.4	$38,310	Q	$21.5m	446.2	$52,668
$23.6m	Q	$21.5m	446.2	$52,892	H N	$22.4m	613.4	$38,473	Q	$21.5m	446.2	$52,892
$23.7m	Q	$21.5m	446.2	$53,116	H N	$22.4m	613.4	$38,636	Q	$21.5m	446.2	$53,116
$23.8m	Q	$21.5m	446.2	$53,340	H N	$22.4m	613.4	$38,799	Q	$21.5m	446.2	$53,340
$23.9m	Q	$21.5m	446.2	$53,564	H N	$22.4m	613.4	$38,962	Q	$21.5m	446.2	$53,564
$24.0m	Q	$21.5m	446.2	$53,788	H N	$22.4m	613.4	$39,125	Q	$21.5m	446.2	$53,788
$24.1m	Q	$21.5m	446.2	$54,012	H N	$22.4m	613.4	$39,288	Q	$21.5m	446.2	$54,012
$24.2m	Q	$21.5m	446.2	$54,236	H N	$22.4m	613.4	$39,451	Q	$21.5m	446.2	$54,236
$24.3m	Q	$21.5m	446.2	$54,460	H N	$22.4m	613.4	$39,614	Q	$21.5m	446.2	$54,460
$24.4m	Q	$21.5m	446.2	$54,685	H N	$22.4m	613.4	$39,777	Q	$21.5m	446.2	$54,685
$24.5m	Q	$21.5m	446.2	$54,909	H N	$22.4m	613.4	$39,940	Q	$21.5m	446.2	$54,909
$24.6m	Q	$21.5m	446.2	$55,133	H N	$22.4m	613.4	$40,103	Q	$21.5m	446.2	$55,133
$24.7m	Q	$21.5m	446.2	$55,357	H N	$22.4m	613.4	$40,266	Q	$21.5m	446.2	$55,357
$24.8m	Q	$21.5m	446.2	$55,581	O	$24.8m	887.7	$27,938	Q	$21.5m	446.2	$55,581
$24.9m	Q	$21.5m	446.2	$55,805	O	$24.8m	887.7	$28,051	Q	$21.5m	446.2	$55,805
$25.0m	Q	$21.5m	446.2	$56,029	O	$24.8m	887.7	$28,164	Q	$21.5m	446.2	$56,029
$25.1m	Q	$21.5m	446.2	$56,253	O	$24.8m	887.7	$28,276	Q	$21.5m	446.2	$56,253
$25.2m	Q	$21.5m	446.2	$56,478	O	$24.8m	887.7	$28,389	Q	$21.5m	446.2	$56,478
$25.3m	Q	$21.5m	446.2	$56,702	O	$24.8m	887.7	$28,502	Q	$21.5m	446.2	$56,702
$25.4m	Q	$21.5m	446.2	$56,926	O	$24.8m	887.7	$28,614	Q	$21.5m	446.2	$56,926
$25.5m	Q	$21.5m	446.2	$57,150	O	$24.8m	887.7	$28,727	Q	$21.5m	446.2	$57,150
$25.6m	Q	$21.5m	446.2	$57,374	O	$24.8m	887.7	$28,839	Q	$21.5m	446.2	$57,374
$25.7m	Q	$21.5m	446.2	$57,598	O	$24.8m	887.7	$28,952	Q	$21.5m	446.2	$57,598

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$25.8m	Q	$21.5m	446.2	$57,822	O	$24.8m	887.7	$29,065	Q	$21.5m	446.2	$57,822
$25.9m	Q	$21.5m	446.2	$58,046	O	$24.8m	887.7	$29,177	Q	$21.5m	446.2	$58,046
$26.0m	Q	$21.5m	446.2	$58,270	O	$24.8m	887.7	$29,290	Q	$21.5m	446.2	$58,270
$26.1m	Q	$21.5m	446.2	$58,495	O	$24.8m	887.7	$29,403	Q	$21.5m	446.2	$58,495
$26.2m	Q	$21.5m	446.2	$58,719	O	$24.8m	887.7	$29,515	Q	$21.5m	446.2	$58,719
$26.3m	Q	$21.5m	446.2	$58,943	O	$24.8m	887.7	$29,628	Q	$21.5m	446.2	$58,943
$26.4m	Q	$21.5m	446.2	$59,167	O	$24.8m	887.7	$29,741	Q	$21.5m	446.2	$59,167
$26.5m	Q	$21.5m	446.2	$59,391	O	$24.8m	887.7	$29,853	Q	$21.5m	446.2	$59,391
$26.6m	Q	$21.5m	446.2	$59,615	O	$24.8m	887.7	$29,966	Q	$21.5m	446.2	$59,615
$26.7m	Q	$21.5m	446.2	$59,839	O	$24.8m	887.7	$30,079	Q	$21.5m	446.2	$59,839
$26.8m	Q	$21.5m	446.2	$60,063	O	$24.8m	887.7	$30,191	Q	$21.5m	446.2	$60,063
$26.9m	Q	$21.5m	446.2	$60,288	O	$24.8m	887.7	$30,304	Q	$21.5m	446.2	$60,288
$27.0m	Q	$21.5m	446.2	$60,512	O	$24.8m	887.7	$30,417	Q	$21.5m	446.2	$60,512
$27.1m	Q	$21.5m	446.2	$60,736	O	$24.8m	887.7	$30,529	Q	$21.5m	446.2	$60,736
$27.2m	Q	$21.5m	446.2	$60,960	O	$24.8m	887.7	$30,642	Q	$21.5m	446.2	$60,960
$27.3m	Q	$21.5m	446.2	$61,184	O	$24.8m	887.7	$30,755	Q	$21.5m	446.2	$61,184
$27.4m	Q	$21.5m	446.2	$61,408	O	$24.8m	887.7	$30,867	Q	$21.5m	446.2	$61,408
$27.5m	Q	$21.5m	446.2	$61,632	O	$24.8m	887.7	$30,980	Q	$21.5m	446.2	$61,632
$27.6m	Q	$21.5m	446.2	$61,856	O	$24.8m	887.7	$31,093	Q	$21.5m	446.2	$61,856
$27.7m	Q	$21.5m	446.2	$62,080	O	$24.8m	887.7	$31,205	Q	$21.5m	446.2	$62,080
$27.8m	Q	$21.5m	446.2	$62,305	O	$24.8m	887.7	$31,318	Q	$21.5m	446.2	$62,305
$27.9m	Q	$21.5m	446.2	$62,529	O	$24.8m	887.7	$31,431	Q	$21.5m	446.2	$62,529
$28.0m	Q	$21.5m	446.2	$62,753	O	$24.8m	887.7	$31,543	Q	$21.5m	446.2	$62,753
$28.1m	Q	$21.5m	446.2	$62,977	O	$24.8m	887.7	$31,656	Q	$21.5m	446.2	$62,977
$28.2m	Q	$21.5m	446.2	$63,201	O	$24.8m	887.7	$31,769	Q	$21.5m	446.2	$63,201
$28.3m	Q	$21.5m	446.2	$63,425	O	$24.8m	887.7	$31,881	Q	$21.5m	446.2	$63,425
$28.4m	Q	$21.5m	446.2	$63,649	O	$24.8m	887.7	$31,994	Q	$21.5m	446.2	$63,649
$28.5m	Q	$21.5m	446.2	$63,873	O	$24.8m	887.7	$32,106	Q	$21.5m	446.2	$63,873
$28.6m	Q	$21.5m	446.2	$64,098	O	$24.8m	887.7	$32,219	Q	$21.5m	446.2	$64,098
$28.7m	Q	$21.5m	446.2	$64,322	O	$24.8m	887.7	$32,332	Q	$21.5m	446.2	$64,322
$28.8m	Q	$21.5m	446.2	$64,546	O	$24.8m	887.7	$32,444	Q	$21.5m	446.2	$64,546
$28.9m	Q	$21.5m	446.2	$64,770	N O	$28.9m	954.4	$30,282	Q	$21.5m	446.2	$64,770
$29.0m	Q	$21.5m	446.2	$64,994	N O	$28.9m	954.4	$30,387	Q	$21.5m	446.2	$64,994
$29.1m	Q	$21.5m	446.2	$65,218	N O	$28.9m	954.4	$30,492	Q	$21.5m	446.2	$65,218
$29.2m	Q	$21.5m	446.2	$65,442	N O	$28.9m	954.4	$30,596	Q	$21.5m	446.2	$65,442
$29.3m	Q	$21.5m	446.2	$65,666	N O	$28.9m	954.4	$30,701	Q	$21.5m	446.2	$65,666
$29.4m	Q	$21.5m	446.2	$65,890	N O	$28.9m	954.4	$30,806	Q	$21.5m	446.2	$65,890
$29.5m	Q	$21.5m	446.2	$66,115	N O	$28.9m	954.4	$30,911	Q	$21.5m	446.2	$66,115
$29.6m	Q	$21.5m	446.2	$66,339	N O	$28.9m	954.4	$31,016	Q	$21.5m	446.2	$66,339
$29.7m	Q	$21.5m	446.2	$66,563	N O	$28.9m	954.4	$31,120	Q	$21.5m	446.2	$66,563
$29.8m	Q	$21.5m	446.2	$66,787	N O	$28.9m	954.4	$31,225	Q	$21.5m	446.2	$66,787
$29.9m	Q	$21.5m	446.2	$67,011	N O	$28.9m	954.4	$31,330	Q	$21.5m	446.2	$67,011
$30.0m	Q	$21.5m	446.2	$67,235	N O	$28.9m	954.4	$31,435	Q	$21.5m	446.2	$67,235
$30.1m	Q	$21.5m	446.2	$67,459	N O	$28.9m	954.4	$31,539	Q	$21.5m	446.2	$67,459
$30.2m	Q	$21.5m	446.2	$67,683	N O	$28.9m	954.4	$31,644	Q	$21.5m	446.2	$67,683
$30.3m	Q	$21.5m	446.2	$67,908	N O	$28.9m	954.4	$31,749	Q	$21.5m	446.2	$67,908
$30.4m	Q	$21.5m	446.2	$68,132	N O	$28.9m	954.4	$31,854	Q	$21.5m	446.2	$68,132
$30.5m	Q	$21.5m	446.2	$68,356	N O	$28.9m	954.4	$31,959	Q	$21.5m	446.2	$68,356
$30.6m	Q	$21.5m	446.2	$68,580	N O	$28.9m	954.4	$32,063	Q	$21.5m	446.2	$68,580
$30.7m	Q	$21.5m	446.2	$68,804	N O	$28.9m	954.4	$32,168	Q	$21.5m	446.2	$68,804
$30.8m	Q	$21.5m	446.2	$69,028	N O	$28.9m	954.4	$32,273	Q	$21.5m	446.2	$69,028
$30.9m	Q	$21.5m	446.2	$69,252	N O	$28.9m	954.4	$32,378	Q	$21.5m	446.2	$69,252

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$31.0m	Q	$21.5m	446.2	$69,476	N O	$28.9m	954.4	$32,482	Q	$21.5m	446.2	$69,476
$31.1m	Q	$21.5m	446.2	$69,700	N O	$28.9m	954.4	$32,587	Q	$21.5m	446.2	$69,700
$31.2m	Q	$21.5m	446.2	$69,925	N O	$28.9m	954.4	$32,692	Q	$21.5m	446.2	$69,925
$31.3m	Q	$21.5m	446.2	$70,149	N O	$28.9m	954.4	$32,797	Q	$21.5m	446.2	$70,149
$31.4m	Q	$21.5m	446.2	$70,373	N O	$28.9m	954.4	$32,902	Q	$21.5m	446.2	$70,373
$31.5m	Q	$21.5m	446.2	$70,597	N O	$28.9m	954.4	$33,006	Q	$21.5m	446.2	$70,597
$31.6m	Q	$21.5m	446.2	$70,821	N O	$28.9m	954.4	$33,111	Q	$21.5m	446.2	$70,821
$31.7m	Q	$21.5m	446.2	$71,045	N O	$28.9m	954.4	$33,216	Q	$21.5m	446.2	$71,045
$31.8m	Q	$21.5m	446.2	$71,269	N O	$28.9m	954.4	$33,321	Q	$21.5m	446.2	$71,269
$31.9m	Q	$21.5m	446.2	$71,493	N O	$28.9m	954.4	$33,425	Q	$21.5m	446.2	$71,493
$32.0m	Q	$21.5m	446.2	$71,718	N O	$28.9m	954.4	$33,530	Q	$21.5m	446.2	$71,718
$32.1m	Q	$21.5m	446.2	$71,942	N O	$28.9m	954.4	$33,635	Q	$21.5m	446.2	$71,942
$32.2m	Q	$21.5m	446.2	$72,166	N O	$28.9m	954.4	$33,740	Q	$21.5m	446.2	$72,166
$32.3m	Q	$21.5m	446.2	$72,390	N O	$28.9m	954.4	$33,845	Q	$21.5m	446.2	$72,390
$32.4m	Q	$21.5m	446.2	$72,614	N O	$28.9m	954.4	$33,949	Q	$21.5m	446.2	$72,614
$32.5m	Q	$21.5m	446.2	$72,838	N O	$28.9m	954.4	$34,054	Q	$21.5m	446.2	$72,838
$32.6m	Q	$21.5m	446.2	$73,062	N O	$28.9m	954.4	$34,159	Q	$21.5m	446.2	$73,062
$32.7m	Q	$21.5m	446.2	$73,286	N O	$28.9m	954.4	$34,264	Q	$21.5m	446.2	$73,286
$32.8m	Q	$21.5m	446.2	$73,510	N O	$28.9m	954.4	$34,369	Q	$21.5m	446.2	$73,510
$32.9m	Q	$21.5m	446.2	$73,735	N O	$28.9m	954.4	$34,473	Q	$21.5m	446.2	$73,735
$33.0m	Q	$21.5m	446.2	$73,959	N O	$28.9m	954.4	$34,578	Q	$21.5m	446.2	$73,959
$33.1m	Q	$21.5m	446.2	$74,183	N O	$28.9m	954.4	$34,683	Q	$21.5m	446.2	$74,183
$33.2m	Q	$21.5m	446.2	$74,407	N O	$28.9m	954.4	$34,788	Q	$21.5m	446.2	$74,407
$33.3m	Q	$21.5m	446.2	$74,631	N O	$28.9m	954.4	$34,892	Q	$21.5m	446.2	$74,631
$33.4m	Q	$21.5m	446.2	$74,855	N O	$28.9m	954.4	$34,997	Q	$21.5m	446.2	$74,855
$33.5m	Q	$21.5m	446.2	$75,079	N O	$28.9m	954.4	$35,102	Q	$21.5m	446.2	$75,079
$33.6m	Q	$21.5m	446.2	$75,303	N O	$28.9m	954.4	$35,207	Q	$21.5m	446.2	$75,303
$33.7m	Q	$21.5m	446.2	$75,528	N O	$28.9m	954.4	$35,312	Q	$21.5m	446.2	$75,528
$33.8m	Q	$21.5m	446.2	$75,752	N O	$28.9m	954.4	$35,416	Q	$21.5m	446.2	$75,752
$33.9m	Q	$21.5m	446.2	$75,976	N O	$28.9m	954.4	$35,521	Q	$21.5m	446.2	$75,976
$34.0m	Q	$21.5m	446.2	$76,200	N O	$28.9m	954.4	$35,626	Q	$21.5m	446.2	$76,200
$34.1m	Q	$21.5m	446.2	$76,424	N O	$28.9m	954.4	$35,731	Q	$21.5m	446.2	$76,424
$34.2m	Q	$21.5m	446.2	$76,648	N O	$28.9m	954.4	$35,835	Q	$21.5m	446.2	$76,648
$34.3m	Q	$21.5m	446.2	$76,872	N O	$28.9m	954.4	$35,940	Q	$21.5m	446.2	$76,872
$34.4m	Q	$21.5m	446.2	$77,096	N O	$28.9m	954.4	$36,045	Q	$21.5m	446.2	$77,096
$34.5m	Q	$21.5m	446.2	$77,320	N O	$28.9m	954.4	$36,150	Q	$21.5m	446.2	$77,320
$34.6m	Q	$21.5m	446.2	$77,545	N O	$28.9m	954.4	$36,255	Q	$21.5m	446.2	$77,545
$34.7m	Q	$21.5m	446.2	$77,769	N O	$28.9m	954.4	$36,359	Q	$21.5m	446.2	$77,769
$34.8m	Q	$21.5m	446.2	$77,993	N O	$28.9m	954.4	$36,464	Q	$21.5m	446.2	$77,993
$34.9m	Q	$21.5m	446.2	$78,217	N O	$28.9m	954.4	$36,569	Q	$21.5m	446.2	$78,217
$35.0m	Q	$21.5m	446.2	$78,441	N O	$28.9m	954.4	$36,674	Q	$21.5m	446.2	$78,441
$35.1m	Q	$21.5m	446.2	$78,665	N O	$28.9m	954.4	$36,779	Q	$21.5m	446.2	$78,665
$35.2m	Q	$21.5m	446.2	$78,889	N O	$28.9m	954.4	$36,883	Q	$21.5m	446.2	$78,889
$35.3m	Q	$21.5m	446.2	$79,113	N O	$28.9m	954.4	$36,988	Q	$21.5m	446.2	$79,113
$35.4m	Q	$21.5m	446.2	$79,338	N O	$28.9m	954.4	$37,093	Q	$21.5m	446.2	$79,338
$35.5m	Q	$21.5m	446.2	$79,562	N O	$28.9m	954.4	$37,198	Q	$21.5m	446.2	$79,562
$35.6m	Q	$21.5m	446.2	$79,786	N O	$28.9m	954.4	$37,302	Q	$21.5m	446.2	$79,786
$35.7m	Q	$21.5m	446.2	$80,010	N O	$28.9m	954.4	$37,407	Q	$21.5m	446.2	$80,010
$35.8m	Q	$21.5m	446.2	$80,234	N O	$28.9m	954.4	$37,512	Q	$21.5m	446.2	$80,234
$35.9m	Q	$21.5m	446.2	$80,458	N O	$28.9m	954.4	$37,617	Q	$21.5m	446.2	$80,458
$36.0m	Q	$21.5m	446.2	$80,682	N O	$28.9m	954.4	$37,722	Q	$21.5m	446.2	$80,682
$36.1m	Q	$21.5m	446.2	$80,906	N O	$28.9m	954.4	$37,826	Q	$21.5m	446.2	$80,906

Budget impact	Primary budget ($50m)				Lower budget ($0m)				Higher budget ($100m)			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$36.2m	Q	$21.5m	446.2	$81,130	N O	$28.9m	954.4	$37,931	Q	$21.5m	446.2	$81,130
$36.3m	Q	$21.5m	446.2	$81,355	N O	$28.9m	954.4	$38,036	Q	$21.5m	446.2	$81,355
$36.4m	Q	$21.5m	446.2	$81,579	N O	$28.9m	954.4	$38,141	Q	$21.5m	446.2	$81,579
$36.5m	Q	$21.5m	446.2	$81,803	N O	$28.9m	954.4	$38,245	Q	$21.5m	446.2	$81,803
$36.6m	Q	$21.5m	446.2	$82,027	N O	$28.9m	954.4	$38,350	Q	$21.5m	446.2	$82,027
$36.7m	Q	$21.5m	446.2	$82,251	N O	$28.9m	954.4	$38,455	Q	$21.5m	446.2	$82,251
$36.8m	Q	$21.5m	446.2	$82,475	N O	$28.9m	954.4	$38,560	Q	$21.5m	446.2	$82,475
$36.9m	Q	$21.5m	446.2	$82,699	N O	$28.9m	954.4	$38,665	Q	$21.5m	446.2	$82,699
$37.0m	Q	$21.5m	446.2	$82,923	N O	$28.9m	954.4	$38,769	Q	$21.5m	446.2	$82,923
$37.1m	Q	$21.5m	446.2	$83,148	N O	$28.9m	954.4	$38,874	Q	$21.5m	446.2	$83,148
$37.2m	Q	$21.5m	446.2	$83,372	N O	$28.9m	954.4	$38,979	Q	$21.5m	446.2	$83,372
$37.3m	Q	$21.5m	446.2	$83,596	N O	$28.9m	954.4	$39,084	Q	$21.5m	446.2	$83,596
$37.4m	Q	$21.5m	446.2	$83,820	N O	$28.9m	954.4	$39,189	Q	$21.5m	446.2	$83,820
$37.5m	M W	$37.5m	502.9	$74,564	N O	$28.9m	954.4	$39,293	M W	$37.5m	502.9	$74,564
$37.6m	M W	$37.5m	502.9	$74,763	N O	$28.9m	954.4	$39,398	M W	$37.5m	502.9	$74,763
$37.7m	M W	$37.5m	502.9	$74,962	N O	$28.9m	954.4	$39,503	M W	$37.5m	502.9	$74,962
$37.8m	M W	$37.5m	502.9	$75,161	N O	$28.9m	954.4	$39,608	M W	$37.5m	502.9	$75,161
$37.9m	M W	$37.5m	502.9	$75,360	N O	$28.9m	954.4	$39,712	M W	$37.5m	502.9	$75,360
$38.0m	M W	$37.5m	502.9	$75,558	N O	$28.9m	954.4	$39,817	M W	$37.5m	502.9	$75,558
$38.1m	M W	$37.5m	502.9	$75,757	N O	$28.9m	954.4	$39,922	M W	$37.5m	502.9	$75,757
$38.2m	M W	$37.5m	502.9	$75,956	N O	$28.9m	954.4	$40,027	M W	$37.5m	502.9	$75,956
$38.3m	M W	$37.5m	502.9	$76,155	N O	$28.9m	954.4	$40,132	M W	$37.5m	502.9	$76,155
$38.4m	M W	$37.5m	502.9	$76,354	N O	$28.9m	954.4	$40,236	M W	$37.5m	502.9	$76,354
$38.5m	M W	$37.5m	502.9	$76,553	N O	$28.9m	954.4	$40,341	M W	$37.5m	502.9	$76,553
$38.6m	M W	$37.5m	502.9	$76,751	N O	$28.9m	954.4	$40,446	M W	$37.5m	502.9	$76,751
$38.7m	M W	$37.5m	502.9	$76,950	N O	$28.9m	954.4	$40,551	M W	$37.5m	502.9	$76,950
$38.8m	M W	$37.5m	502.9	$77,149	N O	$28.9m	954.4	$40,655	M W	$37.5m	502.9	$77,149
$38.9m	M W	$37.5m	502.9	$77,348	N O	$28.9m	954.4	$40,760	M W	$37.5m	502.9	$77,348
$39.0m	M W	$37.5m	502.9	$77,547	N O	$28.9m	954.4	$40,865	M W	$37.5m	502.9	$77,547
$39.1m	M W	$37.5m	502.9	$77,746	N O	$28.9m	954.4	$40,970	M W	$37.5m	502.9	$77,746
$39.2m	M W	$37.5m	502.9	$77,944	N O	$28.9m	954.4	$41,075	M W	$37.5m	502.9	$77,944
$39.3m	Q W	$39.3m	551.9	$71,208	N O	$28.9m	954.4	$41,179	Q W	$39.3m	551.9	$71,208
$39.4m	Q W	$39.3m	551.9	$71,389	N O	$28.9m	954.4	$41,284	Q W	$39.3m	551.9	$71,389
$39.5m	Q W	$39.3m	551.9	$71,570	N O	$28.9m	954.4	$41,389	Q W	$39.3m	551.9	$71,570
$39.6m	Q W	$39.3m	551.9	$71,751	N O	$28.9m	954.4	$41,494	Q W	$39.3m	551.9	$71,751
$39.7m	Q W	$39.3m	551.9	$71,933	N O	$28.9m	954.4	$41,599	Q W	$39.3m	551.9	$71,933
$39.8m	Q W	$39.3m	551.9	$72,114	H Q	$39.8m	992.9	$40,084	Q W	$39.3m	551.9	$72,114
$39.9m	Q W	$39.3m	551.9	$72,295	H Q	$39.8m	992.9	$40,184	Q W	$39.3m	551.9	$72,295
$40.0m	Q W	$39.3m	551.9	$72,476	H Q	$39.8m	992.9	$40,285	Q W	$39.3m	551.9	$72,476
$40.1m	Q W	$39.3m	551.9	$72,657	H Q	$39.8m	992.9	$40,386	Q W	$39.3m	551.9	$72,657
$40.2m	Q W	$39.3m	551.9	$72,839	H Q	$39.8m	992.9	$40,487	Q W	$39.3m	551.9	$72,839
$40.3m	Q W	$39.3m	551.9	$73,020	H Q	$39.8m	992.9	$40,587	Q W	$39.3m	551.9	$73,020
$40.4m	Q W	$39.3m	551.9	$73,201	H Q	$39.8m	992.9	$40,688	Q W	$39.3m	551.9	$73,201
$40.5m	Q W	$39.3m	551.9	$73,382	H Q	$39.8m	992.9	$40,789	Q W	$39.3m	551.9	$73,382
$40.6m	Q W	$39.3m	551.9	$73,563	H Q	$39.8m	992.9	$40,889	Q W	$39.3m	551.9	$73,563
$40.7m	Q W	$39.3m	551.9	$73,745	H Q	$39.8m	992.9	$40,990	Q W	$39.3m	551.9	$73,745
$40.8m	Q W	$39.3m	551.9	$73,926	H Q	$39.8m	992.9	$41,091	Q W	$39.3m	551.9	$73,926
$40.9m	Q W	$39.3m	551.9	$74,107	H Q	$39.8m	992.9	$41,192	Q W	$39.3m	551.9	$74,107
$41.0m	Q W	$39.3m	551.9	$74,288	H Q	$39.8m	992.9	$41,292	Q W	$39.3m	551.9	$74,288
$41.1m	Q W	$39.3m	551.9	$74,469	H Q	$39.8m	992.9	$41,393	Q W	$39.3m	551.9	$74,469
$41.2m	M Q	$41.2m	843.4	$48,849	H Q	$39.8m	992.9	$41,494	M Q	$41.2m	843.4	$48,849
$41.3m	M Q	$41.2m	843.4	$48,968	H Q	$39.8m	992.9	$41,594	M Q	$41.2m	843.4	$48,968

Budget impact	***Primary budget ($50m)***				***Lower budget ($0m)***				***Higher budget ($100m)***			
	Tech [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]	**Tech** [a]	ΔC [b]	ΔE [c]	λ^{-} [d]
$41.4m	M Q	$41.2m	843.4	$49,087	H Q	$39.8m	992.9	$41,695	M Q	$41.2m	843.4	$49,087
$41.5m	M Q	$41.2m	843.4	$49,205	H Q	$39.8m	992.9	$41,796	M Q	$41.2m	843.4	$49,205
$41.6m	M Q	$41.2m	843.4	$49,324	H Q	$39.8m	992.9	$41,897	M Q	$41.2m	843.4	$49,324
$41.7m	M Q	$41.2m	843.4	$49,442	H Q	$39.8m	992.9	$41,997	M Q	$41.2m	843.4	$49,442
$41.8m	M Q	$41.2m	843.4	$49,561	H Q	$39.8m	992.9	$42,098	M Q	$41.2m	843.4	$49,561
$41.9m	M Q	$41.2m	843.4	$49,679	H Q	$39.8m	992.9	$42,199	M Q	$41.2m	843.4	$49,679
$42.0m	M Q	$41.2m	843.4	$49,798	H Q	$39.8m	992.9	$42,299	M Q	$41.2m	843.4	$49,798
$42.1m	M Q	$41.2m	843.4	$49,917	H M N	$42.1m	1010.6	$41,657	M Q	$41.2m	843.4	$49,917
$42.2m	M Q	$41.2m	843.4	$50,035	H M N	$42.1m	1010.6	$41,756	M Q	$41.2m	843.4	$50,035
$42.3m	M Q	$41.2m	843.4	$50,154	H M N	$42.1m	1010.6	$41,855	M Q	$41.2m	843.4	$50,154
$42.4m	M Q	$41.2m	843.4	$50,272	H M N	$42.1m	1010.6	$41,954	M Q	$41.2m	843.4	$50,272
$42.5m	M Q	$41.2m	843.4	$50,391	H M N	$42.1m	1010.6	$42,053	M Q	$41.2m	843.4	$50,391
$42.6m	M Q	$41.2m	843.4	$50,509	H M N	$42.1m	1010.6	$42,152	M Q	$41.2m	843.4	$50,509
$42.7m	M Q	$41.2m	843.4	$50,628	H M N	$42.1m	1010.6	$42,251	M Q	$41.2m	843.4	$50,628
$42.8m	M Q	$41.2m	843.4	$50,747	H M N	$42.1m	1010.6	$42,350	M Q	$41.2m	843.4	$50,747
$42.9m	M Q	$41.2m	843.4	$50,865	H M N	$42.1m	1010.6	$42,449	M Q	$41.2m	843.4	$50,865
$43.0m	M Q	$41.2m	843.4	$50,984	H M N	$42.1m	1010.6	$42,548	M Q	$41.2m	843.4	$50,984
$43.1m	M Q	$41.2m	843.4	$51,102	H O	$43.1m	1434.4	$30,047	M Q	$41.2m	843.4	$51,102
$43.2m	M Q	$41.2m	843.4	$51,221	H O	$43.1m	1434.4	$30,117	M Q	$41.2m	843.4	$51,221
$43.3m	M Q	$41.2m	843.4	$51,339	H O	$43.1m	1434.4	$30,187	M Q	$41.2m	843.4	$51,339
$43.4m	M Q	$41.2m	843.4	$51,458	H O	$43.1m	1434.4	$30,257	M Q	$41.2m	843.4	$51,458
$43.5m	M Q	$41.2m	843.4	$51,577	H O	$43.1m	1434.4	$30,326	M Q	$41.2m	843.4	$51,577
$43.6m	M Q	$41.2m	843.4	$51,695	H O	$43.1m	1434.4	$30,396	M Q	$41.2m	843.4	$51,695
$43.7m	M Q	$41.2m	843.4	$51,814	H O	$43.1m	1434.4	$30,466	M Q	$41.2m	843.4	$51,814
$43.8m	M Q	$41.2m	843.4	$51,932	H O	$43.1m	1434.4	$30,535	M Q	$41.2m	843.4	$51,932
$43.9m	M Q	$41.2m	843.4	$52,051	H O	$43.1m	1434.4	$30,605	M Q	$41.2m	843.4	$52,051
$44.0m	M Q	$41.2m	843.4	$52,169	H O	$43.1m	1434.4	$30,675	M Q	$41.2m	843.4	$52,169
$44.1m	M Q	$41.2m	843.4	$52,288	H O	$43.1m	1434.4	$30,745	M Q	$41.2m	843.4	$52,288
$44.2m	M Q	$41.2m	843.4	$52,406	H O	$43.1m	1434.4	$30,814	M Q	$41.2m	843.4	$52,406
$44.3m	M Q	$41.2m	843.4	$52,525	H O	$43.1m	1434.4	$30,884	M Q	$41.2m	843.4	$52,525
$44.4m	M Q	$41.2m	843.4	$52,644	H O	$43.1m	1434.4	$30,954	M Q	$41.2m	843.4	$52,644
$44.5m	M Q	$41.2m	843.4	$52,762	H O	$43.1m	1434.4	$31,023	M Q	$41.2m	843.4	$52,762
$44.6m	M Q	$41.2m	843.4	$52,881	H O	$43.1m	1434.4	$31,093	M Q	$41.2m	843.4	$52,881
$44.7m	M Q	$41.2m	843.4	$52,999	H O	$43.1m	1434.4	$31,163	M Q	$41.2m	843.4	$52,999
$44.8m	M Q	$41.2m	843.4	$53,118	H O	$43.1m	1434.4	$31,233	M Q	$41.2m	843.4	$53,118
$44.9m	M Q	$41.2m	843.4	$53,236	H O	$43.1m	1434.4	$31,302	M Q	$41.2m	843.4	$53,236
$45.0m	M Q	$41.2m	843.4	$53,355	H O	$43.1m	1434.4	$31,372	M Q	$41.2m	843.4	$53,355
$45.1m	M Q	$41.2m	843.4	$53,474	H O	$43.1m	1434.4	$31,442	M Q	$41.2m	843.4	$53,474
$45.2m	M Q	$41.2m	843.4	$53,592	H O	$43.1m	1434.4	$31,511	M Q	$41.2m	843.4	$53,592
$45.3m	M Q	$41.2m	843.4	$53,711	H O	$43.1m	1434.4	$31,581	M Q	$41.2m	843.4	$53,711
$45.4m	M Q	$41.2m	843.4	$53,829	H O	$43.1m	1434.4	$31,651	M Q	$41.2m	843.4	$53,829
$45.5m	M Q	$41.2m	843.4	$53,948	H O	$43.1m	1434.4	$31,721	M Q	$41.2m	843.4	$53,948
$45.6m	M Q	$41.2m	843.4	$54,066	H O	$43.1m	1434.4	$31,790	M Q	$41.2m	843.4	$54,066
$45.7m	M Q	$41.2m	843.4	$54,185	H O	$43.1m	1434.4	$31,860	M Q	$41.2m	843.4	$54,185
$45.8m	M Q	$41.2m	843.4	$54,304	H O	$43.1m	1434.4	$31,930	M Q	$41.2m	843.4	$54,304
$45.9m	M Q	$41.2m	843.4	$54,422	H O	$43.1m	1434.4	$31,999	M Q	$41.2m	843.4	$54,422
$46.0m	M Q	$41.2m	843.4	$54,541	H O	$43.1m	1434.4	$32,069	M Q	$41.2m	843.4	$54,541
$46.1m	M Q	$41.2m	843.4	$54,659	H O	$43.1m	1434.4	$32,139	M Q	$41.2m	843.4	$54,659
$46.2m	M Q	$41.2m	843.4	$54,778	H O	$43.1m	1434.4	$32,209	M Q	$41.2m	843.4	$54,778
$46.3m	M Q	$41.2m	843.4	$54,896	H O	$43.1m	1434.4	$32,278	M Q	$41.2m	843.4	$54,896
$46.4m	M Q	$41.2m	843.4	$55,015	H O	$43.1m	1434.4	$32,348	M Q	$41.2m	843.4	$55,015
$46.5m	M Q	$41.2m	843.4	$55,134	H O	$43.1m	1434.4	$32,418	M Q	$41.2m	843.4	$55,134

Budget impact	***Primary budget ($50m)***				***Lower budget ($0m)***				***Higher budget ($100m)***			
	Tech [a]	$\Delta \boldsymbol{C}$ [b]	$\Delta \boldsymbol{E}$ [c]	$\boldsymbol{\lambda}^{-}$ [d]	**Tech** [a]	$\Delta \boldsymbol{C}$ [b]	$\Delta \boldsymbol{E}$ [c]	$\boldsymbol{\lambda}^{-}$ [d]	**Tech** [a]	$\Delta \boldsymbol{C}$ [b]	$\Delta \boldsymbol{E}$ [c]	$\boldsymbol{\lambda}^{-}$ [d]
$46.6m	M Q	$41.2m	843.4	$55,252	H O	$43.1m	1434.4	$32,488	M Q	$41.2m	843.4	$55,252
$46.7m	M Q	$41.2m	843.4	$55,371	H O	$43.1m	1434.4	$32,557	M Q	$41.2m	843.4	$55,371
$46.8m	M Q	$41.2m	843.4	$55,489	H O	$43.1m	1434.4	$32,627	M Q	$41.2m	843.4	$55,489
$46.9m	M Q	$41.2m	843.4	$55,608	H O	$43.1m	1434.4	$32,697	M Q	$41.2m	843.4	$55,608
$47.0m	M Q	$41.2m	843.4	$55,726	H O	$43.1m	1434.4	$32,766	M Q	$41.2m	843.4	$55,726
$47.1m	M Q	$41.2m	843.4	$55,845	H O	$43.1m	1434.4	$32,836	M Q	$41.2m	843.4	$55,845
$47.2m	M Q	$41.2m	843.4	$55,963	H N O	$47.2m	1501.1	$31,444	M Q	$41.2m	843.4	$55,963
$47.3m	M Q	$41.2m	843.4	$56,082	H N O	$47.2m	1501.1	$31,510	M Q	$41.2m	843.4	$56,082
$47.4m	M Q	$41.2m	843.4	$56,201	H N O	$47.2m	1501.1	$31,577	M Q	$41.2m	843.4	$56,201
$47.5m	M Q	$41.2m	843.4	$56,319	H N O	$47.2m	1501.1	$31,644	M Q	$41.2m	843.4	$56,319
$47.6m	M Q	$41.2m	843.4	$56,438	H N O	$47.2m	1501.1	$31,710	M Q	$41.2m	843.4	$56,438
$47.7m	M Q	$41.2m	843.4	$56,556	H N O	$47.2m	1501.1	$31,777	M Q	$41.2m	843.4	$56,556
$47.8m	M Q	$41.2m	843.4	$56,675	H N O	$47.2m	1501.1	$31,844	M Q	$41.2m	843.4	$56,675
$47.9m	M Q	$41.2m	843.4	$56,793	H N O	$47.2m	1501.1	$31,910	M Q	$41.2m	843.4	$56,793
$48.0m	M Q	$41.2m	843.4	$56,912	H N O	$47.2m	1501.1	$31,977	M Q	$41.2m	843.4	$56,912
$48.1m	M Q	$41.2m	843.4	$57,031	H N O	$47.2m	1501.1	$32,043	M Q	$41.2m	843.4	$57,031
$48.2m	M Q	$41.2m	843.4	$57,149	H N O	$47.2m	1501.1	$32,110	M Q	$41.2m	843.4	$57,149
$48.3m	M Q	$41.2m	843.4	$57,268	H N O	$47.2m	1501.1	$32,177	M Q	$41.2m	843.4	$57,268
$48.4m	M Q	$41.2m	843.4	$57,386	H N O	$47.2m	1501.1	$32,243	M Q	$41.2m	843.4	$57,386
$48.5m	M Q	$41.2m	843.4	$57,505	H N O	$47.2m	1501.1	$32,310	M Q	$41.2m	843.4	$57,505
$48.6m	M Q	$41.2m	843.4	$57,623	H N O	$47.2m	1501.1	$32,377	M Q	$41.2m	843.4	$57,623
$48.7m	M Q	$41.2m	843.4	$57,742	H N O	$47.2m	1501.1	$32,443	M Q	$41.2m	843.4	$57,742
$48.8m	M Q	$41.2m	843.4	$57,861	H N O	$47.2m	1501.1	$32,510	M Q	$41.2m	843.4	$57,861
$48.9m	M Q	$41.2m	843.4	$57,979	H N O	$47.2m	1501.1	$32,576	M Q	$41.2m	843.4	$57,979
$49.0m	M Q	$41.2m	843.4	$58,098	H N O	$47.2m	1501.1	$32,643	M Q	$41.2m	843.4	$58,098
$49.1m	M Q	$41.2m	843.4	$58,216	H N O	$47.2m	1501.1	$32,710	M Q	$41.2m	843.4	$58,216
$49.2m	M Q	$41.2m	843.4	$58,335	H N O	$47.2m	1501.1	$32,776	M Q	$41.2m	843.4	$58,335
$49.3m	M Q	$41.2m	843.4	$58,453	H N O	$47.2m	1501.1	$32,843	M Q	$41.2m	843.4	$58,453
$49.4m	M Q	$41.2m	843.4	$58,572	H N O	$47.2m	1501.1	$32,909	M Q	$41.2m	843.4	$58,572
$49.5m	M Q	$41.2m	843.4	$58,691	H N O	$47.2m	1501.1	$32,976	M Q	$41.2m	843.4	$58,691
$49.6m	M Q	$41.2m	843.4	$58,809	H N O	$47.2m	1501.1	$33,043	M Q	$41.2m	843.4	$58,809
$49.7m	M Q	$41.2m	843.4	$58,928	H N O	$47.2m	1501.1	$33,109	M Q	$41.2m	843.4	$58,928
$49.8m	M Q	$41.2m	843.4	$59,046	H N O	$47.2m	1501.1	$33,176	M Q	$41.2m	843.4	$59,046
$49.9m	M Q	$41.2m	843.4	$59,165	H N O	$47.2m	1501.1	$33,243	M Q	$41.2m	843.4	$59,165
$50.0m	R	$50.0m	1226.8	$40,758	H N O	$47.2m	1501.1	$33,309	M Q	$41.2m	843.4	$59,283

[a] Technologies adopted; [b] Total change in incremental expenditure across all adopted technologies.; [c] Total change in incremental benefit (QALYs) resulting from adoption of technologies; [d] Optimal cost-effectiveness threshold (per QALY) for net disinvestments.

Appendix 2 (Chapter 2)

Appendix 2.1: Algebraic specification of optimal numerical thresholds

Eckermann and Pekarsky introduced some useful notation for specifying the optimal cost-effectiveness threshold.[63] Under specific assumptions, they determined that the optimal threshold in an allocatively inefficient health system is given by:

$$\left(\frac{1}{n}+\frac{1}{d}-\frac{1}{m}\right)^{-1}$$

where n denotes the "[average] ICER of the most cost-effective service in expansion", d denotes the "[average] ICER of the displaced services", and m denotes the "[average] ICER of the least cost-effective of the existing services in contraction".

In order to specify optimal cost-effectiveness thresholds in a model that considers multiple decision makers, imperfect information, and new technologies with non-marginal budget impact, we have updated this notation as follows:

- $d_b^{x,y,z}$ represents the agent's estimate of the average ICER associated with the reallocation preferred by the *reallocator* following a *net investment*;
- $m_b^{x,z}$ represents the agent's estimate of the average ICER associated with the reallocation preferred by the *agent* following a *net investment*;
- $s_b^{x,y,z}$ represents the agent's estimate of the average ICER associated with the reallocation preferred by the *reallocator* following a *net disinvestment*; and
- $n_b^{x,z}$ represents the agent's estimate of the average ICER associated with the reallocation preferred by the *agent* following a *net disinvestment*,

where x denotes the allocator's information, y denotes the reallocator's information, z denotes the agent's information, and b denotes the budget impact of the new technology. For each of x, y and z, information is either good (G) or poor (P).

Note that the d, m and n specified by Eckermann and Pekarsky may be considered as special cases of $d_b^{x,y,z}$, $m_b^{x,y,z}$ and $n_b^{x,y,z}$, in which the budget impact (b) is assumed to be marginal and the agent's information (z) is assumed to differ from the allocator and reallocator's information (x and y respectively).

Furthermore, it should be noted that Eckermann and Pekarsky's definitions of m and n are inappropriate if initial technologies are permitted to lie in the southern half of the CE plane, since an "expansion" of these initial technologies *reduces* incremental expenditure, while a "contraction" of these initial technologies *increases* incremental expenditure. For the purposes of this chapter, $m_b^{x,y,z}$ represents the average ICER of the most efficient *reduction* in incremental expenditure on initial technologies (as required following a net investment), while $n_b^{x,y,z}$ represents the average ICER of the most efficient *increase* in incremental expenditure on initial technologies (as required following a net disinvestment), regardless of whether these reductions or increases arise through contraction, expansion, or a combination of both.

Finally, Eckermann and Pekarsky's definition of d implies that the new technology is a net investment, since adoption results in "displaced services". This displacement may be inefficient. For our purposes, $d_b^{x,y,z}$ therefore represents the agent's estimate of the average ICER associated with the *reallocator's* preferred reallocation following a *net investment*. Since Eckermann and Pekarsky did not define an analogous term for net disinvestments, we denote this as $s_b^{x,y,z}$.

In this section, we use this notation to provide algebraic specifications of numerical thresholds for each threshold subset within each of the eight unique sets of optimal thresholds.

Threshold set λ1

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$\lambda_G^+ = m_b^{G,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$\lambda_G^- = n_b^{G,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$\lambda_P^+ = m_b^{P,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$\lambda_P^- = n_b^{P,P}$$

Threshold set λ2

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$\lambda_G^+ = d_b^{G,P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$\lambda_G^- = s_b^{G,P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$\lambda_P^+ = d_b^{P,G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$\lambda_P^- = s_b^{P,G,P}$$

Threshold set λ3

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$if\ \left(\frac{1}{n_b^{P,G}} - \frac{1}{m_b^{P,G}}\right)^{-1} > 0\ then\ \lambda_G^+ = n_b^{P,G}\ else\ \lambda_G^+ = m_b^{P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$if\ \left(\frac{1}{m_b^{P,G}} - \frac{1}{n_b^{P,G}}\right)^{-1} < 0\ then\ \lambda_G^- = m_b^{P,G}\ else\ \lambda_G^- = n_b^{P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$if\ \left(\frac{1}{n_b^{G,P}} - \frac{1}{m_b^{G,P}}\right)^{-1} > 0\ then\ \lambda_P^+ = n_b^{G,P}\ else\ \lambda_P^+ = m_b^{G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$if\ \left(\frac{1}{m_b^{G,P}} - \frac{1}{n_b^{G,P}}\right)^{-1} < 0\ then\ \lambda_P^- = m_b^{G,P}\ else\ \lambda_P^- = n_b^{G,P}$$

Threshold set λ4

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$\lambda_G^+ = m_b^{P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$\lambda_G^- = n_b^{P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$\lambda_P^+ = m_b^{G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$\lambda_P^- = n_b^{G,P}$$

Threshold set λ5

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$if \left(\frac{1}{n_b^{P,G}} - \frac{1}{d_b^{P,P,G}}\right)^{-1} > 0 \; then \; \lambda_G^+ = \left(\frac{1}{m_b^{P,G}} + \frac{1}{n_b^{P,G}} - \frac{1}{d_b^{P,P,G}}\right)^{-1} \; else \; \lambda_G^+ = m_b^{P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$if \left(\frac{1}{m_b^{P,G}} - \frac{1}{s_b^{P,P,G}}\right)^{-1} < 0 \; then \; \lambda_G^- = \left(\frac{1}{n_b^{P,G}} + \frac{1}{m_b^{P,G}} - \frac{1}{s_b^{P,P,G}}\right)^{-1} \; else \; \lambda_G^- = n_b^{P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$if \left(\frac{1}{n_b^{G,P}} - \frac{1}{d_b^{G,G,P}}\right)^{-1} > 0 \; then \; \lambda_P^+ = \left(\frac{1}{m_b^{G,P}} + \frac{1}{n_b^{G,P}} - \frac{1}{d_b^{G,G,P}}\right)^{-1} \; else \; \lambda_P^+ = m_b^{G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$if \left(\frac{1}{m_b^{G,P}} - \frac{1}{s_b^{G,G,P}}\right)^{-1} < 0 \; then \; \lambda_P^- = \left(\frac{1}{n_b^{G,P}} + \frac{1}{m_b^{G,P}} - \frac{1}{s_b^{G,G,P}}\right)^{-1} \; else \; \lambda_P^- = n_b^{G,P}$$

Threshold set λ6

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$if\ \left(\frac{1}{n_b^{P,G}}-\frac{1}{m_b^{P,G}}\right)^{-1} > 0\ then\ \lambda_G^+ = \left(\frac{1}{d_b^{P,P,G}}+\frac{1}{n_b^{P,G}}-\frac{1}{m_b^{P,G}}\right)^{-1}\ else\ \lambda_G^+ = d_b^{P,P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$if\ \left(\frac{1}{m_b^{P,G}}-\frac{1}{n_b^{P,G}}\right)^{-1} < 0\ then\ \lambda_G^- = \left(\frac{1}{s_b^{P,P,G}}+\frac{1}{m_b^{P,G}}-\frac{1}{n_b^{P,G}}\right)^{-1}\ else\ \lambda_G^- = s_b^{P,P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$if\ \left(\frac{1}{n_b^{G,P}}-\frac{1}{m_b^{G,P}}\right)^{-1} > 0\ then\ \lambda_P^+ = \left(\frac{1}{d_b^{G,G,P}}+\frac{1}{n_b^{G,P}}-\frac{1}{m_b^{G,P}}\right)^{-1}\ else\ \lambda_P^+ = d_b^{G,G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$if\ \left(\frac{1}{m_b^{G,P}}-\frac{1}{n_b^{G,P}}\right)^{-1} < 0\ then\ \lambda_P^- = \left(\frac{1}{s_b^{G,G,P}}+\frac{1}{m_b^{G,P}}-\frac{1}{n_b^{G,P}}\right)^{-1}\ else\ \lambda_P^- = s_b^{G,G,P}$$

Threshold set λ7

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$if \left(\frac{1}{n_b^{P,G}} - \frac{1}{d_b^{P,P,G}}\right)^{-1} > 0 \; then \; \lambda_G^+ = n_b^{P,G} \; else \; \lambda_G^+ = d_b^{P,P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$if \left(\frac{1}{m_b^{P,G}} - \frac{1}{s_b^{P,P,G}}\right)^{-1} < 0 \; then \; \lambda_G^- = m_b^{P,G} \; else \; \lambda_G^- = s_b^{P,P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$if \left(\frac{1}{n_b^{G,P}} - \frac{1}{d_b^{G,G,P}}\right)^{-1} > 0 \; then \; \lambda_P^+ = n_b^{G,P} \; else \; \lambda_P^+ = d_b^{G,G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$if \left(\frac{1}{m_b^{G,P}} - \frac{1}{s_b^{G,G,P}}\right)^{-1} < 0 \; then \; \lambda_P^- = m_b^{G,P} \; else \; \lambda_P^- = s_b^{G,G,P}$$

Threshold set λ8

If the agent has good information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_G^+) is

$$\lambda_G^+ = d_b^{P,P,G}$$

- The optimal numerical threshold for net disinvestments (λ_G^-) is

$$\lambda_G^- = s_b^{P,P,G}$$

If the agent has poor information on the incremental benefit of initial technologies, then:

- The optimal numerical threshold for net investments (λ_P^+) is

$$\lambda_P^+ = d_b^{G,G,P}$$

- The optimal numerical threshold for net disinvestments (λ_P^-) is

$$\lambda_P^- = s_b^{G,G,P}$$

Appendix 2.2: Reallocation tables

Table A2.2.1: Reallocation following net investment (allocator has good information)

	Reallocation with good information							*Reallocation with poor information*						
	Marginal	*Estimates with good information*			*Estimates with poor information*			**Marginal**	*Estimates with good information*			*Estimates with poor information*		
Budget impact	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$0.1m	C	-1.75	$57,122	-1.75	-1.58	$63,369	-1.58	E	-1.76	$56,770	-1.76	10.43	-$9,586	10.43
$0.2m	R	-1.75	$57,106	-3.50	-1.61	$62,051	-3.19	E	-1.82	$55,023	-3.58	10.22	-$9,788	20.65
$0.3m	H	-1.75	$57,058	-5.25	-1.47	$67,849	-4.66	E	-1.87	$53,427	-5.45	10.02	-$9,981	30.67
$0.4m	O	-1.75	$56,981	-7.01	-0.54	$185,534	-5.20	E	-1.92	$51,963	-7.38	9.83	-$10,168	40.50
$0.5m	R	-1.76	$56,970	-8.76	-1.62	$61,903	-6.82	E	-1.98	$50,613	-9.35	9.66	-$10,348	50.17
$0.6m	H	-1.76	$56,948	-10.52	-1.48	$67,718	-8.29	E	-2.03	$49,363	-11.38	9.50	-$10,522	59.67
$0.7m	C	-1.76	$56,911	-12.28	-1.58	$63,135	-9.88	E	-2.07	$48,201	-13.45	9.35	-$10,691	69.02
$0.8m	H	-1.76	$56,837	-14.04	-1.48	$67,586	-11.36	E	-2.12	$47,118	-15.57	9.21	-$10,854	78.24
$0.9m	R	-1.76	$56,834	-15.80	-1.62	$61,755	-12.98	E	-2.17	$46,104	-17.74	9.08	-$11,012	87.32
$1.0m	O	-1.76	$56,833	-17.56	-0.54	$185,052	-13.52	E	-2.21	$45,153	-19.96	8.96	-$11,166	96.27
$1.1m	W	-1.76	$56,787	-19.32	-2.26	$44,258	-15.78	E	-2.26	$44,259	-22.22	8.84	-$11,316	105.11
$1.2m	E	-1.76	$56,770	-21.08	10.43	-$9,586	-5.34	E	-2.30	$43,416	-24.52	8.72	-$11,463	113.83
$1.3m	H	-1.76	$56,726	-22.84	-1.48	$67,454	-6.83	E	-2.35	$42,619	-26.87	8.62	-$11,605	122.45
$1.4m	U	-1.76	$56,722	-24.60	-3.15	$31,764	-9.98	E	-2.39	$41,865	-29.25	8.52	-$11,744	130.97
$1.5m	C	-1.76	$56,698	-26.37	-1.59	$62,899	-11.57	E	-2.43	$41,149	-31.69	8.42	-$11,880	139.38
$1.6m	R	-1.76	$56,698	-28.13	-1.62	$61,607	-13.19	E	-2.47	$40,469	-34.16	8.32	-$12,012	147.71
$1.7m	O	-1.76	$56,684	-29.90	-0.54	$184,567	-13.73	E	-2.51	$39,821	-36.67	8.24	-$12,142	155.94
$1.8m	H	-1.77	$56,614	-31.66	-1.49	$67,321	-15.22	E	-2.55	$39,204	-39.22	8.15	-$12,269	164.09
$1.9m	R	-1.77	$56,561	-33.43	-1.63	$61,458	-16.84	E	-2.59	$38,615	-41.81	8.07	-$12,394	172.16
$2.0m	O	-1.77	$56,534	-35.20	-0.54	$184,079	-17.39	E	-2.63	$38,051	-44.44	7.99	-$12,516	180.15
$2.1m	H	-1.77	$56,501	-36.97	-1.49	$67,187	-18.87	E	-2.67	$37,511	-47.10	7.91	-$12,636	188.07
$2.2m	C	-1.77	$56,484	-38.74	-1.60	$62,661	-20.47	E	-2.70	$36,993	-49.80	7.84	-$12,754	195.91
$2.3m	D	-1.77	$56,483	-40.51	-5.50	$18,182	-25.97	E	-2.74	$36,497	-52.54	7.77	-$12,869	203.68
$2.4m	R	-1.77	$56,424	-42.28	-1.63	$61,309	-27.60	E	-2.78	$36,020	-55.32	7.70	-$12,982	211.38
$2.5m	H	-1.77	$56,389	-44.06	-1.49	$67,053	-29.09	E	-2.81	$35,561	-58.13	7.64	-$13,094	219.02
$2.6m	O	-1.77	$56,384	-45.83	-0.54	$183,589	-29.64	E	-2.85	$35,119	-60.98	7.57	-$13,203	226.59
$2.7m	R	-1.78	$56,286	-47.61	-1.64	$61,160	-31.27	E	-2.88	$34,693	-63.86	7.51	-$13,311	234.10
$2.8m	H	-1.78	$56,276	-49.38	-1.49	$66,919	-32.77	E	-2.92	$34,283	-66.78	7.45	-$13,417	241.56
$2.9m	C	-1.78	$56,268	-51.16	-1.60	$62,421	-34.37	E	-2.95	$33,886	-69.73	7.40	-$13,522	248.95
$3.0m	O	-1.78	$56,232	-52.94	-0.55	$183,096	-34.92	E	-2.98	$33,504	-72.72	7.34	-$13,625	256.29
$3.1m	H	-1.78	$56,162	-54.72	-1.50	$66,784	-36.41	E	-3.02	$33,133	-75.73	7.29	-$13,726	263.58
$3.2m	R	-1.78	$56,149	-56.50	-1.64	$61,011	-38.05	E	-3.05	$32,775	-78.79	7.23	-$13,826	270.81
$3.3m	O	-1.78	$56,081	-58.28	-0.55	$182,600	-38.60	E	-3.08	$32,428	-81.87	7.18	-$13,924	277.99
$3.4m	C	-1.78	$56,050	-60.07	-1.61	$62,180	-40.21	E	-3.12	$32,092	-84.98	7.13	-$14,021	285.12
$3.5m	H	-1.78	$56,048	-61.85	-1.50	$66,648	-41.71	E	-3.15	$31,766	-88.13	7.08	-$14,117	292.21
$3.6m	R	-1.79	$56,010	-63.64	-1.64	$60,860	-43.35	E	-3.18	$31,450	-91.31	7.04	-$14,211	299.24
$3.7m	H	-1.79	$55,934	-65.42	-1.50	$66,512	-44.85	E	-3.21	$31,143	-94.52	6.99	-$14,305	306.23
$3.8m	O	-1.79	$55,927	-67.21	-0.55	$182,103	-45.40	E	-3.24	$30,845	-97.77	6.95	-$14,397	313.18
$3.9m	R	-1.79	$55,872	-69.00	-1.65	$60,710	-47.05	E	-3.27	$30,556	-101.04	6.90	-$14,487	320.08
$4.0m	C	-1.79	$55,831	-70.79	-1.61	$61,937	-48.67	E	-3.30	$30,274	-104.34	6.86	-$14,577	326.94
$4.1m	H	-1.79	$55,819	-72.59	-1.51	$66,375	-50.17	E	-3.33	$30,000	-107.67	6.82	-$14,666	333.76
$4.2m	U	-1.79	$55,814	-74.38	-3.20	$31,255	-53.37	E	-3.36	$29,734	-111.04	6.78	-$14,753	340.54
$4.3m	O	-1.79	$55,773	-76.17	-0.55	$181,601	-53.92	E	-3.39	$29,474	-114.43	6.74	-$14,840	347.28
$4.4m	R	-1.79	$55,733	-77.96	-1.65	$60,559	-55.57	E	-3.42	$29,220	-117.85	6.70	-$14,925	353.98
$4.5m	H	-1.80	$55,703	-79.76	-1.51	$66,238	-57.08	E	-3.45	$28,975	-121.30	6.66	-$15,010	360.64
$4.6m	G	-1.80	$55,644	-81.56	-3.45	$28,945	-60.54	E	-3.48	$28,733	-124.78	6.63	-$15,093	367.27
$4.7m	O	-1.80	$55,619	-83.35	-0.55	$181,097	-61.09	E	-3.51	$28,500	-128.29	6.59	-$15,176	373.86
$4.8m	C	-1.80	$55,609	-85.15	-1.62	$61,691	-62.71	E	-3.54	$28,270	-131.83	6.55	-$15,258	380.41

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$4.9m	R	-1.80	$55,594	-86.95	-1.66	$60,408	-64.37	E	-3.57	$28,047	-135.40	6.52	-$15,339	386.93
$5.0m	H	-1.80	$55,587	-88.75	-1.51	$66,100	-65.88	E	-3.59	$27,829	-138.99	6.49	-$15,419	393.41
$5.1m	H	-1.80	$55,471	-90.55	-1.52	$65,962	-67.40	E	-3.62	$27,615	-142.61	6.45	-$15,498	399.87
$5.2m	O	-1.80	$55,463	-92.36	-0.55	$180,591	-67.95	E	-3.65	$27,406	-146.26	6.42	-$15,577	406.29
$5.3m	R	-1.80	$55,455	-94.16	-1.66	$60,256	-69.61	M	-1.92	$52,170	-148.18	0.18	-$548,002	406.47
$5.4m	C	-1.81	$55,387	-95.96	-1.63	$61,444	-71.24	Q	-1.91	$52,239	-150.09	0.10	-$1.02m	406.57
$5.5m	H	-1.81	$55,354	-97.77	-1.52	$65,823	-72.76	O	-1.75	$56,981	-151.85	-0.54	$185,534	406.03
$5.6m	R	-1.81	$55,315	-99.58	-1.66	$60,104	-74.42	O	-1.76	$56,833	-153.60	-0.54	$185,052	405.49
$5.7m	O	-1.81	$55,307	-101.39	-0.56	$180,082	-74.97	O	-1.76	$56,684	-155.37	-0.54	$184,567	404.95
$5.8m	H	-1.81	$55,236	-103.20	-1.52	$65,683	-76.50	O	-1.77	$56,534	-157.14	-0.54	$184,079	404.40
$5.9m	R	-1.81	$55,175	-105.01	-1.67	$59,952	-78.16	O	-1.77	$56,384	-158.91	-0.54	$183,589	403.86
$6.0m	C	-1.81	$55,162	-106.82	-1.63	$61,195	-79.80	O	-1.78	$56,232	-160.69	-0.55	$183,096	403.31
$6.1m	O	-1.81	$55,149	-108.64	-0.56	$179,569	-80.36	O	-1.78	$56,081	-162.47	-0.55	$182,600	402.76
$6.2m	H	-1.81	$55,119	-110.45	-1.53	$65,543	-81.88	O	-1.79	$55,927	-164.26	-0.55	$182,103	402.22
$6.3m	R	-1.82	$55,034	-112.27	-1.67	$59,799	-83.55	O	-1.79	$55,773	-166.05	-0.55	$181,601	401.66
$6.4m	E	-1.82	$55,023	-114.09	10.22	-$9,788	-73.34	O	-1.80	$55,619	-167.85	-0.55	$181,097	401.11
$6.5m	H	-1.82	$55,000	-115.90	-1.53	$65,402	-74.87	O	-1.80	$55,463	-169.65	-0.55	$180,591	400.56
$6.6m	O	-1.82	$54,991	-117.72	-0.56	$179,054	-75.42	O	-1.81	$55,307	-171.46	-0.56	$180,082	400.00
$6.7m	C	-1.82	$54,935	-119.54	-1.64	$60,943	-77.07	O	-1.81	$55,149	-173.28	-0.56	$179,569	399.45
$6.8m	R	-1.82	$54,893	-121.36	-1.68	$59,646	-78.74	O	-1.82	$54,991	-175.09	-0.56	$179,054	398.89
$6.9m	U	-1.82	$54,891	-123.19	-3.25	$30,738	-82.00	O	-1.82	$54,832	-176.92	-0.56	$178,536	398.33
$7.0m	H	-1.82	$54,881	-125.01	-1.53	$65,261	-83.53	O	-1.83	$54,672	-178.75	-0.56	$178,014	397.77
$7.1m	O	-1.82	$54,832	-126.83	-0.56	$178,536	-84.09	O	-1.83	$54,511	-180.58	-0.56	$177,490	397.20
$7.2m	H	-1.83	$54,762	-128.66	-1.54	$65,119	-85.62	O	-1.84	$54,349	-182.42	-0.57	$176,963	396.64
$7.3m	R	-1.83	$54,752	-130.48	-1.68	$59,492	-87.30	O	-1.85	$54,186	-184.27	-0.57	$176,432	396.07
$7.4m	C	-1.83	$54,707	-132.31	-1.65	$60,690	-88.95	O	-1.85	$54,022	-186.12	-0.57	$175,898	395.50
$7.5m	O	-1.83	$54,672	-134.14	-0.56	$178,014	-89.51	O	-1.86	$53,857	-187.98	-0.57	$175,362	394.93
$7.6m	H	-1.83	$54,642	-135.97	-1.54	$64,976	-91.05	O	-1.86	$53,691	-189.84	-0.57	$174,819	394.36
$7.7m	R	-1.83	$54,610	-137.80	-1.69	$59,339	-92.74	O	-1.87	$53,524	-191.71	-0.57	$174,277	393.79
$7.8m	H	-1.83	$54,521	-139.64	-1.54	$64,833	-94.28	O	-1.87	$53,356	-193.58	-0.58	$173,729	393.21
$7.9m	O	-1.83	$54,511	-141.47	-0.56	$177,490	-94.84	O	-1.88	$53,187	-195.46	-0.58	$173,181	392.63
$8.0m	C	-1.84	$54,476	-143.31	-1.65	$60,434	-96.50	O	-1.89	$53,017	-197.35	-0.58	$172,625	392.05
$8.1m	R	-1.84	$54,468	-145.14	-1.69	$59,184	-98.19	O	-1.89	$52,845	-199.24	-0.58	$172,067	391.47
$8.2m	H	-1.84	$54,400	-146.98	-1.55	$64,689	-99.73	O	-1.90	$52,673	-201.14	-0.58	$171,506	390.89
$8.3m	O	-1.84	$54,349	-148.82	-0.57	$176,963	-100.30	O	-1.90	$52,499	-203.04	-0.59	$170,940	390.30
$8.4m	R	-1.84	$54,325	-150.66	-1.69	$59,029	-101.99	O	-1.91	$52,325	-204.95	-0.59	$170,372	389.72
$8.5m	H	-1.84	$54,279	-152.50	-1.55	$64,544	-103.54	O	-1.92	$52,149	-206.87	-0.59	$169,797	389.13
$8.6m	C	-1.84	$54,244	-154.35	-1.66	$60,177	-105.20	O	-1.92	$51,972	-208.80	-0.59	$169,225	388.54
$8.7m	O	-1.85	$54,186	-156.19	-0.57	$176,432	-105.77	O	-1.93	$51,793	-210.73	-0.59	$168,640	387.94
$8.8m	R	-1.85	$54,183	-158.04	-1.70	$58,874	-107.47	O	-1.94	$51,614	-212.66	-0.60	$168,059	387.35
$8.9m	H	-1.85	$54,157	-159.88	-1.55	$64,399	-109.02	O	-1.94	$51,433	-214.61	-0.60	$167,468	386.75
$9.0m	R	-1.85	$54,040	-161.74	-1.70	$58,719	-110.73	O	-1.95	$51,251	-216.56	-0.60	$166,875	386.15
$9.1m	H	-1.85	$54,034	-163.59	-1.56	$64,253	-112.28	O	-1.96	$51,068	-218.52	-0.60	$166,279	385.55
$9.2m	O	-1.85	$54,022	-165.44	-0.57	$175,898	-112.85	O	-1.97	$50,883	-220.48	-0.60	$165,678	384.95
$9.3m	C	-1.85	$54,010	-167.29	-1.67	$59,917	-114.52	O	-1.97	$50,697	-222.45	-0.61	$165,071	384.34
$9.4m	U	-1.85	$53,953	-169.14	-3.31	$30,213	-117.83	O	-1.98	$50,510	-224.43	-0.61	$164,463	383.73
$9.5m	H	-1.85	$53,911	-171.00	-1.56	$64,107	-119.39	O	-1.99	$50,321	-226.42	-0.61	$163,846	383.12
$9.6m	R	-1.86	$53,896	-172.85	-1.71	$58,563	-121.10	O	-1.99	$50,130	-228.42	-0.61	$163,228	382.51
$9.7m	O	-1.86	$53,857	-174.71	-0.57	$175,362	-121.67	O	-2.00	$49,939	-230.42	-0.61	$162,602	381.90
$9.8m	H	-1.86	$53,787	-176.57	-1.56	$63,959	-123.23	O	-2.01	$49,745	-232.43	-0.62	$161,975	381.28
$9.9m	C	-1.86	$53,774	-178.43	-1.68	$59,654	-124.91	O	-2.02	$49,551	-234.45	-0.62	$161,340	380.66

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$10.0m	R	-1.86	$53,752	-180.29	-1.71	$58,406	-126.62	O	-2.03	$49,355	-236.47	-0.62	$160,699	380.04
$10.1m	O	-1.86	$53,691	-182.15	-0.57	$174,819	-127.19	O	-2.03	$49,157	-238.51	-0.62	$160,059	379.41
$10.2m	H	-1.86	$53,663	-184.01	-1.57	$63,811	-128.76	O	-2.04	$48,957	-240.55	-0.63	$159,406	378.78
$10.3m	R	-1.87	$53,608	-185.88	-1.72	$58,250	-130.47	O	-2.05	$48,756	-242.60	-0.63	$158,753	378.16
$10.4m	H	-1.87	$53,538	-187.75	-1.57	$63,663	-132.05	O	-2.06	$48,553	-244.66	-0.63	$158,093	377.52
$10.5m	C	-1.87	$53,535	-189.62	-1.68	$59,390	-133.73	O	-2.07	$48,349	-246.73	-0.64	$157,428	376.89
$10.6m	O	-1.87	$53,524	-191.48	-0.57	$174,277	-134.30	O	-2.08	$48,143	-248.81	-0.64	$156,755	376.25
$10.7m	R	-1.87	$53,463	-193.35	-1.72	$58,093	-136.02	O	-2.09	$47,935	-250.89	-0.64	$156,079	375.61
$10.8m	E	-1.87	$53,427	-195.23	10.02	-$9,981	-126.01	O	-2.10	$47,726	-252.99	-0.64	$155,395	374.97
$10.9m	H	-1.87	$53,412	-197.10	-1.57	$63,514	-127.58	O	-2.10	$47,513	-255.09	-0.65	$154,705	374.32
$11.0m	O	-1.87	$53,356	-198.97	-0.58	$173,729	-128.16	O	-2.11	$47,301	-257.21	-0.65	$154,012	373.67
$11.1m	R	-1.88	$53,318	-200.85	-1.73	$57,935	-129.88	O	-2.12	$47,083	-259.33	-0.65	$153,308	373.02
$11.2m	C	-1.88	$53,294	-202.72	-1.69	$59,123	-131.57	O	-2.13	$46,867	-261.46	-0.66	$152,602	372.36
$11.3m	H	-1.88	$53,286	-204.60	-1.58	$63,364	-133.15	O	-2.14	$46,648	-263.61	-0.66	$151,886	371.70
$11.4m	O	-1.88	$53,187	-206.48	-0.58	$173,181	-133.73	O	-2.15	$46,425	-265.76	-0.66	$151,165	371.04
$11.5m	R	-1.88	$53,173	-208.36	-1.73	$57,777	-135.46	O	-2.16	$46,202	-267.93	-0.66	$150,437	370.38
$11.6m	H	-1.88	$53,159	-210.24	-1.58	$63,213	-137.04	O	-2.18	$45,975	-270.10	-0.67	$149,701	369.71
$11.7m	W	-1.88	$53,096	-212.13	-2.42	$41,382	-139.46	O	-2.19	$45,748	-272.29	-0.67	$148,956	369.04
$11.8m	C	-1.88	$53,052	-214.01	-1.70	$58,854	-141.16	O	-2.20	$45,519	-274.48	-0.67	$148,207	368.36
$11.9m	H	-1.89	$53,032	-215.90	-1.59	$63,062	-142.74	O	-2.21	$45,284	-276.69	-0.68	$147,449	367.68
$12.0m	R	-1.89	$53,027	-217.78	-1.74	$57,618	-144.48	O	-2.22	$45,049	-278.91	-0.68	$146,683	367.00
$12.1m	O	-1.89	$53,017	-219.67	-0.58	$172,625	-145.06	O	-2.23	$44,813	-281.14	-0.69	$145,909	366.32
$12.2m	U	-1.89	$52,998	-221.56	-3.37	$29,678	-148.43	O	-2.24	$44,571	-283.39	-0.69	$145,127	365.63
$12.3m	H	-1.89	$52,904	-223.45	-1.59	$62,909	-150.02	O	-2.26	$44,328	-285.64	-0.69	$144,336	364.94
$12.4m	R	-1.89	$52,881	-225.34	-1.74	$57,459	-151.76	O	-2.27	$44,082	-287.91	-0.70	$143,536	364.24
$12.5m	O	-1.89	$52,845	-227.23	-0.58	$172,067	-152.34	O	-2.28	$43,835	-290.19	-0.70	$142,727	363.54
$12.6m	C	-1.89	$52,806	-229.12	-1.71	$58,582	-154.05	O	-2.29	$43,584	-292.49	-0.70	$141,910	362.83
$12.7m	H	-1.89	$52,775	-231.02	-1.59	$62,757	-155.64	O	-2.31	$43,329	-294.80	-0.71	$141,082	362.13
$12.8m	R	-1.90	$52,734	-232.91	-1.75	$57,300	-157.38	O	-2.32	$43,072	-297.12	-0.71	$140,245	361.41
$12.9m	O	-1.90	$52,673	-234.81	-0.58	$171,506	-157.97	O	-2.34	$42,810	-299.45	-0.72	$139,396	360.69
$13.0m	H	-1.90	$52,646	-236.71	-1.60	$62,603	-159.56	O	-2.35	$42,550	-301.80	-0.72	$138,539	359.97
$13.1m	G	-1.90	$52,621	-238.61	-3.65	$27,373	-163.22	O	-2.37	$42,282	-304.17	-0.73	$137,671	359.25
$13.2m	R	-1.90	$52,586	-240.51	-1.75	$57,140	-164.97	O	-2.38	$42,012	-306.55	-0.73	$136,791	358.52
$13.3m	C	-1.90	$52,559	-242.42	-1.72	$58,308	-166.68	O	-2.40	$41,736	-308.95	-0.74	$135,899	357.78
$13.4m	H	-1.90	$52,517	-244.32	-1.60	$62,448	-168.28	O	-2.41	$41,461	-311.36	-0.74	$134,996	357.04
$13.5m	O	-1.90	$52,499	-246.23	-0.59	$170,940	-168.87	O	-2.43	$41,179	-313.79	-0.75	$134,081	356.29
$13.6m	R	-1.91	$52,439	-248.13	-1.76	$56,980	-170.62	O	-2.45	$40,893	-316.23	-0.75	$133,154	355.54
$13.7m	H	-1.91	$52,386	-250.04	-1.61	$62,294	-172.23	O	-2.46	$40,606	-318.69	-0.76	$132,212	354.79
$13.8m	O	-1.91	$52,325	-251.95	-0.59	$170,372	-172.82	O	-2.48	$40,311	-321.17	-0.76	$131,256	354.02
$13.9m	C	-1.91	$52,309	-253.86	-1.72	$58,030	-174.54	O	-2.50	$40,014	-323.67	-0.77	$130,290	353.26
$14.0m	R	-1.91	$52,291	-255.78	-1.76	$56,819	-176.30	O	-2.52	$39,712	-326.19	-0.77	$129,304	352.48
$14.1m	H	-1.91	$52,255	-257.69	-1.61	$62,138	-177.91	O	-2.54	$39,406	-328.73	-0.78	$128,307	351.70
$14.2m	Q	-1.91	$52,239	-259.60	0.10	-$1.02m	-177.81	O	-2.56	$39,093	-331.29	-0.79	$127,293	350.92
$14.3m	M	-1.92	$52,170	-261.52	0.18	-$548,002	-177.63	O	-2.58	$38,778	-333.87	-0.79	$126,261	350.13
$14.4m	O	-1.92	$52,149	-263.44	-0.59	$169,797	-178.22	O	-2.60	$38,456	-336.47	-0.80	$125,213	349.33
$14.5m	R	-1.92	$52,143	-265.36	-1.76	$56,658	-179.98	O	-2.62	$38,129	-339.09	-0.81	$124,148	348.52
$14.6m	H	-1.92	$52,123	-267.28	-1.61	$61,981	-181.60	O	-2.65	$37,796	-341.73	-0.81	$123,063	347.71
$14.7m	C	-1.92	$52,058	-269.20	-1.73	$57,751	-183.33	O	-2.67	$37,456	-344.40	-0.82	$121,960	346.89
$14.8m	U	-1.92	$52,025	-271.12	-3.43	$29,133	-186.76	O	-2.69	$37,111	-347.10	-0.83	$120,834	346.06
$14.9m	R	-1.92	$51,994	-273.04	-1.77	$56,496	-188.53	O	-2.72	$36,759	-349.82	-0.84	$119,690	345.23
$15.0m	H	-1.92	$51,991	-274.97	-1.62	$61,823	-190.15	O	-2.75	$36,399	-352.57	-0.84	$118,521	344.38

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$15.1m	O	-1.92	$51,972	-276.89	-0.59	$169,225	-190.74	O	-2.78	$36,035	-355.34	-0.85	$117,331	343.53
$15.2m	E	-1.92	$51,963	-278.81	9.83	-$10,168	-180.90	O	-2.80	$35,662	-358.15	-0.86	$116,114	342.67
$15.3m	D	-1.93	$51,942	-280.74	-5.98	$16,720	-186.88	O	-2.83	$35,280	-360.98	-0.87	$114,873	341.80
$15.4m	H	-1.93	$51,858	-282.67	-1.62	$61,665	-188.51	O	-2.87	$34,889	-363.85	-0.88	$113,603	340.92
$15.5m	R	-1.93	$51,845	-284.60	-1.78	$56,334	-190.28	O	-2.90	$34,491	-366.75	-0.89	$112,304	340.03
$15.6m	C	-1.93	$51,803	-286.53	-1.74	$57,468	-192.02	O	-2.93	$34,082	-369.68	-0.90	$110,974	339.13
$15.7m	O	-1.93	$51,793	-288.46	-0.59	$168,640	-192.61	O	-2.97	$33,664	-372.65	-0.91	$109,613	338.21
$15.8m	H	-1.93	$51,724	-290.39	-1.63	$61,506	-194.24	O	-3.01	$33,236	-375.66	-0.92	$108,216	337.29
$15.9m	R	-1.93	$51,695	-292.33	-1.78	$56,172	-196.02	O	-3.05	$32,794	-378.71	-0.94	$106,783	336.35
$16.0m	O	-1.94	$51,614	-294.26	-0.60	$168,059	-196.62	O	-3.09	$32,343	-381.80	-0.95	$105,309	335.40
$16.1m	H	-1.94	$51,589	-296.20	-1.63	$61,346	-198.25	O	-3.14	$31,878	-384.94	-0.96	$103,793	334.44
$16.2m	C	-1.94	$51,546	-298.14	-1.75	$57,183	-199.99	O	-3.19	$31,397	-388.12	-0.98	$102,233	333.46
$16.3m	R	-1.94	$51,545	-300.08	-1.79	$56,008	-201.78	O	-3.24	$30,903	-391.36	-0.99	$100,621	332.47
$16.4m	H	-1.94	$51,454	-302.02	-1.63	$61,185	-203.41	O	-3.29	$30,391	-394.65	-1.01	$98,957	331.46
$16.5m	O	-1.94	$51,433	-303.97	-0.60	$167,468	-204.01	O	-3.35	$29,863	-398.00	-1.03	$97,236	330.43
$16.6m	R	-1.95	$51,395	-305.91	-1.79	$55,845	-205.80	O	-3.41	$29,314	-401.41	-1.05	$95,450	329.38
$16.7m	H	-1.95	$51,318	-307.86	-1.64	$61,023	-207.44	O	-3.48	$28,746	-404.89	-1.07	$93,596	328.31
$16.8m	C	-1.95	$51,286	-309.81	-1.76	$56,895	-209.20	O	-3.55	$28,152	-408.44	-1.09	$91,664	327.22
$16.9m	O	-1.95	$51,251	-311.76	-0.60	$166,875	-209.80	O	-3.63	$27,533	-412.07	-1.12	$89,648	326.11
$17.0m	R	-1.95	$51,244	-313.72	-1.80	$55,681	-211.59	O	-3.72	$26,885	-415.79	-1.14	$87,537	324.96
$17.1m	H	-1.95	$51,181	-315.67	-1.64	$60,861	-213.24	O	-3.82	$26,203	-419.61	-1.17	$85,318	323.79
$17.2m	R	-1.96	$51,092	-317.63	-1.80	$55,516	-215.04	O	-3.92	$25,484	-423.53	-1.21	$82,978	322.59
$17.3m	O	-1.96	$51,068	-319.59	-0.60	$166,279	-215.64	O	-4.04	$24,722	-427.58	-1.24	$80,497	321.35
$17.4m	H	-1.96	$51,044	-321.54	-1.65	$60,698	-217.29	O	-4.18	$23,910	-431.76	-1.28	$77,853	320.06
$17.5m	U	-1.96	$51,034	-323.50	-3.50	$28,578	-220.79	O	-4.34	$23,039	-436.10	-1.33	$75,016	318.73
$17.6m	C	-1.96	$51,024	-325.46	-1.77	$56,604	-222.55	O	-4.53	$22,096	-440.63	-1.39	$71,945	317.34
$17.7m	R	-1.96	$50,941	-327.43	-1.81	$55,351	-224.36	O	-4.75	$21,065	-445.37	-1.46	$68,586	315.88
$17.8m	H	-1.96	$50,906	-329.39	-1.65	$60,533	-226.01	H	-1.75	$57,058	-447.13	-1.47	$67,849	314.41
$17.9m	O	-1.97	$50,883	-331.36	-0.60	$165,678	-226.61	H	-1.76	$56,948	-448.88	-1.48	$67,718	312.93
$18.0m	R	-1.97	$50,788	-333.33	-1.81	$55,186	-228.43	H	-1.76	$56,837	-450.64	-1.48	$67,586	311.45
$18.1m	H	-1.97	$50,767	-335.30	-1.66	$60,368	-230.08	H	-1.76	$56,726	-452.40	-1.48	$67,454	309.97
$18.2m	C	-1.97	$50,759	-337.27	-1.78	$56,310	-231.86	H	-1.77	$56,614	-454.17	-1.49	$67,321	308.48
$18.3m	O	-1.97	$50,697	-339.24	-0.61	$165,071	-232.47	H	-1.77	$56,501	-455.94	-1.49	$67,187	306.99
$18.4m	R	-1.97	$50,635	-341.21	-1.82	$55,020	-234.28	H	-1.77	$56,389	-457.71	-1.49	$67,053	305.50
$18.5m	H	-1.98	$50,627	-343.19	-1.66	$60,202	-235.94	H	-1.78	$56,276	-459.49	-1.49	$66,919	304.01
$18.6m	E	-1.98	$50,613	-345.16	9.66	-$10,348	-226.28	H	-1.78	$56,162	-461.27	-1.50	$66,784	302.51
$18.7m	O	-1.98	$50,510	-347.14	-0.61	$164,463	-226.89	H	-1.78	$56,048	-463.05	-1.50	$66,648	301.01
$18.8m	C	-1.98	$50,491	-349.12	-1.79	$56,013	-228.67	H	-1.79	$55,934	-464.84	-1.50	$66,512	299.51
$18.9m	H	-1.98	$50,487	-351.10	-1.67	$60,035	-230.34	H	-1.79	$55,819	-466.63	-1.51	$66,375	298.00
$19.0m	R	-1.98	$50,482	-353.09	-1.82	$54,853	-232.16	H	-1.80	$55,703	-468.43	-1.51	$66,238	296.49
$19.1m	H	-1.99	$50,345	-355.07	-1.67	$59,867	-233.83	H	-1.80	$55,587	-470.23	-1.51	$66,100	294.98
$19.2m	R	-1.99	$50,329	-357.06	-1.83	$54,686	-235.66	H	-1.80	$55,471	-472.03	-1.52	$65,962	293.46
$19.3m	O	-1.99	$50,321	-359.05	-0.61	$163,846	-236.27	H	-1.81	$55,354	-473.84	-1.52	$65,823	291.94
$19.4m	C	-1.99	$50,220	-361.04	-1.79	$55,712	-238.07	H	-1.81	$55,236	-475.65	-1.52	$65,683	290.42
$19.5m	H	-1.99	$50,203	-363.03	-1.68	$59,698	-239.74	H	-1.81	$55,119	-477.46	-1.53	$65,543	288.89
$19.6m	R	-1.99	$50,175	-365.02	-1.83	$54,519	-241.58	H	-1.82	$55,000	-479.28	-1.53	$65,402	287.36
$19.7m	O	-1.99	$50,130	-367.02	-0.61	$163,228	-242.19	H	-1.82	$54,881	-481.10	-1.53	$65,261	285.83
$19.8m	H	-2.00	$50,063	-369.01	-1.68	$59,528	-243.87	H	-1.83	$54,762	-482.93	-1.54	$65,119	284.30
$19.9m	U	-2.00	$50,023	-371.01	-3.57	$28,012	-247.44	H	-1.83	$54,642	-484.76	-1.54	$64,976	282.76
$20.0m	R	-2.00	$50,020	-373.01	-1.84	$54,351	-249.28	O	-5.02	$19,920	-489.78	-1.54	$64,861	281.22
$20.1m	C	-2.00	$49,947	-375.02	-1.80	$55,409	-251.08	H	-1.83	$54,521	-491.61	-1.54	$64,833	279.67

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$20.2m	O	-2.00	$49,939	-377.02	-0.61	$162,602	-251.70	H	-1.84	$54,400	-493.45	-1.55	$64,689	278.13
$20.3m	H	-2.00	$49,915	-379.02	-1.68	$59,357	-253.38	H	-1.84	$54,279	-495.29	-1.55	$64,544	276.58
$20.4m	R	-2.01	$49,865	-381.03	-1.85	$54,182	-255.23	H	-1.85	$54,157	-497.14	-1.55	$64,399	275.03
$20.5m	H	-2.01	$49,774	-383.04	-1.69	$59,186	-256.92	H	-1.85	$54,034	-498.99	-1.56	$64,253	273.47
$20.6m	O	-2.01	$49,745	-385.05	-0.62	$161,975	-257.54	H	-1.85	$53,911	-500.85	-1.56	$64,107	271.91
$20.7m	R	-2.01	$49,709	-387.06	-1.85	$54,013	-259.39	H	-1.86	$53,787	-502.70	-1.56	$63,959	270.35
$20.8m	C	-2.01	$49,670	-389.07	-1.81	$55,102	-261.20	H	-1.86	$53,663	-504.57	-1.57	$63,811	268.78
$20.9m	H	-2.02	$49,628	-391.09	-1.69	$59,013	-262.90	H	-1.87	$53,538	-506.44	-1.57	$63,663	267.21
$21.0m	R	-2.02	$49,553	-393.10	-1.86	$53,844	-264.75	H	-1.87	$53,412	-508.31	-1.57	$63,514	265.63
$21.1m	O	-2.02	$49,551	-395.12	-0.62	$161,340	-265.37	C	-1.75	$57,122	-510.06	-1.58	$63,369	264.06
$21.2m	H	-2.02	$49,480	-397.14	-1.70	$58,839	-267.07	H	-1.88	$53,286	-511.94	-1.58	$63,364	262.48
$21.3m	R	-2.02	$49,396	-399.17	-1.86	$53,674	-268.94	H	-1.88	$53,159	-513.82	-1.58	$63,213	260.90
$21.4m	C	-2.02	$49,390	-401.19	-1.83	$54,791	-270.76	C	-1.76	$56,911	-515.57	-1.58	$63,135	259.31
$21.5m	E	-2.03	$49,363	-403.22	9.50	-$10,522	-261.26	H	-1.89	$53,032	-517.46	-1.59	$63,062	257.73
$21.6m	O	-2.03	$49,355	-405.24	-0.62	$160,699	-261.88	H	-1.89	$52,904	-519.35	-1.59	$62,909	256.14
$21.7m	H	-2.03	$49,334	-407.27	-1.70	$58,664	-263.58	C	-1.76	$56,698	-521.11	-1.59	$62,899	254.55
$21.8m	R	-2.03	$49,239	-409.30	-1.87	$53,503	-265.45	H	-1.89	$52,775	-523.01	-1.59	$62,757	252.95
$21.9m	G	-2.03	$49,202	-411.33	-3.91	$25,594	-269.36	C	-1.77	$56,484	-524.78	-1.60	$62,661	251.36
$22.0m	H	-2.03	$49,186	-413.37	-1.71	$58,488	-271.07	H	-1.90	$52,646	-526.68	-1.60	$62,603	249.76
$22.1m	O	-2.03	$49,157	-415.40	-0.62	$160,059	-271.69	H	-1.90	$52,517	-528.58	-1.60	$62,448	248.16
$22.2m	C	-2.04	$49,107	-417.44	-1.84	$54,477	-273.53	C	-1.78	$56,268	-530.36	-1.60	$62,421	246.56
$22.3m	R	-2.04	$49,082	-419.48	-1.88	$53,332	-275.41	H	-1.91	$52,386	-532.27	-1.61	$62,294	244.95
$22.4m	H	-2.04	$49,036	-421.51	-1.71	$58,312	-277.12	C	-1.78	$56,050	-534.05	-1.61	$62,180	243.34
$22.5m	U	-2.04	$48,991	-423.56	-3.65	$27,434	-280.77	H	-1.91	$52,255	-535.97	-1.61	$62,138	241.73
$22.6m	O	-2.04	$48,957	-425.60	-0.63	$159,406	-281.39	R	-1.75	$57,106	-537.72	-1.61	$62,051	240.12
$22.7m	R	-2.04	$48,924	-427.64	-1.88	$53,160	-283.27	H	-1.92	$52,123	-539.64	-1.61	$61,981	238.51
$22.8m	H	-2.05	$48,888	-429.69	-1.72	$58,133	-284.99	C	-1.79	$55,831	-541.43	-1.61	$61,937	236.89
$22.9m	C	-2.05	$48,820	-431.74	-1.85	$54,160	-286.84	R	-1.76	$56,970	-543.18	-1.62	$61,903	235.28
$23.0m	W	-2.05	$48,800	-433.79	-2.63	$38,034	-289.47	H	-1.92	$51,991	-545.11	-1.62	$61,823	233.66
$23.1m	R	-2.05	$48,766	-435.84	-1.89	$52,987	-291.36	R	-1.76	$56,834	-546.87	-1.62	$61,755	232.04
$23.2m	O	-2.05	$48,756	-437.89	-0.63	$158,753	-291.99	C	-1.80	$55,609	-548.66	-1.62	$61,691	230.42
$23.3m	H	-2.05	$48,738	-439.94	-1.73	$57,954	-293.71	H	-1.93	$51,858	-550.59	-1.62	$61,665	228.80
$23.4m	R	-2.06	$48,605	-442.00	-1.89	$52,815	-295.61	R	-1.76	$56,698	-552.36	-1.62	$61,607	227.18
$23.5m	H	-2.06	$48,586	-444.05	-1.73	$57,773	-297.34	H	-1.93	$51,724	-554.29	-1.63	$61,506	225.55
$23.6m	O	-2.06	$48,553	-446.11	-0.63	$158,093	-297.97	R	-1.77	$56,561	-556.06	-1.63	$61,458	223.92
$23.7m	C	-2.06	$48,530	-448.17	-1.86	$53,838	-299.83	C	-1.81	$55,387	-557.86	-1.63	$61,444	222.30
$23.8m	R	-2.06	$48,447	-450.24	-1.90	$52,643	-301.73	H	-1.94	$51,589	-559.80	-1.63	$61,346	220.67
$23.9m	H	-2.06	$48,431	-452.30	-1.74	$57,594	-303.46	R	-1.77	$56,424	-561.57	-1.63	$61,309	219.03
$24.0m	O	-2.07	$48,349	-454.37	-0.64	$157,428	-304.10	C	-1.81	$55,162	-563.39	-1.63	$61,195	217.40
$24.1m	R	-2.07	$48,286	-456.44	-1.91	$52,466	-306.00	H	-1.94	$51,454	-565.33	-1.63	$61,185	215.77
$24.2m	H	-2.07	$48,281	-458.51	-1.74	$57,409	-307.75	R	-1.78	$56,286	-567.11	-1.64	$61,160	214.13
$24.3m	C	-2.07	$48,237	-460.59	-1.87	$53,513	-309.61	H	-1.95	$51,318	-569.05	-1.64	$61,023	212.49
$24.4m	E	-2.07	$48,201	-462.66	9.35	-$10,691	-300.26	R	-1.78	$56,149	-570.84	-1.64	$61,011	210.85
$24.5m	O	-2.08	$48,143	-464.74	-0.64	$156,755	-300.90	C	-1.82	$54,935	-572.66	-1.64	$60,943	209.21
$24.6m	R	-2.08	$48,126	-466.82	-1.91	$52,293	-302.81	H	-1.95	$51,181	-574.61	-1.64	$60,861	207.57
$24.7m	H	-2.08	$48,123	-468.89	-1.75	$57,228	-304.56	R	-1.79	$56,010	-576.40	-1.64	$60,860	205.93
$24.8m	H	-2.08	$47,971	-470.98	-1.75	$57,039	-306.31	R	-1.79	$55,872	-578.19	-1.65	$60,710	204.28
$24.9m	R	-2.08	$47,966	-473.06	-1.92	$52,119	-308.23	H	-1.96	$51,044	-580.14	-1.65	$60,698	202.63
$25.0m	C	-2.09	$47,941	-475.15	-1.88	$53,184	-310.11	C	-1.83	$54,707	-581.97	-1.65	$60,690	200.98
$25.1m	U	-2.09	$47,937	-477.24	-3.73	$26,844	-313.84	O	-5.37	$18,625	-587.34	-1.65	$60,645	199.33
$25.2m	O	-2.09	$47,935	-479.32	-0.64	$156,079	-314.48	R	-1.79	$55,733	-589.14	-1.65	$60,559	197.68

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$25.3m	H	-2.09	$47,813	-481.41	-1.76	$56,857	-316.23	H	-1.96	$50,906	-591.10	-1.65	$60,533	196.03
$25.4m	R	-2.09	$47,801	-483.51	-1.93	$51,940	-318.16	C	-1.84	$54,476	-592.94	-1.65	$60,434	194.38
$25.5m	O	-2.10	$47,726	-485.60	-0.64	$155,395	-318.80	R	-1.80	$55,594	-594.73	-1.66	$60,408	192.72
$25.6m	H	-2.10	$47,655	-487.70	-1.76	$56,667	-320.57	H	-1.97	$50,767	-596.70	-1.66	$60,368	191.06
$25.7m	R	-2.10	$47,642	-489.80	-1.93	$51,768	-322.50	R	-1.80	$55,455	-598.51	-1.66	$60,256	189.40
$25.8m	C	-2.10	$47,640	-491.90	-1.89	$52,850	-324.39	H	-1.98	$50,627	-600.48	-1.66	$60,202	187.74
$25.9m	O	-2.10	$47,513	-494.00	-0.65	$154,705	-325.04	C	-1.84	$54,244	-602.33	-1.66	$60,177	186.08
$26.0m	H	-2.11	$47,495	-496.11	-1.77	$56,481	-326.81	R	-1.81	$55,315	-604.13	-1.66	$60,104	184.42
$26.1m	R	-2.11	$47,477	-498.21	-1.94	$51,586	-328.75	H	-1.98	$50,487	-606.11	-1.67	$60,035	182.75
$26.2m	H	-2.11	$47,337	-500.33	-1.78	$56,287	-330.52	R	-1.81	$55,175	-607.93	-1.67	$59,952	181.08
$26.3m	C	-2.11	$47,335	-502.44	-1.90	$52,512	-332.43	C	-1.85	$54,010	-609.78	-1.67	$59,917	179.42
$26.4m	R	-2.11	$47,315	-504.55	-1.95	$51,411	-334.37	H	-1.99	$50,345	-611.77	-1.67	$59,867	177.75
$26.5m	O	-2.11	$47,301	-506.67	-0.65	$154,012	-335.02	R	-1.82	$55,034	-613.58	-1.67	$59,799	176.07
$26.6m	H	-2.12	$47,176	-508.79	-1.78	$56,098	-336.81	H	-1.99	$50,203	-615.57	-1.68	$59,698	174.40
$26.7m	R	-2.12	$47,150	-510.91	-1.95	$51,232	-338.76	C	-1.86	$53,774	-617.43	-1.68	$59,654	172.72
$26.8m	E	-2.12	$47,118	-513.03	9.21	-$10,854	-329.54	R	-1.82	$54,893	-619.26	-1.68	$59,646	171.04
$26.9m	O	-2.12	$47,083	-515.15	-0.65	$153,308	-330.20	H	-2.00	$50,063	-621.25	-1.68	$59,528	169.37
$27.0m	C	-2.13	$47,027	-517.28	-1.92	$52,170	-332.11	R	-1.83	$54,752	-623.08	-1.68	$59,492	167.68
$27.1m	H	-2.13	$47,015	-519.41	-1.79	$55,907	-333.90	C	-1.87	$53,535	-624.95	-1.68	$59,390	166.00
$27.2m	R	-2.13	$46,986	-521.54	-1.96	$51,054	-335.86	H	-2.00	$49,915	-626.95	-1.68	$59,357	164.32
$27.3m	D	-2.13	$46,959	-523.67	-6.62	$15,116	-342.48	R	-1.83	$54,610	-628.78	-1.69	$59,339	162.63
$27.4m	O	-2.13	$46,867	-525.80	-0.66	$152,602	-343.13	H	-2.01	$49,774	-630.79	-1.69	$59,186	160.94
$27.5m	U	-2.13	$46,860	-527.93	-3.81	$26,241	-346.94	R	-1.84	$54,468	-632.63	-1.69	$59,184	159.25
$27.6m	H	-2.13	$46,852	-530.07	-1.79	$55,713	-348.74	C	-1.88	$53,294	-634.50	-1.69	$59,123	157.56
$27.7m	R	-2.14	$46,819	-532.20	-1.97	$50,875	-350.70	R	-1.84	$54,325	-636.34	-1.69	$59,029	155.87
$27.8m	C	-2.14	$46,715	-534.34	-1.93	$51,824	-352.63	H	-2.02	$49,628	-638.36	-1.69	$59,013	154.17
$27.9m	H	-2.14	$46,688	-536.49	-1.80	$55,515	-354.43	R	-1.85	$54,183	-640.20	-1.70	$58,874	152.47
$28.0m	R	-2.14	$46,655	-538.63	-1.97	$50,695	-356.41	C	-1.88	$53,052	-642.09	-1.70	$58,854	150.77
$28.1m	O	-2.14	$46,648	-540.77	-0.66	$151,886	-357.06	H	-2.02	$49,480	-644.11	-1.70	$58,839	149.07
$28.2m	H	-2.15	$46,522	-542.92	-1.81	$55,322	-358.87	R	-1.85	$54,040	-645.96	-1.70	$58,719	147.37
$28.3m	R	-2.15	$46,488	-545.07	-1.98	$50,513	-360.85	H	-2.03	$49,334	-647.99	-1.70	$58,664	145.67
$28.4m	O	-2.15	$46,425	-547.23	-0.66	$151,165	-361.51	C	-1.89	$52,806	-649.88	-1.71	$58,582	143.96
$28.5m	C	-2.16	$46,398	-549.38	-1.94	$51,472	-363.46	R	-1.86	$53,896	-651.74	-1.71	$58,563	142.25
$28.6m	H	-2.16	$46,354	-551.54	-1.81	$55,121	-365.27	H	-2.03	$49,186	-653.77	-1.71	$58,488	140.54
$28.7m	R	-2.16	$46,322	-553.70	-1.99	$50,332	-367.26	R	-1.86	$53,752	-655.63	-1.71	$58,406	138.83
$28.8m	O	-2.16	$46,202	-555.86	-0.66	$150,437	-367.92	H	-2.04	$49,036	-657.67	-1.71	$58,312	137.12
$28.9m	H	-2.16	$46,189	-558.03	-1.82	$54,924	-369.74	C	-1.90	$52,559	-659.57	-1.72	$58,308	135.40
$29.0m	R	-2.17	$46,153	-560.19	-1.99	$50,150	-371.74	R	-1.87	$53,608	-661.44	-1.72	$58,250	133.68
$29.1m	E	-2.17	$46,104	-562.36	9.08	-$11,012	-362.66	H	-2.05	$48,888	-663.48	-1.72	$58,133	131.96
$29.2m	C	-2.17	$46,077	-564.53	-1.96	$51,116	-364.61	R	-1.87	$53,463	-665.35	-1.72	$58,093	130.24
$29.3m	H	-2.17	$46,017	-566.71	-1.83	$54,723	-366.44	C	-1.91	$52,309	-667.27	-1.72	$58,030	128.52
$29.4m	R	-2.17	$45,988	-568.88	-2.00	$49,968	-368.44	H	-2.05	$48,738	-669.32	-1.73	$57,954	126.79
$29.5m	O	-2.18	$45,975	-571.06	-0.67	$149,701	-369.11	R	-1.88	$53,318	-671.19	-1.73	$57,935	125.07
$29.6m	H	-2.18	$45,851	-573.24	-1.83	$54,520	-370.94	R	-1.88	$53,173	-673.07	-1.73	$57,777	123.34
$29.7m	R	-2.18	$45,817	-575.42	-2.01	$49,783	-372.95	H	-2.06	$48,586	-675.13	-1.73	$57,773	121.61
$29.8m	U	-2.19	$45,757	-577.61	-3.90	$25,623	-376.85	C	-1.92	$52,058	-677.05	-1.73	$57,751	119.87
$29.9m	C	-2.19	$45,751	-579.79	-1.97	$50,755	-378.82	R	-1.89	$53,027	-678.94	-1.74	$57,618	118.14
$30.0m	O	-2.19	$45,748	-581.98	-0.67	$148,956	-379.50	H	-2.06	$48,431	-681.00	-1.74	$57,594	116.40
$30.1m	H	-2.19	$45,677	-584.17	-1.84	$54,315	-381.34	C	-1.93	$51,803	-682.93	-1.74	$57,468	114.66
$30.2m	R	-2.19	$45,648	-586.36	-2.02	$49,601	-383.35	R	-1.89	$52,881	-684.82	-1.74	$57,459	112.92
$30.3m	O	-2.20	$45,519	-588.55	-0.67	$148,207	-384.03	H	-2.07	$48,281	-686.90	-1.74	$57,409	111.18

	Reallocation with good information							***Reallocation with poor information***						
	Marginal	***Estimates with good information***			***Estimates with poor information***			**Marginal**	***Estimates with good information***			***Estimates with poor information***		
Budget impact	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$30.4m	H	-2.20	$45,504	-590.75	-1.85	$54,113	-385.88	R	-1.90	$52,734	-688.79	-1.75	$57,300	109.43
$30.5m	R	-2.20	$45,477	-592.95	-2.02	$49,417	-387.90	H	-2.08	$48,123	-690.87	-1.75	$57,228	107.69
$30.6m	C	-2.20	$45,421	-595.15	-1.98	$50,388	-389.88	C	-1.94	$51,546	-692.81	-1.75	$57,183	105.94
$30.7m	H	-2.21	$45,331	-597.36	-1.86	$53,903	-391.74	R	-1.90	$52,586	-694.71	-1.75	$57,140	104.19
$30.8m	R	-2.21	$45,306	-599.57	-2.03	$49,230	-393.77	H	-2.08	$47,971	-696.80	-1.75	$57,039	102.43
$30.9m	O	-2.21	$45,284	-601.77	-0.68	$147,449	-394.45	R	-1.91	$52,439	-698.70	-1.76	$56,980	100.68
$31.0m	G	-2.21	$45,221	-603.99	-4.25	$23,523	-398.70	C	-1.95	$51,286	-700.65	-1.76	$56,895	98.92
$31.1m	H	-2.21	$45,157	-606.20	-1.86	$53,697	-400.56	H	-2.09	$47,813	-702.75	-1.76	$56,857	97.16
$31.2m	E	-2.21	$45,153	-608.41	8.96	-$11,166	-391.61	R	-1.91	$52,291	-704.66	-1.76	$56,819	95.40
$31.3m	R	-2.22	$45,137	-610.63	-2.04	$49,044	-393.65	H	-2.10	$47,655	-706.76	-1.76	$56,667	93.64
$31.4m	C	-2.22	$45,085	-612.85	-2.00	$50,017	-395.65	R	-1.92	$52,143	-708.67	-1.76	$56,658	91.87
$31.5m	O	-2.22	$45,049	-615.07	-0.68	$146,683	-396.33	C	-1.96	$51,024	-710.63	-1.77	$56,604	90.11
$31.6m	H	-2.22	$44,978	-617.29	-1.87	$53,485	-398.20	R	-1.92	$51,994	-712.56	-1.77	$56,496	88.34
$31.7m	R	-2.22	$44,962	-619.52	-2.05	$48,857	-400.24	H	-2.11	$47,495	-714.66	-1.77	$56,481	86.57
$31.8m	O	-2.23	$44,813	-621.75	-0.69	$145,909	-400.93	R	-1.93	$51,845	-716.59	-1.78	$56,334	84.79
$31.9m	H	-2.23	$44,801	-623.98	-1.88	$53,274	-402.81	C	-1.97	$50,759	-718.56	-1.78	$56,310	83.02
$32.0m	R	-2.23	$44,791	-626.21	-2.05	$48,669	-404.86	H	-2.11	$47,337	-720.67	-1.78	$56,287	81.24
$32.1m	C	-2.23	$44,745	-628.45	-2.01	$49,639	-406.88	R	-1.93	$51,695	-722.61	-1.78	$56,172	79.46
$32.2m	U	-2.24	$44,626	-630.69	-4.00	$24,990	-410.88	H	-2.12	$47,176	-724.73	-1.78	$56,098	77.68
$32.3m	H	-2.24	$44,621	-632.93	-1.88	$53,059	-412.76	C	-1.98	$50,491	-726.71	-1.79	$56,013	75.89
$32.4m	R	-2.24	$44,619	-635.17	-2.06	$48,480	-414.82	R	-1.94	$51,545	-728.65	-1.79	$56,008	74.11
$32.5m	O	-2.24	$44,571	-637.41	-0.69	$145,127	-415.51	H	-2.13	$47,015	-730.78	-1.79	$55,907	72.32
$32.6m	R	-2.25	$44,442	-639.66	-2.07	$48,293	-417.58	R	-1.95	$51,395	-732.72	-1.79	$55,845	70.53
$32.7m	H	-2.25	$44,439	-641.91	-1.89	$52,846	-419.48	O	-5.84	$17,118	-738.56	-1.79	$55,738	68.73
$32.8m	C	-2.25	$44,400	-644.17	-2.03	$49,256	-421.51	C	-1.99	$50,220	-740.55	-1.79	$55,712	66.94
$32.9m	O	-2.26	$44,328	-646.42	-0.69	$144,336	-422.20	H	-2.13	$46,852	-742.69	-1.79	$55,713	65.14
$33.0m	R	-2.26	$44,269	-648.68	-2.08	$48,102	-424.28	R	-1.95	$51,244	-744.64	-1.80	$55,681	63.35
$33.1m	E	-2.26	$44,259	-650.94	8.84	-$11,316	-415.44	H	-2.14	$46,688	-746.78	-1.80	$55,515	61.54
$33.2m	H	-2.26	$44,258	-653.20	-1.90	$52,626	-417.34	R	-1.96	$51,092	-748.74	-1.80	$55,516	59.74
$33.3m	R	-2.27	$44,094	-655.47	-2.09	$47,911	-419.43	C	-2.00	$49,947	-750.74	-1.80	$55,409	57.94
$33.4m	O	-2.27	$44,082	-657.74	-0.70	$143,536	-420.13	R	-1.96	$50,941	-752.70	-1.81	$55,351	56.13
$33.5m	H	-2.27	$44,074	-660.00	-1.91	$52,411	-422.03	H	-2.15	$46,522	-754.85	-1.81	$55,322	54.32
$33.6m	C	-2.27	$44,049	-662.27	-2.05	$48,866	-424.08	R	-1.97	$50,788	-756.82	-1.81	$55,186	52.51
$33.7m	R	-2.28	$43,919	-664.55	-2.10	$47,721	-426.18	H	-2.16	$46,354	-758.98	-1.81	$55,121	50.70
$33.8m	H	-2.28	$43,889	-666.83	-1.92	$52,187	-428.09	C	-2.01	$49,670	-760.99	-1.81	$55,102	48.88
$33.9m	O	-2.28	$43,835	-669.11	-0.70	$142,727	-428.79	R	-1.97	$50,635	-762.97	-1.82	$55,020	47.07
$34.0m	R	-2.29	$43,741	-671.40	-2.10	$47,529	-430.90	H	-2.16	$46,189	-765.13	-1.82	$54,924	45.25
$34.1m	H	-2.29	$43,701	-673.69	-1.92	$51,967	-432.82	R	-1.98	$50,482	-767.11	-1.82	$54,853	43.42
$34.2m	C	-2.29	$43,692	-675.97	-2.06	$48,470	-434.88	C	-2.02	$49,390	-769.14	-1.83	$54,791	41.60
$34.3m	O	-2.29	$43,584	-678.27	-0.70	$141,910	-435.59	H	-2.17	$46,017	-771.31	-1.83	$54,723	39.77
$34.4m	R	-2.30	$43,563	-680.56	-2.11	$47,335	-437.70	R	-1.99	$50,329	-773.30	-1.83	$54,686	37.94
$34.5m	W	-2.30	$43,558	-682.86	-2.95	$33,948	-440.65	H	-2.18	$45,851	-775.48	-1.83	$54,520	36.11
$34.6m	H	-2.30	$43,510	-685.16	-1.93	$51,741	-442.58	R	-1.99	$50,175	-777.47	-1.83	$54,519	34.27
$34.7m	U	-2.30	$43,466	-687.46	-4.11	$24,341	-446.69	C	-2.04	$49,107	-779.51	-1.84	$54,477	32.44
$34.8m	E	-2.30	$43,416	-689.76	8.72	-$11,463	-437.96	R	-2.00	$50,020	-781.51	-1.84	$54,351	30.60
$34.9m	R	-2.30	$43,386	-692.07	-2.12	$47,143	-440.09	H	-2.19	$45,677	-783.70	-1.84	$54,315	28.76
$35.0m	C	-2.31	$43,329	-694.38	-2.08	$48,068	-442.17	R	-2.01	$49,865	-785.70	-1.85	$54,182	26.91
$35.1m	O	-2.31	$43,329	-696.68	-0.71	$141,082	-442.87	C	-2.05	$48,820	-787.75	-1.85	$54,160	25.06
$35.2m	H	-2.31	$43,322	-698.99	-1.94	$51,515	-444.82	H	-2.20	$45,504	-789.95	-1.85	$54,113	23.22
$35.3m	R	-2.31	$43,206	-701.31	-2.13	$46,948	-446.95	R	-2.01	$49,709	-791.96	-1.85	$54,013	21.36
$35.4m	H	-2.32	$43,129	-703.62	-1.95	$51,285	-448.90	H	-2.21	$45,331	-794.17	-1.86	$53,903	19.51

Budget impact	*Reallocation with good information*							*Reallocation with poor information*						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			**Marginal Tech** [a]	*Estimates with good information*			*Estimates with poor information*		
Budget impact		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$35.5m	O	-2.32	$43,072	-705.95	-0.71	$140,245	-449.61	R	-2.02	$49,553	-796.18	-1.86	$53,844	17.65
$35.6m	R	-2.32	$43,027	-708.27	-2.14	$46,751	-451.75	C	-2.06	$48,530	-798.25	-1.86	$53,838	15.79
$35.7m	C	-2.33	$42,961	-710.60	-2.10	$47,659	-453.85	H	-2.21	$45,157	-800.46	-1.86	$53,697	13.93
$35.8m	H	-2.33	$42,935	-712.93	-1.96	$51,057	-455.80	R	-2.02	$49,396	-802.48	-1.86	$53,674	12.07
$35.9m	R	-2.33	$42,847	-715.26	-2.15	$46,557	-457.95	C	-2.07	$48,237	-804.56	-1.87	$53,513	10.20
$36.0m	O	-2.34	$42,810	-717.60	-0.72	$139,396	-458.67	R	-2.03	$49,239	-806.59	-1.87	$53,503	8.33
$36.1m	H	-2.34	$42,741	-719.94	-1.97	$50,823	-460.64	H	-2.22	$44,978	-808.81	-1.87	$53,485	6.46
$36.2m	R	-2.34	$42,664	-722.28	-2.16	$46,361	-462.79	R	-2.04	$49,082	-810.85	-1.88	$53,332	4.59
$36.3m	E	-2.35	$42,619	-724.63	8.62	-$11,605	-454.18	H	-2.23	$44,801	-813.08	-1.88	$53,274	2.71
$36.4m	C	-2.35	$42,584	-726.98	-2.12	$47,243	-456.29	C	-2.09	$47,941	-815.17	-1.88	$53,184	0.83
$36.5m	O	-2.35	$42,550	-729.33	-0.72	$138,539	-457.02	R	-2.04	$48,924	-817.21	-1.88	$53,160	-1.05
$36.6m	H	-2.35	$42,542	-731.68	-1.98	$50,587	-458.99	H	-2.24	$44,621	-819.45	-1.88	$53,059	-2.94
$36.7m	R	-2.35	$42,484	-734.03	-2.17	$46,162	-461.16	R	-2.05	$48,766	-821.50	-1.89	$52,987	-4.82
$36.8m	H	-2.36	$42,342	-736.39	-1.99	$50,352	-463.14	C	-2.10	$47,640	-823.60	-1.89	$52,850	-6.72
$36.9m	R	-2.36	$42,301	-738.76	-2.18	$45,962	-465.32	H	-2.25	$44,439	-825.85	-1.89	$52,846	-8.61
$37.0m	O	-2.37	$42,282	-741.12	-0.73	$137,671	-466.05	R	-2.06	$48,605	-827.91	-1.89	$52,815	-10.50
$37.1m	U	-2.37	$42,275	-743.49	-4.22	$23,673	-470.27	R	-2.06	$48,447	-829.97	-1.90	$52,643	-12.40
$37.2m	C	-2.37	$42,205	-745.86	-2.14	$46,819	-472.41	H	-2.26	$44,258	-832.23	-1.90	$52,626	-14.30
$37.3m	H	-2.37	$42,143	-748.23	-2.00	$50,110	-474.40	C	-2.11	$47,335	-834.35	-1.90	$52,512	-16.21
$37.4m	R	-2.37	$42,116	-750.60	-2.19	$45,764	-476.59	R	-2.07	$48,286	-836.42	-1.91	$52,466	-18.11
$37.5m	O	-2.38	$42,012	-752.98	-0.73	$136,791	-477.32	H	-2.27	$44,074	-838.69	-1.91	$52,411	-20.02
$37.6m	H	-2.38	$41,939	-755.37	-2.01	$49,870	-479.32	R	-2.08	$48,126	-840.76	-1.91	$52,293	-21.93
$37.7m	R	-2.38	$41,934	-757.75	-2.19	$45,564	-481.52	H	-2.28	$43,889	-843.04	-1.92	$52,187	-23.85
$37.8m	E	-2.39	$41,865	-760.14	8.52	-$11,744	-473.00	C	-2.13	$47,027	-845.17	-1.92	$52,170	-25.77
$37.9m	C	-2.39	$41,813	-762.53	-2.16	$46,388	-475.16	R	-2.08	$47,966	-847.25	-1.92	$52,119	-27.68
$38.0m	R	-2.40	$41,747	-764.93	-2.20	$45,362	-477.36	H	-2.29	$43,701	-849.54	-1.92	$51,967	-29.61
$38.1m	O	-2.40	$41,736	-767.32	-0.74	$135,899	-478.10	R	-2.09	$47,801	-851.63	-1.93	$51,940	-31.53
$38.2m	H	-2.40	$41,734	-769.72	-2.02	$49,628	-480.11	C	-2.14	$46,715	-853.77	-1.93	$51,824	-33.46
$38.3m	R	-2.41	$41,561	-772.13	-2.21	$45,161	-482.33	R	-2.10	$47,642	-855.87	-1.93	$51,768	-35.39
$38.4m	H	-2.41	$41,527	-774.53	-2.03	$49,380	-484.35	H	-2.30	$43,510	-858.17	-1.93	$51,741	-37.33
$38.5m	O	-2.41	$41,461	-776.95	-0.74	$134,996	-485.09	R	-2.11	$47,477	-860.28	-1.94	$51,586	-39.27
$38.6m	C	-2.41	$41,418	-779.36	-2.18	$45,947	-487.27	H	-2.31	$43,322	-862.59	-1.94	$51,515	-41.21
$38.7m	R	-2.42	$41,375	-781.78	-2.22	$44,958	-489.50	C	-2.16	$46,398	-864.74	-1.94	$51,472	-43.15
$38.8m	D	-2.42	$41,371	-784.19	-7.51	$13,318	-497.00	R	-2.11	$47,315	-866.85	-1.95	$51,411	-45.09
$38.9m	H	-2.42	$41,317	-786.62	-2.04	$49,133	-499.04	H	-2.32	$43,129	-869.17	-1.95	$51,285	-47.04
$39.0m	R	-2.43	$41,188	-789.04	-2.23	$44,753	-501.27	R	-2.12	$47,150	-871.29	-1.95	$51,232	-49.00
$39.1m	O	-2.43	$41,179	-791.47	-0.75	$134,081	-502.02	C	-2.17	$46,077	-873.46	-1.96	$51,116	-50.95
$39.2m	E	-2.43	$41,149	-793.90	8.42	-$11,880	-493.60	H	-2.33	$42,935	-875.79	-1.96	$51,057	-52.91
$39.3m	H	-2.43	$41,107	-796.33	-2.05	$48,878	-495.65	R	-2.13	$46,986	-877.92	-1.96	$51,054	-54.87
$39.4m	U	-2.44	$41,049	-798.77	-4.35	$22,987	-500.00	R	-2.14	$46,819	-880.06	-1.97	$50,875	-56.84
$39.5m	C	-2.44	$41,014	-801.21	-2.20	$45,498	-502.20	H	-2.34	$42,741	-882.40	-1.97	$50,823	-58.80
$39.6m	R	-2.44	$40,999	-803.65	-2.24	$44,549	-504.44	C	-2.19	$45,751	-884.58	-1.97	$50,755	-60.77
$39.7m	O	-2.45	$40,893	-806.09	-0.75	$133,154	-505.19	R	-2.14	$46,655	-886.73	-1.97	$50,695	-62.75
$39.8m	H	-2.45	$40,891	-808.54	-2.06	$48,626	-507.25	H	-2.35	$42,542	-889.08	-1.98	$50,587	-64.72
$39.9m	R	-2.45	$40,810	-810.99	-2.26	$44,342	-509.50	R	-2.15	$46,488	-891.23	-1.98	$50,513	-66.70
$40.0m	H	-2.46	$40,677	-813.45	-2.07	$48,370	-511.57	C	-2.20	$45,421	-893.43	-1.98	$50,388	-68.69
$40.1m	R	-2.46	$40,619	-815.91	-2.27	$44,136	-513.84	H	-2.36	$42,342	-895.79	-1.99	$50,352	-70.67
$40.2m	O	-2.46	$40,606	-818.37	-0.76	$132,212	-514.59	R	-2.16	$46,322	-897.95	-1.99	$50,332	-72.66
$40.3m	C	-2.46	$40,601	-820.83	-2.22	$45,043	-516.81	R	-2.17	$46,153	-900.12	-1.99	$50,150	-74.65
$40.4m	E	-2.47	$40,469	-823.31	8.32	-$12,012	-508.49	H	-2.37	$42,143	-902.49	-2.00	$50,110	-76.65
$40.5m	H	-2.47	$40,460	-825.78	-2.08	$48,112	-510.57	C	-2.22	$45,085	-904.71	-2.00	$50,017	-78.65

Budget impact	*Reallocation with good information*							*Reallocation with poor information*						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$40.6m	R	-2.47	$40,427	-828.25	-2.28	$43,929	-512.84	R	-2.17	$45,988	-906.88	-2.00	$49,968	-80.65
$40.7m	G	-2.48	$40,363	-830.73	-4.76	$20,996	-517.61	H	-2.38	$41,939	-909.27	-2.01	$49,870	-82.66
$40.8m	O	-2.48	$40,311	-833.21	-0.76	$131,256	-518.37	R	-2.18	$45,817	-911.45	-2.01	$49,783	-84.66
$40.9m	H	-2.49	$40,238	-835.69	-2.09	$47,847	-520.46	O	-6.54	$15,280	-917.99	-2.01	$49,751	-86.67
$41.0m	R	-2.49	$40,237	-838.18	-2.29	$43,720	-522.75	C	-2.23	$44,745	-920.23	-2.01	$49,639	-88.69
$41.1m	C	-2.49	$40,182	-840.67	-2.24	$44,575	-524.99	H	-2.40	$41,734	-922.63	-2.02	$49,628	-90.70
$41.2m	R	-2.50	$40,043	-843.17	-2.30	$43,510	-527.29	R	-2.19	$45,648	-924.82	-2.02	$49,601	-92.72
$41.3m	H	-2.50	$40,014	-845.67	-2.10	$47,585	-529.39	R	-2.20	$45,477	-927.02	-2.02	$49,417	-94.74
$41.4m	O	-2.50	$40,014	-848.16	-0.77	$130,290	-530.16	H	-2.41	$41,527	-929.42	-2.03	$49,380	-96.77
$41.5m	R	-2.51	$39,849	-850.67	-2.31	$43,299	-532.47	C	-2.25	$44,400	-931.68	-2.03	$49,256	-98.80
$41.6m	E	-2.51	$39,821	-853.18	8.24	-$12,142	-524.23	R	-2.21	$45,306	-933.88	-2.03	$49,230	-100.83
$41.7m	H	-2.51	$39,790	-855.70	-2.11	$47,315	-526.34	H	-2.42	$41,317	-936.30	-2.04	$49,133	-102.87
$41.8m	U	-2.51	$39,785	-858.21	-4.49	$22,279	-530.83	R	-2.22	$45,137	-938.52	-2.04	$49,044	-104.90
$41.9m	C	-2.52	$39,750	-860.73	-2.27	$44,098	-533.10	H	-2.43	$41,107	-940.95	-2.05	$48,878	-106.95
$42.0m	O	-2.52	$39,712	-863.25	-0.77	$129,304	-533.87	C	-2.27	$44,049	-943.22	-2.05	$48,866	-109.00
$42.1m	R	-2.52	$39,654	-865.77	-2.32	$43,087	-536.19	R	-2.22	$44,962	-945.45	-2.05	$48,857	-111.04
$42.2m	H	-2.53	$39,562	-868.29	-2.13	$47,043	-538.32	R	-2.23	$44,791	-947.68	-2.05	$48,669	-113.10
$42.3m	R	-2.53	$39,459	-870.83	-2.33	$42,876	-540.65	H	-2.45	$40,891	-950.12	-2.06	$48,626	-115.16
$42.4m	O	-2.54	$39,406	-873.37	-0.78	$128,307	-541.43	R	-2.24	$44,619	-952.36	-2.06	$48,480	-117.22
$42.5m	H	-2.54	$39,331	-875.91	-2.14	$46,768	-543.57	C	-2.29	$43,692	-954.65	-2.06	$48,470	-119.28
$42.6m	C	-2.54	$39,311	-878.45	-2.29	$43,611	-545.86	H	-2.46	$40,677	-957.11	-2.07	$48,370	-121.35
$42.7m	R	-2.55	$39,262	-881.00	-2.34	$42,660	-548.21	R	-2.25	$44,442	-959.36	-2.07	$48,293	-123.42
$42.8m	E	-2.55	$39,204	-883.55	8.15	-$12,269	-540.06	H	-2.47	$40,460	-961.83	-2.08	$48,112	-125.50
$42.9m	H	-2.56	$39,098	-886.11	-2.15	$46,492	-542.21	R	-2.26	$44,269	-964.09	-2.08	$48,102	-127.58
$43.0m	O	-2.56	$39,093	-888.67	-0.79	$127,293	-542.99	C	-2.31	$43,329	-966.40	-2.08	$48,068	-129.66
$43.1m	R	-2.56	$39,063	-891.23	-2.36	$42,447	-545.35	R	-2.27	$44,094	-968.67	-2.09	$47,911	-131.74
$43.2m	R	-2.57	$38,865	-893.80	-2.37	$42,230	-547.72	H	-2.49	$40,238	-971.15	-2.09	$47,847	-133.83
$43.3m	C	-2.57	$38,862	-896.37	-2.32	$43,111	-550.04	R	-2.28	$43,919	-973.43	-2.10	$47,721	-135.93
$43.4m	H	-2.57	$38,862	-898.95	-2.16	$46,211	-552.20	C	-2.33	$42,961	-975.76	-2.10	$47,659	-138.03
$43.5m	O	-2.58	$38,778	-901.52	-0.79	$126,261	-552.99	H	-2.50	$40,014	-978.26	-2.10	$47,585	-140.13
$43.6m	R	-2.59	$38,665	-904.11	-2.38	$42,013	-555.37	R	-2.29	$43,741	-980.54	-2.10	$47,529	-142.23
$43.7m	H	-2.59	$38,622	-906.70	-2.18	$45,928	-557.55	R	-2.30	$43,563	-982.84	-2.11	$47,335	-144.35
$43.8m	E	-2.59	$38,615	-909.29	8.07	-$12,394	-549.48	H	-2.51	$39,790	-985.35	-2.11	$47,315	-146.46
$43.9m	U	-2.60	$38,479	-911.89	-4.64	$21,548	-554.12	C	-2.35	$42,584	-987.70	-2.12	$47,243	-148.58
$44.0m	R	-2.60	$38,464	-914.49	-2.39	$41,796	-556.51	R	-2.30	$43,386	-990.01	-2.12	$47,143	-150.70
$44.1m	O	-2.60	$38,456	-917.09	-0.80	$125,213	-557.31	H	-2.53	$39,562	-992.53	-2.13	$47,043	-152.82
$44.2m	C	-2.60	$38,402	-919.69	-2.35	$42,602	-559.66	R	-2.31	$43,206	-994.85	-2.13	$46,948	-154.95
$44.3m	H	-2.61	$38,380	-922.30	-2.19	$45,637	-561.85	C	-2.37	$42,205	-997.22	-2.14	$46,819	-157.09
$44.4m	R	-2.61	$38,263	-924.91	-2.41	$41,575	-564.26	H	-2.54	$39,331	-999.76	-2.14	$46,768	-159.23
$44.5m	H	-2.62	$38,134	-927.53	-2.21	$45,347	-566.46	R	-2.32	$43,027	-1002.08	-2.14	$46,751	-161.37
$44.6m	O	-2.62	$38,129	-930.16	-0.81	$124,148	-567.27	R	-2.33	$42,847	-1004.42	-2.15	$46,557	-163.51
$44.7m	R	-2.63	$38,059	-932.78	-2.42	$41,355	-569.69	H	-2.56	$39,098	-1006.98	-2.15	$46,492	-165.66
$44.8m	E	-2.63	$38,051	-935.41	7.99	-$12,516	-561.70	C	-2.39	$41,813	-1009.37	-2.16	$46,388	-167.82
$44.9m	C	-2.64	$37,931	-938.05	-2.38	$42,080	-564.07	R	-2.34	$42,664	-1011.71	-2.16	$46,361	-169.98
$45.0m	H	-2.64	$37,886	-940.69	-2.22	$45,051	-566.29	H	-2.57	$38,862	-1014.28	-2.16	$46,211	-172.14
$45.1m	R	-2.64	$37,854	-943.33	-2.43	$41,134	-568.72	R	-2.35	$42,484	-1016.64	-2.17	$46,162	-174.31
$45.2m	O	-2.65	$37,796	-945.98	-0.81	$123,063	-569.54	R	-2.36	$42,301	-1019.00	-2.18	$45,962	-176.48
$45.3m	R	-2.66	$37,651	-948.63	-2.44	$40,910	-571.98	C	-2.41	$41,418	-1021.42	-2.18	$45,947	-178.66
$45.4m	H	-2.66	$37,635	-951.29	-2.23	$44,753	-574.22	H	-2.59	$38,622	-1024.01	-2.18	$45,928	-180.84
$45.5m	E	-2.67	$37,511	-953.95	7.91	-$12,636	-566.30	R	-2.37	$42,116	-1026.38	-2.19	$45,764	-183.02
$45.6m	O	-2.67	$37,456	-956.62	-0.82	$121,960	-567.12	H	-2.61	$38,380	-1028.99	-2.19	$45,637	-185.21

	Reallocation with good information							Reallocation with poor information						
	Marginal	*Estimates with good information*			*Estimates with poor information*			Marginal	*Estimates with good information*			*Estimates with poor information*		
Budget impact	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$45.7m	C	-2.67	$37,448	-959.30	-2.41	$41,542	-569.53	R	-2.38	$41,934	-1031.37	-2.19	$45,564	-187.41
$45.8m	R	-2.67	$37,443	-961.97	-2.46	$40,685	-571.99	C	-2.44	$41,014	-1033.81	-2.20	$45,498	-189.61
$45.9m	H	-2.68	$37,379	-964.64	-2.25	$44,448	-574.24	R	-2.40	$41,747	-1036.20	-2.20	$45,362	-191.81
$46.0m	R	-2.69	$37,237	-967.33	-2.47	$40,461	-576.71	H	-2.62	$38,134	-1038.83	-2.21	$45,347	-194.02
$46.1m	U	-2.69	$37,128	-970.02	-4.81	$20,791	-581.52	R	-2.41	$41,561	-1041.23	-2.21	$45,161	-196.23
$46.2m	H	-2.69	$37,121	-972.71	-2.27	$44,142	-583.78	H	-2.64	$37,886	-1043.87	-2.22	$45,051	-198.45
$46.3m	O	-2.69	$37,111	-975.41	-0.83	$120,834	-584.61	C	-2.46	$40,601	-1046.33	-2.22	$45,043	-200.67
$46.4m	R	-2.70	$37,027	-978.11	-2.49	$40,233	-587.10	R	-2.42	$41,375	-1048.75	-2.22	$44,958	-202.89
$46.5m	E	-2.70	$36,993	-980.81	7.84	-$12,754	-579.25	R	-2.43	$41,188	-1051.18	-2.23	$44,753	-205.13
$46.6m	C	-2.71	$36,951	-983.52	-2.44	$40,992	-581.69	H	-2.66	$37,635	-1053.84	-2.23	$44,753	-207.36
$46.7m	H	-2.71	$36,858	-986.23	-2.28	$43,829	-583.98	C	-2.49	$40,182	-1056.32	-2.24	$44,575	-209.61
$46.8m	R	-2.72	$36,817	-988.95	-2.50	$40,006	-586.48	R	-2.44	$40,999	-1058.76	-2.24	$44,549	-211.85
$46.9m	O	-2.72	$36,759	-991.67	-0.84	$119,690	-587.31	H	-2.68	$37,379	-1061.44	-2.25	$44,448	-214.10
$47.0m	R	-2.73	$36,607	-994.40	-2.51	$39,776	-589.83	R	-2.45	$40,810	-1063.89	-2.26	$44,342	-216.36
$47.1m	H	-2.73	$36,593	-997.13	-2.30	$43,512	-592.12	W	-1.76	$56,787	-1065.65	-2.26	$44,258	-218.62
$47.2m	W	-2.74	$36,534	-999.87	-3.51	$28,474	-595.64	H	-2.69	$37,121	-1068.34	-2.27	$44,142	-220.88
$47.3m	E	-2.74	$36,497	-1002.61	7.77	-$12,869	-587.86	R	-2.46	$40,619	-1070.81	-2.27	$44,136	-223.15
$47.4m	C	-2.74	$36,442	-1005.35	-2.47	$40,427	-590.34	C	-2.52	$39,750	-1073.32	-2.27	$44,098	-225.41
$47.5m	O	-2.75	$36,399	-1008.10	-0.84	$118,521	-591.18	R	-2.47	$40,427	-1075.80	-2.28	$43,929	-227.69
$47.6m	R	-2.75	$36,395	-1010.85	-2.53	$39,548	-593.71	H	-2.71	$36,858	-1078.51	-2.28	$43,829	-229.97
$47.7m	H	-2.75	$36,323	-1013.60	-2.32	$43,191	-596.03	R	-2.49	$40,237	-1080.99	-2.29	$43,720	-232.26
$47.8m	R	-2.76	$36,181	-1016.37	-2.54	$39,313	-598.57	C	-2.54	$39,311	-1083.54	-2.29	$43,611	-234.55
$47.9m	H	-2.77	$36,048	-1019.14	-2.33	$42,865	-600.90	H	-2.73	$36,593	-1086.27	-2.30	$43,512	-236.85
$48.0m	O	-2.78	$36,035	-1021.92	-0.85	$117,331	-601.75	R	-2.50	$40,043	-1088.77	-2.30	$43,510	-239.15
$48.1m	E	-2.78	$36,020	-1024.69	7.70	-$12,982	-594.05	R	-2.51	$39,849	-1091.28	-2.31	$43,299	-241.46
$48.2m	R	-2.78	$35,966	-1027.47	-2.56	$39,081	-596.61	H	-2.75	$36,323	-1094.03	-2.32	$43,191	-243.77
$48.3m	C	-2.78	$35,917	-1030.26	-2.51	$39,845	-599.12	C	-2.57	$38,862	-1096.60	-2.32	$43,111	-246.09
$48.4m	H	-2.80	$35,769	-1033.05	-2.35	$42,535	-601.47	R	-2.52	$39,654	-1099.13	-2.32	$43,087	-248.41
$48.5m	R	-2.80	$35,751	-1035.85	-2.57	$38,847	-604.05	I	-3.38	$29,614	-1102.50	-2.33	$42,972	-250.74
$48.6m	U	-2.80	$35,725	-1038.65	-5.00	$20,006	-609.04	I	-3.38	$29,578	-1105.88	-2.33	$42,920	-253.07
$48.7m	O	-2.80	$35,662	-1041.45	-0.86	$116,114	-609.91	R	-2.53	$39,459	-1108.42	-2.33	$42,876	-255.40
$48.8m	E	-2.81	$35,561	-1044.26	7.64	-$13,094	-602.27	I	-3.39	$29,542	-1111.80	-2.33	$42,868	-257.74
$48.9m	R	-2.81	$35,533	-1047.08	-2.59	$38,610	-604.86	H	-2.77	$36,048	-1114.58	-2.33	$42,865	-260.07
$49.0m	H	-2.82	$35,487	-1049.90	-2.37	$42,198	-607.23	I	-3.39	$29,506	-1117.97	-2.34	$42,815	-262.41
$49.1m	C	-2.83	$35,377	-1052.72	-2.55	$39,246	-609.78	I	-3.39	$29,469	-1121.36	-2.34	$42,762	-264.74
$49.2m	R	-2.83	$35,314	-1055.55	-2.61	$38,372	-612.38	I	-3.40	$29,433	-1124.76	-2.34	$42,709	-267.09
$49.3m	O	-2.83	$35,280	-1058.39	-0.87	$114,873	-613.25	R	-2.55	$39,262	-1127.30	-2.34	$42,660	-269.43
$49.4m	H	-2.84	$35,199	-1061.23	-2.39	$41,857	-615.64	I	-3.40	$29,396	-1130.71	-2.34	$42,656	-271.77
$49.5m	E	-2.85	$35,119	-1064.08	7.57	-$13,203	-608.07	I	-3.41	$29,359	-1134.11	-2.35	$42,602	-274.12
$49.6m	R	-2.85	$35,094	-1066.93	-2.62	$38,133	-610.69	C	-2.60	$38,402	-1136.72	-2.35	$42,602	-276.47
$49.7m	H	-2.86	$34,908	-1069.79	-2.41	$41,509	-613.10	I	-3.41	$29,322	-1140.13	-2.35	$42,548	-278.82
$49.8m	O	-2.87	$34,889	-1072.66	-0.88	$113,603	-613.98	H	-2.80	$35,769	-1142.92	-2.35	$42,535	-281.17
$49.9m	D	-2.87	$34,878	-1075.53	-8.91	$11,227	-622.89	I	-3.41	$29,285	-1146.34	-2.35	$42,494	-283.52
$50.0m	R	-2.87	$34,874	-1078.39	-2.64	$37,893	-625.53	R	-2.56	$39,063	-1148.90	-2.36	$42,447	-285.88

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $100,000 reduction in incremental expenditure compared to the previous (smaller) level of budget impact;
[b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 reduction in incremental expenditure on marginal technology;
[c] Estimate (given imperfect information) of the marginal ICER in contraction for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies.

Table A2.2.2: Reallocation following net disinvestment (allocator has good information)

	Reallocation with good information							*Reallocation with poor information*						
	Marginal	*Estimates with good information*			*Estimates with poor information*			**Marginal**	*Estimates with good information*			*Estimates with poor information*		
Budget impact	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$0.1m	O	1.75	$57,129	1.75	0.54	$186,014	0.54	S	-1.00	-$99,957	-1.00	33.89	$2,951	33.89
$0.2m	H	1.75	$57,168	3.50	1.47	$67,980	2.01	S	-1.83	-$54,668	-2.83	19.91	$5,023	53.80
$0.3m	R	1.75	$57,242	5.25	1.61	$62,198	3.62	S	-2.37	-$42,216	-5.20	16.70	$5,989	70.49
$0.4m	O	1.75	$57,276	6.99	0.54	$186,492	4.15	S	-2.81	-$35,650	-8.00	14.90	$6,710	85.40
$0.5m	H	1.75	$57,278	8.74	1.47	$68,111	5.62	S	-3.18	-$31,430	-11.19	13.70	$7,301	99.09
$0.6m	C	1.74	$57,332	10.48	1.57	$63,602	7.19	S	-3.52	-$28,424	-14.70	12.81	$7,808	111.90
$0.7m	R	1.74	$57,377	12.23	1.60	$62,345	8.80	S	-3.82	-$26,144	-18.53	12.11	$8,257	124.01
$0.8m	H	1.74	$57,387	13.97	1.47	$68,240	10.26	S	-4.11	-$24,337	-22.64	11.55	$8,661	135.56
$0.9m	O	1.74	$57,421	15.71	0.53	$186,967	10.80	S	-4.37	-$22,860	-27.01	11.07	$9,031	146.63
$1.0m	H	1.74	$57,496	17.45	1.46	$68,370	12.26	S	-4.62	-$21,623	-31.64	10.67	$9,372	157.30
$1.1m	R	1.74	$57,512	19.19	1.60	$62,491	13.86	S	-4.86	-$20,567	-36.50	10.32	$9,691	167.62
$1.2m	C	1.74	$57,540	20.93	1.57	$63,833	15.43	S	-5.09	-$19,652	-41.59	10.01	$9,989	177.63
$1.3m	O	1.74	$57,567	22.66	0.53	$187,440	15.96	S	-5.31	-$18,849	-46.89	9.74	$10,271	187.37
$1.4m	H	1.74	$57,604	24.40	1.46	$68,499	17.42	S	-5.51	-$18,138	-52.41	9.49	$10,538	196.86
$1.5m	U	1.74	$57,615	26.13	3.10	$32,264	20.52	S	-5.71	-$17,501	-58.12	9.27	$10,792	206.12
$1.6m	R	1.73	$57,646	27.87	1.60	$62,638	22.12	S	-5.91	-$16,927	-64.03	9.06	$11,035	215.18
$1.7m	O	1.73	$57,711	29.60	0.53	$187,910	22.65	S	-6.10	-$16,406	-70.12	8.88	$11,267	224.06
$1.8m	H	1.73	$57,712	31.33	1.46	$68,627	24.11	S	-6.28	-$15,930	-76.40	8.70	$11,491	232.76
$1.9m	C	1.73	$57,746	33.07	1.56	$64,062	25.67	S	-6.45	-$15,493	-82.85	8.54	$11,706	241.30
$2.0m	R	1.73	$57,780	34.80	1.59	$62,783	27.26	S	-6.63	-$15,091	-89.48	8.39	$11,913	249.70
$2.1m	H	1.73	$57,820	36.53	1.45	$68,755	28.71	S	-6.79	-$14,718	-96.28	8.26	$12,113	257.95
$2.2m	O	1.73	$57,855	38.25	0.53	$188,378	29.24	S	-6.96	-$14,372	-103.23	8.13	$12,307	266.08
$2.3m	R	1.73	$57,914	39.98	1.59	$62,929	30.83	S	-7.12	-$14,049	-110.35	8.00	$12,495	274.08
$2.4m	H	1.73	$57,927	41.71	1.45	$68,882	32.29	S	-7.27	-$13,747	-117.63	7.89	$12,678	281.97
$2.5m	C	1.73	$57,951	43.43	1.56	$64,289	33.84	S	-7.43	-$13,463	-125.05	7.78	$12,855	289.75
$2.6m	O	1.72	$57,998	45.16	0.53	$188,844	34.37	S	-7.58	-$13,197	-132.63	7.68	$13,027	297.43
$2.7m	H	1.72	$58,034	46.88	1.45	$69,009	35.82	S	-7.72	-$12,945	-140.36	7.58	$13,196	305.00
$2.8m	R	1.72	$58,048	48.60	1.59	$63,074	37.40	S	-7.87	-$12,707	-148.23	7.49	$13,360	312.49
$2.9m	H	1.72	$58,140	50.32	1.45	$69,136	38.85	S	-8.01	-$12,483	-156.24	7.40	$13,520	319.89
$3.0m	O	1.72	$58,140	52.04	0.53	$189,307	39.38	S	-8.15	-$12,269	-164.39	7.31	$13,676	327.20
$3.1m	C	1.72	$58,155	53.76	1.55	$64,515	40.93	S	-8.29	-$12,066	-172.68	7.23	$13,829	334.43
$3.2m	R	1.72	$58,181	55.48	1.58	$63,219	42.51	S	-8.42	-$11,873	-181.10	7.15	$13,978	341.58
$3.3m	O	1.72	$58,282	57.20	0.53	$189,769	43.04	S	-8.55	-$11,689	-189.65	7.08	$14,125	348.66
$3.4m	R	1.71	$58,314	58.91	1.58	$63,363	44.62	S	-8.69	-$11,513	-198.34	7.01	$14,268	355.67
$3.5m	C	1.71	$58,357	60.63	1.54	$64,740	46.16	S	-8.81	-$11,345	-207.15	6.94	$14,409	362.61
$3.6m	G	1.71	$58,369	62.34	3.29	$30,363	49.45	S	-8.94	-$11,184	-216.09	6.87	$14,547	369.49
$3.7m	O	1.71	$58,423	64.05	0.53	$190,228	49.98	S	-9.07	-$11,030	-225.16	6.81	$14,682	376.30
$3.8m	R	1.71	$58,447	65.76	1.57	$63,508	51.55	S	-9.19	-$10,882	-234.35	6.75	$14,815	383.05
$3.9m	U	1.71	$58,495	67.47	3.05	$32,756	54.61	S	-9.31	-$10,740	-243.66	6.69	$14,945	389.74
$4.0m	C	1.71	$58,558	69.18	1.54	$64,962	56.15	D	1.65	$60,684	-242.01	5.12	$19,535	394.86
$4.1m	O	1.71	$58,563	70.89	0.52	$190,684	56.67	D	1.55	$64,611	-240.46	4.81	$20,799	399.67
$4.2m	R	1.71	$58,579	72.59	1.57	$63,651	58.24	D	1.46	$68,312	-239.00	4.55	$21,990	404.21
$4.3m	E	1.70	$58,696	74.30	-10.67	-$9,375	47.58	D	1.39	$71,822	-237.61	4.33	$23,120	408.54
$4.4m	O	1.70	$58,703	76.00	0.52	$191,139	48.10	D	1.33	$75,168	-236.28	4.13	$24,197	412.67
$4.5m	R	1.70	$58,711	77.70	1.57	$63,795	49.67	D	1.28	$78,370	-235.00	3.96	$25,228	416.64
$4.6m	C	1.70	$58,758	79.41	1.53	$65,184	51.20	D	1.23	$81,447	-233.77	3.81	$26,219	420.45
$4.7m	O	1.70	$58,842	81.11	0.52	$191,591	51.72	D	1.18	$84,412	-232.59	3.68	$27,173	424.13
$4.8m	R	1.70	$58,843	82.81	1.56	$63,938	53.29	D	1.15	$87,276	-231.44	3.56	$28,095	427.69

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$4.9m	C	1.70	$58,956	84.50	1.53	$65,404	54.82	D	1.11	$90,048	-230.33	3.45	$28,987	431.14
$5.0m	R	1.70	$58,975	86.20	1.56	$64,081	56.38	D	1.08	$92,739	-229.26	3.35	$29,853	434.49
$5.1m	O	1.70	$58,980	87.89	0.52	$192,041	56.90	G	1.71	$58,369	-227.54	3.29	$30,363	437.78
$5.2m	R	1.69	$59,106	89.58	1.56	$64,224	58.45	D	1.05	$95,352	-226.49	3.26	$30,695	441.04
$5.3m	O	1.69	$59,118	91.28	0.52	$192,490	58.97	D	1.02	$97,896	-225.47	3.17	$31,514	444.21
$5.4m	C	1.69	$59,153	92.97	1.52	$65,622	60.50	G	1.64	$60,861	-223.83	3.16	$31,659	447.37
$5.5m	R	1.69	$59,236	94.65	1.55	$64,366	62.05	U	1.74	$57,615	-222.09	3.10	$32,264	450.47
$5.6m	O	1.69	$59,254	96.34	0.52	$192,936	62.57	D	1.00	$100,375	-221.10	3.09	$32,312	453.57
$5.7m	C	1.68	$59,348	98.03	1.52	$65,839	64.09	U	1.71	$58,495	-219.39	3.05	$32,756	456.62
$5.8m	U	1.68	$59,362	99.71	3.01	$33,242	67.10	G	1.58	$63,163	-217.80	3.04	$32,856	459.66
$5.9m	R	1.68	$59,367	101.40	1.55	$64,508	68.65	D	0.97	$102,796	-216.83	3.02	$33,091	462.68
$6.0m	O	1.68	$59,391	103.08	0.52	$193,380	69.16	U	1.68	$59,362	-215.15	3.01	$33,242	465.69
$6.1m	R	1.68	$59,498	104.76	1.55	$64,650	70.71	U	1.66	$60,216	-213.49	2.97	$33,720	468.66
$6.2m	O	1.68	$59,527	106.44	0.52	$193,822	71.23	D	0.95	$105,159	-212.53	2.95	$33,852	471.61
$6.3m	C	1.68	$59,543	108.12	1.51	$66,055	72.74	G	1.53	$65,308	-211.00	2.94	$33,972	474.56
$6.4m	R	1.68	$59,627	109.80	1.54	$64,791	74.28	U	1.64	$61,058	-209.37	2.92	$34,192	477.48
$6.5m	O	1.68	$59,662	111.47	0.51	$194,262	74.80	D	0.93	$107,471	-208.44	2.89	$34,596	480.37
$6.6m	C	1.67	$59,736	113.15	1.51	$66,269	76.31	U	1.62	$61,889	-206.82	2.89	$34,657	483.26
$6.7m	R	1.67	$59,758	114.82	1.54	$64,932	77.85	G	1.49	$67,320	-205.33	2.86	$35,019	486.11
$6.8m	O	1.67	$59,796	116.49	0.51	$194,699	78.36	U	1.59	$62,709	-203.74	2.85	$35,116	488.96
$6.9m	R	1.67	$59,887	118.16	1.54	$65,072	79.90	D	0.91	$109,735	-202.83	2.83	$35,324	491.79
$7.0m	C	1.67	$59,928	119.83	1.50	$66,481	81.40	U	1.57	$63,518	-201.25	2.81	$35,569	494.60
$7.1m	O	1.67	$59,930	121.50	0.51	$195,137	81.91	G	1.44	$69,219	-199.81	2.78	$36,007	497.38
$7.2m	R	1.67	$60,016	123.17	1.53	$65,213	83.45	U	1.55	$64,317	-198.25	2.78	$36,017	500.16
$7.3m	W	1.67	$60,049	124.83	2.14	$46,801	85.58	D	0.89	$111,953	-197.36	2.77	$36,038	502.93
$7.4m	O	1.66	$60,064	126.50	0.51	$195,568	86.10	U	1.54	$65,107	-195.83	2.74	$36,459	505.67
$7.5m	C	1.66	$60,118	128.16	1.50	$66,693	87.60	D	0.88	$114,127	-194.95	2.72	$36,738	508.40
$7.6m	R	1.66	$60,145	129.82	1.53	$65,353	89.13	U	1.52	$65,886	-193.43	2.71	$36,895	511.11
$7.7m	O	1.66	$60,196	131.48	0.51	$196,005	89.64	G	1.41	$71,019	-192.02	2.71	$36,943	513.81
$7.8m	U	1.66	$60,216	133.14	2.97	$33,720	92.60	U	1.50	$66,657	-190.52	2.68	$37,327	516.49
$7.9m	R	1.66	$60,274	134.80	1.53	$65,493	94.13	D	0.86	$116,260	-189.66	2.67	$37,425	519.16
$8.0m	C	1.66	$60,307	136.46	1.49	$66,903	95.62	U	1.48	$67,419	-188.18	2.65	$37,754	521.81
$8.1m	O	1.66	$60,328	138.12	0.51	$196,433	96.13	G	1.37	$72,732	-186.80	2.64	$37,834	524.46
$8.2m	R	1.66	$60,402	139.77	1.52	$65,632	97.66	D	0.84	$118,356	-185.96	2.62	$38,100	527.08
$8.3m	O	1.65	$60,460	141.43	0.51	$196,858	98.16	U	1.47	$68,172	-184.49	2.62	$38,176	529.70
$8.4m	C	1.65	$60,496	143.08	1.49	$67,112	99.65	U	1.45	$68,918	-183.04	2.59	$38,593	532.29
$8.5m	R	1.65	$60,530	144.73	1.52	$65,772	101.17	G	1.34	$74,368	-181.70	2.58	$38,685	534.88
$8.6m	O	1.65	$60,591	146.38	0.51	$197,289	101.68	D	0.83	$120,414	-180.87	2.58	$38,763	537.46
$8.7m	R	1.65	$60,658	148.03	1.52	$65,910	103.20	U	1.44	$69,655	-179.43	2.56	$39,006	540.02
$8.8m	C	1.65	$60,683	149.68	1.49	$67,319	104.68	D	0.82	$122,439	-178.61	2.54	$39,414	542.56
$8.9m	D	1.65	$60,684	151.33	5.12	$19,535	109.80	U	1.42	$70,384	-177.19	2.54	$39,414	545.09
$9.0m	O	1.65	$60,722	152.98	0.51	$197,711	110.31	G	1.32	$75,935	-175.88	2.53	$39,500	547.63
$9.1m	R	1.65	$60,786	154.62	1.51	$66,049	111.82	U	1.41	$71,106	-174.47	2.51	$39,818	550.14
$9.2m	E	1.64	$60,831	156.26	-10.92	-$9,154	100.90	D	0.80	$124,431	-173.67	2.50	$40,055	552.63
$9.3m	O	1.64	$60,851	157.91	0.50	$198,138	101.40	U	1.39	$71,821	-172.27	2.49	$40,219	555.12
$9.4m	G	1.64	$60,861	159.55	3.16	$31,659	104.56	G	1.29	$77,439	-170.98	2.48	$40,283	557.60
$9.5m	C	1.64	$60,868	161.19	1.48	$67,525	106.04	U	1.38	$72,528	-169.60	2.46	$40,615	560.06
$9.6m	R	1.64	$60,913	162.84	1.51	$66,187	107.55	D	0.79	$126,389	-168.81	2.46	$40,686	562.52
$9.7m	O	1.64	$60,981	164.48	0.50	$198,555	108.06	U	1.37	$73,229	-167.45	2.44	$41,007	564.96
$9.8m	R	1.64	$61,040	166.11	1.51	$66,325	109.56	G	1.27	$78,887	-166.18	2.44	$41,036	567.40
$9.9m	C	1.64	$61,053	167.75	1.48	$67,730	111.04	D	0.78	$128,320	-165.40	2.42	$41,307	569.82

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$10.0m	U	1.64	$61,058	169.39	2.92	$34,192	113.97	U	1.35	$73,923	-164.05	2.42	$41,396	572.23
$10.1m	O	1.64	$61,109	171.03	0.50	$198,977	114.47	G	1.25	$80,285	-162.80	2.39	$41,763	574.63
$10.2m	R	1.63	$61,167	172.66	1.50	$66,463	115.97	U	1.34	$74,611	-161.46	2.39	$41,781	577.02
$10.3m	C	1.63	$61,237	174.29	1.47	$67,934	117.45	D	0.77	$130,222	-160.69	2.39	$41,919	579.41
$10.4m	O	1.63	$61,238	175.93	0.50	$199,394	117.95	U	1.33	$75,293	-159.37	2.37	$42,163	581.78
$10.5m	R	1.63	$61,293	177.56	1.50	$66,601	119.45	G	1.22	$81,635	-158.14	2.35	$42,465	584.13
$10.6m	O	1.63	$61,366	179.19	0.50	$199,808	119.95	D	0.76	$132,095	-157.38	2.35	$42,523	586.49
$10.7m	C	1.63	$61,419	180.82	1.47	$68,137	121.42	U	1.32	$75,968	-156.07	2.35	$42,541	588.84
$10.8m	R	1.63	$61,419	182.44	1.50	$66,738	122.91	U	1.30	$76,637	-154.76	2.33	$42,916	591.17
$10.9m	O	1.63	$61,493	184.07	0.50	$200,224	123.41	D	0.75	$133,942	-154.02	2.32	$43,117	593.49
$11.0m	R	1.62	$61,546	185.70	1.50	$66,874	124.91	G	1.21	$82,941	-152.81	2.32	$43,145	595.80
$11.1m	C	1.62	$61,601	187.32	1.46	$68,338	126.37	U	1.29	$77,300	-151.52	2.31	$43,287	598.11
$11.2m	O	1.62	$61,619	188.94	0.50	$200,634	126.87	U	1.28	$77,959	-150.23	2.29	$43,656	600.40
$11.3m	R	1.62	$61,671	190.56	1.49	$67,012	128.36	D	0.74	$135,766	-149.50	2.29	$43,704	602.69
$11.4m	O	1.62	$61,746	192.18	0.50	$201,045	128.86	G	1.19	$84,208	-148.31	2.28	$43,804	604.98
$11.5m	C	1.62	$61,781	193.80	1.46	$68,538	130.32	U	1.27	$78,611	-147.04	2.27	$44,021	607.25
$11.6m	R	1.62	$61,797	195.42	1.49	$67,147	131.81	D	0.73	$137,563	-146.31	2.26	$44,282	609.51
$11.7m	O	1.62	$61,871	197.04	0.50	$201,455	132.31	U	1.26	$79,258	-145.05	2.25	$44,383	611.76
$11.8m	U	1.62	$61,889	198.65	2.89	$34,657	135.19	G	1.17	$85,438	-143.88	2.25	$44,443	614.01
$11.9m	R	1.61	$61,922	200.27	1.49	$67,283	136.68	U	1.25	$79,900	-142.63	2.23	$44,743	616.24
$12.0m	C	1.61	$61,961	201.88	1.45	$68,737	138.13	D	0.72	$139,340	-141.91	2.23	$44,855	618.47
$12.1m	O	1.61	$61,996	203.49	0.50	$201,865	138.63	G	1.15	$86,633	-140.76	2.22	$45,065	620.69
$12.2m	R	1.61	$62,047	205.10	1.48	$67,420	140.11	U	1.24	$80,537	-139.51	2.22	$45,099	622.91
$12.3m	O	1.61	$62,121	206.71	0.49	$202,269	140.61	D	0.71	$141,091	-138.80	2.20	$45,419	625.11
$12.4m	C	1.61	$62,139	208.32	1.45	$68,935	142.06	U	1.23	$81,168	-137.57	2.20	$45,453	627.31
$12.5m	R	1.61	$62,171	209.93	1.48	$67,555	143.54	G	1.14	$87,796	-136.43	2.19	$45,670	629.50
$12.6m	O	1.61	$62,245	211.54	0.49	$202,671	144.03	U	1.22	$81,795	-135.21	2.18	$45,804	631.68
$12.7m	R	1.61	$62,296	213.14	1.48	$67,690	145.51	D	0.70	$142,824	-134.51	2.18	$45,975	633.86
$12.8m	C	1.60	$62,316	214.75	1.45	$69,131	146.95	U	1.21	$82,417	-133.30	2.17	$46,152	636.03
$12.9m	O	1.60	$62,369	216.35	0.49	$203,075	147.45	G	1.12	$88,929	-132.17	2.16	$46,260	638.19
$13.0m	R	1.60	$62,420	217.95	1.47	$67,825	148.92	U	1.20	$83,034	-130.97	2.15	$46,498	640.34
$13.1m	O	1.60	$62,492	219.55	0.49	$203,475	149.41	D	0.69	$144,534	-130.28	2.15	$46,527	642.49
$13.2m	C	1.60	$62,493	221.15	1.44	$69,326	150.85	W	1.67	$60,049	-128.61	2.14	$46,801	644.62
$13.3m	R	1.60	$62,545	222.75	1.47	$67,960	152.33	G	1.11	$90,035	-127.50	2.14	$46,834	646.76
$13.4m	O	1.60	$62,614	224.35	0.49	$203,878	152.82	U	1.20	$83,647	-126.31	2.13	$46,841	648.89
$13.5m	C	1.60	$62,668	225.95	1.44	$69,521	154.25	D	0.68	$146,224	-125.62	2.12	$47,072	651.02
$13.6m	R	1.60	$62,668	227.54	1.47	$68,094	155.72	U	1.19	$84,256	-124.43	2.12	$47,182	653.14
$13.7m	U	1.59	$62,709	229.14	2.85	$35,116	158.57	G	1.10	$91,113	-123.34	2.11	$47,395	655.25
$13.8m	O	1.59	$62,736	230.73	0.49	$204,273	159.06	U	1.18	$84,859	-122.16	2.10	$47,520	657.35
$13.9m	R	1.59	$62,792	232.32	1.47	$68,229	160.53	D	0.68	$147,896	-121.48	2.10	$47,608	659.45
$14.0m	C	1.59	$62,842	233.91	1.43	$69,715	161.96	U	1.17	$85,459	-120.31	2.09	$47,856	661.54
$14.1m	O	1.59	$62,858	235.51	0.49	$204,671	162.45	G	1.09	$92,166	-119.23	2.09	$47,943	663.63
$14.2m	R	1.59	$62,915	237.09	1.46	$68,363	163.91	D	0.67	$149,548	-118.56	2.08	$48,142	665.71
$14.3m	O	1.59	$62,979	238.68	0.49	$205,061	164.40	U	1.16	$86,055	-117.40	2.08	$48,190	667.78
$14.4m	W	1.59	$62,990	240.27	2.04	$49,093	166.44	G	1.07	$93,197	-116.32	2.06	$48,479	669.84
$14.5m	C	1.59	$63,015	241.86	1.43	$69,907	167.87	U	1.15	$86,646	-115.17	2.06	$48,520	671.90
$14.6m	R	1.59	$63,038	243.44	1.46	$68,496	169.33	D	0.66	$151,185	-114.51	2.05	$48,667	673.96
$14.7m	O	1.58	$63,100	245.03	0.49	$205,457	169.81	U	1.15	$87,234	-113.36	2.05	$48,850	676.01
$14.8m	R	1.58	$63,160	246.61	1.46	$68,629	171.27	G	1.06	$94,205	-112.30	2.04	$49,003	678.05
$14.9m	G	1.58	$63,163	248.19	3.04	$32,856	174.31	W	1.59	$62,990	-110.71	2.04	$49,093	680.08
$15.0m	C	1.58	$63,188	249.78	1.43	$70,098	175.74	U	1.14	$87,817	-109.57	2.03	$49,176	682.12

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$15.1m	E	1.58	$63,218	251.36	-11.21	-$8,922	164.53	D	0.65	$152,800	-108.92	2.03	$49,188	684.15
$15.2m	O	1.58	$63,221	252.94	0.49	$205,850	165.02	U	1.13	$88,397	-107.79	2.02	$49,502	686.17
$15.3m	R	1.58	$63,283	254.52	1.45	$68,763	166.47	G	1.05	$95,191	-106.74	2.02	$49,517	688.19
$15.4m	O	1.58	$63,340	256.10	0.48	$206,241	166.96	D	0.65	$154,400	-106.09	2.01	$49,702	690.20
$15.5m	C	1.58	$63,359	257.68	1.42	$70,288	168.38	U	1.12	$88,973	-104.97	2.01	$49,823	692.21
$15.6m	R	1.58	$63,406	259.26	1.45	$68,895	169.83	G	1.04	$96,157	-103.93	2.00	$50,019	694.21
$15.7m	O	1.58	$63,460	260.83	0.48	$206,629	170.32	U	1.12	$89,545	-102.81	1.99	$50,143	696.20
$15.8m	U	1.57	$63,518	262.41	2.81	$35,569	173.13	D	0.64	$155,984	-102.17	1.99	$50,213	698.19
$15.9m	R	1.57	$63,527	263.98	1.45	$69,028	174.58	U	1.11	$90,114	-101.06	1.98	$50,464	700.18
$16.0m	C	1.57	$63,530	265.55	1.42	$70,478	175.99	G	1.03	$97,105	-100.03	1.98	$50,512	702.16
$16.1m	O	1.57	$63,578	267.13	0.48	$207,014	176.48	D	0.63	$157,552	-99.39	1.97	$50,718	704.13
$16.2m	R	1.57	$63,649	268.70	1.45	$69,161	177.92	U	1.10	$90,678	-98.29	1.97	$50,779	706.10
$16.3m	O	1.57	$63,698	270.27	0.48	$207,404	178.41	G	1.02	$98,034	-97.27	1.96	$50,996	708.06
$16.4m	C	1.57	$63,699	271.84	1.42	$70,666	179.82	U	1.10	$91,240	-96.18	1.96	$51,091	710.01
$16.5m	R	1.57	$63,771	273.41	1.44	$69,292	181.26	W	1.52	$65,678	-94.65	1.95	$51,188	711.97
$16.6m	O	1.57	$63,815	274.97	0.48	$207,784	181.74	D	0.63	$159,104	-94.02	1.95	$51,216	713.92
$16.7m	C	1.57	$63,868	276.54	1.41	$70,853	183.16	U	1.09	$91,799	-92.93	1.95	$51,406	715.87
$16.8m	R	1.57	$63,892	278.10	1.44	$69,425	184.60	G	1.01	$98,946	-91.92	1.94	$51,470	717.81
$16.9m	O	1.56	$63,933	279.67	0.48	$208,169	185.08	D	0.62	$160,643	-91.30	1.93	$51,712	719.74
$17.0m	R	1.56	$64,013	281.23	1.44	$69,556	186.51	U	1.08	$92,352	-90.22	1.93	$51,717	721.68
$17.1m	C	1.56	$64,036	282.79	1.41	$71,039	187.92	G	1.00	$99,841	-89.22	1.93	$51,936	723.60
$17.2m	O	1.56	$64,050	284.35	0.48	$208,551	188.40	U	1.08	$92,904	-88.14	1.92	$52,026	725.52
$17.3m	R	1.56	$64,134	285.91	1.43	$69,687	189.84	D	0.62	$162,164	-87.52	1.92	$52,203	727.44
$17.4m	O	1.56	$64,167	287.47	0.48	$208,934	190.32	U	1.07	$93,453	-86.45	1.91	$52,331	729.35
$17.5m	C	1.56	$64,203	289.03	1.40	$71,225	191.72	G	0.99	$100,722	-85.46	1.91	$52,394	731.26
$17.6m	R	1.56	$64,255	290.58	1.43	$69,819	193.15	U	1.06	$93,997	-84.40	1.90	$52,637	733.16
$17.7m	O	1.56	$64,283	292.14	0.48	$209,306	193.63	D	0.61	$163,674	-83.79	1.90	$52,687	735.06
$17.8m	U	1.55	$64,317	293.69	2.78	$36,017	196.41	G	0.98	$101,587	-82.80	1.89	$52,844	736.95
$17.9m	C	1.55	$64,369	295.25	1.40	$71,409	197.81	U	1.06	$94,539	-81.74	1.89	$52,941	738.84
$18.0m	R	1.55	$64,375	296.80	1.43	$69,949	199.24	W	1.47	$68,162	-80.28	1.88	$53,124	740.72
$18.1m	O	1.55	$64,399	298.35	0.48	$209,688	199.71	D	0.61	$165,166	-79.67	1.88	$53,169	742.60
$18.2m	R	1.55	$64,496	299.91	1.43	$70,080	201.14	U	1.05	$95,078	-78.62	1.88	$53,242	744.48
$18.3m	O	1.55	$64,515	301.46	0.48	$210,066	201.62	G	0.98	$102,436	-77.64	1.88	$53,286	746.36
$18.4m	C	1.55	$64,534	303.00	1.40	$71,592	203.01	U	1.05	$95,613	-76.60	1.87	$53,542	748.22
$18.5m	D	1.55	$64,611	304.55	4.81	$20,799	207.82	D	0.60	$166,650	-76.00	1.86	$53,645	750.09
$18.6m	R	1.55	$64,615	306.10	1.42	$70,210	209.25	G	0.97	$103,273	-75.03	1.86	$53,721	751.95
$18.7m	O	1.55	$64,630	307.65	0.48	$210,438	209.72	U	1.04	$96,146	-73.99	1.86	$53,842	753.81
$18.8m	C	1.55	$64,699	309.19	1.39	$71,774	211.11	D	0.59	$168,118	-73.39	1.85	$54,118	755.65
$18.9m	R	1.54	$64,735	310.74	1.42	$70,340	212.54	U	1.03	$96,675	-72.36	1.85	$54,136	757.50
$19.0m	O	1.54	$64,744	312.28	0.47	$210,810	213.01	G	0.96	$104,096	-71.40	1.85	$54,149	759.35
$19.1m	R	1.54	$64,855	313.82	1.42	$70,471	214.43	U	1.03	$97,203	-70.37	1.84	$54,434	761.19
$19.2m	O	1.54	$64,859	315.37	0.47	$211,184	214.90	G	0.95	$104,905	-69.42	1.83	$54,570	763.02
$19.3m	C	1.54	$64,862	316.91	1.39	$71,956	216.29	D	0.59	$169,572	-68.83	1.83	$54,588	764.85
$19.4m	O	1.54	$64,973	318.45	0.47	$211,551	216.76	U	1.02	$97,727	-67.80	1.83	$54,726	766.68
$19.5m	R	1.54	$64,973	319.99	1.42	$70,600	218.18	W	1.42	$70,477	-66.39	1.82	$54,928	768.50
$19.6m	C	1.54	$65,025	321.52	1.39	$72,137	219.57	G	0.95	$105,704	-65.44	1.82	$54,986	770.32
$19.7m	O	1.54	$65,087	323.06	0.47	$211,927	220.04	U	1.02	$98,248	-64.42	1.82	$55,018	772.13
$19.8m	R	1.54	$65,096	324.60	1.41	$70,729	221.45	D	0.58	$171,019	-63.84	1.82	$55,051	773.95
$19.9m	U	1.54	$65,107	326.13	2.74	$36,459	224.20	U	1.01	$98,766	-62.82	1.81	$55,307	775.76
$20.0m	C	1.53	$65,187	327.67	1.38	$72,316	225.58	G	0.94	$106,491	-61.89	1.81	$55,394	777.56
$20.1m	O	1.53	$65,198	329.20	0.47	$212,292	226.05	D	0.58	$172,446	-61.31	1.80	$55,512	779.37

	Reallocation with good information							*Reallocation with poor information*						
	Marginal	***Estimates with good information***			***Estimates with poor information***			**Marginal**	***Estimates with good information***			***Estimates with poor information***		
Budget impact	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$20.2m	R	1.53	$65,210	330.73	1.41	$70,859	227.46	U	1.01	$99,282	-60.30	1.80	$55,596	781.16
$20.3m	G	1.53	$65,308	332.26	2.94	$33,972	230.40	G	0.93	$107,264	-59.37	1.79	$55,797	782.96
$20.4m	O	1.53	$65,313	333.80	0.47	$212,657	230.87	U	1.00	$99,794	-58.36	1.79	$55,885	784.75
$20.5m	R	1.53	$65,330	335.33	1.41	$70,987	232.28	D	0.58	$173,868	-57.79	1.79	$55,969	786.53
$20.6m	C	1.53	$65,348	336.86	1.38	$72,495	233.66	U	1.00	$100,306	-56.79	1.78	$56,170	788.31
$20.7m	O	1.53	$65,424	338.39	0.47	$213,024	234.13	G	0.93	$108,028	-55.87	1.78	$56,194	790.09
$20.8m	R	1.53	$65,449	339.91	1.41	$71,116	235.54	D	0.57	$175,276	-55.30	1.77	$56,424	791.86
$20.9m	C	1.53	$65,508	341.44	1.38	$72,673	236.91	U	0.99	$100,814	-54.30	1.77	$56,456	793.64
$21.0m	O	1.53	$65,539	342.97	0.47	$213,393	237.38	G	0.92	$108,781	-53.38	1.77	$56,586	795.40
$21.1m	R	1.53	$65,569	344.49	1.40	$71,247	238.79	W	1.38	$72,649	-52.01	1.77	$56,621	797.17
$21.2m	O	1.52	$65,647	346.01	0.47	$213,753	239.25	U	0.99	$101,319	-51.02	1.76	$56,738	798.93
$21.3m	W	1.52	$65,678	347.54	1.95	$51,188	241.21	D	0.57	$176,672	-50.46	1.76	$56,873	800.69
$21.4m	R	1.52	$65,686	349.06	1.40	$71,372	242.61	G	0.91	$109,524	-49.54	1.76	$56,972	802.45
$21.5m	O	1.52	$65,759	350.58	0.47	$214,114	243.08	U	0.98	$101,822	-48.56	1.75	$57,019	804.20
$21.6m	R	1.52	$65,802	352.10	1.40	$71,500	244.47	U	0.98	$102,322	-47.58	1.75	$57,297	805.94
$21.7m	O	1.52	$65,867	353.62	0.47	$214,473	244.94	D	0.56	$178,056	-47.02	1.74	$57,316	807.69
$21.8m	U	1.52	$65,886	355.14	2.71	$36,895	247.65	G	0.91	$110,256	-46.11	1.74	$57,353	809.43
$21.9m	E	1.52	$65,910	356.65	-11.52	-$8,677	236.13	U	0.97	$102,820	-45.14	1.74	$57,580	811.17
$22.0m	R	1.52	$65,920	358.17	1.40	$71,628	237.52	G	0.90	$110,978	-44.24	1.73	$57,729	812.90
$22.1m	O	1.52	$65,980	359.69	0.47	$214,837	237.99	D	0.56	$179,433	-43.68	1.73	$57,760	814.63
$22.2m	R	1.51	$66,041	361.20	1.39	$71,757	239.38	U	0.97	$103,315	-42.72	1.73	$57,854	816.36
$22.3m	O	1.51	$66,089	362.71	0.46	$215,193	239.85	G	0.90	$111,693	-41.82	1.72	$58,100	818.08
$22.4m	R	1.51	$66,155	364.22	1.39	$71,886	241.24	U	0.96	$103,809	-40.86	1.72	$58,133	819.80
$22.5m	O	1.51	$66,203	365.73	0.46	$215,550	241.70	D	0.55	$180,796	-40.30	1.72	$58,200	821.52
$22.6m	R	1.51	$66,269	367.24	1.39	$72,010	243.09	W	1.34	$74,698	-38.96	1.72	$58,218	823.24
$22.7m	O	1.51	$66,309	368.75	0.46	$215,908	243.55	U	0.96	$104,299	-38.01	1.71	$58,404	824.95
$22.8m	R	1.51	$66,392	370.26	1.39	$72,134	244.94	G	0.89	$112,397	-37.12	1.71	$58,469	826.66
$22.9m	O	1.51	$66,419	371.76	0.46	$216,258	245.40	D	0.55	$182,153	-36.57	1.71	$58,637	828.37
$23.0m	R	1.50	$66,507	373.27	1.38	$72,265	246.79	U	0.95	$104,789	-35.61	1.70	$58,682	830.07
$23.1m	O	1.50	$66,525	374.77	0.46	$216,614	247.25	G	0.88	$113,094	-34.73	1.70	$58,827	831.77
$23.2m	R	1.50	$66,622	376.27	1.38	$72,396	248.63	U	0.95	$105,274	-33.78	1.70	$58,952	833.47
$23.3m	O	1.50	$66,636	377.77	0.46	$216,967	249.09	D	0.54	$183,496	-33.23	1.69	$59,067	835.16
$23.4m	U	1.50	$66,657	379.27	2.68	$37,327	251.77	G	0.88	$113,781	-32.35	1.69	$59,189	836.85
$23.5m	R	1.50	$66,738	380.77	1.38	$72,516	253.15	U	0.95	$105,759	-31.41	1.69	$59,224	838.54
$23.6m	O	1.50	$66,742	382.27	0.46	$217,320	253.61	U	0.94	$106,239	-30.47	1.68	$59,492	840.22
$23.7m	O	1.50	$66,849	383.76	0.46	$217,670	254.07	D	0.54	$184,829	-29.93	1.68	$59,499	841.90
$23.8m	R	1.50	$66,854	385.26	1.38	$72,643	255.44	G	0.87	$114,460	-29.05	1.68	$59,538	843.58
$23.9m	O	1.49	$66,961	386.75	0.46	$218,017	255.90	W	1.30	$76,641	-27.75	1.67	$59,732	845.25
$24.0m	R	1.49	$66,970	388.25	1.37	$72,770	257.28	U	0.94	$106,720	-26.81	1.67	$59,762	846.93
$24.1m	O	1.49	$67,065	389.74	0.46	$218,364	257.74	G	0.87	$115,132	-25.94	1.67	$59,891	848.60
$24.2m	R	1.49	$67,083	391.23	1.37	$72,892	259.11	D	0.54	$186,154	-25.41	1.67	$59,927	850.26
$24.3m	O	1.49	$67,168	392.72	0.46	$218,713	259.56	U	0.93	$107,197	-24.47	1.67	$60,028	851.93
$24.4m	R	1.49	$67,204	394.21	1.37	$73,019	260.93	G	0.86	$115,796	-23.61	1.66	$60,234	853.59
$24.5m	O	1.49	$67,277	395.69	0.46	$219,058	261.39	U	0.93	$107,673	-22.68	1.66	$60,295	855.25
$24.6m	R	1.49	$67,313	397.18	1.37	$73,148	262.76	D	0.53	$187,473	-22.15	1.66	$60,346	856.91
$24.7m	G	1.49	$67,320	398.66	2.86	$35,019	265.61	U	0.92	$108,146	-21.22	1.65	$60,562	858.56
$24.8m	O	1.48	$67,385	400.15	0.46	$219,404	266.07	G	0.86	$116,451	-20.36	1.65	$60,577	860.21
$24.9m	U	1.48	$67,419	401.63	2.65	$37,754	268.72	D	0.53	$188,775	-19.83	1.65	$60,772	861.85
$25.0m	R	1.48	$67,435	403.11	1.36	$73,271	270.08	U	0.92	$108,613	-18.91	1.64	$60,824	863.50
$25.1m	O	1.48	$67,490	404.60	0.46	$219,746	270.54	G	0.85	$117,100	-18.06	1.64	$60,912	865.14
$25.2m	R	1.48	$67,545	406.08	1.36	$73,394	271.90	U	0.92	$109,087	-17.14	1.64	$61,087	866.78

	Reallocation with good information							Reallocation with poor information						
	Marginal	Estimates with good information			Estimates with poor information			Marginal	Estimates with good information			Estimates with poor information		
Budget impact	Tech [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	Tech [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$25.3m	O	1.48	$67,595	407.55	0.45	$220,090	272.35	W	1.27	$78,489	-15.87	1.63	$61,173	868.41
$25.4m	R	1.48	$67,659	409.03	1.36	$73,519	273.71	D	0.53	$190,074	-15.34	1.63	$61,185	870.05
$25.5m	O	1.48	$67,696	410.51	0.45	$220,434	274.17	G	0.85	$117,741	-14.49	1.63	$61,248	871.68
$25.6m	R	1.48	$67,774	411.99	1.36	$73,643	275.53	U	0.91	$109,553	-13.58	1.63	$61,350	873.31
$25.7m	O	1.47	$67,806	413.46	0.45	$220,770	275.98	G	0.84	$118,377	-12.74	1.62	$61,576	874.93
$25.8m	R	1.47	$67,889	414.93	1.36	$73,768	277.33	D	0.52	$191,366	-12.21	1.62	$61,603	876.56
$25.9m	O	1.47	$67,907	416.41	0.45	$221,112	277.79	U	0.91	$110,023	-11.30	1.62	$61,607	878.18
$26.0m	R	1.47	$68,004	417.88	1.35	$73,888	279.14	U	0.91	$110,485	-10.40	1.62	$61,870	879.80
$26.1m	O	1.47	$68,009	419.35	0.45	$221,450	279.59	G	0.84	$119,005	-9.56	1.62	$61,904	881.41
$26.2m	O	1.47	$68,115	420.82	0.45	$221,784	280.04	D	0.52	$192,645	-9.04	1.61	$62,012	883.02
$26.3m	R	1.47	$68,120	422.28	1.35	$74,019	281.39	U	0.90	$110,939	-8.14	1.61	$62,127	884.63
$26.4m	W	1.47	$68,162	423.75	1.88	$53,124	283.28	R	1.75	$57,242	-6.39	1.61	$62,198	886.24
$26.5m	U	1.47	$68,172	425.22	2.62	$38,176	285.90	G	0.84	$119,626	-5.56	1.61	$62,228	887.85
$26.6m	O	1.47	$68,222	426.68	0.45	$222,124	286.35	R	1.74	$57,377	-3.81	1.60	$62,345	889.45
$26.7m	R	1.47	$68,227	428.15	1.35	$74,134	287.69	U	0.90	$111,408	-2.91	1.60	$62,383	891.05
$26.8m	D	1.46	$68,312	429.61	4.55	$21,990	292.24	D	0.52	$193,915	-2.40	1.60	$62,426	892.66
$26.9m	O	1.46	$68,320	431.08	0.45	$222,460	292.69	R	1.74	$57,512	-0.66	1.60	$62,491	894.26
$27.0m	R	1.46	$68,348	432.54	1.35	$74,261	294.04	G	0.83	$120,241	0.17	1.60	$62,551	895.86
$27.1m	O	1.46	$68,423	434.00	0.45	$222,792	294.49	W	1.25	$80,254	1.42	1.60	$62,548	897.45
$27.2m	R	1.46	$68,456	435.46	1.34	$74,388	295.83	R	1.73	$57,646	3.15	1.60	$62,638	899.05
$27.3m	O	1.46	$68,526	436.92	0.45	$223,125	296.28	U	0.89	$111,857	4.05	1.60	$62,641	900.65
$27.4m	R	1.46	$68,568	438.38	1.34	$74,505	297.62	R	1.73	$57,780	5.78	1.59	$62,783	902.24
$27.5m	O	1.46	$68,629	439.84	0.45	$223,459	298.07	D	0.51	$195,179	6.29	1.59	$62,830	903.83
$27.6m	R	1.46	$68,686	441.29	1.34	$74,632	299.41	G	0.83	$120,850	7.12	1.59	$62,861	905.42
$27.7m	O	1.45	$68,733	442.75	0.45	$223,789	299.86	U	0.89	$112,322	8.01	1.59	$62,897	907.01
$27.8m	R	1.45	$68,795	444.20	1.34	$74,755	301.19	R	1.73	$57,914	9.73	1.59	$62,929	908.60
$27.9m	O	1.45	$68,828	445.65	0.45	$224,120	301.64	R	1.72	$58,048	11.46	1.59	$63,074	910.19
$28.0m	R	1.45	$68,908	447.10	1.34	$74,873	302.98	U	0.89	$112,765	12.34	1.58	$63,147	911.77
$28.1m	U	1.45	$68,918	448.56	2.59	$38,593	305.57	G	0.82	$121,452	13.17	1.58	$63,179	913.35
$28.2m	O	1.45	$68,937	450.01	0.45	$224,452	306.01	R	1.72	$58,181	14.89	1.58	$63,219	914.94
$28.3m	E	1.45	$68,979	451.46	-11.88	-$8,418	294.13	D	0.51	$196,433	15.39	1.58	$63,231	916.52
$28.4m	R	1.45	$69,023	452.90	1.33	$74,996	295.47	R	1.71	$58,314	17.11	1.58	$63,363	918.09
$28.5m	O	1.45	$69,032	454.35	0.44	$224,775	295.91	U	0.88	$113,225	17.99	1.58	$63,403	919.67
$28.6m	R	1.45	$69,132	455.80	1.33	$75,120	297.24	G	0.82	$122,051	18.81	1.58	$63,488	921.25
$28.7m	O	1.45	$69,132	457.25	0.44	$225,104	297.69	R	1.71	$58,447	20.52	1.57	$63,508	922.82
$28.8m	G	1.44	$69,219	458.69	2.78	$36,007	300.46	C	1.74	$57,332	22.27	1.57	$63,602	924.39
$28.9m	O	1.44	$69,238	460.14	0.44	$225,433	300.91	D	0.51	$197,679	22.77	1.57	$63,638	925.97
$29.0m	R	1.44	$69,242	461.58	1.33	$75,239	302.24	R	1.71	$58,579	24.48	1.57	$63,651	927.54
$29.1m	O	1.44	$69,334	463.02	0.44	$225,759	302.68	U	0.88	$113,662	25.36	1.57	$63,654	929.11
$29.2m	R	1.44	$69,358	464.46	1.33	$75,364	304.01	R	1.70	$58,711	27.06	1.57	$63,795	930.67
$29.3m	O	1.44	$69,435	465.90	0.44	$226,081	304.45	G	0.82	$122,641	27.88	1.57	$63,796	932.24
$29.4m	R	1.44	$69,469	467.34	1.32	$75,483	305.77	C	1.74	$57,540	29.62	1.57	$63,833	933.81
$29.5m	O	1.44	$69,531	468.78	0.44	$226,403	306.21	W	1.22	$81,946	30.84	1.57	$63,866	935.37
$29.6m	R	1.44	$69,580	470.22	1.32	$75,603	307.54	U	0.88	$114,129	31.71	1.56	$63,906	936.94
$29.7m	O	1.44	$69,633	471.65	0.44	$226,727	307.98	R	1.70	$58,843	33.41	1.56	$63,938	938.50
$29.8m	U	1.44	$69,655	473.09	2.56	$39,006	310.54	D	0.50	$198,922	33.91	1.56	$64,033	940.07
$29.9m	R	1.43	$69,691	474.53	1.32	$75,729	311.86	C	1.73	$57,746	35.65	1.56	$64,062	941.63
$30.0m	O	1.43	$69,730	475.96	0.44	$227,051	312.30	R	1.70	$58,975	37.34	1.56	$64,081	943.19
$30.1m	R	1.43	$69,798	477.39	1.32	$75,844	313.62	G	0.81	$123,226	38.15	1.56	$64,098	944.75
$30.2m	O	1.43	$69,832	478.82	0.44	$227,371	314.06	U	0.87	$114,561	39.03	1.56	$64,156	946.31
$30.3m	R	1.43	$69,915	480.25	1.32	$75,965	315.38	R	1.69	$59,106	40.72	1.56	$64,224	947.86

	Reallocation with good information							***Reallocation with poor information***						
	Marginal Tech [a]	***Estimates with good information***			***Estimates with poor information***			**Marginal Tech** [a]	***Estimates with good information***			***Estimates with poor information***		
Budget impact		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$30.4m	O	1.43	$69,930	481.68	0.44	$227,692	315.82	C	1.73	$57,951	42.44	1.56	$64,289	949.42
$30.5m	R	1.43	$70,023	483.11	1.31	$76,086	317.13	R	1.69	$59,236	44.13	1.55	$64,366	950.97
$30.6m	O	1.43	$70,023	484.54	0.44	$228,009	317.57	G	0.81	$123,805	44.94	1.55	$64,404	952.52
$30.7m	O	1.43	$70,126	485.97	0.44	$228,326	318.01	U	0.87	$115,022	45.81	1.55	$64,408	954.08
$30.8m	R	1.43	$70,136	487.39	1.31	$76,208	319.32	D	0.50	$200,152	46.31	1.55	$64,429	955.63
$30.9m	O	1.42	$70,220	488.82	0.44	$228,645	319.76	R	1.68	$59,367	47.99	1.55	$64,508	957.18
$31.0m	R	1.42	$70,244	490.24	1.31	$76,330	321.07	C	1.72	$58,155	49.71	1.55	$64,515	958.73
$31.1m	O	1.42	$70,319	491.66	0.44	$228,964	321.50	R	1.68	$59,498	51.39	1.55	$64,650	960.28
$31.2m	R	1.42	$70,353	493.08	1.31	$76,441	322.81	U	0.87	$115,447	52.26	1.55	$64,654	961.82
$31.3m	U	1.42	$70,384	494.50	2.54	$39,414	325.35	G	0.80	$124,381	53.06	1.55	$64,700	963.37
$31.4m	M	1.42	$70,395	495.93	-0.25	-$397,560	325.10	C	1.71	$58,357	54.78	1.54	$64,740	964.91
$31.5m	O	1.42	$70,418	497.35	0.44	$229,279	325.53	R	1.68	$59,627	56.45	1.54	$64,791	966.46
$31.6m	R	1.42	$70,462	498.76	1.31	$76,570	326.84	D	0.50	$201,377	56.95	1.54	$64,826	968.00
$31.7m	W	1.42	$70,477	500.18	1.82	$54,928	328.66	U	0.86	$115,902	57.81	1.54	$64,897	969.54
$31.8m	O	1.42	$70,512	501.60	0.44	$229,589	329.10	R	1.67	$59,758	59.49	1.54	$64,932	971.08
$31.9m	R	1.42	$70,577	503.02	1.30	$76,687	330.40	C	1.71	$58,558	61.19	1.54	$64,962	972.62
$32.0m	O	1.42	$70,607	504.43	0.43	$229,906	330.84	G	0.80	$124,950	62.00	1.54	$64,998	974.16
$32.1m	R	1.41	$70,681	505.85	1.30	$76,799	332.14	R	1.67	$59,887	63.67	1.54	$65,072	975.69
$32.2m	O	1.41	$70,706	507.26	0.43	$230,218	332.57	W	1.20	$83,569	64.86	1.54	$65,132	977.23
$32.3m	R	1.41	$70,796	508.68	1.30	$76,929	333.87	U	0.86	$116,333	65.72	1.53	$65,151	978.77
$32.4m	O	1.41	$70,801	510.09	0.43	$230,532	334.31	C	1.70	$58,758	67.42	1.53	$65,184	980.30
$32.5m	O	1.41	$70,897	511.50	0.43	$230,840	334.74	R	1.67	$60,016	69.09	1.53	$65,213	981.83
$32.6m	R	1.41	$70,902	512.91	1.30	$77,042	336.04	D	0.49	$202,593	69.58	1.53	$65,219	983.37
$32.7m	R	1.41	$71,013	514.32	1.30	$77,160	337.33	G	0.80	$125,515	70.38	1.53	$65,287	984.90
$32.8m	G	1.41	$71,019	515.73	2.71	$36,943	340.04	R	1.66	$60,145	72.04	1.53	$65,353	986.43
$32.9m	U	1.41	$71,106	517.13	2.51	$39,818	342.55	U	0.86	$116,782	72.90	1.53	$65,389	987.96
$33.0m	R	1.41	$71,119	518.54	1.29	$77,280	343.85	C	1.70	$58,956	74.59	1.53	$65,404	989.49
$33.1m	R	1.40	$71,230	519.94	1.29	$77,393	345.14	R	1.66	$60,274	76.25	1.53	$65,493	991.01
$33.2m	R	1.40	$71,342	521.34	1.29	$77,519	346.43	G	0.79	$126,072	77.05	1.52	$65,582	992.54
$33.3m	R	1.40	$71,444	522.74	1.29	$77,634	347.72	D	0.49	$203,803	77.54	1.52	$65,604	994.06
$33.4m	R	1.40	$71,556	524.14	1.29	$77,748	349.00	C	1.69	$59,153	79.23	1.52	$65,622	995.59
$33.5m	R	1.40	$71,664	525.54	1.28	$77,869	350.29	R	1.66	$60,402	80.88	1.52	$65,632	997.11
$33.6m	R	1.39	$71,772	526.93	1.28	$77,985	351.57	U	0.85	$117,206	81.74	1.52	$65,638	998.63
$33.7m	U	1.39	$71,821	528.32	2.49	$40,219	354.05	R	1.65	$60,530	83.39	1.52	$65,772	1000.15
$33.8m	D	1.39	$71,822	529.71	4.33	$23,120	358.38	C	1.68	$59,348	85.07	1.52	$65,839	1001.67
$33.9m	R	1.39	$71,880	531.11	1.28	$78,107	359.66	G	0.79	$126,627	85.86	1.52	$65,867	1003.19
$34.0m	R	1.39	$71,984	532.49	1.28	$78,217	360.94	U	0.85	$117,647	86.71	1.52	$65,880	1004.71
$34.1m	R	1.39	$72,098	533.88	1.28	$78,339	362.21	R	1.65	$60,658	88.36	1.52	$65,910	1006.23
$34.2m	R	1.38	$72,202	535.27	1.27	$78,456	363.49	D	0.49	$205,006	88.85	1.52	$65,994	1007.74
$34.3m	R	1.38	$72,307	536.65	1.27	$78,567	364.76	R	1.65	$60,786	90.50	1.51	$66,049	1009.25
$34.4m	R	1.38	$72,417	538.03	1.27	$78,691	366.03	C	1.68	$59,543	92.17	1.51	$66,055	1010.77
$34.5m	E	1.38	$72,520	539.41	-12.28	-$8,141	353.75	U	0.85	$118,078	93.02	1.51	$66,124	1012.28
$34.6m	R	1.38	$72,527	540.79	1.27	$78,802	355.02	G	0.79	$127,178	93.81	1.51	$66,155	1013.79
$34.7m	U	1.38	$72,528	542.17	2.46	$40,615	357.48	R	1.64	$60,913	95.45	1.51	$66,187	1015.30
$34.8m	R	1.38	$72,627	543.54	1.27	$78,914	358.75	C	1.67	$59,736	97.12	1.51	$66,269	1016.81
$34.9m	W	1.38	$72,649	544.92	1.77	$56,621	360.51	R	1.64	$61,040	98.76	1.51	$66,325	1018.32
$35.0m	G	1.37	$72,732	546.30	2.64	$37,834	363.16	W	1.17	$85,132	99.94	1.51	$66,350	1019.83
$35.1m	R	1.37	$72,738	547.67	1.27	$79,039	364.42	U	0.84	$118,511	100.78	1.51	$66,361	1021.33
$35.2m	R	1.37	$72,844	549.04	1.26	$79,151	365.69	D	0.48	$206,198	101.27	1.51	$66,379	1022.84
$35.3m	R	1.37	$72,945	550.41	1.26	$79,264	366.95	G	0.78	$127,720	102.05	1.51	$66,441	1024.35
$35.4m	R	1.37	$73,057	551.78	1.26	$79,378	368.21	R	1.63	$61,167	103.68	1.50	$66,463	1025.85

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$35.5m	R	1.37	$73,164	553.15	1.26	$79,498	369.47	C	1.67	$59,928	105.35	1.50	$66,481	1027.35
$35.6m	U	1.37	$73,229	554.52	2.44	$41,007	371.90	R	1.63	$61,293	106.98	1.50	$66,601	1028.86
$35.7m	R	1.36	$73,265	555.88	1.26	$79,611	373.16	U	0.84	$118,934	107.82	1.50	$66,609	1030.36
$35.8m	R	1.36	$73,373	557.24	1.25	$79,726	374.41	C	1.66	$60,118	109.49	1.50	$66,693	1031.86
$35.9m	R	1.36	$73,475	558.60	1.25	$79,840	375.67	G	0.78	$128,261	110.27	1.50	$66,720	1033.36
$36.0m	R	1.36	$73,584	559.96	1.25	$79,955	376.92	R	1.63	$61,419	111.90	1.50	$66,738	1034.85
$36.1m	R	1.36	$73,692	561.32	1.25	$80,070	378.17	D	0.48	$207,391	112.38	1.50	$66,760	1036.35
$36.2m	R	1.36	$73,795	562.68	1.25	$80,180	379.41	U	0.84	$119,374	113.22	1.50	$66,845	1037.85
$36.3m	R	1.35	$73,899	564.03	1.25	$80,302	380.66	R	1.62	$61,546	114.84	1.50	$66,874	1039.34
$36.4m	U	1.35	$73,923	565.38	2.42	$41,396	383.07	C	1.66	$60,307	116.50	1.49	$66,903	1040.84
$36.5m	R	1.35	$74,003	566.73	1.24	$80,412	384.32	G	0.78	$128,798	117.27	1.49	$66,997	1042.33
$36.6m	R	1.35	$74,107	568.08	1.24	$80,522	385.56	R	1.62	$61,671	118.90	1.49	$67,012	1043.82
$36.7m	R	1.35	$74,212	569.43	1.24	$80,639	386.80	U	0.83	$119,804	119.73	1.49	$67,083	1045.31
$36.8m	R	1.35	$74,316	570.78	1.24	$80,749	388.04	C	1.65	$60,496	121.38	1.49	$67,112	1046.80
$36.9m	G	1.34	$74,368	572.12	2.58	$38,685	390.62	D	0.48	$208,568	121.86	1.49	$67,141	1048.29
$37.0m	R	1.34	$74,421	573.46	1.24	$80,867	391.86	R	1.62	$61,797	123.48	1.49	$67,147	1049.78
$37.1m	R	1.34	$74,527	574.81	1.23	$80,978	393.10	G	0.77	$129,328	124.25	1.49	$67,272	1051.27
$37.2m	U	1.34	$74,611	576.15	2.39	$41,781	395.49	R	1.61	$61,922	125.87	1.49	$67,283	1052.76
$37.3m	R	1.34	$74,627	577.49	1.23	$81,090	396.72	C	1.65	$60,683	127.52	1.49	$67,319	1054.24
$37.4m	W	1.34	$74,698	578.82	1.72	$58,218	398.44	U	0.83	$120,221	128.35	1.49	$67,326	1055.73
$37.5m	R	1.34	$74,733	580.16	1.23	$81,202	399.67	R	1.61	$62,047	129.96	1.48	$67,420	1057.21
$37.6m	R	1.34	$74,833	581.50	1.23	$81,321	400.90	D	0.48	$209,745	130.44	1.48	$67,517	1058.69
$37.7m	R	1.33	$74,940	582.83	1.23	$81,427	402.13	W	1.15	$86,639	131.59	1.48	$67,525	1060.17
$37.8m	R	1.33	$75,047	584.17	1.23	$81,539	403.36	C	1.64	$60,868	133.24	1.48	$67,525	1061.65
$37.9m	R	1.33	$75,143	585.50	1.22	$81,653	404.58	G	0.77	$129,855	134.01	1.48	$67,549	1063.13
$38.0m	D	1.33	$75,168	586.83	4.13	$24,197	408.71	R	1.61	$62,171	135.61	1.48	$67,555	1064.61
$38.1m	R	1.33	$75,250	588.16	1.22	$81,766	409.94	U	0.83	$120,642	136.44	1.48	$67,558	1066.09
$38.2m	U	1.33	$75,293	589.48	2.37	$42,163	412.31	R	1.61	$62,296	138.05	1.48	$67,690	1067.57
$38.3m	R	1.33	$75,352	590.81	1.22	$81,873	413.53	C	1.64	$61,053	139.69	1.48	$67,730	1069.05
$38.4m	R	1.33	$75,455	592.14	1.22	$81,987	414.75	U	0.83	$121,065	140.51	1.47	$67,797	1070.52
$38.5m	R	1.32	$75,557	593.46	1.22	$82,102	415.97	G	0.77	$130,378	141.28	1.47	$67,820	1072.00
$38.6m	R	1.32	$75,660	594.78	1.22	$82,210	417.18	R	1.60	$62,420	142.88	1.47	$67,825	1073.47
$38.7m	R	1.32	$75,758	596.10	1.21	$82,325	418.40	D	0.47	$210,917	143.35	1.47	$67,893	1074.94
$38.8m	R	1.32	$75,867	597.42	1.21	$82,433	419.61	C	1.63	$61,237	144.99	1.47	$67,934	1076.42
$38.9m	G	1.32	$75,935	598.74	2.53	$39,500	422.14	R	1.60	$62,545	146.59	1.47	$67,960	1077.89
$39.0m	R	1.32	$75,965	600.05	1.21	$82,542	423.35	H	1.75	$57,168	148.34	1.47	$67,980	1079.36
$39.1m	U	1.32	$75,968	601.37	2.35	$42,541	425.70	U	0.82	$121,492	149.16	1.47	$68,032	1080.83
$39.2m	R	1.31	$76,069	602.68	1.21	$82,651	426.91	G	0.76	$130,895	149.92	1.47	$68,092	1082.30
$39.3m	R	1.31	$76,173	604.00	1.21	$82,768	428.12	R	1.60	$62,668	151.52	1.47	$68,094	1083.77
$39.4m	R	1.31	$76,266	605.31	1.21	$82,878	429.33	H	1.75	$57,278	153.26	1.47	$68,111	1085.23
$39.5m	R	1.31	$76,377	606.62	1.20	$82,988	430.53	C	1.63	$61,419	154.89	1.47	$68,137	1086.70
$39.6m	R	1.31	$76,476	607.92	1.20	$83,091	431.74	R	1.59	$62,792	156.49	1.47	$68,229	1088.17
$39.7m	R	1.31	$76,576	609.23	1.20	$83,209	432.94	H	1.74	$57,387	158.23	1.47	$68,240	1089.63
$39.8m	U	1.30	$76,637	610.54	2.33	$42,916	435.27	U	0.82	$121,921	159.05	1.46	$68,269	1091.10
$39.9m	W	1.30	$76,641	611.84	1.67	$59,732	436.94	D	0.47	$212,076	159.52	1.46	$68,269	1092.56
$40.0m	E	1.30	$76,669	613.14	-12.75	-$7,845	424.20	C	1.62	$61,601	161.14	1.46	$68,338	1094.02
$40.1m	R	1.30	$76,675	614.45	1.20	$83,313	425.40	G	0.76	$131,409	161.90	1.46	$68,357	1095.49
$40.2m	R	1.30	$76,775	615.75	1.20	$83,431	426.60	R	1.59	$62,915	163.49	1.46	$68,363	1096.95
$40.3m	R	1.30	$76,882	617.05	1.20	$83,535	427.79	H	1.74	$57,496	165.23	1.46	$68,370	1098.41
$40.4m	R	1.30	$76,976	618.35	1.20	$83,640	428.99	R	1.59	$63,038	166.82	1.46	$68,496	1099.87
$40.5m	R	1.30	$77,077	619.65	1.19	$83,759	430.18	H	1.74	$57,604	168.55	1.46	$68,499	1101.33

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$40.6m	R	1.30	$77,184	620.94	1.19	$83,857	431.37	U	0.82	$122,324	169.37	1.46	$68,503	1102.79
$40.7m	R	1.29	$77,280	622.24	1.19	$83,977	432.57	C	1.62	$61,781	170.99	1.46	$68,538	1104.25
$40.8m	U	1.29	$77,300	623.53	2.31	$43,287	434.88	G	0.76	$131,921	171.75	1.46	$68,620	1105.71
$40.9m	R	1.29	$77,381	624.82	1.19	$84,076	436.06	H	1.73	$57,712	173.48	1.46	$68,627	1107.17
$41.0m	G	1.29	$77,439	626.12	2.48	$40,283	438.55	R	1.58	$63,160	175.07	1.46	$68,629	1108.62
$41.1m	R	1.29	$77,477	627.41	1.19	$84,189	439.73	D	0.47	$213,233	175.53	1.46	$68,644	1110.08
$41.2m	R	1.29	$77,580	628.69	1.19	$84,303	440.92	W	1.14	$88,096	176.67	1.46	$68,660	1111.54
$41.3m	R	1.29	$77,682	629.98	1.18	$84,402	442.11	U	0.81	$122,745	177.48	1.45	$68,738	1112.99
$41.4m	R	1.29	$77,779	631.27	1.18	$84,517	443.29	C	1.61	$61,961	179.10	1.45	$68,737	1114.45
$41.5m	R	1.28	$77,882	632.55	1.18	$84,624	444.47	H	1.73	$57,820	180.83	1.45	$68,755	1115.90
$41.6m	U	1.28	$77,959	633.83	2.29	$43,656	446.76	R	1.58	$63,283	182.41	1.45	$68,763	1117.36
$41.7m	R	1.28	$77,979	635.12	1.18	$84,731	447.94	H	1.73	$57,927	184.13	1.45	$68,882	1118.81
$41.8m	R	1.28	$78,076	636.40	1.18	$84,839	449.12	G	0.76	$132,428	184.89	1.45	$68,890	1120.26
$41.9m	R	1.28	$78,180	637.68	1.18	$84,940	450.30	R	1.58	$63,406	186.47	1.45	$68,895	1121.71
$42.0m	M	1.28	$78,201	638.96	-0.29	-$349,089	450.01	C	1.61	$62,139	188.08	1.45	$68,935	1123.16
$42.1m	R	1.28	$78,272	640.23	1.18	$85,056	451.19	U	0.81	$123,153	188.89	1.45	$68,966	1124.61
$42.2m	D	1.28	$78,370	641.51	3.96	$25,228	455.15	H	1.72	$58,034	190.61	1.45	$69,009	1126.06
$42.3m	R	1.28	$78,376	642.79	1.17	$85,164	456.33	D	0.47	$214,381	191.08	1.45	$69,008	1127.51
$42.4m	R	1.27	$78,474	644.06	1.17	$85,266	457.50	R	1.57	$63,527	192.65	1.45	$69,028	1128.96
$42.5m	W	1.27	$78,489	645.33	1.63	$61,173	459.13	C	1.60	$62,316	194.26	1.45	$69,131	1130.40
$42.6m	R	1.27	$78,573	646.61	1.17	$85,375	460.30	H	1.72	$58,140	195.98	1.45	$69,136	1131.85
$42.7m	U	1.27	$78,611	647.88	2.27	$44,021	462.58	G	0.75	$132,929	196.73	1.45	$69,147	1133.30
$42.8m	R	1.27	$78,672	649.15	1.17	$85,485	463.75	R	1.57	$63,649	198.30	1.45	$69,161	1134.74
$42.9m	R	1.27	$78,771	650.42	1.17	$85,594	464.91	U	0.81	$123,579	199.11	1.44	$69,204	1136.19
$43.0m	R	1.27	$78,864	651.69	1.17	$85,690	466.08	R	1.57	$63,771	200.68	1.44	$69,292	1137.63
$43.1m	G	1.27	$78,887	652.95	2.44	$41,036	468.52	C	1.60	$62,493	202.28	1.44	$69,326	1139.07
$43.2m	R	1.27	$78,970	654.22	1.17	$85,807	469.68	D	0.46	$215,527	202.74	1.44	$69,382	1140.51
$43.3m	R	1.26	$79,064	655.49	1.16	$85,911	470.85	G	0.75	$133,428	203.49	1.44	$69,406	1141.96
$43.4m	R	1.26	$79,158	656.75	1.16	$86,014	472.01	R	1.57	$63,892	205.06	1.44	$69,425	1143.40
$43.5m	U	1.26	$79,258	658.01	2.25	$44,383	474.26	U	0.81	$123,993	205.86	1.44	$69,430	1144.84
$43.6m	R	1.26	$79,264	659.27	1.16	$86,125	475.42	C	1.60	$62,668	207.46	1.44	$69,521	1146.27
$43.7m	R	1.26	$79,352	660.53	1.16	$86,229	476.58	R	1.56	$64,013	209.02	1.44	$69,556	1147.71
$43.8m	R	1.26	$79,460	661.79	1.16	$86,333	477.74	U	0.80	$124,394	209.82	1.44	$69,662	1149.15
$43.9m	R	1.26	$79,548	663.05	1.16	$86,438	478.90	G	0.75	$133,924	210.57	1.44	$69,667	1150.58
$44.0m	R	1.26	$79,650	664.30	1.16	$86,550	480.05	R	1.56	$64,134	212.13	1.43	$69,687	1152.02
$44.1m	R	1.25	$79,751	665.56	1.15	$86,648	481.21	C	1.59	$62,842	213.72	1.43	$69,715	1153.45
$44.2m	R	1.25	$79,840	666.81	1.15	$86,760	482.36	D	0.46	$216,661	214.18	1.43	$69,745	1154.89
$44.3m	U	1.25	$79,900	668.06	2.23	$44,743	484.60	W	1.12	$89,506	215.30	1.43	$69,759	1156.32
$44.4m	R	1.25	$79,942	669.31	1.15	$86,866	485.75	R	1.56	$64,255	216.86	1.43	$69,819	1157.75
$44.5m	R	1.25	$80,038	670.56	1.15	$86,964	486.90	U	0.80	$124,813	217.66	1.43	$69,891	1159.18
$44.6m	R	1.25	$80,135	671.81	1.15	$87,070	488.05	C	1.59	$63,015	219.24	1.43	$69,907	1160.61
$44.7m	R	1.25	$80,231	673.06	1.15	$87,184	489.19	G	0.74	$134,414	219.99	1.43	$69,920	1162.04
$44.8m	W	1.25	$80,254	674.30	1.60	$62,548	490.79	R	1.55	$64,375	221.54	1.43	$69,949	1163.47
$44.9m	G	1.25	$80,285	675.55	2.39	$41,763	493.19	R	1.55	$64,496	223.09	1.43	$70,080	1164.90
$45.0m	R	1.24	$80,328	676.79	1.15	$87,283	494.33	C	1.58	$63,188	224.67	1.43	$70,098	1166.33
$45.1m	R	1.24	$80,425	678.04	1.14	$87,382	495.48	D	0.46	$217,794	225.13	1.43	$70,111	1167.75
$45.2m	R	1.24	$80,515	679.28	1.14	$87,497	496.62	U	0.80	$125,219	225.93	1.43	$70,116	1169.18
$45.3m	U	1.24	$80,537	680.52	2.22	$45,099	498.84	G	0.74	$134,904	226.67	1.43	$70,171	1170.60
$45.4m	R	1.24	$80,619	681.76	1.14	$87,596	499.98	R	1.55	$64,615	228.22	1.42	$70,210	1172.03
$45.5m	R	1.24	$80,710	683.00	1.14	$87,704	501.12	C	1.58	$63,359	229.80	1.42	$70,288	1173.45
$45.6m	R	1.24	$80,808	684.24	1.14	$87,804	502.26	R	1.54	$64,735	231.34	1.42	$70,340	1174.87

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$45.7m	R	1.24	$80,906	685.47	1.14	$87,904	503.39	U	0.80	$125,612	232.14	1.42	$70,348	1176.29
$45.8m	R	1.23	$80,998	686.71	1.14	$88,013	504.53	G	0.74	$135,388	232.88	1.42	$70,427	1177.71
$45.9m	R	1.23	$81,096	687.94	1.13	$88,121	505.67	R	1.54	$64,855	234.42	1.42	$70,471	1179.13
$46.0m	U	1.23	$81,168	689.17	2.20	$45,453	507.87	D	0.46	$218,919	234.88	1.42	$70,472	1180.55
$46.1m	R	1.23	$81,189	690.40	1.13	$88,222	509.00	C	1.57	$63,530	236.45	1.42	$70,478	1181.97
$46.2m	R	1.23	$81,288	691.63	1.13	$88,324	510.13	U	0.79	$126,040	237.25	1.42	$70,577	1183.39
$46.3m	R	1.23	$81,380	692.86	1.13	$88,425	511.26	R	1.54	$64,973	238.78	1.42	$70,600	1184.80
$46.4m	D	1.23	$81,447	694.09	3.81	$26,219	515.08	C	1.57	$63,699	240.35	1.42	$70,666	1186.22
$46.5m	R	1.23	$81,480	695.32	1.13	$88,535	516.21	G	0.74	$135,868	241.09	1.41	$70,676	1187.63
$46.6m	R	1.23	$81,573	696.54	1.13	$88,629	517.33	R	1.54	$65,096	242.63	1.41	$70,729	1189.05
$46.7m	E	1.23	$81,624	697.77	-13.29	-$7,523	504.04	U	0.79	$126,422	243.42	1.41	$70,801	1190.46
$46.8m	G	1.22	$81,635	698.99	2.35	$42,465	506.40	W	1.10	$90,874	244.52	1.41	$70,825	1191.87
$46.9m	R	1.22	$81,666	700.22	1.13	$88,739	507.52	D	0.45	$220,041	244.97	1.41	$70,832	1193.28
$47.0m	R	1.22	$81,759	701.44	1.13	$88,842	508.65	C	1.57	$63,868	246.54	1.41	$70,853	1194.70
$47.1m	U	1.22	$81,795	702.66	2.18	$45,804	510.83	R	1.53	$65,210	248.07	1.41	$70,859	1196.11
$47.2m	R	1.22	$81,853	703.89	1.12	$88,944	511.96	G	0.73	$136,346	248.80	1.41	$70,927	1197.52
$47.3m	W	1.22	$81,946	705.11	1.57	$63,866	513.52	R	1.53	$65,330	250.34	1.41	$70,987	1198.93
$47.4m	R	1.22	$81,954	706.33	1.12	$89,047	514.65	U	0.79	$126,839	251.12	1.41	$71,028	1200.33
$47.5m	R	1.22	$82,041	707.55	1.12	$89,150	515.77	C	1.56	$64,036	252.69	1.41	$71,039	1201.74
$47.6m	R	1.22	$82,142	708.76	1.12	$89,254	516.89	R	1.53	$65,449	254.21	1.41	$71,116	1203.15
$47.7m	R	1.22	$82,230	709.98	1.12	$89,350	518.01	G	0.73	$136,819	254.94	1.41	$71,169	1204.55
$47.8m	R	1.21	$82,332	711.19	1.12	$89,453	519.12	D	0.45	$221,151	255.40	1.40	$71,190	1205.96
$47.9m	U	1.21	$82,417	712.41	2.17	$46,152	521.29	C	1.56	$64,203	256.95	1.40	$71,225	1207.36
$48.0m	R	1.21	$82,420	713.62	1.12	$89,566	522.41	R	1.53	$65,569	258.48	1.40	$71,247	1208.76
$48.1m	R	1.21	$82,515	714.83	1.12	$89,654	523.52	U	0.79	$127,243	259.27	1.40	$71,250	1210.17
$48.2m	R	1.21	$82,610	716.04	1.11	$89,767	524.64	R	1.52	$65,686	260.79	1.40	$71,372	1211.57
$48.3m	R	1.21	$82,706	717.25	1.11	$89,863	525.75	C	1.55	$64,369	262.34	1.40	$71,409	1212.97
$48.4m	R	1.21	$82,795	718.46	1.11	$89,969	526.86	G	0.73	$137,291	263.07	1.40	$71,418	1214.37
$48.5m	R	1.21	$82,891	719.67	1.11	$90,066	527.97	U	0.78	$127,649	263.85	1.40	$71,480	1215.77
$48.6m	G	1.21	$82,941	720.87	2.32	$43,145	530.29	R	1.52	$65,802	265.37	1.40	$71,500	1217.17
$48.7m	R	1.21	$82,981	722.08	1.11	$90,171	531.40	D	0.45	$222,267	265.82	1.40	$71,551	1218.57
$48.8m	U	1.20	$83,034	723.28	2.15	$46,498	533.55	C	1.55	$64,534	267.37	1.40	$71,592	1219.96
$48.9m	R	1.20	$83,077	724.48	1.11	$90,269	534.66	R	1.52	$65,920	268.89	1.40	$71,628	1221.36
$49.0m	R	1.20	$83,174	725.69	1.11	$90,367	535.76	G	0.73	$137,760	269.61	1.40	$71,659	1222.75
$49.1m	R	1.20	$83,264	726.89	1.11	$90,473	536.87	U	0.78	$128,041	270.40	1.39	$71,700	1224.15
$49.2m	R	1.20	$83,354	728.09	1.10	$90,580	537.97	R	1.51	$66,041	271.91	1.39	$71,757	1225.54
$49.3m	R	1.20	$83,445	729.29	1.10	$90,670	539.08	C	1.55	$64,699	273.46	1.39	$71,774	1226.94
$49.4m	R	1.20	$83,542	730.48	1.10	$90,777	540.18	W	1.08	$92,201	274.54	1.39	$71,859	1228.33
$49.5m	W	1.20	$83,569	731.68	1.54	$65,132	541.71	R	1.51	$66,155	276.05	1.39	$71,886	1229.72
$49.6m	R	1.20	$83,640	732.88	1.10	$90,876	542.81	G	0.72	$138,223	276.78	1.39	$71,901	1231.11
$49.7m	U	1.20	$83,647	734.07	2.13	$46,841	544.95	D	0.45	$223,364	277.22	1.39	$71,901	1232.50
$49.8m	M	1.19	$83,712	735.27	-0.31	-$320,726	544.64	U	0.78	$128,436	278.00	1.39	$71,922	1233.89
$49.9m	R	1.19	$83,724	736.46	1.10	$90,975	545.74	C	1.54	$64,862	279.54	1.39	$71,956	1235.28
$50.0m	R	1.19	$83,822	737.65	1.10	$91,083	546.83	R	1.51	$66,269	281.05	1.39	$72,010	1236.67

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $100,000 increase in incremental expenditure compared to the previous (smaller) level of budget impact;
[b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 increase in incremental expenditure on marginal technology;
[c] Estimate (given imperfect information) of the marginal ICER in expansion for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies.

Table A2.2.3: Reallocation following net investment (allocator has poor information)

	Reallocation with good information							*Reallocation with poor information*						
	Marginal	*Estimates with good information*			*Estimates with poor information*			**Marginal**	*Estimates with good information*			*Estimates with poor information*		
Budget impact	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$0.1m	S	9.31	-$10,740	9.31	-6.69	$14,945	-6.69	H	-1.96	$51,044	-1.96	-1.65	$60,698	-1.65
$0.2m	S	9.19	-$10,882	18.50	-6.75	$14,815	-13.44	C	-1.83	$54,707	-3.79	-1.65	$60,690	-3.30
$0.3m	S	9.07	-$11,030	27.57	-6.81	$14,682	-20.25	O	-5.37	$18,625	-9.16	-1.65	$60,645	-4.94
$0.4m	S	8.94	-$11,184	36.51	-6.87	$14,547	-27.13	G	-0.86	$116,451	-10.01	-1.65	$60,576	-6.59
$0.5m	S	8.81	-$11,345	45.32	-6.94	$14,409	-34.07	U	-0.92	$108,146	-10.94	-1.65	$60,560	-8.25
$0.6m	S	8.69	-$11,513	54.01	-7.01	$14,268	-41.08	R	-1.79	$55,733	-12.73	-1.65	$60,559	-9.90
$0.7m	S	8.55	-$11,689	62.56	-7.08	$14,125	-48.16	H	-1.96	$50,906	-14.70	-1.65	$60,533	-11.55
$0.8m	S	8.42	-$11,873	70.98	-7.15	$13,978	-55.31	C	-1.84	$54,477	-16.53	-1.65	$60,434	-13.20
$0.9m	S	8.29	-$12,066	79.27	-7.23	$13,829	-62.54	R	-1.80	$55,594	-18.33	-1.66	$60,408	-14.86
$1.0m	S	8.15	-$12,269	87.42	-7.31	$13,676	-69.85	H	-1.97	$50,767	-20.30	-1.66	$60,368	-16.52
$1.1m	S	8.01	-$12,483	95.43	-7.40	$13,520	-77.25	D	-0.53	$187,471	-20.84	-1.66	$60,348	-18.17
$1.2m	S	7.87	-$12,708	103.30	-7.49	$13,360	-84.73	U	-0.93	$107,673	-21.76	-1.66	$60,295	-19.83
$1.3m	S	7.72	-$12,945	111.03	-7.58	$13,196	-92.31	R	-1.80	$55,455	-23.57	-1.66	$60,256	-21.49
$1.4m	S	7.58	-$13,196	118.61	-7.68	$13,028	-99.99	G	-0.86	$115,795	-24.43	-1.66	$60,235	-23.15
$1.5m	S	7.43	-$13,463	126.03	-7.78	$12,855	-107.77	H	-1.98	$50,627	-26.41	-1.66	$60,202	-24.81
$1.6m	S	7.27	-$13,747	133.31	-7.89	$12,678	-115.66	C	-1.84	$54,244	-28.25	-1.66	$60,177	-26.47
$1.7m	S	7.12	-$14,049	140.43	-8.00	$12,495	-123.66	R	-1.81	$55,315	-30.06	-1.66	$60,104	-28.14
$1.8m	S	6.96	-$14,372	147.38	-8.13	$12,307	-131.78	H	-1.98	$50,487	-32.04	-1.67	$60,035	-29.80
$1.9m	S	6.79	-$14,718	154.18	-8.26	$12,113	-140.04	U	-0.93	$107,197	-32.97	-1.67	$60,029	-31.47
$2.0m	S	6.63	-$15,091	160.81	-8.39	$11,913	-148.43	R	-1.81	$55,174	-34.78	-1.67	$59,952	-33.14
$2.1m	S	6.45	-$15,494	167.26	-8.54	$11,706	-156.98	D	-0.54	$186,155	-35.32	-1.67	$59,925	-34.81
$2.2m	S	6.28	-$15,930	173.54	-8.70	$11,491	-165.68	C	-1.85	$54,010	-37.17	-1.67	$59,917	-36.48
$2.3m	S	6.10	-$16,406	179.63	-8.88	$11,267	-174.55	G	-0.87	$115,132	-38.04	-1.67	$59,890	-38.15
$2.4m	S	5.91	-$16,927	185.54	-9.06	$11,035	-183.62	H	-1.99	$50,346	-40.03	-1.67	$59,867	-39.82
$2.5m	S	5.71	-$17,501	191.25	-9.27	$10,792	-192.88	R	-1.82	$55,034	-41.84	-1.67	$59,799	-41.49
$2.6m	S	5.51	-$18,137	196.77	-9.49	$10,538	-202.37	U	-0.94	$106,720	-42.78	-1.67	$59,762	-43.16
$2.7m	S	5.31	-$18,849	202.07	-9.74	$10,271	-212.11	W	-1.30	$76,641	-44.09	-1.67	$59,732	-44.84
$2.8m	S	5.09	-$19,652	207.16	-10.01	$9,989	-222.12	H	-1.99	$50,204	-46.08	-1.68	$59,698	-46.51
$2.9m	S	4.86	-$20,567	212.02	-10.32	$9,691	-232.44	C	-1.86	$53,774	-47.94	-1.68	$59,654	-48.19
$3.0m	S	4.62	-$21,623	216.65	-10.67	$9,372	-243.11	R	-1.82	$54,893	-49.76	-1.68	$59,646	-49.86
$3.1m	S	4.37	-$22,860	221.02	-11.07	$9,031	-254.18	G	-0.87	$114,460	-50.63	-1.68	$59,540	-51.54
$3.2m	S	4.11	-$24,337	225.13	-11.55	$8,661	-265.73	H	-2.00	$50,061	-52.63	-1.68	$59,528	-53.22
$3.3m	S	3.82	-$26,144	228.96	-12.11	$8,257	-277.84	D	-0.54	$184,831	-53.17	-1.68	$59,498	-54.90
$3.4m	S	3.52	-$28,424	232.48	-12.81	$7,808	-290.65	U	-0.94	$106,240	-54.11	-1.68	$59,493	-56.58
$3.5m	S	3.18	-$31,430	235.66	-13.70	$7,301	-304.34	R	-1.83	$54,752	-55.94	-1.68	$59,492	-58.26
$3.6m	S	2.80	-$35,651	238.46	-14.90	$6,710	-319.25	C	-1.87	$53,535	-57.81	-1.68	$59,390	-59.95
$3.7m	S	2.37	-$42,215	240.83	-16.70	$5,989	-335.94	H	-2.00	$49,917	-59.81	-1.68	$59,357	-61.63
$3.8m	S	1.83	-$54,669	242.66	-19.91	$5,023	-355.85	R	-1.83	$54,610	-61.64	-1.69	$59,339	-63.32
$3.9m	S	1.00	-$99,960	243.66	-33.89	$2,951	-389.74	U	-0.95	$105,758	-62.59	-1.69	$59,223	-65.01
$4.0m	D	-0.53	$187,471	243.13	-1.66	$60,348	-391.40	G	-0.88	$113,781	-63.47	-1.69	$59,187	-66.70
$4.1m	D	-0.54	$186,155	242.59	-1.67	$59,925	-393.06	H	-2.01	$49,773	-65.48	-1.69	$59,186	-68.39
$4.2m	D	-0.54	$184,831	242.05	-1.68	$59,498	-394.75	R	-1.84	$54,468	-67.31	-1.69	$59,184	-70.08
$4.3m	D	-0.54	$183,496	241.50	-1.69	$59,069	-396.44	C	-1.88	$53,294	-69.19	-1.69	$59,123	-71.77
$4.4m	D	-0.55	$182,151	240.95	-1.71	$58,636	-398.14	D	-0.54	$183,496	-69.73	-1.69	$59,069	-73.46
$4.5m	D	-0.55	$180,797	240.40	-1.72	$58,200	-399.86	R	-1.84	$54,325	-71.57	-1.69	$59,029	-75.15
$4.6m	D	-0.56	$179,433	239.84	-1.73	$57,761	-401.59	H	-2.02	$49,627	-73.59	-1.69	$59,013	-76.85
$4.7m	D	-0.56	$178,057	239.28	-1.74	$57,318	-403.34	U	-0.95	$105,274	-74.54	-1.70	$58,952	-78.55
$4.8m	D	-0.57	$176,672	238.72	-1.76	$56,872	-405.10	R	-1.85	$54,183	-76.38	-1.70	$58,874	-80.24

	Reallocation with good information							***Reallocation with poor information***						
	Marginal	***Estimates with good information***			***Estimates with poor information***			**Marginal**	***Estimates with good information***			***Estimates with poor information***		
Budget impact	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$4.9m	D	-0.57	$175,275	238.15	-1.77	$56,423	-406.87	C	-1.88	$53,052	-78.27	-1.70	$58,854	-81.94
$5.0m	D	-0.58	$173,867	237.57	-1.79	$55,969	-408.66	H	-2.02	$49,481	-80.29	-1.70	$58,839	-83.64
$5.1m	D	-0.58	$172,448	236.99	-1.80	$55,512	-410.46	G	-0.88	$113,094	-81.17	-1.70	$58,829	-85.34
$5.2m	D	-0.58	$171,017	236.41	-1.82	$55,052	-412.27	R	-1.85	$54,039	-83.02	-1.70	$58,719	-87.05
$5.3m	D	-0.59	$169,573	235.82	-1.83	$54,587	-414.10	U	-0.95	$104,788	-83.98	-1.70	$58,680	-88.75
$5.4m	D	-0.59	$168,118	235.22	-1.85	$54,118	-415.95	H	-2.03	$49,334	-86.01	-1.70	$58,664	-90.45
$5.5m	D	-0.60	$166,649	234.62	-1.86	$53,646	-417.82	D	-0.55	$182,151	-86.56	-1.71	$58,636	-92.16
$5.6m	D	-0.61	$165,168	234.02	-1.88	$53,169	-419.70	C	-1.89	$52,807	-88.45	-1.71	$58,582	-93.87
$5.7m	D	-0.61	$163,674	233.41	-1.90	$52,688	-421.60	R	-1.86	$53,896	-90.30	-1.71	$58,563	-95.57
$5.8m	D	-0.62	$162,164	232.79	-1.92	$52,202	-423.51	H	-2.03	$49,186	-92.34	-1.71	$58,488	-97.28
$5.9m	D	-0.62	$160,640	232.17	-1.93	$51,712	-425.44	G	-0.89	$112,397	-93.23	-1.71	$58,467	-98.99
$6.0m	D	-0.63	$159,106	231.54	-1.95	$51,217	-427.40	R	-1.86	$53,752	-95.09	-1.71	$58,406	-100.71
$6.1m	D	-0.63	$157,552	230.90	-1.97	$50,717	-429.37	U	-0.96	$104,299	-96.05	-1.71	$58,406	-102.42
$6.2m	D	-0.64	$155,984	230.26	-1.99	$50,213	-431.36	H	-2.04	$49,037	-98.09	-1.71	$58,311	-104.13
$6.3m	D	-0.65	$154,400	229.61	-2.01	$49,703	-433.37	C	-1.90	$52,559	-99.99	-1.72	$58,308	-105.85
$6.4m	D	-0.65	$152,800	228.96	-2.03	$49,188	-435.41	R	-1.87	$53,608	-101.85	-1.72	$58,250	-107.57
$6.5m	D	-0.66	$151,183	228.30	-2.05	$48,667	-437.46	W	-1.34	$74,698	-103.19	-1.72	$58,218	-109.28
$6.6m	D	-0.67	$149,548	227.63	-2.08	$48,141	-439.54	D	-0.55	$180,797	-103.75	-1.72	$58,200	-111.00
$6.7m	D	-0.68	$147,896	226.95	-2.10	$47,609	-441.64	H	-2.05	$48,887	-105.79	-1.72	$58,133	-112.72
$6.8m	D	-0.68	$146,227	226.27	-2.12	$47,071	-443.76	U	-0.96	$103,809	-106.75	-1.72	$58,132	-114.44
$6.9m	D	-0.69	$144,534	225.58	-2.15	$46,527	-445.91	G	-0.90	$111,693	-107.65	-1.72	$58,101	-116.16
$7.0m	D	-0.70	$142,822	224.88	-2.18	$45,976	-448.09	R	-1.87	$53,463	-109.52	-1.72	$58,093	-117.88
$7.1m	D	-0.71	$141,093	224.17	-2.20	$45,419	-450.29	C	-1.91	$52,310	-111.43	-1.72	$58,030	-119.61
$7.2m	D	-0.72	$139,338	223.45	-2.23	$44,855	-452.52	H	-2.05	$48,737	-113.48	-1.73	$57,954	-121.33
$7.3m	D	-0.73	$137,565	222.72	-2.26	$44,283	-454.78	R	-1.88	$53,318	-115.36	-1.73	$57,935	-123.06
$7.4m	D	-0.74	$135,766	221.99	-2.29	$43,704	-457.06	U	-0.97	$103,315	-116.33	-1.73	$57,855	-124.79
$7.5m	D	-0.75	$133,942	221.24	-2.32	$43,117	-459.38	R	-1.88	$53,173	-118.21	-1.73	$57,777	-126.52
$7.6m	D	-0.76	$132,095	220.48	-2.35	$42,523	-461.74	H	-2.06	$48,585	-120.27	-1.73	$57,774	-128.25
$7.7m	D	-0.77	$130,222	219.72	-2.39	$41,919	-464.12	D	-0.56	$179,433	-120.82	-1.73	$57,761	-129.98
$7.8m	D	-0.78	$128,319	218.94	-2.42	$41,307	-466.54	C	-1.92	$52,057	-122.74	-1.73	$57,751	-131.71
$7.9m	D	-0.79	$126,390	218.15	-2.46	$40,686	-469.00	G	-0.90	$110,979	-123.65	-1.73	$57,729	-133.44
$8.0m	D	-0.80	$124,431	217.34	-2.50	$40,055	-471.50	R	-1.89	$53,027	-125.53	-1.74	$57,618	-135.18
$8.1m	D	-0.82	$122,438	216.53	-2.54	$39,414	-474.03	H	-2.06	$48,433	-127.60	-1.74	$57,593	-136.92
$8.2m	D	-0.83	$120,415	215.69	-2.58	$38,762	-476.61	U	-0.97	$102,820	-128.57	-1.74	$57,578	-138.65
$8.3m	D	-0.84	$118,356	214.85	-2.62	$38,100	-479.24	C	-1.93	$51,803	-130.50	-1.74	$57,468	-140.39
$8.4m	G	-0.86	$116,451	213.99	-1.65	$60,576	-480.89	R	-1.89	$52,880	-132.39	-1.74	$57,459	-142.13
$8.5m	D	-0.86	$116,260	213.13	-2.67	$37,425	-483.56	H	-2.07	$48,279	-134.46	-1.74	$57,410	-143.88
$8.6m	G	-0.86	$115,795	212.27	-1.66	$60,235	-485.22	G	-0.91	$110,256	-135.37	-1.74	$57,353	-145.62
$8.7m	G	-0.87	$115,132	211.40	-1.67	$59,890	-486.89	D	-0.56	$178,057	-135.93	-1.74	$57,318	-147.36
$8.8m	G	-0.87	$114,460	210.53	-1.68	$59,540	-488.57	R	-1.90	$52,734	-137.83	-1.75	$57,300	-149.11
$8.9m	D	-0.88	$114,127	209.65	-2.72	$36,738	-491.29	U	-0.98	$102,322	-138.80	-1.75	$57,299	-150.85
$9.0m	G	-0.88	$113,781	208.77	-1.69	$59,187	-492.98	H	-2.08	$48,125	-140.88	-1.75	$57,226	-152.60
$9.1m	G	-0.88	$113,094	207.89	-1.70	$58,829	-494.68	C	-1.94	$51,546	-142.82	-1.75	$57,183	-154.35
$9.2m	G	-0.89	$112,397	207.00	-1.71	$58,467	-496.39	R	-1.90	$52,586	-144.72	-1.75	$57,140	-156.10
$9.3m	D	-0.89	$111,952	206.10	-2.77	$36,038	-499.17	H	-2.08	$47,969	-146.81	-1.75	$57,041	-157.85
$9.4m	G	-0.90	$111,693	205.21	-1.72	$58,101	-500.89	U	-0.98	$101,823	-147.79	-1.75	$57,019	-159.61
$9.5m	G	-0.90	$110,979	204.31	-1.73	$57,729	-502.62	R	-1.91	$52,439	-149.70	-1.76	$56,980	-161.36
$9.6m	G	-0.91	$110,256	203.40	-1.74	$57,353	-504.36	G	-0.91	$109,523	-150.61	-1.76	$56,972	-163.12
$9.7m	D	-0.91	$109,736	202.49	-2.83	$35,325	-507.19	C	-1.95	$51,286	-152.56	-1.76	$56,895	-164.87
$9.8m	G	-0.91	$109,523	201.58	-1.76	$56,972	-508.95	D	-0.57	$176,672	-153.13	-1.76	$56,872	-166.63
$9.9m	G	-0.92	$108,781	200.66	-1.77	$56,586	-510.72	H	-2.09	$47,813	-155.22	-1.76	$56,855	-168.39

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$10.0m	U	-0.92	$108,146	199.73	-1.65	$60,560	-512.37	R	-1.91	$52,291	-157.13	-1.76	$56,819	-170.15
$10.1m	G	-0.93	$108,028	198.81	-1.78	$56,194	-514.15	U	-0.99	$101,318	-158.12	-1.76	$56,737	-171.91
$10.2m	U	-0.93	$107,673	197.88	-1.66	$60,295	-515.81	H	-2.10	$47,655	-160.21	-1.76	$56,668	-173.68
$10.3m	D	-0.93	$107,471	196.95	-2.89	$34,596	-518.70	R	-1.92	$52,143	-162.13	-1.76	$56,658	-175.44
$10.4m	G	-0.93	$107,264	196.01	-1.79	$55,797	-520.49	W	-1.38	$72,649	-163.51	-1.77	$56,621	-177.21
$10.5m	U	-0.93	$107,197	195.08	-1.67	$60,029	-522.15	C	-1.96	$51,024	-165.47	-1.77	$56,604	-178.98
$10.6m	U	-0.94	$106,720	194.14	-1.67	$59,762	-523.83	G	-0.92	$108,781	-166.39	-1.77	$56,586	-180.74
$10.7m	G	-0.94	$106,489	193.21	-1.81	$55,394	-525.63	R	-1.92	$51,994	-168.31	-1.77	$56,496	-182.51
$10.8m	U	-0.94	$106,240	192.26	-1.68	$59,493	-527.31	H	-2.11	$47,497	-170.42	-1.77	$56,479	-184.28
$10.9m	U	-0.95	$105,758	191.32	-1.69	$59,223	-529.00	U	-0.99	$100,814	-171.41	-1.77	$56,454	-186.06
$11.0m	G	-0.95	$105,705	190.37	-1.82	$54,985	-530.82	D	-0.57	$175,275	-171.98	-1.77	$56,423	-187.83
$11.1m	U	-0.95	$105,274	189.42	-1.70	$58,952	-532.52	R	-1.93	$51,845	-173.91	-1.78	$56,334	-189.60
$11.2m	D	-0.95	$105,159	188.47	-2.95	$33,851	-535.47	C	-1.97	$50,759	-175.88	-1.78	$56,310	-191.38
$11.3m	G	-0.95	$104,905	187.52	-1.83	$54,570	-537.30	H	-2.11	$47,337	-177.99	-1.78	$56,290	-193.16
$11.4m	U	-0.95	$104,788	186.56	-1.70	$58,680	-539.01	G	-0.93	$108,028	-178.92	-1.78	$56,194	-194.94
$11.5m	U	-0.96	$104,299	185.61	-1.71	$58,406	-540.72	R	-1.93	$51,695	-180.85	-1.78	$56,172	-196.72
$11.6m	G	-0.96	$104,096	184.64	-1.85	$54,149	-542.57	U	-1.00	$100,306	-181.85	-1.78	$56,170	-198.50
$11.7m	U	-0.96	$103,809	183.68	-1.72	$58,132	-544.29	H	-2.12	$47,176	-183.97	-1.78	$56,098	-200.28
$11.8m	U	-0.97	$103,315	182.71	-1.73	$57,855	-546.02	C	-1.98	$50,491	-185.95	-1.79	$56,013	-202.06
$11.9m	G	-0.97	$103,273	181.74	-1.86	$53,721	-547.88	R	-1.94	$51,545	-187.89	-1.79	$56,008	-203.85
$12.0m	U	-0.97	$102,820	180.77	-1.74	$57,578	-549.61	D	-0.58	$173,867	-188.46	-1.79	$55,969	-205.64
$12.1m	D	-0.97	$102,795	179.80	-3.02	$33,091	-552.64	H	-2.13	$47,014	-190.59	-1.79	$55,906	-207.42
$12.2m	G	-0.98	$102,436	178.82	-1.88	$53,286	-554.51	U	-1.00	$99,795	-191.59	-1.79	$55,884	-209.21
$12.3m	U	-0.98	$102,322	177.85	-1.75	$57,299	-556.26	R	-1.95	$51,395	-193.54	-1.79	$55,845	-211.01
$12.4m	U	-0.98	$101,823	176.86	-1.75	$57,019	-558.01	G	-0.93	$107,264	-194.47	-1.79	$55,797	-212.80
$12.5m	G	-0.98	$101,587	175.88	-1.89	$52,844	-559.90	O	-5.84	$17,118	-200.31	-1.79	$55,738	-214.59
$12.6m	U	-0.99	$101,318	174.89	-1.76	$56,737	-561.67	C	-1.99	$50,220	-202.30	-1.79	$55,712	-216.39
$12.7m	U	-0.99	$100,814	173.90	-1.77	$56,454	-563.44	H	-2.13	$46,851	-204.44	-1.79	$55,712	-218.18
$12.8m	G	-0.99	$100,721	172.91	-1.91	$52,394	-565.35	R	-1.95	$51,244	-206.39	-1.80	$55,681	-219.98
$12.9m	D	-1.00	$100,375	171.91	-3.09	$32,312	-568.44	U	-1.01	$99,282	-207.40	-1.80	$55,597	-221.78
$13.0m	U	-1.00	$100,306	170.91	-1.78	$56,170	-570.22	H	-2.14	$46,687	-209.54	-1.80	$55,517	-223.58
$13.1m	G	-1.00	$99,842	169.91	-1.93	$51,936	-572.15	R	-1.96	$51,092	-211.50	-1.80	$55,516	-225.38
$13.2m	U	-1.00	$99,795	168.91	-1.79	$55,884	-573.94	D	-0.58	$172,448	-212.08	-1.80	$55,512	-227.18
$13.3m	U	-1.01	$99,282	167.90	-1.80	$55,597	-575.74	C	-2.00	$49,947	-214.08	-1.80	$55,409	-228.98
$13.4m	G	-1.01	$98,946	166.89	-1.94	$51,470	-577.68	G	-0.94	$106,489	-215.02	-1.81	$55,394	-230.79
$13.5m	U	-1.01	$98,766	165.88	-1.81	$55,308	-579.49	R	-1.96	$50,941	-216.98	-1.81	$55,351	-232.60
$13.6m	U	-1.02	$98,247	164.86	-1.82	$55,018	-581.30	H	-2.15	$46,522	-219.13	-1.81	$55,320	-234.40
$13.7m	G	-1.02	$98,034	163.84	-1.96	$50,996	-583.26	U	-1.01	$98,766	-220.14	-1.81	$55,308	-236.21
$13.8m	D	-1.02	$97,896	162.82	-3.17	$31,513	-586.44	R	-1.97	$50,788	-222.11	-1.81	$55,186	-238.02
$13.9m	U	-1.02	$97,727	161.80	-1.83	$54,726	-588.27	H	-2.16	$46,356	-224.27	-1.81	$55,123	-239.84
$14.0m	U	-1.03	$97,203	160.77	-1.84	$54,432	-590.10	C	-2.01	$49,670	-226.28	-1.81	$55,102	-241.65
$14.1m	G	-1.03	$97,105	159.74	-1.98	$50,512	-592.08	D	-0.58	$171,017	-226.87	-1.82	$55,052	-243.47
$14.2m	U	-1.03	$96,676	158.70	-1.85	$54,137	-593.93	R	-1.97	$50,635	-228.84	-1.82	$55,020	-245.29
$14.3m	G	-1.04	$96,157	157.67	-2.00	$50,019	-595.93	U	-1.02	$98,247	-229.86	-1.82	$55,018	-247.10
$14.4m	U	-1.04	$96,146	156.62	-1.86	$53,841	-597.79	G	-0.95	$105,705	-230.80	-1.82	$54,985	-248.92
$14.5m	U	-1.05	$95,613	155.58	-1.87	$53,542	-599.65	W	-1.42	$70,477	-232.22	-1.82	$54,928	-250.74
$14.6m	D	-1.05	$95,353	154.53	-3.26	$30,695	-602.91	H	-2.17	$46,188	-234.39	-1.82	$54,923	-252.56
$14.7m	G	-1.05	$95,191	153.48	-2.02	$49,517	-604.93	R	-1.98	$50,482	-236.37	-1.82	$54,853	-254.39
$14.8m	U	-1.05	$95,078	152.43	-1.88	$53,242	-606.81	C	-2.02	$49,390	-238.39	-1.83	$54,791	-256.21
$14.9m	U	-1.06	$94,539	151.37	-1.89	$52,941	-608.70	U	-1.02	$97,727	-239.42	-1.83	$54,726	-258.04
$15.0m	G	-1.06	$94,205	150.31	-2.04	$49,004	-610.74	H	-2.17	$46,019	-241.59	-1.83	$54,723	-259.87

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$15.1m	U	-1.06	$93,996	149.24	-1.90	$52,637	-612.64	R	-1.99	$50,329	-243.58	-1.83	$54,686	-261.70
$15.2m	U	-1.07	$93,453	148.17	-1.91	$52,332	-614.55	D	-0.59	$169,573	-244.17	-1.83	$54,587	-263.53
$15.3m	G	-1.07	$93,197	147.10	-2.06	$48,479	-616.61	G	-0.95	$104,905	-245.12	-1.83	$54,570	-265.36
$15.4m	U	-1.08	$92,904	146.03	-1.92	$52,025	-618.53	H	-2.18	$45,849	-247.30	-1.83	$54,520	-267.19
$15.5m	D	-1.08	$92,738	144.95	-3.35	$29,853	-621.88	R	-1.99	$50,175	-249.29	-1.83	$54,519	-269.03
$15.6m	U	-1.08	$92,353	143.86	-1.93	$51,716	-623.82	C	-2.04	$49,107	-251.33	-1.84	$54,477	-270.86
$15.7m	G	-1.09	$92,166	142.78	-2.09	$47,943	-625.90	U	-1.03	$97,203	-252.36	-1.84	$54,432	-272.70
$15.8m	U	-1.09	$91,798	141.69	-1.95	$51,406	-627.85	R	-2.00	$50,020	-254.36	-1.84	$54,351	-274.54
$15.9m	U	-1.10	$91,240	140.59	-1.96	$51,093	-629.81	H	-2.19	$45,678	-256.55	-1.84	$54,316	-276.38
$16.0m	G	-1.10	$91,113	139.50	-2.11	$47,395	-631.92	R	-2.01	$49,865	-258.55	-1.85	$54,182	-278.23
$16.1m	U	-1.10	$90,678	138.39	-1.97	$50,779	-633.89	C	-2.05	$48,820	-260.60	-1.85	$54,160	-280.07
$16.2m	U	-1.11	$90,114	137.28	-1.98	$50,462	-635.87	G	-0.96	$104,096	-261.56	-1.85	$54,149	-281.92
$16.3m	D	-1.11	$90,049	136.17	-3.45	$28,987	-639.32	U	-1.03	$96,676	-262.60	-1.85	$54,137	-283.77
$16.4m	G	-1.11	$90,035	135.06	-2.14	$46,834	-641.45	D	-0.59	$168,118	-263.19	-1.85	$54,118	-285.62
$16.5m	U	-1.12	$89,546	133.95	-1.99	$50,144	-643.45	H	-2.20	$45,505	-265.39	-1.85	$54,111	-287.46
$16.6m	U	-1.12	$88,973	132.82	-2.01	$49,824	-645.45	R	-2.01	$49,709	-267.40	-1.85	$54,013	-289.32
$16.7m	G	-1.12	$88,929	131.70	-2.16	$46,259	-647.62	H	-2.21	$45,331	-269.61	-1.86	$53,904	-291.17
$16.8m	U	-1.13	$88,397	130.57	-2.02	$49,501	-649.64	R	-2.02	$49,553	-271.63	-1.86	$53,844	-293.03
$16.9m	U	-1.14	$87,817	129.43	-2.03	$49,177	-651.67	U	-1.04	$96,146	-272.67	-1.86	$53,841	-294.89
$17.0m	G	-1.14	$87,796	128.29	-2.19	$45,670	-653.86	C	-2.06	$48,531	-274.73	-1.86	$53,838	-296.74
$17.1m	D	-1.15	$87,275	127.14	-3.56	$28,095	-657.42	G	-0.97	$103,273	-275.69	-1.86	$53,721	-298.60
$17.2m	U	-1.15	$87,233	126.00	-2.05	$48,850	-659.46	H	-2.21	$45,155	-277.91	-1.86	$53,696	-300.47
$17.3m	U	-1.15	$86,646	124.84	-2.06	$48,521	-661.53	R	-2.02	$49,397	-279.93	-1.86	$53,674	-302.33
$17.4m	G	-1.15	$86,633	123.69	-2.22	$45,065	-663.74	D	-0.60	$166,649	-280.53	-1.86	$53,646	-304.19
$17.5m	U	-1.16	$86,055	122.53	-2.08	$48,190	-665.82	U	-1.05	$95,613	-281.58	-1.87	$53,542	-306.06
$17.6m	U	-1.17	$85,460	121.36	-2.09	$47,856	-667.91	C	-2.07	$48,237	-283.65	-1.87	$53,513	-307.93
$17.7m	G	-1.17	$85,438	120.19	-2.25	$44,443	-670.16	R	-2.03	$49,239	-285.68	-1.87	$53,503	-309.80
$17.8m	U	-1.18	$84,859	119.01	-2.10	$47,520	-672.26	H	-2.22	$44,979	-287.91	-1.87	$53,485	-311.67
$17.9m	D	-1.18	$84,412	117.82	-3.68	$27,173	-675.94	R	-2.04	$49,082	-289.94	-1.88	$53,332	-313.54
$18.0m	U	-1.19	$84,255	116.64	-2.12	$47,182	-678.06	G	-0.98	$102,436	-290.92	-1.88	$53,286	-315.42
$18.1m	G	-1.19	$84,208	115.45	-2.28	$43,803	-680.35	H	-2.23	$44,800	-293.15	-1.88	$53,273	-317.30
$18.2m	U	-1.20	$83,647	114.25	-2.13	$46,841	-682.48	U	-1.05	$95,078	-294.20	-1.88	$53,242	-319.18
$18.3m	U	-1.20	$83,034	113.05	-2.15	$46,498	-684.63	C	-2.09	$47,940	-296.29	-1.88	$53,184	-321.06
$18.4m	G	-1.21	$82,941	111.84	-2.32	$43,145	-686.95	D	-0.61	$165,168	-296.90	-1.88	$53,169	-322.94
$18.5m	U	-1.21	$82,417	110.63	-2.17	$46,152	-689.12	R	-2.04	$48,924	-298.94	-1.88	$53,160	-324.82
$18.6m	U	-1.22	$81,795	109.41	-2.18	$45,804	-691.30	W	-1.47	$68,162	-300.41	-1.88	$53,124	-326.70
$18.7m	G	-1.22	$81,635	108.18	-2.35	$42,465	-693.65	H	-2.24	$44,621	-302.65	-1.88	$53,060	-328.59
$18.8m	D	-1.23	$81,448	106.95	-3.81	$26,219	-697.47	R	-2.05	$48,765	-304.70	-1.89	$52,988	-330.47
$18.9m	U	-1.23	$81,168	105.72	-2.20	$45,453	-699.67	U	-1.06	$94,539	-305.76	-1.89	$52,941	-332.36
$19.0m	U	-1.24	$80,536	104.48	-2.22	$45,099	-701.89	C	-2.10	$47,640	-307.85	-1.89	$52,850	-334.25
$19.1m	G	-1.25	$80,284	103.23	-2.39	$41,763	-704.28	H	-2.25	$44,440	-310.10	-1.89	$52,844	-336.15
$19.2m	U	-1.25	$79,900	101.98	-2.24	$44,742	-706.52	G	-0.98	$101,587	-311.09	-1.89	$52,844	-338.04
$19.3m	U	-1.26	$79,258	100.72	-2.25	$44,383	-708.77	R	-2.06	$48,606	-313.15	-1.89	$52,815	-339.93
$19.4m	G	-1.27	$78,888	99.45	-2.44	$41,036	-711.21	D	-0.61	$163,674	-313.76	-1.90	$52,688	-341.83
$19.5m	U	-1.27	$78,611	98.18	-2.27	$44,022	-713.48	R	-2.06	$48,446	-315.82	-1.90	$52,641	-343.73
$19.6m	D	-1.28	$78,370	96.91	-3.96	$25,228	-717.44	U	-1.06	$93,996	-316.89	-1.90	$52,637	-345.63
$19.7m	U	-1.28	$77,959	95.62	-2.29	$43,657	-719.73	H	-2.26	$44,258	-319.15	-1.90	$52,628	-347.53
$19.8m	G	-1.29	$77,439	94.33	-2.48	$40,282	-722.21	C	-2.11	$47,335	-321.26	-1.90	$52,512	-349.43
$19.9m	U	-1.29	$77,301	93.04	-2.31	$43,286	-724.52	R	-2.07	$48,287	-323.33	-1.91	$52,468	-351.34
$20.0m	W	-1.30	$76,641	91.73	-1.67	$59,732	-726.20	H	-2.27	$44,073	-325.60	-1.91	$52,409	-353.25
$20.1m	U	-1.30	$76,637	90.43	-2.33	$42,917	-728.53	G	-0.99	$100,721	-326.59	-1.91	$52,394	-355.16

	Reallocation with good information							Reallocation with poor information						
	Marginal	Estimates with good information			Estimates with poor information			Marginal	Estimates with good information			Estimates with poor information		
Budget impact	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	**Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$20.2m	U	-1.32	$75,968	89.11	-2.35	$42,541	-730.88	U	-1.07	$93,453	-327.66	-1.91	$52,332	-357.07
$20.3m	G	-1.32	$75,935	87.79	-2.53	$39,500	-733.41	R	-2.08	$48,125	-329.74	-1.91	$52,293	-358.98
$20.4m	U	-1.33	$75,292	86.47	-2.37	$42,162	-735.78	D	-0.62	$162,164	-330.36	-1.92	$52,202	-360.90
$20.5m	D	-1.33	$75,168	85.14	-4.13	$24,197	-739.92	H	-2.28	$43,888	-332.63	-1.92	$52,188	-362.81
$20.6m	W	-1.34	$74,698	83.80	-1.72	$58,218	-741.63	C	-2.13	$47,027	-334.76	-1.92	$52,170	-364.73
$20.7m	U	-1.34	$74,611	82.46	-2.39	$41,782	-744.03	R	-2.08	$47,964	-336.85	-1.92	$52,118	-366.65
$20.8m	G	-1.34	$74,368	81.11	-2.58	$38,685	-746.61	U	-1.08	$92,904	-337.92	-1.92	$52,025	-368.57
$20.9m	U	-1.35	$73,923	79.76	-2.42	$41,396	-749.03	H	-2.29	$43,701	-340.21	-1.92	$51,966	-370.49
$21.0m	U	-1.37	$73,229	78.39	-2.44	$41,007	-751.47	R	-2.09	$47,803	-342.30	-1.93	$51,942	-372.42
$21.1m	G	-1.37	$72,732	77.02	-2.64	$37,834	-754.11	G	-1.00	$99,842	-343.30	-1.93	$51,936	-374.34
$21.2m	W	-1.38	$72,649	75.64	-1.77	$56,621	-755.88	C	-2.14	$46,715	-345.44	-1.93	$51,824	-376.27
$21.3m	U	-1.38	$72,528	74.26	-2.46	$40,616	-758.34	R	-2.10	$47,639	-347.54	-1.93	$51,765	-378.21
$21.4m	D	-1.39	$71,822	72.87	-4.33	$23,120	-762.66	H	-2.30	$43,512	-349.84	-1.93	$51,741	-380.14
$21.5m	U	-1.39	$71,821	71.48	-2.49	$40,219	-765.15	U	-1.08	$92,353	-350.92	-1.93	$51,716	-382.07
$21.6m	U	-1.41	$71,106	70.07	-2.51	$39,818	-767.66	D	-0.62	$160,640	-351.55	-1.93	$51,712	-384.01
$21.7m	G	-1.41	$71,019	68.66	-2.71	$36,943	-770.37	R	-2.11	$47,479	-353.65	-1.94	$51,588	-385.94
$21.8m	W	-1.42	$70,477	67.25	-1.82	$54,928	-772.19	H	-2.31	$43,322	-355.96	-1.94	$51,515	-387.89
$21.9m	U	-1.42	$70,384	65.83	-2.54	$39,414	-774.72	C	-2.16	$46,398	-358.12	-1.94	$51,472	-389.83
$22.0m	U	-1.44	$69,654	64.39	-2.56	$39,006	-777.29	G	-1.01	$98,946	-359.13	-1.94	$51,470	-391.77
$22.1m	G	-1.44	$69,219	62.94	-2.78	$36,007	-780.07	R	-2.11	$47,313	-361.24	-1.95	$51,411	-393.72
$22.2m	U	-1.45	$68,918	61.49	-2.59	$38,592	-782.66	U	-1.09	$91,798	-362.33	-1.95	$51,406	-395.66
$22.3m	D	-1.46	$68,312	60.03	-4.55	$21,990	-787.20	H	-2.32	$43,129	-364.65	-1.95	$51,286	-397.61
$22.4m	U	-1.47	$68,172	58.56	-2.62	$38,177	-789.82	R	-2.12	$47,152	-366.77	-1.95	$51,232	-399.56
$22.5m	W	-1.47	$68,162	57.10	-1.88	$53,124	-791.71	D	-0.63	$159,106	-367.40	-1.95	$51,217	-401.52
$22.6m	U	-1.48	$67,419	55.61	-2.65	$37,753	-794.36	W	-1.52	$65,678	-368.92	-1.95	$51,188	-403.47
$22.7m	G	-1.49	$67,320	54.13	-2.86	$35,019	-797.21	C	-2.17	$46,077	-371.09	-1.96	$51,116	-405.43
$22.8m	U	-1.50	$66,657	52.63	-2.68	$37,327	-799.89	U	-1.10	$91,240	-372.19	-1.96	$51,093	-407.38
$22.9m	U	-1.52	$65,887	51.11	-2.71	$36,895	-802.60	H	-2.33	$42,935	-374.52	-1.96	$51,056	-409.34
$23.0m	W	-1.52	$65,678	49.59	-1.95	$51,188	-804.55	R	-2.13	$46,984	-376.64	-1.96	$51,054	-411.30
$23.1m	G	-1.53	$65,308	48.06	-2.94	$33,972	-807.50	G	-1.02	$98,034	-377.66	-1.96	$50,996	-413.26
$23.2m	U	-1.54	$65,106	46.52	-2.74	$36,459	-810.24	R	-2.14	$46,821	-379.80	-1.97	$50,875	-415.23
$23.3m	D	-1.55	$64,611	44.97	-4.81	$20,799	-815.05	H	-2.34	$42,741	-382.14	-1.97	$50,823	-417.19
$23.4m	U	-1.55	$64,317	43.42	-2.78	$36,018	-817.82	U	-1.10	$90,678	-383.24	-1.97	$50,779	-419.16
$23.5m	U	-1.57	$63,518	41.84	-2.81	$35,569	-820.64	C	-2.19	$45,751	-385.43	-1.97	$50,755	-421.13
$23.6m	G	-1.58	$63,162	40.26	-3.04	$32,856	-823.68	D	-0.63	$157,552	-386.06	-1.97	$50,717	-423.11
$23.7m	W	-1.59	$62,990	38.67	-2.04	$49,093	-825.72	R	-2.14	$46,655	-388.21	-1.97	$50,695	-425.08
$23.8m	U	-1.59	$62,709	37.08	-2.85	$35,116	-828.56	H	-2.35	$42,542	-390.56	-1.98	$50,588	-427.05
$23.9m	U	-1.62	$61,889	35.46	-2.89	$34,657	-831.45	R	-2.15	$46,488	-392.71	-1.98	$50,513	-429.03
$24.0m	U	-1.64	$61,058	33.82	-2.92	$34,192	-834.37	G	-1.03	$97,105	-393.74	-1.98	$50,512	-431.01
$24.1m	G	-1.64	$60,861	32.18	-3.16	$31,659	-837.53	U	-1.11	$90,114	-394.85	-1.98	$50,462	-433.00
$24.2m	D	-1.65	$60,684	30.53	-5.12	$19,534	-842.65	C	-2.20	$45,421	-397.05	-1.98	$50,388	-434.98
$24.3m	U	-1.66	$60,216	28.87	-2.97	$33,720	-845.62	H	-2.36	$42,342	-399.41	-1.99	$50,351	-436.97
$24.4m	W	-1.67	$60,049	27.21	-2.14	$46,801	-847.75	R	-2.16	$46,322	-401.57	-1.99	$50,332	-438.95
$24.5m	U	-1.68	$59,362	25.52	-3.01	$33,242	-850.76	D	-0.64	$155,984	-402.21	-1.99	$50,213	-440.94
$24.6m	U	-1.71	$58,495	23.81	-3.05	$32,756	-853.82	R	-2.17	$46,153	-404.38	-1.99	$50,150	-442.94
$24.7m	G	-1.71	$58,369	22.10	-3.29	$30,363	-857.11	U	-1.12	$89,546	-405.49	-1.99	$50,144	-444.93
$24.8m	U	-1.74	$57,615	20.36	-3.10	$32,264	-860.21	H	-2.37	$42,143	-407.87	-2.00	$50,112	-446.93
$24.9m	W	-1.76	$56,787	18.60	-2.26	$44,258	-862.47	G	-1.04	$96,157	-408.91	-2.00	$50,019	-448.93
$25.0m	U	-1.76	$56,721	16.84	-3.15	$31,763	-865.62	C	-2.22	$45,086	-411.13	-2.00	$50,017	-450.93
$25.1m	D	-1.77	$56,483	15.07	-5.50	$18,182	-871.12	R	-2.17	$45,985	-413.30	-2.00	$49,968	-452.93
$25.2m	U	-1.79	$55,816	13.28	-3.20	$31,256	-874.32	H	-2.38	$41,939	-415.68	-2.01	$49,871	-454.93

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$25.3m	R	-1.79	$55,733	11.48	-1.65	$60,559	-875.97	U	-1.12	$88,973	-416.81	-2.01	$49,824	-456.94
$25.4m	G	-1.80	$55,644	9.69	-3.45	$28,945	-879.42	R	-2.18	$45,817	-418.99	-2.01	$49,783	-458.95
$25.5m	R	-1.80	$55,594	7.89	-1.66	$60,408	-881.08	O	-6.54	$15,279	-425.54	-2.01	$49,751	-460.96
$25.6m	R	-1.80	$55,455	6.08	-1.66	$60,256	-882.74	D	-0.65	$154,400	-426.18	-2.01	$49,703	-462.97
$25.7m	R	-1.81	$55,315	4.28	-1.66	$60,104	-884.40	C	-2.23	$44,745	-428.42	-2.01	$49,639	-464.99
$25.8m	R	-1.81	$55,174	2.46	-1.67	$59,952	-886.07	H	-2.40	$41,733	-430.81	-2.02	$49,625	-467.00
$25.9m	R	-1.82	$55,034	0.65	-1.67	$59,799	-887.74	R	-2.19	$45,648	-433.00	-2.02	$49,601	-469.02
$26.0m	R	-1.82	$54,893	-1.17	-1.68	$59,646	-889.42	G	-1.05	$95,191	-434.06	-2.02	$49,517	-471.04
$26.1m	U	-1.82	$54,891	-3.00	-3.25	$30,738	-892.67	U	-1.13	$88,397	-435.19	-2.02	$49,501	-473.06
$26.2m	R	-1.83	$54,752	-4.82	-1.68	$59,492	-894.35	R	-2.20	$45,477	-437.39	-2.02	$49,414	-475.08
$26.3m	C	-1.83	$54,707	-6.65	-1.65	$60,690	-896.00	H	-2.41	$41,527	-439.79	-2.03	$49,380	-477.11
$26.4m	R	-1.83	$54,610	-8.48	-1.69	$59,339	-897.68	C	-2.25	$44,400	-442.05	-2.03	$49,256	-479.14
$26.5m	C	-1.84	$54,477	-10.32	-1.65	$60,434	-899.34	R	-2.21	$45,308	-444.25	-2.03	$49,230	-481.17
$26.6m	R	-1.84	$54,468	-12.15	-1.69	$59,184	-901.03	D	-0.65	$152,800	-444.91	-2.03	$49,188	-483.20
$26.7m	R	-1.84	$54,325	-13.99	-1.69	$59,029	-902.72	U	-1.14	$87,817	-446.05	-2.03	$49,177	-485.23
$26.8m	C	-1.84	$54,244	-15.84	-1.66	$60,177	-904.38	H	-2.42	$41,319	-448.47	-2.04	$49,133	-487.27
$26.9m	R	-1.85	$54,183	-17.68	-1.70	$58,874	-906.08	W	-1.59	$62,990	-450.05	-2.04	$49,093	-489.31
$27.0m	R	-1.85	$54,039	-19.53	-1.70	$58,719	-907.79	R	-2.22	$45,135	-452.27	-2.04	$49,046	-491.34
$27.1m	C	-1.85	$54,010	-21.39	-1.67	$59,917	-909.46	G	-1.06	$94,205	-453.33	-2.04	$49,004	-493.39
$27.2m	U	-1.85	$53,952	-23.24	-3.31	$30,213	-912.76	H	-2.43	$41,105	-455.76	-2.05	$48,881	-495.43
$27.3m	R	-1.86	$53,896	-25.09	-1.71	$58,563	-914.47	C	-2.27	$44,049	-458.03	-2.05	$48,866	-497.48
$27.4m	C	-1.86	$53,774	-26.95	-1.68	$59,654	-916.15	R	-2.22	$44,964	-460.26	-2.05	$48,857	-499.52
$27.5m	R	-1.86	$53,752	-28.81	-1.71	$58,406	-917.86	U	-1.15	$87,233	-461.40	-2.05	$48,850	-501.57
$27.6m	R	-1.87	$53,608	-30.68	-1.72	$58,250	-919.58	R	-2.23	$44,791	-463.64	-2.05	$48,669	-503.63
$27.7m	C	-1.87	$53,535	-32.55	-1.68	$59,390	-921.26	D	-0.66	$151,183	-464.30	-2.05	$48,667	-505.68
$27.8m	R	-1.87	$53,463	-34.42	-1.72	$58,093	-922.98	H	-2.45	$40,893	-466.74	-2.06	$48,626	-507.74
$27.9m	R	-1.88	$53,318	-36.29	-1.73	$57,935	-924.71	U	-1.15	$86,646	-467.90	-2.06	$48,521	-509.80
$28.0m	C	-1.88	$53,294	-38.17	-1.69	$59,123	-926.40	R	-2.24	$44,619	-470.14	-2.06	$48,480	-511.86
$28.1m	R	-1.88	$53,173	-40.05	-1.73	$57,777	-928.13	G	-1.07	$93,197	-471.21	-2.06	$48,479	-513.92
$28.2m	W	-1.88	$53,096	-41.93	-2.42	$41,382	-930.55	C	-2.29	$43,692	-473.50	-2.06	$48,470	-515.99
$28.3m	C	-1.88	$53,052	-43.82	-1.70	$58,854	-932.25	H	-2.46	$40,677	-475.96	-2.07	$48,370	-518.05
$28.4m	R	-1.89	$53,027	-45.70	-1.74	$57,618	-933.98	R	-2.25	$44,442	-478.21	-2.07	$48,293	-520.13
$28.5m	U	-1.89	$52,997	-47.59	-3.37	$29,678	-937.35	U	-1.16	$86,055	-479.37	-2.08	$48,190	-522.20
$28.6m	R	-1.89	$52,880	-49.48	-1.74	$57,459	-939.09	D	-0.67	$149,548	-480.04	-2.08	$48,141	-524.28
$28.7m	C	-1.89	$52,807	-51.38	-1.71	$58,582	-940.80	H	-2.47	$40,458	-482.51	-2.08	$48,109	-526.36
$28.8m	R	-1.90	$52,734	-53.27	-1.75	$57,300	-942.54	R	-2.26	$44,269	-484.77	-2.08	$48,102	-528.44
$28.9m	G	-1.90	$52,622	-55.17	-3.65	$27,373	-946.20	C	-2.31	$43,329	-487.08	-2.08	$48,068	-530.52
$29.0m	R	-1.90	$52,586	-57.07	-1.75	$57,140	-947.95	G	-1.09	$92,166	-488.16	-2.09	$47,943	-532.60
$29.1m	C	-1.90	$52,559	-58.98	-1.72	$58,308	-949.66	R	-2.27	$44,094	-490.43	-2.09	$47,911	-534.69
$29.2m	R	-1.91	$52,439	-60.88	-1.76	$56,980	-951.42	U	-1.17	$85,460	-491.60	-2.09	$47,856	-536.78
$29.3m	C	-1.91	$52,310	-62.80	-1.72	$58,030	-953.14	H	-2.49	$40,238	-494.09	-2.09	$47,849	-538.87
$29.4m	R	-1.91	$52,291	-64.71	-1.76	$56,819	-954.90	R	-2.28	$43,917	-496.36	-2.10	$47,721	-540.96
$29.5m	R	-1.92	$52,143	-66.63	-1.76	$56,658	-956.67	C	-2.33	$42,960	-498.69	-2.10	$47,659	-543.06
$29.6m	C	-1.92	$52,057	-68.55	-1.73	$57,751	-958.40	D	-0.68	$147,896	-499.37	-2.10	$47,609	-545.16
$29.7m	U	-1.92	$52,026	-70.47	-3.43	$29,133	-961.83	H	-2.50	$40,016	-501.87	-2.10	$47,583	-547.26
$29.8m	R	-1.92	$51,994	-72.39	-1.77	$56,496	-963.60	R	-2.29	$43,743	-504.15	-2.10	$47,529	-549.37
$29.9m	D	-1.93	$51,942	-74.32	-5.98	$16,720	-969.58	U	-1.18	$84,859	-505.33	-2.10	$47,520	-551.47
$30.0m	R	-1.93	$51,845	-76.25	-1.78	$56,334	-971.36	G	-1.10	$91,113	-506.43	-2.11	$47,395	-553.58
$30.1m	C	-1.93	$51,803	-78.18	-1.74	$57,468	-973.10	R	-2.30	$43,563	-508.72	-2.11	$47,335	-555.69
$30.2m	R	-1.93	$51,695	-80.11	-1.78	$56,172	-974.88	H	-2.51	$39,790	-511.24	-2.11	$47,315	-557.81
$30.3m	C	-1.94	$51,546	-82.05	-1.75	$57,183	-976.62	C	-2.35	$42,585	-513.59	-2.12	$47,243	-559.92

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$30.4m	R	-1.94	$51,545	-83.99	-1.79	$56,008	-978.41	U	-1.19	$84,255	-514.77	-2.12	$47,182	-562.04
$30.5m	R	-1.95	$51,395	-85.94	-1.79	$55,845	-980.20	R	-2.30	$43,386	-517.08	-2.12	$47,143	-564.17
$30.6m	C	-1.95	$51,286	-87.89	-1.76	$56,895	-981.96	D	-0.68	$146,227	-517.76	-2.12	$47,071	-566.29
$30.7m	R	-1.95	$51,244	-89.84	-1.80	$55,681	-983.75	H	-2.53	$39,562	-520.29	-2.13	$47,043	-568.42
$30.8m	R	-1.96	$51,092	-91.80	-1.80	$55,516	-985.56	R	-2.31	$43,206	-522.60	-2.13	$46,946	-570.55
$30.9m	H	-1.96	$51,044	-93.76	-1.65	$60,698	-987.20	U	-1.20	$83,647	-523.80	-2.13	$46,841	-572.68
$31.0m	U	-1.96	$51,033	-95.71	-3.50	$28,578	-990.70	G	-1.11	$90,035	-524.91	-2.14	$46,834	-574.82
$31.1m	C	-1.96	$51,024	-97.67	-1.77	$56,604	-992.47	C	-2.37	$42,203	-527.28	-2.14	$46,819	-576.95
$31.2m	R	-1.96	$50,941	-99.64	-1.81	$55,351	-994.28	W	-1.67	$60,049	-528.94	-2.14	$46,801	-579.09
$31.3m	H	-1.96	$50,906	-101.60	-1.65	$60,533	-995.93	H	-2.54	$39,331	-531.49	-2.14	$46,770	-581.23
$31.4m	R	-1.97	$50,788	-103.57	-1.81	$55,186	-997.74	R	-2.32	$43,027	-533.81	-2.14	$46,753	-583.37
$31.5m	H	-1.97	$50,767	-105.54	-1.66	$60,368	-999.40	R	-2.33	$42,845	-536.15	-2.15	$46,557	-585.51
$31.6m	C	-1.97	$50,759	-107.51	-1.78	$56,310	-1001.17	D	-0.69	$144,534	-536.84	-2.15	$46,527	-587.66
$31.7m	R	-1.97	$50,635	-109.49	-1.82	$55,020	-1002.99	U	-1.20	$83,034	-538.04	-2.15	$46,498	-589.81
$31.8m	H	-1.98	$50,627	-111.46	-1.66	$60,202	-1004.65	H	-2.56	$39,098	-540.60	-2.15	$46,492	-591.96
$31.9m	C	-1.98	$50,491	-113.44	-1.79	$56,013	-1006.44	C	-2.39	$41,814	-542.99	-2.16	$46,387	-594.12
$32.0m	H	-1.98	$50,487	-115.42	-1.67	$60,035	-1008.10	R	-2.34	$42,666	-545.33	-2.16	$46,359	-596.28
$32.1m	R	-1.98	$50,482	-117.40	-1.82	$54,853	-1009.92	G	-1.12	$88,929	-546.46	-2.16	$46,259	-598.44
$32.2m	H	-1.99	$50,346	-119.39	-1.67	$59,867	-1011.60	H	-2.57	$38,861	-549.03	-2.16	$46,211	-600.60
$32.3m	R	-1.99	$50,329	-121.38	-1.83	$54,686	-1013.42	R	-2.35	$42,484	-551.39	-2.17	$46,164	-602.77
$32.4m	C	-1.99	$50,220	-123.37	-1.79	$55,712	-1015.22	U	-1.21	$82,417	-552.60	-2.17	$46,152	-604.94
$32.5m	H	-1.99	$50,204	-125.36	-1.68	$59,698	-1016.89	D	-0.70	$142,822	-553.30	-2.18	$45,976	-607.11
$32.6m	R	-1.99	$50,175	-127.35	-1.83	$54,519	-1018.73	R	-2.36	$42,299	-555.66	-2.18	$45,962	-609.29
$32.7m	H	-2.00	$50,061	-129.35	-1.68	$59,528	-1020.41	C	-2.41	$41,418	-558.08	-2.18	$45,947	-611.46
$32.8m	U	-2.00	$50,023	-131.35	-3.57	$28,012	-1023.98	H	-2.59	$38,622	-560.67	-2.18	$45,926	-613.64
$32.9m	R	-2.00	$50,020	-133.35	-1.84	$54,351	-1025.82	U	-1.22	$81,795	-561.89	-2.18	$45,804	-615.82
$33.0m	C	-2.00	$49,947	-135.35	-1.80	$55,409	-1027.62	R	-2.37	$42,118	-564.26	-2.19	$45,764	-618.01
$33.1m	H	-2.00	$49,917	-137.35	-1.68	$59,357	-1029.31	G	-1.14	$87,796	-565.40	-2.19	$45,670	-620.20
$33.2m	R	-2.01	$49,865	-139.36	-1.85	$54,182	-1031.15	H	-2.61	$38,380	-568.01	-2.19	$45,639	-622.39
$33.3m	H	-2.01	$49,773	-141.37	-1.69	$59,186	-1032.84	R	-2.38	$41,932	-570.39	-2.19	$45,564	-624.58
$33.4m	R	-2.01	$49,709	-143.38	-1.85	$54,013	-1034.69	C	-2.44	$41,014	-572.83	-2.20	$45,499	-626.78
$33.5m	C	-2.01	$49,670	-145.39	-1.81	$55,102	-1036.51	U	-1.23	$81,168	-574.06	-2.20	$45,453	-628.98
$33.6m	H	-2.02	$49,627	-147.41	-1.69	$59,013	-1038.20	D	-0.71	$141,093	-574.77	-2.20	$45,419	-631.18
$33.7m	R	-2.02	$49,553	-149.43	-1.86	$53,844	-1040.06	R	-2.40	$41,748	-577.17	-2.20	$45,362	-633.39
$33.8m	H	-2.02	$49,481	-151.45	-1.70	$58,839	-1041.76	H	-2.62	$38,134	-579.79	-2.21	$45,345	-635.59
$33.9m	R	-2.02	$49,397	-153.47	-1.86	$53,674	-1043.62	R	-2.41	$41,561	-582.20	-2.21	$45,161	-637.81
$34.0m	C	-2.02	$49,390	-155.50	-1.83	$54,791	-1045.45	U	-1.24	$80,536	-583.44	-2.22	$45,099	-640.03
$34.1m	H	-2.03	$49,334	-157.52	-1.70	$58,664	-1047.15	G	-1.15	$86,633	-584.59	-2.22	$45,065	-642.24
$34.2m	R	-2.03	$49,239	-159.55	-1.87	$53,503	-1049.02	H	-2.64	$37,887	-587.23	-2.22	$45,053	-644.46
$34.3m	G	-2.03	$49,202	-161.59	-3.91	$25,594	-1052.93	C	-2.46	$40,601	-589.69	-2.22	$45,042	-646.68
$34.4m	H	-2.03	$49,186	-163.62	-1.71	$58,488	-1054.64	R	-2.42	$41,375	-592.11	-2.22	$44,956	-648.91
$34.5m	C	-2.04	$49,107	-165.66	-1.84	$54,477	-1056.47	D	-0.72	$139,338	-592.83	-2.23	$44,855	-651.14
$34.6m	R	-2.04	$49,082	-167.69	-1.88	$53,332	-1058.35	R	-2.43	$41,188	-595.26	-2.23	$44,755	-653.37
$34.7m	H	-2.04	$49,037	-169.73	-1.71	$58,311	-1060.06	H	-2.66	$37,634	-597.91	-2.23	$44,751	-655.61
$34.8m	U	-2.04	$48,991	-171.77	-3.65	$27,435	-1063.71	U	-1.25	$79,900	-599.17	-2.24	$44,742	-657.84
$34.9m	R	-2.04	$48,924	-173.82	-1.88	$53,160	-1065.59	C	-2.49	$40,182	-601.65	-2.24	$44,575	-660.09
$35.0m	H	-2.05	$48,887	-175.86	-1.72	$58,133	-1067.31	R	-2.44	$40,999	-604.09	-2.24	$44,549	-662.33
$35.1m	C	-2.05	$48,820	-177.91	-1.85	$54,160	-1069.16	H	-2.68	$37,380	-606.77	-2.25	$44,450	-664.58
$35.2m	W	-2.05	$48,800	-179.96	-2.63	$38,033	-1071.79	G	-1.17	$85,438	-607.94	-2.25	$44,443	-666.83
$35.3m	R	-2.05	$48,765	-182.01	-1.89	$52,988	-1073.67	U	-1.26	$79,258	-609.20	-2.25	$44,383	-669.08
$35.4m	H	-2.05	$48,737	-184.06	-1.73	$57,954	-1075.40	R	-2.45	$40,810	-611.65	-2.26	$44,342	-671.34

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$35.5m	R	-2.06	$48,606	-186.12	-1.89	$52,815	-1077.29	D	-0.73	$137,565	-612.38	-2.26	$44,283	-673.60
$35.6m	H	-2.06	$48,585	-188.18	-1.73	$57,774	-1079.02	W	-1.76	$56,787	-614.14	-2.26	$44,258	-675.86
$35.7m	C	-2.06	$48,531	-190.24	-1.86	$53,838	-1080.88	H	-2.69	$37,121	-616.83	-2.27	$44,140	-678.12
$35.8m	R	-2.06	$48,446	-192.30	-1.90	$52,641	-1082.78	R	-2.46	$40,619	-619.29	-2.27	$44,136	-680.39
$35.9m	H	-2.06	$48,433	-194.37	-1.74	$57,593	-1084.52	C	-2.52	$39,750	-621.81	-2.27	$44,098	-682.65
$36.0m	R	-2.07	$48,287	-196.44	-1.91	$52,468	-1086.42	U	-1.27	$78,611	-623.08	-2.27	$44,022	-684.93
$36.1m	H	-2.07	$48,279	-198.51	-1.74	$57,410	-1088.16	R	-2.47	$40,427	-625.56	-2.28	$43,929	-687.20
$36.2m	C	-2.07	$48,237	-200.58	-1.87	$53,513	-1090.03	H	-2.71	$36,858	-628.27	-2.28	$43,829	-689.48
$36.3m	R	-2.08	$48,125	-202.66	-1.91	$52,293	-1091.95	G	-1.19	$84,208	-629.46	-2.28	$43,803	-691.77
$36.4m	H	-2.08	$48,125	-204.74	-1.75	$57,226	-1093.69	R	-2.49	$40,237	-631.94	-2.29	$43,720	-694.05
$36.5m	H	-2.08	$47,969	-206.82	-1.75	$57,041	-1095.45	D	-0.74	$135,766	-632.68	-2.29	$43,704	-696.34
$36.6m	R	-2.08	$47,964	-208.91	-1.92	$52,118	-1097.37	U	-1.28	$77,959	-633.96	-2.29	$43,657	-698.63
$36.7m	C	-2.09	$47,940	-211.00	-1.88	$53,184	-1099.25	C	-2.54	$39,311	-636.51	-2.29	$43,611	-700.93
$36.8m	U	-2.09	$47,939	-213.08	-3.73	$26,844	-1102.97	H	-2.73	$36,593	-639.24	-2.30	$43,512	-703.22
$36.9m	H	-2.09	$47,813	-215.17	-1.76	$56,855	-1104.73	R	-2.50	$40,043	-641.74	-2.30	$43,510	-705.52
$37.0m	R	-2.09	$47,803	-217.26	-1.93	$51,942	-1106.65	R	-2.51	$39,849	-644.24	-2.31	$43,299	-707.83
$37.1m	H	-2.10	$47,655	-219.36	-1.76	$56,668	-1108.42	U	-1.29	$77,301	-645.54	-2.31	$43,286	-710.14
$37.2m	R	-2.10	$47,639	-221.46	-1.93	$51,765	-1110.35	H	-2.75	$36,321	-648.29	-2.32	$43,193	-712.46
$37.3m	C	-2.10	$47,640	-223.56	-1.89	$52,850	-1112.24	G	-1.21	$82,941	-649.50	-2.32	$43,145	-714.78
$37.4m	H	-2.11	$47,497	-225.67	-1.77	$56,479	-1114.01	D	-0.75	$133,942	-650.24	-2.32	$43,117	-717.09
$37.5m	R	-2.11	$47,479	-227.77	-1.94	$51,588	-1115.95	C	-2.57	$38,862	-652.82	-2.32	$43,112	-719.41
$37.6m	H	-2.11	$47,337	-229.89	-1.78	$56,290	-1117.73	R	-2.52	$39,654	-655.34	-2.32	$43,087	-721.73
$37.7m	C	-2.11	$47,335	-232.00	-1.90	$52,512	-1119.63	I	-3.38	$29,614	-658.72	-2.33	$42,972	-724.06
$37.8m	R	-2.11	$47,313	-234.11	-1.95	$51,411	-1121.58	I	-3.38	$29,578	-662.10	-2.33	$42,920	-726.39
$37.9m	H	-2.12	$47,176	-236.23	-1.78	$56,098	-1123.36	U	-1.30	$76,637	-663.40	-2.33	$42,917	-728.72
$38.0m	R	-2.12	$47,152	-238.35	-1.95	$51,232	-1125.31	R	-2.53	$39,459	-665.94	-2.33	$42,876	-731.05
$38.1m	C	-2.13	$47,027	-240.48	-1.92	$52,170	-1127.23	I	-3.39	$29,542	-669.32	-2.33	$42,868	-733.39
$38.2m	H	-2.13	$47,014	-242.61	-1.79	$55,906	-1129.02	H	-2.77	$36,048	-672.09	-2.33	$42,865	-735.72
$38.3m	R	-2.13	$46,984	-244.73	-1.96	$51,054	-1130.98	I	-3.39	$29,506	-675.48	-2.34	$42,815	-738.06
$38.4m	D	-2.13	$46,959	-246.86	-6.62	$15,116	-1137.59	I	-3.39	$29,469	-678.88	-2.34	$42,762	-740.39
$38.5m	U	-2.13	$46,858	-249.00	-3.81	$26,241	-1141.40	I	-3.40	$29,433	-682.28	-2.34	$42,709	-742.74
$38.6m	H	-2.13	$46,851	-251.13	-1.79	$55,712	-1143.20	R	-2.55	$39,260	-684.82	-2.34	$42,660	-745.08
$38.7m	R	-2.14	$46,821	-253.27	-1.97	$50,875	-1145.16	I	-3.40	$29,396	-688.22	-2.34	$42,656	-747.42
$38.8m	C	-2.14	$46,715	-255.41	-1.93	$51,824	-1147.09	I	-3.41	$29,359	-691.63	-2.35	$42,602	-749.77
$38.9m	H	-2.14	$46,687	-257.55	-1.80	$55,517	-1148.89	C	-2.60	$38,402	-694.23	-2.35	$42,601	-752.12
$39.0m	R	-2.14	$46,655	-259.69	-1.97	$50,695	-1150.87	I	-3.41	$29,322	-697.64	-2.35	$42,548	-754.47
$39.1m	H	-2.15	$46,522	-261.84	-1.81	$55,320	-1152.67	U	-1.32	$75,968	-698.96	-2.35	$42,541	-756.82
$39.2m	R	-2.15	$46,488	-263.99	-1.98	$50,513	-1154.65	H	-2.80	$35,770	-701.76	-2.35	$42,535	-759.17
$39.3m	C	-2.16	$46,398	-266.15	-1.94	$51,472	-1156.60	D	-0.76	$132,095	-702.51	-2.35	$42,523	-761.52
$39.4m	H	-2.16	$46,356	-268.31	-1.81	$55,123	-1158.41	I	-3.41	$29,285	-705.93	-2.35	$42,494	-763.88
$39.5m	R	-2.16	$46,322	-270.47	-1.99	$50,332	-1160.40	G	-1.22	$81,635	-707.15	-2.35	$42,465	-766.23
$39.6m	H	-2.17	$46,188	-272.63	-1.82	$54,923	-1162.22	R	-2.56	$39,064	-709.71	-2.36	$42,447	-768.59
$39.7m	R	-2.17	$46,153	-274.80	-1.99	$50,150	-1164.21	I	-3.42	$29,247	-713.13	-2.36	$42,440	-770.94
$39.8m	C	-2.17	$46,077	-276.97	-1.96	$51,116	-1166.17	I	-3.42	$29,209	-716.56	-2.36	$42,385	-773.30
$39.9m	H	-2.17	$46,019	-279.14	-1.83	$54,723	-1168.00	I	-3.43	$29,171	-719.98	-2.36	$42,330	-775.66
$40.0m	R	-2.17	$45,985	-281.32	-2.00	$49,968	-1170.00	I	-3.43	$29,133	-723.42	-2.37	$42,275	-778.03
$40.1m	H	-2.18	$45,849	-283.50	-1.83	$54,520	-1171.83	R	-2.57	$38,865	-725.99	-2.37	$42,230	-780.40
$40.2m	R	-2.18	$45,817	-285.68	-2.01	$49,783	-1173.84	I	-3.44	$29,095	-729.43	-2.37	$42,219	-782.77
$40.3m	U	-2.19	$45,758	-287.86	-3.90	$25,623	-1177.74	H	-2.82	$35,486	-732.24	-2.37	$42,198	-785.14
$40.4m	C	-2.19	$45,751	-290.05	-1.97	$50,755	-1179.71	I	-3.44	$29,057	-735.69	-2.37	$42,163	-787.51
$40.5m	H	-2.19	$45,678	-292.24	-1.84	$54,316	-1181.55	U	-1.33	$75,292	-737.01	-2.37	$42,162	-789.88

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$40.6m	R	-2.19	$45,648	-294.43	-2.02	$49,601	-1183.57	I	-3.45	$29,018	-740.46	-2.37	$42,107	-792.25
$40.7m	H	-2.20	$45,505	-296.63	-1.85	$54,111	-1185.42	C	-2.64	$37,931	-743.10	-2.38	$42,080	-794.63
$40.8m	R	-2.20	$45,477	-298.83	-2.02	$49,414	-1187.44	I	-3.45	$28,979	-746.55	-2.38	$42,051	-797.01
$40.9m	C	-2.20	$45,421	-301.03	-1.98	$50,388	-1189.43	R	-2.59	$38,665	-749.13	-2.38	$42,013	-799.39
$41.0m	H	-2.21	$45,331	-303.23	-1.86	$53,904	-1191.28	I	-3.46	$28,940	-752.59	-2.38	$41,994	-801.77
$41.1m	R	-2.21	$45,308	-305.44	-2.03	$49,230	-1193.31	I	-3.46	$28,900	-756.05	-2.38	$41,937	-804.15
$41.2m	G	-2.21	$45,220	-307.65	-4.25	$23,523	-1197.56	D	-0.77	$130,222	-756.82	-2.39	$41,919	-806.54
$41.3m	H	-2.21	$45,155	-309.87	-1.86	$53,696	-1199.43	I	-3.46	$28,861	-760.28	-2.39	$41,879	-808.93
$41.4m	R	-2.22	$45,135	-312.08	-2.04	$49,046	-1201.47	H	-2.84	$35,200	-763.12	-2.39	$41,857	-811.32
$41.5m	C	-2.22	$45,086	-314.30	-2.00	$50,017	-1203.47	I	-3.47	$28,821	-766.59	-2.39	$41,822	-813.71
$41.6m	H	-2.22	$44,979	-316.52	-1.87	$53,485	-1205.34	R	-2.60	$38,464	-769.19	-2.39	$41,794	-816.10
$41.7m	R	-2.22	$44,964	-318.75	-2.05	$48,857	-1207.38	U	-1.34	$74,611	-770.53	-2.39	$41,782	-818.49
$41.8m	H	-2.23	$44,800	-320.98	-1.88	$53,273	-1209.26	I	-3.47	$28,781	-774.01	-2.39	$41,764	-820.89
$41.9m	R	-2.23	$44,791	-323.21	-2.05	$48,669	-1211.31	G	-1.25	$80,284	-775.25	-2.39	$41,763	-823.28
$42.0m	C	-2.23	$44,745	-325.45	-2.01	$49,639	-1213.33	O	-7.80	$12,816	-783.06	-2.40	$41,728	-825.68
$42.1m	U	-2.24	$44,625	-327.69	-4.00	$24,990	-1217.33	I	-3.48	$28,741	-786.54	-2.40	$41,705	-828.08
$42.2m	H	-2.24	$44,621	-329.93	-1.88	$53,060	-1219.21	I	-3.48	$28,700	-790.02	-2.40	$41,647	-830.48
$42.3m	R	-2.24	$44,619	-332.17	-2.06	$48,480	-1221.28	I	-3.49	$28,660	-793.51	-2.40	$41,588	-832.88
$42.4m	R	-2.25	$44,442	-334.42	-2.07	$48,293	-1223.35	R	-2.61	$38,261	-796.12	-2.41	$41,577	-835.29
$42.5m	H	-2.25	$44,440	-336.67	-1.89	$52,844	-1225.24	C	-2.67	$37,448	-798.79	-2.41	$41,542	-837.70
$42.6m	C	-2.25	$44,400	-338.92	-2.03	$49,256	-1227.27	I	-3.49	$28,619	-802.29	-2.41	$41,528	-840.10
$42.7m	R	-2.26	$44,269	-341.18	-2.08	$48,102	-1229.35	H	-2.86	$34,906	-805.15	-2.41	$41,509	-842.51
$42.8m	H	-2.26	$44,258	-343.44	-1.90	$52,628	-1231.25	I	-3.50	$28,578	-808.65	-2.41	$41,468	-844.92
$42.9m	R	-2.27	$44,094	-345.71	-2.09	$47,911	-1233.34	I	-3.50	$28,536	-812.16	-2.41	$41,409	-847.34
$43.0m	H	-2.27	$44,073	-347.98	-1.91	$52,409	-1235.24	U	-1.35	$73,923	-813.51	-2.42	$41,396	-849.76
$43.1m	C	-2.27	$44,049	-350.25	-2.05	$48,866	-1237.29	W	-1.88	$53,096	-815.39	-2.42	$41,382	-852.17
$43.2m	R	-2.28	$43,917	-352.53	-2.10	$47,721	-1239.39	R	-2.63	$38,060	-818.02	-2.42	$41,355	-854.59
$43.3m	H	-2.28	$43,888	-354.80	-1.92	$52,188	-1241.30	I	-3.51	$28,494	-821.53	-2.42	$41,348	-857.01
$43.4m	R	-2.29	$43,743	-357.09	-2.10	$47,529	-1243.41	D	-0.78	$128,319	-822.31	-2.42	$41,307	-859.43
$43.5m	H	-2.29	$43,701	-359.38	-1.92	$51,966	-1245.33	I	-3.51	$28,453	-825.82	-2.42	$41,287	-861.85
$43.6m	C	-2.29	$43,692	-361.67	-2.06	$48,470	-1247.39	I	-3.52	$28,411	-829.34	-2.43	$41,226	-864.28
$43.7m	R	-2.30	$43,563	-363.96	-2.11	$47,335	-1249.51	I	-3.53	$28,369	-832.87	-2.43	$41,165	-866.71
$43.8m	W	-2.30	$43,558	-366.26	-2.95	$33,948	-1252.45	H	-2.89	$34,610	-835.76	-2.43	$41,156	-869.14
$43.9m	H	-2.30	$43,512	-368.56	-1.93	$51,741	-1254.39	R	-2.64	$37,854	-838.40	-2.43	$41,132	-871.57
$44.0m	U	-2.30	$43,467	-370.86	-4.11	$24,341	-1258.49	I	-3.53	$28,325	-841.93	-2.43	$41,103	-874.00
$44.1m	R	-2.30	$43,386	-373.16	-2.12	$47,143	-1260.61	I	-3.54	$28,283	-845.46	-2.44	$41,041	-876.44
$44.2m	C	-2.31	$43,329	-375.47	-2.08	$48,068	-1262.70	G	-1.27	$78,888	-846.73	-2.44	$41,036	-878.87
$44.3m	H	-2.31	$43,322	-377.78	-1.94	$51,515	-1264.64	U	-1.37	$73,229	-848.10	-2.44	$41,007	-881.31
$44.4m	R	-2.31	$43,206	-380.09	-2.13	$46,946	-1266.77	C	-2.71	$36,951	-850.80	-2.44	$40,992	-883.75
$44.5m	H	-2.32	$43,129	-382.41	-1.95	$51,286	-1268.72	I	-3.54	$28,239	-854.34	-2.44	$40,978	-886.19
$44.6m	R	-2.32	$43,027	-384.74	-2.14	$46,753	-1270.86	I	-3.55	$28,197	-857.89	-2.44	$40,915	-888.64
$44.7m	C	-2.33	$42,960	-387.06	-2.10	$47,659	-1272.95	R	-2.66	$37,651	-860.55	-2.44	$40,912	-891.08
$44.8m	H	-2.33	$42,935	-389.39	-1.96	$51,056	-1274.91	I	-3.55	$28,152	-864.10	-2.45	$40,852	-893.53
$44.9m	R	-2.33	$42,845	-391.73	-2.15	$46,557	-1277.06	H	-2.91	$34,308	-867.01	-2.45	$40,796	-895.98
$45.0m	H	-2.34	$42,741	-394.07	-1.97	$50,823	-1279.03	I	-3.56	$28,109	-870.57	-2.45	$40,788	-898.43
$45.1m	R	-2.34	$42,666	-396.41	-2.16	$46,359	-1281.18	I	-3.56	$28,064	-874.13	-2.46	$40,724	-900.89
$45.2m	C	-2.35	$42,585	-398.76	-2.12	$47,243	-1283.30	D	-0.79	$126,390	-874.93	-2.46	$40,686	-903.34
$45.3m	H	-2.35	$42,542	-401.11	-1.98	$50,588	-1285.28	R	-2.67	$37,443	-877.60	-2.46	$40,685	-905.80
$45.4m	R	-2.35	$42,484	-403.46	-2.17	$46,164	-1287.44	I	-3.57	$28,020	-881.17	-2.46	$40,659	-908.26
$45.5m	H	-2.36	$42,342	-405.82	-1.99	$50,351	-1289.43	U	-1.38	$72,528	-882.54	-2.46	$40,616	-910.72
$45.6m	R	-2.36	$42,299	-408.19	-2.18	$45,962	-1291.61	I	-3.57	$27,975	-886.12	-2.46	$40,594	-913.19

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$45.7m	U	-2.37	$42,274	-410.55	-4.22	$23,674	-1295.83	I	-3.58	$27,930	-889.70	-2.47	$40,528	-915.65
$45.8m	C	-2.37	$42,203	-412.92	-2.14	$46,819	-1297.97	I	-3.59	$27,885	-893.29	-2.47	$40,463	-918.13
$45.9m	H	-2.37	$42,143	-415.30	-2.00	$50,112	-1299.96	R	-2.69	$37,237	-895.97	-2.47	$40,461	-920.60
$46.0m	R	-2.37	$42,118	-417.67	-2.19	$45,764	-1302.15	H	-2.94	$34,001	-898.91	-2.47	$40,430	-923.07
$46.1m	H	-2.38	$41,939	-420.06	-2.01	$49,871	-1304.15	C	-2.74	$36,442	-901.66	-2.47	$40,427	-925.54
$46.2m	R	-2.38	$41,932	-422.44	-2.19	$45,564	-1306.35	I	-3.59	$27,839	-905.25	-2.48	$40,398	-928.02
$46.3m	C	-2.39	$41,814	-424.83	-2.16	$46,387	-1308.50	I	-3.60	$27,793	-908.85	-2.48	$40,329	-930.50
$46.4m	R	-2.40	$41,748	-427.23	-2.20	$45,362	-1310.71	G	-1.29	$77,439	-910.14	-2.48	$40,282	-932.98
$46.5m	H	-2.40	$41,733	-429.62	-2.02	$49,625	-1312.72	I	-3.60	$27,746	-913.74	-2.48	$40,263	-935.47
$46.6m	R	-2.41	$41,561	-432.03	-2.21	$45,161	-1314.94	R	-2.70	$37,027	-916.44	-2.49	$40,233	-937.95
$46.7m	H	-2.41	$41,527	-434.44	-2.03	$49,380	-1316.96	U	-1.39	$71,821	-917.84	-2.49	$40,219	-940.44
$46.8m	C	-2.41	$41,418	-436.85	-2.18	$45,947	-1319.14	I	-3.61	$27,700	-921.45	-2.49	$40,195	-942.93
$46.9m	R	-2.42	$41,375	-439.27	-2.22	$44,956	-1321.36	I	-3.62	$27,653	-925.06	-2.49	$40,127	-945.42
$47.0m	D	-2.42	$41,371	-441.69	-7.51	$13,318	-1328.87	I	-3.62	$27,606	-928.68	-2.50	$40,059	-947.91
$47.1m	H	-2.42	$41,319	-444.11	-2.04	$49,133	-1330.91	H	-2.97	$33,686	-931.65	-2.50	$40,058	-950.41
$47.2m	R	-2.43	$41,188	-446.53	-2.23	$44,755	-1333.14	D	-0.80	$124,431	-932.46	-2.50	$40,055	-952.91
$47.3m	H	-2.43	$41,105	-448.97	-2.05	$48,881	-1335.19	R	-2.72	$36,817	-935.17	-2.50	$40,006	-955.41
$47.4m	U	-2.44	$41,049	-451.40	-4.35	$22,986	-1339.54	I	-3.63	$27,558	-938.80	-2.50	$39,989	-957.91
$47.5m	C	-2.44	$41,014	-453.84	-2.20	$45,499	-1341.73	I	-3.64	$27,510	-942.44	-2.51	$39,920	-960.41
$47.6m	R	-2.44	$40,999	-456.28	-2.24	$44,549	-1343.98	I	-3.64	$27,463	-946.08	-2.51	$39,850	-962.92
$47.7m	H	-2.45	$40,893	-458.73	-2.06	$48,626	-1346.04	C	-2.78	$35,917	-948.86	-2.51	$39,845	-965.43
$47.8m	R	-2.45	$40,810	-461.18	-2.26	$44,342	-1348.29	U	-1.41	$71,106	-950.27	-2.51	$39,818	-967.94
$47.9m	H	-2.46	$40,677	-463.63	-2.07	$48,370	-1350.36	I	-3.65	$27,414	-953.92	-2.51	$39,779	-970.46
$48.0m	R	-2.46	$40,619	-466.10	-2.27	$44,136	-1352.62	R	-2.73	$36,607	-956.65	-2.51	$39,776	-972.97
$48.1m	C	-2.46	$40,601	-468.56	-2.22	$45,042	-1354.84	I	-3.65	$27,364	-960.30	-2.52	$39,709	-975.49
$48.2m	H	-2.47	$40,458	-471.03	-2.08	$48,109	-1356.92	H	-3.00	$33,368	-963.30	-2.52	$39,678	-978.01
$48.3m	R	-2.47	$40,427	-473.50	-2.28	$43,929	-1359.20	I	-3.66	$27,316	-966.96	-2.52	$39,637	-980.53
$48.4m	G	-2.48	$40,363	-475.98	-4.76	$20,996	-1363.96	I	-3.67	$27,266	-970.63	-2.53	$39,565	-983.06
$48.5m	H	-2.49	$40,238	-478.47	-2.09	$47,849	-1366.05	R	-2.75	$36,394	-973.37	-2.53	$39,546	-985.59
$48.6m	R	-2.49	$40,237	-480.95	-2.29	$43,720	-1368.34	G	-1.32	$75,935	-974.69	-2.53	$39,500	-988.12
$48.7m	C	-2.49	$40,182	-483.44	-2.24	$44,575	-1370.58	I	-3.67	$27,216	-978.37	-2.53	$39,491	-990.65
$48.8m	R	-2.50	$40,043	-485.94	-2.30	$43,510	-1372.88	I	-3.68	$27,166	-982.05	-2.54	$39,420	-993.19
$48.9m	H	-2.50	$40,016	-488.44	-2.10	$47,583	-1374.98	U	-1.42	$70,384	-983.47	-2.54	$39,414	-995.73
$49.0m	R	-2.51	$39,849	-490.95	-2.31	$43,299	-1377.29	D	-0.82	$122,438	-984.28	-2.54	$39,414	-998.26
$49.1m	H	-2.51	$39,790	-493.46	-2.11	$47,315	-1379.41	I	-3.69	$27,114	-987.97	-2.54	$39,345	-1000.81
$49.2m	U	-2.51	$39,785	-495.97	-4.49	$22,279	-1383.89	R	-2.76	$36,182	-990.74	-2.54	$39,314	-1003.35
$49.3m	C	-2.52	$39,750	-498.49	-2.27	$44,098	-1386.16	H	-3.03	$33,041	-993.76	-2.55	$39,290	-1005.89
$49.4m	R	-2.52	$39,654	-501.01	-2.32	$43,087	-1388.48	I	-3.69	$27,064	-997.46	-2.55	$39,273	-1008.44
$49.5m	H	-2.53	$39,562	-503.54	-2.13	$47,043	-1390.61	C	-2.83	$35,377	-1000.28	-2.55	$39,246	-1010.99
$49.6m	R	-2.53	$39,459	-506.07	-2.33	$42,876	-1392.94	I	-3.70	$27,012	-1003.99	-2.55	$39,196	-1013.54
$49.7m	H	-2.54	$39,331	-508.62	-2.14	$46,770	-1395.08	I	-3.71	$26,961	-1007.70	-2.56	$39,122	-1016.10
$49.8m	C	-2.54	$39,311	-511.16	-2.29	$43,611	-1397.37	R	-2.78	$35,966	-1010.48	-2.56	$39,081	-1018.65
$49.9m	R	-2.55	$39,260	-513.71	-2.34	$42,660	-1399.72	I	-3.72	$26,908	-1014.19	-2.56	$39,046	-1021.22
$50.0m	H	-2.56	$39,098	-516.26	-2.15	$46,492	-1401.87	U	-1.44	$69,654	-1015.63	-2.56	$39,006	-1023.78

[a] Marginal technology in contraction. At each level of budget impact, this technology is subject to a $100,000 reduction in incremental expenditure compared to the previous (smaller) level of budget impact;
[b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 reduction in incremental expenditure on marginal technology;
[c] Estimate (given imperfect information) of the marginal ICER in contraction for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire reduction in expenditure across all technologies.

Table A2.2.4: Reallocation following net disinvestment (allocator has poor information)

	Reallocation with good information							*Reallocation with poor information*						
	Marginal	*Estimates with good information*			*Estimates with poor information*			**Marginal**	*Estimates with good information*			*Estimates with poor information*		
Budget impact	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	**Tech** [a]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$0.1m	O	5.02	$19,920	5.02	1.54	$64,860	1.54	R	1.79	$55,872	1.79	1.65	$60,710	1.65
$0.2m	O	4.75	$21,064	9.77	1.46	$68,586	3.00	D	0.53	$188,777	2.32	1.65	$60,769	3.29
$0.3m	O	4.53	$22,096	14.29	1.39	$71,945	4.39	U	0.92	$108,617	3.24	1.64	$60,824	4.94
$0.4m	O	4.34	$23,039	18.63	1.33	$75,016	5.72	R	1.79	$56,010	5.03	1.64	$60,860	6.58
$0.5m	O	4.18	$23,910	22.82	1.28	$77,853	7.01	H	1.95	$51,181	6.98	1.64	$60,861	8.22
$0.6m	O	4.04	$24,722	26.86	1.24	$80,497	8.25	G	0.85	$117,100	7.83	1.64	$60,914	9.86
$0.7m	O	3.92	$25,484	30.78	1.21	$82,978	9.45	C	1.82	$54,935	9.65	1.64	$60,943	11.51
$0.8m	O	3.82	$26,203	34.60	1.17	$85,318	10.63	R	1.78	$56,149	11.43	1.64	$61,010	13.14
$0.9m	O	3.72	$26,884	38.32	1.14	$87,537	11.77	H	1.95	$51,318	13.38	1.64	$61,023	14.78
$1.0m	O	3.63	$27,533	41.95	1.12	$89,648	12.88	U	0.92	$109,086	14.30	1.64	$61,087	16.42
$1.1m	O	3.55	$28,152	45.51	1.09	$91,665	13.98	R	1.78	$56,286	16.08	1.64	$61,160	18.06
$1.2m	O	3.48	$28,745	48.98	1.07	$93,595	15.04	W	1.27	$78,489	17.35	1.63	$61,172	19.69
$1.3m	O	3.41	$29,315	52.40	1.05	$95,451	16.09	H	1.94	$51,454	19.29	1.63	$61,185	21.32
$1.4m	O	3.35	$29,863	55.74	1.03	$97,235	17.12	D	0.53	$190,075	19.82	1.63	$61,187	22.96
$1.5m	O	3.29	$30,392	59.03	1.01	$98,958	18.13	C	1.81	$55,162	21.63	1.63	$61,195	24.59
$1.6m	O	3.24	$30,903	62.27	0.99	$100,621	19.12	G	0.85	$117,742	22.48	1.63	$61,247	26.23
$1.7m	O	3.18	$31,398	65.46	0.98	$102,232	20.10	R	1.77	$56,424	24.25	1.63	$61,309	27.86
$1.8m	O	3.14	$31,877	68.59	0.96	$103,794	21.07	H	1.94	$51,589	26.19	1.63	$61,346	29.49
$1.9m	O	3.09	$32,343	71.68	0.95	$105,309	22.02	U	0.91	$109,554	27.11	1.63	$61,349	31.12
$2.0m	O	3.05	$32,795	74.73	0.94	$106,782	22.95	C	1.81	$55,387	28.91	1.63	$61,444	32.74
$2.1m	O	3.01	$33,235	77.74	0.92	$108,217	23.88	R	1.77	$56,561	30.68	1.63	$61,458	34.37
$2.2m	O	2.97	$33,664	80.71	0.91	$109,612	24.79	H	1.93	$51,724	32.61	1.63	$61,506	36.00
$2.3m	O	2.93	$34,083	83.65	0.90	$110,975	25.69	G	0.84	$118,377	33.46	1.62	$61,577	37.62
$2.4m	O	2.90	$34,491	86.55	0.89	$112,304	26.58	D	0.52	$191,364	33.98	1.62	$61,602	39.24
$2.5m	O	2.87	$34,890	89.41	0.88	$113,603	27.46	R	1.76	$56,698	35.74	1.62	$61,607	40.87
$2.6m	O	2.83	$35,280	92.25	0.87	$114,873	28.33	U	0.91	$110,019	36.65	1.62	$61,609	42.49
$2.7m	O	2.80	$35,661	95.05	0.86	$116,114	29.19	H	1.93	$51,858	38.58	1.62	$61,665	44.11
$2.8m	O	2.78	$36,035	97.83	0.85	$117,330	30.04	C	1.80	$55,609	40.38	1.62	$61,691	45.73
$2.9m	O	2.75	$36,400	100.57	0.84	$118,523	30.89	R	1.76	$56,834	42.14	1.62	$61,755	47.35
$3.0m	O	2.72	$36,759	103.29	0.84	$119,689	31.72	H	1.92	$51,991	44.06	1.62	$61,823	48.97
$3.1m	O	2.69	$37,111	105.99	0.83	$120,836	32.55	U	0.91	$110,482	44.97	1.62	$61,869	50.59
$3.2m	O	2.67	$37,456	108.66	0.82	$121,959	33.37	R	1.76	$56,970	46.72	1.62	$61,903	52.20
$3.3m	O	2.65	$37,796	111.30	0.81	$123,063	34.18	G	0.84	$119,005	47.56	1.62	$61,904	53.82
$3.4m	O	2.62	$38,127	113.93	0.81	$124,148	34.99	C	1.79	$55,831	49.35	1.61	$61,936	55.43
$3.5m	O	2.60	$38,456	116.53	0.80	$125,214	35.79	H	1.92	$52,123	51.27	1.61	$61,981	57.05
$3.6m	O	2.58	$38,778	119.11	0.79	$126,261	36.58	D	0.52	$192,644	51.79	1.61	$62,014	58.66
$3.7m	O	2.56	$39,095	121.66	0.79	$127,291	37.37	R	1.75	$57,106	53.54	1.61	$62,051	60.27
$3.8m	O	2.54	$39,406	124.20	0.78	$128,307	38.14	U	0.90	$110,943	54.44	1.61	$62,127	61.88
$3.9m	O	2.52	$39,712	126.72	0.77	$129,306	38.92	H	1.91	$52,255	56.36	1.61	$62,137	63.49
$4.0m	O	2.50	$40,014	129.22	0.77	$130,288	39.69	C	1.78	$56,050	58.14	1.61	$62,180	65.10
$4.1m	O	2.48	$40,311	131.70	0.76	$131,258	40.45	R	1.75	$57,242	59.89	1.61	$62,198	66.70
$4.2m	O	2.46	$40,604	134.16	0.76	$132,212	41.20	G	0.84	$119,626	60.73	1.61	$62,227	68.31
$4.3m	O	2.45	$40,895	136.61	0.75	$133,152	41.95	H	1.91	$52,386	62.63	1.61	$62,294	69.92
$4.4m	O	2.43	$41,179	139.04	0.75	$134,082	42.70	R	1.74	$57,377	64.38	1.60	$62,345	71.52
$4.5m	O	2.41	$41,459	141.45	0.74	$134,996	43.44	U	0.90	$111,403	65.27	1.60	$62,384	73.12
$4.6m	O	2.40	$41,738	143.84	0.74	$135,899	44.18	C	1.78	$56,268	67.05	1.60	$62,421	74.73
$4.7m	O	2.38	$42,012	146.22	0.73	$136,791	44.91	D	0.52	$193,915	67.57	1.60	$62,423	76.33
$4.8m	O	2.37	$42,282	148.59	0.73	$137,669	45.63	H	1.90	$52,517	69.47	1.60	$62,448	77.93

	Reallocation with good information							Reallocation with poor information						
		Estimates with good information			Estimates with poor information				Estimates with good information			Estimates with poor information		
Budget impact	**Marginal Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	**Marginal Tech** [a]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$4.9m	O	2.35	$42,548	150.94	0.72	$138,541	46.36	R	1.74	$57,512	71.21	1.60	$62,491	79.53
$5.0m	O	2.34	$42,812	153.28	0.72	$139,396	47.07	G	0.83	$120,241	72.04	1.60	$62,547	81.13
$5.1m	O	2.32	$43,072	155.60	0.71	$140,245	47.79	W	1.25	$80,254	73.29	1.60	$62,548	82.73
$5.2m	O	2.31	$43,329	157.90	0.71	$141,082	48.50	H	1.90	$52,646	75.19	1.60	$62,603	84.32
$5.3m	O	2.29	$43,582	160.20	0.70	$141,908	49.20	R	1.73	$57,646	76.92	1.60	$62,638	85.92
$5.4m	O	2.28	$43,835	162.48	0.70	$142,729	49.90	U	0.89	$111,860	77.82	1.60	$62,640	87.52
$5.5m	O	2.27	$44,084	164.75	0.70	$143,536	50.60	C	1.77	$56,483	79.59	1.60	$62,661	89.11
$5.6m	O	2.26	$44,328	167.00	0.69	$144,336	51.29	H	1.89	$52,775	81.48	1.59	$62,757	90.71
$5.7m	O	2.24	$44,571	169.25	0.69	$145,125	51.98	R	1.73	$57,780	83.21	1.59	$62,783	92.30
$5.8m	O	2.23	$44,811	171.48	0.69	$145,909	52.67	D	0.51	$195,179	83.72	1.59	$62,830	93.89
$5.9m	O	2.22	$45,049	173.70	0.68	$146,683	53.35	G	0.83	$120,850	84.55	1.59	$62,864	95.48
$6.0m	O	2.21	$45,286	175.91	0.68	$147,449	54.03	U	0.89	$112,316	85.44	1.59	$62,896	97.07
$6.1m	O	2.20	$45,517	178.11	0.67	$148,207	54.70	C	1.76	$56,698	87.21	1.59	$62,899	98.66
$6.2m	O	2.19	$45,748	180.29	0.67	$148,958	55.37	H	1.89	$52,904	89.10	1.59	$62,909	100.25
$6.3m	O	2.18	$45,977	182.47	0.67	$149,701	56.04	R	1.73	$57,914	90.82	1.59	$62,929	101.84
$6.4m	O	2.16	$46,202	184.63	0.66	$150,435	56.70	H	1.89	$53,032	92.71	1.59	$63,062	103.43
$6.5m	O	2.15	$46,425	186.78	0.66	$151,165	57.37	R	1.72	$58,048	94.43	1.59	$63,074	105.01
$6.6m	O	2.14	$46,648	188.93	0.66	$151,888	58.02	C	1.76	$56,911	96.19	1.58	$63,135	106.60
$6.7m	O	2.13	$46,867	191.06	0.66	$152,600	58.68	U	0.89	$112,770	97.08	1.58	$63,149	108.18
$6.8m	O	2.12	$47,083	193.19	0.65	$153,311	59.33	G	0.82	$121,453	97.90	1.58	$63,178	109.76
$6.9m	O	2.11	$47,299	195.30	0.65	$154,010	59.98	H	1.88	$53,159	99.78	1.58	$63,213	111.34
$7.0m	O	2.10	$47,515	197.40	0.65	$154,708	60.63	R	1.72	$58,181	101.50	1.58	$63,219	112.93
$7.1m	O	2.10	$47,724	199.50	0.64	$155,395	61.27	D	0.51	$196,434	102.01	1.58	$63,234	114.51
$7.2m	O	2.09	$47,936	201.59	0.64	$156,077	61.91	R	1.71	$58,314	103.72	1.58	$63,363	116.09
$7.3m	O	2.08	$48,142	203.66	0.64	$156,757	62.55	H	1.88	$53,286	105.60	1.58	$63,364	117.66
$7.4m	O	2.07	$48,349	205.73	0.64	$157,426	63.18	C	1.75	$57,122	107.35	1.58	$63,369	119.24
$7.5m	O	2.06	$48,555	207.79	0.63	$158,093	63.82	U	0.88	$113,222	108.23	1.58	$63,403	120.82
$7.6m	O	2.05	$48,754	209.84	0.63	$158,753	64.45	G	0.82	$122,050	109.05	1.58	$63,488	122.39
$7.7m	O	2.04	$48,957	211.88	0.63	$159,408	65.07	R	1.71	$58,447	110.76	1.57	$63,508	123.97
$7.8m	O	2.03	$49,157	213.92	0.62	$160,056	65.70	H	1.87	$53,412	112.64	1.57	$63,514	125.54
$7.9m	O	2.03	$49,356	215.95	0.62	$160,702	66.32	C	1.74	$57,332	114.38	1.57	$63,601	127.11
$8.0m	O	2.02	$49,549	217.96	0.62	$161,340	66.94	D	0.51	$197,681	114.89	1.57	$63,635	128.69
$8.1m	O	2.01	$49,746	219.97	0.62	$161,972	67.56	R	1.71	$58,579	116.59	1.57	$63,651	130.26
$8.2m	O	2.00	$49,940	221.98	0.61	$162,604	68.17	U	0.88	$113,671	117.47	1.57	$63,655	131.83
$8.3m	O	1.99	$50,130	223.97	0.61	$163,225	68.79	H	1.87	$53,538	119.34	1.57	$63,663	133.40
$8.4m	O	1.99	$50,320	225.96	0.61	$163,848	69.40	R	1.70	$58,711	121.04	1.57	$63,795	134.97
$8.5m	O	1.98	$50,510	227.94	0.61	$164,460	70.00	G	0.82	$122,641	121.86	1.57	$63,796	136.53
$8.6m	O	1.97	$50,697	229.91	0.61	$165,071	70.61	H	1.86	$53,663	123.72	1.57	$63,812	138.10
$8.7m	O	1.97	$50,883	231.88	0.60	$165,678	71.21	C	1.74	$57,540	125.46	1.57	$63,833	139.67
$8.8m	O	1.96	$51,067	233.83	0.60	$166,279	71.82	W	1.22	$81,945	126.68	1.57	$63,866	141.23
$8.9m	H	1.95	$51,181	235.79	1.64	$60,861	73.46	U	0.88	$114,121	127.56	1.56	$63,906	142.80
$9.0m	O	1.95	$51,251	237.74	0.60	$166,875	74.06	R	1.70	$58,843	129.26	1.56	$63,938	144.36
$9.1m	H	1.95	$51,318	239.69	1.64	$61,023	75.70	H	1.86	$53,787	131.12	1.56	$63,959	145.93
$9.2m	O	1.94	$51,432	241.63	0.60	$167,471	76.29	D	0.50	$198,921	131.62	1.56	$64,034	147.49
$9.3m	H	1.94	$51,454	243.58	1.63	$61,185	77.93	C	1.73	$57,746	133.35	1.56	$64,062	149.05
$9.4m	H	1.94	$51,589	245.51	1.63	$61,346	79.56	R	1.70	$58,974	135.05	1.56	$64,081	150.61
$9.5m	O	1.94	$51,616	247.45	0.60	$168,056	80.15	G	0.81	$123,226	135.86	1.56	$64,100	152.17
$9.6m	H	1.93	$51,724	249.38	1.63	$61,506	81.78	H	1.85	$53,911	137.71	1.56	$64,107	153.73
$9.7m	O	1.93	$51,792	251.32	0.59	$168,643	82.37	U	0.87	$114,566	138.58	1.56	$64,156	155.29
$9.8m	H	1.93	$51,858	253.24	1.62	$61,665	83.99	R	1.69	$59,106	140.28	1.56	$64,224	156.84
$9.9m	O	1.92	$51,972	255.17	0.59	$169,222	84.58	H	1.85	$54,034	142.13	1.56	$64,253	158.40

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$10.0m	H	1.92	$51,991	257.09	1.62	$61,823	86.20	C	1.73	$57,951	143.85	1.56	$64,289	159.96
$10.1m	H	1.92	$52,123	259.01	1.61	$61,981	87.82	R	1.69	$59,237	145.54	1.55	$64,366	161.51
$10.2m	O	1.92	$52,149	260.93	0.59	$169,799	88.40	H	1.85	$54,157	147.39	1.55	$64,399	163.06
$10.3m	M	1.92	$52,170	262.84	-0.18	-$548,002	88.22	G	0.81	$123,806	148.20	1.55	$64,402	164.62
$10.4m	Q	1.91	$52,239	264.76	-0.10	-$1.02m	88.12	U	0.87	$115,013	149.06	1.55	$64,405	166.17
$10.5m	H	1.91	$52,255	266.67	1.61	$62,137	89.73	D	0.50	$200,152	149.56	1.55	$64,430	167.72
$10.6m	O	1.91	$52,326	268.58	0.59	$170,372	90.32	R	1.68	$59,367	151.25	1.55	$64,508	169.27
$10.7m	H	1.91	$52,386	270.49	1.61	$62,294	91.93	C	1.72	$58,155	152.97	1.55	$64,515	170.82
$10.8m	O	1.90	$52,499	272.40	0.59	$170,940	92.51	H	1.84	$54,279	154.81	1.55	$64,544	172.37
$10.9m	H	1.90	$52,517	274.30	1.60	$62,448	94.11	R	1.68	$59,498	156.49	1.55	$64,650	173.92
$11.0m	H	1.90	$52,646	276.20	1.60	$62,603	95.71	U	0.87	$115,455	157.36	1.55	$64,653	175.46
$11.1m	O	1.90	$52,673	278.10	0.58	$171,506	96.29	H	1.84	$54,400	159.20	1.55	$64,689	177.01
$11.2m	H	1.89	$52,775	279.99	1.59	$62,757	97.89	G	0.80	$124,380	160.00	1.55	$64,701	178.56
$11.3m	O	1.89	$52,843	281.89	0.58	$172,067	98.47	C	1.71	$58,357	161.71	1.54	$64,740	180.10
$11.4m	H	1.89	$52,904	283.78	1.59	$62,909	100.06	R	1.68	$59,627	163.39	1.54	$64,791	181.64
$11.5m	O	1.89	$53,017	285.66	0.58	$172,625	100.64	D	0.50	$201,377	163.89	1.54	$64,825	183.19
$11.6m	H	1.89	$53,032	287.55	1.59	$63,062	102.22	H	1.83	$54,521	165.72	1.54	$64,833	184.73
$11.7m	H	1.88	$53,159	289.43	1.58	$63,213	103.80	O	5.02	$19,920	170.74	1.54	$64,860	186.27
$11.8m	O	1.88	$53,189	291.31	0.58	$173,178	104.38	U	0.86	$115,896	171.60	1.54	$64,901	187.81
$11.9m	H	1.88	$53,286	293.19	1.58	$63,364	105.96	R	1.67	$59,758	173.28	1.54	$64,932	189.35
$12.0m	O	1.87	$53,356	295.06	0.58	$173,729	106.53	C	1.71	$58,558	174.99	1.54	$64,962	190.89
$12.1m	H	1.87	$53,412	296.93	1.57	$63,514	108.11	H	1.83	$54,642	176.82	1.54	$64,976	192.43
$12.2m	O	1.87	$53,525	298.80	0.57	$174,277	108.68	G	0.80	$124,950	177.62	1.54	$64,997	193.97
$12.3m	H	1.87	$53,538	300.67	1.57	$63,663	110.25	R	1.67	$59,887	179.29	1.54	$65,072	195.50
$12.4m	H	1.86	$53,663	302.53	1.57	$63,812	111.82	H	1.83	$54,762	181.11	1.54	$65,119	197.04
$12.5m	O	1.86	$53,688	304.39	0.57	$174,822	112.39	W	1.20	$83,569	182.31	1.54	$65,132	198.58
$12.6m	H	1.86	$53,787	306.25	1.56	$63,959	113.96	U	0.86	$116,337	183.17	1.53	$65,147	200.11
$12.7m	O	1.86	$53,859	308.11	0.57	$175,362	114.53	C	1.70	$58,758	184.87	1.53	$65,184	201.64
$12.8m	H	1.85	$53,911	309.97	1.56	$64,107	116.09	R	1.67	$60,016	186.54	1.53	$65,213	203.18
$12.9m	O	1.85	$54,022	311.82	0.57	$175,898	116.65	D	0.49	$202,593	187.03	1.53	$65,216	204.71
$13.0m	H	1.85	$54,034	313.67	1.56	$64,253	118.21	H	1.82	$54,881	188.85	1.53	$65,261	206.24
$13.1m	H	1.85	$54,157	315.51	1.55	$64,399	119.76	G	0.80	$125,515	189.65	1.53	$65,290	207.78
$13.2m	O	1.85	$54,186	317.36	0.57	$176,432	120.33	R	1.66	$60,145	191.31	1.53	$65,353	209.31
$13.3m	H	1.84	$54,279	319.20	1.55	$64,544	121.88	U	0.86	$116,775	192.17	1.53	$65,392	210.83
$13.4m	O	1.84	$54,348	321.04	0.57	$176,963	122.45	H	1.82	$55,000	193.99	1.53	$65,402	212.36
$13.5m	H	1.84	$54,400	322.88	1.55	$64,689	123.99	C	1.70	$58,956	195.68	1.53	$65,404	213.89
$13.6m	O	1.83	$54,511	324.71	0.56	$177,487	124.55	R	1.66	$60,274	197.34	1.53	$65,493	215.42
$13.7m	H	1.83	$54,521	326.55	1.54	$64,833	126.10	H	1.81	$55,119	199.16	1.53	$65,543	216.95
$13.8m	H	1.83	$54,642	328.38	1.54	$64,976	127.64	G	0.79	$126,072	199.95	1.52	$65,581	218.47
$13.9m	O	1.83	$54,672	330.21	0.56	$178,015	128.20	D	0.49	$203,803	200.44	1.52	$65,606	219.99
$14.0m	H	1.83	$54,762	332.03	1.54	$65,119	129.73	C	1.69	$59,153	202.13	1.52	$65,622	221.52
$14.1m	O	1.82	$54,834	333.86	0.56	$178,536	130.29	R	1.66	$60,402	203.78	1.52	$65,632	223.04
$14.2m	H	1.82	$54,881	335.68	1.53	$65,261	131.83	U	0.85	$117,211	204.64	1.52	$65,637	224.57
$14.3m	C	1.82	$54,935	337.50	1.64	$60,943	133.47	H	1.81	$55,236	206.45	1.52	$65,683	226.09
$14.4m	O	1.82	$54,990	339.32	0.56	$179,054	134.03	R	1.65	$60,530	208.10	1.52	$65,771	227.61
$14.5m	H	1.82	$55,000	341.14	1.53	$65,402	135.55	H	1.81	$55,354	209.91	1.52	$65,823	229.13
$14.6m	H	1.81	$55,119	342.95	1.53	$65,543	137.08	C	1.68	$59,349	211.59	1.52	$65,839	230.65
$14.7m	O	1.81	$55,148	344.76	0.56	$179,569	137.64	G	0.79	$126,629	212.38	1.52	$65,869	232.16
$14.8m	C	1.81	$55,162	346.58	1.63	$61,195	139.27	U	0.85	$117,646	213.23	1.52	$65,880	233.68
$14.9m	H	1.81	$55,236	348.39	1.52	$65,683	140.79	R	1.65	$60,658	214.88	1.52	$65,910	235.20
$15.0m	O	1.81	$55,307	350.20	0.56	$180,083	141.35	H	1.80	$55,471	216.68	1.52	$65,962	236.72

Budget impact	***Reallocation with good information***							***Reallocation with poor information***						
	Marginal Tech [a]	***Estimates with good information***			***Estimates with poor information***			**Marginal Tech** [a]	***Estimates with good information***			***Estimates with poor information***		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$15.1m	H	1.81	$55,354	352.00	1.52	$65,823	142.87	D	0.49	$205,005	217.17	1.52	$65,993	238.23
$15.2m	C	1.81	$55,387	353.81	1.63	$61,444	144.50	R	1.65	$60,785	218.82	1.51	$66,049	239.75
$15.3m	O	1.80	$55,463	355.61	0.55	$180,590	145.05	C	1.68	$59,543	220.50	1.51	$66,055	241.26
$15.4m	H	1.80	$55,471	357.41	1.52	$65,962	146.57	H	1.80	$55,587	222.29	1.51	$66,100	242.77
$15.5m	H	1.80	$55,587	359.21	1.51	$66,100	148.08	U	0.85	$118,079	223.14	1.51	$66,123	244.28
$15.6m	C	1.80	$55,609	361.01	1.62	$61,691	149.70	G	0.79	$127,176	223.93	1.51	$66,155	245.80
$15.7m	O	1.80	$55,620	362.81	0.55	$181,097	150.25	R	1.64	$60,913	225.57	1.51	$66,187	247.31
$15.8m	H	1.80	$55,703	364.60	1.51	$66,238	151.76	H	1.80	$55,703	227.36	1.51	$66,238	248.82
$15.9m	O	1.79	$55,772	366.40	0.55	$181,600	152.31	C	1.67	$59,736	229.04	1.51	$66,269	250.33
$16.0m	H	1.79	$55,819	368.19	1.51	$66,375	153.82	R	1.64	$61,040	230.68	1.51	$66,325	251.83
$16.1m	C	1.79	$55,831	369.98	1.61	$61,936	155.43	W	1.17	$85,132	231.85	1.51	$66,350	253.34
$16.2m	R	1.79	$55,872	371.77	1.65	$60,710	157.08	U	0.84	$118,511	232.70	1.51	$66,365	254.85
$16.3m	O	1.79	$55,928	373.56	0.55	$182,103	157.63	H	1.79	$55,819	234.49	1.51	$66,375	256.35
$16.4m	H	1.79	$55,934	375.34	1.50	$66,512	159.13	D	0.48	$206,201	234.97	1.51	$66,378	257.86
$16.5m	R	1.79	$56,010	377.13	1.64	$60,860	160.78	G	0.78	$127,720	235.75	1.51	$66,439	259.37
$16.6m	H	1.78	$56,048	378.91	1.50	$66,648	162.28	R	1.63	$61,167	237.39	1.50	$66,463	260.87
$16.7m	C	1.78	$56,050	380.70	1.61	$62,180	163.88	C	1.67	$59,928	239.06	1.50	$66,481	262.37
$16.8m	O	1.78	$56,079	382.48	0.55	$182,602	164.43	H	1.79	$55,934	240.85	1.50	$66,512	263.88
$16.9m	R	1.78	$56,149	384.26	1.64	$61,010	166.07	R	1.63	$61,293	242.48	1.50	$66,600	265.38
$17.0m	H	1.78	$56,162	386.04	1.50	$66,784	167.57	U	0.84	$118,941	243.32	1.50	$66,605	266.88
$17.1m	O	1.78	$56,233	387.82	0.55	$183,097	168.11	H	1.78	$56,048	245.10	1.50	$66,648	268.38
$17.2m	C	1.78	$56,268	389.60	1.60	$62,421	169.72	C	1.66	$60,118	246.77	1.50	$66,693	269.88
$17.3m	H	1.78	$56,276	391.38	1.49	$66,919	171.21	G	0.78	$128,261	247.55	1.50	$66,719	271.38
$17.4m	R	1.78	$56,286	393.15	1.64	$61,160	172.85	R	1.63	$61,420	249.17	1.50	$66,738	272.88
$17.5m	O	1.77	$56,382	394.93	0.54	$183,587	173.39	D	0.48	$207,389	249.66	1.50	$66,761	274.38
$17.6m	H	1.77	$56,389	396.70	1.49	$67,053	174.88	H	1.78	$56,162	251.44	1.50	$66,784	275.87
$17.7m	R	1.77	$56,424	398.47	1.63	$61,309	176.51	U	0.84	$119,370	252.27	1.50	$66,846	277.37
$17.8m	C	1.77	$56,483	400.24	1.60	$62,661	178.11	R	1.62	$61,545	253.90	1.50	$66,874	278.86
$17.9m	H	1.77	$56,501	402.01	1.49	$67,187	179.60	C	1.66	$60,307	255.56	1.49	$66,903	280.36
$18.0m	O	1.77	$56,536	403.78	0.54	$184,081	180.14	H	1.78	$56,276	257.33	1.49	$66,919	281.85
$18.1m	R	1.77	$56,561	405.55	1.63	$61,458	181.77	G	0.78	$128,798	258.11	1.49	$66,998	283.35
$18.2m	H	1.77	$56,614	407.32	1.49	$67,321	183.25	R	1.62	$61,671	259.73	1.49	$67,012	284.84
$18.3m	O	1.76	$56,686	409.08	0.54	$184,567	183.79	H	1.77	$56,389	261.51	1.49	$67,053	286.33
$18.4m	R	1.76	$56,698	410.84	1.62	$61,607	185.42	U	0.83	$119,796	262.34	1.49	$67,085	287.82
$18.5m	C	1.76	$56,698	412.61	1.59	$62,899	187.01	C	1.65	$60,496	263.99	1.49	$67,112	289.31
$18.6m	H	1.76	$56,725	414.37	1.48	$67,454	188.49	D	0.48	$208,571	264.47	1.49	$67,141	290.80
$18.7m	O	1.76	$56,831	416.13	0.54	$185,052	189.03	R	1.62	$61,797	266.09	1.49	$67,147	292.29
$18.8m	R	1.76	$56,834	417.89	1.62	$61,755	190.65	H	1.77	$56,501	267.86	1.49	$67,187	293.78
$18.9m	H	1.76	$56,837	419.65	1.48	$67,586	192.13	G	0.77	$129,328	268.63	1.49	$67,274	295.26
$19.0m	C	1.76	$56,911	421.41	1.58	$63,135	193.71	R	1.61	$61,922	270.25	1.49	$67,283	296.75
$19.1m	H	1.76	$56,948	423.16	1.48	$67,718	195.19	C	1.65	$60,683	271.90	1.49	$67,319	298.24
$19.2m	R	1.76	$56,970	424.92	1.62	$61,903	196.81	H	1.77	$56,614	273.66	1.49	$67,321	299.72
$19.3m	O	1.75	$56,983	426.67	0.54	$185,536	197.34	U	0.83	$120,223	274.50	1.49	$67,323	301.21
$19.4m	H	1.75	$57,058	428.42	1.47	$67,849	198.82	R	1.61	$62,047	276.11	1.48	$67,420	302.69
$19.5m	R	1.75	$57,106	430.18	1.61	$62,051	200.43	H	1.76	$56,725	277.87	1.48	$67,454	304.17
$19.6m	C	1.75	$57,122	431.93	1.58	$63,369	202.01	D	0.48	$209,746	278.35	1.48	$67,519	305.65
$19.7m	O	1.75	$57,127	433.68	0.54	$186,012	202.55	W	1.15	$86,639	279.50	1.48	$67,525	307.13
$19.8m	H	1.75	$57,168	435.43	1.47	$67,980	204.02	C	1.64	$60,868	281.14	1.48	$67,525	308.61
$19.9m	R	1.75	$57,242	437.17	1.61	$62,198	205.62	G	0.77	$129,855	281.91	1.48	$67,548	310.10
$20.0m	O	1.75	$57,277	438.92	0.54	$186,494	206.16	R	1.61	$62,172	283.52	1.48	$67,555	311.58
$20.1m	H	1.75	$57,278	440.66	1.47	$68,111	207.63	U	0.83	$120,648	284.35	1.48	$67,561	313.06

	Reallocation with good information							*Reallocation with poor information*						
	Marginal Tech [a]	***Estimates with good information***			***Estimates with poor information***			**Marginal Tech** [a]	***Estimates with good information***			***Estimates with poor information***		
Budget impact		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$20.2m	C	1.74	$57,332	442.41	1.57	$63,601	209.20	H	1.76	$56,837	286.11	1.48	$67,586	314.54
$20.3m	R	1.74	$57,377	444.15	1.60	$62,345	210.81	R	1.61	$62,296	287.72	1.48	$67,690	316.01
$20.4m	H	1.74	$57,387	445.89	1.47	$68,240	212.27	H	1.76	$56,948	289.47	1.48	$67,718	317.49
$20.5m	O	1.74	$57,422	447.64	0.53	$186,965	212.81	C	1.64	$61,053	291.11	1.48	$67,730	318.97
$20.6m	H	1.74	$57,496	449.37	1.46	$68,370	214.27	U	0.83	$121,068	291.94	1.47	$67,797	320.44
$20.7m	R	1.74	$57,512	451.11	1.60	$62,491	215.87	G	0.77	$130,378	292.70	1.47	$67,820	321.92
$20.8m	C	1.74	$57,540	452.85	1.57	$63,833	217.43	R	1.60	$62,420	294.30	1.47	$67,825	323.39
$20.9m	O	1.74	$57,567	454.59	0.53	$187,441	217.97	H	1.75	$57,058	296.06	1.47	$67,849	324.86
$21.0m	H	1.74	$57,604	456.32	1.46	$68,498	219.43	D	0.47	$210,914	296.53	1.47	$67,895	326.34
$21.1m	R	1.73	$57,646	458.06	1.60	$62,638	221.02	C	1.63	$61,237	298.16	1.47	$67,934	327.81
$21.2m	O	1.73	$57,710	459.79	0.53	$187,910	221.56	R	1.60	$62,545	299.76	1.47	$67,960	329.28
$21.3m	H	1.73	$57,711	461.52	1.46	$68,627	223.01	H	1.75	$57,168	301.51	1.47	$67,980	330.75
$21.4m	C	1.73	$57,746	463.26	1.56	$64,062	224.58	U	0.82	$121,490	302.34	1.47	$68,033	332.22
$21.5m	R	1.73	$57,780	464.99	1.59	$62,783	226.17	G	0.76	$130,895	303.10	1.47	$68,090	333.69
$21.6m	H	1.73	$57,820	466.72	1.45	$68,755	227.62	R	1.60	$62,668	304.70	1.47	$68,094	335.16
$21.7m	O	1.73	$57,854	468.45	0.53	$188,377	228.15	H	1.75	$57,278	306.44	1.47	$68,111	336.63
$21.8m	R	1.73	$57,914	470.17	1.59	$62,929	229.74	C	1.63	$61,419	308.07	1.47	$68,137	338.09
$21.9m	H	1.73	$57,927	471.90	1.45	$68,882	231.19	R	1.59	$62,791	309.66	1.47	$68,229	339.56
$22.0m	C	1.73	$57,951	473.62	1.56	$64,289	232.75	H	1.74	$57,387	311.40	1.47	$68,240	341.02
$22.1m	O	1.72	$57,998	475.35	0.53	$188,847	233.28	U	0.82	$121,911	312.22	1.46	$68,268	342.49
$22.2m	H	1.72	$58,035	477.07	1.45	$69,009	234.73	D	0.47	$212,076	312.70	1.46	$68,269	343.95
$22.3m	R	1.72	$58,048	478.79	1.59	$63,074	236.31	C	1.62	$61,601	314.32	1.46	$68,338	345.42
$22.4m	H	1.72	$58,140	480.51	1.45	$69,136	237.76	G	0.76	$131,409	315.08	1.46	$68,357	346.88
$22.5m	O	1.72	$58,140	482.23	0.53	$189,304	238.29	R	1.59	$62,915	316.67	1.46	$68,363	348.34
$22.6m	C	1.72	$58,155	483.95	1.55	$64,515	239.84	H	1.74	$57,496	318.41	1.46	$68,370	349.81
$22.7m	R	1.72	$58,181	485.67	1.58	$63,219	241.42	R	1.59	$63,038	320.00	1.46	$68,496	351.27
$22.8m	O	1.72	$58,282	487.39	0.53	$189,771	241.95	H	1.74	$57,604	321.73	1.46	$68,498	352.73
$22.9m	R	1.71	$58,314	489.10	1.58	$63,363	243.53	U	0.82	$122,327	322.55	1.46	$68,502	354.19
$23.0m	C	1.71	$58,357	490.82	1.54	$64,740	245.07	C	1.62	$61,781	324.17	1.46	$68,538	355.64
$23.1m	O	1.71	$58,425	492.53	0.53	$190,226	245.60	O	4.75	$21,064	328.91	1.46	$68,586	357.10
$23.2m	R	1.71	$58,447	494.24	1.57	$63,508	247.17	G	0.76	$131,921	329.67	1.46	$68,623	358.56
$23.3m	C	1.71	$58,558	495.95	1.54	$64,962	248.71	H	1.73	$57,711	331.41	1.46	$68,627	360.02
$23.4m	O	1.71	$58,562	497.65	0.52	$190,683	249.23	R	1.58	$63,160	332.99	1.46	$68,629	361.47
$23.5m	R	1.71	$58,579	499.36	1.57	$63,651	250.81	D	0.47	$213,231	333.46	1.46	$68,641	362.93
$23.6m	O	1.70	$58,703	501.06	0.52	$191,139	251.33	W	1.14	$88,096	334.59	1.46	$68,660	364.39
$23.7m	R	1.70	$58,711	502.77	1.57	$63,795	252.90	U	0.81	$122,746	335.41	1.45	$68,736	365.84
$23.8m	C	1.70	$58,758	504.47	1.53	$65,184	254.43	C	1.61	$61,961	337.02	1.45	$68,737	367.30
$23.9m	O	1.70	$58,841	506.17	0.52	$191,593	254.95	H	1.73	$57,820	338.75	1.45	$68,755	368.75
$24.0m	R	1.70	$58,843	507.87	1.56	$63,938	256.52	R	1.58	$63,283	340.33	1.45	$68,763	370.21
$24.1m	C	1.70	$58,956	509.57	1.53	$65,404	258.04	H	1.73	$57,927	342.06	1.45	$68,882	371.66
$24.2m	R	1.70	$58,974	511.26	1.56	$64,081	259.61	G	0.76	$132,428	342.81	1.45	$68,886	373.11
$24.3m	O	1.70	$58,983	512.96	0.52	$192,042	260.13	R	1.58	$63,406	344.39	1.45	$68,895	374.56
$24.4m	R	1.69	$59,106	514.65	1.56	$64,224	261.68	C	1.61	$62,138	346.00	1.45	$68,935	376.01
$24.5m	O	1.69	$59,116	516.34	0.52	$192,489	262.20	U	0.81	$123,160	346.81	1.45	$68,968	377.46
$24.6m	C	1.69	$59,153	518.03	1.52	$65,622	263.73	H	1.72	$58,035	348.53	1.45	$69,009	378.91
$24.7m	R	1.69	$59,237	519.72	1.55	$64,366	265.28	D	0.47	$214,381	349.00	1.45	$69,011	380.36
$24.8m	O	1.69	$59,256	521.41	0.52	$192,938	265.80	R	1.57	$63,528	350.57	1.45	$69,028	381.81
$24.9m	C	1.68	$59,349	523.09	1.52	$65,839	267.32	C	1.60	$62,316	352.18	1.45	$69,131	383.25
$25.0m	R	1.68	$59,367	524.78	1.55	$64,508	268.87	H	1.72	$58,140	353.90	1.45	$69,136	384.70
$25.1m	O	1.68	$59,389	526.46	0.52	$193,386	269.38	G	0.75	$132,929	354.65	1.45	$69,148	386.15
$25.2m	R	1.68	$59,498	528.14	1.55	$64,650	270.93	R	1.57	$63,650	356.22	1.45	$69,161	387.59

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]		$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]	$E(\Delta E_m)$ [b]	$E(ICER_m)$ [c]	$E(\Delta E)$ [d]
$25.3m	O	1.68	$59,527	529.82	0.52	$193,798	271.45	U	0.81	$123,574	357.03	1.45	$69,200	389.04
$25.4m	C	1.68	$59,543	531.50	1.51	$66,055	272.96	R	1.57	$63,771	358.60	1.44	$69,292	390.48
$25.5m	R	1.68	$59,627	533.18	1.54	$64,791	274.50	C	1.60	$62,493	360.20	1.44	$69,326	391.92
$25.6m	O	1.68	$59,662	534.85	0.51	$194,288	275.02	D	0.46	$215,527	360.66	1.44	$69,379	393.37
$25.7m	C	1.67	$59,736	536.53	1.51	$66,269	276.53	G	0.75	$133,428	361.41	1.44	$69,407	394.81
$25.8m	R	1.67	$59,758	538.20	1.54	$64,932	278.07	R	1.57	$63,890	362.98	1.44	$69,425	396.25
$25.9m	O	1.67	$59,794	539.87	0.51	$194,704	278.58	U	0.81	$123,986	363.79	1.44	$69,431	397.69
$26.0m	R	1.67	$59,887	541.54	1.54	$65,072	280.12	C	1.60	$62,668	365.38	1.44	$69,521	399.13
$26.1m	C	1.67	$59,928	543.21	1.50	$66,481	281.62	R	1.56	$64,012	366.94	1.44	$69,556	400.56
$26.2m	O	1.67	$59,930	544.88	0.51	$195,122	282.14	U	0.80	$124,398	367.75	1.44	$69,662	402.00
$26.3m	R	1.67	$60,016	546.55	1.53	$65,213	283.67	G	0.75	$133,924	368.49	1.44	$69,665	403.43
$26.4m	O	1.66	$60,064	548.21	0.51	$195,580	284.18	R	1.56	$64,135	370.05	1.43	$69,687	404.87
$26.5m	C	1.66	$60,118	549.87	1.50	$66,693	285.68	C	1.59	$62,842	371.64	1.43	$69,715	406.30
$26.6m	R	1.66	$60,145	551.54	1.53	$65,353	287.21	D	0.46	$216,661	372.11	1.43	$69,746	407.74
$26.7m	O	1.66	$60,197	553.20	0.51	$196,002	287.72	W	1.12	$89,506	373.22	1.43	$69,759	409.17
$26.8m	R	1.66	$60,274	554.86	1.53	$65,493	289.25	R	1.56	$64,255	374.78	1.43	$69,819	410.60
$26.9m	C	1.66	$60,307	556.52	1.49	$66,903	290.74	U	0.80	$124,810	375.58	1.43	$69,891	412.03
$27.0m	O	1.66	$60,328	558.17	0.51	$196,425	291.25	C	1.59	$63,016	377.17	1.43	$69,907	413.46
$27.1m	R	1.66	$60,402	559.83	1.52	$65,632	292.77	G	0.74	$134,414	377.91	1.43	$69,920	414.89
$27.2m	O	1.65	$60,459	561.48	0.51	$196,850	293.28	R	1.55	$64,375	379.47	1.43	$69,950	416.32
$27.3m	C	1.65	$60,496	563.14	1.49	$67,112	294.77	R	1.55	$64,495	381.02	1.43	$70,077	417.75
$27.4m	R	1.65	$60,530	564.79	1.52	$65,771	296.29	C	1.58	$63,188	382.60	1.43	$70,098	419.18
$27.5m	O	1.65	$60,591	566.44	0.51	$197,278	296.80	D	0.46	$217,794	383.06	1.43	$70,110	420.60
$27.6m	R	1.65	$60,658	568.09	1.52	$65,910	298.32	U	0.80	$125,216	383.86	1.43	$70,120	422.03
$27.7m	C	1.65	$60,683	569.73	1.49	$67,319	299.80	G	0.74	$134,904	384.60	1.43	$70,174	423.46
$27.8m	O	1.65	$60,724	571.38	0.51	$197,746	300.31	R	1.55	$64,616	386.15	1.42	$70,210	424.88
$27.9m	R	1.65	$60,785	573.03	1.51	$66,049	301.82	C	1.58	$63,359	387.72	1.42	$70,288	426.30
$28.0m	O	1.64	$60,849	574.67	0.50	$198,138	302.33	R	1.54	$64,733	389.27	1.42	$70,343	427.72
$28.1m	C	1.64	$60,868	576.31	1.48	$67,525	303.81	U	0.80	$125,623	390.06	1.42	$70,348	429.15
$28.2m	R	1.64	$60,913	577.95	1.51	$66,187	305.32	G	0.74	$135,388	390.80	1.42	$70,426	430.57
$28.3m	O	1.64	$60,979	579.59	0.50	$198,531	305.82	R	1.54	$64,855	392.34	1.42	$70,472	431.98
$28.4m	R	1.64	$61,040	581.23	1.51	$66,325	307.33	D	0.46	$218,924	392.80	1.42	$70,472	433.40
$28.5m	C	1.64	$61,053	582.87	1.48	$67,730	308.81	C	1.57	$63,530	394.38	1.42	$70,478	434.82
$28.6m	O	1.64	$61,110	584.51	0.50	$198,965	309.31	U	0.79	$126,030	395.17	1.42	$70,575	436.24
$28.7m	R	1.63	$61,167	586.14	1.50	$66,463	310.81	R	1.54	$64,977	396.71	1.42	$70,597	437.66
$28.8m	C	1.63	$61,237	587.77	1.47	$67,934	312.29	C	1.57	$63,700	398.28	1.42	$70,666	439.07
$28.9m	O	1.63	$61,241	589.41	0.50	$199,402	312.79	G	0.74	$135,868	399.01	1.41	$70,676	440.49
$29.0m	R	1.63	$61,293	591.04	1.50	$66,600	314.29	R	1.54	$65,091	400.55	1.41	$70,731	441.90
$29.1m	O	1.63	$61,365	592.67	0.50	$199,800	314.79	U	0.79	$126,435	401.34	1.41	$70,802	443.31
$29.2m	C	1.63	$61,419	594.30	1.47	$68,137	316.26	W	1.10	$90,873	402.44	1.41	$70,825	444.72
$29.3m	R	1.63	$61,420	595.92	1.50	$66,738	317.76	D	0.45	$220,037	402.90	1.41	$70,833	446.14
$29.4m	O	1.63	$61,493	597.55	0.50	$200,240	318.25	C	1.57	$63,868	404.46	1.41	$70,853	447.55
$29.5m	R	1.62	$61,545	599.18	1.50	$66,874	319.75	R	1.53	$65,210	406.00	1.41	$70,857	448.96
$29.6m	C	1.62	$61,601	600.80	1.46	$68,338	321.21	G	0.73	$136,346	406.73	1.41	$70,925	450.37
$29.7m	O	1.62	$61,618	602.42	0.50	$200,642	321.71	R	1.53	$65,334	408.26	1.41	$70,987	451.78
$29.8m	R	1.62	$61,671	604.04	1.49	$67,012	323.20	U	0.79	$126,838	409.05	1.41	$71,027	453.18
$29.9m	O	1.62	$61,744	605.66	0.50	$201,045	323.70	C	1.56	$64,036	410.61	1.41	$71,039	454.59
$30.0m	C	1.62	$61,781	607.28	1.46	$68,538	325.16	R	1.53	$65,449	412.14	1.41	$71,119	456.00
$30.1m	R	1.62	$61,797	608.90	1.49	$67,147	326.65	G	0.73	$136,819	412.87	1.41	$71,172	457.40
$30.2m	O	1.62	$61,874	610.52	0.50	$201,450	327.15	D	0.45	$221,156	413.32	1.40	$71,191	458.81
$30.3m	R	1.61	$61,922	612.13	1.49	$67,283	328.63	C	1.56	$64,203	414.88	1.40	$71,225	460.21

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$30.4m	C	1.61	$61,961	613.75	1.45	$68,737	330.09	R	1.53	$65,565	416.40	1.40	$71,245	461.62
$30.5m	O	1.61	$61,996	615.36	0.50	$201,857	330.58	U	0.79	$127,239	417.19	1.40	$71,253	463.02
$30.6m	R	1.61	$62,047	616.97	1.48	$67,420	332.07	R	1.52	$65,686	418.71	1.40	$71,372	464.42
$30.7m	O	1.61	$62,120	618.58	0.49	$202,265	332.56	C	1.55	$64,369	420.26	1.40	$71,409	465.82
$30.8m	C	1.61	$62,138	620.19	1.45	$68,935	334.01	G	0.73	$137,291	420.99	1.40	$71,416	467.22
$30.9m	R	1.61	$62,172	621.80	1.48	$67,555	335.49	U	0.78	$127,641	421.78	1.40	$71,477	468.62
$31.0m	O	1.61	$62,247	623.40	0.49	$202,675	335.98	R	1.52	$65,802	423.30	1.40	$71,500	470.02
$31.1m	R	1.61	$62,296	625.01	1.48	$67,690	337.46	D	0.45	$222,262	423.75	1.40	$71,548	471.42
$31.2m	C	1.60	$62,316	626.61	1.45	$69,131	338.91	C	1.55	$64,534	425.30	1.40	$71,592	472.81
$31.3m	O	1.60	$62,367	628.22	0.49	$203,087	339.40	R	1.52	$65,924	426.81	1.40	$71,628	474.21
$31.4m	R	1.60	$62,420	629.82	1.47	$67,825	340.88	G	0.73	$137,760	427.54	1.40	$71,659	475.60
$31.5m	O	1.60	$62,492	631.42	0.49	$203,459	341.37	U	0.78	$128,039	428.32	1.39	$71,701	477.00
$31.6m	C	1.60	$62,493	633.02	1.44	$69,326	342.81	R	1.51	$66,037	429.83	1.39	$71,757	478.39
$31.7m	R	1.60	$62,545	634.62	1.47	$67,960	344.28	C	1.55	$64,699	431.38	1.39	$71,775	479.79
$31.8m	O	1.60	$62,613	636.22	0.49	$203,874	344.77	W	1.08	$92,201	432.46	1.39	$71,859	481.18
$31.9m	C	1.60	$62,668	637.81	1.44	$69,521	346.21	R	1.51	$66,155	433.98	1.39	$71,886	482.57
$32.0m	R	1.60	$62,668	639.41	1.47	$68,094	347.68	G	0.72	$138,223	434.70	1.39	$71,902	483.96
$32.1m	O	1.59	$62,735	641.00	0.49	$204,290	348.17	D	0.45	$223,364	435.15	1.39	$71,903	485.35
$32.2m	R	1.59	$62,791	642.59	1.47	$68,229	349.63	U	0.78	$128,439	435.93	1.39	$71,924	486.74
$32.3m	C	1.59	$62,842	644.18	1.43	$69,715	351.07	O	4.53	$22,096	440.45	1.39	$71,945	488.13
$32.4m	O	1.59	$62,858	645.78	0.49	$204,666	351.56	C	1.54	$64,862	441.99	1.39	$71,956	489.52
$32.5m	R	1.59	$62,915	647.37	1.46	$68,363	353.02	R	1.51	$66,273	443.50	1.39	$72,010	490.91
$32.6m	O	1.59	$62,980	648.95	0.49	$205,044	353.51	C	1.54	$65,025	445.04	1.39	$72,137	492.30
$32.7m	C	1.59	$63,016	650.54	1.43	$69,907	354.94	R	1.51	$66,388	446.55	1.39	$72,140	493.68
$32.8m	R	1.59	$63,038	652.13	1.46	$68,496	356.40	G	0.72	$138,685	447.27	1.39	$72,142	495.07
$32.9m	O	1.58	$63,099	653.71	0.49	$205,465	356.88	U	0.78	$128,836	448.04	1.39	$72,146	496.45
$33.0m	R	1.58	$63,160	655.29	1.46	$68,629	358.34	D	0.45	$224,462	448.49	1.38	$72,256	497.84
$33.1m	C	1.58	$63,188	656.88	1.43	$70,098	359.77	R	1.50	$66,507	449.99	1.38	$72,265	499.22
$33.2m	O	1.58	$63,223	658.46	0.49	$205,846	360.25	C	1.53	$65,187	451.53	1.38	$72,316	500.60
$33.3m	R	1.58	$63,283	660.04	1.45	$68,763	361.71	U	0.77	$129,231	452.30	1.38	$72,368	501.99
$33.4m	O	1.58	$63,339	661.62	0.48	$206,271	362.19	G	0.72	$139,144	453.02	1.38	$72,380	503.37
$33.5m	C	1.58	$63,359	663.20	1.42	$70,288	363.62	R	1.50	$66,622	454.52	1.38	$72,390	504.75
$33.6m	R	1.58	$63,406	664.77	1.45	$68,895	365.07	C	1.53	$65,348	456.05	1.38	$72,495	506.13
$33.7m	O	1.58	$63,460	666.35	0.48	$206,612	365.55	R	1.50	$66,738	457.55	1.38	$72,516	507.51
$33.8m	R	1.57	$63,528	667.92	1.45	$69,028	367.00	U	0.77	$129,626	458.32	1.38	$72,589	508.89
$33.9m	C	1.57	$63,530	669.50	1.42	$70,478	368.42	D	0.44	$225,555	458.76	1.38	$72,608	510.26
$34.0m	O	1.57	$63,581	671.07	0.48	$206,996	368.90	G	0.72	$139,599	459.48	1.38	$72,617	511.64
$34.1m	R	1.57	$63,650	672.64	1.45	$69,161	370.35	R	1.50	$66,854	460.98	1.38	$72,643	513.02
$34.2m	O	1.57	$63,694	674.21	0.48	$207,426	370.83	C	1.53	$65,509	462.50	1.38	$72,673	514.39
$34.3m	C	1.57	$63,700	675.78	1.42	$70,666	372.24	R	1.49	$66,970	464.00	1.37	$72,770	515.77
$34.4m	R	1.57	$63,771	677.35	1.44	$69,292	373.69	U	0.77	$130,019	464.76	1.37	$72,809	517.14
$34.5m	O	1.57	$63,816	678.92	0.48	$207,771	374.17	G	0.71	$140,052	465.48	1.37	$72,852	518.51
$34.6m	C	1.57	$63,868	680.48	1.41	$70,853	375.58	W	1.07	$93,490	466.55	1.37	$72,864	519.88
$34.7m	R	1.57	$63,890	682.05	1.44	$69,425	377.02	R	1.49	$67,087	468.04	1.37	$72,892	521.26
$34.8m	O	1.56	$63,935	683.61	0.48	$208,160	377.50	D	0.44	$226,644	468.48	1.37	$72,958	522.63
$34.9m	R	1.56	$64,012	685.17	1.44	$69,556	378.94	R	1.49	$67,200	469.97	1.37	$73,019	524.00
$35.0m	C	1.56	$64,036	686.73	1.41	$71,039	380.35	U	0.77	$130,410	470.73	1.37	$73,029	525.37
$35.1m	O	1.56	$64,049	688.30	0.48	$208,551	380.83	G	0.71	$140,501	471.45	1.37	$73,087	526.73
$35.2m	R	1.56	$64,135	689.86	1.43	$69,687	382.26	R	1.49	$67,317	472.93	1.37	$73,148	528.10
$35.3m	O	1.56	$64,168	691.41	0.48	$208,943	382.74	U	0.76	$130,803	473.70	1.37	$73,248	529.47
$35.4m	C	1.56	$64,203	692.97	1.40	$71,225	384.14	R	1.48	$67,431	475.18	1.36	$73,271	530.83

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	Estimates with good information			Estimates with poor information			Marginal Tech [a]	Estimates with good information			Estimates with poor information		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$35.5m	R	1.56	$64,255	694.53	1.43	$69,819	385.58	D	0.44	$227,723	475.62	1.36	$73,306	532.20
$35.6m	O	1.56	$64,280	696.08	0.48	$209,336	386.05	G	0.71	$140,948	476.33	1.36	$73,319	533.56
$35.7m	C	1.55	$64,369	697.64	1.40	$71,409	387.45	R	1.48	$67,545	477.81	1.36	$73,394	534.92
$35.8m	R	1.55	$64,375	699.19	1.43	$69,950	388.88	U	0.76	$131,192	478.57	1.36	$73,466	536.28
$35.9m	O	1.55	$64,400	700.74	0.48	$209,688	389.36	R	1.48	$67,659	480.05	1.36	$73,519	537.64
$36.0m	R	1.55	$64,495	702.29	1.43	$70,077	390.79	G	0.71	$141,391	480.76	1.36	$73,549	539.00
$36.1m	O	1.55	$64,516	703.84	0.48	$210,040	391.26	R	1.48	$67,778	482.23	1.36	$73,643	540.36
$36.2m	C	1.55	$64,534	705.39	1.40	$71,592	392.66	D	0.44	$228,802	482.67	1.36	$73,653	541.72
$36.3m	R	1.55	$64,616	706.94	1.42	$70,210	394.08	U	0.76	$131,581	483.43	1.36	$73,684	543.08
$36.4m	O	1.55	$64,629	708.49	0.48	$210,438	394.56	R	1.47	$67,889	484.90	1.36	$73,768	544.43
$36.5m	C	1.55	$64,699	710.03	1.39	$71,775	395.95	G	0.71	$141,834	485.61	1.36	$73,779	545.79
$36.6m	R	1.54	$64,733	711.58	1.42	$70,343	397.37	W	1.06	$94,746	486.66	1.35	$73,843	547.14
$36.7m	O	1.54	$64,746	713.12	0.47	$210,837	397.85	R	1.47	$68,004	488.13	1.35	$73,893	548.49
$36.8m	R	1.54	$64,855	714.66	1.42	$70,472	399.27	U	0.76	$131,970	488.89	1.35	$73,901	549.85
$36.9m	O	1.54	$64,859	716.21	0.47	$211,149	399.74	D	0.44	$229,869	489.33	1.35	$73,998	551.20
$37.0m	C	1.54	$64,862	717.75	1.39	$71,956	401.13	G	0.70	$142,270	490.03	1.35	$74,007	552.55
$37.1m	O	1.54	$64,973	719.29	0.47	$211,551	401.60	R	1.47	$68,115	491.50	1.35	$74,014	553.90
$37.2m	R	1.54	$64,977	720.83	1.42	$70,597	403.02	U	0.76	$132,354	492.25	1.35	$74,117	555.25
$37.3m	C	1.54	$65,025	722.36	1.39	$72,137	404.41	R	1.47	$68,231	493.72	1.35	$74,140	556.60
$37.4m	O	1.54	$65,083	723.90	0.47	$211,954	404.88	G	0.70	$142,708	494.42	1.35	$74,234	557.95
$37.5m	R	1.54	$65,091	725.44	1.41	$70,731	406.29	R	1.46	$68,343	495.88	1.35	$74,261	559.29
$37.6m	C	1.53	$65,187	726.97	1.38	$72,316	407.68	U	0.75	$132,740	496.63	1.35	$74,333	560.64
$37.7m	O	1.53	$65,202	728.50	0.47	$212,269	408.15	D	0.43	$230,942	497.07	1.35	$74,341	561.98
$37.8m	R	1.53	$65,210	730.04	1.41	$70,857	409.56	R	1.46	$68,456	498.53	1.34	$74,383	563.33
$37.9m	O	1.53	$65,313	731.57	0.47	$212,675	410.03	G	0.70	$143,139	499.23	1.34	$74,459	564.67
$38.0m	R	1.53	$65,334	733.10	1.41	$70,987	411.44	R	1.46	$68,573	500.69	1.34	$74,510	566.01
$38.1m	C	1.53	$65,348	734.63	1.38	$72,495	412.82	U	0.75	$133,126	501.44	1.34	$74,548	567.35
$38.2m	O	1.53	$65,424	736.16	0.47	$213,038	413.29	R	1.46	$68,681	502.89	1.34	$74,627	568.69
$38.3m	R	1.53	$65,449	737.69	1.41	$71,119	414.69	D	0.43	$232,002	503.32	1.34	$74,683	570.03
$38.4m	C	1.53	$65,509	739.21	1.38	$72,673	416.07	G	0.70	$143,571	504.02	1.34	$74,683	571.37
$38.5m	O	1.53	$65,535	740.74	0.47	$213,356	416.54	R	1.45	$68,795	505.47	1.34	$74,755	572.71
$38.6m	R	1.53	$65,565	742.26	1.40	$71,245	417.94	U	0.75	$133,508	506.22	1.34	$74,763	574.05
$38.7m	O	1.52	$65,647	743.79	0.47	$213,767	418.41	W	1.04	$95,968	507.26	1.34	$74,795	575.38
$38.8m	R	1.52	$65,686	745.31	1.40	$71,372	419.81	R	1.45	$68,908	508.72	1.34	$74,873	576.72
$38.9m	O	1.52	$65,759	746.83	0.47	$214,133	420.28	G	0.69	$143,999	509.41	1.34	$74,906	578.06
$39.0m	R	1.52	$65,802	748.35	1.40	$71,500	421.67	U	0.75	$133,889	510.16	1.33	$74,976	579.39
$39.1m	O	1.52	$65,872	749.87	0.47	$214,454	422.14	R	1.45	$69,023	511.61	1.33	$74,996	580.72
$39.2m	R	1.52	$65,924	751.39	1.40	$71,628	423.54	O	4.34	$23,039	515.95	1.33	$75,016	582.06
$39.3m	O	1.52	$65,980	752.90	0.47	$214,823	424.00	D	0.43	$233,057	516.38	1.33	$75,023	583.39
$39.4m	R	1.51	$66,037	754.42	1.39	$71,757	425.40	R	1.45	$69,132	517.82	1.33	$75,120	584.72
$39.5m	O	1.51	$66,089	755.93	0.46	$215,193	425.86	G	0.69	$144,423	518.51	1.33	$75,127	586.05
$39.6m	R	1.51	$66,155	757.44	1.39	$71,886	427.25	U	0.74	$134,271	519.26	1.33	$75,190	587.38
$39.7m	O	1.51	$66,199	758.95	0.46	$215,564	427.72	R	1.44	$69,242	520.70	1.33	$75,239	588.71
$39.8m	R	1.51	$66,273	760.46	1.39	$72,010	429.10	G	0.69	$144,848	521.39	1.33	$75,347	590.04
$39.9m	O	1.51	$66,309	761.97	0.46	$215,889	429.57	D	0.43	$234,110	521.82	1.33	$75,362	591.36
$40.0m	R	1.51	$66,388	763.47	1.39	$72,140	430.95	R	1.44	$69,358	523.26	1.33	$75,364	592.69
$40.1m	O	1.51	$66,419	764.98	0.46	$216,263	431.42	U	0.74	$134,649	524.01	1.33	$75,402	594.02
$40.2m	R	1.50	$66,507	766.48	1.38	$72,265	432.80	R	1.44	$69,469	525.45	1.32	$75,483	595.34
$40.3m	O	1.50	$66,529	767.99	0.46	$216,638	433.26	G	0.69	$145,266	526.13	1.32	$75,566	596.67
$40.4m	R	1.50	$66,622	769.49	1.38	$72,390	434.64	R	1.44	$69,580	527.57	1.32	$75,603	597.99
$40.5m	O	1.50	$66,636	770.99	0.46	$216,967	435.10	U	0.74	$135,029	528.31	1.32	$75,615	599.31

	Reallocation with good information							*Reallocation with poor information*						
	Marginal	*Estimates with good information*			*Estimates with poor information*			**Marginal**	*Estimates with good information*			*Estimates with poor information*		
Budget impact	**Tech [a]**	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	**Tech [a]**	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$40.6m	R	1.50	$66,738	772.49	1.38	$72,516	436.48	D	0.43	$235,156	528.74	1.32	$75,699	600.63
$40.7m	O	1.50	$66,742	773.98	0.46	$217,297	436.94	W	1.03	$97,161	529.77	1.32	$75,725	601.95
$40.8m	O	1.50	$66,849	775.48	0.46	$217,675	437.40	R	1.43	$69,691	531.20	1.32	$75,729	603.27
$40.9m	R	1.50	$66,854	776.98	1.38	$72,643	438.78	G	0.69	$145,686	531.89	1.32	$75,783	604.59
$41.0m	O	1.49	$66,957	778.47	0.46	$218,007	439.24	U	0.74	$135,408	532.63	1.32	$75,826	605.91
$41.1m	R	1.49	$66,970	779.96	1.37	$72,770	440.61	R	1.43	$69,803	534.06	1.32	$75,844	607.23
$41.2m	O	1.49	$67,065	781.45	0.46	$218,388	441.07	R	1.43	$69,911	535.49	1.32	$75,965	608.55
$41.3m	R	1.49	$67,087	782.94	1.37	$72,892	442.44	G	0.68	$146,103	536.17	1.32	$75,999	609.86
$41.4m	O	1.49	$67,173	784.43	0.46	$218,723	442.90	D	0.42	$236,200	536.60	1.32	$76,035	611.18
$41.5m	R	1.49	$67,200	785.92	1.37	$73,019	444.27	U	0.74	$135,783	537.33	1.32	$76,037	612.49
$41.6m	O	1.49	$67,277	787.41	0.46	$219,058	444.72	R	1.43	$70,023	538.76	1.31	$76,092	613.81
$41.7m	R	1.49	$67,317	788.89	1.37	$73,148	446.09	R	1.43	$70,136	540.19	1.31	$76,202	615.12
$41.8m	O	1.48	$67,385	790.38	0.46	$219,394	446.55	G	0.68	$146,514	540.87	1.31	$76,214	616.43
$41.9m	R	1.48	$67,431	791.86	1.36	$73,271	447.91	U	0.73	$136,158	541.60	1.31	$76,247	617.74
$42.0m	O	1.48	$67,485	793.34	0.46	$219,732	448.37	R	1.42	$70,244	543.03	1.31	$76,330	619.05
$42.1m	R	1.48	$67,545	794.82	1.36	$73,394	449.73	D	0.42	$237,242	543.45	1.31	$76,369	620.36
$42.2m	O	1.48	$67,595	796.30	0.45	$220,119	450.18	G	0.68	$146,925	544.13	1.31	$76,428	621.67
$42.3m	R	1.48	$67,659	797.78	1.36	$73,519	451.54	R	1.42	$70,353	545.55	1.31	$76,447	622.98
$42.4m	O	1.48	$67,700	799.26	0.45	$220,410	452.00	U	0.73	$136,534	546.28	1.31	$76,457	624.29
$42.5m	R	1.48	$67,778	800.73	1.36	$73,643	453.36	R	1.42	$70,467	547.70	1.31	$76,564	625.59
$42.6m	O	1.47	$67,801	802.21	0.45	$220,799	453.81	W	1.02	$98,325	548.72	1.30	$76,632	626.90
$42.7m	R	1.47	$67,889	803.68	1.36	$73,768	455.16	G	0.68	$147,334	549.40	1.30	$76,641	628.20
$42.8m	O	1.47	$67,907	805.15	0.45	$221,092	455.62	U	0.73	$136,908	550.13	1.30	$76,669	629.51
$42.9m	R	1.47	$68,004	806.62	1.35	$73,893	456.97	R	1.42	$70,572	551.55	1.30	$76,687	630.81
$43.0m	O	1.47	$68,013	808.09	0.45	$221,435	457.42	D	0.42	$238,271	551.97	1.30	$76,702	632.11
$43.1m	O	1.47	$68,115	809.56	0.45	$221,779	457.87	R	1.41	$70,686	553.38	1.30	$76,805	633.42
$43.2m	R	1.47	$68,115	811.03	1.35	$74,014	459.22	G	0.68	$147,741	554.06	1.30	$76,852	634.72
$43.3m	O	1.47	$68,217	812.50	0.45	$222,124	459.67	U	0.73	$137,280	554.79	1.30	$76,870	636.02
$43.4m	R	1.47	$68,231	813.96	1.35	$74,140	461.02	R	1.41	$70,791	556.20	1.30	$76,923	637.32
$43.5m	O	1.46	$68,325	815.43	0.45	$222,469	461.47	D	0.42	$239,303	556.62	1.30	$77,033	638.62
$43.6m	R	1.46	$68,343	816.89	1.35	$74,261	462.82	R	1.41	$70,902	558.03	1.30	$77,042	639.91
$43.7m	O	1.46	$68,423	818.35	0.45	$222,816	463.27	G	0.68	$148,144	558.70	1.30	$77,062	641.21
$43.8m	R	1.46	$68,456	819.81	1.34	$74,383	464.61	U	0.73	$137,652	559.43	1.30	$77,083	642.51
$43.9m	O	1.46	$68,526	821.27	0.45	$223,115	465.06	R	1.41	$71,013	560.84	1.30	$77,160	643.81
$44.0m	R	1.46	$68,573	822.73	1.34	$74,510	466.40	G	0.67	$148,546	561.51	1.29	$77,271	645.10
$44.1m	O	1.46	$68,629	824.19	0.45	$223,464	466.85	R	1.41	$71,124	562.92	1.29	$77,280	646.39
$44.2m	R	1.46	$68,681	825.64	1.34	$74,627	468.19	U	0.72	$138,022	563.64	1.29	$77,292	647.69
$44.3m	O	1.45	$68,729	827.10	0.45	$223,764	468.64	D	0.42	$240,321	564.06	1.29	$77,363	648.98
$44.4m	R	1.45	$68,795	828.55	1.34	$74,755	469.97	R	1.40	$71,230	565.46	1.29	$77,399	650.27
$44.5m	O	1.45	$68,833	830.00	0.45	$224,115	470.42	G	0.67	$148,947	566.13	1.29	$77,480	651.56
$44.6m	R	1.45	$68,908	831.45	1.34	$74,873	471.76	U	0.72	$138,391	566.85	1.29	$77,501	652.85
$44.7m	O	1.45	$68,932	832.90	0.45	$224,467	472.20	R	1.40	$71,337	568.26	1.29	$77,513	654.14
$44.8m	R	1.45	$69,023	834.35	1.33	$74,996	473.54	W	1.01	$99,462	569.26	1.29	$77,518	655.43
$44.9m	O	1.45	$69,032	835.80	0.44	$224,770	473.98	R	1.40	$71,449	570.66	1.29	$77,634	656.72
$45.0m	R	1.45	$69,132	837.25	1.33	$75,120	475.31	G	0.67	$149,345	571.33	1.29	$77,686	658.01
$45.1m	O	1.45	$69,137	838.69	0.44	$225,124	475.76	D	0.41	$241,348	571.74	1.29	$77,692	659.30
$45.2m	O	1.44	$69,233	840.14	0.44	$225,428	476.20	U	0.72	$138,760	572.47	1.29	$77,700	660.58
$45.3m	R	1.44	$69,242	841.58	1.33	$75,239	477.53	R	1.40	$71,551	573.86	1.29	$77,748	661.87
$45.4m	O	1.44	$69,334	843.03	0.44	$225,734	477.97	O	4.18	$23,910	578.04	1.28	$77,853	663.15
$45.5m	R	1.44	$69,358	844.47	1.33	$75,364	479.30	R	1.40	$71,664	579.44	1.28	$77,869	664.44
$45.6m	O	1.44	$69,435	845.91	0.44	$226,091	479.74	G	0.67	$149,741	580.11	1.28	$77,892	665.72

Budget impact	Reallocation with good information							Reallocation with poor information						
	Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*			Marginal Tech [a]	*Estimates with good information*			*Estimates with poor information*		
		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]		$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]	$E(\Delta E_m)$[b]	$E(ICER_m)$[c]	$E(\Delta E)$[d]
$45.7m	R	1.44	$69,469	847.35	1.32	$75,483	481.07	U	0.72	$139,127	580.83	1.28	$77,912	667.00
$45.8m	O	1.44	$69,536	848.79	0.44	$226,398	481.51	R	1.39	$71,772	582.22	1.28	$77,985	668.29
$45.9m	R	1.44	$69,580	850.22	1.32	$75,603	482.83	D	0.41	$242,365	582.63	1.28	$78,018	669.57
$46.0m	O	1.44	$69,633	851.66	0.44	$226,757	483.27	G	0.67	$150,132	583.30	1.28	$78,097	670.85
$46.1m	R	1.43	$69,691	853.09	1.32	$75,729	484.59	R	1.39	$71,880	584.69	1.28	$78,107	672.13
$46.2m	O	1.43	$69,730	854.53	0.44	$227,015	485.03	U	0.72	$139,495	585.41	1.28	$78,113	673.41
$46.3m	R	1.43	$69,803	855.96	1.32	$75,844	486.35	R	1.39	$71,989	586.80	1.28	$78,223	674.69
$46.4m	O	1.43	$69,832	857.39	0.44	$227,376	486.79	G	0.66	$150,525	587.46	1.28	$78,301	675.96
$46.5m	R	1.43	$69,911	858.82	1.32	$75,965	488.11	U	0.72	$139,860	588.18	1.28	$78,321	677.24
$46.6m	O	1.43	$69,925	860.25	0.44	$227,687	488.55	R	1.39	$72,093	589.56	1.28	$78,333	678.52
$46.7m	R	1.43	$70,023	861.68	1.31	$76,092	489.86	D	0.41	$243,374	589.97	1.28	$78,345	679.79
$46.8m	O	1.43	$70,028	863.11	0.44	$228,050	490.30	W	0.99	$100,574	590.97	1.28	$78,384	681.07
$46.9m	O	1.43	$70,121	864.54	0.44	$228,311	490.74	R	1.38	$72,202	592.35	1.27	$78,456	682.35
$47.0m	R	1.43	$70,136	865.96	1.31	$76,202	492.05	G	0.66	$150,914	593.02	1.27	$78,503	683.62
$47.1m	O	1.42	$70,225	867.38	0.44	$228,624	492.49	U	0.71	$140,223	593.73	1.27	$78,524	684.89
$47.2m	R	1.42	$70,244	868.81	1.31	$76,330	493.80	R	1.38	$72,307	595.11	1.27	$78,567	686.17
$47.3m	O	1.42	$70,319	870.23	0.44	$228,990	494.23	D	0.41	$244,385	595.52	1.27	$78,669	687.44
$47.4m	R	1.42	$70,353	871.65	1.31	$76,447	495.54	R	1.38	$72,417	596.90	1.27	$78,691	688.71
$47.5m	M	1.42	$70,395	873.07	-0.25	-$397,560	495.29	G	0.66	$151,302	597.56	1.27	$78,706	689.98
$47.6m	O	1.42	$70,418	874.49	0.44	$229,253	495.73	U	0.71	$140,590	598.27	1.27	$78,728	691.25
$47.7m	R	1.42	$70,467	875.91	1.31	$76,564	497.03	R	1.38	$72,527	599.65	1.27	$78,802	692.52
$47.8m	O	1.42	$70,512	877.33	0.44	$229,621	497.47	G	0.66	$151,688	600.31	1.27	$78,902	693.78
$47.9m	R	1.42	$70,572	878.75	1.30	$76,687	498.77	R	1.38	$72,627	601.69	1.27	$78,920	695.05
$48.0m	O	1.42	$70,607	880.16	0.44	$229,885	499.21	U	0.71	$140,950	602.40	1.27	$78,933	696.32
$48.1m	R	1.41	$70,686	881.58	1.30	$76,805	500.51	D	0.41	$245,387	602.81	1.27	$78,992	697.58
$48.2m	O	1.41	$70,706	882.99	0.43	$230,203	500.94	R	1.37	$72,738	604.18	1.27	$79,033	698.85
$48.3m	R	1.41	$70,791	884.40	1.30	$76,923	502.24	G	0.66	$152,070	604.84	1.26	$79,108	700.11
$48.4m	O	1.41	$70,801	885.82	0.43	$230,574	502.68	U	0.71	$141,313	605.55	1.26	$79,133	701.38
$48.5m	O	1.41	$70,897	887.23	0.43	$230,840	503.11	R	1.37	$72,844	606.92	1.26	$79,151	702.64
$48.6m	R	1.41	$70,902	888.64	1.30	$77,042	504.41	W	0.98	$101,660	607.90	1.26	$79,232	703.90
$48.7m	R	1.41	$71,013	890.05	1.30	$77,160	505.70	R	1.37	$72,950	609.27	1.26	$79,264	705.16
$48.8m	R	1.41	$71,124	891.45	1.29	$77,280	507.00	G	0.66	$152,453	609.93	1.26	$79,302	706.43
$48.9m	R	1.40	$71,230	892.86	1.29	$77,399	508.29	D	0.41	$246,384	610.33	1.26	$79,313	707.69
$49.0m	R	1.40	$71,337	894.26	1.29	$77,513	509.58	U	0.71	$141,673	611.04	1.26	$79,334	708.95
$49.1m	R	1.40	$71,449	895.66	1.29	$77,634	510.87	R	1.37	$73,051	612.41	1.26	$79,378	710.21
$49.2m	R	1.40	$71,551	897.06	1.29	$77,748	512.15	R	1.37	$73,164	613.78	1.26	$79,498	711.46
$49.3m	R	1.40	$71,664	898.45	1.28	$77,869	513.44	G	0.65	$152,833	614.43	1.26	$79,504	712.72
$49.4m	R	1.39	$71,772	899.84	1.28	$77,985	514.72	U	0.70	$142,035	615.13	1.26	$79,536	713.98
$49.5m	R	1.39	$71,880	901.24	1.28	$78,107	516.00	R	1.36	$73,265	616.50	1.26	$79,611	715.24
$49.6m	R	1.39	$71,989	902.62	1.28	$78,223	517.28	D	0.40	$247,384	616.90	1.26	$79,634	716.49
$49.7m	R	1.39	$72,093	904.01	1.28	$78,333	518.56	G	0.65	$153,210	617.56	1.25	$79,694	717.75
$49.8m	R	1.38	$72,202	905.40	1.27	$78,456	519.83	R	1.36	$73,373	618.92	1.25	$79,726	719.00
$49.9m	R	1.38	$72,307	906.78	1.27	$78,567	521.10	U	0.70	$142,391	619.62	1.25	$79,738	720.25
$50.0m	R	1.38	$72,417	908.16	1.27	$78,691	522.37	R	1.36	$73,481	620.98	1.25	$79,840	721.51

[a] Marginal technology in expansion. At each level of budget impact, this technology is subject to a $100,000 increase in incremental expenditure compared to the previous (smaller) level of budget impact;
[b] Estimate (given imperfect information) of the marginal change in incremental benefit (QALYs) resulting from $100,000 increase in incremental expenditure on marginal technology;
[c] Estimate (given imperfect information) of the marginal ICER in expansion for the marginal technology; [d] Estimate (given imperfect information) of the cumulative change in incremental benefit (QALYs) resulting from entire increase in expenditure across all technologies.

Appendix 2.3: Optimal numerical thresholds

Table A2.3.1: Optimal numerical thresholds (threshold sets λ1 and λ2)

	λ1								*λ2*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$0.1m	1.75	$57,122	-1.75	$57,129	1.65	$60,698	-1.65	$60,710	1.76	$56,770	1.00	-$99,957	6.69	$14,945	-1.54	$64,860
$0.2m	3.50	$57,114	-3.50	$57,149	3.30	$60,694	-3.29	$60,739	3.58	$55,883	2.83	-$70,680	13.44	$14,880	-3.00	$66,671
$0.3m	5.25	$57,095	-5.25	$57,180	4.94	$60,678	-4.94	$60,768	5.45	$55,040	5.20	-$57,710	20.25	$14,813	-4.39	$68,341
$0.4m	7.01	$57,067	-6.99	$57,204	6.59	$60,652	-6.58	$60,791	7.38	$54,237	8.00	-$49,978	27.13	$14,746	-5.72	$69,896
$0.5m	8.76	$57,048	-8.74	$57,218	8.25	$60,634	-8.22	$60,805	9.35	$53,471	11.19	-$44,702	34.07	$14,677	-7.01	$71,354
$0.6m	10.52	$57,031	-10.48	$57,237	9.90	$60,621	-9.86	$60,823	11.38	$52,740	14.70	-$40,807	41.08	$14,607	-8.25	$72,731
$0.7m	12.28	$57,014	-12.23	$57,257	11.55	$60,609	-11.51	$60,840	13.45	$52,040	18.53	-$37,780	48.16	$14,536	-9.45	$74,037
$0.8m	14.04	$56,992	-13.97	$57,273	13.20	$60,587	-13.14	$60,861	15.57	$51,369	22.64	-$35,340	55.31	$14,464	-10.63	$75,282
$0.9m	15.80	$56,974	-15.71	$57,290	14.86	$60,567	-14.78	$60,879	17.74	$50,725	27.01	-$33,319	62.54	$14,391	-11.77	$76,471
$1.0m	17.56	$56,960	-17.45	$57,310	16.52	$60,547	-16.42	$60,900	19.96	$50,107	31.64	-$31,609	69.85	$14,316	-12.88	$77,612
$1.1m	19.32	$56,944	-19.19	$57,329	18.17	$60,529	-18.06	$60,924	22.22	$49,512	36.50	-$30,138	77.25	$14,240	-13.98	$78,709
$1.2m	21.08	$56,930	-20.93	$57,346	19.83	$60,509	-19.69	$60,944	24.52	$48,940	41.59	-$28,855	84.73	$14,162	-15.04	$79,766
$1.3m	22.84	$56,914	-22.66	$57,363	21.49	$60,490	-21.32	$60,963	26.87	$48,388	46.89	-$27,723	92.31	$14,083	-16.09	$80,787
$1.4m	24.60	$56,900	-24.40	$57,380	23.15	$60,472	-22.96	$60,979	29.25	$47,855	52.41	-$26,715	99.99	$14,002	-17.12	$81,775
$1.5m	26.37	$56,887	-26.13	$57,396	24.81	$60,453	-24.59	$60,993	31.69	$47,341	58.12	-$25,809	107.77	$13,919	-18.13	$82,733
$1.6m	28.13	$56,875	-27.87	$57,411	26.47	$60,436	-26.23	$61,009	34.16	$46,844	64.03	-$24,989	115.66	$13,834	-19.12	$83,663
$1.7m	29.90	$56,863	-29.60	$57,429	28.14	$60,416	-27.86	$61,026	36.67	$46,363	70.12	-$24,243	123.66	$13,748	-20.10	$84,566
$1.8m	31.66	$56,850	-31.33	$57,445	29.80	$60,395	-29.49	$61,044	39.22	$45,897	76.40	-$23,560	131.78	$13,659	-21.07	$85,445
$1.9m	33.43	$56,834	-33.07	$57,460	31.47	$60,376	-31.12	$61,060	41.81	$45,446	82.85	-$22,932	140.04	$13,568	-22.02	$86,302
$2.0m	35.20	$56,819	-34.80	$57,476	33.14	$60,354	-32.74	$61,079	44.44	$45,009	89.48	-$22,351	148.43	$13,474	-22.95	$87,138
$2.1m	36.97	$56,804	-36.53	$57,493	34.81	$60,334	-34.37	$61,097	47.10	$44,584	96.28	-$21,812	156.98	$13,378	-23.88	$87,954
$2.2m	38.74	$56,789	-38.25	$57,509	36.48	$60,315	-36.00	$61,116	49.80	$44,172	103.23	-$21,311	165.68	$13,279	-24.79	$88,751
$2.3m	40.51	$56,776	-39.98	$57,526	38.15	$60,296	-37.62	$61,135	52.54	$43,772	110.35	-$20,842	174.55	$13,176	-25.69	$89,530
$2.4m	42.28	$56,761	-41.71	$57,543	39.82	$60,278	-39.24	$61,155	55.32	$43,383	117.63	-$20,404	183.62	$13,071	-26.58	$90,293
$2.5m	44.06	$56,746	-43.43	$57,559	41.49	$60,259	-40.87	$61,173	58.13	$43,005	125.05	-$19,991	192.88	$12,961	-27.46	$91,040
$2.6m	45.83	$56,732	-45.16	$57,576	43.16	$60,240	-42.49	$61,189	60.98	$42,636	132.63	-$19,603	202.37	$12,848	-28.33	$91,773
$2.7m	47.61	$56,716	-46.88	$57,593	44.84	$60,221	-44.11	$61,207	63.86	$42,278	140.36	-$19,237	212.11	$12,729	-29.19	$92,491
$2.8m	49.38	$56,700	-48.60	$57,609	46.51	$60,202	-45.73	$61,224	66.78	$41,929	148.23	-$18,890	222.12	$12,606	-30.04	$93,195
$2.9m	51.16	$56,685	-50.32	$57,627	48.19	$60,183	-47.35	$61,242	69.73	$41,588	156.24	-$18,561	232.44	$12,476	-30.89	$93,887
$3.0m	52.94	$56,670	-52.04	$57,644	49.86	$60,165	-48.97	$61,261	72.72	$41,257	164.39	-$18,250	243.11	$12,340	-31.72	$94,567
$3.1m	54.72	$56,653	-53.76	$57,660	51.54	$60,144	-50.59	$61,281	75.73	$40,933	172.68	-$17,953	254.18	$12,196	-32.55	$95,235
$3.2m	56.50	$56,637	-55.48	$57,677	53.22	$60,125	-52.20	$61,300	78.79	$40,617	181.10	-$17,670	265.73	$12,042	-33.37	$95,891
$3.3m	58.28	$56,620	-57.20	$57,695	54.90	$60,106	-53.82	$61,318	81.87	$40,308	189.65	-$17,400	277.84	$11,877	-34.18	$96,537
$3.4m	60.07	$56,603	-58.91	$57,713	56.58	$60,088	-55.43	$61,336	84.98	$40,007	198.34	-$17,142	290.65	$11,698	-34.99	$97,173
$3.5m	61.85	$56,587	-60.63	$57,731	58.27	$60,070	-57.05	$61,354	88.13	$39,713	207.15	-$16,896	304.34	$11,500	-35.79	$97,799
$3.6m	63.64	$56,571	-62.34	$57,748	59.95	$60,051	-58.66	$61,373	91.31	$39,425	216.09	-$16,659	319.25	$11,277	-36.58	$98,415
$3.7m	65.42	$56,554	-64.05	$57,767	61.63	$60,032	-60.27	$61,391	94.52	$39,144	225.16	-$16,433	335.94	$11,014	-37.37	$99,022
$3.8m	67.21	$56,537	-65.76	$57,784	63.32	$60,014	-61.88	$61,410	97.77	$38,869	234.35	-$16,215	355.85	$10,679	-38.14	$99,620
$3.9m	69.00	$56,520	-67.47	$57,802	65.01	$59,993	-63.49	$61,428	101.04	$38,599	243.66	-$16,006	389.74	$10,007	-38.92	$100,210
$4.0m	70.79	$56,502	-69.18	$57,821	66.70	$59,973	-65.10	$61,447	104.34	$38,336	242.01	-$16,528	391.40	$10,220	-39.69	$100,792
$4.1m	72.59	$56,485	-70.89	$57,839	68.39	$59,953	-66.70	$61,465	107.67	$38,078	240.46	-$17,050	393.06	$10,431	-40.45	$101,366
$4.2m	74.38	$56,469	-72.59	$57,856	70.08	$59,935	-68.31	$61,483	111.04	$37,825	239.00	-$17,573	394.75	$10,640	-41.20	$101,932
$4.3m	76.17	$56,453	-74.30	$57,875	71.77	$59,916	-69.92	$61,502	114.43	$37,577	237.61	-$18,097	396.44	$10,847	-41.95	$102,491
$4.4m	77.96	$56,436	-76.00	$57,894	73.46	$59,896	-71.52	$61,520	117.85	$37,335	236.28	-$18,622	398.14	$11,051	-42.70	$103,043
$4.5m	79.76	$56,420	-77.70	$57,912	75.15	$59,877	-73.12	$61,539	121.30	$37,097	235.00	-$19,149	399.86	$11,254	-43.44	$103,588
$4.6m	81.56	$56,403	-79.41	$57,930	76.85	$59,858	-74.73	$61,558	124.78	$36,864	233.77	-$19,677	401.59	$11,454	-44.18	$104,126
$4.7m	83.35	$56,386	-81.11	$57,949	78.55	$59,838	-76.33	$61,576	128.29	$36,635	232.59	-$20,207	403.34	$11,653	-44.91	$104,658

	λ1								λ2							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$4.8m	85.15	$56,369	-82.81	$57,967	80.24	$59,818	-77.93	$61,594	131.83	$36,410	231.44	-$20,739	405.10	$11,849	-45.63	$105,183
$4.9m	86.95	$56,353	-84.50	$57,987	81.94	$59,798	-79.53	$61,612	135.40	$36,190	230.33	-$21,274	406.87	$12,043	-46.36	$105,702
$5.0m	88.75	$56,338	-86.20	$58,007	83.64	$59,778	-81.13	$61,631	138.99	$35,974	229.26	-$21,810	408.66	$12,235	-47.07	$106,216
$5.1m	90.55	$56,321	-87.89	$58,026	85.34	$59,759	-82.73	$61,649	142.61	$35,762	227.54	-$22,413	410.46	$12,425	-47.79	$106,724
$5.2m	92.36	$56,304	-89.58	$58,046	87.05	$59,739	-84.32	$61,667	146.26	$35,553	226.49	-$22,959	412.27	$12,613	-48.50	$107,226
$5.3m	94.16	$56,288	-91.28	$58,066	88.75	$59,719	-85.92	$61,685	148.18	$35,768	225.47	-$23,506	414.10	$12,799	-49.20	$107,723
$5.4m	95.96	$56,271	-92.97	$58,086	90.45	$59,699	-87.52	$61,702	150.09	$35,978	223.83	-$24,126	415.95	$12,982	-49.90	$108,214
$5.5m	97.77	$56,254	-94.65	$58,106	92.16	$59,679	-89.11	$61,719	151.85	$36,221	222.09	-$24,764	417.82	$13,164	-50.60	$108,700
$5.6m	99.58	$56,237	-96.34	$58,126	93.87	$59,659	-90.71	$61,738	153.60	$36,457	221.10	-$25,328	419.70	$13,343	-51.29	$109,182
$5.7m	101.39	$56,220	-98.03	$58,147	95.57	$59,640	-92.30	$61,756	155.37	$36,687	219.39	-$25,981	421.60	$13,520	-51.98	$109,658
$5.8m	103.20	$56,203	-99.71	$58,168	97.28	$59,619	-93.89	$61,774	157.14	$36,910	217.80	-$26,629	423.51	$13,695	-52.67	$110,130
$5.9m	105.01	$56,185	-101.40	$58,188	98.99	$59,599	-95.48	$61,792	158.91	$37,128	216.83	-$27,210	425.45	$13,868	-53.35	$110,597
$6.0m	106.82	$56,168	-103.08	$58,207	100.71	$59,579	-97.07	$61,810	160.69	$37,339	215.15	-$27,888	427.40	$14,038	-54.03	$111,060
$6.1m	108.64	$56,151	-104.76	$58,228	102.42	$59,560	-98.66	$61,828	162.47	$37,545	213.49	-$28,573	429.37	$14,207	-54.70	$111,518
$6.2m	110.45	$56,134	-106.44	$58,249	104.13	$59,539	-100.25	$61,845	164.26	$37,745	212.53	-$29,172	431.36	$14,373	-55.37	$111,972
$6.3m	112.27	$56,116	-108.12	$58,269	105.85	$59,519	-101.84	$61,862	166.05	$37,939	211.00	-$29,857	433.37	$14,537	-56.04	$112,422
$6.4m	114.09	$56,098	-109.80	$58,289	107.57	$59,499	-103.43	$61,880	167.85	$38,129	209.37	-$30,568	435.41	$14,699	-56.70	$112,867
$6.5m	115.90	$56,081	-111.47	$58,310	109.28	$59,479	-105.01	$61,898	169.65	$38,313	208.44	-$31,185	437.46	$14,858	-57.37	$113,309
$6.6m	117.72	$56,064	-113.15	$58,331	111.00	$59,459	-106.60	$61,916	171.46	$38,492	206.82	-$31,912	439.54	$15,016	-58.02	$113,747
$6.7m	119.54	$56,047	-114.82	$58,352	112.72	$59,439	-108.18	$61,935	173.28	$38,667	205.33	-$32,630	441.64	$15,171	-58.68	$114,181
$6.8m	121.36	$56,030	-116.49	$58,373	114.44	$59,419	-109.76	$61,952	175.09	$38,836	203.74	-$33,376	443.76	$15,324	-59.33	$114,611
$6.9m	123.19	$56,013	-118.16	$58,394	116.16	$59,399	-111.34	$61,970	176.92	$39,001	202.83	-$34,019	445.91	$15,474	-59.98	$115,037
$7.0m	125.01	$55,997	-119.83	$58,415	117.88	$59,380	-112.93	$61,988	178.75	$39,161	201.25	-$34,782	448.09	$15,622	-60.63	$115,460
$7.1m	126.83	$55,980	-121.50	$58,436	119.61	$59,361	-114.51	$62,005	180.58	$39,317	199.81	-$35,534	450.29	$15,768	-61.27	$115,880
$7.2m	128.66	$55,963	-123.17	$58,458	121.33	$59,341	-116.09	$62,023	182.42	$39,469	198.25	-$36,317	452.52	$15,911	-61.91	$116,296
$7.3m	130.48	$55,946	-124.83	$58,479	123.06	$59,321	-117.66	$62,041	184.27	$39,616	197.36	-$36,988	454.78	$16,052	-62.55	$116,708
$7.4m	132.31	$55,928	-126.50	$58,500	124.79	$59,301	-119.24	$62,059	186.12	$39,760	195.83	-$37,789	457.06	$16,190	-63.18	$117,118
$7.5m	134.14	$55,911	-128.16	$58,521	126.52	$59,280	-120.82	$62,077	187.98	$39,899	194.95	-$38,472	459.38	$16,326	-63.82	$117,524
$7.6m	135.97	$55,894	-129.82	$58,541	128.25	$59,260	-122.39	$62,095	189.84	$40,034	193.43	-$39,290	461.74	$16,460	-64.45	$117,927
$7.7m	137.80	$55,877	-131.48	$58,562	129.98	$59,240	-123.97	$62,113	191.71	$40,166	192.02	-$40,099	464.12	$16,591	-65.07	$118,327
$7.8m	139.64	$55,859	-133.14	$58,583	131.71	$59,220	-125.54	$62,130	193.58	$40,293	190.52	-$40,940	466.54	$16,719	-65.70	$118,723
$7.9m	141.47	$55,842	-134.80	$58,604	133.44	$59,201	-127.12	$62,148	195.46	$40,417	189.66	-$41,653	469.00	$16,844	-66.32	$119,117
$8.0m	143.31	$55,824	-136.46	$58,624	135.18	$59,180	-128.69	$62,167	197.35	$40,538	188.18	-$42,513	471.50	$16,967	-66.94	$119,508
$8.1m	145.14	$55,807	-138.12	$58,645	136.92	$59,160	-130.26	$62,185	199.24	$40,655	186.80	-$43,361	474.03	$17,087	-67.56	$119,896
$8.2m	146.98	$55,790	-139.77	$58,666	138.65	$59,141	-131.83	$62,202	201.14	$40,768	185.96	-$44,096	476.61	$17,205	-68.17	$120,282
$8.3m	148.82	$55,772	-141.43	$58,687	140.39	$59,120	-133.40	$62,219	203.04	$40,878	184.49	-$44,988	479.24	$17,319	-68.79	$120,664
$8.4m	150.66	$55,754	-143.08	$58,708	142.13	$59,099	-134.97	$62,238	204.95	$40,985	183.04	-$45,891	480.89	$17,468	-69.40	$121,044
$8.5m	152.50	$55,736	-144.73	$58,728	143.88	$59,079	-136.53	$62,255	206.87	$41,088	181.70	-$46,781	483.56	$17,578	-70.00	$121,421
$8.6m	154.35	$55,719	-146.38	$58,749	145.62	$59,058	-138.10	$62,273	208.80	$41,189	180.87	-$47,549	485.22	$17,724	-70.61	$121,795
$8.7m	156.19	$55,700	-148.03	$58,771	147.36	$59,038	-139.67	$62,291	210.73	$41,286	179.43	-$48,487	486.89	$17,868	-71.21	$122,167
$8.8m	158.04	$55,683	-149.68	$58,792	149.11	$59,017	-141.23	$62,308	212.66	$41,380	178.61	-$49,268	488.57	$18,012	-71.82	$122,537
$8.9m	159.88	$55,665	-151.33	$58,812	150.85	$58,998	-142.80	$62,326	214.61	$41,471	177.19	-$50,228	491.29	$18,115	-73.46	$121,157
$9.0m	161.74	$55,646	-152.98	$58,833	152.60	$58,977	-144.36	$62,343	216.56	$41,559	175.88	-$51,172	492.98	$18,256	-74.06	$121,527
$9.1m	163.59	$55,628	-154.62	$58,854	154.35	$58,957	-145.93	$62,360	218.52	$41,644	174.47	-$52,158	494.68	$18,396	-75.70	$120,217
$9.2m	165.44	$55,610	-156.26	$58,874	156.10	$58,937	-147.49	$62,378	220.48	$41,727	173.67	-$52,975	496.39	$18,534	-76.29	$120,587
$9.3m	167.29	$55,593	-157.91	$58,895	157.85	$58,915	-149.05	$62,396	222.46	$41,806	172.27	-$53,984	499.17	$18,631	-77.93	$119,341
$9.4m	169.14	$55,575	-159.55	$58,915	159.61	$58,895	-150.61	$62,413	224.43	$41,883	170.98	-$54,976	500.89	$18,767	-79.56	$118,153
$9.5m	171.00	$55,557	-161.19	$58,935	161.36	$58,874	-152.17	$62,430	226.42	$41,957	169.60	-$56,013	502.62	$18,901	-80.15	$118,524
$9.6m	172.85	$55,539	-162.84	$58,955	163.12	$58,853	-153.73	$62,447	228.42	$42,028	168.81	-$56,868	504.36	$19,034	-81.78	$117,390
$9.7m	174.71	$55,521	-164.48	$58,975	164.87	$58,832	-155.29	$62,465	230.42	$42,097	167.45	-$57,929	507.19	$19,125	-82.37	$117,759

	λ1								*λ2*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$
$9.8m	176.57	$55,503	-166.11	$58,996	166.63	$58,812	-156.85	$62,482	232.43	$42,163	166.18	-$58,972	508.95	$19,255	-83.99	$116,676
$9.9m	178.43	$55,485	-167.75	$59,016	168.39	$58,791	-158.40	$62,499	234.45	$42,227	165.40	-$59,855	510.72	$19,385	-84.58	$117,043
$10.0m	180.29	$55,467	-169.39	$59,036	170.15	$58,771	-159.96	$62,517	236.47	$42,288	164.05	-$60,958	512.37	$19,517	-86.20	$116,007
$10.1m	182.15	$55,449	-171.03	$59,055	171.91	$58,750	-161.51	$62,535	238.51	$42,347	162.80	-$62,039	514.15	$19,644	-87.82	$115,014
$10.2m	184.01	$55,430	-172.66	$59,075	173.68	$58,729	-163.06	$62,552	240.55	$42,403	161.46	-$63,173	515.81	$19,775	-88.40	$115,379
$10.3m	185.88	$55,412	-174.29	$59,096	175.44	$58,708	-164.62	$62,570	242.60	$42,456	160.69	-$64,097	518.70	$19,857	-88.22	$116,751
$10.4m	187.75	$55,394	-175.93	$59,115	177.21	$58,687	-166.17	$62,587	244.66	$42,508	159.37	-$65,259	520.49	$19,981	-88.12	$118,016
$10.5m	189.62	$55,375	-177.56	$59,136	178.98	$58,667	-167.72	$62,604	246.73	$42,557	158.14	-$66,397	522.15	$20,109	-89.73	$117,014
$10.6m	191.48	$55,357	-179.19	$59,156	180.74	$58,646	-169.27	$62,622	248.81	$42,603	157.38	-$67,351	523.83	$20,236	-90.32	$117,360
$10.7m	193.35	$55,339	-180.82	$59,176	182.51	$58,626	-170.82	$62,639	250.89	$42,648	156.07	-$68,560	525.63	$20,356	-91.93	$116,399
$10.8m	195.23	$55,321	-182.44	$59,196	184.28	$58,605	-172.37	$62,656	252.99	$42,690	154.76	-$69,784	527.31	$20,481	-92.51	$116,744
$10.9m	197.10	$55,302	-184.07	$59,216	186.06	$58,584	-173.92	$62,674	255.09	$42,730	154.02	-$70,772	529.00	$20,605	-94.11	$115,820
$11.0m	198.97	$55,284	-185.70	$59,237	187.83	$58,564	-175.46	$62,691	257.21	$42,767	152.81	-$71,985	530.82	$20,723	-95.71	$114,932
$11.1m	200.85	$55,266	-187.32	$59,257	189.60	$58,543	-177.01	$62,708	259.33	$42,802	151.52	-$73,259	532.52	$20,844	-96.29	$115,274
$11.2m	202.72	$55,247	-188.94	$59,278	191.38	$58,522	-178.56	$62,726	261.46	$42,836	150.23	-$74,550	535.47	$20,916	-97.89	$114,419
$11.3m	204.60	$55,229	-190.56	$59,298	193.16	$58,502	-180.10	$62,743	263.61	$42,867	149.50	-$75,587	537.30	$21,031	-98.47	$114,760
$11.4m	206.48	$55,211	-192.18	$59,319	194.94	$58,481	-181.64	$62,760	265.76	$42,895	148.31	-$76,866	539.01	$21,150	-100.06	$113,936
$11.5m	208.36	$55,192	-193.80	$59,339	196.72	$58,460	-183.19	$62,778	267.93	$42,922	147.04	-$78,211	540.72	$21,268	-100.64	$114,274
$11.6m	210.24	$55,174	-195.42	$59,360	198.50	$58,439	-184.73	$62,795	270.10	$42,947	146.31	-$79,283	542.57	$21,380	-102.22	$113,479
$11.7m	212.13	$55,156	-197.04	$59,380	200.28	$58,419	-186.27	$62,812	272.29	$42,969	145.05	-$80,662	544.29	$21,496	-103.80	$112,713
$11.8m	214.01	$55,137	-198.65	$59,401	202.06	$58,397	-187.81	$62,829	274.48	$42,990	143.88	-$82,014	546.02	$21,611	-104.38	$113,048
$11.9m	215.90	$55,119	-200.27	$59,421	203.85	$58,376	-189.35	$62,846	276.69	$43,008	142.63	-$83,434	547.88	$21,720	-105.96	$112,308
$12.0m	217.78	$55,101	-201.88	$59,441	205.64	$58,355	-190.89	$62,863	278.91	$43,024	141.91	-$84,561	549.61	$21,833	-106.53	$112,640
$12.1m	219.67	$55,083	-203.49	$59,461	207.42	$58,334	-192.43	$62,880	281.14	$43,038	140.76	-$85,965	552.64	$21,895	-108.11	$111,924
$12.2m	221.56	$55,065	-205.10	$59,482	209.21	$58,313	-193.97	$62,897	283.39	$43,051	139.51	-$87,447	554.51	$22,001	-108.68	$112,253
$12.3m	223.45	$55,047	-206.71	$59,502	211.01	$58,292	-195.50	$62,914	285.64	$43,061	138.80	-$88,614	556.26	$22,112	-110.25	$111,561
$12.4m	225.34	$55,029	-208.32	$59,523	212.80	$58,271	-197.04	$62,931	287.91	$43,069	137.57	-$90,134	558.01	$22,222	-111.82	$110,892
$12.5m	227.23	$55,010	-209.93	$59,543	214.59	$58,250	-198.58	$62,948	290.19	$43,075	136.43	-$91,620	559.90	$22,325	-112.39	$111,217
$12.6m	229.12	$54,992	-211.54	$59,563	216.39	$58,229	-200.11	$62,965	292.49	$43,079	135.21	-$93,188	561.67	$22,433	-113.96	$110,569
$12.7m	231.02	$54,974	-213.14	$59,584	218.18	$58,208	-201.64	$62,982	294.80	$43,081	134.51	-$94,416	563.44	$22,540	-114.53	$110,891
$12.8m	232.91	$54,956	-214.75	$59,604	219.98	$58,188	-203.18	$62,999	297.12	$43,081	133.30	-$96,026	565.35	$22,641	-116.09	$110,263
$12.9m	234.81	$54,937	-216.35	$59,625	221.78	$58,167	-204.71	$63,015	299.45	$43,078	132.17	-$97,599	568.44	$22,694	-116.65	$110,583
$13.0m	236.71	$54,919	-217.95	$59,646	223.58	$58,145	-206.24	$63,032	301.80	$43,074	130.97	-$99,260	570.22	$22,798	-118.21	$109,973
$13.1m	238.61	$54,901	-219.55	$59,666	225.38	$58,124	-207.78	$63,049	304.17	$43,068	130.28	-$100,555	572.15	$22,896	-119.76	$109,382
$13.2m	240.51	$54,882	-221.15	$59,687	227.18	$58,104	-209.31	$63,066	306.55	$43,060	128.61	-$102,635	573.94	$22,999	-120.33	$109,698
$13.3m	242.42	$54,864	-222.75	$59,707	228.98	$58,083	-210.83	$63,083	308.95	$43,050	127.50	-$104,313	575.74	$23,101	-121.88	$109,124
$13.4m	244.32	$54,846	-224.35	$59,728	230.79	$58,061	-212.36	$63,099	311.36	$43,037	126.31	-$106,092	577.68	$23,196	-122.45	$109,437
$13.5m	246.23	$54,828	-225.95	$59,749	232.60	$58,040	-213.89	$63,116	313.79	$43,023	125.62	-$107,466	579.49	$23,296	-123.99	$108,879
$13.6m	248.13	$54,809	-227.54	$59,769	234.40	$58,019	-215.42	$63,133	316.23	$43,007	124.43	-$109,294	581.30	$23,396	-124.55	$109,189
$13.7m	250.04	$54,791	-229.14	$59,790	236.21	$57,999	-216.95	$63,150	318.69	$42,988	123.34	-$111,078	583.27	$23,488	-126.10	$108,647
$13.8m	251.95	$54,772	-230.73	$59,810	238.02	$57,977	-218.47	$63,166	321.17	$42,967	122.16	-$112,968	586.44	$23,532	-127.64	$108,120
$13.9m	253.86	$54,754	-232.32	$59,830	239.84	$57,956	-219.99	$63,183	323.67	$42,945	121.48	-$114,420	588.27	$23,629	-128.20	$108,426
$14.0m	255.78	$54,735	-233.91	$59,851	241.65	$57,934	-221.52	$63,200	326.19	$42,920	120.31	-$116,364	590.10	$23,725	-129.73	$107,914
$14.1m	257.69	$54,717	-235.51	$59,871	243.47	$57,913	-223.04	$63,217	328.73	$42,892	119.23	-$118,261	592.08	$23,814	-130.29	$108,217
$14.2m	259.60	$54,699	-237.10	$59,892	245.29	$57,891	-224.57	$63,233	331.29	$42,863	118.56	-$119,772	593.93	$23,909	-131.83	$107,718
$14.3m	261.52	$54,680	-238.68	$59,912	247.10	$57,870	-226.09	$63,250	333.87	$42,832	117.40	-$121,809	595.93	$23,996	-133.47	$107,143
$14.4m	263.44	$54,662	-240.27	$59,932	248.92	$57,849	-227.61	$63,267	336.47	$42,798	116.32	-$123,792	597.79	$24,089	-134.03	$107,443
$14.5m	265.36	$54,643	-241.86	$59,953	250.74	$57,828	-229.13	$63,283	339.09	$42,762	115.17	-$125,901	599.65	$24,181	-135.55	$106,968
$14.6m	267.28	$54,625	-243.44	$59,973	252.56	$57,807	-230.65	$63,300	341.73	$42,723	114.51	-$127,502	602.91	$24,216	-137.08	$106,507
$14.7m	269.20	$54,607	-245.03	$59,993	254.39	$57,786	-232.16	$63,317	344.40	$42,682	113.36	-$129,673	604.93	$24,300	-137.64	$106,803

	λ1								λ2							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$
$14.8m	271.12	$54,589	-246.61	$60,013	256.21	$57,764	-233.68	$63,334	347.10	$42,639	112.30	-$131,789	606.81	$24,390	-139.27	$106,268
$14.9m	273.04	$54,570	-248.19	$60,033	258.04	$57,743	-235.20	$63,350	349.82	$42,593	110.71	-$134,583	608.70	$24,478	-140.79	$105,829
$15.0m	274.97	$54,552	-249.78	$60,053	259.87	$57,722	-236.72	$63,367	352.57	$42,545	109.57	-$136,894	610.74	$24,560	-141.35	$106,121
$15.1m	276.89	$54,534	-251.36	$60,073	261.70	$57,701	-238.23	$63,384	355.34	$42,494	108.92	-$138,634	612.64	$24,647	-142.87	$105,692
$15.2m	278.81	$54,517	-252.94	$60,093	263.53	$57,679	-239.75	$63,401	358.15	$42,441	107.79	-$141,017	614.55	$24,734	-144.50	$105,194
$15.3m	280.74	$54,499	-254.52	$60,113	265.36	$57,657	-241.26	$63,417	360.98	$42,385	106.74	-$143,342	616.61	$24,813	-145.05	$105,482
$15.4m	282.67	$54,481	-256.10	$60,133	267.19	$57,636	-242.77	$63,434	363.85	$42,326	106.09	-$145,160	618.53	$24,898	-146.57	$105,073
$15.5m	284.60	$54,463	-257.68	$60,153	269.03	$57,615	-244.28	$63,451	366.75	$42,264	104.97	-$147,667	621.88	$24,924	-148.08	$104,675
$15.6m	286.53	$54,445	-259.26	$60,172	270.86	$57,593	-245.80	$63,467	369.68	$42,199	103.93	-$150,107	623.82	$25,007	-149.70	$104,209
$15.7m	288.46	$54,427	-260.83	$60,192	272.70	$57,572	-247.31	$63,484	372.65	$42,131	102.81	-$152,710	625.90	$25,084	-150.25	$104,492
$15.8m	290.39	$54,409	-262.41	$60,212	274.54	$57,550	-248.82	$63,501	375.66	$42,059	102.17	-$154,647	627.85	$25,165	-151.76	$104,111
$15.9m	292.33	$54,391	-263.98	$60,232	276.38	$57,529	-250.33	$63,517	378.71	$41,985	101.06	-$157,334	629.81	$25,246	-152.31	$104,391
$16.0m	294.26	$54,373	-265.55	$60,251	278.23	$57,507	-251.83	$63,534	381.80	$41,907	100.03	-$159,954	631.92	$25,320	-153.82	$104,019
$16.1m	296.20	$54,355	-267.13	$60,271	280.07	$57,485	-253.34	$63,551	384.94	$41,825	99.39	-$161,981	633.89	$25,399	-155.43	$103,582
$16.2m	298.14	$54,337	-268.70	$60,291	281.92	$57,463	-254.85	$63,568	388.12	$41,739	98.29	-$164,816	635.87	$25,477	-157.08	$103,132
$16.3m	300.08	$54,319	-270.27	$60,311	283.77	$57,441	-256.35	$63,584	391.36	$41,650	97.27	-$167,573	639.32	$25,496	-157.63	$103,407
$16.4m	302.02	$54,300	-271.84	$60,330	285.62	$57,420	-257.86	$63,600	394.65	$41,556	96.18	-$170,522	641.45	$25,567	-159.13	$103,059
$16.5m	303.97	$54,282	-273.41	$60,350	287.46	$57,398	-259.37	$63,617	398.00	$41,458	94.65	-$174,322	643.45	$25,643	-160.78	$102,628
$16.6m	305.91	$54,263	-274.97	$60,370	289.32	$57,377	-260.87	$63,633	401.41	$41,354	94.02	-$176,550	645.45	$25,718	-162.28	$102,295
$16.7m	307.86	$54,245	-276.54	$60,389	291.17	$57,355	-262.37	$63,650	404.89	$41,246	92.93	-$179,696	647.62	$25,787	-163.88	$101,901
$16.8m	309.81	$54,226	-278.10	$60,409	293.03	$57,332	-263.88	$63,666	408.44	$41,132	91.92	-$182,759	649.64	$25,861	-164.43	$102,170
$16.9m	311.76	$54,208	-279.67	$60,429	294.89	$57,310	-265.38	$63,682	412.07	$41,012	91.30	-$185,101	651.67	$25,933	-166.07	$101,764
$17.0m	313.72	$54,189	-281.23	$60,449	296.74	$57,289	-266.88	$63,699	415.79	$40,886	90.22	-$188,431	653.86	$26,000	-167.57	$101,451
$17.1m	315.67	$54,171	-282.79	$60,469	298.60	$57,266	-268.38	$63,715	419.61	$40,752	89.22	-$191,667	657.42	$26,011	-168.11	$101,716
$17.2m	317.63	$54,152	-284.35	$60,488	300.47	$57,244	-269.88	$63,732	423.53	$40,611	88.14	-$195,142	659.46	$26,082	-169.72	$101,345
$17.3m	319.59	$54,133	-285.91	$60,508	302.33	$57,222	-271.38	$63,748	427.58	$40,461	87.52	-$197,660	661.53	$26,152	-171.21	$101,045
$17.4m	321.54	$54,114	-287.47	$60,528	304.19	$57,200	-272.88	$63,765	431.76	$40,300	86.45	-$201,263	663.74	$26,215	-172.85	$100,668
$17.5m	323.50	$54,095	-289.03	$60,548	306.06	$57,178	-274.38	$63,781	436.10	$40,128	85.46	-$204,771	665.82	$26,283	-173.39	$100,928
$17.6m	325.46	$54,077	-290.58	$60,568	307.93	$57,156	-275.87	$63,797	440.63	$39,943	84.40	-$208,537	667.91	$26,351	-174.88	$100,639
$17.7m	327.43	$54,058	-292.14	$60,587	309.80	$57,134	-277.37	$63,814	445.37	$39,742	83.79	-$211,251	670.16	$26,412	-176.51	$100,276
$17.8m	329.39	$54,039	-293.69	$60,607	311.67	$57,112	-278.86	$63,830	447.13	$39,810	82.80	-$214,970	672.26	$26,478	-178.11	$99,939
$17.9m	331.36	$54,020	-295.25	$60,627	313.54	$57,089	-280.36	$63,847	448.88	$39,877	81.74	-$218,975	675.94	$26,481	-179.60	$99,667
$18.0m	333.33	$54,001	-296.80	$60,647	315.42	$57,067	-281.85	$63,863	450.64	$39,943	80.28	-$224,223	678.06	$26,546	-180.14	$99,922
$18.1m	335.30	$53,982	-298.35	$60,666	317.30	$57,044	-283.35	$63,880	452.40	$40,009	79.67	-$227,182	680.35	$26,604	-181.77	$99,578
$18.2m	337.27	$53,963	-299.91	$60,686	319.18	$57,022	-284.84	$63,896	454.17	$40,073	78.62	-$231,493	682.48	$26,667	-183.25	$99,316
$18.3m	339.24	$53,944	-301.46	$60,706	321.06	$56,999	-286.33	$63,912	455.94	$40,137	77.64	-$235,692	684.63	$26,730	-183.79	$99,568
$18.4m	341.21	$53,925	-303.00	$60,725	322.94	$56,977	-287.82	$63,929	457.71	$40,200	76.60	-$240,215	686.95	$26,785	-185.42	$99,235
$18.5m	343.19	$53,906	-304.55	$60,745	324.82	$56,955	-289.31	$63,945	459.49	$40,262	76.00	-$243,428	689.12	$26,846	-187.01	$98,926
$18.6m	345.16	$53,887	-306.10	$60,764	326.70	$56,933	-290.80	$63,962	461.27	$40,323	75.03	-$247,902	691.30	$26,906	-188.49	$98,679
$18.7m	347.14	$53,868	-307.65	$60,784	328.59	$56,911	-292.29	$63,978	463.05	$40,384	73.99	-$252,739	693.65	$26,959	-189.03	$98,926
$18.8m	349.12	$53,849	-309.19	$60,803	330.47	$56,888	-293.78	$63,994	464.84	$40,444	73.39	-$256,149	697.47	$26,955	-190.65	$98,610
$18.9m	351.10	$53,830	-310.74	$60,823	332.36	$56,866	-295.26	$64,011	466.63	$40,503	72.36	-$261,193	699.67	$27,013	-192.13	$98,371
$19.0m	353.09	$53,811	-312.28	$60,842	334.25	$56,843	-296.75	$64,027	468.43	$40,561	71.40	-$266,108	701.89	$27,070	-193.71	$98,083
$19.1m	355.07	$53,792	-313.82	$60,862	336.15	$56,821	-298.24	$64,043	470.23	$40,619	70.37	-$271,419	704.28	$27,120	-195.19	$97,853
$19.2m	357.06	$53,773	-315.37	$60,882	338.04	$56,798	-299.72	$64,060	472.03	$40,675	69.42	-$276,587	706.52	$27,176	-196.81	$97,558
$19.3m	359.05	$53,754	-316.91	$60,901	339.93	$56,776	-301.21	$64,076	473.84	$40,731	68.83	-$280,410	708.77	$27,230	-197.34	$97,798
$19.4m	361.04	$53,734	-318.45	$60,921	341.83	$56,753	-302.69	$64,092	475.65	$40,786	67.80	-$286,116	711.21	$27,278	-198.82	$97,576
$19.5m	363.03	$53,715	-319.99	$60,940	343.73	$56,731	-304.17	$64,108	477.46	$40,841	66.39	-$293,738	713.48	$27,331	-200.43	$97,291
$19.6m	365.02	$53,695	-321.52	$60,960	345.63	$56,708	-305.65	$64,125	479.28	$40,895	65.44	-$299,512	717.44	$27,319	-202.01	$97,026
$19.7m	367.02	$53,676	-323.06	$60,979	347.53	$56,686	-307.13	$64,141	481.10	$40,948	64.42	-$305,797	719.73	$27,371	-202.55	$97,262

Budget impact	λ1								λ2							
	Agent has good information				*Agent has poor information*				*Agent has good information*				*Agent has poor information*			
	Net Investment		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$19.8m	369.01	$53,656	-324.60	$60,999	349.43	$56,663	-308.61	$64,158	482.93	$41,000	63.84	-$310,164	722.21	$27,416	-204.02	$97,051
$19.9m	371.01	$53,637	-326.13	$61,018	351.34	$56,640	-310.10	$64,174	484.76	$41,051	62.82	-$316,755	724.52	$27,466	-205.62	$96,778
$20.0m	373.01	$53,617	-327.67	$61,038	353.25	$56,617	-311.58	$64,190	489.78	$40,835	61.89	-$323,177	726.20	$27,541	-206.16	$97,012
$20.1m	375.02	$53,598	-329.20	$61,057	355.16	$56,595	-313.06	$64,206	491.61	$40,886	61.31	-$327,865	728.53	$27,590	-207.63	$96,807
$20.2m	377.02	$53,578	-330.73	$61,076	357.07	$56,572	-314.54	$64,222	493.45	$40,936	60.30	-$335,000	730.88	$27,638	-209.20	$96,558
$20.3m	379.02	$53,559	-332.26	$61,096	358.98	$56,549	-316.01	$64,238	495.29	$40,986	59.37	-$341,946	733.41	$27,679	-210.81	$96,297
$20.4m	381.03	$53,540	-333.80	$61,115	360.90	$56,526	-317.49	$64,254	497.14	$41,035	58.36	-$349,530	735.78	$27,726	-212.27	$96,104
$20.5m	383.04	$53,520	-335.33	$61,134	362.81	$56,503	-318.97	$64,270	498.99	$41,083	57.79	-$354,739	739.92	$27,706	-212.81	$96,332
$20.6m	385.05	$53,500	-336.86	$61,154	364.73	$56,480	-320.44	$64,286	500.85	$41,130	56.79	-$362,727	741.63	$27,777	-214.27	$96,141
$20.7m	387.06	$53,480	-338.39	$61,173	366.65	$56,458	-321.92	$64,303	502.71	$41,177	55.87	-$370,527	744.03	$27,822	-215.87	$95,892
$20.8m	389.07	$53,461	-339.91	$61,192	368.57	$56,434	-323.39	$64,319	504.57	$41,223	55.30	-$376,159	746.61	$27,859	-217.44	$95,661
$20.9m	391.09	$53,441	-341.44	$61,211	370.49	$56,411	-324.86	$64,335	506.44	$41,269	54.30	-$384,871	749.03	$27,903	-217.97	$95,885
$21.0m	393.10	$53,421	-342.97	$61,231	372.42	$56,388	-326.34	$64,351	508.31	$41,313	53.38	-$393,372	751.47	$27,945	-219.43	$95,703
$21.1m	395.12	$53,401	-344.49	$61,250	374.34	$56,365	-327.81	$64,367	510.06	$41,368	52.01	-$405,706	754.11	$27,980	-221.02	$95,464
$21.2m	397.14	$53,381	-346.01	$61,269	376.27	$56,342	-329.28	$64,383	511.94	$41,411	51.02	-$415,514	755.88	$28,047	-221.56	$95,686
$21.3m	399.17	$53,361	-347.54	$61,289	378.21	$56,319	-330.75	$64,399	513.82	$41,454	50.46	-$422,157	758.34	$28,088	-223.01	$95,510
$21.4m	401.19	$53,341	-349.06	$61,308	380.14	$56,295	-332.22	$64,415	515.57	$41,507	49.54	-$431,956	762.66	$28,060	-224.58	$95,291
$21.5m	403.22	$53,321	-350.58	$61,327	382.07	$56,272	-333.69	$64,431	517.46	$41,549	48.56	-$442,752	765.15	$28,099	-226.17	$95,062
$21.6m	405.24	$53,301	-352.10	$61,346	384.01	$56,249	-335.16	$64,447	519.35	$41,590	47.58	-$453,947	767.66	$28,137	-227.62	$94,894
$21.7m	407.27	$53,281	-353.62	$61,366	385.94	$56,226	-336.63	$64,463	521.11	$41,642	47.02	-$461,496	770.37	$28,168	-228.15	$95,112
$21.8m	409.30	$53,261	-355.14	$61,385	387.89	$56,202	-338.09	$64,479	523.01	$41,682	46.11	-$472,741	772.19	$28,231	-229.74	$94,889
$21.9m	411.33	$53,241	-356.65	$61,404	389.83	$56,179	-339.56	$64,495	524.78	$41,732	45.14	-$485,141	774.72	$28,268	-231.19	$94,726
$22.0m	413.37	$53,221	-358.17	$61,423	391.77	$56,155	-341.02	$64,511	526.68	$41,771	44.24	-$497,283	777.29	$28,304	-232.75	$94,522
$22.1m	415.40	$53,202	-359.69	$61,443	393.72	$56,132	-342.49	$64,527	528.58	$41,810	43.68	-$505,917	780.07	$28,331	-233.28	$94,736
$22.2m	417.44	$53,182	-361.20	$61,462	395.66	$56,109	-343.95	$64,543	530.36	$41,858	42.72	-$519,721	782.66	$28,365	-234.73	$94,577
$22.3m	419.48	$53,162	-362.71	$61,481	397.61	$56,085	-345.42	$64,559	532.27	$41,896	41.82	-$533,239	787.20	$28,328	-236.31	$94,366
$22.4m	421.51	$53,142	-364.22	$61,501	399.56	$56,061	-346.88	$64,576	534.05	$41,943	40.86	-$548,260	789.82	$28,361	-237.76	$94,213
$22.5m	423.56	$53,122	-365.73	$61,520	401.52	$56,038	-348.34	$64,591	535.97	$41,980	40.30	-$558,265	791.71	$28,420	-238.29	$94,423
$22.6m	425.60	$53,102	-367.24	$61,540	403.47	$56,014	-349.81	$64,607	537.72	$42,029	38.96	-$580,012	794.36	$28,451	-239.84	$94,230
$22.7m	427.64	$53,082	-368.75	$61,559	405.43	$55,991	-351.27	$64,623	539.64	$42,065	38.01	-$597,275	797.21	$28,474	-241.42	$94,027
$22.8m	429.69	$53,062	-370.26	$61,579	407.38	$55,967	-352.73	$64,639	541.43	$42,111	37.12	-$614,286	799.89	$28,504	-241.95	$94,235
$22.9m	431.74	$53,042	-371.76	$61,598	409.34	$55,944	-354.19	$64,655	543.18	$42,159	36.57	-$626,243	802.60	$28,532	-243.53	$94,035
$23.0m	433.79	$53,022	-373.27	$61,618	411.30	$55,920	-355.64	$64,671	545.11	$42,194	35.61	-$645,832	804.55	$28,587	-245.07	$93,851
$23.1m	435.84	$53,002	-374.77	$61,638	413.26	$55,897	-357.10	$64,687	546.87	$42,241	34.73	-$665,155	807.50	$28,607	-245.60	$94,057
$23.2m	437.89	$52,982	-376.27	$61,658	415.23	$55,873	-358.56	$64,703	548.66	$42,285	33.78	-$686,821	810.24	$28,633	-247.17	$93,862
$23.3m	439.94	$52,962	-377.77	$61,677	417.19	$55,849	-360.02	$64,719	550.59	$42,318	33.23	-$701,092	815.05	$28,587	-248.71	$93,684
$23.4m	442.00	$52,942	-379.27	$61,697	419.16	$55,825	-361.47	$64,735	552.36	$42,364	32.35	-$723,227	817.82	$28,612	-249.23	$93,888
$23.5m	444.05	$52,921	-380.77	$61,717	421.13	$55,802	-362.93	$64,751	554.29	$42,397	31.41	-$748,183	820.64	$28,636	-250.81	$93,698
$23.6m	446.11	$52,901	-382.27	$61,737	423.11	$55,778	-364.39	$64,766	556.06	$42,442	30.47	-$774,579	823.68	$28,652	-251.33	$93,901
$23.7m	448.17	$52,881	-383.76	$61,757	425.08	$55,754	-365.84	$64,782	557.86	$42,484	29.93	-$791,924	825.72	$28,702	-252.90	$93,715
$23.8m	450.24	$52,861	-385.26	$61,776	427.05	$55,731	-367.30	$64,798	559.80	$42,515	29.05	-$819,179	828.56	$28,724	-254.43	$93,542
$23.9m	452.30	$52,841	-386.75	$61,796	429.03	$55,706	-368.75	$64,813	561.57	$42,559	27.75	-$861,303	831.45	$28,745	-254.95	$93,743
$24.0m	454.37	$52,820	-388.25	$61,816	431.01	$55,683	-370.21	$64,829	563.39	$42,600	26.81	-$895,134	834.37	$28,764	-256.52	$93,561
$24.1m	456.44	$52,800	-389.74	$61,836	433.00	$55,659	-371.66	$64,845	565.33	$42,630	25.94	-$928,957	837.53	$28,775	-258.04	$93,395
$24.2m	458.51	$52,779	-391.23	$61,856	434.98	$55,635	-373.11	$64,860	567.11	$42,673	25.41	-$952,535	842.65	$28,719	-259.61	$93,218
$24.3m	460.59	$52,759	-392.72	$61,877	436.97	$55,611	-374.56	$64,876	569.06	$42,702	24.47	-$992,930	845.62	$28,736	-260.13	$93,416
$24.4m	462.66	$52,738	-394.21	$61,897	438.95	$55,587	-376.01	$64,892	570.84	$42,744	23.61	-$1.03m	847.75	$28,782	-261.68	$93,243
$24.5m	464.74	$52,718	-395.69	$61,917	440.94	$55,563	-377.46	$64,907	572.66	$42,783	22.68	-$1.08m	850.76	$28,798	-262.20	$93,439
$24.6m	466.82	$52,697	-397.18	$61,937	442.94	$55,538	-378.91	$64,923	574.61	$42,812	22.15	-$1.11m	853.82	$28,812	-263.73	$93,278
$24.7m	468.89	$52,677	-398.66	$61,957	444.93	$55,514	-380.36	$64,939	576.40	$42,853	21.22	-$1.16m	857.11	$28,818	-265.28	$93,109

	λ1								λ2							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$24.8m	470.98	$52,656	-400.15	$61,977	446.93	$55,490	-381.81	$64,954	578.19	$42,893	20.36	-$1.22m	860.21	$28,830	-265.80	$93,304
$24.9m	473.06	$52,636	-401.63	$61,997	448.93	$55,465	-383.25	$64,970	580.14	$42,920	19.83	-$1.26m	862.47	$28,871	-267.32	$93,148
$25.0m	475.15	$52,615	-403.11	$62,017	450.93	$55,441	-384.70	$64,985	581.97	$42,957	18.91	-$1.32m	865.62	$28,881	-268.87	$92,983
$25.1m	477.24	$52,594	-404.60	$62,037	452.93	$55,417	-386.15	$65,001	587.34	$42,735	18.06	-$1.39m	871.12	$28,814	-269.38	$93,175
$25.2m	479.32	$52,574	-406.08	$62,057	454.93	$55,393	-387.59	$65,017	589.14	$42,775	17.14	-$1.47m	874.32	$28,823	-270.93	$93,012
$25.3m	481.41	$52,554	-407.56	$62,078	456.94	$55,368	-389.04	$65,032	591.10	$42,802	15.87	-$1.59m	875.97	$28,882	-271.45	$93,204
$25.4m	483.51	$52,533	-409.03	$62,098	458.95	$55,344	-390.48	$65,048	592.94	$42,838	15.34	-$1.66m	879.42	$28,883	-272.96	$93,054
$25.5m	485.60	$52,512	-410.51	$62,118	460.96	$55,319	-391.92	$65,064	594.73	$42,876	14.49	-$1.76m	881.08	$28,942	-274.50	$92,895
$25.6m	487.70	$52,491	-411.99	$62,138	462.97	$55,295	-393.37	$65,079	596.70	$42,902	13.58	-$1.89m	882.74	$29,001	-275.02	$93,084
$25.7m	489.80	$52,471	-413.46	$62,158	464.99	$55,270	-394.81	$65,095	598.51	$42,940	12.74	-$2.02m	884.40	$29,059	-276.53	$92,938
$25.8m	491.90	$52,450	-414.93	$62,179	467.00	$55,246	-396.25	$65,111	600.48	$42,965	12.21	-$2.11m	886.07	$29,117	-278.07	$92,783
$25.9m	494.00	$52,429	-416.41	$62,199	469.02	$55,222	-397.69	$65,127	602.33	$43,000	11.30	-$2.29m	887.74	$29,175	-278.58	$92,971
$26.0m	496.11	$52,408	-417.88	$62,219	471.04	$55,197	-399.13	$65,142	604.13	$43,037	10.40	-$2.50m	889.42	$29,233	-280.12	$92,818
$26.1m	498.21	$52,387	-419.35	$62,240	473.06	$55,173	-400.56	$65,158	606.11	$43,061	9.56	-$2.73m	892.67	$29,238	-281.62	$92,677
$26.2m	500.33	$52,366	-420.81	$62,260	475.08	$55,149	-402.00	$65,174	607.93	$43,097	9.04	-$2.90m	894.35	$29,295	-282.14	$92,863
$26.3m	502.44	$52,345	-422.28	$62,281	477.11	$55,124	-403.43	$65,190	609.78	$43,130	8.14	-$3.23m	896.00	$29,353	-283.67	$92,714
$26.4m	504.55	$52,324	-423.75	$62,301	479.14	$55,099	-404.87	$65,206	611.77	$43,154	6.39	-$4.13m	897.68	$29,409	-284.18	$92,899
$26.5m	506.67	$52,303	-425.22	$62,321	481.17	$55,074	-406.30	$65,222	613.58	$43,189	5.56	-$4.77m	899.34	$29,466	-285.68	$92,761
$26.6m	508.79	$52,281	-426.68	$62,341	483.20	$55,050	-407.74	$65,238	615.57	$43,212	3.81	-$6.98m	901.03	$29,522	-287.21	$92,615
$26.7m	510.91	$52,260	-428.15	$62,362	485.23	$55,025	-409.17	$65,254	617.43	$43,244	2.91	-$9.16m	902.72	$29,577	-287.72	$92,799
$26.8m	513.03	$52,239	-429.61	$62,382	487.27	$55,000	-410.60	$65,270	619.26	$43,278	2.40	-$11.17m	904.38	$29,633	-289.25	$92,654
$26.9m	515.15	$52,217	-431.08	$62,402	489.31	$54,976	-412.03	$65,286	621.25	$43,300	0.66	-$40.73m	906.08	$29,688	-290.74	$92,522
$27.0m	517.28	$52,196	-432.54	$62,422	491.34	$54,951	-413.46	$65,302	623.08	$43,333	-0.17	$157.74m	907.79	$29,743	-291.25	$92,704
$27.1m	519.41	$52,175	-434.00	$62,442	493.39	$54,927	-414.89	$65,318	624.95	$43,364	-1.42	$19.12m	909.46	$29,798	-292.77	$92,563
$27.2m	521.54	$52,154	-435.46	$62,462	495.43	$54,902	-416.32	$65,334	626.95	$43,385	-3.15	$8.63m	912.76	$29,800	-293.28	$92,743
$27.3m	523.67	$52,133	-436.92	$62,483	497.48	$54,877	-417.75	$65,350	628.78	$43,417	-4.05	$6.75m	914.47	$29,853	-294.77	$92,614
$27.4m	525.80	$52,111	-438.38	$62,503	499.52	$54,852	-419.18	$65,366	630.79	$43,438	-5.78	$4.74m	916.15	$29,908	-296.29	$92,476
$27.5m	527.93	$52,090	-439.84	$62,523	501.57	$54,828	-420.60	$65,382	632.63	$43,470	-6.29	$4.37m	917.86	$29,961	-296.80	$92,655
$27.6m	530.07	$52,069	-441.29	$62,544	503.63	$54,803	-422.03	$65,398	634.50	$43,499	-7.12	$3.88m	919.58	$30,014	-298.32	$92,519
$27.7m	532.20	$52,048	-442.75	$62,564	505.68	$54,778	-423.46	$65,414	636.34	$43,530	-8.01	$3.46m	921.26	$30,067	-299.80	$92,394
$27.8m	534.34	$52,026	-444.20	$62,584	507.74	$54,753	-424.88	$65,430	638.36	$43,549	-9.73	$2.86m	922.98	$30,120	-300.31	$92,572
$27.9m	536.49	$52,005	-445.65	$62,605	509.80	$54,727	-426.30	$65,447	640.20	$43,580	-11.46	$2.44m	924.71	$30,172	-301.82	$92,439
$28.0m	538.63	$51,984	-447.10	$62,625	511.86	$54,702	-427.72	$65,463	642.09	$43,608	-12.34	$2.27m	926.40	$30,225	-302.33	$92,615
$28.1m	540.77	$51,963	-448.56	$62,646	513.92	$54,677	-429.15	$65,479	644.11	$43,626	-13.17	$2.13m	928.13	$30,276	-303.81	$92,493
$28.2m	542.92	$51,941	-450.01	$62,666	515.99	$54,653	-430.57	$65,495	645.96	$43,656	-14.89	$1.89m	930.55	$30,305	-305.32	$92,363
$28.3m	545.07	$51,920	-451.46	$62,686	518.05	$54,627	-431.98	$65,512	647.99	$43,674	-15.39	$1.84m	932.25	$30,357	-305.82	$92,537
$28.4m	547.23	$51,898	-452.91	$62,706	520.13	$54,602	-433.40	$65,528	649.88	$43,700	-17.11	$1.66m	933.98	$30,407	-307.33	$92,409
$28.5m	549.38	$51,876	-454.35	$62,726	522.20	$54,577	-434.82	$65,544	651.74	$43,729	-17.99	$1.58m	937.35	$30,405	-308.81	$92,291
$28.6m	551.54	$51,855	-455.80	$62,747	524.28	$54,551	-436.24	$65,560	653.77	$43,746	-18.81	$1.52m	939.09	$30,455	-309.31	$92,464
$28.7m	553.70	$51,833	-457.25	$62,767	526.36	$54,526	-437.66	$65,577	655.63	$43,775	-20.52	$1.40m	940.80	$30,506	-310.81	$92,338
$28.8m	555.86	$51,811	-458.69	$62,787	528.44	$54,501	-439.07	$65,593	657.67	$43,791	-22.27	$1.29m	942.54	$30,556	-312.29	$92,223
$28.9m	558.03	$51,790	-460.14	$62,808	530.52	$54,475	-440.49	$65,609	659.57	$43,816	-22.77	$1.27m	946.20	$30,543	-312.79	$92,395
$29.0m	560.19	$51,768	-461.58	$62,828	532.60	$54,450	-441.90	$65,626	661.44	$43,844	-24.48	$1.18m	947.95	$30,592	-314.29	$92,272
$29.1m	562.36	$51,746	-463.02	$62,848	534.69	$54,424	-443.31	$65,642	663.48	$43,859	-25.36	$1.15m	949.66	$30,642	-314.79	$92,443
$29.2m	564.53	$51,724	-464.46	$62,868	536.78	$54,399	-444.72	$65,659	665.35	$43,886	-27.06	$1.08m	951.42	$30,691	-316.26	$92,330
$29.3m	566.71	$51,702	-465.90	$62,888	538.87	$54,373	-446.14	$65,675	667.27	$43,911	-27.88	$1.05m	953.14	$30,740	-317.76	$92,209
$29.4m	568.88	$51,680	-467.34	$62,909	540.96	$54,347	-447.55	$65,691	669.32	$43,925	-29.62	$992,707	954.90	$30,789	-318.25	$92,379
$29.5m	571.06	$51,659	-468.78	$62,929	543.06	$54,322	-448.96	$65,708	671.19	$43,952	-30.84	$956,664	956.67	$30,836	-319.75	$92,260
$29.6m	573.24	$51,637	-470.22	$62,949	545.16	$54,296	-450.37	$65,724	673.07	$43,977	-31.71	$933,383	958.40	$30,885	-321.21	$92,151
$29.7m	575.42	$51,614	-471.66	$62,970	547.26	$54,270	-451.78	$65,740	675.13	$43,991	-33.41	$888,901	961.83	$30,879	-321.71	$92,319

	λ1								λ2							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$29.8m	577.61	$51,592	-473.09	$62,990	549.37	$54,244	-453.18	$65,757	677.05	$44,014	-33.91	$878,674	963.60	$30,926	-323.20	$92,202
$29.9m	579.79	$51,570	-474.53	$63,010	551.47	$54,219	-454.59	$65,773	678.94	$44,039	-35.65	$838,793	969.58	$30,838	-323.70	$92,369
$30.0m	581.98	$51,548	-475.96	$63,031	553.58	$54,193	-456.00	$65,790	681.00	$44,053	-37.34	$803,383	971.36	$30,885	-325.16	$92,262
$30.1m	584.17	$51,526	-477.39	$63,051	555.69	$54,166	-457.40	$65,806	682.93	$44,075	-38.15	$788,916	973.10	$30,932	-326.65	$92,148
$30.2m	586.36	$51,504	-478.82	$63,071	557.81	$54,140	-458.81	$65,823	684.82	$44,099	-39.03	$773,834	974.88	$30,978	-327.15	$92,313
$30.3m	588.55	$51,482	-480.25	$63,092	559.92	$54,114	-460.21	$65,839	686.90	$44,111	-40.72	$744,136	976.63	$31,025	-328.63	$92,200
$30.4m	590.75	$51,460	-481.68	$63,112	562.04	$54,088	-461.62	$65,856	688.79	$44,135	-42.44	$716,239	978.41	$31,071	-330.09	$92,097
$30.5m	592.95	$51,438	-483.11	$63,132	564.17	$54,062	-463.02	$65,872	690.87	$44,147	-44.13	$691,107	980.20	$31,116	-330.58	$92,261
$30.6m	595.15	$51,415	-484.54	$63,153	566.29	$54,036	-464.42	$65,889	692.81	$44,168	-44.94	$680,911	981.96	$31,162	-332.07	$92,150
$30.7m	597.36	$51,393	-485.97	$63,173	568.42	$54,010	-465.82	$65,905	694.71	$44,191	-45.81	$670,170	983.75	$31,207	-332.56	$92,314
$30.8m	599.57	$51,371	-487.39	$63,193	570.55	$53,983	-467.22	$65,922	696.80	$44,202	-46.31	$665,099	985.56	$31,251	-334.01	$92,213
$30.9m	601.77	$51,348	-488.82	$63,214	572.68	$53,957	-468.62	$65,938	698.70	$44,225	-47.99	$643,840	987.20	$31,301	-335.49	$92,104
$31.0m	603.99	$51,326	-490.24	$63,234	574.82	$53,930	-470.02	$65,955	700.65	$44,244	-49.71	$623,581	990.70	$31,291	-335.98	$92,266
$31.1m	606.20	$51,303	-491.66	$63,255	576.95	$53,904	-471.42	$65,971	702.75	$44,255	-51.39	$605,134	992.47	$31,336	-337.46	$92,159
$31.2m	608.41	$51,281	-493.08	$63,275	579.09	$53,878	-472.81	$65,988	704.66	$44,277	-52.26	$597,018	994.28	$31,380	-338.91	$92,060
$31.3m	610.63	$51,259	-494.50	$63,296	581.23	$53,852	-474.21	$66,005	706.76	$44,287	-53.06	$589,857	995.93	$31,428	-339.40	$92,221
$31.4m	612.85	$51,236	-495.93	$63,316	583.37	$53,826	-475.60	$66,021	708.67	$44,308	-54.78	$573,230	997.74	$31,471	-340.88	$92,116
$31.5m	615.07	$51,214	-497.35	$63,336	585.51	$53,799	-477.00	$66,038	710.63	$44,327	-56.45	$557,973	999.40	$31,519	-341.37	$92,276
$31.6m	617.29	$51,191	-498.76	$63,357	587.66	$53,772	-478.39	$66,055	712.56	$44,347	-56.95	$554,864	1001.17	$31,563	-342.81	$92,180
$31.7m	619.52	$51,169	-500.18	$63,377	589.81	$53,746	-479.79	$66,071	714.66	$44,357	-57.81	$548,312	1002.99	$31,605	-344.28	$92,076
$31.8m	621.75	$51,146	-501.60	$63,397	591.96	$53,719	-481.18	$66,088	716.59	$44,377	-59.49	$534,569	1004.65	$31,653	-344.77	$92,235
$31.9m	623.98	$51,124	-503.02	$63,417	594.12	$53,693	-482.57	$66,105	718.56	$44,394	-61.19	$521,285	1006.44	$31,696	-346.21	$92,141
$32.0m	626.21	$51,101	-504.43	$63,437	596.28	$53,666	-483.96	$66,121	720.67	$44,403	-62.00	$516,169	1008.10	$31,743	-347.68	$92,039
$32.1m	628.45	$51,078	-505.85	$63,458	598.44	$53,640	-485.35	$66,138	722.61	$44,422	-63.67	$504,201	1009.93	$31,785	-348.17	$92,197
$32.2m	630.69	$51,055	-507.26	$63,478	600.60	$53,613	-486.74	$66,154	724.73	$44,430	-64.86	$496,441	1011.60	$31,831	-349.63	$92,097
$32.3m	632.93	$51,033	-508.68	$63,498	602.77	$53,586	-488.13	$66,171	726.71	$44,447	-65.72	$491,470	1013.42	$31,872	-351.07	$92,005
$32.4m	635.17	$51,010	-510.09	$63,518	604.94	$53,559	-489.52	$66,187	728.65	$44,466	-67.42	$480,547	1015.22	$31,914	-351.56	$92,162
$32.5m	637.41	$50,987	-511.50	$63,539	607.11	$53,532	-490.91	$66,204	730.78	$44,473	-69.09	$470,405	1016.89	$31,960	-353.02	$92,063
$32.6m	639.66	$50,964	-512.91	$63,559	609.29	$53,505	-492.30	$66,220	732.72	$44,492	-69.58	$468,506	1018.73	$32,001	-353.51	$92,219
$32.7m	641.91	$50,941	-514.32	$63,579	611.46	$53,478	-493.68	$66,237	738.56	$44,275	-70.38	$464,623	1020.41	$32,046	-354.94	$92,129
$32.8m	644.17	$50,919	-515.73	$63,600	613.64	$53,452	-495.07	$66,254	740.55	$44,291	-72.04	$455,288	1023.98	$32,032	-356.40	$92,032
$32.9m	646.42	$50,896	-517.13	$63,620	615.82	$53,424	-496.45	$66,270	742.69	$44,299	-72.90	$451,311	1025.82	$32,072	-356.88	$92,187
$33.0m	648.68	$50,873	-518.54	$63,640	618.01	$53,397	-497.84	$66,287	744.64	$44,317	-74.59	$442,390	1027.62	$32,113	-358.34	$92,091
$33.1m	650.94	$50,850	-519.94	$63,661	620.20	$53,370	-499.22	$66,303	746.78	$44,324	-76.25	$434,076	1029.31	$32,158	-359.77	$92,004
$33.2m	653.20	$50,827	-521.34	$63,682	622.39	$53,343	-500.60	$66,320	748.74	$44,341	-77.05	$430,905	1031.15	$32,197	-360.25	$92,157
$33.3m	655.47	$50,803	-522.74	$63,702	624.58	$53,315	-501.99	$66,336	750.74	$44,356	-77.54	$429,468	1032.84	$32,241	-361.71	$92,063
$33.4m	657.74	$50,780	-524.14	$63,723	626.78	$53,288	-503.37	$66,353	752.70	$44,373	-79.23	$421,566	1034.69	$32,280	-362.19	$92,216
$33.5m	660.00	$50,757	-525.54	$63,744	628.98	$53,261	-504.75	$66,370	754.85	$44,379	-80.88	$414,174	1036.51	$32,320	-363.62	$92,130
$33.6m	662.27	$50,734	-526.93	$63,766	631.18	$53,233	-506.13	$66,386	756.82	$44,396	-81.74	$411,074	1038.20	$32,364	-365.07	$92,038
$33.7m	664.55	$50,711	-528.32	$63,787	633.39	$53,206	-507.51	$66,403	758.98	$44,402	-83.39	$404,129	1040.06	$32,402	-365.55	$92,190
$33.8m	666.83	$50,688	-529.71	$63,808	635.59	$53,179	-508.89	$66,420	760.99	$44,416	-85.07	$397,301	1041.76	$32,445	-367.00	$92,098
$33.9m	669.11	$50,664	-531.11	$63,829	637.81	$53,151	-510.26	$66,436	762.97	$44,432	-85.86	$394,811	1043.62	$32,483	-368.42	$92,015
$34.0m	671.40	$50,641	-532.50	$63,850	640.03	$53,123	-511.64	$66,453	765.13	$44,437	-86.71	$392,094	1045.45	$32,522	-368.90	$92,166
$34.1m	673.69	$50,617	-533.88	$63,872	642.24	$53,095	-513.02	$66,470	767.11	$44,452	-88.36	$385,911	1047.15	$32,564	-370.35	$92,076
$34.2m	675.97	$50,594	-535.27	$63,893	644.46	$53,067	-514.39	$66,486	769.14	$44,465	-88.85	$384,917	1049.02	$32,602	-370.83	$92,226
$34.3m	678.27	$50,570	-536.65	$63,915	646.68	$53,040	-515.77	$66,503	771.31	$44,470	-90.50	$379,025	1052.93	$32,576	-372.24	$92,144
$34.4m	680.56	$50,546	-538.03	$63,937	648.91	$53,012	-517.14	$66,520	773.30	$44,485	-92.17	$373,204	1054.64	$32,618	-373.69	$92,056
$34.5m	682.86	$50,523	-539.41	$63,959	651.14	$52,984	-518.51	$66,536	775.48	$44,489	-93.02	$370,881	1056.48	$32,656	-374.17	$92,204
$34.6m	685.16	$50,499	-540.79	$63,981	653.37	$52,956	-519.88	$66,553	777.47	$44,503	-93.81	$368,838	1058.35	$32,692	-375.58	$92,124
$34.7m	687.46	$50,476	-542.17	$64,002	655.61	$52,928	-521.26	$66,570	779.51	$44,515	-95.45	$363,542	1060.07	$32,734	-377.02	$92,037

	λ1								λ2							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$34.8m	689.76	$50,452	-543.54	$64,024	657.84	$52,900	-522.63	$66,587	781.51	$44,529	-97.12	$358,306	1063.71	$32,716	-377.50	$92,185
$34.9m	692.07	$50,429	-544.92	$64,046	660.09	$52,872	-524.00	$66,603	783.70	$44,532	-98.76	$353,375	1065.59	$32,752	-378.94	$92,099
$35.0m	694.38	$50,405	-546.30	$64,068	662.33	$52,844	-525.37	$66,620	785.70	$44,546	-99.94	$350,222	1067.31	$32,793	-380.35	$92,021
$35.1m	696.68	$50,382	-547.67	$64,090	664.58	$52,815	-526.73	$66,637	787.75	$44,557	-100.78	$348,282	1069.16	$32,830	-380.83	$92,168
$35.2m	698.99	$50,358	-549.04	$64,112	666.83	$52,787	-528.10	$66,654	789.95	$44,560	-101.27	$347,601	1071.79	$32,842	-382.26	$92,084
$35.3m	701.31	$50,335	-550.41	$64,134	669.08	$52,759	-529.47	$66,671	791.96	$44,573	-102.05	$345,914	1073.67	$32,878	-382.74	$92,230
$35.4m	703.62	$50,311	-551.78	$64,156	671.34	$52,731	-530.83	$66,688	794.17	$44,575	-103.68	$341,424	1075.40	$32,918	-384.14	$92,153
$35.5m	705.95	$50,287	-553.15	$64,178	673.60	$52,702	-532.20	$66,705	796.18	$44,588	-105.35	$336,966	1077.29	$32,953	-385.58	$92,070
$35.6m	708.27	$50,263	-554.52	$64,200	675.86	$52,674	-533.56	$66,722	798.25	$44,598	-106.98	$332,762	1079.02	$32,993	-386.05	$92,215
$35.7m	710.60	$50,239	-555.88	$64,222	678.12	$52,645	-534.92	$66,739	800.46	$44,599	-107.82	$331,095	1080.88	$33,029	-387.45	$92,140
$35.8m	712.93	$50,215	-557.24	$64,245	680.39	$52,617	-536.28	$66,756	802.48	$44,611	-109.49	$326,978	1082.78	$33,063	-388.88	$92,058
$35.9m	715.26	$50,191	-558.60	$64,267	682.65	$52,589	-537.64	$66,773	804.56	$44,621	-110.27	$325,573	1084.52	$33,102	-389.36	$92,202
$36.0m	717.60	$50,167	-559.96	$64,290	684.93	$52,560	-539.00	$66,790	806.59	$44,632	-111.90	$321,729	1086.42	$33,136	-390.79	$92,122
$36.1m	719.94	$50,143	-561.32	$64,313	687.20	$52,532	-540.36	$66,807	808.81	$44,633	-112.38	$321,238	1088.17	$33,175	-391.26	$92,265
$36.2m	722.28	$50,119	-562.68	$64,336	689.48	$52,503	-541.72	$66,824	810.85	$44,645	-113.22	$319,745	1090.03	$33,210	-392.66	$92,192
$36.3m	724.63	$50,095	-564.03	$64,358	691.77	$52,474	-543.08	$66,841	813.08	$44,645	-114.84	$316,092	1091.95	$33,243	-394.08	$92,112
$36.4m	726.98	$50,070	-565.38	$64,381	694.05	$52,445	-544.43	$66,859	815.17	$44,653	-116.50	$312,451	1093.69	$33,282	-394.56	$92,255
$36.5m	729.33	$50,046	-566.73	$64,404	696.34	$52,417	-545.79	$66,876	817.21	$44,664	-117.27	$311,235	1095.45	$33,320	-395.95	$92,183
$36.6m	731.68	$50,022	-568.08	$64,427	698.63	$52,388	-547.14	$66,893	819.45	$44,664	-118.90	$307,832	1097.37	$33,353	-397.37	$92,105
$36.7m	734.03	$49,998	-569.43	$64,450	700.93	$52,359	-548.49	$66,910	821.50	$44,674	-119.73	$306,520	1099.25	$33,387	-397.85	$92,246
$36.8m	736.39	$49,973	-570.78	$64,474	703.22	$52,330	-549.85	$66,928	823.60	$44,682	-121.38	$303,170	1102.97	$33,364	-399.27	$92,169
$36.9m	738.76	$49,949	-572.12	$64,497	705.52	$52,302	-551.20	$66,945	825.85	$44,681	-121.86	$302,798	1104.73	$33,402	-399.74	$92,310
$37.0m	741.12	$49,924	-573.46	$64,520	707.83	$52,272	-552.55	$66,962	827.91	$44,691	-123.48	$299,640	1106.66	$33,434	-401.13	$92,239
$37.1m	743.49	$49,900	-574.81	$64,544	710.14	$52,243	-553.90	$66,979	829.97	$44,700	-124.25	$298,580	1108.42	$33,471	-401.60	$92,380
$37.2m	745.86	$49,876	-576.15	$64,567	712.46	$52,214	-555.25	$66,997	832.23	$44,699	-125.87	$295,543	1110.35	$33,503	-403.02	$92,303
$37.3m	748.23	$49,851	-577.49	$64,590	714.78	$52,184	-556.60	$67,014	834.35	$44,706	-127.52	$292,508	1112.24	$33,536	-404.41	$92,234
$37.4m	750.60	$49,827	-578.82	$64,614	717.09	$52,155	-557.95	$67,032	836.42	$44,715	-128.35	$291,392	1114.01	$33,572	-404.88	$92,373
$37.5m	752.98	$49,802	-580.16	$64,637	719.41	$52,126	-559.29	$67,049	838.69	$44,713	-129.96	$288,548	1115.95	$33,604	-406.29	$92,298
$37.6m	755.37	$49,777	-581.50	$64,661	721.73	$52,097	-560.64	$67,066	840.76	$44,721	-130.44	$288,260	1117.73	$33,640	-407.68	$92,230
$37.7m	757.75	$49,752	-582.83	$64,684	724.06	$52,067	-561.98	$67,084	843.04	$44,719	-131.59	$286,491	1119.63	$33,672	-408.15	$92,369
$37.8m	760.14	$49,728	-584.17	$64,708	726.39	$52,038	-563.33	$67,101	845.17	$44,725	-133.24	$283,709	1121.58	$33,703	-409.56	$92,295
$37.9m	762.53	$49,703	-585.50	$64,731	728.72	$52,009	-564.67	$67,119	847.25	$44,733	-134.01	$282,825	1123.36	$33,738	-410.03	$92,433
$38.0m	764.93	$49,678	-586.83	$64,755	731.05	$51,980	-566.01	$67,136	849.54	$44,730	-135.61	$280,208	1125.31	$33,768	-411.44	$92,359
$38.1m	767.32	$49,653	-588.16	$64,779	733.39	$51,951	-567.35	$67,154	851.63	$44,738	-136.44	$279,239	1127.23	$33,800	-412.82	$92,293
$38.2m	769.72	$49,628	-589.48	$64,802	735.72	$51,922	-568.69	$67,171	853.77	$44,743	-138.05	$276,716	1129.02	$33,835	-413.29	$92,430
$38.3m	772.13	$49,603	-590.81	$64,826	738.06	$51,893	-570.03	$67,189	855.87	$44,750	-139.69	$274,187	1130.98	$33,865	-414.69	$92,358
$38.4m	774.53	$49,578	-592.14	$64,850	740.39	$51,864	-571.37	$67,207	858.17	$44,746	-140.51	$273,287	1137.59	$33,756	-416.07	$92,293
$38.5m	776.95	$49,553	-593.46	$64,874	742.74	$51,835	-572.71	$67,224	860.28	$44,753	-141.28	$272,511	1141.40	$33,730	-416.54	$92,429
$38.6m	779.36	$49,528	-594.78	$64,898	745.08	$51,807	-574.05	$67,242	862.59	$44,749	-142.88	$270,156	1143.20	$33,765	-417.94	$92,358
$38.7m	781.78	$49,503	-596.10	$64,922	747.42	$51,778	-575.38	$67,259	864.74	$44,753	-143.35	$269,960	1145.16	$33,794	-418.41	$92,494
$38.8m	784.19	$49,478	-597.42	$64,946	749.77	$51,749	-576.72	$67,277	866.85	$44,760	-144.99	$267,609	1147.09	$33,825	-419.81	$92,423
$38.9m	786.62	$49,452	-598.74	$64,970	752.12	$51,721	-578.06	$67,295	869.17	$44,755	-146.59	$265,372	1148.89	$33,859	-420.28	$92,558
$39.0m	789.04	$49,427	-600.05	$64,994	754.47	$51,692	-579.39	$67,312	871.29	$44,761	-148.34	$262,917	1150.87	$33,887	-421.67	$92,488
$39.1m	791.47	$49,402	-601.37	$65,018	756.82	$51,664	-580.72	$67,330	873.46	$44,764	-149.16	$262,136	1152.68	$33,921	-422.14	$92,623
$39.2m	793.90	$49,376	-602.68	$65,042	759.17	$51,635	-582.06	$67,348	875.79	$44,759	-149.92	$261,468	1154.65	$33,950	-423.54	$92,554
$39.3m	796.33	$49,351	-604.00	$65,067	761.52	$51,607	-583.39	$67,365	877.92	$44,765	-151.52	$259,374	1156.60	$33,979	-424.00	$92,688
$39.4m	798.77	$49,326	-605.31	$65,091	763.88	$51,579	-584.72	$67,383	880.06	$44,770	-153.26	$257,072	1158.41	$34,012	-425.40	$92,620
$39.5m	801.21	$49,301	-606.62	$65,115	766.23	$51,551	-586.05	$67,400	882.40	$44,764	-154.89	$255,015	1160.40	$34,040	-425.86	$92,753
$39.6m	803.65	$49,275	-607.92	$65,140	768.59	$51,523	-587.38	$67,418	884.58	$44,767	-156.49	$253,059	1162.22	$34,073	-427.25	$92,685
$39.7m	806.09	$49,250	-609.23	$65,164	770.94	$51,495	-588.71	$67,436	886.73	$44,771	-158.23	$250,904	1164.21	$34,100	-427.72	$92,819

	λ1								*λ2*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$39.8m	808.54	$49,225	-610.54	$65,189	773.30	$51,468	-590.04	$67,453	889.08	$44,766	-159.05	$250,239	1166.17	$34,129	-429.10	$92,751
$39.9m	810.99	$49,199	-611.84	$65,213	775.66	$51,440	-591.36	$67,471	891.23	$44,770	-159.52	$250,126	1168.00	$34,161	-429.57	$92,884
$40.0m	813.45	$49,173	-613.14	$65,237	778.03	$51,412	-592.69	$67,489	893.43	$44,771	-161.14	$248,227	1170.00	$34,188	-430.95	$92,817
$40.1m	815.91	$49,148	-614.45	$65,262	780.40	$51,384	-594.02	$67,506	895.79	$44,765	-161.90	$247,678	1171.83	$34,220	-431.42	$92,950
$40.2m	818.37	$49,122	-615.75	$65,286	782.77	$51,356	-595.34	$67,524	897.95	$44,769	-163.49	$245,881	1173.84	$34,247	-432.80	$92,884
$40.3m	820.84	$49,096	-617.05	$65,311	785.14	$51,329	-596.67	$67,542	900.12	$44,772	-165.23	$243,899	1177.74	$34,218	-433.26	$93,015
$40.4m	823.31	$49,070	-618.35	$65,335	787.51	$51,301	-597.99	$67,560	902.49	$44,765	-166.82	$242,179	1179.71	$34,246	-434.64	$92,950
$40.5m	825.78	$49,045	-619.65	$65,360	789.88	$51,274	-599.31	$67,578	904.71	$44,766	-168.56	$240,278	1181.56	$34,277	-435.10	$93,081
$40.6m	828.25	$49,019	-620.94	$65,384	792.25	$51,246	-600.63	$67,596	906.88	$44,769	-169.37	$239,708	1183.57	$34,303	-436.48	$93,016
$40.7m	830.73	$48,993	-622.24	$65,409	794.63	$51,219	-601.95	$67,613	909.27	$44,761	-170.99	$238,024	1185.42	$34,334	-436.94	$93,147
$40.8m	833.21	$48,967	-623.53	$65,434	797.01	$51,191	-603.27	$67,631	911.45	$44,764	-171.75	$237,556	1187.44	$34,360	-437.40	$93,278
$40.9m	835.69	$48,941	-624.82	$65,458	799.39	$51,164	-604.59	$67,649	917.99	$44,554	-173.48	$235,760	1189.43	$34,386	-438.78	$93,213
$41.0m	838.18	$48,916	-626.12	$65,483	801.77	$51,137	-605.91	$67,667	920.23	$44,554	-175.07	$234,199	1191.28	$34,417	-439.24	$93,344
$41.1m	840.67	$48,890	-627.41	$65,508	804.16	$51,110	-607.23	$67,684	922.63	$44,547	-175.53	$234,143	1193.31	$34,442	-440.61	$93,279
$41.2m	843.17	$48,863	-628.69	$65,533	806.54	$51,082	-608.55	$67,702	924.82	$44,549	-176.67	$233,204	1197.57	$34,403	-441.07	$93,409
$41.3m	845.67	$48,837	-629.98	$65,557	808.93	$51,055	-609.86	$67,720	927.02	$44,552	-177.48	$232,697	1199.43	$34,433	-442.44	$93,346
$41.4m	848.16	$48,811	-631.27	$65,582	811.32	$51,028	-611.18	$67,738	929.42	$44,544	-179.10	$231,159	1201.47	$34,458	-442.90	$93,475
$41.5m	850.67	$48,785	-632.55	$65,607	813.71	$51,001	-612.49	$67,756	931.68	$44,543	-180.83	$229,501	1203.47	$34,484	-444.27	$93,412
$41.6m	853.18	$48,758	-633.83	$65,632	816.10	$50,974	-613.81	$67,774	933.88	$44,545	-182.41	$228,061	1205.34	$34,513	-444.72	$93,541
$41.7m	855.70	$48,732	-635.12	$65,657	818.49	$50,947	-615.12	$67,792	936.30	$44,537	-184.13	$226,466	1207.38	$34,538	-446.09	$93,479
$41.8m	858.21	$48,706	-636.40	$65,682	820.89	$50,920	-616.43	$67,810	938.52	$44,538	-184.89	$226,082	1209.26	$34,567	-446.55	$93,607
$41.9m	860.73	$48,680	-637.68	$65,707	823.28	$50,894	-617.74	$67,828	940.95	$44,529	-186.47	$224,706	1211.31	$34,591	-447.91	$93,545
$42.0m	863.25	$48,654	-638.96	$65,732	825.68	$50,867	-619.05	$67,846	943.22	$44,528	-188.08	$223,315	1213.33	$34,616	-448.37	$93,673
$42.1m	865.77	$48,627	-640.23	$65,757	828.08	$50,841	-620.36	$67,864	945.45	$44,529	-188.89	$222,884	1217.33	$34,584	-449.73	$93,612
$42.2m	868.29	$48,601	-641.51	$65,782	830.48	$50,814	-621.67	$67,882	947.68	$44,530	-190.61	$221,394	1219.22	$34,612	-450.18	$93,739
$42.3m	870.83	$48,574	-642.79	$65,807	832.88	$50,787	-622.98	$67,900	950.12	$44,521	-191.08	$221,377	1221.28	$34,636	-451.54	$93,678
$42.4m	873.37	$48,548	-644.06	$65,832	835.29	$50,761	-624.29	$67,918	952.36	$44,521	-192.65	$220,087	1223.35	$34,659	-452.00	$93,806
$42.5m	875.91	$48,521	-645.33	$65,857	837.70	$50,734	-625.59	$67,936	954.65	$44,519	-194.26	$218,784	1225.24	$34,687	-453.36	$93,745
$42.6m	878.45	$48,494	-646.61	$65,882	840.10	$50,708	-626.90	$67,954	957.11	$44,509	-195.98	$217,374	1227.27	$34,711	-453.81	$93,872
$42.7m	881.00	$48,468	-647.88	$65,907	842.51	$50,682	-628.20	$67,972	959.36	$44,509	-196.73	$217,051	1229.35	$34,734	-455.16	$93,812
$42.8m	883.55	$48,441	-649.15	$65,932	844.92	$50,655	-629.51	$67,990	961.83	$44,498	-198.30	$215,835	1231.25	$34,761	-455.62	$93,939
$42.9m	886.11	$48,414	-650.42	$65,957	847.34	$50,629	-630.81	$68,008	964.09	$44,498	-199.11	$215,461	1233.34	$34,784	-456.97	$93,879
$43.0m	888.67	$48,387	-651.69	$65,983	849.76	$50,603	-632.11	$68,026	966.40	$44,495	-200.68	$214,275	1235.25	$34,811	-457.42	$94,005
$43.1m	891.23	$48,360	-652.95	$66,008	852.17	$50,577	-633.42	$68,044	968.67	$44,494	-202.28	$213,074	1237.29	$34,834	-457.87	$94,131
$43.2m	893.80	$48,333	-654.22	$66,033	854.59	$50,551	-634.72	$68,062	971.15	$44,483	-202.74	$213,080	1239.39	$34,856	-459.22	$94,072
$43.3m	896.37	$48,306	-655.49	$66,058	857.01	$50,525	-636.02	$68,080	973.43	$44,482	-203.49	$212,787	1241.30	$34,883	-459.67	$94,197
$43.4m	898.95	$48,279	-656.75	$66,083	859.43	$50,499	-637.32	$68,098	975.76	$44,478	-205.06	$211,650	1243.41	$34,904	-461.02	$94,139
$43.5m	901.52	$48,252	-658.01	$66,108	861.85	$50,473	-638.62	$68,116	978.26	$44,467	-205.86	$211,307	1245.33	$34,930	-461.47	$94,264
$43.6m	904.11	$48,224	-659.27	$66,134	864.28	$50,447	-639.91	$68,134	980.54	$44,465	-207.46	$210,163	1247.39	$34,953	-462.82	$94,205
$43.7m	906.70	$48,197	-660.53	$66,159	866.71	$50,421	-641.21	$68,152	982.84	$44,463	-209.02	$209,071	1249.51	$34,974	-463.27	$94,330
$43.8m	909.29	$48,169	-661.79	$66,184	869.14	$50,395	-642.51	$68,170	985.35	$44,451	-209.82	$208,747	1252.45	$34,971	-464.61	$94,272
$43.9m	911.89	$48,142	-663.05	$66,209	871.57	$50,369	-643.81	$68,188	987.70	$44,447	-210.57	$208,481	1254.39	$34,997	-465.06	$94,396
$44.0m	914.49	$48,114	-664.30	$66,235	874.00	$50,343	-645.10	$68,207	990.01	$44,444	-212.13	$207,420	1258.49	$34,962	-466.40	$94,339
$44.1m	917.09	$48,087	-665.56	$66,260	876.44	$50,317	-646.39	$68,225	992.53	$44,432	-213.72	$206,344	1260.62	$34,983	-466.85	$94,463
$44.2m	919.69	$48,060	-666.81	$66,286	878.87	$50,292	-647.69	$68,243	994.85	$44,429	-214.18	$206,366	1262.70	$35,004	-468.19	$94,406
$44.3m	922.30	$48,032	-668.06	$66,311	881.31	$50,266	-648.98	$68,261	997.22	$44,424	-215.30	$205,760	1264.64	$35,030	-468.64	$94,530
$44.4m	924.91	$48,005	-669.31	$66,337	883.75	$50,240	-650.27	$68,279	999.76	$44,411	-216.86	$204,744	1266.77	$35,050	-469.97	$94,473
$44.5m	927.53	$47,977	-670.56	$66,362	886.19	$50,215	-651.56	$68,297	1002.08	$44,407	-217.66	$204,450	1268.72	$35,075	-470.42	$94,596
$44.6m	930.16	$47,949	-671.81	$66,388	888.64	$50,189	-652.85	$68,316	1004.42	$44,404	-219.24	$203,426	1270.86	$35,094	-471.76	$94,540
$44.7m	932.78	$47,921	-673.06	$66,413	891.08	$50,164	-654.14	$68,334	1006.98	$44,390	-219.99	$203,193	1272.95	$35,115	-472.20	$94,663

	λ1								*λ2*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$44.8m	935.41	$47,893	-674.30	$66,439	893.53	$50,138	-655.43	$68,352	1009.37	$44,384	-221.54	$202,220	1274.91	$35,140	-473.54	$94,608
$44.9m	938.05	$47,865	-675.55	$66,465	895.98	$50,113	-656.72	$68,370	1011.71	$44,380	-223.09	$201,262	1277.06	$35,159	-473.98	$94,730
$45.0m	940.69	$47,837	-676.79	$66,490	898.43	$50,087	-658.01	$68,388	1014.28	$44,366	-224.67	$200,290	1279.03	$35,183	-475.31	$94,675
$45.1m	943.33	$47,809	-678.04	$66,516	900.89	$50,062	-659.30	$68,406	1016.64	$44,362	-225.13	$200,325	1281.19	$35,202	-475.76	$94,797
$45.2m	945.98	$47,781	-679.28	$66,541	903.34	$50,036	-660.58	$68,424	1019.00	$44,357	-225.93	$200,060	1283.30	$35,222	-476.20	$94,918
$45.3m	948.63	$47,753	-680.52	$66,567	905.80	$50,011	-661.87	$68,443	1021.42	$44,350	-226.67	$199,847	1285.28	$35,245	-477.53	$94,864
$45.4m	951.29	$47,725	-681.76	$66,592	908.26	$49,986	-663.15	$68,461	1024.01	$44,336	-228.22	$198,930	1287.45	$35,264	-477.97	$94,985
$45.5m	953.96	$47,696	-683.00	$66,618	910.72	$49,960	-664.44	$68,479	1026.38	$44,331	-229.80	$197,999	1289.43	$35,287	-479.30	$94,931
$45.6m	956.62	$47,668	-684.24	$66,644	913.19	$49,935	-665.72	$68,497	1028.99	$44,316	-231.34	$197,109	1291.61	$35,305	-479.74	$95,051
$45.7m	959.30	$47,639	-685.47	$66,669	915.65	$49,910	-667.00	$68,515	1031.37	$44,310	-232.14	$196,864	1295.83	$35,267	-481.07	$94,998
$45.8m	961.97	$47,611	-686.71	$66,695	918.13	$49,884	-668.29	$68,533	1033.81	$44,302	-232.88	$196,669	1297.97	$35,286	-481.51	$95,118
$45.9m	964.64	$47,582	-687.94	$66,721	920.60	$49,859	-669.57	$68,552	1036.20	$44,296	-234.42	$195,802	1299.96	$35,309	-482.83	$95,065
$46.0m	967.33	$47,554	-689.17	$66,747	923.07	$49,834	-670.85	$68,570	1038.83	$44,281	-234.88	$195,847	1302.15	$35,326	-483.27	$95,185
$46.1m	970.02	$47,525	-690.40	$66,772	925.54	$49,809	-672.13	$68,588	1041.23	$44,274	-236.45	$194,966	1304.15	$35,349	-484.59	$95,132
$46.2m	972.71	$47,496	-691.63	$66,798	928.02	$49,783	-673.41	$68,606	1043.87	$44,258	-237.25	$194,735	1306.35	$35,366	-485.03	$95,252
$46.3m	975.41	$47,467	-692.86	$66,824	930.50	$49,758	-674.69	$68,624	1046.33	$44,250	-238.78	$193,899	1308.50	$35,384	-486.35	$95,199
$46.4m	978.11	$47,438	-694.09	$66,850	932.98	$49,733	-675.96	$68,643	1048.75	$44,243	-240.35	$193,049	1310.71	$35,401	-486.79	$95,318
$46.5m	980.81	$47,410	-695.32	$66,876	935.47	$49,708	-677.24	$68,661	1051.18	$44,236	-241.09	$192,874	1312.72	$35,423	-488.11	$95,266
$46.6m	983.52	$47,381	-696.54	$66,902	937.95	$49,683	-678.52	$68,679	1053.84	$44,219	-242.63	$192,065	1314.94	$35,439	-488.55	$95,385
$46.7m	986.23	$47,352	-697.77	$66,928	940.44	$49,658	-679.79	$68,697	1056.33	$44,210	-243.42	$191,852	1316.96	$35,460	-489.86	$95,333
$46.8m	988.95	$47,323	-698.99	$66,953	942.93	$49,633	-681.07	$68,715	1058.76	$44,202	-244.52	$191,397	1319.14	$35,478	-490.30	$95,452
$46.9m	991.67	$47,294	-700.22	$66,979	945.42	$49,608	-682.35	$68,734	1061.44	$44,185	-244.97	$191,450	1321.36	$35,494	-490.74	$95,571
$47.0m	994.40	$47,265	-701.44	$67,005	947.91	$49,583	-683.62	$68,752	1063.89	$44,177	-246.54	$190,640	1328.87	$35,368	-492.05	$95,519
$47.1m	997.13	$47,235	-702.66	$67,031	950.41	$49,558	-684.89	$68,770	1065.65	$44,198	-248.07	$189,865	1330.91	$35,389	-492.49	$95,637
$47.2m	999.87	$47,206	-703.89	$67,056	952.91	$49,533	-686.17	$68,788	1068.35	$44,180	-248.80	$189,707	1333.14	$35,405	-493.80	$95,586
$47.3m	1002.61	$47,177	-705.11	$67,082	955.41	$49,508	-687.44	$68,806	1070.81	$44,172	-250.34	$188,947	1335.19	$35,426	-494.23	$95,704
$47.4m	1005.35	$47,148	-706.33	$67,108	957.91	$49,483	-688.71	$68,825	1073.32	$44,162	-251.12	$188,751	1339.54	$35,385	-495.54	$95,653
$47.5m	1008.10	$47,118	-707.55	$67,134	960.41	$49,458	-689.98	$68,843	1075.80	$44,153	-252.69	$187,981	1341.74	$35,402	-495.29	$95,904
$47.6m	1010.85	$47,089	-708.76	$67,159	962.92	$49,433	-691.25	$68,861	1078.51	$44,135	-254.21	$187,244	1343.98	$35,417	-495.73	$96,021
$47.7m	1013.60	$47,060	-709.98	$67,185	965.43	$49,408	-692.52	$68,879	1080.99	$44,126	-254.94	$187,100	1346.04	$35,437	-497.03	$95,970
$47.8m	1016.37	$47,030	-711.19	$67,211	967.94	$49,383	-693.78	$68,897	1083.54	$44,115	-255.40	$187,160	1348.29	$35,452	-497.47	$96,087
$47.9m	1019.14	$47,000	-712.41	$67,237	970.46	$49,358	-695.05	$68,916	1086.27	$44,096	-256.95	$186,415	1350.36	$35,472	-498.77	$96,036
$48.0m	1021.92	$46,971	-713.62	$67,263	972.97	$49,333	-696.32	$68,934	1088.77	$44,087	-258.48	$185,702	1352.62	$35,487	-499.21	$96,153
$48.1m	1024.69	$46,941	-714.83	$67,289	975.49	$49,309	-697.58	$68,952	1091.28	$44,077	-259.27	$185,524	1354.85	$35,502	-500.51	$96,102
$48.2m	1027.47	$46,911	-716.04	$67,314	978.01	$49,284	-698.85	$68,970	1094.03	$44,057	-260.79	$184,825	1356.92	$35,522	-500.94	$96,219
$48.3m	1030.26	$46,882	-717.25	$67,340	980.53	$49,259	-700.11	$68,989	1096.60	$44,045	-262.34	$184,112	1359.20	$35,536	-502.24	$96,169
$48.4m	1033.05	$46,851	-718.46	$67,366	983.06	$49,234	-701.38	$69,007	1099.13	$44,035	-263.07	$183,982	1363.96	$35,485	-502.68	$96,285
$48.5m	1035.85	$46,821	-719.67	$67,392	985.59	$49,209	-702.64	$69,025	1102.50	$43,991	-263.85	$183,815	1366.05	$35,504	-503.11	$96,401
$48.6m	1038.65	$46,792	-720.87	$67,418	988.12	$49,184	-703.90	$69,044	1105.88	$43,947	-265.37	$183,139	1368.34	$35,517	-504.41	$96,351
$48.7m	1041.45	$46,762	-722.08	$67,444	990.65	$49,160	-705.16	$69,062	1108.42	$43,936	-265.82	$183,205	1370.58	$35,532	-505.70	$96,302
$48.8m	1044.26	$46,731	-723.28	$67,470	993.19	$49,135	-706.43	$69,080	1111.80	$43,893	-267.37	$182,517	1372.88	$35,546	-507.00	$96,253
$48.9m	1047.08	$46,701	-724.48	$67,496	995.73	$49,110	-707.69	$69,098	1114.58	$43,873	-268.89	$181,859	1374.98	$35,564	-508.29	$96,205
$49.0m	1049.90	$46,671	-725.69	$67,522	998.26	$49,085	-708.95	$69,117	1117.97	$43,830	-269.61	$181,741	1377.29	$35,577	-509.58	$96,158
$49.1m	1052.72	$46,641	-726.89	$67,548	1000.81	$49,061	-710.21	$69,135	1121.36	$43,786	-270.40	$181,586	1379.41	$35,595	-510.87	$96,111
$49.2m	1055.56	$46,611	-728.09	$67,574	1003.35	$49,036	-711.46	$69,153	1124.76	$43,743	-271.91	$180,942	1383.89	$35,552	-512.15	$96,065
$49.3m	1058.39	$46,580	-729.29	$67,600	1005.89	$49,011	-712.72	$69,171	1127.30	$43,733	-273.46	$180,285	1386.16	$35,566	-513.44	$96,019
$49.4m	1061.23	$46,550	-730.48	$67,626	1008.44	$48,987	-713.98	$69,190	1130.71	$43,690	-274.54	$179,937	1388.48	$35,578	-514.72	$95,974
$49.5m	1064.08	$46,519	-731.68	$67,653	1010.99	$48,962	-715.24	$69,208	1134.11	$43,646	-276.05	$179,314	1390.61	$35,596	-516.00	$95,930
$49.6m	1066.93	$46,489	-732.88	$67,679	1013.54	$48,937	-716.49	$69,226	1136.72	$43,634	-276.78	$179,207	1392.94	$35,608	-517.28	$95,886
$49.7m	1069.79	$46,458	-734.07	$67,705	1016.10	$48,913	-717.75	$69,245	1140.13	$43,592	-277.22	$179,278	1395.08	$35,625	-518.56	$95,843

Budget impact	*λ1*								*λ2*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_G^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_G^-)}$[d]	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_P^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_P^-)}$[d]	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_G^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_G^-)}$[d]	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_P^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_P^-)}$[d]
$49.8m	1072.66	$46,427	-735.27	$67,731	1018.65	$48,888	-719.00	$69,263	1142.92	$43,573	-278.00	$179,136	1397.37	$35,638	-519.83	$95,801
$49.9m	1075.53	$46,396	-736.46	$67,757	1021.22	$48,863	-720.25	$69,281	1146.34	$43,530	-279.54	$178,505	1399.72	$35,650	-521.10	$95,758
$50.0m	1078.39	$46,365	-737.65	$67,783	1023.78	$48,839	-721.51	$69,299	1148.90	$43,520	-281.05	$177,903	1401.87	$35,667	-522.37	$95,717

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment;
[c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

Table A2.3.2: Optimal numerical thresholds (threshold sets λ3 and λ4)

	λ3								*λ4*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$
$0.1m	5.02	$19,920	9.31	-$10,740	33.89	$2,951	10.43	-$9,586	-9.31	-$10,740	-5.02	$19,920	-10.43	-$9,586	-33.89	$2,951
$0.2m	9.77	$20,476	18.50	-$10,810	53.80	$3,718	20.65	-$9,686	-18.50	-$10,810	-9.77	$20,476	-20.65	-$9,686	-53.80	$3,718
$0.3m	14.29	$20,989	27.57	-$10,883	70.49	$4,256	30.67	-$9,782	-27.57	-$10,883	-14.29	$20,989	-30.67	-$9,782	-70.49	$4,256
$0.4m	18.63	$21,466	36.51	-$10,957	85.40	$4,684	40.50	-$9,876	-36.51	-$10,957	-18.63	$21,466	-40.50	-$9,876	-85.40	$4,684
$0.5m	22.82	$21,914	45.32	-$11,032	99.09	$5,046	50.17	-$9,967	-45.32	-$11,032	-22.82	$21,914	-50.17	-$9,967	-99.09	$5,046
$0.6m	26.86	$22,337	54.01	-$11,110	111.90	$5,362	59.67	-$10,055	-54.01	-$11,110	-26.86	$22,337	-59.67	-$10,055	-111.90	$5,362
$0.7m	30.78	$22,738	62.56	-$11,189	124.01	$5,645	69.02	-$10,141	-62.56	-$11,189	-30.78	$22,738	-69.02	-$10,141	-124.01	$5,645
$0.8m	34.60	$23,121	70.98	-$11,270	135.56	$5,902	78.24	-$10,225	-70.98	-$11,270	-34.60	$23,121	-78.24	-$10,225	-135.56	$5,902
$0.9m	38.32	$23,486	79.27	-$11,353	146.63	$6,138	87.32	-$10,307	-79.27	-$11,353	-38.32	$23,486	-87.32	-$10,307	-146.63	$6,138
$1.0m	41.95	$23,836	87.42	-$11,439	157.30	$6,357	96.27	-$10,387	-87.42	-$11,439	-41.95	$23,836	-96.27	-$10,387	-157.30	$6,357
$1.1m	45.51	$24,173	95.43	-$11,526	167.62	$6,562	105.11	-$10,465	-95.43	-$11,526	-45.51	$24,173	-105.11	-$10,465	-167.62	$6,562
$1.2m	48.98	$24,498	103.30	-$11,616	177.63	$6,756	113.83	-$10,542	-103.30	-$11,616	-48.98	$24,498	-113.83	-$10,542	-177.63	$6,756
$1.3m	52.40	$24,811	111.03	-$11,709	187.37	$6,938	122.45	-$10,617	-111.03	-$11,709	-52.40	$24,811	-122.45	-$10,617	-187.37	$6,938
$1.4m	55.74	$25,115	118.61	-$11,804	196.86	$7,112	130.97	-$10,690	-118.61	-$11,804	-55.74	$25,115	-130.97	-$10,690	-196.86	$7,112
$1.5m	59.03	$25,409	126.03	-$11,902	206.12	$7,277	139.38	-$10,762	-126.03	-$11,902	-59.03	$25,409	-139.38	-$10,762	-206.12	$7,277
$1.6m	62.27	$25,694	133.31	-$12,002	215.18	$7,435	147.71	-$10,832	-133.31	-$12,002	-62.27	$25,694	-147.71	-$10,832	-215.18	$7,435
$1.7m	65.46	$25,972	140.43	-$12,106	224.06	$7,587	155.94	-$10,901	-140.43	-$12,106	-65.46	$25,972	-155.94	-$10,901	-224.06	$7,587
$1.8m	68.59	$26,242	147.38	-$12,213	232.76	$7,733	164.09	-$10,969	-147.38	-$12,213	-68.59	$26,242	-164.09	-$10,969	-232.76	$7,733
$1.9m	71.68	$26,505	154.18	-$12,323	241.30	$7,874	172.16	-$11,036	-154.18	-$12,323	-71.68	$26,505	-172.16	-$11,036	-241.30	$7,874
$2.0m	74.73	$26,762	160.81	-$12,437	249.70	$8,010	180.15	-$11,102	-160.81	-$12,437	-74.73	$26,762	-180.15	-$11,102	-249.70	$8,010
$2.1m	77.74	$27,012	167.26	-$12,555	257.95	$8,141	188.07	-$11,166	-167.26	-$12,555	-77.74	$27,012	-188.07	-$11,166	-257.95	$8,141
$2.2m	80.71	$27,257	173.54	-$12,677	266.08	$8,268	195.91	-$11,230	-173.54	-$12,677	-80.71	$27,257	-195.91	-$11,230	-266.08	$8,268
$2.3m	83.65	$27,497	179.63	-$12,804	274.08	$8,392	203.68	-$11,292	-179.63	-$12,804	-83.65	$27,497	-203.68	-$11,292	-274.08	$8,392
$2.4m	86.55	$27,731	185.54	-$12,935	281.97	$8,512	211.38	-$11,354	-185.54	-$12,935	-86.55	$27,731	-211.38	-$11,354	-281.97	$8,512
$2.5m	89.41	$27,960	191.25	-$13,072	289.75	$8,628	219.02	-$11,415	-191.25	-$13,072	-89.41	$27,960	-219.02	-$11,415	-289.75	$8,628
$2.6m	92.25	$28,185	196.77	-$13,214	297.43	$8,742	226.59	-$11,474	-196.77	-$13,214	-92.25	$28,185	-226.59	-$11,474	-297.43	$8,742
$2.7m	95.05	$28,406	202.07	-$13,361	305.00	$8,852	234.10	-$11,533	-202.07	-$13,361	-95.05	$28,406	-234.10	-$11,533	-305.00	$8,852
$2.8m	97.83	$28,622	207.16	-$13,516	312.49	$8,960	241.56	-$11,591	-207.16	-$13,516	-97.83	$28,622	-241.56	-$11,591	-312.49	$8,960
$2.9m	100.57	$28,835	212.02	-$13,678	319.89	$9,066	248.95	-$11,649	-212.02	-$13,678	-100.57	$28,835	-248.95	-$11,649	-319.89	$9,066
$3.0m	103.29	$29,043	216.65	-$13,847	327.20	$9,169	256.29	-$11,705	-216.65	-$13,847	-103.29	$29,043	-256.29	-$11,705	-327.20	$9,169
$3.1m	105.99	$29,249	221.02	-$14,026	334.43	$9,270	263.58	-$11,761	-221.02	-$14,026	-105.99	$29,249	-263.58	-$11,761	-334.43	$9,270
$3.2m	108.66	$29,450	225.13	-$14,214	341.58	$9,368	270.81	-$11,816	-225.13	-$14,214	-108.66	$29,450	-270.81	-$11,816	-341.58	$9,368
$3.3m	111.30	$29,649	228.96	-$14,413	348.66	$9,465	277.99	-$11,871	-228.96	-$14,413	-111.30	$29,649	-277.99	-$11,871	-348.66	$9,465
$3.4m	113.93	$29,844	232.48	-$14,625	355.67	$9,559	285.12	-$11,925	-232.48	-$14,625	-113.93	$29,844	-285.12	-$11,925	-355.67	$9,559
$3.5m	116.53	$30,036	235.66	-$14,852	362.61	$9,652	292.21	-$11,978	-235.66	-$14,852	-116.53	$30,036	-292.21	-$11,978	-362.61	$9,652
$3.6m	119.11	$30,225	238.46	-$15,097	369.49	$9,743	299.24	-$12,030	-238.46	-$15,097	-119.11	$30,225	-299.24	-$12,030	-369.49	$9,743
$3.7m	121.66	$30,412	240.83	-$15,363	376.30	$9,833	306.23	-$12,082	-240.83	-$15,363	-121.66	$30,412	-306.23	-$12,082	-376.30	$9,833
$3.8m	124.20	$30,595	242.66	-$15,660	383.05	$9,920	313.18	-$12,134	-242.66	-$15,660	-124.20	$30,595	-313.18	-$12,134	-383.05	$9,920
$3.9m	126.72	$30,777	243.66	-$16,006	389.74	$10,007	320.08	-$12,184	-243.66	-$16,006	-126.72	$30,777	-320.08	-$12,184	-389.74	$10,007
$4.0m	129.22	$30,955	243.13	-$16,452	394.86	$10,130	326.94	-$12,235	-243.13	-$16,452	-129.22	$30,955	-326.94	-$12,235	-394.86	$10,130
$4.1m	131.70	$31,132	242.59	-$16,901	399.67	$10,259	333.76	-$12,284	-242.59	-$16,901	-131.70	$31,132	-333.76	-$12,284	-399.67	$10,259
$4.2m	134.16	$31,305	242.05	-$17,352	404.21	$10,391	340.54	-$12,333	-242.05	-$17,352	-134.16	$31,305	-340.54	-$12,333	-404.21	$10,391
$4.3m	136.61	$31,477	241.50	-$17,805	408.54	$10,525	347.28	-$12,382	-241.50	-$17,805	-136.61	$31,477	-347.28	-$12,382	-408.54	$10,525
$4.4m	139.04	$31,647	240.95	-$18,261	412.67	$10,662	353.98	-$12,430	-240.95	-$18,261	-139.04	$31,647	-353.98	-$12,430	-412.67	$10,662
$4.5m	141.45	$31,814	240.40	-$18,719	416.64	$10,801	360.64	-$12,478	-240.40	-$18,719	-141.45	$31,814	-360.64	-$12,478	-416.64	$10,801
$4.6m	143.84	$31,979	239.84	-$19,179	420.45	$10,941	367.27	-$12,525	-239.84	-$19,179	-143.84	$31,979	-367.27	-$12,525	-420.45	$10,941
$4.7m	146.22	$32,142	239.28	-$19,642	424.13	$11,082	373.86	-$12,572	-239.28	-$19,642	-146.22	$32,142	-373.86	-$12,572	-424.13	$11,082

	λ3								λ4							
	Agent has good information				*Agent has poor information*				*Agent has good information*				*Agent has poor information*			
	Net Investment		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$4.8m	148.59	$32,304	238.72	-$20,108	427.69	$11,223	380.41	-$12,618	-238.72	-$20,108	-148.59	$32,304	-380.41	-$12,618	-427.69	$11,223
$4.9m	150.94	$32,463	238.15	-$20,576	431.14	$11,365	386.93	-$12,664	-238.15	-$20,576	-150.94	$32,463	-386.93	-$12,664	-431.14	$11,365
$5.0m	153.28	$32,621	237.57	-$21,046	434.49	$11,508	393.41	-$12,709	-237.57	-$21,046	-153.28	$32,621	-393.41	-$12,709	-434.49	$11,508
$5.1m	155.60	$32,777	236.99	-$21,520	437.78	$11,650	399.87	-$12,754	-236.99	-$21,520	-155.60	$32,777	-399.87	-$12,754	-437.78	$11,650
$5.2m	157.90	$32,931	236.41	-$21,996	441.04	$11,790	406.29	-$12,799	-236.41	-$21,996	-157.90	$32,931	-406.29	-$12,799	-441.04	$11,790
$5.3m	160.20	$33,084	235.82	-$22,475	444.21	$11,931	406.47	-$13,039	-235.82	-$22,475	-160.20	$33,084	-406.47	-$13,039	-444.21	$11,931
$5.4m	162.48	$33,235	235.22	-$22,957	447.37	$12,071	406.57	-$13,282	-235.22	-$22,957	-162.48	$33,235	-406.57	-$13,282	-447.37	$12,071
$5.5m	164.75	$33,384	234.62	-$23,442	450.47	$12,209	406.03	-$13,546	-234.62	-$23,442	-164.75	$33,384	-406.03	-$13,546	-450.47	$12,209
$5.6m	167.00	$33,532	234.02	-$23,930	453.57	$12,347	405.49	-$13,811	-234.02	-$23,930	-167.00	$33,532	-405.49	-$13,811	-453.57	$12,347
$5.7m	169.25	$33,678	233.41	-$24,421	456.62	$12,483	404.95	-$14,076	-233.41	-$24,421	-169.25	$33,678	-404.95	-$14,076	-456.62	$12,483
$5.8m	171.48	$33,823	232.79	-$24,915	459.66	$12,618	404.40	-$14,342	-232.79	-$24,915	-171.48	$33,823	-404.40	-$14,342	-459.66	$12,618
$5.9m	173.70	$33,967	232.17	-$25,413	462.68	$12,752	403.86	-$14,609	-232.17	-$25,413	-173.70	$33,967	-403.86	-$14,609	-462.68	$12,752
$6.0m	175.91	$34,109	231.54	-$25,914	465.69	$12,884	403.31	-$14,877	-231.54	-$25,914	-175.91	$34,109	-403.31	-$14,877	-465.69	$12,884
$6.1m	178.11	$34,249	230.90	-$26,418	468.66	$13,016	402.76	-$15,145	-230.90	-$26,418	-178.11	$34,249	-402.76	-$15,145	-468.66	$13,016
$6.2m	180.29	$34,389	230.26	-$26,926	471.61	$13,146	402.22	-$15,415	-230.26	-$26,926	-180.29	$34,389	-402.22	-$15,415	-471.61	$13,146
$6.3m	182.47	$34,527	229.61	-$27,437	474.56	$13,276	401.66	-$15,685	-229.61	-$27,437	-182.47	$34,527	-401.66	-$15,685	-474.56	$13,276
$6.4m	184.63	$34,664	228.96	-$27,952	477.48	$13,404	401.11	-$15,956	-228.96	-$27,952	-184.63	$34,664	-401.11	-$15,956	-477.48	$13,404
$6.5m	186.78	$34,799	228.30	-$28,472	480.37	$13,531	400.56	-$16,227	-228.30	-$28,472	-186.78	$34,799	-400.56	-$16,227	-480.37	$13,531
$6.6m	188.93	$34,934	227.63	-$28,994	483.26	$13,657	400.00	-$16,500	-227.63	-$28,994	-188.93	$34,934	-400.00	-$16,500	-483.26	$13,657
$6.7m	191.06	$35,067	226.95	-$29,521	486.11	$13,783	399.45	-$16,773	-226.95	-$29,521	-191.06	$35,067	-399.45	-$16,773	-486.11	$13,783
$6.8m	193.19	$35,199	226.27	-$30,053	488.96	$13,907	398.89	-$17,047	-226.27	-$30,053	-193.19	$35,199	-398.89	-$17,047	-488.96	$13,907
$6.9m	195.30	$35,330	225.58	-$30,588	491.79	$14,030	398.33	-$17,322	-225.58	-$30,588	-195.30	$35,330	-398.33	-$17,322	-491.79	$14,030
$7.0m	197.40	$35,460	224.88	-$31,128	494.60	$14,153	397.77	-$17,598	-224.88	-$31,128	-197.40	$35,460	-397.77	-$17,598	-494.60	$14,153
$7.1m	199.50	$35,589	224.17	-$31,673	497.38	$14,275	397.20	-$17,875	-224.17	-$31,673	-199.50	$35,589	-397.20	-$17,875	-497.38	$14,275
$7.2m	201.59	$35,717	223.45	-$32,222	500.16	$14,396	396.64	-$18,153	-223.45	-$32,222	-201.59	$35,717	-396.64	-$18,153	-500.16	$14,396
$7.3m	203.66	$35,843	222.72	-$32,776	502.93	$14,515	396.07	-$18,431	-222.72	-$32,776	-203.66	$35,843	-396.07	-$18,431	-502.93	$14,515
$7.4m	205.73	$35,969	221.99	-$33,335	505.67	$14,634	395.50	-$18,710	-221.99	-$33,335	-205.73	$35,969	-395.50	-$18,710	-505.67	$14,634
$7.5m	207.79	$36,094	221.24	-$33,900	508.40	$14,752	394.93	-$18,991	-221.24	-$33,900	-207.79	$36,094	-394.93	-$18,991	-508.40	$14,752
$7.6m	209.84	$36,218	220.48	-$34,470	511.11	$14,870	394.36	-$19,272	-220.48	-$34,470	-209.84	$36,218	-394.36	-$19,272	-511.11	$14,870
$7.7m	211.88	$36,341	219.72	-$35,045	513.81	$14,986	393.79	-$19,554	-219.72	-$35,045	-211.88	$36,341	-393.79	-$19,554	-513.81	$14,986
$7.8m	213.92	$36,462	218.94	-$35,627	516.49	$15,102	393.21	-$19,837	-218.94	-$35,627	-213.92	$36,462	-393.21	-$19,837	-516.49	$15,102
$7.9m	215.95	$36,583	218.15	-$36,214	519.16	$15,217	392.63	-$20,121	-218.15	-$36,214	-215.95	$36,583	-392.63	-$20,121	-519.16	$15,217
$8.0m	217.96	$36,703	217.34	-$36,808	521.81	$15,331	392.05	-$20,405	-217.34	-$36,808	-217.96	$36,703	-392.05	-$20,405	-521.81	$15,331
$8.1m	219.97	$36,823	216.53	-$37,409	524.46	$15,445	391.47	-$20,691	-216.53	-$37,409	-219.97	$36,823	-391.47	-$20,691	-524.46	$15,445
$8.2m	221.98	$36,941	215.69	-$38,017	527.08	$15,557	390.89	-$20,978	-215.69	-$38,017	-221.98	$36,941	-390.89	-$20,978	-527.08	$15,557
$8.3m	223.97	$37,058	214.85	-$38,632	529.70	$15,669	390.30	-$21,265	-214.85	-$38,632	-223.97	$37,058	-390.30	-$21,265	-529.70	$15,669
$8.4m	225.96	$37,175	213.99	-$39,254	532.29	$15,781	389.72	-$21,554	-213.99	-$39,254	-225.96	$37,175	-389.72	-$21,554	-532.29	$15,781
$8.5m	227.94	$37,291	213.13	-$39,882	534.88	$15,892	389.13	-$21,844	-213.13	-$39,882	-227.94	$37,291	-389.13	-$21,844	-534.88	$15,892
$8.6m	229.91	$37,406	212.27	-$40,515	537.46	$16,001	388.54	-$22,134	-212.27	-$40,515	-229.91	$37,406	-388.54	-$22,134	-537.46	$16,001
$8.7m	231.88	$37,520	211.40	-$41,154	540.02	$16,111	387.94	-$22,426	-211.40	-$41,154	-231.88	$37,520	-387.94	-$22,426	-540.02	$16,111
$8.8m	233.83	$37,634	210.53	-$41,800	542.56	$16,220	387.35	-$22,718	-210.53	-$41,800	-233.83	$37,634	-387.35	-$22,718	-542.56	$16,220
$8.9m	235.79	$37,746	209.65	-$42,452	545.09	$16,327	386.75	-$23,012	-209.65	-$42,452	-235.79	$37,746	-386.75	-$23,012	-545.09	$16,327
$9.0m	237.74	$37,857	208.77	-$43,110	547.63	$16,435	386.15	-$23,307	-208.77	-$43,110	-237.74	$37,857	-386.15	-$23,307	-547.63	$16,435
$9.1m	239.69	$37,966	207.89	-$43,774	550.14	$16,541	385.55	-$23,603	-207.89	-$43,774	-239.69	$37,966	-385.55	-$23,603	-550.14	$16,541
$9.2m	241.63	$38,074	207.00	-$44,445	552.63	$16,648	384.95	-$23,899	-207.00	-$44,445	-241.63	$38,074	-384.95	-$23,899	-552.63	$16,648
$9.3m	243.58	$38,181	206.10	-$45,123	555.12	$16,753	384.34	-$24,197	-206.10	-$45,123	-243.58	$38,181	-384.34	-$24,197	-555.12	$16,753
$9.4m	245.51	$38,287	205.21	-$45,807	557.60	$16,858	383.73	-$24,496	-205.21	-$45,807	-245.51	$38,287	-383.73	-$24,496	-557.60	$16,858
$9.5m	247.45	$38,391	204.31	-$46,499	560.06	$16,962	383.12	-$24,796	-204.31	-$46,499	-247.45	$38,391	-383.12	-$24,796	-560.06	$16,962
$9.6m	249.38	$38,495	203.40	-$47,198	562.52	$17,066	382.51	-$25,097	-203.40	-$47,198	-249.38	$38,495	-382.51	-$25,097	-562.52	$17,066
$9.7m	251.32	$38,597	202.49	-$47,904	564.96	$17,169	381.90	-$25,400	-202.49	-$47,904	-251.32	$38,597	-381.90	-$25,400	-564.96	$17,169

	λ3								*λ4*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$9.8m	253.24	$38,698	201.58	-$48,617	567.40	$17,272	381.28	-$25,703	-201.58	-$48,617	-253.24	$38,698	-381.28	-$25,703	-567.40	$17,272
$9.9m	255.17	$38,798	200.66	-$49,338	569.82	$17,374	380.66	-$26,008	-200.66	-$49,338	-255.17	$38,798	-380.66	-$26,008	-569.82	$17,374
$10.0m	257.09	$38,897	199.73	-$50,067	572.23	$17,475	380.04	-$26,313	-199.73	-$50,067	-257.09	$38,897	-380.04	-$26,313	-572.23	$17,475
$10.1m	259.01	$38,995	198.81	-$50,803	574.63	$17,577	379.41	-$26,620	-198.81	-$50,803	-259.01	$38,995	-379.41	-$26,620	-574.63	$17,577
$10.2m	260.93	$39,091	197.88	-$51,547	577.02	$17,677	378.78	-$26,928	-197.88	-$51,547	-260.93	$39,091	-378.78	-$26,928	-577.02	$17,677
$10.3m	262.84	$39,187	196.95	-$52,298	579.41	$17,777	378.16	-$27,238	-196.95	-$52,298	-262.84	$39,187	-378.16	-$27,238	-579.41	$17,777
$10.4m	264.76	$39,281	196.01	-$53,057	581.78	$17,876	377.52	-$27,548	-196.01	-$53,057	-264.76	$39,281	-377.52	-$27,548	-581.78	$17,876
$10.5m	266.67	$39,374	195.08	-$53,824	584.13	$17,975	376.89	-$27,860	-195.08	-$53,824	-266.67	$39,374	-376.89	-$27,860	-584.13	$17,975
$10.6m	268.58	$39,466	194.14	-$54,599	586.49	$18,074	376.25	-$28,173	-194.14	-$54,599	-268.58	$39,466	-376.25	-$28,173	-586.49	$18,074
$10.7m	270.49	$39,558	193.21	-$55,382	588.84	$18,171	375.61	-$28,487	-193.21	-$55,382	-270.49	$39,558	-375.61	-$28,487	-588.84	$18,171
$10.8m	272.40	$39,648	192.26	-$56,173	591.17	$18,269	374.97	-$28,803	-192.26	-$56,173	-272.40	$39,648	-374.97	-$28,803	-591.17	$18,269
$10.9m	274.30	$39,737	191.32	-$56,973	593.49	$18,366	374.32	-$29,120	-191.32	-$56,973	-274.30	$39,737	-374.32	-$29,120	-593.49	$18,366
$11.0m	276.20	$39,826	190.37	-$57,782	595.80	$18,462	373.67	-$29,438	-190.37	-$57,782	-276.20	$39,826	-373.67	-$29,438	-595.80	$18,462
$11.1m	278.10	$39,914	189.42	-$58,599	598.11	$18,558	373.02	-$29,757	-189.42	-$58,599	-278.10	$39,914	-373.02	-$29,757	-598.11	$18,558
$11.2m	279.99	$40,001	188.47	-$59,425	600.40	$18,654	372.36	-$30,078	-188.47	-$59,425	-279.99	$40,001	-372.36	-$30,078	-600.40	$18,654
$11.3m	281.89	$40,087	187.52	-$60,261	602.69	$18,749	371.70	-$30,401	-187.52	-$60,261	-281.89	$40,087	-371.70	-$30,401	-602.69	$18,749
$11.4m	283.78	$40,172	186.56	-$61,105	604.98	$18,844	371.04	-$30,724	-186.56	-$61,105	-283.78	$40,172	-371.04	-$30,724	-604.98	$18,844
$11.5m	285.66	$40,257	185.61	-$61,959	607.25	$18,938	370.38	-$31,049	-185.61	-$61,959	-285.66	$40,257	-370.38	-$31,049	-607.25	$18,938
$11.6m	287.55	$40,341	184.64	-$62,823	609.51	$19,032	369.71	-$31,376	-184.64	-$62,823	-287.55	$40,341	-369.71	-$31,376	-609.51	$19,032
$11.7m	289.43	$40,424	183.68	-$63,697	611.76	$19,125	369.04	-$31,704	-183.68	-$63,697	-289.43	$40,424	-369.04	-$31,704	-611.76	$19,125
$11.8m	291.31	$40,507	182.71	-$64,582	614.01	$19,218	368.36	-$32,034	-182.71	-$64,582	-291.31	$40,507	-368.36	-$32,034	-614.01	$19,218
$11.9m	293.19	$40,589	181.75	-$65,476	616.24	$19,311	367.68	-$32,365	-181.75	-$65,476	-293.19	$40,589	-367.68	-$32,365	-616.24	$19,311
$12.0m	295.06	$40,670	180.77	-$66,382	618.47	$19,403	367.00	-$32,697	-180.77	-$66,382	-295.06	$40,670	-367.00	-$32,697	-618.47	$19,403
$12.1m	296.93	$40,750	179.80	-$67,297	620.69	$19,494	366.32	-$33,031	-179.80	-$67,297	-296.93	$40,750	-366.32	-$33,031	-620.69	$19,494
$12.2m	298.80	$40,830	178.82	-$68,224	622.91	$19,586	365.63	-$33,367	-178.82	-$68,224	-298.80	$40,830	-365.63	-$33,367	-622.91	$19,586
$12.3m	300.67	$40,909	177.85	-$69,161	625.11	$19,677	364.94	-$33,705	-177.85	-$69,161	-300.67	$40,909	-364.94	-$33,705	-625.11	$19,677
$12.4m	302.53	$40,987	176.86	-$70,110	627.31	$19,767	364.24	-$34,044	-176.86	-$70,110	-302.53	$40,987	-364.24	-$34,044	-627.31	$19,767
$12.5m	304.39	$41,065	175.88	-$71,071	629.50	$19,857	363.54	-$34,384	-175.88	-$71,071	-304.39	$41,065	-363.54	-$34,384	-629.50	$19,857
$12.6m	306.25	$41,142	174.89	-$72,044	631.68	$19,947	362.83	-$34,727	-174.89	-$72,044	-306.25	$41,142	-362.83	-$34,727	-631.68	$19,947
$12.7m	308.11	$41,219	173.90	-$73,030	633.86	$20,036	362.13	-$35,071	-173.90	-$73,030	-308.11	$41,219	-362.13	-$35,071	-633.86	$20,036
$12.8m	309.97	$41,295	172.91	-$74,028	636.03	$20,125	361.41	-$35,417	-172.91	-$74,028	-309.97	$41,295	-361.41	-$35,417	-636.03	$20,125
$12.9m	311.82	$41,370	171.91	-$75,039	638.19	$20,213	360.69	-$35,764	-171.91	-$75,039	-311.82	$41,370	-360.69	-$35,764	-638.19	$20,213
$13.0m	313.67	$41,445	170.91	-$76,061	640.34	$20,302	359.97	-$36,114	-170.91	-$76,061	-313.67	$41,445	-359.97	-$36,114	-640.34	$20,302
$13.1m	315.51	$41,520	169.91	-$77,098	642.49	$20,390	359.25	-$36,465	-169.91	-$77,098	-315.51	$41,520	-359.25	-$36,465	-642.49	$20,390
$13.2m	317.36	$41,593	168.91	-$78,148	644.62	$20,477	358.52	-$36,819	-168.91	-$78,148	-317.36	$41,593	-358.52	-$36,819	-644.62	$20,477
$13.3m	319.20	$41,666	167.90	-$79,212	646.76	$20,564	357.78	-$37,174	-167.90	-$79,212	-319.20	$41,666	-357.78	-$37,174	-646.76	$20,564
$13.4m	321.04	$41,739	166.89	-$80,291	648.89	$20,651	357.04	-$37,531	-166.89	-$80,291	-321.04	$41,739	-357.04	-$37,531	-648.89	$20,651
$13.5m	322.88	$41,811	165.88	-$81,384	651.02	$20,737	356.29	-$37,890	-165.88	-$81,384	-322.88	$41,811	-356.29	-$37,890	-651.02	$20,737
$13.6m	324.71	$41,883	164.86	-$82,493	653.14	$20,823	355.54	-$38,251	-164.86	-$82,493	-324.71	$41,883	-355.54	-$38,251	-653.14	$20,823
$13.7m	326.55	$41,954	163.84	-$83,617	655.25	$20,908	354.79	-$38,615	-163.84	-$83,617	-326.55	$41,954	-354.79	-$38,615	-655.25	$20,908
$13.8m	328.38	$42,025	162.82	-$84,756	657.35	$20,993	354.02	-$38,980	-162.82	-$84,756	-328.38	$42,025	-354.02	-$38,980	-657.35	$20,993
$13.9m	330.21	$42,095	161.80	-$85,910	659.45	$21,078	353.26	-$39,348	-161.80	-$85,910	-330.21	$42,095	-353.26	-$39,348	-659.45	$21,078
$14.0m	332.03	$42,164	160.77	-$87,081	661.54	$21,163	352.48	-$39,718	-160.77	-$87,081	-332.03	$42,164	-352.48	-$39,718	-661.54	$21,163
$14.1m	333.86	$42,234	159.74	-$88,269	663.63	$21,247	351.70	-$40,091	-159.74	-$88,269	-333.86	$42,234	-351.70	-$40,091	-663.63	$21,247
$14.2m	335.68	$42,302	158.71	-$89,474	665.71	$21,331	350.92	-$40,465	-158.71	-$89,474	-335.68	$42,302	-350.92	-$40,465	-665.71	$21,331
$14.3m	337.50	$42,370	157.67	-$90,699	667.78	$21,414	350.13	-$40,842	-157.67	-$90,699	-337.50	$42,370	-350.13	-$40,842	-667.78	$21,414
$14.4m	339.32	$42,438	156.63	-$91,939	669.84	$21,498	349.33	-$41,222	-156.63	-$91,939	-339.32	$42,438	-349.33	-$41,222	-669.84	$21,498
$14.5m	341.14	$42,505	155.58	-$93,200	671.90	$21,580	348.52	-$41,604	-155.58	-$93,200	-341.14	$42,505	-348.52	-$41,604	-671.90	$21,580
$14.6m	342.95	$42,572	154.53	-$94,480	673.96	$21,663	347.71	-$41,989	-154.53	-$94,480	-342.95	$42,572	-347.71	-$41,989	-673.96	$21,663
$14.7m	344.76	$42,638	153.48	-$95,778	676.01	$21,745	346.89	-$42,377	-153.48	-$95,778	-344.76	$42,638	-346.89	-$42,377	-676.01	$21,745

Budget impact	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$14.8m	346.58	$42,703	152.43	-$97,095	678.05	$21,827	346.06	-$42,767	-152.43	-$97,095	-346.58	$42,703	-346.06	-$42,767	-678.05	$21,827
$14.9m	348.39	$42,768	151.37	-$98,434	680.08	$21,909	345.23	-$43,160	-151.37	-$98,434	-348.39	$42,768	-345.23	-$43,160	-680.08	$21,909
$15.0m	350.20	$42,833	150.31	-$99,795	682.12	$21,990	344.38	-$43,556	-150.31	-$99,795	-350.20	$42,833	-344.38	-$43,556	-682.12	$21,990
$15.1m	352.00	$42,897	149.24	-$101,176	684.15	$22,071	343.53	-$43,955	-149.24	-$101,176	-352.00	$42,897	-343.53	-$43,955	-684.15	$22,071
$15.2m	353.81	$42,961	148.17	-$102,582	686.17	$22,152	342.67	-$44,358	-148.17	-$102,582	-353.81	$42,961	-342.67	-$44,358	-686.17	$22,152
$15.3m	355.61	$43,025	147.10	-$104,010	688.19	$22,232	341.80	-$44,763	-147.10	-$104,010	-355.61	$43,025	-341.80	-$44,763	-688.19	$22,232
$15.4m	357.41	$43,087	146.03	-$105,461	690.20	$22,312	340.92	-$45,172	-146.03	-$105,461	-357.41	$43,087	-340.92	-$45,172	-690.20	$22,312
$15.5m	359.21	$43,150	144.95	-$106,936	692.21	$22,392	340.03	-$45,585	-144.95	-$106,936	-359.21	$43,150	-340.03	-$45,585	-692.21	$22,392
$15.6m	361.01	$43,212	143.86	-$108,436	694.21	$22,472	339.13	-$46,001	-143.86	-$108,436	-361.01	$43,212	-339.13	-$46,001	-694.21	$22,472
$15.7m	362.81	$43,274	142.78	-$109,960	696.20	$22,551	338.21	-$46,420	-142.78	-$109,960	-362.81	$43,274	-338.21	-$46,420	-696.20	$22,551
$15.8m	364.60	$43,335	141.69	-$111,511	698.19	$22,630	337.29	-$46,844	-141.69	-$111,511	-364.60	$43,335	-337.29	-$46,844	-698.19	$22,630
$15.9m	366.40	$43,396	140.59	-$113,092	700.18	$22,709	336.35	-$47,272	-140.59	-$113,092	-366.40	$43,396	-336.35	-$47,272	-700.18	$22,709
$16.0m	368.19	$43,456	139.50	-$114,698	702.16	$22,787	335.40	-$47,704	-139.50	-$114,698	-368.19	$43,456	-335.40	-$47,704	-702.16	$22,787
$16.1m	369.98	$43,516	138.39	-$116,335	704.13	$22,865	334.44	-$48,140	-138.39	-$116,335	-369.98	$43,516	-334.44	-$48,140	-704.13	$22,865
$16.2m	371.77	$43,575	137.28	-$118,004	706.10	$22,943	333.46	-$48,581	-137.28	-$118,004	-371.77	$43,575	-333.46	-$48,581	-706.10	$22,943
$16.3m	373.56	$43,635	136.17	-$119,700	708.06	$23,021	332.47	-$49,027	-136.17	-$119,700	-373.56	$43,635	-332.47	-$49,027	-708.06	$23,021
$16.4m	375.35	$43,693	135.06	-$121,425	710.01	$23,098	331.46	-$49,478	-135.06	-$121,425	-375.35	$43,693	-331.46	-$49,478	-710.01	$23,098
$16.5m	377.13	$43,751	133.95	-$123,184	711.97	$23,175	330.43	-$49,935	-133.95	-$123,184	-377.13	$43,751	-330.43	-$49,935	-711.97	$23,175
$16.6m	378.91	$43,809	132.82	-$124,979	713.92	$23,252	329.38	-$50,397	-132.82	-$124,979	-378.91	$43,809	-329.38	-$50,397	-713.92	$23,252
$16.7m	380.70	$43,867	131.70	-$126,806	715.87	$23,328	328.31	-$50,866	-131.70	-$126,806	-380.70	$43,867	-328.31	-$50,866	-715.87	$23,328
$16.8m	382.48	$43,924	130.57	-$128,670	717.81	$23,405	327.22	-$51,341	-130.57	-$128,670	-382.48	$43,924	-327.22	-$51,341	-717.81	$23,405
$16.9m	384.26	$43,980	129.43	-$130,575	719.74	$23,481	326.11	-$51,823	-129.43	-$130,575	-384.26	$43,980	-326.11	-$51,823	-719.74	$23,481
$17.0m	386.04	$44,036	128.29	-$132,514	721.68	$23,556	324.96	-$52,313	-128.29	-$132,514	-386.04	$44,036	-324.96	-$52,313	-721.68	$23,556
$17.1m	387.82	$44,092	127.14	-$134,494	723.60	$23,632	323.79	-$52,812	-127.14	-$134,494	-387.82	$44,092	-323.79	-$52,812	-723.60	$23,632
$17.2m	389.60	$44,148	126.00	-$136,512	725.52	$23,707	322.59	-$53,319	-126.00	-$136,512	-389.60	$44,148	-322.59	-$53,319	-725.52	$23,707
$17.3m	391.38	$44,203	124.84	-$138,575	727.44	$23,782	321.35	-$53,836	-124.84	-$138,575	-391.38	$44,203	-321.35	-$53,836	-727.44	$23,782
$17.4m	393.15	$44,258	123.69	-$140,677	729.35	$23,857	320.06	-$54,365	-123.69	-$140,677	-393.15	$44,258	-320.06	-$54,365	-729.35	$23,857
$17.5m	394.93	$44,312	122.53	-$142,827	731.26	$23,931	318.73	-$54,906	-122.53	-$142,827	-394.93	$44,312	-318.73	-$54,906	-731.26	$23,931
$17.6m	396.70	$44,366	121.36	-$145,028	733.16	$24,006	317.34	-$55,461	-121.36	-$145,028	-396.70	$44,366	-317.34	-$55,461	-733.16	$24,006
$17.7m	398.47	$44,420	120.19	-$147,272	735.06	$24,080	315.88	-$56,034	-120.19	-$147,272	-398.47	$44,420	-315.88	-$56,034	-735.06	$24,080
$17.8m	400.24	$44,473	119.01	-$149,571	736.95	$24,154	314.41	-$56,615	-119.01	-$149,571	-400.24	$44,473	-314.41	-$56,615	-736.95	$24,154
$17.9m	402.01	$44,526	117.82	-$151,924	738.84	$24,227	312.93	-$57,201	-117.82	-$151,924	-402.01	$44,526	-312.93	-$57,201	-738.84	$24,227
$18.0m	403.78	$44,579	116.64	-$154,327	740.72	$24,301	311.45	-$57,794	-116.64	-$154,327	-403.78	$44,579	-311.45	-$57,794	-740.72	$24,301
$18.1m	405.55	$44,631	115.45	-$156,781	742.60	$24,374	309.97	-$58,393	-115.45	-$156,781	-405.55	$44,631	-309.97	-$58,393	-742.60	$24,374
$18.2m	407.32	$44,683	114.25	-$159,296	744.48	$24,447	308.48	-$58,999	-114.25	-$159,296	-407.32	$44,683	-308.48	-$58,999	-744.48	$24,447
$18.3m	409.08	$44,735	113.05	-$161,878	746.36	$24,519	306.99	-$59,610	-113.05	-$161,878	-409.08	$44,735	-306.99	-$59,610	-746.36	$24,519
$18.4m	410.84	$44,786	111.84	-$164,517	748.22	$24,592	305.50	-$60,229	-111.84	-$164,517	-410.84	$44,786	-305.50	-$60,229	-748.22	$24,592
$18.5m	412.61	$44,837	110.63	-$167,226	750.09	$24,664	304.01	-$60,854	-110.63	-$167,226	-412.61	$44,837	-304.01	-$60,854	-750.09	$24,664
$18.6m	414.37	$44,887	109.41	-$170,008	751.95	$24,736	302.51	-$61,486	-109.41	-$170,008	-414.37	$44,887	-302.51	-$61,486	-751.95	$24,736
$18.7m	416.13	$44,938	108.18	-$172,858	753.81	$24,807	301.01	-$62,124	-108.18	-$172,858	-416.13	$44,938	-301.01	-$62,124	-753.81	$24,807
$18.8m	417.89	$44,988	106.95	-$175,777	755.65	$24,879	299.51	-$62,770	-106.95	-$175,777	-417.89	$44,988	-299.51	-$62,770	-755.65	$24,879
$18.9m	419.65	$45,038	105.72	-$178,771	757.50	$24,950	298.00	-$63,423	-105.72	-$178,771	-419.65	$45,038	-298.00	-$63,423	-757.50	$24,950
$19.0m	421.41	$45,087	104.48	-$181,853	759.35	$25,021	296.49	-$64,083	-104.48	-$181,853	-421.41	$45,087	-296.49	-$64,083	-759.35	$25,021
$19.1m	423.16	$45,136	103.23	-$185,016	761.19	$25,092	294.98	-$64,751	-103.23	-$185,016	-423.16	$45,136	-294.98	-$64,751	-761.19	$25,092
$19.2m	424.92	$45,185	101.98	-$188,267	763.02	$25,163	293.46	-$65,426	-101.98	-$188,267	-424.92	$45,185	-293.46	-$65,426	-763.02	$25,163
$19.3m	426.67	$45,234	100.72	-$191,618	764.85	$25,234	291.94	-$66,109	-100.72	-$191,618	-426.67	$45,234	-291.94	-$66,109	-764.85	$25,234
$19.4m	428.42	$45,282	99.45	-$195,066	766.68	$25,304	290.42	-$66,800	-99.45	-$195,066	-428.42	$45,282	-290.42	-$66,800	-766.68	$25,304
$19.5m	430.18	$45,330	98.18	-$198,612	768.50	$25,374	288.89	-$67,499	-98.18	-$198,612	-430.18	$45,330	-288.89	-$67,499	-768.50	$25,374
$19.6m	431.93	$45,378	96.91	-$202,259	770.32	$25,444	287.36	-$68,206	-96.91	-$202,259	-431.93	$45,378	-287.36	-$68,206	-770.32	$25,444
$19.7m	433.68	$45,426	95.62	-$206,018	772.13	$25,514	285.83	-$68,921	-95.62	-$206,018	-433.68	$45,426	-285.83	-$68,921	-772.13	$25,514

	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$19.8m	435.43	$45,473	94.33	-$209,898	773.95	$25,583	284.30	-$69,646	-94.33	-$209,898	-435.43	$45,473	-284.30	-$69,646	-773.95	$25,583
$19.9m	437.17	$45,520	93.04	-$213,892	775.76	$25,652	282.76	-$70,378	-93.04	-$213,892	-437.17	$45,520	-282.76	-$70,378	-775.76	$25,652
$20.0m	438.92	$45,567	91.73	-$218,024	777.56	$25,721	281.22	-$71,120	-91.73	-$218,024	-438.92	$45,567	-281.22	-$71,120	-777.56	$25,721
$20.1m	440.66	$45,613	90.43	-$222,276	779.37	$25,790	279.67	-$71,869	-90.43	-$222,276	-440.66	$45,613	-279.67	-$71,869	-779.37	$25,790
$20.2m	442.41	$45,659	89.11	-$226,682	781.16	$25,859	278.13	-$72,629	-89.11	-$226,682	-442.41	$45,659	-278.13	-$72,629	-781.16	$25,859
$20.3m	444.15	$45,705	87.79	-$231,221	782.96	$25,927	276.58	-$73,397	-87.79	-$231,221	-444.15	$45,705	-276.58	-$73,397	-782.96	$25,927
$20.4m	445.89	$45,751	86.47	-$235,929	784.75	$25,996	275.03	-$74,175	-86.47	-$235,929	-445.89	$45,751	-275.03	-$74,175	-784.75	$25,996
$20.5m	447.64	$45,796	85.14	-$240,790	786.53	$26,064	273.47	-$74,963	-85.14	-$240,790	-447.64	$45,796	-273.47	-$74,963	-786.53	$26,064
$20.6m	449.37	$45,841	83.80	-$245,830	788.31	$26,132	271.91	-$75,761	-83.80	-$245,830	-449.37	$45,841	-271.91	-$75,761	-788.31	$26,132
$20.7m	451.11	$45,886	82.46	-$251,039	790.09	$26,199	270.35	-$76,569	-82.46	-$251,039	-451.11	$45,886	-270.35	-$76,569	-790.09	$26,199
$20.8m	452.85	$45,931	81.11	-$256,434	791.86	$26,267	268.78	-$77,387	-81.11	-$256,434	-452.85	$45,931	-268.78	-$77,387	-791.86	$26,267
$20.9m	454.59	$45,976	79.76	-$262,036	793.64	$26,334	267.21	-$78,216	-79.76	-$262,036	-454.59	$45,976	-267.21	-$78,216	-793.64	$26,334
$21.0m	456.32	$46,020	78.39	-$267,877	795.40	$26,402	265.63	-$79,056	-78.39	-$267,877	-456.32	$46,020	-265.63	-$79,056	-795.40	$26,402
$21.1m	458.06	$46,064	77.02	-$273,957	797.17	$26,469	264.06	-$79,907	-77.02	-$273,957	-458.06	$46,064	-264.06	-$79,907	-797.17	$26,469
$21.2m	459.79	$46,108	75.64	-$280,264	798.93	$26,535	262.48	-$80,769	-75.64	-$280,264	-459.79	$46,108	-262.48	-$80,769	-798.93	$26,535
$21.3m	461.52	$46,151	74.26	-$286,814	800.69	$26,602	260.90	-$81,642	-74.26	-$286,814	-461.52	$46,151	-260.90	-$81,642	-800.69	$26,602
$21.4m	463.26	$46,195	72.87	-$293,666	802.45	$26,668	259.31	-$82,526	-72.87	-$293,666	-463.26	$46,195	-259.31	-$82,526	-802.45	$26,668
$21.5m	464.99	$46,238	71.48	-$300,786	804.20	$26,735	257.73	-$83,422	-71.48	-$300,786	-464.99	$46,238	-257.73	-$83,422	-804.20	$26,735
$21.6m	466.72	$46,281	70.07	-$308,250	805.94	$26,801	256.14	-$84,330	-70.07	-$308,250	-466.72	$46,281	-256.14	-$84,330	-805.94	$26,801
$21.7m	468.45	$46,323	68.67	-$316,027	807.69	$26,867	254.55	-$85,250	-68.67	-$316,027	-468.45	$46,323	-254.55	-$85,250	-807.69	$26,867
$21.8m	470.17	$46,366	67.25	-$324,182	809.43	$26,932	252.95	-$86,182	-67.25	-$324,182	-470.17	$46,366	-252.95	-$86,182	-809.43	$26,932
$21.9m	471.90	$46,408	65.83	-$332,699	811.17	$26,998	251.36	-$87,127	-65.83	-$332,699	-471.90	$46,408	-251.36	-$87,127	-811.17	$26,998
$22.0m	473.62	$46,450	64.39	-$341,670	812.90	$27,064	249.76	-$88,085	-64.39	-$341,670	-473.62	$46,450	-249.76	-$88,085	-812.90	$27,064
$22.1m	475.35	$46,492	62.95	-$351,100	814.63	$27,129	248.16	-$89,056	-62.95	-$351,100	-475.35	$46,492	-248.16	-$89,056	-814.63	$27,129
$22.2m	477.07	$46,534	61.49	-$361,011	816.36	$27,194	246.56	-$90,040	-61.49	-$361,011	-477.07	$46,534	-246.56	-$90,040	-816.36	$27,194
$22.3m	478.79	$46,575	60.03	-$371,480	818.08	$27,259	244.95	-$91,039	-60.03	-$371,480	-478.79	$46,575	-244.95	-$91,039	-818.08	$27,259
$22.4m	480.51	$46,617	58.56	-$382,492	819.80	$27,324	243.34	-$92,051	-58.56	-$382,492	-480.51	$46,617	-243.34	-$92,051	-819.80	$27,324
$22.5m	482.23	$46,658	57.10	-$394,072	821.52	$27,388	241.73	-$93,078	-57.10	-$394,072	-482.23	$46,658	-241.73	-$93,078	-821.52	$27,388
$22.6m	483.95	$46,699	55.61	-$406,381	823.24	$27,453	240.12	-$94,119	-55.61	-$406,381	-483.95	$46,699	-240.12	-$94,119	-823.24	$27,453
$22.7m	485.67	$46,739	54.13	-$419,380	824.95	$27,517	238.51	-$95,175	-54.13	-$419,380	-485.67	$46,739	-238.51	-$95,175	-824.95	$27,517
$22.8m	487.39	$46,780	52.63	-$433,236	826.66	$27,581	236.89	-$96,246	-52.63	-$433,236	-487.39	$46,780	-236.89	-$96,246	-826.66	$27,581
$22.9m	489.10	$46,820	51.11	-$448,058	828.37	$27,645	235.28	-$97,332	-51.11	-$448,058	-489.10	$46,820	-235.28	-$97,332	-828.37	$27,645
$23.0m	490.82	$46,861	49.59	-$463,832	830.07	$27,708	233.66	-$98,433	-49.59	-$463,832	-490.82	$46,861	-233.66	-$98,433	-830.07	$27,708
$23.1m	492.53	$46,901	48.06	-$480,692	831.77	$27,772	232.04	-$99,551	-48.06	-$480,692	-492.53	$46,901	-232.04	-$99,551	-831.77	$27,772
$23.2m	494.24	$46,941	46.52	-$498,713	833.47	$27,836	230.42	-$100,685	-46.52	-$498,713	-494.24	$46,941	-230.42	-$100,685	-833.47	$27,836
$23.3m	495.95	$46,981	44.97	-$518,100	835.16	$27,899	228.80	-$101,836	-44.97	-$518,100	-495.95	$46,981	-228.80	-$101,836	-835.16	$27,899
$23.4m	497.65	$47,021	43.42	-$538,957	836.85	$27,962	227.18	-$103,004	-43.42	-$538,957	-497.65	$47,021	-227.18	-$103,004	-836.85	$27,962
$23.5m	499.36	$47,060	41.84	-$561,625	838.54	$28,025	225.55	-$104,190	-41.84	-$561,625	-499.36	$47,060	-225.55	-$104,190	-838.54	$28,025
$23.6m	501.06	$47,100	40.26	-$586,195	840.22	$28,088	223.92	-$105,394	-40.26	-$586,195	-501.06	$47,100	-223.92	-$105,394	-840.22	$28,088
$23.7m	502.77	$47,139	38.67	-$612,845	841.90	$28,151	222.30	-$106,615	-38.67	-$612,845	-502.77	$47,139	-222.30	-$106,615	-841.90	$28,151
$23.8m	504.47	$47,178	37.08	-$641,900	843.58	$28,213	220.67	-$107,856	-37.08	-$641,900	-504.47	$47,178	-220.67	-$107,856	-843.58	$28,213
$23.9m	506.17	$47,217	35.46	-$673,968	845.25	$28,276	219.03	-$109,115	-35.46	-$673,968	-506.17	$47,217	-219.03	-$109,115	-845.25	$28,276
$24.0m	507.87	$47,256	33.82	-$709,558	846.93	$28,338	217.40	-$110,396	-33.82	-$709,558	-507.87	$47,256	-217.40	-$110,396	-846.93	$28,338
$24.1m	509.57	$47,295	32.18	-$748,895	848.60	$28,400	215.77	-$111,695	-32.18	-$748,895	-509.57	$47,295	-215.77	-$111,695	-848.60	$28,400
$24.2m	511.26	$47,334	30.53	-$792,588	850.26	$28,462	214.13	-$113,015	-30.53	-$792,588	-511.26	$47,334	-214.13	-$113,015	-850.26	$28,462
$24.3m	512.96	$47,372	28.87	-$841,640	851.93	$28,523	212.49	-$114,357	-28.87	-$841,640	-512.96	$47,372	-212.49	-$114,357	-851.93	$28,523
$24.4m	514.65	$47,411	27.21	-$896,832	853.59	$28,585	210.85	-$115,721	-27.21	-$896,832	-514.65	$47,411	-210.85	-$115,721	-853.59	$28,585
$24.5m	516.34	$47,449	25.52	-$959,945	855.25	$28,647	209.21	-$117,106	-25.52	-$959,945	-516.34	$47,449	-209.21	-$117,106	-855.25	$28,647
$24.6m	518.03	$47,488	23.81	-$1.03m	856.91	$28,708	207.57	-$118,515	-23.81	-$1.03m	-518.03	$47,488	-207.57	-$118,515	-856.91	$28,708
$24.7m	519.72	$47,526	22.10	-$1.12m	858.56	$28,769	205.93	-$119,946	-22.10	-$1.12m	-519.72	$47,526	-205.93	-$119,946	-858.56	$28,769

	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$
$24.8m	521.41	$47,564	20.36	-$1.22m	860.21	$28,830	204.28	-$121,403	-20.36	-$1.22m	-521.41	$47,564	-204.28	-$121,403	-860.21	$28,830
$24.9m	523.09	$47,602	18.60	-$1.34m	861.85	$28,891	202.63	-$122,884	-18.60	-$1.34m	-523.09	$47,602	-202.63	-$122,884	-861.85	$28,891
$25.0m	524.78	$47,639	16.84	-$1.48m	863.50	$28,952	200.98	-$124,389	-16.84	-$1.48m	-524.78	$47,639	-200.98	-$124,389	-863.50	$28,952
$25.1m	526.46	$47,677	15.07	-$1.67m	865.14	$29,013	199.33	-$125,919	-15.07	-$1.67m	-526.46	$47,677	-199.33	-$125,919	-865.14	$29,013
$25.2m	528.14	$47,715	13.28	-$1.90m	866.78	$29,073	197.68	-$127,477	-13.28	-$1.90m	-528.14	$47,715	-197.68	-$127,477	-866.78	$29,073
$25.3m	529.82	$47,752	11.48	-$2.20m	868.41	$29,134	196.03	-$129,061	-11.48	-$2.20m	-529.82	$47,752	-196.03	-$129,061	-868.41	$29,134
$25.4m	531.50	$47,789	9.69	-$2.62m	870.05	$29,194	194.38	-$130,674	-9.69	-$2.62m	-531.50	$47,789	-194.38	-$130,674	-870.05	$29,194
$25.5m	533.18	$47,827	7.89	-$3.23m	871.68	$29,254	192.72	-$132,316	-7.89	-$3.23m	-533.18	$47,827	-192.72	-$132,316	-871.68	$29,254
$25.6m	534.85	$47,864	6.08	-$4.21m	873.31	$29,314	191.06	-$133,986	-6.08	-$4.21m	-534.85	$47,864	-191.06	-$133,986	-873.31	$29,314
$25.7m	536.53	$47,901	4.28	-$6.01m	874.93	$29,374	189.40	-$135,688	-4.28	-$6.01m	-536.53	$47,901	-189.40	-$135,688	-874.93	$29,374
$25.8m	538.20	$47,938	2.46	-$10.47m	876.56	$29,433	187.74	-$137,421	-2.46	-$10.47m	-538.20	$47,938	-187.74	-$137,421	-876.56	$29,433
$25.9m	539.87	$47,974	0.65	-$40.03m	878.18	$29,493	186.08	-$139,186	-0.65	-$40.03m	-539.87	$47,974	-186.08	-$139,186	-878.18	$29,493
$26.0m	541.54	$48,011	-1.17	$22.13m	879.80	$29,552	184.42	-$140,984	1.17	$22.13m	-541.54	$48,011	-184.42	-$140,984	-879.80	$29,552
$26.1m	543.21	$48,048	-3.00	$8.71m	881.41	$29,612	182.75	-$142,816	3.00	$8.71m	-543.21	$48,048	-182.75	-$142,816	-881.41	$29,612
$26.2m	544.88	$48,084	-4.82	$5.43m	883.02	$29,671	181.08	-$144,684	4.82	$5.43m	-544.88	$48,084	-181.08	-$144,684	-883.02	$29,671
$26.3m	546.55	$48,120	-6.65	$3.95m	884.63	$29,730	179.42	-$146,587	6.65	$3.95m	-546.55	$48,120	-179.42	-$146,587	-884.63	$29,730
$26.4m	548.21	$48,157	-8.48	$3.11m	886.24	$29,789	177.75	-$148,527	8.48	$3.11m	-548.21	$48,157	-177.75	-$148,527	-886.24	$29,789
$26.5m	549.87	$48,193	-10.32	$2.57m	887.85	$29,847	176.07	-$150,506	10.32	$2.57m	-549.87	$48,193	-176.07	-$150,506	-887.85	$29,847
$26.6m	551.54	$48,229	-12.15	$2.19m	889.45	$29,906	174.40	-$152,525	12.15	$2.19m	-551.54	$48,229	-174.40	-$152,525	-889.45	$29,906
$26.7m	553.20	$48,265	-13.99	$1.91m	891.05	$29,964	172.72	-$154,584	13.99	$1.91m	-553.20	$48,265	-172.72	-$154,584	-891.05	$29,964
$26.8m	554.86	$48,301	-15.84	$1.69m	892.66	$30,023	171.04	-$156,684	15.84	$1.69m	-554.86	$48,301	-171.04	-$156,684	-892.66	$30,023
$26.9m	556.52	$48,337	-17.68	$1.52m	894.26	$30,081	169.37	-$158,829	17.68	$1.52m	-556.52	$48,337	-169.37	-$158,829	-894.26	$30,081
$27.0m	558.17	$48,372	-19.53	$1.38m	895.86	$30,139	167.68	-$161,017	19.53	$1.38m	-558.17	$48,372	-167.68	-$161,017	-895.86	$30,139
$27.1m	559.83	$48,408	-21.39	$1.27m	897.45	$30,197	166.00	-$163,253	21.39	$1.27m	-559.83	$48,408	-166.00	-$163,253	-897.45	$30,197
$27.2m	561.48	$48,443	-23.24	$1.17m	899.05	$30,254	164.32	-$165,535	23.24	$1.17m	-561.48	$48,443	-164.32	-$165,535	-899.05	$30,254
$27.3m	563.14	$48,479	-25.09	$1.09m	900.65	$30,312	162.63	-$167,865	25.09	$1.09m	-563.14	$48,479	-162.63	-$167,865	-900.65	$30,312
$27.4m	564.79	$48,514	-26.95	$1.02m	902.24	$30,369	160.94	-$170,249	26.95	$1.02m	-564.79	$48,514	-160.94	-$170,249	-902.24	$30,369
$27.5m	566.44	$48,549	-28.81	$954,385	903.83	$30,426	159.25	-$172,683	28.81	$954,385	-566.44	$48,549	-159.25	-$172,683	-903.83	$30,426
$27.6m	568.09	$48,584	-30.68	$899,615	905.42	$30,483	157.56	-$175,172	30.68	$899,615	-568.09	$48,584	-157.56	-$175,172	-905.42	$30,483
$27.7m	569.73	$48,619	-32.55	$851,058	907.01	$30,540	155.87	-$177,717	32.55	$851,058	-569.73	$48,619	-155.87	-$177,717	-907.01	$30,540
$27.8m	571.38	$48,654	-34.42	$807,713	908.60	$30,596	154.17	-$180,319	34.42	$807,713	-571.38	$48,654	-154.17	-$180,319	-908.60	$30,596
$27.9m	573.03	$48,689	-36.29	$768,728	910.19	$30,653	152.47	-$182,984	36.29	$768,728	-573.03	$48,689	-152.47	-$182,984	-910.19	$30,653
$28.0m	574.67	$48,724	-38.17	$733,559	911.77	$30,709	150.77	-$185,709	38.17	$733,559	-574.67	$48,724	-150.77	-$185,709	-911.77	$30,709
$28.1m	576.31	$48,758	-40.05	$701,610	913.35	$30,766	149.07	-$188,497	40.05	$701,610	-576.31	$48,758	-149.07	-$188,497	-913.35	$30,766
$28.2m	577.95	$48,793	-41.93	$672,484	914.94	$30,822	147.37	-$191,354	41.93	$672,484	-577.95	$48,793	-147.37	-$191,354	-914.94	$30,822
$28.3m	579.59	$48,827	-43.82	$645,838	916.52	$30,878	145.67	-$194,280	43.82	$645,838	-579.59	$48,827	-145.67	-$194,280	-916.52	$30,878
$28.4m	581.23	$48,862	-45.70	$621,378	918.09	$30,934	143.96	-$197,278	45.70	$621,378	-581.23	$48,862	-143.96	-$197,278	-918.09	$30,934
$28.5m	582.87	$48,896	-47.59	$598,843	919.67	$30,989	142.25	-$200,349	47.59	$598,843	-582.87	$48,896	-142.25	-$200,349	-919.67	$30,989
$28.6m	584.51	$48,930	-49.48	$577,978	921.25	$31,045	140.54	-$203,498	49.48	$577,978	-584.51	$48,930	-140.54	-$203,498	-921.25	$31,045
$28.7m	586.14	$48,964	-51.38	$558,621	922.82	$31,100	138.83	-$206,728	51.38	$558,621	-586.14	$48,964	-138.83	-$206,728	-922.82	$31,100
$28.8m	587.77	$48,998	-53.27	$540,613	924.39	$31,156	137.11	-$210,043	53.27	$540,613	-587.77	$48,998	-137.11	-$210,043	-924.39	$31,156
$28.9m	589.41	$49,032	-55.17	$523,805	925.97	$31,211	135.40	-$213,442	55.17	$523,805	-589.41	$49,032	-135.40	-$213,442	-925.97	$31,211
$29.0m	591.04	$49,066	-57.07	$508,105	927.54	$31,266	133.68	-$216,931	57.07	$508,105	-591.04	$49,066	-133.68	-$216,931	-927.54	$31,266
$29.1m	592.67	$49,100	-58.98	$493,409	929.11	$31,320	131.96	-$220,517	58.98	$493,409	-592.67	$49,100	-131.96	-$220,517	-929.11	$31,320
$29.2m	594.30	$49,134	-60.88	$479,597	930.68	$31,375	130.24	-$224,199	60.88	$479,597	-594.30	$49,134	-130.24	-$224,199	-930.68	$31,375
$29.3m	595.92	$49,167	-62.80	$466,589	932.24	$31,430	128.52	-$227,983	62.80	$466,589	-595.92	$49,167	-128.52	-$227,983	-932.24	$31,430
$29.4m	597.55	$49,201	-64.71	$454,345	933.81	$31,484	126.79	-$231,874	64.71	$454,345	-597.55	$49,201	-126.79	-$231,874	-933.81	$31,484
$29.5m	599.18	$49,234	-66.63	$442,768	935.37	$31,538	125.07	-$235,874	66.63	$442,768	-599.18	$49,234	-125.07	-$235,874	-935.37	$31,538
$29.6m	600.80	$49,268	-68.55	$431,819	936.94	$31,592	123.34	-$239,995	68.55	$431,819	-600.80	$49,268	-123.34	-$239,995	-936.94	$31,592
$29.7m	602.42	$49,301	-70.47	$421,460	938.50	$31,646	121.61	-$244,233	70.47	$421,460	-602.42	$49,301	-121.61	-$244,233	-938.50	$31,646

	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$
$29.8m	604.04	$49,334	-72.39	$411,644	940.07	$31,700	119.87	-$248,595	72.39	$411,644	-604.04	$49,334	-119.87	-$248,595	-940.07	$31,700
$29.9m	605.66	$49,367	-74.32	$402,325	941.63	$31,754	118.14	-$253,094	74.32	$402,325	-605.66	$49,367	-118.14	-$253,094	-941.63	$31,754
$30.0m	607.28	$49,400	-76.25	$393,459	943.19	$31,807	116.40	-$257,728	76.25	$393,459	-607.28	$49,400	-116.40	-$257,728	-943.19	$31,807
$30.1m	608.90	$49,433	-78.18	$385,023	944.75	$31,860	114.66	-$262,512	78.18	$385,023	-608.90	$49,433	-114.66	-$262,512	-944.75	$31,860
$30.2m	610.52	$49,466	-80.11	$376,974	946.31	$31,914	112.92	-$267,443	80.11	$376,974	-610.52	$49,466	-112.92	-$267,443	-946.31	$31,914
$30.3m	612.13	$49,499	-82.05	$369,280	947.86	$31,967	111.18	-$272,533	82.05	$369,280	-612.13	$49,499	-111.18	-$272,533	-947.86	$31,967
$30.4m	613.75	$49,532	-83.99	$361,941	949.42	$32,020	109.43	-$277,793	83.99	$361,941	-613.75	$49,532	-109.43	-$277,793	-949.42	$32,020
$30.5m	615.36	$49,565	-85.94	$354,910	950.97	$32,072	107.69	-$283,229	85.94	$354,910	-615.36	$49,565	-107.69	-$283,229	-950.97	$32,072
$30.6m	616.97	$49,597	-87.89	$348,174	952.52	$32,125	105.94	-$288,849	87.89	$348,174	-616.97	$49,597	-105.94	-$288,849	-952.52	$32,125
$30.7m	618.58	$49,630	-89.84	$341,724	954.08	$32,178	104.19	-$294,660	89.84	$341,724	-618.58	$49,630	-104.19	-$294,660	-954.08	$32,178
$30.8m	620.19	$49,662	-91.80	$335,527	955.63	$32,230	102.43	-$300,680	91.80	$335,527	-620.19	$49,662	-102.43	-$300,680	-955.63	$32,230
$30.9m	621.80	$49,695	-93.76	$329,582	957.18	$32,282	100.68	-$306,914	93.76	$329,582	-621.80	$49,695	-100.68	-$306,914	-957.18	$32,282
$31.0m	623.40	$49,727	-95.71	$323,880	958.73	$32,334	98.92	-$313,378	95.71	$323,880	-623.40	$49,727	-98.92	-$313,378	-958.73	$32,334
$31.1m	625.01	$49,759	-97.67	$318,405	960.28	$32,387	97.16	-$320,080	97.67	$318,405	-625.01	$49,759	-97.16	-$320,080	-960.28	$32,387
$31.2m	626.61	$49,791	-99.64	$313,135	961.82	$32,438	95.40	-$327,033	99.64	$313,135	-626.61	$49,791	-95.40	-$327,033	-961.82	$32,438
$31.3m	628.22	$49,824	-101.60	$308,065	963.37	$32,490	93.64	-$334,264	101.60	$308,065	-628.22	$49,824	-93.64	-$334,264	-963.37	$32,490
$31.4m	629.82	$49,856	-103.57	$303,174	964.91	$32,542	91.87	-$341,774	103.57	$303,174	-629.82	$49,856	-91.87	-$341,774	-964.91	$32,542
$31.5m	631.42	$49,888	-105.54	$298,463	966.46	$32,593	90.11	-$349,585	105.54	$298,463	-631.42	$49,888	-90.11	-$349,585	-966.46	$32,593
$31.6m	633.02	$49,919	-107.51	$293,924	968.00	$32,645	88.34	-$357,722	107.51	$293,924	-633.02	$49,919	-88.34	-$357,722	-968.00	$32,645
$31.7m	634.62	$49,951	-109.49	$289,536	969.54	$32,696	86.57	-$366,193	109.49	$289,536	-634.62	$49,951	-86.57	-$366,193	-969.54	$32,696
$31.8m	636.22	$49,983	-111.46	$285,302	971.08	$32,747	84.79	-$375,039	111.46	$285,302	-636.22	$49,983	-84.79	-$375,039	-971.08	$32,747
$31.9m	637.81	$50,015	-113.44	$281,202	972.62	$32,798	83.02	-$384,267	113.44	$281,202	-637.81	$50,015	-83.02	-$384,267	-972.62	$32,798
$32.0m	639.41	$50,046	-115.42	$277,243	974.16	$32,849	81.24	-$393,901	115.42	$277,243	-639.41	$50,046	-81.24	-$393,901	-974.16	$32,849
$32.1m	641.00	$50,078	-117.40	$273,417	975.69	$32,900	79.46	-$403,985	117.40	$273,417	-641.00	$50,078	-79.46	-$403,985	-975.69	$32,900
$32.2m	642.59	$50,109	-119.39	$269,706	977.23	$32,950	77.68	-$414,543	119.39	$269,706	-642.59	$50,109	-77.68	-$414,543	-977.23	$32,950
$32.3m	644.18	$50,141	-121.38	$266,115	978.77	$33,001	75.89	-$425,613	121.38	$266,115	-644.18	$50,141	-75.89	-$425,613	-978.77	$33,001
$32.4m	645.78	$50,172	-123.37	$262,630	980.30	$33,051	74.11	-$437,217	123.37	$262,630	-645.78	$50,172	-74.11	-$437,217	-980.30	$33,051
$32.5m	647.37	$50,204	-125.36	$259,255	981.83	$33,101	72.32	-$449,414	125.36	$259,255	-647.37	$50,204	-72.32	-$449,414	-981.83	$33,101
$32.6m	648.95	$50,235	-127.35	$255,983	983.37	$33,151	70.53	-$462,243	127.35	$255,983	-648.95	$50,235	-70.53	-$462,243	-983.37	$33,151
$32.7m	650.54	$50,266	-129.35	$252,803	984.90	$33,201	68.73	-$475,763	129.35	$252,803	-650.54	$50,266	-68.73	-$475,763	-984.90	$33,201
$32.8m	652.13	$50,297	-131.35	$249,716	986.43	$33,251	66.94	-$490,015	131.35	$249,716	-652.13	$50,297	-66.94	-$490,015	-986.43	$33,251
$32.9m	653.71	$50,328	-133.35	$246,722	987.96	$33,301	65.14	-$505,052	133.35	$246,722	-653.71	$50,328	-65.14	-$505,052	-987.96	$33,301
$33.0m	655.29	$50,359	-135.35	$243,812	989.49	$33,351	63.35	-$520,950	135.35	$243,812	-655.29	$50,359	-63.35	-$520,950	-989.49	$33,351
$33.1m	656.88	$50,390	-137.35	$240,984	991.01	$33,400	61.54	-$537,822	137.35	$240,984	-656.88	$50,390	-61.54	-$537,822	-991.01	$33,400
$33.2m	658.46	$50,421	-139.36	$238,233	992.54	$33,450	59.74	-$555,711	139.36	$238,233	-658.46	$50,421	-59.74	-$555,711	-992.54	$33,450
$33.3m	660.04	$50,452	-141.37	$235,555	994.06	$33,499	57.94	-$574,747	141.37	$235,555	-660.04	$50,452	-57.94	-$574,747	-994.06	$33,499
$33.4m	661.62	$50,482	-143.38	$232,947	995.59	$33,548	56.13	-$595,027	143.38	$232,947	-661.62	$50,482	-56.13	-$595,027	-995.59	$33,548
$33.5m	663.20	$50,513	-145.39	$230,410	997.11	$33,597	54.32	-$616,668	145.39	$230,410	-663.20	$50,513	-54.32	-$616,668	-997.11	$33,597
$33.6m	664.77	$50,544	-147.41	$227,938	998.63	$33,646	52.51	-$639,852	147.41	$227,938	-664.77	$50,544	-52.51	-$639,852	-998.63	$33,646
$33.7m	666.35	$50,574	-149.43	$225,529	1000.15	$33,695	50.70	-$664,720	149.43	$225,529	-666.35	$50,574	-50.70	-$664,720	-1000.15	$33,695
$33.8m	667.92	$50,605	-151.45	$223,180	1001.67	$33,744	48.88	-$691,444	151.45	$223,180	-667.92	$50,605	-48.88	-$691,444	-1001.67	$33,744
$33.9m	669.50	$50,635	-153.47	$220,888	1003.19	$33,792	47.07	-$720,270	153.47	$220,888	-669.50	$50,635	-47.07	-$720,270	-1003.19	$33,792
$34.0m	671.07	$50,665	-155.50	$218,655	1004.71	$33,841	45.24	-$751,465	155.50	$218,655	-671.07	$50,665	-45.24	-$751,465	-1004.71	$33,841
$34.1m	672.64	$50,696	-157.52	$216,476	1006.23	$33,889	43.42	-$785,317	157.52	$216,476	-672.64	$50,696	-43.42	-$785,317	-1006.23	$33,889
$34.2m	674.21	$50,726	-159.55	$214,347	1007.74	$33,937	41.60	-$822,178	159.55	$214,347	-674.21	$50,726	-41.60	-$822,178	-1007.74	$33,937
$34.3m	675.78	$50,756	-161.59	$212,270	1009.26	$33,985	39.77	-$862,472	161.59	$212,270	-675.78	$50,756	-39.77	-$862,472	-1009.26	$33,985
$34.4m	677.35	$50,786	-163.62	$210,243	1010.77	$34,033	37.94	-$906,675	163.62	$210,243	-677.35	$50,786	-37.94	-$906,675	-1010.77	$34,033
$34.5m	678.92	$50,816	-165.66	$208,263	1012.28	$34,081	36.11	-$955,503	165.66	$208,263	-678.92	$50,816	-36.11	-$955,503	-1012.28	$34,081
$34.6m	680.48	$50,846	-167.69	$206,329	1013.79	$34,129	34.27	-$1.01m	167.69	$206,329	-680.48	$50,846	-34.27	-$1.01m	-1013.79	$34,129
$34.7m	682.05	$50,876	-169.73	$204,439	1015.30	$34,177	32.44	-$1.07m	169.73	$204,439	-682.05	$50,876	-32.44	-$1.07m	-1015.30	$34,177

	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$34.8m	683.61	$50,906	-171.77	$202,592	1016.81	$34,225	30.60	-$1.14m	171.77	$202,592	-683.61	$50,906	-30.60	-$1.14m	-1016.81	$34,225
$34.9m	685.17	$50,936	-173.82	$200,785	1018.32	$34,272	28.76	-$1.21m	173.82	$200,785	-685.17	$50,936	-28.76	-$1.21m	-1018.32	$34,272
$35.0m	686.73	$50,966	-175.86	$199,018	1019.83	$34,320	26.91	-$1.30m	175.86	$199,018	-686.73	$50,966	-26.91	-$1.30m	-1019.83	$34,320
$35.1m	688.30	$50,996	-177.91	$197,289	1021.33	$34,367	25.06	-$1.40m	177.91	$197,289	-688.30	$50,996	-25.06	-$1.40m	-1021.33	$34,367
$35.2m	689.86	$51,025	-179.96	$195,598	1022.84	$34,414	23.22	-$1.52m	179.96	$195,598	-689.86	$51,025	-23.22	-$1.52m	-1022.84	$34,414
$35.3m	691.41	$51,055	-182.01	$193,944	1024.35	$34,461	21.36	-$1.65m	182.01	$193,944	-691.41	$51,055	-21.36	-$1.65m	-1024.35	$34,461
$35.4m	692.97	$51,084	-184.06	$192,325	1025.85	$34,508	19.51	-$1.81m	184.06	$192,325	-692.97	$51,084	-19.51	-$1.81m	-1025.85	$34,508
$35.5m	694.53	$51,114	-186.12	$190,736	1027.36	$34,555	17.65	-$2.01m	186.12	$190,736	-694.53	$51,114	-17.65	-$2.01m	-1027.36	$34,555
$35.6m	696.08	$51,143	-188.18	$189,181	1028.86	$34,602	15.79	-$2.25m	188.18	$189,181	-696.08	$51,143	-15.79	-$2.25m	-1028.86	$34,602
$35.7m	697.64	$51,173	-190.24	$187,658	1030.36	$34,648	13.93	-$2.56m	190.24	$187,658	-697.64	$51,173	-13.93	-$2.56m	-1030.36	$34,648
$35.8m	699.19	$51,202	-192.30	$186,164	1031.86	$34,695	12.07	-$2.97m	192.30	$186,164	-699.19	$51,202	-12.07	-$2.97m	-1031.86	$34,695
$35.9m	700.74	$51,231	-194.37	$184,701	1033.36	$34,741	10.20	-$3.52m	194.37	$184,701	-700.74	$51,231	-10.20	-$3.52m	-1033.36	$34,741
$36.0m	702.29	$51,261	-196.44	$183,263	1034.85	$34,788	8.33	-$4.32m	196.44	$183,263	-702.29	$51,261	-8.33	-$4.32m	-1034.85	$34,788
$36.1m	703.84	$51,290	-198.51	$181,854	1036.35	$34,834	6.46	-$5.59m	198.51	$181,854	-703.84	$51,290	-6.46	-$5.59m	-1036.35	$34,834
$36.2m	705.39	$51,319	-200.58	$180,473	1037.85	$34,880	4.59	-$7.89m	200.58	$180,473	-705.39	$51,319	-4.59	-$7.89m	-1037.85	$34,880
$36.3m	706.94	$51,348	-202.66	$179,116	1039.34	$34,926	2.71	-$13.40m	202.66	$179,116	-706.94	$51,348	-2.71	-$13.40m	-1039.34	$34,926
$36.4m	708.49	$51,377	-204.74	$177,787	1040.84	$34,972	0.83	-$43.90m	204.74	$177,787	-708.49	$51,377	-0.83	-$43.90m	-1040.84	$34,972
$36.5m	710.03	$51,406	-206.82	$176,478	1042.33	$35,018	-1.05	$34.70m	206.82	$176,478	-710.03	$51,406	1.05	$34.70m	-1042.33	$35,018
$36.6m	711.58	$51,435	-208.91	$175,196	1043.82	$35,063	-2.94	$12.46m	208.91	$175,196	-711.58	$51,435	2.94	$12.46m	-1043.82	$35,063
$36.7m	713.12	$51,464	-211.00	$173,938	1045.31	$35,109	-4.82	$7.61m	211.00	$173,938	-713.12	$51,464	4.82	$7.61m	-1045.31	$35,109
$36.8m	714.66	$51,493	-213.08	$172,704	1046.80	$35,155	-6.72	$5.48m	213.08	$172,704	-714.66	$51,493	6.72	$5.48m	-1046.80	$35,155
$36.9m	716.21	$51,521	-215.17	$171,490	1048.29	$35,200	-8.61	$4.29m	215.17	$171,490	-716.21	$51,521	8.61	$4.29m	-1048.29	$35,200
$37.0m	717.75	$51,550	-217.26	$170,299	1049.78	$35,245	-10.50	$3.52m	217.26	$170,299	-717.75	$51,550	10.50	$3.52m	-1049.78	$35,245
$37.1m	719.29	$51,579	-219.36	$169,126	1051.27	$35,291	-12.40	$2.99m	219.36	$169,126	-719.29	$51,579	12.40	$2.99m	-1051.27	$35,291
$37.2m	720.83	$51,607	-221.46	$167,974	1052.76	$35,336	-14.30	$2.60m	221.46	$167,974	-720.83	$51,607	14.30	$2.60m	-1052.76	$35,336
$37.3m	722.36	$51,636	-223.56	$166,845	1054.24	$35,381	-16.21	$2.30m	223.56	$166,845	-722.36	$51,636	16.21	$2.30m	-1054.24	$35,381
$37.4m	723.90	$51,665	-225.67	$165,731	1055.73	$35,426	-18.11	$2.06m	225.67	$165,731	-723.90	$51,665	18.11	$2.06m	-1055.73	$35,426
$37.5m	725.44	$51,693	-227.77	$164,638	1057.21	$35,471	-20.02	$1.87m	227.77	$164,638	-725.44	$51,693	20.02	$1.87m	-1057.21	$35,471
$37.6m	726.97	$51,721	-229.89	$163,560	1058.69	$35,516	-21.93	$1.71m	229.89	$163,560	-726.97	$51,721	21.93	$1.71m	-1058.69	$35,516
$37.7m	728.50	$51,750	-232.00	$162,501	1060.17	$35,560	-23.85	$1.58m	232.00	$162,501	-728.50	$51,750	23.85	$1.58m	-1060.17	$35,560
$37.8m	730.04	$51,778	-234.11	$161,462	1061.65	$35,605	-25.77	$1.47m	234.11	$161,462	-730.04	$51,778	25.77	$1.47m	-1061.65	$35,605
$37.9m	731.57	$51,806	-236.23	$160,436	1063.13	$35,649	-27.68	$1.37m	236.23	$160,436	-731.57	$51,806	27.68	$1.37m	-1063.13	$35,649
$38.0m	733.10	$51,835	-238.35	$159,428	1064.61	$35,694	-29.61	$1.28m	238.35	$159,428	-733.10	$51,835	29.61	$1.28m	-1064.61	$35,694
$38.1m	734.63	$51,863	-240.48	$158,434	1066.09	$35,738	-31.53	$1.21m	240.48	$158,434	-734.63	$51,863	31.53	$1.21m	-1066.09	$35,738
$38.2m	736.16	$51,891	-242.61	$157,457	1067.57	$35,782	-33.46	$1.14m	242.61	$157,457	-736.16	$51,891	33.46	$1.14m	-1067.57	$35,782
$38.3m	737.69	$51,919	-244.73	$156,497	1069.05	$35,826	-35.39	$1.08m	244.73	$156,497	-737.69	$51,919	35.39	$1.08m	-1069.05	$35,826
$38.4m	739.21	$51,947	-246.86	$155,552	1070.52	$35,870	-37.33	$1.03m	246.86	$155,552	-739.21	$51,947	37.33	$1.03m	-1070.52	$35,870
$38.5m	740.74	$51,975	-249.00	$154,620	1072.00	$35,914	-39.27	$980,494	249.00	$154,620	-740.74	$51,975	39.27	$980,494	-1072.00	$35,914
$38.6m	742.26	$52,003	-251.13	$153,704	1073.47	$35,958	-41.21	$936,731	251.13	$153,704	-742.26	$52,003	41.21	$936,731	-1073.47	$35,958
$38.7m	743.79	$52,031	-253.27	$152,803	1074.94	$36,002	-43.15	$896,873	253.27	$152,803	-743.79	$52,031	43.15	$896,873	-1074.94	$36,002
$38.8m	745.31	$52,059	-255.41	$151,914	1076.42	$36,046	-45.10	$860,405	255.41	$151,914	-745.31	$52,059	45.10	$860,405	-1076.42	$36,046
$38.9m	746.83	$52,087	-257.55	$151,038	1077.89	$36,089	-47.04	$826,870	257.55	$151,038	-746.83	$52,087	47.04	$826,870	-1077.89	$36,089
$39.0m	748.35	$52,115	-259.69	$150,177	1079.36	$36,133	-49.00	$795,971	259.69	$150,177	-748.35	$52,115	49.00	$795,971	-1079.36	$36,133
$39.1m	749.87	$52,142	-261.84	$149,326	1080.83	$36,176	-50.95	$767,372	261.84	$149,326	-749.87	$52,142	50.95	$767,372	-1080.83	$36,176
$39.2m	751.39	$52,170	-263.99	$148,488	1082.30	$36,219	-52.91	$740,856	263.99	$148,488	-751.39	$52,170	52.91	$740,856	-1082.30	$36,219
$39.3m	752.90	$52,198	-266.15	$147,661	1083.77	$36,262	-54.87	$716,232	266.15	$147,661	-752.90	$52,198	54.87	$716,232	-1083.77	$36,262
$39.4m	754.42	$52,226	-268.31	$146,847	1085.23	$36,306	-56.84	$693,222	268.31	$146,847	-754.42	$52,226	56.84	$693,222	-1085.23	$36,306
$39.5m	755.93	$52,254	-270.47	$146,044	1086.70	$36,349	-58.80	$671,726	270.47	$146,044	-755.93	$52,254	58.80	$671,726	-1086.70	$36,349
$39.6m	757.44	$52,281	-272.63	$145,251	1088.17	$36,391	-60.77	$651,595	272.63	$145,251	-757.44	$52,281	60.77	$651,595	-1088.17	$36,391
$39.7m	758.95	$52,309	-274.80	$144,470	1089.63	$36,434	-62.75	$632,704	274.80	$144,470	-758.95	$52,309	62.75	$632,704	-1089.63	$36,434

	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$39.8m	760.46	$52,337	-276.97	$143,699	1091.10	$36,477	-64.72	$614,925	276.97	$143,699	-760.46	$52,337	64.72	$614,925	-1091.10	$36,477
$39.9m	761.97	$52,364	-279.14	$142,939	1092.56	$36,520	-66.70	$598,174	279.14	$142,939	-761.97	$52,364	66.70	$598,174	-1092.56	$36,520
$40.0m	763.47	$52,392	-281.32	$142,189	1094.03	$36,562	-68.69	$582,347	281.32	$142,189	-763.47	$52,392	68.69	$582,347	-1094.03	$36,562
$40.1m	764.98	$52,420	-283.50	$141,448	1095.49	$36,605	-70.67	$567,397	283.50	$141,448	-764.98	$52,420	70.67	$567,397	-1095.49	$36,605
$40.2m	766.48	$52,447	-285.68	$140,717	1096.95	$36,647	-72.66	$553,259	285.68	$140,717	-766.48	$52,447	72.66	$553,259	-1096.95	$36,647
$40.3m	767.99	$52,475	-287.86	$139,996	1098.41	$36,689	-74.65	$539,821	287.86	$139,996	-767.99	$52,475	74.65	$539,821	-1098.41	$36,689
$40.4m	769.49	$52,502	-290.05	$139,286	1099.87	$36,732	-76.65	$527,071	290.05	$139,286	-769.49	$52,502	76.65	$527,071	-1099.87	$36,732
$40.5m	770.99	$52,530	-292.24	$138,585	1101.33	$36,774	-78.65	$514,944	292.24	$138,585	-770.99	$52,530	78.65	$514,944	-1101.33	$36,774
$40.6m	772.49	$52,558	-294.43	$137,894	1102.79	$36,816	-80.65	$503,406	294.43	$137,894	-772.49	$52,558	80.65	$503,406	-1102.79	$36,816
$40.7m	773.98	$52,585	-296.63	$137,209	1104.25	$36,858	-82.66	$492,403	296.63	$137,209	-773.98	$52,585	82.66	$492,403	-1104.25	$36,858
$40.8m	775.48	$52,613	-298.83	$136,534	1105.71	$36,899	-84.66	$481,902	298.83	$136,534	-775.48	$52,613	84.66	$481,902	-1105.71	$36,899
$40.9m	776.98	$52,640	-301.03	$135,868	1107.17	$36,941	-86.67	$471,880	301.03	$135,868	-776.98	$52,640	86.67	$471,880	-1107.17	$36,941
$41.0m	778.47	$52,667	-303.23	$135,209	1108.62	$36,983	-88.69	$462,289	303.23	$135,209	-778.47	$52,667	88.69	$462,289	-1108.62	$36,983
$41.1m	779.96	$52,695	-305.44	$134,559	1110.08	$37,024	-90.70	$453,122	305.44	$134,559	-779.96	$52,695	90.70	$453,122	-1110.08	$37,024
$41.2m	781.45	$52,722	-307.65	$133,917	1111.54	$37,066	-92.72	$444,348	307.65	$133,917	-781.45	$52,722	92.72	$444,348	-1111.54	$37,066
$41.3m	782.94	$52,750	-309.87	$133,283	1112.99	$37,107	-94.74	$435,912	309.87	$133,283	-782.94	$52,750	94.74	$435,912	-1112.99	$37,107
$41.4m	784.43	$52,777	-312.08	$132,657	1114.45	$37,149	-96.77	$427,823	312.08	$132,657	-784.43	$52,777	96.77	$427,823	-1114.45	$37,149
$41.5m	785.92	$52,804	-314.30	$132,039	1115.90	$37,190	-98.80	$420,044	314.30	$132,039	-785.92	$52,804	98.80	$420,044	-1115.90	$37,190
$41.6m	787.41	$52,832	-316.52	$131,428	1117.36	$37,231	-100.83	$412,574	316.52	$131,428	-787.41	$52,832	100.83	$412,574	-1117.36	$37,231
$41.7m	788.89	$52,859	-318.75	$130,824	1118.81	$37,272	-102.87	$405,383	318.75	$130,824	-788.89	$52,859	102.87	$405,383	-1118.81	$37,272
$41.8m	790.38	$52,886	-320.98	$130,226	1120.26	$37,313	-104.90	$398,457	320.98	$130,226	-790.38	$52,886	104.90	$398,457	-1120.26	$37,313
$41.9m	791.86	$52,913	-323.21	$129,636	1121.71	$37,354	-106.95	$391,769	323.21	$129,636	-791.86	$52,913	106.95	$391,769	-1121.71	$37,354
$42.0m	793.34	$52,941	-325.45	$129,053	1123.16	$37,394	-109.00	$385,331	325.45	$129,053	-793.34	$52,941	109.00	$385,331	-1123.16	$37,394
$42.1m	794.82	$52,968	-327.69	$128,476	1124.61	$37,435	-111.04	$379,129	327.69	$128,476	-794.82	$52,968	111.04	$379,129	-1124.61	$37,435
$42.2m	796.30	$52,995	-329.93	$127,906	1126.06	$37,476	-113.10	$373,126	329.93	$127,906	-796.30	$52,995	113.10	$373,126	-1126.06	$37,476
$42.3m	797.78	$53,022	-332.17	$127,344	1127.51	$37,516	-115.16	$367,331	332.17	$127,344	-797.78	$53,022	115.16	$367,331	-1127.51	$37,516
$42.4m	799.26	$53,049	-334.42	$126,786	1128.96	$37,557	-117.22	$361,720	334.42	$126,786	-799.26	$53,049	117.22	$361,720	-1128.96	$37,557
$42.5m	800.73	$53,076	-336.67	$126,236	1130.40	$37,597	-119.28	$356,302	336.67	$126,236	-800.73	$53,076	119.28	$356,302	-1130.40	$37,597
$42.6m	802.21	$53,103	-338.92	$125,692	1131.85	$37,637	-121.35	$351,056	338.92	$125,692	-802.21	$53,103	121.35	$351,056	-1131.85	$37,637
$42.7m	803.68	$53,131	-341.18	$125,153	1133.30	$37,678	-123.42	$345,976	341.18	$125,153	-803.68	$53,131	123.42	$345,976	-1133.30	$37,678
$42.8m	805.15	$53,158	-343.44	$124,621	1134.74	$37,718	-125.50	$341,043	343.44	$124,621	-805.15	$53,158	125.50	$341,043	-1134.74	$37,718
$42.9m	806.62	$53,185	-345.71	$124,093	1136.19	$37,758	-127.58	$336,269	345.71	$124,093	-806.62	$53,185	127.58	$336,269	-1136.19	$37,758
$43.0m	808.09	$53,212	-347.98	$123,571	1137.63	$37,798	-129.66	$331,645	347.98	$123,571	-808.09	$53,212	129.66	$331,645	-1137.63	$37,798
$43.1m	809.56	$53,239	-350.25	$123,055	1139.07	$37,838	-131.74	$327,150	350.25	$123,055	-809.56	$53,239	131.74	$327,150	-1139.07	$37,838
$43.2m	811.03	$53,266	-352.53	$122,544	1140.51	$37,878	-133.83	$322,788	352.53	$122,544	-811.03	$53,266	133.83	$322,788	-1140.51	$37,878
$43.3m	812.50	$53,293	-354.80	$122,039	1141.96	$37,917	-135.93	$318,548	354.80	$122,039	-812.50	$53,293	135.93	$318,548	-1141.96	$37,917
$43.4m	813.96	$53,319	-357.09	$121,538	1143.40	$37,957	-138.03	$314,430	357.09	$121,538	-813.96	$53,319	138.03	$314,430	-1143.40	$37,957
$43.5m	815.43	$53,346	-359.38	$121,042	1144.84	$37,997	-140.13	$310,428	359.38	$121,042	-815.43	$53,346	140.13	$310,428	-1144.84	$37,997
$43.6m	816.89	$53,373	-361.67	$120,553	1146.27	$38,036	-142.23	$306,539	361.67	$120,553	-816.89	$53,373	142.23	$306,539	-1146.27	$38,036
$43.7m	818.35	$53,400	-363.96	$120,067	1147.71	$38,076	-144.35	$302,745	363.96	$120,067	-818.35	$53,400	144.35	$302,745	-1147.71	$38,076
$43.8m	819.81	$53,427	-366.26	$119,588	1149.15	$38,115	-146.46	$299,059	366.26	$119,588	-819.81	$53,427	146.46	$299,059	-1149.15	$38,115
$43.9m	821.27	$53,454	-368.56	$119,113	1150.58	$38,155	-148.58	$295,471	368.56	$119,113	-821.27	$53,454	148.58	$295,471	-1150.58	$38,155
$44.0m	822.73	$53,481	-370.86	$118,644	1152.02	$38,194	-150.70	$291,976	370.86	$118,644	-822.73	$53,481	150.70	$291,976	-1152.02	$38,194
$44.1m	824.19	$53,507	-373.16	$118,179	1153.45	$38,233	-152.82	$288,569	373.16	$118,179	-824.19	$53,507	152.82	$288,569	-1153.45	$38,233
$44.2m	825.64	$53,534	-375.47	$117,719	1154.89	$38,272	-154.95	$285,248	375.47	$117,719	-825.64	$53,534	154.95	$285,248	-1154.89	$38,272
$44.3m	827.10	$53,561	-377.78	$117,264	1156.32	$38,311	-157.09	$282,006	377.78	$117,264	-827.10	$53,561	157.09	$282,006	-1156.32	$38,311
$44.4m	828.55	$53,588	-380.09	$116,813	1157.75	$38,350	-159.23	$278,847	380.09	$116,813	-828.55	$53,588	159.23	$278,847	-1157.75	$38,350
$44.5m	830.00	$53,614	-382.41	$116,367	1159.18	$38,389	-161.37	$275,771	382.41	$116,367	-830.00	$53,614	161.37	$275,771	-1159.18	$38,389
$44.6m	831.45	$53,641	-384.74	$115,924	1160.61	$38,428	-163.51	$272,760	384.74	$115,924	-831.45	$53,641	163.51	$272,760	-1160.61	$38,428
$44.7m	832.90	$53,668	-387.06	$115,485	1162.04	$38,467	-165.66	$269,822	387.06	$115,485	-832.90	$53,668	165.66	$269,822	-1162.04	$38,467

	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$44.8m	834.35	$53,694	-389.39	$115,051	1163.47	$38,505	-167.82	$266,952	389.39	$115,051	-834.35	$53,694	167.82	$266,952	-1163.47	$38,505
$44.9m	835.80	$53,721	-391.73	$114,621	1164.90	$38,544	-169.98	$264,152	391.73	$114,621	-835.80	$53,721	169.98	$264,152	-1164.90	$38,544
$45.0m	837.25	$53,747	-394.07	$114,194	1166.33	$38,583	-172.14	$261,413	394.07	$114,194	-837.25	$53,747	172.14	$261,413	-1166.33	$38,583
$45.1m	838.70	$53,774	-396.41	$113,771	1167.75	$38,621	-174.31	$258,738	396.41	$113,771	-838.70	$53,774	174.31	$258,738	-1167.75	$38,621
$45.2m	840.14	$53,801	-398.76	$113,352	1169.18	$38,660	-176.48	$256,114	398.76	$113,352	-840.14	$53,801	176.48	$256,114	-1169.18	$38,660
$45.3m	841.58	$53,827	-401.11	$112,937	1170.60	$38,698	-178.66	$253,554	401.11	$112,937	-841.58	$53,827	178.66	$253,554	-1170.60	$38,698
$45.4m	843.03	$53,854	-403.46	$112,526	1172.03	$38,736	-180.84	$251,054	403.46	$112,526	-843.03	$53,854	180.84	$251,054	-1172.03	$38,736
$45.5m	844.47	$53,880	-405.82	$112,117	1173.45	$38,775	-183.02	$248,603	405.82	$112,117	-844.47	$53,880	183.02	$248,603	-1173.45	$38,775
$45.6m	845.91	$53,907	-408.19	$111,713	1174.87	$38,813	-185.21	$246,202	408.19	$111,713	-845.91	$53,907	185.21	$246,202	-1174.87	$38,813
$45.7m	847.35	$53,933	-410.55	$111,313	1176.29	$38,851	-187.41	$243,853	410.55	$111,313	-847.35	$53,933	187.41	$243,853	-1176.29	$38,851
$45.8m	848.79	$53,959	-412.92	$110,916	1177.71	$38,889	-189.61	$241,553	412.92	$110,916	-848.79	$53,959	189.61	$241,553	-1177.71	$38,889
$45.9m	850.22	$53,986	-415.30	$110,523	1179.13	$38,927	-191.81	$239,299	415.30	$110,523	-850.22	$53,986	191.81	$239,299	-1179.13	$38,927
$46.0m	851.66	$54,012	-417.67	$110,135	1180.55	$38,965	-194.02	$237,094	417.67	$110,135	-851.66	$54,012	194.02	$237,094	-1180.55	$38,965
$46.1m	853.09	$54,039	-420.06	$109,747	1181.97	$39,003	-196.23	$234,928	420.06	$109,747	-853.09	$54,039	196.23	$234,928	-1181.97	$39,003
$46.2m	854.53	$54,065	-422.44	$109,365	1183.39	$39,040	-198.45	$232,804	422.44	$109,365	-854.53	$54,065	198.45	$232,804	-1183.39	$39,040
$46.3m	855.96	$54,091	-424.83	$108,984	1184.80	$39,078	-200.67	$230,727	424.83	$108,984	-855.96	$54,091	200.67	$230,727	-1184.80	$39,078
$46.4m	857.39	$54,118	-427.23	$108,607	1186.22	$39,116	-202.89	$228,691	427.23	$108,607	-857.39	$54,118	202.89	$228,691	-1186.22	$39,116
$46.5m	858.82	$54,144	-429.62	$108,234	1187.63	$39,153	-205.13	$226,687	429.62	$108,234	-858.82	$54,144	205.13	$226,687	-1187.63	$39,153
$46.6m	860.25	$54,170	-432.03	$107,863	1189.05	$39,191	-207.36	$224,726	432.03	$107,863	-860.25	$54,170	207.36	$224,726	-1189.05	$39,191
$46.7m	861.68	$54,196	-434.44	$107,495	1190.46	$39,229	-209.61	$222,798	434.44	$107,495	-861.68	$54,196	209.61	$222,798	-1190.46	$39,229
$46.8m	863.11	$54,223	-436.85	$107,130	1191.87	$39,266	-211.85	$220,909	436.85	$107,130	-863.11	$54,223	211.85	$220,909	-1191.87	$39,266
$46.9m	864.54	$54,249	-439.27	$106,768	1193.28	$39,303	-214.10	$219,055	439.27	$106,768	-864.54	$54,249	214.10	$219,055	-1193.28	$39,303
$47.0m	865.96	$54,275	-441.69	$106,410	1194.70	$39,341	-216.36	$217,234	441.69	$106,410	-865.96	$54,275	216.36	$217,234	-1194.70	$39,341
$47.1m	867.38	$54,301	-444.11	$106,056	1196.11	$39,378	-218.62	$215,446	444.11	$106,056	-867.38	$54,301	218.62	$215,446	-1196.11	$39,378
$47.2m	868.81	$54,327	-446.53	$105,703	1197.52	$39,415	-220.88	$213,689	446.53	$105,703	-868.81	$54,327	220.88	$213,689	-1197.52	$39,415
$47.3m	870.23	$54,353	-448.97	$105,353	1198.93	$39,452	-223.15	$211,968	448.97	$105,353	-870.23	$54,353	223.15	$211,968	-1198.93	$39,452
$47.4m	871.65	$54,380	-451.40	$105,006	1200.33	$39,489	-225.41	$210,279	451.40	$105,006	-871.65	$54,380	225.41	$210,279	-1200.33	$39,489
$47.5m	873.07	$54,406	-453.84	$104,662	1201.74	$39,526	-227.69	$208,616	453.84	$104,662	-873.07	$54,406	227.69	$208,616	-1201.74	$39,526
$47.6m	874.49	$54,432	-456.28	$104,322	1203.15	$39,563	-229.97	$206,981	456.28	$104,322	-874.49	$54,432	229.97	$206,981	-1203.15	$39,563
$47.7m	875.91	$54,458	-458.73	$103,984	1204.55	$39,600	-232.26	$205,373	458.73	$103,984	-875.91	$54,458	232.26	$205,373	-1204.55	$39,600
$47.8m	877.33	$54,483	-461.18	$103,648	1205.96	$39,637	-234.55	$203,792	461.18	$103,648	-877.33	$54,483	234.55	$203,792	-1205.96	$39,637
$47.9m	878.75	$54,509	-463.63	$103,314	1207.36	$39,673	-236.85	$202,237	463.63	$103,314	-878.75	$54,509	236.85	$202,237	-1207.36	$39,673
$48.0m	880.16	$54,535	-466.10	$102,983	1208.77	$39,710	-239.15	$200,711	466.10	$102,983	-880.16	$54,535	239.15	$200,711	-1208.77	$39,710
$48.1m	881.58	$54,561	-468.56	$102,655	1210.17	$39,747	-241.46	$199,206	468.56	$102,655	-881.58	$54,561	241.46	$199,206	-1210.17	$39,747
$48.2m	882.99	$54,587	-471.03	$102,329	1211.57	$39,783	-243.77	$197,724	471.03	$102,329	-882.99	$54,587	243.77	$197,724	-1211.57	$39,783
$48.3m	884.40	$54,613	-473.50	$102,005	1212.97	$39,820	-246.09	$196,267	473.50	$102,005	-884.40	$54,613	246.09	$196,267	-1212.97	$39,820
$48.4m	885.82	$54,639	-475.98	$101,685	1214.37	$39,856	-248.41	$194,835	475.98	$101,685	-885.82	$54,639	248.41	$194,835	-1214.37	$39,856
$48.5m	887.23	$54,665	-478.47	$101,365	1215.77	$39,892	-250.74	$193,426	478.47	$101,365	-887.23	$54,665	250.74	$193,426	-1215.77	$39,892
$48.6m	888.64	$54,690	-480.95	$101,049	1217.17	$39,929	-253.07	$192,041	480.95	$101,049	-888.64	$54,690	253.07	$192,041	-1217.17	$39,929
$48.7m	890.05	$54,716	-483.44	$100,736	1218.57	$39,965	-255.40	$190,678	483.44	$100,736	-890.05	$54,716	255.40	$190,678	-1218.57	$39,965
$48.8m	891.45	$54,742	-485.94	$100,424	1219.96	$40,001	-257.74	$189,340	485.94	$100,424	-891.45	$54,742	257.74	$189,340	-1219.96	$40,001
$48.9m	892.86	$54,768	-488.44	$100,115	1221.36	$40,037	-260.07	$188,027	488.44	$100,115	-892.86	$54,768	260.07	$188,027	-1221.36	$40,037
$49.0m	894.26	$54,794	-490.95	$99,807	1222.75	$40,073	-262.41	$186,734	490.95	$99,807	-894.26	$54,794	262.41	$186,734	-1222.75	$40,073
$49.1m	895.66	$54,820	-493.46	$99,501	1224.15	$40,110	-264.74	$185,462	493.46	$99,501	-895.66	$54,820	264.74	$185,462	-1224.15	$40,110
$49.2m	897.06	$54,846	-495.97	$99,199	1225.54	$40,146	-267.09	$184,211	495.97	$99,199	-897.06	$54,846	267.09	$184,211	-1225.54	$40,146
$49.3m	898.45	$54,872	-498.49	$98,899	1226.94	$40,181	-269.43	$182,979	498.49	$98,899	-898.45	$54,872	269.43	$182,979	-1226.94	$40,181
$49.4m	899.84	$54,898	-501.01	$98,601	1228.33	$40,217	-271.77	$181,769	501.01	$98,601	-899.84	$54,898	271.77	$181,769	-1228.33	$40,217
$49.5m	901.24	$54,925	-503.54	$98,304	1229.72	$40,253	-274.12	$180,577	503.54	$98,304	-901.24	$54,925	274.12	$180,577	-1229.72	$40,253
$49.6m	902.62	$54,951	-506.07	$98,009	1231.11	$40,289	-276.47	$179,406	506.07	$98,009	-902.62	$54,951	276.47	$179,406	-1231.11	$40,289
$49.7m	904.01	$54,977	-508.62	$97,716	1232.50	$40,325	-278.82	$178,252	508.62	$97,716	-904.01	$54,977	278.82	$178,252	-1232.50	$40,325

Budget impact	λ3								λ4							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$49.8m	905.40	$55,004	-511.16	$97,426	1233.89	$40,360	-281.17	$177,117	511.16	$97,426	-905.40	$55,004	281.17	$177,117	-1233.89	$40,360
$49.9m	906.78	$55,030	-513.71	$97,137	1235.28	$40,396	-283.52	$176,000	513.71	$97,137	-906.78	$55,030	283.52	$176,000	-1235.28	$40,396
$50.0m	908.16	$55,056	-516.26	$96,850	1236.67	$40,431	-285.88	$174,899	516.26	$96,850	-908.16	$55,056	285.88	$174,899	-1236.67	$40,431

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment;
[c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

Table A2.3.3: Optimal numerical thresholds (threshold sets λ5 and λ6)

	λ5								λ6							
	Agent has good information				*Agent has poor information*				*Agent has good information*				*Agent has poor information*			
	Net Investment		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$0.1m	-6.25	-$15,999	6.08	-$16,445	21.88	$4,571	-22.92	$4,363	16.29	$6,139	12.54	-$7,974	45.90	$2,179	43.78	-$2,284
$0.2m	-12.52	-$15,974	11.05	-$18,095	29.96	$6,676	-31.14	$6,423	32.06	$6,239	25.95	-$7,708	77.64	$2,576	72.44	-$2,761
$0.3m	-22.43	-$13,375	16.51	-$18,167	35.16	$8,532	-36.21	$8,285	51.02	$5,880	38.62	-$7,768	105.82	$2,835	97.54	-$3,076
$0.4m	-27.89	-$14,343	22.90	-$17,467	39.69	$10,078	-40.74	$9,818	65.16	$6,139	50.12	-$7,981	131.10	$3,051	121.75	-$3,286
$0.5m	-33.45	-$14,950	29.49	-$16,957	42.11	$11,874	-43.31	$11,546	79.08	$6,323	61.16	-$8,175	156.08	$3,204	143.64	-$3,481
$0.6m	-39.88	-$15,045	34.98	-$17,153	43.94	$13,656	-45.04	$13,322	93.60	$6,410	73.04	-$8,215	179.86	$3,336	164.38	-$3,650
$0.7m	-46.48	-$15,062	41.43	-$16,895	45.11	$15,518	-46.19	$15,155	108.05	$6,479	83.69	-$8,364	202.91	$3,450	184.24	-$3,799
$0.8m	-52.92	-$15,118	47.82	-$16,730	45.96	$17,406	-47.06	$17,000	122.12	$6,551	94.15	-$8,497	225.15	$3,553	203.53	-$3,931
$0.9m	-59.28	-$15,181	54.33	-$16,564	46.34	$19,423	-48.52	$18,551	135.93	$6,621	104.21	-$8,636	246.93	$3,645	223.15	-$4,033
$1.0m	-65.77	-$15,204	59.77	-$16,731	47.51	$21,048	-48.77	$20,505	149.68	$6,681	115.08	-$8,690	267.09	$3,744	241.31	-$4,144
$1.1m	-70.76	-$15,544	66.01	-$16,665	46.73	$23,538	-48.65	$22,610	161.78	$6,800	124.86	-$8,810	288.51	$3,813	258.87	-$4,249
$1.2m	-76.08	-$15,772	71.67	-$16,743	58.45	$20,530	-48.37	$24,809	174.05	$6,894	134.94	-$8,893	296.81	$4,043	276.04	-$4,347
$1.3m	-82.20	-$15,815	77.93	-$16,682	58.09	$22,380	-48.96	$26,555	186.99	$6,952	144.13	-$9,020	316.65	$4,106	293.86	-$4,424
$1.4m	-87.29	-$16,038	82.68	-$16,932	55.91	$25,038	-48.47	$28,884	198.78	$7,043	154.53	-$9,060	337.80	$4,144	310.40	-$4,510
$1.5m	-93.41	-$16,059	88.63	-$16,924	55.17	$27,187	-46.22	$32,454	211.47	$7,093	163.44	-$9,178	357.07	$4,201	324.99	-$4,616
$1.6m	-99.29	-$16,115	93.52	-$17,108	54.29	$29,473	-45.36	$35,273	223.83	$7,148	173.10	-$9,243	376.08	$4,254	340.78	-$4,695
$1.7m	-105.03	-$16,186	99.23	-$17,133	54.38	$31,259	-45.47	$37,390	235.94	$7,205	181.63	-$9,360	393.73	$4,318	357.36	-$4,757
$1.8m	-110.83	-$16,241	104.99	-$17,145	53.45	$33,675	-44.56	$40,393	248.02	$7,258	189.78	-$9,484	412.07	$4,368	372.75	-$4,829
$1.9m	-115.47	-$16,455	109.60	-$17,336	52.30	$36,329	-43.48	$43,702	258.83	$7,341	198.76	-$9,559	430.31	$4,415	387.80	-$4,899
$2.0m	-120.86	-$16,549	114.98	-$17,394	52.16	$38,343	-42.29	$47,295	270.32	$7,399	206.63	-$9,679	447.24	$4,472	402.59	-$4,968
$2.1m	-124.84	-$16,822	120.20	-$17,471	51.01	$41,165	-41.18	$51,002	280.32	$7,491	214.32	-$9,798	464.90	$4,517	417.31	-$5,032
$2.2m	-130.00	-$16,923	125.44	-$17,539	49.70	$44,263	-40.93	$53,752	291.42	$7,549	221.64	-$9,926	482.46	$4,560	432.74	-$5,084
$2.3m	-134.03	-$17,161	129.44	-$17,768	44.44	$51,761	-39.57	$58,122	301.32	$7,633	229.82	-$10,008	503.73	$4,566	446.93	-$5,146
$2.4m	-139.02	-$17,263	132.97	-$18,049	42.99	$55,828	-38.31	$62,654	312.11	$7,689	238.11	-$10,080	520.95	$4,607	461.07	-$5,205
$2.5m	-143.69	-$17,399	137.59	-$18,170	41.64	$60,038	-36.89	$67,765	322.51	$7,752	244.92	-$10,207	537.86	$4,648	474.93	-$5,264
$2.6m	-147.30	-$17,651	141.17	-$18,417	41.20	$63,110	-36.46	$71,301	331.80	$7,836	252.36	-$10,303	553.66	$4,696	489.65	-$5,310
$2.7m	-151.11	-$17,868	145.60	-$18,544	39.63	$68,133	-35.08	$76,963	341.21	$7,913	258.54	-$10,443	570.38	$4,734	503.29	-$5,365
$2.8m	-155.41	-$18,016	149.72	-$18,702	38.17	$73,363	-33.53	$83,511	351.07	$7,976	264.61	-$10,582	586.81	$4,772	516.64	-$5,420
$2.9m	-159.39	-$18,195	153.59	-$18,881	36.57	$79,310	-32.08	$90,390	360.54	$8,044	270.46	-$10,723	603.21	$4,808	529.99	-$5,472
$3.0m	-163.11	-$18,392	157.42	-$19,058	35.99	$83,353	-31.53	$95,156	369.70	$8,115	275.88	-$10,874	618.41	$4,851	544.11	-$5,514
$3.1m	-165.67	-$18,712	160.00	-$19,375	34.44	$90,011	-29.92	$103,599	377.64	$8,209	282.04	-$10,991	634.42	$4,886	557.08	-$5,565
$3.2m	-169.11	-$18,923	163.20	-$19,608	32.72	$97,793	-28.26	$113,225	386.42	$8,281	287.07	-$11,147	650.45	$4,920	569.88	-$5,615
$3.3m	-170.83	-$19,318	165.22	-$19,974	32.07	$102,892	-27.63	$119,421	393.43	$8,388	292.70	-$11,274	665.25	$4,961	583.62	-$5,654
$3.4m	-172.66	-$19,692	167.90	-$20,250	30.34	$112,060	-25.93	$131,114	400.52	$8,489	297.05	-$11,446	681.00	$4,993	596.18	-$5,703
$3.5m	-175.07	-$19,992	170.40	-$20,540	28.70	$121,965	-24.24	$144,368	408.12	$8,576	300.91	-$11,631	696.53	$5,025	608.66	-$5,750
$3.6m	-177.16	-$20,320	171.15	-$21,034	26.89	$133,871	-20.79	$173,178	415.38	$8,667	305.78	-$11,773	712.08	$5,056	619.28	-$5,813
$3.7m	-178.98	-$20,673	172.71	-$21,423	25.21	$146,777	-20.08	$184,240	422.31	$8,761	308.95	-$11,976	727.39	$5,087	632.55	-$5,849
$3.8m	-180.10	-$21,099	172.90	-$21,978	24.46	$155,336	-18.31	$207,517	428.50	$8,868	312.42	-$12,163	741.63	$5,124	644.67	-$5,894
$3.9m	-179.53	-$21,724	173.30	-$22,504	22.60	$172,533	-15.05	$259,182	432.97	$9,008	314.02	-$12,420	756.87	$5,153	655.21	-$5,952
$4.0m	-177.37	-$22,551	172.05	-$23,249	19.25	$207,805	-11.77	$339,933	435.81	$9,178	314.20	-$12,731	770.47	$5,192	665.65	-$6,009
$4.1m	-176.37	-$23,247	170.78	-$24,008	15.73	$260,622	-9.23	$444,109	439.76	$9,323	314.40	-$13,041	783.60	$5,232	676.76	-$6,058
$4.2m	-175.20	-$23,973	168.61	-$24,909	10.30	$407,709	-5.43	$773,443	443.52	$9,470	315.49	-$13,313	798.13	$5,262	686.51	-$6,118
$4.3m	-174.08	-$24,701	167.53	-$25,667	7.34	$586,035	-13.68	$314,239	447.30	$9,613	315.48	-$13,630	809.74	$5,310	708.24	-$6,071
$4.4m	-171.65	-$25,633	166.30	-$26,459	3.12	$1.41m	-10.59	$415,353	449.72	$9,784	315.61	-$13,941	822.22	$5,351	718.55	-$6,123
$4.5m	-170.53	-$26,389	164.23	-$27,401	-1.09	-$4.13m	-6.33	$711,185	453.42	$9,925	316.58	-$14,215	834.36	$5,393	727.61	-$6,185
$4.6m	-169.59	-$27,124	163.05	-$28,212	-7.36	-$625,401	-1.98	$2,320,780	457.28	$10,060	316.64	-$14,528	848.25	$5,423	736.52	-$6,246
$4.7m	-167.60	-$28,043	160.63	-$29,260	-10.82	-$434,519	1.45	-$3,243,730	460.05	$10,216	317.94	-$14,783	859.08	$5,471	746.26	-$6,298

	λ5								λ6							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$
$4.8m	-166.51	-$28,827	159.60	-$30,075	-15.43	-$311,041	6.01	-$799,003	463.69	$10,352	317.83	-$15,102	870.81	$5,512	754.81	-$6,359
$4.9m	-165.48	-$29,612	158.42	-$30,931	-20.16	-$243,091	10.61	-$462,004	467.35	$10,485	317.88	-$15,415	882.43	$5,553	763.25	-$6,420
$5.0m	-164.59	-$30,379	156.34	-$31,982	-24.81	-$201,567	15.30	-$326,750	471.14	$10,613	318.80	-$15,684	893.78	$5,594	771.53	-$6,481
$5.1m	-162.57	-$31,371	154.68	-$32,971	-29.48	-$172,996	18.98	-$268,680	473.76	$10,765	319.30	-$15,972	905.04	$5,635	780.75	-$6,532
$5.2m	-161.53	-$32,193	153.69	-$33,835	-33.20	-$156,645	23.70	-$219,403	477.34	$10,894	319.12	-$16,295	915.28	$5,681	788.87	-$6,592
$5.3m	-159.60	-$33,209	152.54	-$34,745	-31.86	-$166,328	21.23	-$249,654	480.00	$11,042	319.09	-$16,610	920.29	$5,759	791.71	-$6,694
$5.4m	-158.75	-$34,016	150.56	-$35,867	-30.43	-$177,447	19.69	-$274,216	483.71	$11,164	319.89	-$16,881	925.17	$5,837	793.44	-$6,806
$5.5m	-156.43	-$35,160	149.46	-$36,799	-28.31	-$194,261	17.61	-$312,363	485.93	$11,319	319.78	-$17,199	929.25	$5,919	794.45	-$6,923
$5.6m	-155.46	-$36,022	148.49	-$37,712	-26.34	-$212,597	14.49	-$386,452	489.47	$11,441	319.54	-$17,525	933.47	$5,999	796.48	-$7,031
$5.7m	-154.46	-$36,902	147.37	-$38,678	-23.30	-$244,619	12.42	-$459,122	492.96	$11,563	319.44	-$17,844	936.54	$6,086	797.48	-$7,148
$5.8m	-153.65	-$37,749	145.03	-$39,991	-21.24	-$273,105	11.84	-$490,012	496.61	$11,679	320.54	-$18,094	940.56	$6,167	796.97	-$7,278
$5.9m	-151.69	-$38,894	143.02	-$41,253	-19.34	-$305,090	9.82	-$600,817	499.09	$11,821	321.31	-$18,362	944.71	$6,245	797.90	-$7,394
$6.0m	-150.72	-$39,810	141.07	-$42,532	-17.42	-$344,466	6.78	-$884,609	502.53	$11,940	322.00	-$18,633	948.80	$6,324	799.84	-$7,501
$6.1m	-148.84	-$40,982	140.00	-$43,570	-14.46	-$421,797	4.82	-$1.27m	505.05	$12,078	321.80	-$18,956	951.78	$6,409	800.71	-$7,618
$6.2m	-148.06	-$41,876	139.07	-$44,583	-12.48	-$496,618	1.83	-$3.39m	508.64	$12,189	321.46	-$19,287	955.71	$6,487	802.60	-$7,725
$6.3m	-147.14	-$42,817	137.97	-$45,662	-10.66	-$590,859	-0.15	$41.62m	512.07	$12,303	321.26	-$19,610	959.77	$6,564	803.48	-$7,841
$6.4m	-146.18	-$43,781	137.04	-$46,702	3.03	$2.11m	-2.08	$3.07m	515.44	$12,416	320.88	-$19,945	951.93	$6,723	804.31	-$7,957
$6.5m	-144.71	-$44,919	135.95	-$47,813	4.95	$1.31m	-5.01	$1.30m	518.28	$12,542	320.65	-$20,271	955.80	$6,801	806.13	-$8,063
$6.6m	-142.45	-$46,333	134.89	-$48,929	7.83	$843,024	-6.95	$950,188	520.30	$12,685	320.37	-$20,601	958.68	$6,884	806.95	-$8,179
$6.7m	-141.68	-$47,289	132.97	-$50,388	9.60	$697,875	-8.82	$759,774	523.81	$12,791	320.94	-$20,876	962.62	$6,960	807.71	-$8,295
$6.8m	-139.84	-$48,628	130.98	-$51,915	11.33	$600,166	-11.71	$580,652	526.21	$12,923	321.56	-$21,147	966.59	$7,035	809.49	-$8,400
$6.9m	-137.93	-$50,026	130.06	-$53,053	11.47	$601,677	-13.57	$508,653	528.53	$13,055	321.10	-$21,489	972.11	$7,098	810.22	-$8,516
$7.0m	-136.99	-$51,098	128.97	-$54,276	13.31	$525,969	-15.43	$453,538	531.80	$13,163	320.78	-$21,822	975.90	$7,173	810.97	-$8,632
$7.1m	-136.10	-$52,167	126.68	-$56,048	16.09	$441,286	-18.26	$388,777	535.10	$13,269	321.66	-$22,073	978.67	$7,255	812.67	-$8,737
$7.2m	-135.35	-$53,196	125.59	-$57,331	17.90	$402,341	-20.07	$358,735	538.52	$13,370	321.31	-$22,408	982.42	$7,329	813.35	-$8,852
$7.3m	-134.42	-$54,307	124.66	-$58,559	19.56	$373,287	-21.28	$343,119	541.75	$13,475	320.79	-$22,756	986.31	$7,401	813.42	-$8,974
$7.4m	-132.58	-$55,814	123.61	-$59,868	21.22	$348,734	-24.08	$307,367	544.05	$13,602	320.37	-$23,098	990.13	$7,474	815.08	-$9,079
$7.5m	-131.66	-$56,966	121.68	-$61,636	23.95	$313,152	-25.87	$289,931	547.24	$13,705	320.80	-$23,379	992.84	$7,554	815.73	-$9,194
$7.6m	-130.91	-$58,056	119.69	-$63,495	25.69	$295,796	-27.62	$275,159	550.59	$13,803	321.27	-$23,656	996.52	$7,627	816.34	-$9,310
$7.7m	-128.65	-$59,850	118.59	-$64,927	27.29	$282,167	-30.39	$253,365	552.42	$13,939	320.84	-$24,000	1000.34	$7,697	817.96	-$9,414
$7.8m	-127.76	-$61,051	117.65	-$66,296	29.00	$268,956	-30.68	$254,238	555.60	$14,039	320.22	-$24,358	1003.98	$7,769	817.10	-$9,546
$7.9m	-125.85	-$62,775	116.58	-$67,765	31.69	$249,313	-32.40	$243,808	557.74	$14,164	319.71	-$24,710	1006.64	$7,848	817.67	-$9,662
$8.0m	-124.91	-$64,046	114.26	-$70,013	33.26	$240,526	-34.14	$234,358	560.84	$14,264	320.42	-$24,967	1010.36	$7,918	818.24	-$9,777
$8.1m	-124.15	-$65,245	113.14	-$71,590	34.80	$232,792	-36.85	$219,804	564.09	$14,359	319.91	-$25,320	1014.12	$7,987	819.80	-$9,881
$8.2m	-122.29	-$67,055	111.19	-$73,747	36.46	$224,923	-38.54	$212,793	566.24	$14,482	320.20	-$25,609	1017.70	$8,057	820.31	-$9,996
$8.3m	-121.38	-$68,382	110.22	-$75,304	39.10	$212,296	-41.23	$201,302	569.32	$14,579	319.48	-$25,980	1020.30	$8,135	821.84	-$10,099
$8.4m	-120.42	-$69,754	109.08	-$77,010	40.58	$206,997	-42.92	$195,714	572.34	$14,677	318.91	-$26,340	1024.00	$8,203	822.35	-$10,215
$8.5m	-119.65	-$71,038	107.05	-$79,401	42.20	$201,398	-44.57	$190,697	575.53	$14,769	319.21	-$26,628	1027.55	$8,272	822.83	-$10,330
$8.6m	-117.73	-$73,052	106.08	-$81,071	43.71	$196,734	-47.24	$182,060	577.55	$14,891	318.46	-$27,005	1031.20	$8,340	824.31	-$10,433
$8.7m	-115.45	-$75,355	104.98	-$82,870	46.30	$187,889	-48.88	$177,999	579.20	$15,021	317.81	-$27,374	1033.74	$8,416	824.77	-$10,548
$8.8m	-114.52	-$76,844	103.37	-$85,129	47.74	$184,341	-50.52	$174,177	582.18	$15,115	317.68	-$27,701	1037.38	$8,483	825.22	-$10,664
$8.9m	-112.66	-$78,996	101.42	-$87,755	49.32	$180,458	-48.54	$183,360	584.24	$15,233	317.88	-$27,998	1040.87	$8,551	822.04	-$10,827
$9.0m	-111.91	-$80,420	100.29	-$89,742	50.75	$177,351	-51.16	$175,906	587.39	$15,322	317.25	-$28,369	1044.50	$8,617	823.47	-$10,929
$9.1m	-111.02	-$81,968	99.31	-$91,629	52.30	$173,985	-52.76	$172,471	590.39	$15,413	316.46	-$28,756	1047.97	$8,683	823.87	-$11,045
$9.2m	-110.09	-$83,570	96.98	-$94,862	54.83	$167,776	-66.79	$137,752	593.35	$15,505	317.01	-$29,021	1050.43	$8,758	836.68	-$10,996
$9.3m	-109.34	-$85,060	95.88	-$96,999	56.26	$165,309	-69.37	$134,055	596.49	$15,591	316.33	-$29,400	1053.98	$8,824	838.06	-$11,097
$9.4m	-107.48	-$87,455	94.74	-$99,219	56.04	$167,741	-69.31	$135,630	598.51	$15,706	315.68	-$29,777	1059.17	$8,875	836.77	-$11,234
$9.5m	-106.55	-$89,158	92.71	-$102,467	57.55	$165,070	-70.90	$133,996	601.45	$15,795	315.90	-$30,073	1062.58	$8,941	837.15	-$11,348
$9.6m	-104.62	-$91,757	91.73	-$104,658	58.91	$162,948	-72.46	$132,492	603.39	$15,910	315.07	-$30,469	1066.13	$9,005	837.48	-$11,463
$9.7m	-103.73	-$93,510	89.76	-$108,068	61.40	$157,987	-75.01	$129,321	606.36	$15,997	315.22	-$30,772	1068.52	$9,078	838.80	-$11,564

	λ5								λ6							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$9.8m	-101.46	-$96,593	88.61	-$110,599	62.89	$155,832	-76.55	$128,015	607.94	$16,120	314.54	-$31,156	1071.91	$9,143	839.11	-$11,679
$9.9m	-100.71	-$98,307	87.62	-$112,993	64.25	$154,079	-78.12	$126,731	611.04	$16,202	313.70	-$31,559	1075.38	$9,206	839.44	-$11,794
$10.0m	-99.77	-$100,231	86.49	-$115,616	65.58	$152,489	-78.23	$127,826	613.95	$16,288	312.97	-$31,952	1078.89	$9,269	838.31	-$11,929
$10.1m	-97.91	-$103,154	85.34	-$118,354	68.03	$148,473	-80.75	$125,081	615.93	$16,398	312.27	-$32,343	1081.23	$9,341	839.57	-$12,030
$10.2m	-97.16	-$104,977	84.34	-$120,943	69.48	$146,806	-82.26	$123,991	619.02	$16,478	311.42	-$32,754	1084.57	$9,405	839.83	-$12,145
$10.3m	-96.23	-$107,030	82.30	-$125,155	70.78	$145,525	-83.81	$122,901	621.92	$16,562	311.60	-$33,056	1088.04	$9,467	840.12	-$12,260
$10.4m	-94.76	-$109,745	80.32	-$129,481	72.21	$144,021	-86.31	$120,495	624.28	$16,659	311.71	-$33,365	1091.35	$9,530	841.36	-$12,361
$10.5m	-93.88	-$111,847	77.97	-$134,661	73.52	$142,822	-87.80	$119,591	627.22	$16,740	312.19	-$33,633	1094.75	$9,591	841.57	-$12,477
$10.6m	-91.95	-$115,281	76.81	-$138,003	75.93	$139,595	-90.29	$117,402	629.12	$16,849	311.48	-$34,031	1097.04	$9,662	842.79	-$12,577
$10.7m	-91.02	-$117,551	75.68	-$141,382	77.20	$138,594	-91.81	$116,543	632.01	$16,930	310.73	-$34,435	1100.47	$9,723	843.03	-$12,692
$10.8m	-90.28	-$119,623	74.68	-$144,621	90.20	$119,739	-93.29	$115,772	635.08	$17,006	309.85	-$34,856	1092.14	$9,889	843.22	-$12,808
$10.9m	-88.43	-$123,267	73.51	-$148,282	91.59	$119,012	-95.75	$113,834	637.03	$17,111	309.13	-$35,260	1095.39	$9,951	844.39	-$12,909
$11.0m	-86.15	-$127,683	71.53	-$153,783	93.98	$117,048	-97.23	$113,140	638.55	$17,226	309.22	-$35,574	1097.63	$10,022	844.56	-$13,024
$11.1m	-85.23	-$130,233	70.52	-$157,404	95.22	$116,578	-98.72	$112,434	641.43	$17,305	308.33	-$36,001	1101.01	$10,082	844.76	-$13,140
$11.2m	-84.36	-$132,771	68.48	-$163,557	96.47	$116,099	-101.17	$110,703	644.34	$17,382	308.47	-$36,309	1104.34	$10,142	845.90	-$13,240
$11.3m	-83.62	-$135,131	67.35	-$167,791	97.84	$115,497	-102.63	$110,109	647.40	$17,455	307.69	-$36,725	1107.55	$10,203	846.03	-$13,356
$11.4m	-81.70	-$139,528	66.18	-$172,263	100.21	$113,767	-105.07	$108,496	649.26	$17,559	306.95	-$37,140	1109.75	$10,273	847.16	-$13,457
$11.5m	-80.79	-$142,338	63.83	-$180,167	101.41	$113,400	-106.55	$107,930	652.12	$17,635	307.38	-$37,413	1113.08	$10,332	847.30	-$13,572
$11.6m	-78.94	-$146,939	62.82	-$184,662	102.75	$112,890	-107.99	$107,420	654.04	$17,736	306.47	-$37,850	1116.26	$10,392	847.41	-$13,689
$11.7m	-78.22	-$149,579	64.99	-$180,019	103.26	$113,303	-110.42	$105,964	657.08	$17,806	302.37	-$38,694	1120.25	$10,444	848.49	-$13,789
$11.8m	-77.35	-$152,550	63.01	-$187,278	104.49	$112,931	-110.45	$106,831	659.97	$17,880	302.42	-$39,019	1123.53	$10,503	847.18	-$13,929
$11.9m	-76.45	-$155,664	61.84	-$192,443	105.82	$112,460	-111.88	$106,362	662.82	$17,954	301.65	-$39,449	1126.67	$10,562	847.25	-$14,045
$12.0m	-74.18	-$161,779	60.70	-$197,702	106.99	$112,159	-113.34	$105,878	664.30	$18,064	300.85	-$39,887	1129.96	$10,620	847.34	-$14,162
$12.1m	-73.46	-$164,722	59.68	-$202,740	109.32	$110,688	-115.75	$104,538	667.32	$18,132	299.92	-$40,345	1132.07	$10,688	848.38	-$14,262
$12.2m	-71.61	-$170,356	57.64	-$211,665	108.85	$112,077	-117.17	$104,122	669.22	$18,230	300.01	-$40,666	1136.97	$10,730	848.43	-$14,380
$12.3m	-70.72	-$173,937	56.46	-$217,842	110.16	$111,657	-119.57	$102,868	672.05	$18,302	299.23	-$41,106	1140.06	$10,789	849.44	-$14,480
$12.4m	-68.80	-$180,227	55.44	-$223,652	111.31	$111,396	-121.02	$102,466	673.87	$18,401	298.28	-$41,571	1143.31	$10,846	849.49	-$14,597
$12.5m	-71.80	-$174,102	53.79	-$232,372	113.62	$110,012	-122.43	$102,102	680.59	$18,367	297.97	-$41,951	1145.38	$10,913	849.50	-$14,714
$12.6m	-70.94	-$177,610	51.81	-$243,213	114.80	$109,752	-124.82	$100,945	683.45	$18,436	297.98	-$42,285	1148.56	$10,970	850.49	-$14,815
$12.7m	-70.23	-$180,841	50.66	-$250,693	116.10	$109,393	-126.23	$100,612	686.45	$18,501	297.14	-$42,741	1151.62	$11,028	850.48	-$14,933
$12.8m	-69.33	-$184,621	49.48	-$258,700	117.23	$109,187	-127.66	$100,266	689.26	$18,571	296.34	-$43,194	1154.82	$11,084	850.48	-$15,050
$12.9m	-67.49	-$191,136	47.12	-$273,744	119.53	$107,927	-130.05	$99,195	691.12	$18,665	296.70	-$43,478	1156.85	$11,151	851.44	-$15,151
$13.0m	-66.79	-$194,653	46.10	-$282,003	120.80	$107,615	-131.45	$98,900	694.12	$18,729	295.73	-$43,959	1159.88	$11,208	851.39	-$15,269
$13.1m	-65.89	-$198,802	44.05	-$297,406	120.02	$109,146	-133.83	$97,886	696.92	$18,797	295.78	-$44,290	1164.95	$11,245	852.32	-$15,370
$13.2m	-63.63	-$207,459	42.86	-$307,961	121.14	$108,964	-135.25	$97,594	698.35	$18,902	294.96	-$44,752	1168.11	$11,300	852.29	-$15,488
$13.3m	-62.78	-$211,852	40.87	-$325,427	122.30	$108,752	-136.65	$97,326	701.18	$18,968	294.94	-$45,094	1171.22	$11,356	852.21	-$15,606
$13.4m	-60.87	-$220,149	39.84	-$336,371	123.57	$108,440	-139.04	$96,375	702.95	$19,062	293.95	-$45,586	1174.22	$11,412	853.12	-$15,707
$13.5m	-59.98	-$225,074	38.68	-$348,996	125.86	$107,265	-140.47	$96,105	705.74	$19,129	293.08	-$46,063	1176.18	$11,478	853.06	-$15,825
$13.6m	-59.28	-$229,429	37.49	-$362,772	126.97	$107,110	-141.87	$95,860	708.71	$19,190	292.24	-$46,538	1179.30	$11,532	852.96	-$15,945
$13.7m	-57.44	-$238,527	36.45	-$375,865	128.23	$106,837	-141.89	$96,552	710.53	$19,281	291.24	-$47,041	1182.26	$11,588	851.46	-$16,090
$13.8m	-56.55	-$244,018	34.39	-$401,270	130.51	$105,737	-144.27	$95,655	713.31	$19,346	291.25	-$47,382	1184.19	$11,654	852.32	-$16,191
$13.9m	-55.86	-$248,845	32.03	-$433,980	131.66	$105,577	-145.67	$95,421	716.27	$19,406	291.57	-$47,673	1187.25	$11,708	852.18	-$16,311
$14.0m	-55.02	-$254,469	30.86	-$453,591	132.76	$105,454	-147.10	$95,174	719.08	$19,469	290.67	-$48,164	1190.33	$11,761	852.07	-$16,431
$14.1m	-52.75	-$267,310	29.67	-$475,279	134.02	$105,212	-149.48	$94,330	720.46	$19,571	289.81	-$48,652	1193.24	$11,817	852.88	-$16,532
$14.2m	-51.87	-$273,782	27.66	-$513,312	136.98	$103,667	-150.88	$94,117	723.23	$19,634	289.75	-$49,008	1194.43	$11,888	852.71	-$16,653
$14.3m	-50.02	-$285,865	26.61	-$537,320	140.03	$102,124	-153.26	$93,308	725.02	$19,723	288.72	-$49,530	1195.54	$11,961	853.51	-$16,754
$14.4m	-48.11	-$299,307	25.41	-$566,771	142.30	$101,196	-154.08	$93,458	726.75	$19,814	287.84	-$50,027	1197.39	$12,026	852.73	-$16,887
$14.5m	-46.67	-$310,719	24.35	-$595,492	143.40	$101,116	-155.52	$93,238	728.94	$19,892	286.81	-$50,556	1200.41	$12,079	852.56	-$17,008
$14.6m	-45.97	-$317,612	23.17	-$630,083	144.65	$100,930	-156.92	$93,039	731.87	$19,949	285.89	-$51,069	1203.26	$12,134	852.34	-$17,129
$14.7m	-45.09	-$326,050	21.10	-$696,765	145.79	$100,830	-159.30	$92,277	734.61	$20,011	285.86	-$51,423	1206.22	$12,187	853.08	-$17,232

	λ5								λ6							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$14.8m	-44.25	-$334,499	19.08	-$775,564	145.23	$101,911	-160.71	$92,089	737.40	$20,071	285.77	-$51,789	1210.87	$12,223	852.84	-$17,354
$14.9m	-42.40	-$351,412	17.86	-$834,112	146.33	$101,826	-160.54	$92,810	739.18	$20,158	284.88	-$52,303	1213.84	$12,275	851.00	-$17,509
$15.0m	-41.70	-$359,680	16.80	-$893,047	147.59	$101,635	-161.99	$92,596	742.09	$20,213	283.82	-$52,850	1216.65	$12,329	850.76	-$17,631
$15.1m	-40.82	-$369,914	14.41	-$1.05m	149.88	$100,746	-176.09	$85,753	744.82	$20,273	284.08	-$53,155	1218.42	$12,393	863.15	-$17,494
$15.2m	-38.53	-$394,453	13.18	-$1.15m	162.60	$93,482	-178.48	$85,162	746.15	$20,371	283.17	-$53,679	1209.74	$12,565	863.82	-$17,596
$15.3m	-36.61	-$417,900	11.99	-$1.28m	159.51	$95,920	-179.92	$85,038	747.83	$20,459	282.22	-$54,214	1216.87	$12,573	863.52	-$17,718
$15.4m	-35.91	-$428,807	10.91	-$1.41m	160.78	$95,784	-182.33	$84,464	750.74	$20,513	281.14	-$54,776	1219.63	$12,627	864.16	-$17,821
$15.5m	-35.03	-$442,486	8.88	-$1.75m	161.90	$95,738	-183.80	$84,330	753.45	$20,572	281.02	-$55,157	1222.52	$12,679	863.86	-$17,943
$15.6m	-34.18	-$456,345	6.78	-$2.30m	163.06	$95,670	-185.25	$84,210	756.21	$20,629	280.95	-$55,526	1225.36	$12,731	863.50	-$18,066
$15.7m	-32.33	-$485,609	5.54	-$2.83m	165.37	$94,936	-187.67	$83,656	757.95	$20,714	280.02	-$56,068	1227.03	$12,795	864.10	-$18,169
$15.8m	-31.45	-$502,462	4.45	-$3.55m	166.66	$94,802	-187.78	$84,142	760.65	$20,772	278.93	-$56,645	1229.73	$12,848	862.36	-$18,322
$15.9m	-30.75	-$517,150	3.24	-$4.91m	167.80	$94,755	-189.25	$84,017	763.54	$20,824	277.95	-$57,204	1232.55	$12,900	861.95	-$18,446
$16.0m	-29.86	-$535,801	1.99	-$8.06m	170.14	$94,043	-190.76	$83,876	766.24	$20,881	277.01	-$57,760	1234.18	$12,964	861.57	-$18,571
$16.1m	-29.02	-$554,862	0.27	-$60.54m	171.44	$93,910	-193.21	$83,329	768.97	$20,937	276.52	-$58,223	1236.81	$13,017	862.09	-$18,676
$16.2m	-27.08	-$598,286	-1.79	$9.05m	172.64	$93,837	-194.71	$83,200	770.62	$21,022	276.36	-$58,620	1239.55	$13,069	861.64	-$18,801
$16.3m	-25.21	-$646,487	-2.90	$5.63m	173.81	$93,781	-197.18	$82,664	772.33	$21,105	275.24	-$59,220	1242.31	$13,121	862.12	-$18,907
$16.4m	-22.91	-$715,861	-5.31	$3.09m	175.14	$93,638	-198.74	$82,522	773.60	$21,200	275.44	-$59,542	1244.89	$13,174	861.65	-$19,033
$16.5m	-22.20	-$743,079	-7.43	$2.22m	177.53	$92,944	-200.27	$82,387	776.47	$21,250	275.32	-$59,930	1246.41	$13,238	861.13	-$19,161
$16.6m	-21.31	-$779,032	-8.70	$1.91m	178.74	$92,874	-202.79	$81,857	779.14	$21,306	274.35	-$60,507	1249.11	$13,290	861.56	-$19,267
$16.7m	-20.61	-$810,448	-9.94	$1.68m	180.11	$92,720	-204.40	$81,704	782.00	$21,355	273.34	-$61,097	1251.62	$13,343	861.02	-$19,396
$16.8m	-19.71	-$852,380	-11.07	$1.52m	181.39	$92,619	-205.99	$81,558	784.67	$21,410	272.20	-$61,719	1254.23	$13,395	860.43	-$19,525
$16.9m	-17.83	-$947,847	-12.36	$1.37m	183.84	$91,929	-208.56	$81,032	786.36	$21,492	271.21	-$62,313	1255.65	$13,459	860.77	-$19,634
$17.0m	-16.97	-$1,001,716	-14.44	$1.18m	185.12	$91,833	-210.20	$80,877	789.06	$21,545	271.01	-$62,728	1258.24	$13,511	860.13	-$19,765
$17.1m	-15.02	-$1,138,857	-15.58	$1.10m	186.57	$91,653	-211.89	$80,704	790.66	$21,628	269.86	-$63,366	1260.63	$13,565	859.47	-$19,896
$17.2m	-14.31	-$1,202,288	-16.84	$1.02m	187.90	$91,539	-214.53	$80,174	793.50	$21,676	268.83	-$63,981	1263.15	$13,617	859.71	-$20,007
$17.3m	-13.40	-$1,291,101	-18.99	$911,108	190.45	$90,835	-216.26	$79,997	796.15	$21,730	268.67	-$64,391	1264.42	$13,682	858.95	-$20,141
$17.4m	-11.07	-$1,572,022	-20.29	$857,539	192.00	$90,624	-218.97	$79,462	797.37	$21,822	267.67	-$65,006	1266.70	$13,737	859.10	-$20,254
$17.5m	-9.18	-$1,906,561	-22.74	$769,432	191.75	$91,267	-220.81	$79,253	799.03	$21,902	267.80	-$65,348	1270.77	$13,771	858.27	-$20,390
$17.6m	-8.31	-$2,118,348	-23.91	$736,185	193.27	$91,065	-222.67	$79,041	801.71	$21,953	266.62	-$66,012	1273.05	$13,825	857.34	-$20,528
$17.7m	-7.40	-$2,393,022	-26.01	$680,454	194.82	$90,854	-225.55	$78,476	804.34	$22,006	266.38	-$66,446	1275.30	$13,879	857.31	-$20,646
$17.8m	-6.67	-$2,668,290	-27.34	$651,154	196.53	$90,571	-226.14	$78,713	807.16	$22,053	265.35	-$67,081	1277.37	$13,935	854.95	-$20,820
$17.9m	-5.75	-$3,110,978	-28.63	$625,165	199.29	$89,817	-228.10	$78,474	809.78	$22,105	264.28	-$67,732	1278.38	$14,002	853.96	-$20,961
$18.0m	-3.77	-$4,769,053	-29.81	$603,800	200.84	$89,622	-230.03	$78,249	811.34	$22,186	263.08	-$68,420	1280.60	$14,056	852.93	-$21,104
$18.1m	-3.05	-$5,932,658	-31.99	$565,797	202.55	$89,360	-232.92	$77,709	814.15	$22,232	262.89	-$68,851	1282.65	$14,111	852.86	-$21,223
$18.2m	-1.14	-$15,953,339	-33.33	$546,044	204.14	$89,155	-234.86	$77,494	815.77	$22,310	261.84	-$69,509	1284.82	$14,165	851.82	-$21,366
$18.3m	-0.26	-$70,857,782	-34.53	$530,039	206.90	$88,450	-237.75	$76,973	818.42	$22,360	260.62	-$70,217	1285.82	$14,232	851.73	-$21,486
$18.4m	2.11	$8,738,166	-36.66	$501,904	208.44	$88,275	-239.71	$76,760	819.58	$22,451	260.35	-$70,675	1288.01	$14,286	850.71	-$21,629
$18.5m	3.04	$6,087,962	-37.98	$487,041	210.14	$88,038	-238.26	$77,646	822.18	$22,501	259.24	-$71,362	1290.04	$14,341	846.27	-$21,861
$18.6m	4.56	$4,081,505	-40.49	$459,368	223.16	$83,349	-240.19	$77,437	824.18	$22,568	259.30	-$71,731	1280.74	$14,523	845.21	-$22,006
$18.7m	5.30	$3,527,936	-41.86	$446,762	225.91	$82,777	-243.08	$76,931	826.96	$22,613	258.22	-$72,419	1281.71	$14,590	845.10	-$22,128
$18.8m	6.24	$3,014,171	-43.07	$436,456	227.47	$82,647	-245.03	$76,724	829.54	$22,663	256.98	-$73,157	1283.83	$14,644	844.05	-$22,274
$18.9m	8.17	$2,313,095	-45.29	$417,289	229.16	$82,474	-246.97	$76,529	831.13	$22,740	256.74	-$73,617	1285.84	$14,699	842.97	-$22,421
$19.0m	9.07	$2,094,678	-46.68	$407,059	230.70	$82,359	-249.85	$76,046	833.74	$22,789	255.64	-$74,324	1288.00	$14,752	842.83	-$22,543
$19.1m	9.82	$1,944,625	-48.03	$397,669	232.38	$82,195	-251.78	$75,860	836.50	$22,833	254.50	-$75,049	1290.00	$14,806	841.73	-$22,691
$19.2m	11.84	$1,621,015	-49.27	$389,686	233.90	$82,088	-254.65	$75,396	837.99	$22,912	253.24	-$75,819	1292.14	$14,859	841.58	-$22,814
$19.3m	12.80	$1,507,372	-51.46	$375,083	236.64	$81,560	-256.62	$75,210	840.54	$22,961	252.90	-$76,315	1293.06	$14,926	840.50	-$22,963
$19.4m	15.21	$1,275,227	-52.86	$366,981	238.19	$81,447	-259.49	$74,761	841.64	$23,050	251.77	-$77,054	1295.16	$14,979	840.33	-$23,086
$19.5m	16.17	$1,205,783	-54.12	$360,283	239.86	$81,297	-261.42	$74,592	844.18	$23,099	250.49	-$77,848	1297.13	$15,033	839.21	-$23,236
$19.6m	18.13	$1,080,793	-56.67	$345,837	241.38	$81,201	-263.38	$74,416	845.72	$23,176	250.49	-$78,248	1299.26	$15,086	838.11	-$23,386
$19.7m	18.91	$1,041,860	-58.55	$336,447	244.11	$80,700	-266.26	$73,987	848.44	$23,219	249.80	-$78,864	1300.16	$15,152	837.93	-$23,510

	λ5								λ6							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$19.8m	19.84	$998,161	-59.95	$330,272	245.79	$80,558	-268.20	$73,825	851.01	$23,266	248.61	-$79,642	1302.12	$15,206	836.79	-$23,662
$19.9m	20.81	$956,449	-62.22	$319,827	245.56	$81,038	-268.81	$74,031	853.54	$23,315	248.30	-$80,146	1305.96	$15,238	834.32	-$23,852
$20.0m	21.59	$926,444	-63.66	$314,152	247.07	$80,949	-270.77	$73,864	856.25	$23,358	247.13	-$80,929	1308.06	$15,290	833.20	-$24,004
$20.1m	23.65	$850,045	-65.89	$305,075	248.61	$80,850	-273.64	$73,454	857.68	$23,435	246.74	-$81,462	1310.12	$15,342	832.99	-$24,130
$20.2m	25.64	$787,944	-67.19	$300,656	251.34	$80,370	-275.58	$73,301	859.18	$23,511	245.41	-$82,311	1310.99	$15,408	831.83	-$24,284
$20.3m	26.62	$762,635	-68.64	$295,741	253.00	$80,239	-275.97	$73,558	861.68	$23,558	244.23	-$83,118	1312.92	$15,462	829.13	-$24,483
$20.4m	29.07	$701,699	-69.96	$291,613	254.49	$80,160	-278.85	$73,159	862.72	$23,646	242.89	-$83,989	1315.00	$15,513	828.90	-$24,611
$20.5m	29.87	$686,408	-71.39	$287,156	256.15	$80,033	-280.78	$73,011	865.41	$23,688	241.66	-$84,829	1316.92	$15,567	827.72	-$24,767
$20.6m	30.82	$668,459	-73.64	$279,733	258.87	$79,577	-282.74	$72,858	867.93	$23,735	241.24	-$85,393	1317.76	$15,633	826.56	-$24,923
$20.7m	31.81	$650,711	-75.95	$272,534	260.36	$79,505	-285.61	$72,475	870.42	$23,782	240.87	-$85,939	1319.83	$15,684	826.31	-$25,051
$20.8m	33.82	$615,065	-77.43	$268,615	261.88	$79,424	-287.55	$72,336	871.89	$23,856	239.66	-$86,790	1321.85	$15,736	825.10	-$25,209
$20.9m	34.62	$603,712	-78.77	$265,324	263.53	$79,307	-289.51	$72,190	874.56	$23,898	238.29	-$87,708	1323.74	$15,789	823.93	-$25,366
$21.0m	35.63	$589,411	-81.40	$257,988	265.02	$79,240	-292.39	$71,823	877.02	$23,945	238.19	-$88,166	1325.79	$15,840	823.65	-$25,496
$21.1m	37.74	$559,136	-82.88	$254,598	267.74	$78,808	-294.33	$71,689	878.38	$24,021	236.91	-$89,062	1326.60	$15,905	822.44	-$25,655
$21.2m	38.71	$547,727	-84.39	$251,226	269.38	$78,699	-297.20	$71,332	880.88	$24,067	235.67	-$89,956	1328.48	$15,958	822.15	-$25,786
$21.3m	39.72	$536,283	-85.75	$248,401	270.86	$78,639	-298.59	$71,336	883.33	$24,113	234.28	-$90,918	1330.52	$16,009	820.38	-$25,964
$21.4m	40.54	$527,826	-88.05	$243,046	272.37	$78,569	-300.52	$71,209	885.97	$24,154	233.79	-$91,534	1332.52	$16,060	819.15	-$26,125
$21.5m	42.58	$504,885	-90.41	$237,810	285.22	$75,381	-303.40	$70,864	887.39	$24,228	233.37	-$92,129	1323.18	$16,249	818.85	-$26,256
$21.6m	45.10	$478,964	-91.95	$234,914	287.93	$75,019	-305.33	$70,742	888.34	$24,315	232.09	-$93,065	1323.96	$16,315	817.61	-$26,419
$21.7m	46.13	$470,434	-93.34	$232,485	289.56	$74,942	-308.20	$70,408	890.76	$24,361	230.67	-$94,074	1325.82	$16,367	817.29	-$26,551
$21.8m	46.96	$464,177	-94.86	$229,821	291.03	$74,907	-308.83	$70,589	893.38	$24,402	229.35	-$95,052	1327.84	$16,418	814.73	-$26,757
$21.9m	47.96	$456,662	-96.41	$227,152	290.45	$75,400	-323.69	$67,658	895.84	$24,446	228.06	-$96,027	1331.89	$16,443	826.40	-$26,501
$22.0m	50.11	$439,058	-97.83	$224,880	292.07	$75,324	-325.62	$67,564	897.14	$24,522	226.61	-$97,083	1333.73	$16,495	825.14	-$26,662
$22.1m	51.16	$431,956	-100.18	$220,606	294.78	$74,971	-328.49	$67,278	899.53	$24,568	226.07	-$97,758	1334.49	$16,561	824.80	-$26,794
$22.2m	53.25	$416,922	-102.88	$215,783	296.27	$74,930	-330.42	$67,187	900.90	$24,642	225.87	-$98,287	1336.45	$16,611	823.54	-$26,957
$22.3m	54.12	$412,082	-104.44	$213,511	297.73	$74,901	-333.28	$66,910	903.47	$24,683	224.50	-$99,330	1338.44	$16,661	823.19	-$27,090
$22.4m	55.18	$405,934	-106.87	$209,600	299.34	$74,831	-335.22	$66,821	905.85	$24,728	224.00	-$100,002	1340.27	$16,713	821.91	-$27,254
$22.5m	57.74	$389,679	-108.47	$207,435	299.02	$75,245	-338.09	$66,551	906.73	$24,815	222.66	-$101,051	1344.02	$16,741	821.55	-$27,387
$22.6m	59.42	$380,343	-109.93	$205,583	301.72	$74,903	-340.03	$66,465	908.49	$24,877	221.16	-$102,190	1344.75	$16,806	820.27	-$27,552
$22.7m	60.45	$375,492	-111.55	$203,498	303.17	$74,876	-342.89	$66,202	910.89	$24,921	219.80	-$103,274	1346.73	$16,856	819.91	-$27,686
$22.8m	62.57	$364,368	-113.03	$201,718	304.77	$74,810	-344.83	$66,120	912.20	$24,994	218.28	-$104,451	1348.55	$16,907	818.61	-$27,852
$22.9m	63.48	$360,757	-115.44	$198,364	306.25	$74,776	-347.69	$65,864	914.73	$25,035	217.66	-$105,208	1350.49	$16,957	818.24	-$27,987
$23.0m	64.59	$356,118	-117.06	$196,477	306.94	$74,933	-349.62	$65,785	917.05	$25,080	216.24	-$106,365	1353.20	$16,997	816.95	-$28,154
$23.1m	66.81	$345,766	-115.56	$199,901	308.37	$74,910	-352.48	$65,535	918.25	$25,157	211.67	-$109,133	1355.17	$17,046	816.56	-$28,289
$23.2m	67.92	$341,582	-118.05	$196,533	311.06	$74,584	-354.42	$65,460	920.56	$25,202	211.09	-$109,908	1355.87	$17,111	815.26	-$28,457
$23.3m	68.84	$338,491	-119.57	$194,867	312.65	$74,525	-357.27	$65,217	923.06	$25,242	209.51	-$111,210	1357.67	$17,162	814.87	-$28,594
$23.4m	70.99	$329,603	-121.25	$192,993	314.07	$74,506	-357.90	$65,381	924.31	$25,316	208.08	-$112,455	1359.63	$17,211	812.26	-$28,809
$23.5m	72.09	$325,980	-124.06	$189,424	315.65	$74,449	-359.84	$65,307	926.63	$25,361	207.75	-$113,119	1361.42	$17,261	810.94	-$28,979
$23.6m	74.74	$315,752	-126.21	$186,987	318.33	$74,138	-362.69	$65,070	927.39	$25,448	206.73	-$114,158	1362.11	$17,326	810.53	-$29,117
$23.7m	75.89	$312,295	-128.69	$184,166	319.78	$74,114	-365.54	$64,836	929.65	$25,494	206.03	-$115,030	1364.02	$17,375	810.13	-$29,255
$23.8m	76.84	$309,752	-130.37	$182,556	321.19	$74,100	-367.47	$64,767	932.10	$25,534	204.53	-$116,367	1365.97	$17,424	808.80	-$29,426
$23.9m	78.00	$306,411	-131.96	$181,120	322.76	$74,050	-370.32	$64,539	934.34	$25,580	202.88	-$117,804	1367.75	$17,474	808.38	-$29,565
$24.0m	80.31	$298,852	-133.71	$179,488	325.43	$73,749	-372.25	$64,473	935.43	$25,657	201.36	-$119,189	1368.42	$17,538	807.05	-$29,738
$24.1m	82.54	$291,991	-135.33	$178,088	326.83	$73,739	-375.10	$64,250	936.59	$25,732	199.69	-$120,688	1370.37	$17,587	806.63	-$29,878
$24.2m	83.68	$289,201	-137.92	$175,470	328.39	$73,693	-377.03	$64,186	938.84	$25,776	198.98	-$121,620	1372.14	$17,637	805.29	-$30,051
$24.3m	84.67	$286,986	-139.69	$173,952	329.82	$73,676	-379.87	$63,968	941.24	$25,817	197.44	-$123,076	1374.04	$17,685	804.86	-$30,192
$24.4m	85.87	$284,145	-141.44	$172,509	342.48	$71,245	-381.80	$63,907	943.42	$25,863	195.86	-$124,582	1364.70	$17,879	803.51	-$30,367
$24.5m	88.61	$276,503	-144.01	$170,132	345.14	$70,986	-384.65	$63,695	944.07	$25,951	195.05	-$125,608	1365.36	$17,944	803.07	-$30,508
$24.6m	89.84	$273,820	-145.68	$168,860	346.53	$70,990	-386.58	$63,635	946.22	$25,998	193.31	-$127,258	1367.29	$17,992	801.72	-$30,684
$24.7m	92.12	$268,115	-148.62	$166,198	348.07	$70,962	-387.02	$63,821	947.31	$26,074	192.82	-$128,101	1369.04	$18,042	798.87	-$30,919

	$\lambda5$								$\lambda6$							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$24.8m	93.18	$266,166	-150.47	$164,820	349.62	$70,934	-389.86	$63,612	949.64	$26,115	191.19	-$129,711	1370.80	$18,092	798.42	-$31,061
$24.9m	95.58	$260,512	-152.31	$163,484	350.99	$70,942	-390.51	$63,763	950.60	$26,194	189.51	-$131,389	1372.72	$18,139	795.77	-$31,291
$25.0m	96.81	$258,237	-154.04	$162,300	352.40	$70,941	-392.43	$63,705	952.74	$26,240	187.72	-$133,180	1374.59	$18,187	794.40	-$31,470
$25.1m	98.09	$255,887	-156.74	$160,140	351.97	$71,313	-395.27	$63,501	954.83	$26,287	186.88	-$134,313	1378.31	$18,211	793.94	-$31,615
$25.2m	99.18	$254,089	-158.64	$158,851	354.62	$71,062	-397.19	$63,445	957.10	$26,329	185.19	-$136,073	1378.94	$18,275	792.56	-$31,796
$25.3m	101.53	$249,192	-161.30	$156,847	356.15	$71,038	-400.03	$63,246	958.11	$26,406	184.27	-$137,298	1380.68	$18,324	792.09	-$31,941
$25.4m	102.82	$247,028	-163.21	$155,625	357.51	$71,047	-401.96	$63,191	960.18	$26,453	182.59	-$139,113	1382.58	$18,371	790.71	-$32,123
$25.5m	99.75	$255,631	-165.09	$154,463	360.15	$70,803	-404.79	$62,996	966.60	$26,381	180.86	-$140,990	1383.20	$18,435	790.23	-$32,269
$25.6m	102.59	$249,549	-168.10	$152,287	361.68	$70,782	-406.72	$62,943	967.12	$26,470	180.27	-$142,007	1384.94	$18,485	788.85	-$32,452
$25.7m	103.83	$247,515	-170.84	$150,437	363.03	$70,793	-409.55	$62,752	969.22	$26,516	179.39	-$143,264	1386.84	$18,531	788.36	-$32,599
$25.8m	104.92	$245,897	-172.76	$149,343	364.42	$70,797	-411.48	$62,701	971.48	$26,557	177.68	-$145,201	1388.69	$18,579	786.97	-$32,784
$25.9m	106.22	$243,832	-175.44	$147,629	367.06	$70,561	-414.31	$62,514	973.52	$26,604	176.73	-$146,548	1389.30	$18,642	786.47	-$32,932
$26.0m	108.66	$239,275	-177.34	$146,615	368.57	$70,543	-416.24	$62,464	974.42	$26,682	174.99	-$148,583	1391.02	$18,691	785.07	-$33,118
$26.1m	111.02	$235,091	-179.26	$145,596	369.91	$70,558	-419.07	$62,281	975.40	$26,758	173.27	-$150,631	1392.91	$18,738	784.57	-$33,267
$26.2m	112.32	$233,269	-181.95	$143,992	371.41	$70,541	-421.90	$62,101	977.44	$26,805	172.31	-$152,053	1394.63	$18,786	784.07	-$33,416
$26.3m	113.40	$231,916	-184.70	$142,391	372.79	$70,549	-423.82	$62,054	979.69	$26,845	171.40	-$153,442	1396.48	$18,833	782.65	-$33,604
$26.4m	114.65	$230,273	-186.64	$141,450	374.12	$70,565	-425.22	$62,086	981.77	$26,890	169.68	-$155,592	1398.36	$18,879	780.71	-$33,815
$26.5m	115.94	$228,569	-188.55	$140,549	376.75	$70,338	-425.88	$62,224	983.81	$26,936	167.91	-$157,821	1398.94	$18,943	778.03	-$34,061
$26.6m	118.78	$223,938	-191.58	$138,843	378.25	$70,324	-428.71	$62,047	984.29	$27,025	167.28	-$159,018	1400.66	$18,991	777.50	-$34,212
$26.7m	121.15	$220,395	-193.97	$137,651	379.58	$70,342	-430.64	$62,001	985.25	$27,100	165.98	-$160,863	1402.53	$19,037	776.08	-$34,404
$26.8m	122.23	$219,262	-195.91	$136,794	392.07	$68,356	-429.37	$62,417	987.49	$27,140	164.24	-$163,177	1393.25	$19,236	771.46	-$34,739
$26.9m	124.14	$216,683	-198.62	$135,436	394.70	$68,154	-432.20	$62,240	988.89	$27,202	163.25	-$164,777	1393.82	$19,300	770.93	-$34,893
$27.0m	125.44	$215,247	-200.54	$134,637	396.06	$68,172	-434.13	$62,193	990.91	$27,248	161.47	-$167,213	1395.65	$19,346	769.50	-$35,088
$27.1m	127.88	$211,913	-203.30	$133,299	397.55	$68,167	-436.97	$62,018	991.77	$27,325	160.53	-$168,815	1397.36	$19,394	768.97	-$35,242
$27.2m	128.96	$210,923	-205.26	$132,518	398.87	$68,192	-438.90	$61,973	994.01	$27,364	158.78	-$171,308	1399.23	$19,439	767.54	-$35,438
$27.3m	130.20	$209,685	-207.21	$131,748	395.54	$69,019	-441.74	$61,801	996.07	$27,408	157.03	-$173,858	1405.75	$19,420	767.00	-$35,593
$27.4m	131.48	$208,391	-209.14	$131,011	398.17	$68,815	-443.68	$61,757	998.09	$27,452	155.23	-$176,507	1406.31	$19,484	765.56	-$35,791
$27.5m	133.85	$205,457	-212.19	$129,598	397.64	$69,158	-446.51	$61,589	999.03	$27,527	154.57	-$177,918	1410.03	$19,503	765.01	-$35,947
$27.6m	135.13	$204,249	-214.91	$128,426	399.13	$69,151	-448.45	$61,545	1001.04	$27,571	153.55	-$179,746	1411.72	$19,551	763.57	-$36,146
$27.7m	137.98	$200,749	-217.68	$127,248	400.44	$69,173	-451.29	$61,380	1001.49	$27,659	152.59	-$181,533	1413.58	$19,596	763.02	-$36,303
$27.8m	139.06	$199,920	-219.65	$126,563	401.80	$69,189	-453.24	$61,337	1003.71	$27,697	150.82	-$184,328	1415.41	$19,641	761.58	-$36,503
$27.9m	141.42	$197,282	-221.60	$125,905	403.28	$69,183	-456.07	$61,174	1004.63	$27,771	149.01	-$187,237	1417.09	$19,688	761.02	-$36,661
$28.0m	142.70	$196,215	-223.57	$125,240	404.59	$69,206	-458.02	$61,133	1006.64	$27,815	147.23	-$190,177	1418.95	$19,733	759.57	-$36,863
$28.1m	145.15	$193,592	-226.30	$124,172	407.21	$69,005	-458.71	$61,258	1007.47	$27,892	146.20	-$192,206	1419.49	$19,796	756.86	-$37,127
$28.2m	146.39	$192,640	-229.09	$123,098	408.69	$69,001	-461.55	$61,098	1009.52	$27,934	145.22	-$194,192	1421.18	$19,843	756.29	-$37,287
$28.3m	147.45	$191,925	-231.07	$122,475	410.00	$69,025	-476.72	$59,364	1011.73	$27,972	143.43	-$197,309	1423.04	$19,887	768.05	-$36,847
$28.4m	148.73	$190,953	-234.14	$121,297	412.62	$68,828	-478.67	$59,331	1013.74	$28,015	142.73	-$198,983	1423.57	$19,950	766.59	-$37,047
$28.5m	151.09	$188,629	-236.09	$120,719	413.96	$68,847	-481.51	$59,189	1014.65	$28,089	140.90	-$202,267	1425.38	$19,995	766.01	-$37,206
$28.6m	153.95	$185,775	-238.82	$119,755	415.43	$68,844	-483.46	$59,157	1015.06	$28,176	139.85	-$204,498	1427.06	$20,041	764.55	-$37,408
$28.7m	155.01	$185,154	-240.81	$119,181	416.73	$68,869	-486.31	$59,016	1017.28	$28,213	138.06	-$207,885	1428.91	$20,085	763.97	-$37,567
$28.8m	156.28	$184,289	-242.77	$118,631	419.36	$68,677	-486.82	$59,160	1019.27	$28,255	136.22	-$211,417	1429.43	$20,148	761.05	-$37,843
$28.9m	157.50	$183,490	-245.57	$117,687	420.82	$68,675	-489.66	$59,021	1021.31	$28,297	135.22	-$213,725	1431.11	$20,194	760.46	-$38,003
$29.0m	159.95	$181,306	-247.56	$117,142	422.12	$68,701	-491.62	$58,989	1022.13	$28,372	133.41	-$217,369	1432.96	$20,238	758.98	-$38,209
$29.1m	161.21	$180,505	-250.30	$116,258	434.49	$66,975	-494.47	$58,851	1024.12	$28,415	132.35	-$219,872	1423.73	$20,439	758.39	-$38,371
$29.2m	163.58	$178,506	-252.74	$115,534	435.82	$67,000	-496.43	$58,820	1025.01	$28,487	130.97	-$222,951	1425.53	$20,484	756.91	-$38,578
$29.3m	164.63	$177,970	-255.82	$114,532	437.28	$67,004	-499.28	$58,685	1027.22	$28,524	130.23	-$224,982	1427.20	$20,530	756.31	-$38,741
$29.4m	165.90	$177,220	-257.80	$114,043	438.58	$67,035	-501.24	$58,654	1029.21	$28,566	128.38	-$229,006	1429.04	$20,573	754.83	-$38,949
$29.5m	167.11	$176,530	-259.81	$113,546	441.20	$66,863	-504.09	$58,521	1031.24	$28,606	126.55	-$233,102	1429.55	$20,636	754.23	-$39,113
$29.6m	169.98	$174,139	-262.62	$112,711	442.66	$66,868	-506.07	$58,490	1031.62	$28,693	125.52	-$235,813	1431.22	$20,682	752.74	-$39,323
$29.7m	171.02	$173,659	-264.63	$112,231	443.95	$66,900	-508.92	$58,359	1033.82	$28,728	123.69	-$240,110	1433.06	$20,725	752.13	-$39,488

	λ5								λ6							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$29.8m	172.28	$172,971	-267.39	$111,448	443.34	$67,217	-509.65	$58,472	1035.80	$28,770	122.60	-$243,061	1436.79	$20,741	749.40	-$39,765
$29.9m	174.65	$171,200	-269.37	$110,999	444.66	$67,242	-511.63	$58,441	1036.68	$28,842	120.74	-$247,648	1438.59	$20,784	747.90	-$39,979
$30.0m	177.10	$169,396	-271.39	$110,542	447.29	$67,071	-514.48	$58,311	1037.46	$28,917	118.90	-$252,318	1439.09	$20,847	747.29	-$40,145
$30.1m	178.35	$168,767	-274.21	$109,770	448.75	$67,075	-516.46	$58,281	1039.45	$28,958	117.85	-$255,399	1440.75	$20,892	745.79	-$40,360
$30.2m	179.39	$168,348	-277.31	$108,904	450.03	$67,106	-519.32	$58,153	1041.64	$28,993	117.08	-$257,934	1442.58	$20,935	745.17	-$40,528
$30.3m	180.60	$167,777	-279.30	$108,484	452.66	$66,938	-521.31	$58,123	1043.67	$29,032	115.20	-$263,017	1443.07	$20,997	743.66	-$40,744
$30.4m	182.96	$166,153	-281.33	$108,057	454.11	$66,944	-524.17	$57,997	1044.53	$29,104	113.35	-$268,195	1444.73	$21,042	743.04	-$40,913
$30.5m	184.22	$165,565	-284.11	$107,354	455.39	$66,976	-526.15	$57,968	1046.50	$29,145	112.23	-$271,759	1446.56	$21,085	741.53	-$41,131
$30.6m	187.10	$163,553	-286.15	$106,939	456.70	$67,002	-529.02	$57,843	1046.84	$29,231	110.37	-$277,246	1448.35	$21,128	740.89	-$41,302
$30.7m	188.13	$163,186	-288.15	$106,541	458.15	$67,009	-531.88	$57,720	1049.03	$29,265	108.48	-$283,012	1450.00	$21,172	740.26	-$41,472
$30.8m	189.38	$162,635	-290.99	$105,845	459.42	$67,040	-533.87	$57,691	1051.00	$29,306	107.40	-$286,779	1451.84	$21,215	738.74	-$41,692
$30.9m	191.75	$161,145	-293.78	$105,182	462.05	$66,876	-536.74	$57,570	1051.84	$29,377	106.27	-$290,781	1452.31	$21,276	738.10	-$41,864
$31.0m	194.21	$159,622	-295.82	$104,793	461.11	$67,229	-538.74	$57,542	1052.60	$29,451	104.39	-$296,955	1456.35	$21,286	736.58	-$42,086
$31.1m	195.40	$159,157	-298.94	$104,035	462.55	$67,236	-541.61	$57,422	1054.61	$29,489	103.59	-$300,227	1458.00	$21,331	735.93	-$42,259
$31.2m	197.31	$158,130	-300.96	$103,670	474.81	$65,710	-543.61	$57,394	1055.92	$29,548	101.68	-$306,844	1448.83	$21,535	734.41	-$42,483
$31.3m	198.33	$157,816	-303.01	$103,298	476.08	$65,745	-544.38	$57,497	1058.10	$29,581	99.80	-$313,620	1450.65	$21,576	731.66	-$42,780
$31.4m	199.58	$157,331	-305.85	$102,664	477.39	$65,774	-547.94	$57,305	1060.06	$29,621	98.71	-$318,105	1452.43	$21,619	731.69	-$42,914
$31.5m	200.81	$156,861	-308.64	$102,061	480.02	$65,622	-550.82	$57,188	1062.02	$29,660	97.56	-$322,882	1452.89	$21,681	731.03	-$43,090
$31.6m	203.69	$155,135	-310.70	$101,707	481.47	$65,633	-552.82	$57,161	1062.35	$29,745	95.67	-$330,285	1454.53	$21,725	729.50	-$43,318
$31.7m	206.06	$153,837	-312.72	$101,367	482.73	$65,668	-554.31	$57,188	1063.17	$29,816	93.75	-$338,122	1456.35	$21,767	727.45	-$43,577
$31.8m	207.08	$153,566	-315.21	$100,884	485.36	$65,518	-557.19	$57,072	1065.35	$29,849	92.29	-$344,564	1456.80	$21,829	726.77	-$43,755
$31.9m	208.26	$153,172	-317.28	$100,543	486.80	$65,530	-559.20	$57,045	1067.36	$29,887	90.39	-$352,899	1458.44	$21,873	725.23	-$43,986
$32.0m	209.49	$152,748	-320.13	$99,959	488.06	$65,566	-562.08	$56,931	1069.32	$29,926	89.29	-$358,401	1460.26	$21,914	724.56	-$44,165
$32.1m	211.95	$151,454	-323.26	$99,302	489.36	$65,596	-564.10	$56,905	1070.06	$29,998	88.45	-$362,913	1462.03	$21,956	723.02	-$44,397
$32.2m	212.95	$151,209	-326.06	$98,756	488.68	$65,892	-566.98	$56,792	1072.24	$30,031	87.28	-$368,933	1465.78	$21,968	722.33	-$44,578
$32.3m	214.18	$150,811	-325.11	$99,351	490.11	$65,903	-569.00	$56,766	1074.20	$30,069	82.36	-$392,194	1467.42	$22,011	720.78	-$44,812
$32.4m	216.54	$149,623	-327.15	$99,037	491.37	$65,938	-571.89	$56,654	1075.01	$30,139	80.42	-$402,909	1469.23	$22,052	720.10	-$44,994
$32.5m	219.43	$148,114	-329.22	$98,717	494.00	$65,789	-574.78	$56,544	1075.31	$30,224	78.50	-$413,993	1469.66	$22,114	719.41	-$45,176
$32.6m	220.64	$147,751	-331.27	$98,411	495.26	$65,825	-576.80	$56,518	1077.26	$30,262	76.56	-$425,806	1471.48	$22,155	717.85	-$45,413
$32.7m	221.81	$147,422	-333.34	$98,097	496.69	$65,836	-578.83	$56,493	1079.27	$30,298	74.64	-$438,081	1473.11	$22,198	716.30	-$45,651
$32.8m	222.81	$147,212	-336.21	$97,559	497.98	$65,866	-579.45	$56,605	1081.44	$30,330	73.51	-$446,198	1474.87	$22,239	713.32	-$45,982
$32.9m	225.17	$146,112	-339.02	$97,046	500.62	$65,719	-580.26	$56,698	1082.25	$30,400	72.32	-$454,926	1475.30	$22,301	710.55	-$46,302
$33.0m	226.38	$145,772	-342.16	$96,447	501.86	$65,755	-582.30	$56,672	1084.21	$30,437	71.46	-$461,829	1477.11	$22,341	708.99	-$46,545
$33.1m	228.83	$144,650	-344.24	$96,154	514.03	$64,394	-584.33	$56,646	1084.93	$30,509	69.53	-$476,049	1468.00	$22,548	707.42	-$46,790
$33.2m	229.81	$144,468	-346.29	$95,873	515.45	$64,409	-586.37	$56,620	1087.11	$30,540	67.57	-$491,321	1469.62	$22,591	705.85	-$47,035
$33.3m	231.01	$144,147	-349.11	$95,386	516.69	$64,448	-588.41	$56,593	1089.06	$30,577	66.37	-$501,731	1471.43	$22,631	704.29	-$47,282
$33.4m	232.17	$143,863	-351.98	$94,892	519.33	$64,314	-590.45	$56,567	1091.07	$30,612	65.22	-$512,124	1471.84	$22,693	702.72	-$47,530
$33.5m	234.53	$142,842	-354.07	$94,614	520.75	$64,330	-592.50	$56,540	1091.87	$30,681	63.28	-$529,372	1473.47	$22,735	701.15	-$47,779
$33.6m	237.41	$141,528	-356.13	$94,347	522.04	$64,363	-594.55	$56,513	1092.14	$30,765	61.31	-$547,995	1475.23	$22,776	699.58	-$48,029
$33.7m	238.61	$141,236	-358.23	$94,075	523.28	$64,402	-595.40	$56,601	1094.09	$30,802	59.37	-$567,590	1477.03	$22,816	696.80	-$48,364
$33.8m	239.58	$141,080	-361.05	$93,616	524.70	$64,418	-594.41	$56,863	1096.27	$30,832	58.16	-$581,200	1478.65	$22,859	692.18	-$48,832
$33.9m	240.77	$140,797	-364.21	$93,079	527.33	$64,286	-596.46	$56,835	1098.22	$30,868	57.26	-$592,018	1479.05	$22,920	690.60	-$49,088
$34.0m	243.13	$139,844	-367.09	$92,621	528.57	$64,325	-598.52	$56,806	1099.01	$30,937	56.09	-$606,130	1480.85	$22,960	689.01	-$49,346
$34.1m	245.57	$138,859	-369.19	$92,365	529.98	$64,342	-600.59	$56,778	1099.71	$31,008	54.14	-$629,826	1482.47	$23,002	687.43	-$49,605
$34.2m	246.53	$138,723	-371.26	$92,118	531.26	$64,375	-602.65	$56,749	1101.89	$31,038	52.15	-$655,744	1484.22	$23,042	685.85	-$49,865
$34.3m	247.67	$138,489	-373.37	$91,865	533.90	$64,245	-604.72	$56,720	1103.89	$31,072	50.20	-$683,285	1484.61	$23,104	684.26	-$50,127
$34.4m	248.86	$138,232	-376.20	$91,440	535.13	$64,284	-606.79	$56,691	1105.84	$31,108	48.96	-$702,549	1486.41	$23,143	682.68	-$50,390
$34.5m	251.74	$137,044	-379.09	$91,007	535.53	$64,422	-622.42	$55,428	1106.09	$31,191	47.78	-$722,041	1489.04	$23,169	694.64	-$49,666
$34.6m	252.92	$136,803	-381.63	$90,664	536.94	$64,439	-624.50	$55,404	1108.05	$31,226	46.24	-$748,272	1490.65	$23,211	693.05	-$49,925
$34.7m	253.87	$136,686	-383.74	$90,426	536.18	$64,717	-625.39	$55,486	1110.23	$31,255	44.28	-$783,736	1494.43	$23,220	690.26	-$50,271

	λ5								λ6							
	Agent has good information				Agent has poor information				Agent has good information				Agent has poor information			
	Net Investment		Net Disinvestment		Net Investment		Net Disinvestment		Net Investment		Net Disinvestment		Net Investment		Net Disinvestment	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$34.8m	256.22	$135,821	-386.91	$89,945	548.25	$63,474	-627.47	$55,461	1111.00	$31,323	43.36	-$802,641	1485.37	$23,428	688.66	-$50,533
$34.9m	257.34	$135,620	-389.02	$89,712	549.48	$63,515	-629.05	$55,480	1113.01	$31,356	41.39	-$843,260	1487.16	$23,468	686.56	-$50,833
$35.0m	258.50	$135,394	-391.86	$89,317	550.75	$63,549	-629.76	$55,577	1114.97	$31,391	40.14	-$872,029	1488.90	$23,507	683.58	-$51,201
$35.1m	259.44	$135,292	-394.76	$88,914	553.40	$63,427	-631.85	$55,551	1117.15	$31,419	38.94	-$901,445	1489.27	$23,569	681.98	-$51,468
$35.2m	261.88	$134,414	-396.88	$88,691	554.81	$63,445	-633.94	$55,526	1117.83	$31,489	36.96	-$952,329	1490.87	$23,610	680.37	-$51,737
$35.3m	264.22	$133,598	-399.73	$88,310	556.04	$63,485	-636.03	$55,500	1118.60	$31,557	35.71	-$988,648	1492.66	$23,649	678.76	-$52,006
$35.4m	265.38	$133,392	-401.86	$88,091	557.45	$63,504	-638.13	$55,474	1120.56	$31,591	33.73	-$1.05m	1494.26	$23,691	677.15	-$52,278
$35.5m	268.27	$132,329	-405.03	$87,648	560.09	$63,382	-640.24	$55,448	1120.79	$31,674	32.79	-$1.08m	1494.62	$23,752	675.54	-$52,550
$35.6m	270.12	$131,792	-407.93	$87,269	561.31	$63,423	-641.16	$55,525	1122.04	$31,728	31.58	-$1.13m	1496.40	$23,790	672.75	-$52,917
$35.7m	271.04	$131,713	-410.07	$87,059	562.58	$63,458	-643.27	$55,498	1124.23	$31,755	29.59	-$1.21m	1498.14	$23,830	671.13	-$53,194
$35.8m	272.20	$131,521	-412.92	$86,699	563.98	$63,477	-645.37	$55,472	1126.18	$31,789	28.32	-$1.26m	1499.73	$23,871	669.51	-$53,472
$35.9m	273.30	$131,357	-415.06	$86,493	565.20	$63,517	-647.49	$55,445	1128.19	$31,821	26.33	-$1.36m	1501.51	$23,909	667.89	-$53,751
$36.0m	275.65	$130,600	-417.98	$86,129	567.85	$63,397	-649.61	$55,418	1128.94	$31,888	25.10	-$1.43m	1501.86	$23,970	666.27	-$54,032
$36.1m	276.80	$130,420	-420.12	$85,927	569.25	$63,416	-651.72	$55,392	1130.89	$31,922	23.10	-$1.56m	1503.45	$24,011	664.65	-$54,315
$36.2m	277.71	$130,353	-423.31	$85,517	570.47	$63,457	-653.85	$55,365	1133.08	$31,948	22.14	-$1.64m	1505.23	$24,049	663.02	-$54,599
$36.3m	280.15	$129,576	-426.17	$85,177	582.46	$62,322	-655.97	$55,338	1133.74	$32,018	20.85	-$1.74m	1496.23	$24,261	661.39	-$54,884
$36.4m	281.29	$129,406	-428.33	$84,982	583.72	$62,359	-656.93	$55,409	1135.69	$32,051	18.85	-$1.93m	1497.96	$24,300	658.59	-$55,269
$36.5m	284.18	$128,440	-431.25	$84,637	586.37	$62,248	-659.06	$55,382	1135.89	$32,133	17.60	-$2.07m	1498.30	$24,361	656.96	-$55,559
$36.6m	286.53	$127,737	-433.83	$84,366	587.77	$62,270	-661.20	$55,354	1136.63	$32,200	16.01	-$2.29m	1499.88	$24,402	655.33	-$55,850
$36.7m	287.61	$127,602	-435.99	$84,177	588.98	$62,311	-663.34	$55,326	1138.63	$32,232	13.99	-$2.62m	1501.65	$24,440	653.69	-$56,143
$36.8m	288.51	$127,553	-438.86	$83,854	590.37	$62,333	-665.48	$55,298	1140.82	$32,257	12.69	-$2.90m	1503.23	$24,481	652.05	-$56,437
$36.9m	289.64	$127,398	-442.05	$83,474	591.58	$62,375	-666.28	$55,382	1142.77	$32,290	11.71	-$3.15m	1505.01	$24,518	649.06	-$56,851
$37.0m	290.77	$127,249	-444.98	$83,149	594.24	$62,265	-668.42	$55,354	1144.73	$32,322	10.46	-$3.54m	1505.33	$24,579	647.42	-$57,150
$37.1m	293.11	$126,573	-447.15	$82,969	593.40	$62,521	-670.57	$55,326	1145.46	$32,389	8.43	-$4.40m	1509.14	$24,584	645.77	-$57,451
$37.2m	294.00	$126,532	-450.04	$82,660	594.65	$62,558	-671.57	$55,393	1147.66	$32,414	7.11	-$5.23m	1510.86	$24,622	642.96	-$57,857
$37.3m	296.43	$125,832	-452.21	$82,484	596.04	$62,579	-673.72	$55,364	1148.30	$32,483	5.09	-$7.33m	1512.44	$24,662	641.31	-$58,162
$37.4m	299.32	$124,948	-455.15	$82,171	597.25	$62,620	-675.40	$55,375	1148.48	$32,565	3.82	-$9.80m	1514.20	$24,699	639.17	-$58,513
$37.5m	300.39	$124,837	-457.33	$81,998	599.91	$62,509	-677.56	$55,346	1150.48	$32,595	1.78	-$21.04m	1514.51	$24,761	637.52	-$58,822
$37.6m	301.52	$124,703	-460.22	$81,700	601.30	$62,531	-679.72	$55,317	1152.43	$32,627	0.45	-$83.42m	1516.08	$24,801	635.86	-$59,133
$37.7m	301.79	$124,923	-463.43	$81,349	602.50	$62,572	-681.89	$55,287	1155.22	$32,634	-0.56	$67.19m	1517.84	$24,838	634.19	-$59,446
$37.8m	302.05	$125,144	-465.62	$81,182	614.41	$61,522	-684.06	$55,258	1158.02	$32,642	-2.60	$14.53m	1508.89	$25,052	632.53	-$59,760
$37.9m	304.40	$124,508	-468.57	$80,884	615.66	$61,560	-686.24	$55,229	1158.74	$32,708	-3.89	$9.75m	1510.61	$25,089	630.87	-$60,076
$38.0m	305.52	$124,380	-470.77	$80,719	616.86	$61,603	-685.51	$55,433	1160.68	$32,739	-5.94	$6.40m	1512.37	$25,126	626.29	-$60,675
$38.1m	305.79	$124,596	-473.67	$80,435	619.53	$61,499	-687.69	$55,403	1163.47	$32,747	-7.29	$5.23m	1512.66	$25,187	624.62	-$60,997
$38.2m	306.67	$124,564	-475.87	$80,274	620.92	$61,522	-688.73	$55,465	1165.65	$32,771	-9.34	$4.09m	1514.22	$25,227	621.80	-$61,435
$38.3m	306.94	$124,782	-479.10	$79,942	622.11	$61,564	-690.91	$55,434	1168.44	$32,779	-10.37	$3.69m	1515.98	$25,264	620.12	-$61,762
$38.4m	307.20	$125,000	-482.06	$79,659	623.50	$61,588	-693.10	$55,403	1171.23	$32,786	-11.67	$3.29m	1517.55	$25,304	618.45	-$62,091
$38.5m	307.46	$125,219	-484.26	$79,502	626.17	$61,485	-695.30	$55,372	1174.02	$32,793	-13.73	$2.80m	1517.83	$25,365	616.76	-$62,423
$38.6m	308.57	$125,092	-487.17	$79,233	627.41	$61,523	-697.49	$55,341	1175.95	$32,824	-15.09	$2.56m	1519.54	$25,403	615.08	-$62,756
$38.7m	308.83	$125,311	-489.79	$79,013	628.60	$61,566	-699.70	$55,310	1178.74	$32,832	-16.75	$2.31m	1521.29	$25,439	613.40	-$63,091
$38.8m	309.09	$125,530	-492.00	$78,861	624.51	$62,129	-701.90	$55,279	1181.53	$32,839	-18.81	$2.06m	1528.33	$25,387	611.71	-$63,429
$38.9m	310.15	$125,424	-494.97	$78,591	625.89	$62,151	-702.79	$55,351	1183.51	$32,868	-20.13	$1.93m	1529.88	$25,427	608.70	-$63,907
$39.0m	310.40	$125,644	-497.89	$78,331	627.08	$62,193	-705.00	$55,319	1186.30	$32,875	-21.50	$1.81m	1531.64	$25,463	607.01	-$64,250
$39.1m	312.75	$125,020	-500.11	$78,184	629.76	$62,087	-706.08	$55,376	1186.99	$32,941	-23.58	$1.66m	1531.90	$25,524	604.17	-$64,717
$39.2m	313.62	$124,991	-499.43	$78,489	641.61	$61,097	-708.29	$55,344	1189.15	$32,965	-28.56	$1.37m	1522.99	$25,739	602.47	-$65,065
$39.3m	316.54	$124,156	-502.67	$78,182	642.99	$61,121	-710.51	$55,312	1189.27	$33,046	-29.62	$1.33m	1524.54	$25,778	600.77	-$65,416
$39.4m	316.79	$124,371	-504.90	$78,035	642.07	$61,364	-712.74	$55,280	1192.04	$33,053	-31.71	$1.24m	1528.40	$25,779	599.07	-$65,769
$39.5m	319.24	$123,731	-507.88	$77,774	643.31	$61,401	-714.97	$55,247	1192.62	$33,120	-33.05	$1.20m	1530.09	$25,815	597.36	-$66,124
$39.6m	320.36	$123,612	-510.81	$77,524	644.50	$61,443	-717.20	$55,215	1194.52	$33,151	-34.45	$1.15m	1531.83	$25,851	595.65	-$66,481
$39.7m	320.62	$123,824	-513.04	$77,381	647.19	$61,342	-719.44	$55,182	1197.29	$33,158	-36.55	$1.09m	1532.08	$25,913	593.95	-$66,841

	λ5								λ6							
	Agent has good information				*Agent has poor information*				*Agent has good information*				*Agent has poor information*			
	Net Investment		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$39.8m	320.87	$124,037	-516.03	$77,127	648.57	$61,366	-720.55	$55,236	1200.05	$33,165	-37.90	$1.05m	1533.62	$25,952	591.10	-$67,332
$39.9m	321.12	$124,251	-519.29	$76,836	649.76	$61,407	-722.32	$55,239	1202.81	$33,172	-38.99	$1.02m	1535.36	$25,987	588.91	-$67,752
$40.0m	321.37	$124,466	-521.53	$76,698	651.14	$61,431	-738.52	$54,163	1205.58	$33,179	-41.10	$973,130	1536.91	$26,026	601.14	-$66,540
$40.1m	322.49	$124,346	-524.47	$76,458	652.32	$61,472	-740.76	$54,133	1207.47	$33,210	-42.52	$943,028	1538.65	$26,062	599.42	-$66,898
$40.2m	322.74	$124,560	-526.72	$76,322	655.02	$61,372	-743.02	$54,104	1210.23	$33,217	-44.64	$900,516	1538.88	$26,123	597.69	-$67,258
$40.3m	323.61	$124,534	-529.72	$76,078	656.25	$61,409	-745.28	$54,074	1212.37	$33,241	-46.01	$875,862	1540.57	$26,159	595.97	-$67,621
$40.4m	323.85	$124,749	-531.97	$75,945	668.03	$60,476	-747.54	$54,044	1215.12	$33,248	-48.13	$839,328	1531.71	$26,376	594.24	-$67,987
$40.5m	326.21	$124,152	-534.92	$75,713	669.42	$60,501	-749.80	$54,014	1215.76	$33,312	-49.56	$817,144	1533.25	$26,414	592.50	-$68,354
$40.6m	326.46	$124,366	-538.18	$75,439	670.60	$60,543	-752.07	$53,984	1218.52	$33,319	-50.68	$801,098	1534.99	$26,450	590.77	-$68,724
$40.7m	327.52	$124,269	-540.85	$75,252	669.30	$60,810	-754.34	$53,954	1220.45	$33,348	-52.41	$776,585	1539.20	$26,442	589.03	-$69,097
$40.8m	327.76	$124,481	-543.11	$75,123	672.01	$60,714	-755.50	$54,004	1223.20	$33,355	-54.55	$747,981	1539.41	$26,504	586.17	-$69,604
$40.9m	328.87	$124,365	-546.12	$74,892	673.38	$60,738	-757.78	$53,974	1225.08	$33,386	-55.94	$731,152	1540.95	$26,542	584.43	-$69,983
$41.0m	329.11	$124,577	-549.08	$74,671	674.57	$60,780	-758.77	$54,035	1227.83	$33,392	-57.39	$714,408	1542.68	$26,577	581.39	-$70,521
$41.1m	329.36	$124,789	-551.35	$74,545	675.80	$60,817	-761.05	$54,004	1230.57	$33,399	-59.54	$690,330	1544.37	$26,613	579.64	-$70,906
$41.2m	332.29	$123,988	-553.62	$74,420	676.97	$60,859	-763.34	$53,974	1230.62	$33,479	-61.69	$667,884	1546.10	$26,648	577.90	-$71,293
$41.3m	332.53	$124,199	-556.64	$74,195	678.35	$60,883	-765.63	$53,943	1233.36	$33,486	-63.10	$654,560	1547.64	$26,686	576.14	-$71,684
$41.4m	333.39	$124,178	-559.92	$73,939	681.06	$60,788	-767.93	$53,911	1235.47	$33,509	-64.25	$644,398	1547.83	$26,747	574.39	-$72,077
$41.5m	333.63	$124,389	-562.89	$73,727	682.23	$60,830	-770.23	$53,880	1238.21	$33,516	-65.71	$631,540	1549.57	$26,782	572.63	-$72,473
$41.6m	334.74	$124,276	-565.17	$73,606	693.96	$59,946	-771.42	$53,926	1240.08	$33,546	-67.88	$612,870	1540.76	$27,000	569.76	-$73,013
$41.7m	337.11	$123,699	-567.45	$73,486	695.33	$59,972	-773.73	$53,895	1240.68	$33,611	-70.04	$595,360	1542.28	$27,038	568.00	-$73,416
$41.8m	337.35	$123,907	-570.49	$73,271	694.33	$60,202	-776.04	$53,863	1243.40	$33,617	-71.47	$584,842	1546.19	$27,034	566.23	-$73,821
$41.9m	339.82	$123,300	-573.47	$73,064	695.56	$60,239	-778.36	$53,831	1243.90	$33,684	-72.96	$574,316	1547.86	$27,070	564.46	-$74,230
$42.0m	335.73	$125,099	-575.76	$72,947	698.28	$60,147	-782.15	$53,698	1250.95	$33,574	-75.13	$559,008	1548.04	$27,131	564.15	-$74,448
$42.1m	335.98	$125,307	-579.06	$72,704	699.46	$60,189	-784.47	$53,667	1253.67	$33,581	-76.31	$551,661	1549.76	$27,165	562.38	-$74,860
$42.2m	336.21	$125,516	-582.10	$72,496	700.84	$60,214	-784.01	$53,826	1256.39	$33,588	-77.76	$542,715	1551.28	$27,203	557.81	-$75,653
$42.3m	336.44	$125,727	-584.40	$72,382	702.01	$60,255	-786.34	$53,794	1259.12	$33,595	-79.94	$529,134	1553.01	$27,237	556.03	-$76,075
$42.4m	337.56	$125,609	-587.39	$72,183	704.74	$60,164	-788.68	$53,761	1260.96	$33,625	-81.45	$520,582	1553.17	$27,299	554.24	-$76,501
$42.5m	338.61	$125,513	-589.70	$72,070	706.12	$60,188	-790.55	$53,760	1262.85	$33,654	-83.64	$508,123	1554.69	$27,337	551.99	-$76,994
$42.6m	338.92	$125,692	-592.41	$71,909	707.34	$60,226	-792.89	$53,727	1265.57	$33,661	-85.44	$498,621	1556.37	$27,371	550.20	-$77,427
$42.7m	341.18	$125,153	-595.46	$71,709	708.51	$60,267	-794.14	$53,769	1267.65	$33,684	-86.90	$491,368	1558.08	$27,405	547.30	-$78,019
$42.8m	343.44	$124,621	-598.47	$71,516	720.18	$59,429	-796.49	$53,735	1270.36	$33,691	-88.42	$484,067	1549.30	$27,625	545.50	-$78,460
$42.9m	345.71	$124,093	-600.79	$71,406	721.56	$59,455	-798.85	$53,702	1273.07	$33,698	-90.63	$473,343	1550.82	$27,663	543.70	-$78,904
$43.0m	347.98	$123,571	-604.11	$71,179	724.29	$59,368	-801.21	$53,669	1273.62	$33,762	-91.85	$468,154	1550.97	$27,725	541.89	-$79,351
$43.1m	350.25	$123,055	-606.43	$71,072	725.47	$59,410	-802.30	$53,721	1274.70	$33,812	-94.07	$458,184	1552.68	$27,758	538.81	-$79,991
$43.2m	352.53	$122,544	-609.50	$70,878	726.63	$59,452	-804.67	$53,687	1276.52	$33,842	-95.55	$452,106	1554.40	$27,792	537.00	-$80,447
$43.3m	354.80	$122,039	-612.52	$70,692	727.85	$59,490	-807.04	$53,653	1279.22	$33,849	-97.09	$445,960	1556.06	$27,827	535.18	-$80,908
$43.4m	357.09	$121,538	-614.85	$70,586	729.22	$59,515	-809.41	$53,619	1279.18	$33,928	-99.33	$436,940	1557.57	$27,864	533.36	-$81,371
$43.5m	359.38	$121,042	-618.19	$70,367	731.97	$59,428	-810.70	$53,657	1281.87	$33,935	-100.57	$432,536	1557.70	$27,926	530.44	-$82,007
$43.6m	361.67	$120,553	-620.53	$70,263	733.14	$59,471	-813.08	$53,623	1284.56	$33,942	-102.81	$424,102	1559.41	$27,959	528.62	-$82,479
$43.7m	363.96	$120,067	-623.61	$70,076	734.51	$59,496	-815.47	$53,588	1287.25	$33,948	-104.31	$418,925	1560.92	$27,996	526.78	-$82,956
$43.8m	366.26	$119,588	-626.64	$69,896	746.13	$58,703	-817.87	$53,554	1289.31	$33,972	-105.88	$413,691	1552.17	$28,219	524.95	-$83,437
$43.9m	368.56	$119,113	-628.99	$69,794	745.04	$58,923	-820.26	$53,520	1291.11	$34,002	-108.12	$406,018	1556.13	$28,211	523.11	-$83,921
$44.0m	370.86	$118,644	-632.08	$69,612	746.20	$58,965	-822.66	$53,485	1293.80	$34,008	-109.64	$401,319	1557.84	$28,244	521.27	-$84,410
$44.1m	373.16	$118,179	-634.43	$69,511	748.96	$58,881	-825.07	$53,450	1296.49	$34,015	-111.89	$394,128	1557.94	$28,307	519.42	-$84,902
$44.2m	375.47	$117,719	-637.47	$69,336	750.18	$58,919	-827.48	$53,415	1296.90	$34,081	-113.47	$389,534	1559.59	$28,341	517.57	-$85,399
$44.3m	377.78	$117,264	-640.82	$69,130	751.56	$58,944	-828.81	$53,450	1297.42	$34,145	-114.74	$386,096	1561.08	$28,378	514.64	-$86,080
$44.4m	380.09	$116,813	-643.18	$69,032	752.72	$58,986	-831.23	$53,415	1299.26	$34,173	-117.00	$379,477	1562.78	$28,411	512.78	-$86,587
$44.5m	382.41	$116,367	-646.28	$68,855	754.09	$59,012	-833.65	$53,380	1301.94	$34,180	-118.54	$375,399	1564.28	$28,448	510.92	-$87,098
$44.6m	384.74	$115,924	-649.34	$68,686	756.86	$58,928	-836.08	$53,344	1304.61	$34,186	-120.14	$371,246	1564.37	$28,510	509.05	-$87,613
$44.7m	387.06	$115,485	-651.71	$68,588	758.02	$58,969	-838.52	$53,308	1306.39	$34,216	-122.41	$365,152	1566.07	$28,543	507.19	-$88,133

	λ5								λ6							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$44.8m	389.39	$115,051	-654.49	$68,451	769.60	$58,212	-840.50	$53,301	1309.06	$34,223	-124.30	$360,417	1557.35	$28,767	504.86	-$88,737
$44.9m	391.73	$114,621	-656.87	$68,355	770.80	$58,251	-841.69	$53,345	1311.09	$34,246	-126.59	$354,702	1559.00	$28,801	501.74	-$89,489
$45.0m	394.07	$114,194	-659.99	$68,183	772.18	$58,277	-844.14	$53,309	1313.75	$34,253	-128.15	$351,156	1560.48	$28,837	499.85	-$90,026
$45.1m	396.41	$113,771	-663.36	$67,987	773.34	$58,319	-846.59	$53,273	1316.42	$34,260	-129.46	$348,370	1562.17	$28,870	497.97	-$90,568
$45.2m	398.76	$113,352	-666.43	$67,824	776.13	$58,238	-849.04	$53,236	1316.31	$34,338	-131.08	$344,816	1562.23	$28,933	496.08	-$91,115
$45.3m	401.11	$112,937	-668.83	$67,730	777.28	$58,280	-850.43	$53,267	1318.07	$34,368	-133.39	$339,610	1563.93	$28,966	493.11	-$91,866
$45.4m	403.46	$112,526	-668.44	$67,919	778.65	$58,306	-852.89	$53,231	1320.73	$34,375	-138.48	$327,840	1565.41	$29,002	491.21	-$92,424
$45.5m	405.82	$112,117	-670.85	$67,824	790.17	$57,582	-855.36	$53,194	1321.19	$34,439	-140.80	$323,159	1556.73	$29,228	489.31	-$92,988
$45.6m	408.19	$111,713	-673.99	$67,657	792.97	$57,506	-857.83	$53,157	1323.84	$34,445	-142.39	$320,249	1556.78	$29,291	487.40	-$93,557
$45.7m	410.55	$111,313	-677.07	$67,496	794.17	$57,544	-860.31	$53,120	1326.49	$34,452	-144.03	$317,287	1558.41	$29,325	485.49	-$94,131
$45.8m	412.92	$110,916	-679.49	$67,404	795.33	$57,586	-862.79	$53,084	1329.15	$34,458	-146.36	$312,930	1560.09	$29,357	483.58	-$94,711
$45.9m	415.30	$110,523	-682.89	$67,215	796.71	$57,612	-865.28	$53,046	1330.90	$34,488	-147.71	$310,751	1561.56	$29,394	481.66	-$95,296
$46.0m	417.67	$110,135	-686.03	$67,052	797.86	$57,654	-866.70	$53,075	1332.90	$34,511	-149.31	$308,082	1563.24	$29,426	478.67	-$96,099
$46.1m	420.06	$109,747	-688.46	$66,961	796.68	$57,865	-869.20	$53,037	1334.70	$34,540	-151.65	$303,986	1567.26	$29,414	476.74	-$96,698
$46.2m	422.44	$109,365	-691.56	$66,805	798.06	$57,891	-871.71	$52,999	1337.34	$34,546	-153.32	$301,332	1568.72	$29,451	474.81	-$97,303
$46.3m	424.83	$108,984	-694.00	$66,715	800.86	$57,813	-874.21	$52,962	1339.98	$34,553	-155.67	$297,429	1568.75	$29,514	472.87	-$97,912
$46.4m	427.23	$108,607	-697.16	$66,556	802.02	$57,854	-874.04	$53,087	1340.30	$34,619	-157.30	$294,987	1570.42	$29,546	468.25	-$99,092
$46.5m	429.62	$108,234	-700.27	$66,403	813.51	$57,160	-876.56	$53,048	1342.94	$34,625	-158.98	$292,497	1561.76	$29,774	466.30	-$99,721
$46.6m	432.03	$107,863	-702.72	$66,314	814.72	$57,198	-879.08	$53,010	1344.67	$34,655	-161.34	$288,833	1563.38	$29,807	464.35	-$100,355
$46.7m	434.44	$107,495	-706.14	$66,134	816.09	$57,224	-896.03	$52,119	1345.08	$34,719	-162.73	$286,979	1564.83	$29,843	476.81	-$97,942
$46.8m	436.85	$107,130	-708.99	$66,009	817.25	$57,265	-897.33	$52,155	1347.70	$34,726	-164.71	$284,135	1566.50	$29,876	473.62	-$98,812
$46.9m	439.27	$106,768	-711.45	$65,922	820.07	$57,190	-899.86	$52,119	1350.33	$34,732	-167.09	$280,693	1566.49	$29,939	471.66	-$99,436
$47.0m	441.69	$106,410	-714.63	$65,768	821.23	$57,231	-902.40	$52,083	1352.96	$34,739	-168.74	$278,535	1568.17	$29,971	469.69	-$100,066
$47.1m	444.11	$106,056	-717.76	$65,621	822.60	$57,258	-903.89	$52,108	1354.93	$34,762	-170.45	$276,328	1569.62	$30,007	466.66	-$100,930
$47.2m	446.53	$105,703	-720.23	$65,535	822.76	$57,368	-906.44	$52,072	1354.73	$34,841	-172.84	$273,090	1572.27	$30,020	464.68	-$101,576
$47.3m	448.97	$105,353	-723.68	$65,361	834.21	$56,700	-908.55	$52,061	1356.44	$34,871	-174.26	$271,438	1563.64	$30,250	462.26	-$102,324
$47.4m	451.40	$105,006	-726.15	$65,275	835.41	$56,739	-911.10	$52,025	1359.05	$34,877	-176.65	$268,323	1565.26	$30,283	460.27	-$102,982
$47.5m	453.84	$104,662	-729.35	$65,126	838.25	$56,666	-913.67	$51,988	1361.67	$34,884	-178.33	$266,359	1565.23	$30,347	458.28	-$103,648
$47.6m	456.28	$104,322	-732.50	$64,983	839.41	$56,707	-916.23	$51,952	1364.29	$34,890	-180.06	$264,354	1566.89	$30,379	456.29	-$104,320
$47.7m	458.73	$103,984	-734.98	$64,899	840.79	$56,733	-918.81	$51,915	1366.05	$34,918	-182.47	$261,418	1568.32	$30,415	454.29	-$105,000
$47.8m	461.18	$103,648	-738.19	$64,753	841.94	$56,774	-921.39	$51,878	1366.42	$34,982	-184.16	$259,560	1569.97	$30,446	452.28	-$105,687
$47.9m	463.63	$103,314	-740.69	$64,669	843.31	$56,800	-922.92	$51,900	1369.03	$34,988	-186.58	$256,732	1571.41	$30,482	449.22	-$106,630
$48.0m	466.10	$102,983	-743.86	$64,528	846.16	$56,727	-925.51	$51,864	1370.71	$35,018	-188.33	$254,870	1571.37	$30,547	447.21	-$107,333
$48.1m	468.56	$102,655	-747.33	$64,362	857.58	$56,088	-928.10	$51,826	1373.32	$35,025	-189.79	$253,442	1562.76	$30,779	445.19	-$108,045
$48.2m	471.03	$102,329	-749.84	$64,280	858.73	$56,129	-930.71	$51,789	1375.26	$35,048	-192.22	$250,755	1564.41	$30,810	443.16	-$108,765
$48.3m	473.50	$102,005	-753.07	$64,137	859.94	$56,167	-933.31	$51,751	1377.86	$35,054	-193.94	$249,049	1566.00	$30,843	441.13	-$109,493
$48.4m	475.98	$101,685	-756.25	$64,000	861.31	$56,193	-935.92	$51,714	1380.46	$35,061	-195.71	$247,304	1567.43	$30,879	439.09	-$110,227
$48.5m	478.47	$101,365	-758.78	$63,919	862.46	$56,234	-938.54	$51,676	1382.14	$35,091	-198.16	$244,754	1569.07	$30,910	437.06	-$110,970
$48.6m	480.95	$101,049	-761.69	$63,806	861.19	$56,433	-939.95	$51,705	1382.38	$35,157	-200.22	$242,737	1573.14	$30,894	433.81	-$112,032
$48.7m	483.44	$100,736	-764.21	$63,726	864.06	$56,362	-942.57	$51,667	1384.97	$35,163	-202.67	$240,294	1573.07	$30,959	431.76	-$112,794
$48.8m	485.94	$100,424	-767.46	$63,586	875.43	$55,744	-944.15	$51,687	1387.56	$35,170	-204.42	$238,730	1564.49	$31,192	428.68	-$113,839
$48.9m	488.44	$100,115	-770.96	$63,427	876.57	$55,786	-946.77	$51,649	1387.89	$35,233	-205.92	$237,475	1566.15	$31,223	426.63	-$114,619
$49.0m	490.95	$99,807	-774.16	$63,294	877.93	$55,813	-949.40	$51,612	1387.60	$35,313	-207.73	$235,883	1567.58	$31,258	424.58	-$115,407
$49.1m	493.46	$99,501	-776.71	$63,215	879.12	$55,852	-952.02	$51,574	1390.17	$35,319	-210.21	$233,574	1569.18	$31,290	422.54	-$116,203
$49.2m	495.97	$99,199	-779.25	$63,137	880.24	$55,894	-954.65	$51,537	1391.82	$35,349	-212.70	$231,317	1570.84	$31,321	420.48	-$117,008
$49.3m	498.49	$98,899	-782.51	$63,002	883.11	$55,825	-957.29	$51,500	1393.72	$35,373	-214.47	$229,869	1570.76	$31,386	418.43	-$117,821
$49.4m	501.01	$98,601	-785.72	$62,872	884.46	$55,853	-959.92	$51,462	1396.29	$35,379	-216.30	$228,384	1572.20	$31,421	416.38	-$118,643
$49.5m	503.54	$98,304	-788.27	$62,795	895.77	$55,260	-962.13	$51,449	1397.98	$35,408	-218.80	$226,230	1563.67	$31,656	413.88	-$119,599
$49.6m	506.07	$98,009	-791.79	$62,643	896.89	$55,302	-964.76	$51,412	1400.54	$35,415	-220.35	$225,093	1565.33	$31,687	411.83	-$120,439
$49.7m	508.62	$97,716	-795.07	$62,510	898.22	$55,332	-966.37	$51,430	1403.09	$35,422	-222.16	$223,712	1566.78	$31,721	408.73	-$121,595

	λ5								λ6							
	Agent has good information				*Agent has poor information*				*Agent has good information*				*Agent has poor information*			
	Net Investment		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*		*Net Investment*		*Net Disinvestment*	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$49.8m	511.16	$97,426	-797.64	$62,434	901.08	$55,267	-970.42	$51,318	1404.71	$35,452	-224.68	$221,646	1566.70	$31,787	408.08	-$122,034
$49.9m	513.71	$97,137	-800.86	$62,308	895.92	$55,697	-973.07	$51,281	1407.27	$35,459	-226.55	$220,261	1574.64	$31,690	406.02	-$122,900
$50.0m	516.26	$96,850	-803.44	$62,232	897.02	$55,740	-975.71	$51,245	1407.52	$35,523	-229.09	$218,258	1576.32	$31,720	403.96	-$123,776

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment;
[c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

Table A2.3.4: Optimal numerical thresholds (threshold sets λ7 and λ8)

	λ7								*λ8*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
\$0.1m	5.02	\$19,920	9.31	-\$10,740	33.89	\$2,951	10.43	-\$9,586	1.96	\$51,044	-1.79	\$55,872	1.58	\$63,369	-0.54	\$186,014
\$0.2m	9.77	\$20,476	18.50	-\$10,810	53.80	\$3,718	20.65	-\$9,686	3.79	\$52,812	-2.32	\$86,224	3.19	\$62,703	-2.01	\$99,571
\$0.3m	14.29	\$20,989	27.57	-\$10,883	70.49	\$4,256	30.67	-\$9,782	9.16	\$32,765	-3.24	\$92,587	4.66	\$64,329	-3.62	\$82,956
\$0.4m	18.63	\$21,466	36.51	-\$10,957	85.40	\$4,684	40.50	-\$9,876	10.01	\$39,941	-5.03	\$79,593	5.20	\$76,886	-4.15	\$96,325
\$0.5m	22.82	\$21,914	45.32	-\$11,032	99.09	\$5,046	50.17	-\$9,967	10.94	\$45,706	-6.98	\$71,639	6.82	\$73,336	-5.62	\$88,955
\$0.6m	26.86	\$22,337	54.01	-\$11,110	111.90	\$5,362	59.67	-\$10,055	12.73	\$47,119	-7.83	\$76,595	8.29	\$72,336	-7.19	\$83,413
\$0.7m	30.78	\$22,738	62.56	-\$11,189	124.01	\$5,645	69.02	-\$10,141	14.70	\$47,625	-9.65	\$72,511	9.88	\$70,861	-8.80	\$79,572
\$0.8m	34.60	\$23,121	70.98	-\$11,270	135.56	\$5,902	78.24	-\$10,225	16.53	\$48,386	-11.43	\$69,963	11.36	\$70,434	-10.26	\$77,954
\$0.9m	38.32	\$23,486	79.27	-\$11,353	146.63	\$6,138	87.32	-\$10,307	18.33	\$49,093	-13.38	\$67,248	12.98	\$69,351	-10.80	\$83,354
\$1.0m	41.95	\$23,836	87.42	-\$11,439	157.30	\$6,357	96.27	-\$10,387	20.30	\$49,255	-14.30	\$69,930	13.52	\$73,977	-12.26	\$81,566
\$1.1m	45.51	\$24,173	95.43	-\$11,526	167.62	\$6,562	105.11	-\$10,465	20.84	\$52,794	-16.08	\$68,422	15.78	\$69,721	-13.86	\$79,364
\$1.2m	48.98	\$24,498	103.30	-\$11,616	177.63	\$6,756	113.83	-\$10,542	21.76	\$55,136	-17.35	\$69,161	5.34	\$224,511	-15.43	\$77,787
\$1.3m	52.40	\$24,811	111.03	-\$11,709	187.37	\$6,938	122.45	-\$10,617	23.57	\$55,160	-19.29	\$67,378	6.83	\$190,408	-15.96	\$81,452
\$1.4m	55.74	\$25,115	118.61	-\$11,804	196.86	\$7,112	130.97	-\$10,690	24.43	\$57,303	-19.82	\$70,635	9.98	\$140,341	-17.42	\$80,367
\$1.5m	59.03	\$25,409	126.03	-\$11,902	206.12	\$7,277	139.38	-\$10,762	26.41	\$56,804	-21.63	\$69,338	11.57	\$129,695	-20.52	\$73,101
\$1.6m	62.27	\$25,694	133.31	-\$12,002	215.18	\$7,435	147.71	-\$10,832	28.25	\$56,637	-22.48	\$71,167	13.19	\$121,315	-22.12	\$72,345
\$1.7m	65.46	\$25,972	140.43	-\$12,106	224.06	\$7,587	155.94	-\$10,901	30.06	\$56,557	-24.25	\$70,089	13.73	\$123,811	-22.65	\$75,061
\$1.8m	68.59	\$26,242	147.38	-\$12,213	232.76	\$7,733	164.09	-\$10,969	32.04	\$56,182	-26.19	\$68,720	15.22	\$118,297	-24.11	\$74,672
\$1.9m	71.68	\$26,505	154.18	-\$12,323	241.30	\$7,874	172.16	-\$11,036	32.97	\$57,626	-27.11	\$70,095	16.84	\$112,806	-25.67	\$74,027
\$2.0m	74.73	\$26,762	160.81	-\$12,437	249.70	\$8,010	180.15	-\$11,102	34.78	\$57,498	-28.91	\$69,177	17.39	\$115,033	-27.26	\$73,370
\$2.1m	77.74	\$27,012	167.26	-\$12,555	257.95	\$8,141	188.07	-\$11,166	35.32	\$59,455	-30.68	\$68,450	18.87	\$111,260	-28.71	\$73,136
\$2.2m	80.71	\$27,257	173.54	-\$12,677	266.08	\$8,268	195.91	-\$11,230	37.17	\$59,183	-32.61	\$67,458	20.47	\$107,471	-29.24	\$75,228
\$2.3m	83.65	\$27,497	179.63	-\$12,804	274.08	\$8,392	203.68	-\$11,292	38.04	\$60,461	-33.46	\$68,744	25.97	\$88,562	-30.83	\$74,594
\$2.4m	86.55	\$27,731	185.54	-\$12,935	281.97	\$8,512	211.38	-\$11,354	40.03	\$59,959	-33.98	\$70,629	27.60	\$86,952	-32.29	\$74,337
\$2.5m	89.41	\$27,960	191.25	-\$13,072	289.75	\$8,628	219.02	-\$11,415	41.84	\$59,745	-35.74	\$69,942	29.09	\$85,932	-33.84	\$73,875
\$2.6m	92.25	\$28,185	196.77	-\$13,214	297.43	\$8,742	226.59	-\$11,474	42.78	\$60,774	-36.65	\$70,936	29.64	\$87,726	-34.37	\$75,647
\$2.7m	95.05	\$28,406	202.07	-\$13,361	305.00	\$8,852	234.10	-\$11,533	44.09	\$61,243	-38.58	\$69,982	31.27	\$86,338	-35.82	\$75,378
\$2.8m	97.83	\$28,622	207.16	-\$13,516	312.49	\$8,960	241.56	-\$11,591	46.08	\$60,766	-40.38	\$69,342	32.77	\$85,452	-37.40	\$74,857
\$2.9m	100.57	\$28,835	212.02	-\$13,678	319.89	\$9,066	248.95	-\$11,649	47.94	\$60,495	-42.14	\$68,820	34.37	\$84,378	-38.85	\$74,644
\$3.0m	103.29	\$29,043	216.65	-\$13,847	327.20	\$9,169	256.29	-\$11,705	49.76	\$60,290	-44.06	\$68,085	34.92	\$85,923	-39.38	\$76,182
\$3.1m	105.99	\$29,249	221.02	-\$14,026	334.43	\$9,270	263.58	-\$11,761	50.63	\$61,225	-44.97	\$68,939	36.41	\$85,136	-40.93	\$75,740
\$3.2m	108.66	\$29,450	225.13	-\$14,214	341.58	\$9,368	270.81	-\$11,816	52.63	\$60,801	-46.72	\$68,489	38.05	\$84,096	-42.51	\$75,274
\$3.3m	111.30	\$29,649	228.96	-\$14,413	348.66	\$9,465	277.99	-\$11,871	53.17	\$62,063	-47.56	\$69,382	38.60	\$85,494	-43.04	\$76,676
\$3.4m	113.93	\$29,844	232.48	-\$14,625	355.67	\$9,559	285.12	-\$11,925	54.11	\$62,831	-49.35	\$68,890	40.21	\$84,561	-44.62	\$76,205
\$3.5m	116.53	\$30,036	235.66	-\$14,852	362.61	\$9,652	292.21	-\$11,978	55.94	\$62,567	-51.27	\$68,262	41.71	\$83,917	-46.16	\$75,821
\$3.6m	119.11	\$30,225	238.46	-\$15,097	369.49	\$9,743	299.24	-\$12,030	57.81	\$62,276	-51.79	\$69,509	43.35	\$83,043	-49.45	\$72,794
\$3.7m	121.66	\$30,412	240.83	-\$15,363	376.30	\$9,833	306.23	-\$12,082	59.81	\$61,862	-53.54	\$69,103	44.85	\$82,489	-49.98	\$74,029
\$3.8m	124.20	\$30,595	242.66	-\$15,660	383.05	\$9,920	313.18	-\$12,134	61.64	\$61,646	-54.44	\$69,796	45.40	\$83,694	-51.55	\$73,708
\$3.9m	126.72	\$30,777	243.66	-\$16,006	389.74	\$10,007	320.08	-\$12,184	62.59	\$62,313	-56.36	\$69,200	47.05	\$82,889	-54.61	\$71,418
\$4.0m	129.22	\$30,955	243.13	-\$16,452	394.86	\$10,130	326.94	-\$12,235	63.47	\$63,025	-58.14	\$68,797	48.67	\$82,194	-56.15	\$71,241
\$4.1m	131.70	\$31,132	242.59	-\$16,901	399.67	\$10,259	333.76	-\$12,284	65.48	\$62,619	-59.89	\$68,460	50.17	\$81,719	-56.67	\$72,347
\$4.2m	134.16	\$31,305	242.05	-\$17,352	404.21	\$10,391	340.54	-\$12,333	67.31	\$62,396	-60.73	\$69,164	53.37	\$78,694	-58.24	\$72,112
\$4.3m	136.61	\$31,477	241.50	-\$17,805	408.54	\$10,525	347.28	-\$12,382	69.19	\$62,150	-62.63	\$68,653	53.92	\$79,745	-47.58	\$90,382
\$4.4m	139.04	\$31,647	240.95	-\$18,261	412.67	\$10,662	353.98	-\$12,430	69.73	\$63,098	-64.38	\$68,348	55.57	\$79,175	-48.10	\$91,478
\$4.5m	141.45	\$31,814	240.40	-\$18,719	416.64	\$10,801	360.64	-\$12,478	71.57	\$62,872	-65.27	\$68,940	57.08	\$78,833	-49.67	\$90,605
\$4.6m	143.84	\$31,979	239.84	-\$19,179	420.45	\$10,941	367.27	-\$12,525	73.59	\$62,510	-67.05	\$68,604	60.54	\$75,986	-51.20	\$89,843
\$4.7m	146.22	\$32,142	239.28	-\$19,642	424.13	\$11,082	373.86	-\$12,572	74.54	\$63,055	-67.57	\$69,560	61.09	\$76,936	-51.72	\$90,870

	λ7								***λ8***							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$
\$4.8m	148.59	\$32,304	238.72	-\$20,108	427.69	\$11,223	380.41	-\$12,618	76.38	\$62,840	-69.47	\$69,093	62.71	\$76,542	-53.29	\$90,079
\$4.9m	150.94	\$32,463	238.15	-\$20,576	431.14	\$11,365	386.93	-\$12,664	78.27	\$62,605	-71.21	\$68,810	64.37	\$76,127	-54.82	\$89,391
\$5.0m	153.28	\$32,621	237.57	-\$21,046	434.49	\$11,508	393.41	-\$12,709	80.29	\$62,274	-72.04	\$69,404	65.88	\$75,896	-56.38	\$88,690
\$5.1m	155.60	\$32,777	236.99	-\$21,520	437.78	\$11,650	399.87	-\$12,754	81.17	\$62,828	-73.29	\$69,588	67.40	\$75,673	-56.90	\$89,636
\$5.2m	157.90	\$32,931	236.41	-\$21,996	441.04	\$11,790	406.29	-\$12,799	83.02	\$62,632	-75.19	\$69,160	67.95	\$76,528	-58.45	\$88,959
\$5.3m	160.20	\$33,084	235.82	-\$22,475	444.21	\$11,931	406.47	-\$13,039	83.98	\$63,111	-76.92	\$68,901	69.61	\$76,140	-58.97	\$89,871
\$5.4m	162.48	\$33,235	235.22	-\$22,957	447.37	\$12,071	406.57	-\$13,282	86.01	\$62,786	-77.82	\$69,394	71.24	\$75,804	-60.50	\$89,260
\$5.5m	164.75	\$33,384	234.62	-\$23,442	450.47	\$12,209	406.03	-\$13,546	86.56	\$63,543	-79.59	\$69,107	72.76	\$75,596	-62.05	\$88,637
\$5.6m	167.00	\$33,532	234.02	-\$23,930	453.57	\$12,347	405.49	-\$13,811	88.45	\$63,313	-81.48	\$68,727	74.42	\$75,249	-62.57	\$89,501
\$5.7m	169.25	\$33,678	233.41	-\$24,421	456.62	\$12,483	404.95	-\$14,076	90.30	\$63,120	-83.21	\$68,500	74.97	\$76,026	-64.09	\$88,940
\$5.8m	171.48	\$33,823	232.79	-\$24,915	459.66	\$12,618	404.40	-\$14,342	92.34	\$62,813	-83.72	\$69,275	76.50	\$75,820	-67.10	\$86,443
\$5.9m	173.70	\$33,967	232.17	-\$25,413	462.68	\$12,752	403.86	-\$14,609	93.23	\$63,286	-84.55	\$69,780	78.16	\$75,481	-68.65	\$85,948
\$6.0m	175.91	\$34,109	231.54	-\$25,914	465.69	\$12,884	403.31	-\$14,877	95.09	\$63,100	-85.44	\$70,223	79.80	\$75,189	-69.16	\$86,751
\$6.1m	178.11	\$34,249	230.90	-\$26,418	468.66	\$13,016	402.76	-\$15,145	96.05	\$63,511	-87.21	\$69,949	80.36	\$75,912	-70.71	\$86,268
\$6.2m	180.29	\$34,389	230.26	-\$26,926	471.61	\$13,146	402.22	-\$15,415	98.09	\$63,210	-89.10	\$69,588	81.88	\$75,719	-71.23	\$87,047
\$6.3m	182.47	\$34,527	229.61	-\$27,437	474.56	\$13,276	401.66	-\$15,685	99.99	\$63,008	-90.82	\$69,366	83.55	\$75,400	-72.74	\$86,610
\$6.4m	184.63	\$34,664	228.96	-\$27,952	477.48	\$13,404	401.11	-\$15,956	101.85	\$62,835	-92.71	\$69,034	73.34	\$87,269	-74.28	\$86,156
\$6.5m	186.78	\$34,799	228.30	-\$28,472	480.37	\$13,531	400.56	-\$16,227	103.19	\$62,989	-94.43	\$68,833	74.87	\$86,822	-74.80	\$86,900
\$6.6m	188.93	\$34,934	227.63	-\$28,994	483.26	\$13,657	400.00	-\$16,500	103.75	\$63,617	-96.19	\$68,615	75.42	\$87,505	-76.31	\$86,492
\$6.7m	191.06	\$35,067	226.95	-\$29,521	486.11	\$13,783	399.45	-\$16,773	105.79	\$63,333	-97.08	\$69,019	77.07	\$86,939	-77.85	\$86,066
\$6.8m	193.19	\$35,199	226.27	-\$30,053	488.96	\$13,907	398.89	-\$17,047	106.75	\$63,698	-97.90	\$69,460	78.74	\$86,358	-78.36	\$86,778
\$6.9m	195.30	\$35,330	225.58	-\$30,588	491.79	\$14,030	398.33	-\$17,322	107.65	\$64,097	-99.78	\$69,152	82.00	\$84,151	-79.90	\$86,360
\$7.0m	197.40	\$35,460	224.88	-\$31,128	494.60	\$14,153	397.77	-\$17,598	109.52	\$63,915	-101.50	\$68,967	83.53	\$83,805	-81.40	\$85,993
\$7.1m	199.50	\$35,589	224.17	-\$31,673	497.38	\$14,275	397.20	-\$17,875	111.43	\$63,716	-102.01	\$69,603	84.09	\$84,436	-81.91	\$86,676
\$7.2m	201.59	\$35,717	223.45	-\$32,222	500.16	\$14,396	396.64	-\$18,153	113.48	\$63,445	-103.72	\$69,416	85.62	\$84,089	-83.45	\$86,281
\$7.3m	203.66	\$35,843	222.72	-\$32,776	502.93	\$14,515	396.07	-\$18,431	115.36	\$63,281	-105.60	\$69,129	87.30	\$83,616	-85.58	\$85,296
\$7.4m	205.73	\$35,969	221.99	-\$33,335	505.67	\$14,634	395.50	-\$18,710	116.33	\$63,614	-107.35	\$68,934	88.95	\$83,191	-86.10	\$85,951
\$7.5m	207.79	\$36,094	221.24	-\$33,900	508.40	\$14,752	394.93	-\$18,991	118.21	\$63,448	-108.23	\$69,295	89.51	\$83,786	-87.60	\$85,621
\$7.6m	209.84	\$36,218	220.48	-\$34,470	511.11	\$14,870	394.36	-\$19,272	120.27	\$63,193	-109.05	\$69,691	91.05	\$83,468	-89.13	\$85,273
\$7.7m	211.88	\$36,341	219.72	-\$35,045	513.81	\$14,986	393.79	-\$19,554	120.82	\$63,730	-110.76	\$69,518	92.74	\$83,030	-89.64	\$85,903
\$7.8m	213.92	\$36,462	218.94	-\$35,627	516.49	\$15,102	393.21	-\$19,837	122.74	\$63,547	-112.64	\$69,250	94.28	\$82,732	-92.60	\$84,232
\$7.9m	215.95	\$36,583	218.15	-\$36,214	519.16	\$15,217	392.63	-\$20,121	123.65	\$63,893	-114.38	\$69,068	94.84	\$83,295	-94.13	\$83,928
\$8.0m	217.96	\$36,703	217.34	-\$36,808	521.81	\$15,331	392.05	-\$20,405	125.53	\$63,729	-114.89	\$69,635	96.50	\$82,903	-95.62	\$83,662
\$8.1m	219.97	\$36,823	216.53	-\$37,409	524.46	\$15,445	391.47	-\$20,691	127.60	\$63,482	-116.59	\$69,473	98.19	\$82,495	-96.13	\$84,259
\$8.2m	221.98	\$36,941	215.69	-\$38,017	527.08	\$15,557	390.89	-\$20,978	128.57	\$63,779	-117.47	\$69,804	99.73	\$82,219	-97.66	\$83,969
\$8.3m	223.97	\$37,058	214.85	-\$38,632	529.70	\$15,669	390.30	-\$21,265	130.50	\$63,602	-119.34	\$69,549	100.30	\$82,753	-98.16	\$84,553
\$8.4m	225.96	\$37,175	213.99	-\$39,254	532.29	\$15,781	389.72	-\$21,554	132.39	\$63,449	-121.04	\$69,397	101.99	\$82,359	-99.65	\$84,292
\$8.5m	227.94	\$37,291	213.13	-\$39,882	534.88	\$15,892	389.13	-\$21,844	134.46	\$63,215	-121.86	\$69,753	103.54	\$82,092	-101.17	\$84,014
\$8.6m	229.91	\$37,406	212.27	-\$40,515	537.46	\$16,001	388.54	-\$22,134	135.37	\$63,531	-123.72	\$69,511	105.20	\$81,746	-101.68	\$84,578
\$8.7m	231.88	\$37,520	211.40	-\$41,154	540.02	\$16,111	387.94	-\$22,426	135.93	\$64,004	-125.46	\$69,345	105.77	\$82,253	-103.20	\$84,304
\$8.8m	233.83	\$37,634	210.53	-\$41,800	542.56	\$16,220	387.35	-\$22,718	137.83	\$63,849	-126.68	\$69,466	107.47	\$81,884	-104.68	\$84,063
\$8.9m	235.79	\$37,746	209.65	-\$42,452	545.09	\$16,327	386.75	-\$23,012	138.80	\$64,120	-127.56	\$69,773	109.02	\$81,635	-109.80	\$81,055
\$9.0m	237.74	\$37,857	208.77	-\$43,110	547.63	\$16,435	386.15	-\$23,307	140.88	\$63,884	-129.26	\$69,629	110.73	\$81,282	-110.31	\$81,589
\$9.1m	239.69	\$37,966	207.89	-\$43,774	550.14	\$16,541	385.55	-\$23,603	142.82	\$63,716	-131.12	\$69,404	112.28	\$81,046	-111.82	\$81,379
\$9.2m	241.63	\$38,074	207.00	-\$44,445	552.63	\$16,648	384.95	-\$23,899	144.72	\$63,570	-131.62	\$69,899	112.85	\$81,524	-100.90	\$91,181
\$9.3m	243.58	\$38,181	206.10	-\$45,123	555.12	\$16,753	384.34	-\$24,197	146.81	\$63,348	-133.35	\$69,741	114.52	\$81,209	-101.40	\$91,713
\$9.4m	245.51	\$38,287	205.21	-\$45,807	557.60	\$16,858	383.73	-\$24,496	147.79	\$63,604	-135.05	\$69,606	117.83	\$79,777	-104.56	\$89,899
\$9.5m	247.45	\$38,391	204.31	-\$46,499	560.06	\$16,962	383.12	-\$24,796	149.70	\$63,462	-135.86	\$69,926	119.39	\$79,572	-106.04	\$89,587
\$9.6m	249.38	\$38,495	203.40	-\$47,198	562.52	\$17,066	382.51	-\$25,097	150.61	\$63,741	-137.71	\$69,711	121.10	\$79,276	-107.55	\$89,258
\$9.7m	251.32	\$38,597	202.49	-\$47,904	564.96	\$17,169	381.90	-\$25,400	152.56	\$63,582	-138.58	\$69,993	121.67	\$79,726	-108.06	\$89,767

	λ7								λ8							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$
$9.8m	253.24	$38,698	201.58	-$48,617	567.40	$17,272	381.28	-$25,703	153.13	$64,000	-140.28	$69,862	123.23	$79,526	-109.56	$89,445
$9.9m	255.17	$38,798	200.66	-$49,338	569.82	$17,374	380.66	-$26,008	155.22	$63,782	-142.13	$69,656	124.91	$79,259	-111.04	$89,156
$10.0m	257.09	$38,897	199.73	-$50,067	572.23	$17,475	380.04	-$26,313	157.13	$63,642	-143.85	$69,515	126.62	$78,977	-113.97	$87,746
$10.1m	259.01	$38,995	198.81	-$50,803	574.63	$17,577	379.41	-$26,620	158.12	$63,877	-145.54	$69,396	127.19	$79,408	-114.47	$88,234
$10.2m	260.93	$39,091	197.88	-$51,547	577.02	$17,677	378.78	-$26,928	160.21	$63,665	-147.39	$69,205	128.76	$79,219	-115.97	$87,952
$10.3m	262.84	$39,187	196.95	-$52,298	579.41	$17,777	378.16	-$27,238	162.13	$63,528	-148.20	$69,503	130.47	$78,943	-117.45	$87,701
$10.4m	264.76	$39,281	196.01	-$53,057	581.78	$17,876	377.52	-$27,548	163.51	$63,605	-149.06	$69,768	132.05	$78,761	-117.95	$88,175
$10.5m	266.67	$39,374	195.08	-$53,824	584.13	$17,975	376.89	-$27,860	165.47	$63,456	-149.56	$70,204	133.73	$78,517	-119.45	$87,904
$10.6m	268.58	$39,466	194.14	-$54,599	586.49	$18,074	376.25	-$28,173	166.39	$63,706	-151.25	$70,083	134.30	$78,926	-119.95	$88,371
$10.7m	270.49	$39,558	193.21	-$55,382	588.84	$18,171	375.61	-$28,487	168.31	$63,573	-152.97	$69,949	136.02	$78,662	-121.42	$88,127
$10.8m	272.40	$39,648	192.26	-$56,173	591.17	$18,269	374.97	-$28,803	170.42	$63,374	-154.81	$69,763	126.01	$85,710	-122.91	$87,866
$10.9m	274.30	$39,737	191.32	-$56,973	593.49	$18,366	374.32	-$29,120	171.41	$63,591	-156.49	$69,652	127.58	$85,437	-123.41	$88,321
$11.0m	276.20	$39,826	190.37	-$57,782	595.80	$18,462	373.67	-$29,438	171.98	$63,961	-157.36	$69,904	128.16	$85,833	-124.91	$88,064
$11.1m	278.10	$39,914	189.42	-$58,599	598.11	$18,558	373.02	-$29,757	173.91	$63,827	-159.20	$69,725	129.88	$85,462	-126.37	$87,835
$11.2m	279.99	$40,001	188.47	-$59,425	600.40	$18,654	372.36	-$30,078	175.88	$63,680	-160.00	$70,000	131.57	$85,124	-126.87	$88,279
$11.3m	281.89	$40,087	187.52	-$60,261	602.69	$18,749	371.70	-$30,401	177.99	$63,486	-161.71	$69,877	133.15	$84,866	-128.36	$88,031
$11.4m	283.78	$40,172	186.56	-$61,105	604.98	$18,844	371.04	-$30,724	178.92	$63,717	-163.39	$69,771	133.73	$85,247	-128.86	$88,468
$11.5m	285.66	$40,257	185.61	-$61,959	607.25	$18,938	370.38	-$31,049	180.85	$63,588	-163.89	$70,170	135.46	$84,896	-130.32	$88,244
$11.6m	287.55	$40,341	184.64	-$62,823	609.51	$19,032	369.71	-$31,376	181.85	$63,790	-165.72	$69,997	137.04	$84,646	-131.81	$88,006
$11.7m	289.43	$40,424	183.68	-$63,697	611.76	$19,125	369.04	-$31,704	183.97	$63,598	-170.74	$68,525	139.46	$83,896	-132.31	$88,432
$11.8m	291.31	$40,507	182.71	-$64,582	614.01	$19,218	368.36	-$32,034	185.95	$63,459	-171.60	$68,763	141.16	$83,595	-135.19	$87,284
$11.9m	293.19	$40,589	181.75	-$65,476	616.24	$19,311	367.68	-$32,365	187.89	$63,336	-173.28	$68,676	142.74	$83,367	-136.68	$87,067
$12.0m	295.06	$40,670	180.77	-$66,382	618.47	$19,403	367.00	-$32,697	188.46	$63,673	-174.99	$68,577	144.48	$83,057	-138.13	$86,873
$12.1m	296.93	$40,750	179.80	-$67,297	620.69	$19,494	366.32	-$33,031	190.59	$63,487	-176.82	$68,433	145.06	$83,415	-138.63	$87,284
$12.2m	298.80	$40,830	178.82	-$68,224	622.91	$19,586	365.63	-$33,367	191.59	$63,677	-177.62	$68,688	148.43	$82,195	-140.11	$87,074
$12.3m	300.67	$40,909	177.85	-$69,161	625.11	$19,677	364.94	-$33,705	193.54	$63,553	-179.29	$68,606	150.02	$81,991	-140.61	$87,479
$12.4m	302.53	$40,987	176.86	-$70,110	627.31	$19,767	364.24	-$34,044	194.47	$63,763	-181.11	$68,466	151.76	$81,709	-142.06	$87,290
$12.5m	304.39	$41,065	175.88	-$71,071	629.50	$19,857	363.54	-$34,384	200.31	$62,403	-182.31	$68,565	152.34	$82,054	-143.54	$87,086
$12.6m	306.25	$41,142	174.89	-$72,044	631.68	$19,947	362.83	-$34,727	202.30	$62,283	-183.17	$68,789	154.05	$81,794	-144.03	$87,482
$12.7m	308.11	$41,219	173.90	-$73,030	633.86	$20,036	362.13	-$35,071	204.44	$62,122	-184.87	$68,697	155.64	$81,599	-145.51	$87,281
$12.8m	309.97	$41,295	172.91	-$74,028	636.03	$20,125	361.41	-$35,417	206.39	$62,019	-186.54	$68,619	157.38	$81,330	-146.95	$87,103
$12.9m	311.82	$41,370	171.91	-$75,039	638.19	$20,213	360.69	-$35,764	207.40	$62,200	-187.03	$68,973	157.97	$81,663	-147.45	$87,490
$13.0m	313.67	$41,445	170.91	-$76,061	640.34	$20,302	359.97	-$36,114	209.54	$62,041	-188.85	$68,837	159.56	$81,472	-148.92	$87,295
$13.1m	315.51	$41,520	169.91	-$77,098	642.49	$20,390	359.25	-$36,465	211.50	$61,940	-189.65	$69,075	163.22	$80,261	-149.41	$87,677
$13.2m	317.36	$41,593	168.91	-$78,148	644.62	$20,477	358.52	-$36,819	212.08	$62,242	-191.31	$68,998	164.97	$80,016	-150.85	$87,502
$13.3m	319.20	$41,666	167.90	-$79,212	646.76	$20,564	357.78	-$37,174	214.08	$62,127	-192.17	$69,211	166.68	$79,792	-152.33	$87,313
$13.4m	321.04	$41,739	166.89	-$80,291	648.89	$20,651	357.04	-$37,531	215.02	$62,321	-193.99	$69,077	168.28	$79,627	-152.82	$87,687
$13.5m	322.88	$41,811	165.88	-$81,384	651.02	$20,737	356.29	-$37,890	216.98	$62,218	-195.68	$68,990	168.87	$79,944	-154.25	$87,518
$13.6m	324.71	$41,883	164.86	-$82,493	653.14	$20,823	355.54	-$38,251	219.13	$62,064	-197.34	$68,916	170.62	$79,707	-155.72	$87,335
$13.7m	326.55	$41,954	163.84	-$83,617	655.25	$20,908	354.79	-$38,615	220.14	$62,233	-199.16	$68,791	172.23	$79,545	-158.57	$86,397
$13.8m	328.38	$42,025	162.82	-$84,756	657.35	$20,993	354.02	-$38,980	222.11	$62,131	-199.95	$69,018	172.82	$79,853	-159.06	$86,760
$13.9m	330.21	$42,095	161.80	-$85,910	659.45	$21,078	353.26	-$39,348	224.27	$61,979	-200.44	$69,348	174.54	$79,638	-160.53	$86,590
$14.0m	332.03	$42,164	160.77	-$87,081	661.54	$21,163	352.48	-$39,718	226.28	$61,870	-202.13	$69,263	176.30	$79,410	-161.96	$86,441
$14.1m	333.86	$42,234	159.74	-$88,269	663.63	$21,247	351.70	-$40,091	226.87	$62,151	-203.79	$69,191	177.91	$79,254	-162.45	$86,797
$14.2m	335.68	$42,302	158.71	-$89,474	665.71	$21,331	350.92	-$40,465	228.84	$62,052	-204.64	$69,391	177.81	$79,860	-163.91	$86,632
$14.3m	337.50	$42,370	157.67	-$90,699	667.78	$21,414	350.13	-$40,842	229.86	$62,212	-206.45	$69,267	177.63	$80,505	-164.40	$86,983
$14.4m	339.32	$42,438	156.63	-$91,939	669.84	$21,498	349.33	-$41,222	230.80	$62,390	-208.10	$69,197	178.22	$80,800	-166.44	$86,520
$14.5m	341.14	$42,505	155.58	-$93,200	671.90	$21,580	348.52	-$41,604	232.22	$62,440	-209.91	$69,078	179.98	$80,563	-167.87	$86,378
$14.6m	342.95	$42,572	154.53	-$94,480	673.96	$21,663	347.71	-$41,989	234.39	$62,290	-211.59	$69,001	181.60	$80,398	-169.33	$86,224
$14.7m	344.76	$42,638	153.48	-$95,778	676.01	$21,745	346.89	-$42,377	236.37	$62,191	-212.38	$69,215	183.33	$80,184	-169.81	$86,566

	λ7								λ8							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^-)^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^-)^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^-)^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^-)^{d}$
$14.8m	346.58	$42,703	152.43	-$97,095	678.05	$21,827	346.06	-$42,767	238.39	$62,082	-213.23	$69,408	186.76	$79,246	-171.27	$86,413
$14.9m	348.39	$42,768	151.37	-$98,434	680.08	$21,909	345.23	-$43,160	239.42	$62,234	-214.88	$69,341	188.53	$79,033	-174.31	$85,478
$15.0m	350.20	$42,833	150.31	-$99,795	682.12	$21,990	344.38	-$43,556	241.59	$62,089	-216.68	$69,225	190.15	$78,886	-175.74	$85,353
$15.1m	352.00	$42,897	149.24	-$101,176	684.15	$22,071	343.53	-$43,955	243.58	$61,993	-217.17	$69,530	190.74	$79,166	-164.53	$91,775
$15.2m	353.81	$42,961	148.17	-$102,582	686.17	$22,152	342.67	-$44,358	244.17	$62,252	-218.82	$69,465	180.90	$84,023	-165.02	$92,111
$15.3m	355.61	$43,025	147.10	-$104,010	688.19	$22,232	341.80	-$44,763	245.12	$62,418	-220.50	$69,389	186.88	$81,869	-166.47	$91,907
$15.4m	357.41	$43,087	146.03	-$105,461	690.20	$22,312	340.92	-$45,172	247.30	$62,272	-222.29	$69,277	188.51	$81,695	-166.96	$92,239
$15.5m	359.21	$43,150	144.95	-$106,936	692.21	$22,392	340.03	-$45,585	249.29	$62,175	-223.14	$69,463	190.28	$81,458	-168.38	$92,054
$15.6m	361.01	$43,212	143.86	-$108,436	694.21	$22,472	339.13	-$46,001	251.33	$62,070	-223.93	$69,665	192.02	$81,241	-169.83	$91,856
$15.7m	362.81	$43,274	142.78	-$109,960	696.20	$22,551	338.21	-$46,420	252.36	$62,213	-225.57	$69,602	192.61	$81,510	-170.32	$92,182
$15.8m	364.60	$43,335	141.69	-$111,511	698.19	$22,630	337.29	-$46,844	254.36	$62,117	-227.36	$69,492	194.24	$81,343	-173.13	$91,263
$15.9m	366.40	$43,396	140.59	-$113,092	700.18	$22,709	336.35	-$47,272	256.55	$61,977	-229.04	$69,421	196.02	$81,114	-174.58	$91,078
$16.0m	368.19	$43,456	139.50	-$114,698	702.16	$22,787	335.40	-$47,704	258.55	$61,883	-230.68	$69,361	196.62	$81,377	-175.99	$90,912
$16.1m	369.98	$43,516	138.39	-$116,335	704.13	$22,865	334.44	-$48,140	260.60	$61,780	-231.85	$69,441	198.25	$81,212	-176.48	$91,230
$16.2m	371.77	$43,575	137.28	-$118,004	706.10	$22,943	333.46	-$48,581	261.56	$61,935	-232.70	$69,619	199.99	$81,002	-177.92	$91,051
$16.3m	373.56	$43,635	136.17	-$119,700	708.06	$23,021	332.47	-$49,027	262.60	$62,072	-234.49	$69,513	201.78	$80,781	-178.41	$91,365
$16.4m	375.35	$43,693	135.06	-$121,425	710.01	$23,098	331.46	-$49,478	263.19	$62,312	-234.97	$69,796	203.41	$80,624	-179.82	$91,202
$16.5m	377.13	$43,751	133.95	-$123,184	711.97	$23,175	330.43	-$49,935	265.39	$62,173	-235.75	$69,988	204.01	$80,878	-181.26	$91,028
$16.6m	378.91	$43,809	132.82	-$124,979	713.92	$23,252	329.38	-$50,397	267.40	$62,079	-237.39	$69,927	205.80	$80,660	-181.74	$91,337
$16.7m	380.70	$43,867	131.70	-$126,806	715.87	$23,328	328.31	-$50,866	269.61	$61,942	-239.06	$69,857	207.44	$80,505	-183.16	$91,179
$16.8m	382.48	$43,924	130.57	-$128,670	717.81	$23,405	327.22	-$51,341	271.63	$61,850	-240.85	$69,754	209.20	$80,307	-184.60	$91,009
$16.9m	384.26	$43,980	129.43	-$130,575	719.74	$23,481	326.11	-$51,823	272.67	$61,981	-242.48	$69,697	209.80	$80,554	-185.08	$91,313
$17.0m	386.04	$44,036	128.29	-$132,514	721.68	$23,556	324.96	-$52,313	274.73	$61,880	-243.32	$69,867	211.59	$80,343	-186.51	$91,146
$17.1m	387.82	$44,092	127.14	-$134,494	723.60	$23,632	323.79	-$52,812	275.69	$62,025	-245.10	$69,767	213.24	$80,193	-187.92	$90,995
$17.2m	389.60	$44,148	126.00	-$136,512	725.52	$23,707	322.59	-$53,319	277.91	$61,891	-246.77	$69,702	215.04	$79,986	-188.40	$91,294
$17.3m	391.38	$44,203	124.84	-$138,575	727.44	$23,782	321.35	-$53,836	279.93	$61,801	-247.55	$69,886	215.64	$80,227	-189.84	$91,131
$17.4m	393.15	$44,258	123.69	-$140,677	729.35	$23,857	320.06	-$54,365	280.53	$62,025	-249.17	$69,831	217.29	$80,078	-190.32	$91,427
$17.5m	394.93	$44,312	122.53	-$142,827	731.26	$23,931	318.73	-$54,906	281.58	$62,150	-249.66	$70,096	220.79	$79,262	-191.72	$91,279
$17.6m	396.70	$44,366	121.36	-$145,028	733.16	$24,006	317.34	-$55,461	283.65	$62,048	-251.44	$69,998	222.55	$79,082	-193.15	$91,120
$17.7m	398.47	$44,420	120.19	-$147,272	735.06	$24,080	315.88	-$56,034	285.68	$61,957	-252.27	$70,162	224.36	$78,891	-193.63	$91,412
$17.8m	400.24	$44,473	119.01	-$149,571	736.95	$24,154	314.41	-$56,615	287.91	$61,826	-253.90	$70,107	226.01	$78,757	-196.41	$90,629
$17.9m	402.01	$44,526	117.82	-$151,924	738.84	$24,227	312.93	-$57,201	289.94	$61,736	-255.56	$70,043	226.61	$78,989	-197.81	$90,492
$18.0m	403.78	$44,579	116.64	-$154,327	740.72	$24,301	311.45	-$57,794	290.92	$61,873	-257.33	$69,948	228.43	$78,800	-199.24	$90,345
$18.1m	405.55	$44,631	115.45	-$156,781	742.60	$24,374	309.97	-$58,393	293.15	$61,743	-258.11	$70,125	230.08	$78,667	-199.71	$90,630
$18.2m	407.32	$44,683	114.25	-$159,296	744.48	$24,447	308.48	-$58,999	294.20	$61,862	-259.73	$70,072	231.86	$78,496	-201.14	$90,484
$18.3m	409.08	$44,735	113.05	-$161,878	746.36	$24,519	306.99	-$59,610	296.29	$61,764	-261.51	$69,979	232.47	$78,721	-201.62	$90,767
$18.4m	410.84	$44,786	111.84	-$164,517	748.22	$24,592	305.50	-$60,229	296.90	$61,975	-262.34	$70,138	234.28	$78,538	-203.01	$90,635
$18.5m	412.61	$44,837	110.63	-$167,226	750.09	$24,664	304.01	-$60,854	298.94	$61,886	-263.99	$70,078	235.94	$78,409	-207.82	$89,019
$18.6m	414.37	$44,887	109.41	-$170,008	751.95	$24,736	302.51	-$61,486	300.41	$61,916	-264.47	$70,329	226.28	$82,199	-209.25	$88,891
$18.7m	416.13	$44,938	108.18	-$172,858	753.81	$24,807	301.01	-$62,124	302.65	$61,788	-266.09	$70,277	226.89	$82,419	-209.72	$89,166
$18.8m	417.89	$44,988	106.95	-$175,777	755.65	$24,879	299.51	-$62,770	304.70	$61,700	-267.86	$70,186	228.67	$82,213	-211.11	$89,052
$18.9m	419.65	$45,038	105.72	-$178,771	757.50	$24,950	298.00	-$63,423	305.76	$61,814	-268.63	$70,356	230.34	$82,053	-212.54	$88,926
$19.0m	421.41	$45,087	104.48	-$181,853	759.35	$25,021	296.49	-$64,083	307.85	$61,717	-270.25	$70,306	232.16	$81,839	-213.01	$89,198
$19.1m	423.16	$45,136	103.23	-$185,016	761.19	$25,092	294.98	-$64,751	310.11	$61,592	-271.90	$70,247	233.83	$81,682	-214.43	$89,074
$19.2m	424.92	$45,185	101.98	-$188,267	763.02	$25,163	293.46	-$65,426	311.09	$61,719	-273.66	$70,159	235.66	$81,473	-214.90	$89,343
$19.3m	426.67	$45,234	100.72	-$191,618	764.85	$25,234	291.94	-$66,109	313.15	$61,632	-274.50	$70,311	236.27	$81,686	-216.29	$89,231
$19.4m	428.42	$45,282	99.45	-$195,066	766.68	$25,304	290.42	-$66,800	313.76	$61,831	-276.11	$70,263	238.07	$81,490	-216.76	$89,498
$19.5m	430.18	$45,330	98.18	-$198,612	768.50	$25,374	288.89	-$67,499	315.82	$61,744	-277.87	$70,177	239.74	$81,338	-218.18	$89,375
$19.6m	431.93	$45,378	96.91	-$202,259	770.32	$25,444	287.36	-$68,206	316.89	$61,852	-278.35	$70,416	241.58	$81,134	-219.57	$89,267
$19.7m	433.68	$45,426	95.62	-$206,018	772.13	$25,514	285.83	-$68,921	319.15	$61,727	-279.50	$70,483	242.19	$81,342	-220.04	$89,530

	λ7								*λ8*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_G^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_G^-)$[d]	$E(\Delta E)$[a]	$E(\lambda_P^+)$[b]	$E(\Delta E)$[c]	$E(\lambda_P^-)$[d]
$19.8m	435.43	$45,473	94.33	-$209,898	773.95	$25,583	284.30	-$69,646	321.26	$61,633	-281.14	$70,427	243.87	$81,191	-221.45	$89,410
$19.9m	437.17	$45,520	93.04	-$213,892	775.76	$25,652	282.76	-$70,378	323.33	$61,547	-281.91	$70,589	247.44	$80,424	-224.20	$88,762
$20.0m	438.92	$45,567	91.73	-$218,024	777.56	$25,721	281.22	-$71,120	325.60	$61,425	-283.52	$70,541	249.28	$80,232	-225.58	$88,661
$20.1m	440.66	$45,613	90.43	-$222,276	779.37	$25,790	279.67	-$71,869	326.59	$61,545	-284.35	$70,687	251.08	$80,053	-226.05	$88,919
$20.2m	442.41	$45,659	89.11	-$226,682	781.16	$25,859	278.13	-$72,629	327.66	$61,649	-286.11	$70,602	251.70	$80,255	-227.46	$88,807
$20.3m	444.15	$45,705	87.79	-$231,221	782.96	$25,927	276.58	-$73,397	329.74	$61,564	-287.72	$70,556	253.38	$80,116	-230.40	$88,106
$20.4m	445.89	$45,751	86.47	-$235,929	784.75	$25,996	275.03	-$74,175	330.36	$61,752	-289.47	$70,473	255.23	$79,928	-230.87	$88,360
$20.5m	447.64	$45,796	85.14	-$240,790	786.53	$26,064	273.47	-$74,963	332.63	$61,629	-291.11	$70,420	256.92	$79,792	-232.28	$88,254
$20.6m	449.37	$45,841	83.80	-$245,830	788.31	$26,132	271.91	-$75,761	334.76	$61,537	-291.94	$70,564	257.54	$79,989	-233.66	$88,161
$20.7m	451.11	$45,886	82.46	-$251,039	790.09	$26,199	270.35	-$76,569	336.85	$61,453	-292.70	$70,720	259.39	$79,804	-234.13	$88,412
$20.8m	452.85	$45,931	81.11	-$256,434	791.86	$26,267	268.78	-$77,387	337.92	$61,553	-294.30	$70,675	261.20	$79,632	-235.54	$88,308
$20.9m	454.59	$45,976	79.76	-$262,036	793.64	$26,334	267.21	-$78,216	340.21	$61,433	-296.06	$70,594	262.90	$79,499	-236.91	$88,218
$21.0m	456.32	$46,020	78.39	-$267,877	795.40	$26,402	265.63	-$79,056	342.30	$61,349	-296.53	$70,819	264.75	$79,319	-237.38	$88,465
$21.1m	458.06	$46,064	77.02	-$273,957	797.17	$26,469	264.06	-$79,907	343.30	$61,462	-298.16	$70,766	265.37	$79,511	-238.79	$88,363
$21.2m	459.79	$46,108	75.64	-$280,264	798.93	$26,535	262.48	-$80,769	345.44	$61,370	-299.76	$70,722	267.07	$79,379	-239.25	$88,609
$21.3m	461.52	$46,151	74.26	-$286,814	800.69	$26,602	260.90	-$81,642	347.54	$61,287	-301.51	$70,644	268.94	$79,201	-241.21	$88,306
$21.4m	463.26	$46,195	72.87	-$293,666	802.45	$26,668	259.31	-$82,526	349.84	$61,171	-302.34	$70,782	270.76	$79,037	-242.61	$88,208
$21.5m	464.99	$46,238	71.48	-$300,786	804.20	$26,735	257.73	-$83,422	350.92	$61,267	-303.10	$70,934	261.26	$82,294	-243.08	$88,450
$21.6m	466.72	$46,281	70.07	-$308,250	805.94	$26,801	256.14	-$84,330	351.55	$61,443	-304.70	$70,891	261.88	$82,481	-244.47	$88,353
$21.7m	468.45	$46,323	68.67	-$316,027	807.69	$26,867	254.55	-$85,250	353.65	$61,360	-306.44	$70,813	263.58	$82,327	-244.94	$88,593
$21.8m	470.17	$46,366	67.25	-$324,182	809.43	$26,932	252.95	-$86,182	355.96	$61,243	-308.07	$70,763	265.45	$82,124	-247.65	$88,027
$21.9m	471.90	$46,408	65.83	-$332,699	811.17	$26,998	251.36	-$87,127	358.12	$61,153	-309.66	$70,722	269.36	$81,304	-236.13	$92,747
$22.0m	473.62	$46,450	64.39	-$341,670	812.90	$27,064	249.76	-$88,085	359.13	$61,260	-311.40	$70,648	271.07	$81,160	-237.52	$92,623
$22.1m	475.35	$46,492	62.95	-$351,100	814.63	$27,129	248.16	-$89,056	361.24	$61,178	-312.22	$70,782	271.69	$81,341	-237.99	$92,862
$22.2m	477.07	$46,534	61.49	-$361,011	816.36	$27,194	246.56	-$90,040	362.33	$61,270	-312.70	$70,995	273.53	$81,161	-239.38	$92,739
$22.3m	478.79	$46,575	60.03	-$371,480	818.08	$27,259	244.95	-$91,039	364.65	$61,155	-314.32	$70,947	275.41	$80,972	-239.85	$92,976
$22.4m	480.51	$46,617	58.56	-$382,492	819.80	$27,324	243.34	-$92,051	366.77	$61,074	-315.08	$71,093	277.12	$80,831	-241.24	$92,854
$22.5m	482.23	$46,658	57.10	-$394,072	821.52	$27,388	241.73	-$93,078	367.40	$61,242	-316.67	$71,052	280.77	$80,138	-241.70	$93,090
$22.6m	483.95	$46,699	55.61	-$406,381	823.24	$27,453	240.12	-$94,119	368.92	$61,260	-318.41	$70,978	281.39	$80,315	-243.09	$92,969
$22.7m	485.67	$46,739	54.13	-$419,380	824.95	$27,517	238.51	-$95,175	371.09	$61,171	-320.00	$70,938	283.27	$80,134	-243.55	$93,203
$22.8m	487.39	$46,780	52.63	-$433,236	826.66	$27,581	236.89	-$96,246	372.19	$61,260	-321.73	$70,867	284.99	$80,002	-244.94	$93,084
$22.9m	489.10	$46,820	51.11	-$448,058	828.37	$27,645	235.28	-$97,332	374.52	$61,146	-322.55	$70,997	286.84	$79,835	-245.40	$93,316
$23.0m	490.82	$46,861	49.59	-$463,832	830.07	$27,708	233.66	-$98,433	376.64	$61,066	-324.17	$70,951	289.47	$79,456	-246.79	$93,198
$23.1m	492.53	$46,901	48.06	-$480,692	831.77	$27,772	232.04	-$99,551	377.66	$61,165	-328.92	$70,231	291.36	$79,284	-247.25	$93,429
$23.2m	494.24	$46,941	46.52	-$498,713	833.47	$27,836	230.42	-$100,685	379.80	$61,085	-329.67	$70,373	291.99	$79,456	-248.63	$93,312
$23.3m	495.95	$46,981	44.97	-$518,100	835.16	$27,899	228.80	-$101,836	382.14	$60,972	-331.41	$70,307	293.71	$79,329	-249.09	$93,540
$23.4m	497.65	$47,021	43.42	-$538,957	836.85	$27,962	227.18	-$103,004	383.24	$61,058	-332.99	$70,273	295.61	$79,160	-251.77	$92,942
$23.5m	499.36	$47,060	41.84	-$561,625	838.54	$28,025	225.55	-$104,190	385.43	$60,971	-333.46	$70,474	297.34	$79,035	-253.15	$92,831
$23.6m	501.06	$47,100	40.26	-$586,195	840.22	$28,088	223.92	-$105,394	386.06	$61,130	-334.59	$70,533	297.97	$79,203	-253.61	$93,057
$23.7m	502.77	$47,139	38.67	-$612,845	841.90	$28,151	222.30	-$106,615	388.21	$61,050	-335.41	$70,660	299.83	$79,046	-254.07	$93,282
$23.8m	504.47	$47,178	37.08	-$641,900	843.58	$28,213	220.67	-$107,856	390.56	$60,939	-337.02	$70,619	301.73	$78,879	-255.44	$93,171
$23.9m	506.17	$47,217	35.46	-$673,968	845.25	$28,276	219.03	-$109,115	392.71	$60,859	-338.75	$70,553	303.46	$78,758	-255.90	$93,395
$24.0m	507.87	$47,256	33.82	-$709,558	846.93	$28,338	217.40	-$110,396	393.74	$60,954	-340.33	$70,519	304.10	$78,922	-257.28	$93,285
$24.1m	509.57	$47,295	32.18	-$748,895	848.60	$28,400	215.77	-$111,695	394.85	$61,036	-342.06	$70,456	306.00	$78,757	-257.74	$93,507
$24.2m	511.26	$47,334	30.53	-$792,588	850.26	$28,462	214.13	-$113,015	397.05	$60,950	-342.81	$70,592	307.75	$78,636	-259.11	$93,398
$24.3m	512.96	$47,372	28.87	-$841,640	851.93	$28,523	212.49	-$114,357	399.41	$60,840	-344.39	$70,560	309.61	$78,485	-259.56	$93,618
$24.4m	514.65	$47,411	27.21	-$896,832	853.59	$28,585	210.85	-$115,721	401.57	$60,762	-346.00	$70,520	300.26	$81,263	-260.93	$93,510
$24.5m	516.34	$47,449	25.52	-$959,945	855.25	$28,647	209.21	-$117,106	402.21	$60,913	-346.81	$70,644	300.90	$81,423	-261.39	$93,730
$24.6m	518.03	$47,488	23.81	-$1.03m	856.91	$28,708	207.57	-$118,515	404.38	$60,834	-348.53	$70,581	302.81	$81,239	-262.76	$93,623
$24.7m	519.72	$47,526	22.10	-$1.12m	858.56	$28,769	205.93	-$119,946	405.49	$60,913	-349.00	$70,773	304.56	$81,101	-265.61	$92,992

	λ7								λ8							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$
$24.8m	521.41	$47,564	20.36	-$1.22m	860.21	$28,830	204.28	-$121,403	407.87	$60,804	-350.58	$70,741	306.31	$80,963	-266.07	$93,209
$24.9m	523.09	$47,602	18.60	-$1.34m	861.85	$28,891	202.63	-$122,884	408.91	$60,894	-352.18	$70,703	308.23	$80,784	-268.72	$92,662
$25.0m	524.78	$47,639	16.84	-$1.48m	863.50	$28,952	200.98	-$124,389	411.13	$60,809	-353.90	$70,641	310.11	$80,617	-270.08	$92,564
$25.1m	526.46	$47,677	15.07	-$1.67m	865.14	$29,013	199.33	-$125,919	413.30	$60,731	-354.65	$70,774	313.84	$79,978	-270.54	$92,778
$25.2m	528.14	$47,715	13.28	-$1.90m	866.78	$29,073	197.68	-$127,477	415.68	$60,623	-356.22	$70,742	314.48	$80,133	-271.90	$92,681
$25.3m	529.82	$47,752	11.48	-$2.20m	868.41	$29,134	196.03	-$129,061	416.81	$60,699	-357.03	$70,862	316.23	$80,004	-272.35	$92,894
$25.4m	531.50	$47,789	9.69	-$2.62m	870.05	$29,194	194.38	-$130,674	418.99	$60,622	-358.60	$70,831	318.16	$79,834	-273.71	$92,797
$25.5m	533.18	$47,827	7.89	-$3.23m	871.68	$29,254	192.72	-$132,316	425.54	$59,925	-360.20	$70,794	318.80	$79,987	-274.17	$93,009
$25.6m	534.85	$47,864	6.08	-$4.21m	873.31	$29,314	191.06	-$133,986	426.18	$60,068	-360.66	$70,980	320.57	$79,858	-275.53	$92,913
$25.7m	536.53	$47,901	4.28	-$6.01m	874.93	$29,374	189.40	-$135,688	428.42	$59,988	-361.41	$71,110	322.50	$79,690	-275.98	$93,123
$25.8m	538.20	$47,938	2.46	-$10.47m	876.56	$29,433	187.74	-$137,421	430.81	$59,887	-362.98	$71,078	324.39	$79,533	-277.33	$93,028
$25.9m	539.87	$47,974	0.65	-$40.03m	878.18	$29,493	186.08	-$139,186	433.00	$59,815	-363.79	$71,196	325.04	$79,683	-277.79	$93,237
$26.0m	541.54	$48,011	-1.17	$22.13m	879.80	$29,552	184.42	-$140,984	434.06	$59,900	-365.38	$71,159	326.81	$79,557	-279.14	$93,143
$26.1m	543.21	$48,048	-3.00	$8.71m	881.41	$29,612	182.75	-$142,816	435.19	$59,974	-366.94	$71,128	328.75	$79,392	-279.59	$93,350
$26.2m	544.88	$48,084	-4.82	$5.43m	883.02	$29,671	181.08	-$144,684	437.39	$59,901	-367.75	$71,245	330.52	$79,268	-280.04	$93,557
$26.3m	546.55	$48,120	-6.65	$3.95m	884.63	$29,730	179.42	-$146,587	439.79	$59,801	-368.49	$71,372	332.43	$79,115	-281.39	$93,463
$26.4m	548.21	$48,157	-8.48	$3.11m	886.24	$29,789	177.75	-$148,527	442.05	$59,722	-370.05	$71,341	334.37	$78,954	-283.28	$93,195
$26.5m	549.87	$48,193	-10.32	$2.57m	887.85	$29,847	176.07	-$150,506	444.25	$59,651	-371.64	$71,305	335.02	$79,099	-285.90	$92,691
$26.6m	551.54	$48,229	-12.15	$2.19m	889.45	$29,906	174.40	-$152,525	444.91	$59,788	-372.11	$71,485	336.81	$78,977	-286.35	$92,895
$26.7m	553.20	$48,265	-13.99	$1.91m	891.05	$29,964	172.72	-$154,584	446.05	$59,859	-373.22	$71,539	338.76	$78,817	-287.69	$92,807
$26.8m	554.86	$48,301	-15.84	$1.69m	892.66	$30,023	171.04	-$156,684	448.47	$59,759	-374.78	$71,509	329.54	$81,324	-292.24	$91,705
$26.9m	556.52	$48,337	-17.68	$1.52m	894.26	$30,081	169.37	-$158,829	450.05	$59,771	-375.58	$71,622	330.20	$81,467	-292.69	$91,906
$27.0m	558.17	$48,372	-19.53	$1.38m	895.86	$30,139	167.68	-$161,017	452.27	$59,699	-377.17	$71,586	332.11	$81,298	-294.04	$91,825
$27.1m	559.83	$48,408	-21.39	$1.27m	897.45	$30,197	166.00	-$163,253	453.33	$59,780	-377.91	$71,710	333.90	$81,162	-294.49	$92,024
$27.2m	561.48	$48,443	-23.24	$1.17m	899.05	$30,254	164.32	-$165,535	455.76	$59,680	-379.47	$71,680	335.86	$80,986	-295.83	$91,944
$27.3m	563.14	$48,479	-25.09	$1.09m	900.65	$30,312	162.63	-$167,865	458.03	$59,603	-381.02	$71,651	342.48	$79,714	-296.28	$92,143
$27.4m	564.79	$48,514	-26.95	$1.02m	902.24	$30,369	160.94	-$170,249	460.26	$59,532	-382.60	$71,616	343.13	$79,853	-297.62	$92,063
$27.5m	566.44	$48,549	-28.81	$954,385	903.83	$30,426	159.25	-$172,683	461.40	$59,601	-383.06	$71,791	346.94	$79,264	-298.07	$92,260
$27.6m	568.09	$48,584	-30.68	$899,615	905.42	$30,483	157.56	-$175,172	463.64	$59,529	-383.86	$71,902	348.74	$79,143	-299.41	$92,182
$27.7m	569.73	$48,619	-32.55	$851,058	907.01	$30,540	155.87	-$177,717	464.30	$59,660	-384.60	$72,023	350.70	$78,984	-299.86	$92,378
$27.8m	571.38	$48,654	-34.42	$807,713	908.60	$30,596	154.17	-$180,319	466.74	$59,562	-386.15	$71,994	352.63	$78,836	-301.19	$92,299
$27.9m	573.03	$48,689	-36.29	$768,728	910.19	$30,653	152.47	-$182,984	467.90	$59,628	-387.72	$71,959	354.43	$78,717	-301.64	$92,494
$28.0m	574.67	$48,724	-38.17	$733,559	911.77	$30,709	150.77	-$185,709	470.14	$59,557	-389.27	$71,930	356.41	$78,562	-302.98	$92,417
$28.1m	576.31	$48,758	-40.05	$701,610	913.35	$30,766	149.07	-$188,497	471.21	$59,633	-390.06	$72,039	357.06	$78,697	-305.57	$91,960
$28.2m	577.95	$48,793	-41.93	$672,484	914.94	$30,822	147.37	-$191,354	473.50	$59,556	-390.80	$72,159	358.87	$78,580	-306.01	$92,153
$28.3m	579.59	$48,827	-43.82	$645,838	916.52	$30,878	145.67	-$194,280	475.96	$59,459	-392.34	$72,130	360.85	$78,426	-294.13	$96,215
$28.4m	581.23	$48,862	-45.70	$621,378	918.09	$30,934	143.96	-$197,278	478.21	$59,388	-392.80	$72,301	361.51	$78,559	-295.47	$96,119
$28.5m	582.87	$48,896	-47.59	$598,843	919.67	$30,989	142.25	-$200,349	479.37	$59,453	-394.38	$72,266	363.46	$78,414	-295.91	$96,313
$28.6m	584.51	$48,930	-49.48	$577,978	921.25	$31,045	140.54	-$203,498	480.04	$59,578	-395.17	$72,374	365.27	$78,298	-297.24	$96,218
$28.7m	586.14	$48,964	-51.38	$558,621	922.82	$31,100	138.83	-$206,728	482.51	$59,480	-396.71	$72,345	367.26	$78,147	-297.69	$96,410
$28.8m	587.77	$48,998	-53.27	$540,613	924.39	$31,156	137.11	-$210,043	484.77	$59,410	-398.28	$72,311	367.92	$78,278	-300.46	$95,852
$28.9m	589.41	$49,032	-55.17	$523,805	925.97	$31,211	135.40	-$213,442	487.08	$59,333	-399.01	$72,429	369.74	$78,163	-300.91	$96,043
$29.0m	591.04	$49,066	-57.07	$508,105	927.54	$31,266	133.68	-$216,931	488.16	$59,406	-400.55	$72,400	371.74	$78,012	-302.24	$95,951
$29.1m	592.67	$49,100	-58.98	$493,409	929.11	$31,320	131.96	-$220,517	490.43	$59,336	-401.34	$72,507	362.66	$80,241	-302.68	$96,141
$29.2m	594.30	$49,134	-60.88	$479,597	930.68	$31,375	130.24	-$224,199	491.60	$59,398	-402.44	$72,557	364.61	$80,085	-304.01	$96,051
$29.3m	595.92	$49,167	-62.80	$466,589	932.24	$31,430	128.52	-$227,983	494.09	$59,301	-402.90	$72,723	366.44	$79,959	-304.45	$96,240
$29.4m	597.55	$49,201	-64.71	$454,345	933.81	$31,484	126.79	-$231,874	496.36	$59,231	-404.46	$72,689	368.44	$79,796	-305.77	$96,150
$29.5m	599.18	$49,234	-66.63	$442,768	935.37	$31,538	125.07	-$235,874	498.69	$59,155	-406.00	$72,661	369.11	$79,922	-306.21	$96,338
$29.6m	600.80	$49,268	-68.55	$431,819	936.94	$31,592	123.34	-$239,995	499.37	$59,275	-406.73	$72,776	370.94	$79,797	-307.54	$96,248
$29.7m	602.42	$49,301	-70.47	$421,460	938.50	$31,646	121.61	-$244,233	501.87	$59,179	-408.26	$72,748	372.95	$79,635	-307.98	$96,435

	λ7								*λ8*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$
$29.8m	604.04	$49,334	-72.39	$411,644	940.07	$31,700	119.87	-$248,595	504.15	$59,109	-409.05	$72,852	376.85	$79,076	-310.54	$95,961
$29.9m	605.66	$49,367	-74.32	$402,325	941.63	$31,754	118.14	-$253,094	505.33	$59,169	-410.61	$72,819	378.82	$78,928	-311.86	$95,875
$30.0m	607.28	$49,400	-76.25	$393,459	943.19	$31,807	116.40	-$257,728	506.43	$59,238	-412.14	$72,791	379.50	$79,052	-312.30	$96,060
$30.1m	608.90	$49,433	-78.18	$385,023	944.75	$31,860	114.66	-$262,512	508.72	$59,168	-412.87	$72,905	381.34	$78,933	-313.62	$95,975
$30.2m	610.52	$49,466	-80.11	$376,974	946.31	$31,914	112.92	-$267,443	511.24	$59,072	-413.32	$73,067	383.35	$78,779	-314.06	$96,159
$30.3m	612.13	$49,499	-82.05	$369,280	947.86	$31,967	111.18	-$272,533	513.59	$58,997	-414.88	$73,034	384.03	$78,900	-315.38	$96,075
$30.4m	613.75	$49,532	-83.99	$361,941	949.42	$32,020	109.43	-$277,793	514.77	$59,055	-416.40	$73,006	385.88	$78,782	-315.82	$96,258
$30.5m	615.36	$49,565	-85.94	$354,910	950.97	$32,072	107.69	-$283,229	517.08	$58,985	-417.19	$73,108	387.90	$78,629	-317.13	$96,175
$30.6m	616.97	$49,597	-87.89	$348,174	952.52	$32,125	105.94	-$288,849	517.76	$59,101	-418.71	$73,081	389.88	$78,485	-317.57	$96,357
$30.7m	618.58	$49,630	-89.84	$341,724	954.08	$32,178	104.19	-$294,660	520.29	$59,006	-420.26	$73,049	391.74	$78,368	-318.01	$96,538
$30.8m	620.19	$49,662	-91.80	$335,527	955.63	$32,230	102.43	-$300,680	522.60	$58,936	-420.99	$73,160	393.77	$78,218	-319.32	$96,455
$30.9m	621.80	$49,695	-93.76	$329,582	957.18	$32,282	100.68	-$306,914	523.80	$58,992	-421.78	$73,262	394.45	$78,337	-319.76	$96,636
$31.0m	623.40	$49,727	-95.71	$323,880	958.73	$32,334	98.92	-$313,378	524.91	$59,058	-423.30	$73,235	398.70	$77,753	-321.07	$96,553
$31.1m	625.01	$49,759	-97.67	$318,405	960.28	$32,387	97.16	-$320,080	527.28	$58,982	-423.75	$73,393	400.56	$77,641	-321.50	$96,733
$31.2m	626.61	$49,791	-99.64	$313,135	961.82	$32,438	95.40	-$327,033	528.94	$58,985	-425.30	$73,361	391.61	$79,672	-322.81	$96,651
$31.3m	628.22	$49,824	-101.60	$308,065	963.37	$32,490	93.64	-$334,264	531.49	$58,891	-426.81	$73,334	393.65	$79,513	-325.35	$96,204
$31.4m	629.82	$49,856	-103.57	$303,174	964.91	$32,542	91.87	-$341,774	533.81	$58,822	-427.54	$73,444	395.65	$79,364	-325.10	$96,586
$31.5m	631.42	$49,888	-105.54	$298,463	966.46	$32,593	90.11	-$349,585	536.15	$58,753	-428.32	$73,543	396.33	$79,480	-325.53	$96,764
$31.6m	633.02	$49,919	-107.51	$293,924	968.00	$32,645	88.34	-$357,722	536.84	$58,863	-429.83	$73,517	398.20	$79,358	-326.84	$96,683
$31.7m	634.62	$49,951	-109.49	$289,536	969.54	$32,696	86.57	-$366,193	538.04	$58,917	-431.38	$73,485	400.24	$79,202	-328.66	$96,452
$31.8m	636.22	$49,983	-111.46	$285,302	971.08	$32,747	84.79	-$375,039	540.60	$58,824	-432.46	$73,532	400.93	$79,316	-329.10	$96,628
$31.9m	637.81	$50,015	-113.44	$281,202	972.62	$32,798	83.02	-$384,267	542.99	$58,749	-433.98	$73,506	402.81	$79,194	-330.40	$96,549
$32.0m	639.41	$50,046	-115.42	$277,243	974.16	$32,849	81.24	-$393,901	545.33	$58,680	-434.70	$73,614	404.86	$79,040	-330.84	$96,725
$32.1m	641.00	$50,078	-117.40	$273,417	975.69	$32,900	79.46	-$403,985	546.46	$58,742	-435.15	$73,768	406.88	$78,894	-332.14	$96,647
$32.2m	642.59	$50,109	-119.39	$269,706	977.23	$32,950	77.68	-$414,543	549.03	$58,649	-435.93	$73,866	410.88	$78,369	-332.57	$96,821
$32.3m	644.18	$50,141	-121.38	$266,115	978.77	$33,001	75.89	-$425,613	551.39	$58,580	-440.45	$73,334	412.76	$78,253	-333.87	$96,744
$32.4m	645.78	$50,172	-123.37	$262,630	980.30	$33,051	74.11	-$437,217	552.60	$58,632	-441.99	$73,304	414.82	$78,105	-334.31	$96,917
$32.5m	647.37	$50,204	-125.36	$259,255	981.83	$33,101	72.32	-$449,414	553.30	$58,739	-443.50	$73,280	415.51	$78,216	-334.74	$97,091
$32.6m	648.95	$50,235	-127.35	$255,983	983.37	$33,151	70.53	-$462,243	555.66	$58,669	-445.04	$73,252	417.58	$78,068	-336.04	$97,013
$32.7m	650.54	$50,266	-129.35	$252,803	984.90	$33,201	68.73	-$475,763	558.08	$58,594	-446.55	$73,229	419.48	$77,954	-337.33	$96,937
$32.8m	652.13	$50,297	-131.35	$249,716	986.43	$33,251	66.94	-$490,015	560.67	$58,502	-447.27	$73,334	421.51	$77,816	-340.04	$96,459
$32.9m	653.71	$50,328	-133.35	$246,722	987.96	$33,301	65.14	-$505,052	561.89	$58,552	-448.04	$73,430	422.20	$77,925	-342.55	$96,044
$33.0m	655.29	$50,359	-135.35	$243,812	989.49	$33,351	63.35	-$520,950	564.26	$58,483	-448.49	$73,580	424.28	$77,779	-343.85	$95,973
$33.1m	656.88	$50,390	-137.35	$240,984	991.01	$33,400	61.54	-$537,822	565.40	$58,542	-449.99	$73,557	415.44	$79,674	-345.14	$95,904
$33.2m	658.46	$50,421	-139.36	$238,233	992.54	$33,450	59.74	-$555,711	568.01	$58,450	-451.53	$73,528	417.34	$79,551	-346.43	$95,835
$33.3m	660.04	$50,452	-141.37	$235,555	994.06	$33,499	57.94	-$574,747	570.39	$58,381	-452.30	$73,624	419.43	$79,394	-347.72	$95,768
$33.4m	661.62	$50,482	-143.38	$232,947	995.59	$33,548	56.13	-$595,027	572.83	$58,307	-453.02	$73,728	420.13	$79,500	-349.00	$95,702
$33.5m	663.20	$50,513	-145.39	$230,410	997.11	$33,597	54.32	-$616,668	574.06	$58,356	-454.52	$73,704	422.03	$79,378	-350.29	$95,636
$33.6m	664.77	$50,544	-147.41	$227,938	998.63	$33,646	52.51	-$639,852	574.77	$58,458	-456.05	$73,676	424.08	$79,230	-351.57	$95,572
$33.7m	666.35	$50,574	-149.43	$225,529	1000.15	$33,695	50.70	-$664,720	577.17	$58,389	-457.55	$73,653	426.18	$79,075	-354.05	$95,183
$33.8m	667.92	$50,605	-151.45	$223,180	1001.67	$33,744	48.88	-$691,444	579.79	$58,297	-458.32	$73,748	428.09	$78,955	-358.38	$94,313
$33.9m	669.50	$50,635	-153.47	$220,888	1003.19	$33,792	47.07	-$720,270	582.20	$58,228	-458.76	$73,894	428.79	$79,059	-359.66	$94,256
$34.0m	671.07	$50,665	-155.50	$218,655	1004.71	$33,841	45.24	-$751,465	583.44	$58,275	-459.48	$73,997	430.90	$78,905	-360.94	$94,199
$34.1m	672.64	$50,696	-157.52	$216,476	1006.23	$33,889	43.42	-$785,317	584.59	$58,331	-460.98	$73,974	432.82	$78,785	-362.22	$94,143
$34.2m	674.21	$50,726	-159.55	$214,347	1007.74	$33,937	41.60	-$822,178	587.23	$58,239	-462.50	$73,946	434.88	$78,642	-363.49	$94,088
$34.3m	675.78	$50,756	-161.59	$212,270	1009.26	$33,985	39.77	-$862,472	589.69	$58,166	-464.00	$73,923	435.59	$78,744	-364.76	$94,034
$34.4m	677.35	$50,786	-163.62	$210,243	1010.77	$34,033	37.94	-$906,675	592.11	$58,097	-464.76	$74,016	437.70	$78,592	-366.03	$93,981
$34.5m	678.92	$50,816	-165.66	$208,263	1012.28	$34,081	36.11	-$955,503	592.83	$58,196	-465.48	$74,117	440.65	$78,294	-353.75	$97,526
$34.6m	680.48	$50,846	-167.69	$206,329	1013.79	$34,129	34.27	-$1.01m	595.26	$58,126	-466.55	$74,162	442.58	$78,178	-355.02	$97,460
$34.7m	682.05	$50,876	-169.73	$204,439	1015.30	$34,177	32.44	-$1.07m	597.91	$58,035	-468.04	$74,139	446.69	$77,683	-357.48	$97,068

	$\lambda 7$								$\lambda 8$							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^{-})^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^{+})^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^{-})^{d}$
$34.8m	683.61	$50,906	-171.77	$202,592	1016.81	$34,225	30.60	-$1.14m	599.17	$58,081	-468.48	$74,283	437.96	$79,459	-358.75	$97,004
$34.9m	685.17	$50,936	-173.82	$200,785	1018.32	$34,272	28.76	-$1.21m	601.65	$58,007	-469.97	$74,260	440.09	$79,303	-360.51	$96,806
$35.0m	686.73	$50,966	-175.86	$199,018	1019.83	$34,320	26.91	-$1.30m	604.09	$57,938	-470.73	$74,352	442.17	$79,156	-363.16	$96,377
$35.1m	688.30	$50,996	-177.91	$197,289	1021.33	$34,367	25.06	-$1.40m	606.77	$57,847	-471.45	$74,452	442.87	$79,255	-364.42	$96,317
$35.2m	689.86	$51,025	-179.96	$195,598	1022.84	$34,414	23.22	-$1.52m	607.94	$57,901	-472.93	$74,429	444.82	$79,134	-365.69	$96,257
$35.3m	691.41	$51,055	-182.01	$193,944	1024.35	$34,461	21.36	-$1.65m	609.20	$57,945	-473.70	$74,520	446.95	$78,981	-366.95	$96,199
$35.4m	692.97	$51,084	-184.06	$192,325	1025.85	$34,508	19.51	-$1.81m	611.65	$57,876	-475.18	$74,498	448.90	$78,860	-368.21	$96,141
$35.5m	694.53	$51,114	-186.12	$190,736	1027.36	$34,555	17.65	-$2.01m	612.38	$57,971	-475.62	$74,640	449.61	$78,958	-369.47	$96,085
$35.6m	696.08	$51,143	-188.18	$189,181	1028.86	$34,602	15.79	-$2.25m	614.14	$57,967	-476.33	$74,738	451.75	$78,805	-371.90	$95,724
$35.7m	697.64	$51,173	-190.24	$187,658	1030.36	$34,648	13.93	-$2.56m	616.83	$57,876	-477.81	$74,716	453.85	$78,661	-373.16	$95,669
$35.8m	699.19	$51,202	-192.30	$186,164	1031.86	$34,695	12.07	-$2.97m	619.30	$57,808	-478.57	$74,806	455.80	$78,542	-374.41	$95,616
$35.9m	700.74	$51,231	-194.37	$184,701	1033.36	$34,741	10.20	-$3.52m	621.81	$57,735	-480.05	$74,784	457.95	$78,392	-375.67	$95,563
$36.0m	702.29	$51,261	-196.44	$183,263	1034.85	$34,788	8.33	-$4.32m	623.08	$57,777	-480.76	$74,882	458.67	$78,488	-376.92	$95,512
$36.1m	703.84	$51,290	-198.51	$181,854	1036.35	$34,834	6.46	-$5.59m	625.56	$57,709	-482.23	$74,860	460.64	$78,370	-378.17	$95,461
$36.2m	705.39	$51,319	-200.58	$180,473	1037.85	$34,880	4.59	-$7.89m	628.27	$57,619	-482.67	$75,000	462.79	$78,221	-379.41	$95,410
$36.3m	706.94	$51,348	-202.66	$179,116	1039.34	$34,926	2.71	-$13.40m	629.46	$57,669	-483.43	$75,089	454.18	$79,925	-380.66	$95,361
$36.4m	708.49	$51,377	-204.74	$177,787	1040.84	$34,972	0.83	-$43.90m	631.94	$57,600	-484.90	$75,067	456.29	$79,773	-383.07	$95,021
$36.5m	710.03	$51,406	-206.82	$176,478	1042.33	$35,018	-1.05	$34.70m	632.68	$57,691	-485.61	$75,164	457.02	$79,866	-384.32	$94,973
$36.6m	711.58	$51,435	-208.91	$175,196	1043.82	$35,063	-2.94	$12.46m	633.96	$57,732	-486.66	$75,206	458.99	$79,740	-385.56	$94,927
$36.7m	713.12	$51,464	-211.00	$173,938	1045.31	$35,109	-4.82	$7.61m	636.51	$57,659	-488.13	$75,184	461.16	$79,582	-386.80	$94,881
$36.8m	714.66	$51,493	-213.08	$172,704	1046.80	$35,155	-6.72	$5.48m	639.24	$57,569	-488.89	$75,272	463.14	$79,457	-388.04	$94,836
$36.9m	716.21	$51,521	-215.17	$171,490	1048.29	$35,200	-8.61	$4.29m	641.74	$57,500	-489.33	$75,410	465.32	$79,300	-390.62	$94,464
$37.0m	717.75	$51,550	-217.26	$170,299	1049.78	$35,245	-10.50	$3.52m	644.25	$57,432	-490.03	$75,506	466.05	$79,391	-391.86	$94,421
$37.1m	719.29	$51,579	-219.36	$169,126	1051.27	$35,291	-12.40	$2.99m	645.54	$57,471	-491.50	$75,484	470.27	$78,891	-393.10	$94,379
$37.2m	720.83	$51,607	-221.46	$167,974	1052.76	$35,336	-14.30	$2.60m	648.29	$57,382	-492.25	$75,571	472.41	$78,746	-395.49	$94,061
$37.3m	722.36	$51,636	-223.56	$166,845	1054.24	$35,381	-16.21	$2.30m	649.50	$57,429	-493.72	$75,549	474.40	$78,625	-396.72	$94,020
$37.4m	723.90	$51,665	-225.67	$165,731	1055.73	$35,426	-18.11	$2.06m	650.24	$57,517	-494.42	$75,644	476.59	$78,475	-398.44	$93,866
$37.5m	725.44	$51,693	-227.77	$164,638	1057.21	$35,471	-20.02	$1.87m	652.82	$57,443	-495.88	$75,623	477.32	$78,564	-399.67	$93,827
$37.6m	726.97	$51,721	-229.89	$163,560	1058.69	$35,516	-21.93	$1.71m	655.34	$57,375	-496.63	$75,710	479.32	$78,444	-400.90	$93,789
$37.7m	728.50	$51,750	-232.00	$162,501	1060.17	$35,560	-23.85	$1.58m	658.72	$57,233	-497.07	$75,845	481.52	$78,294	-402.13	$93,751
$37.8m	730.04	$51,778	-234.11	$161,462	1061.65	$35,605	-25.77	$1.47m	662.10	$57,091	-498.53	$75,823	473.00	$79,915	-403.36	$93,714
$37.9m	731.57	$51,806	-236.23	$160,436	1063.13	$35,649	-27.68	$1.37m	663.40	$57,130	-499.23	$75,917	475.16	$79,763	-404.58	$93,677
$38.0m	733.10	$51,835	-238.35	$159,428	1064.61	$35,694	-29.61	$1.28m	665.94	$57,063	-500.69	$75,896	477.36	$79,604	-408.71	$92,975
$38.1m	734.63	$51,863	-240.48	$158,434	1066.09	$35,738	-31.53	$1.21m	669.32	$56,923	-501.44	$75,982	478.10	$79,691	-409.94	$92,941
$38.2m	736.16	$51,891	-242.61	$157,457	1067.57	$35,782	-33.46	$1.14m	672.10	$56,837	-502.89	$75,961	480.11	$79,564	-412.31	$92,649
$38.3m	737.69	$51,919	-244.73	$156,497	1069.05	$35,826	-35.39	$1.08m	675.48	$56,700	-503.32	$76,094	482.33	$79,406	-413.53	$92,617
$38.4m	739.21	$51,947	-246.86	$155,552	1070.52	$35,870	-37.33	$1.03m	678.88	$56,564	-504.02	$76,187	484.35	$79,281	-414.75	$92,586
$38.5m	740.74	$51,975	-249.00	$154,620	1072.00	$35,914	-39.27	$980,494	682.28	$56,429	-505.47	$76,166	485.09	$79,366	-415.97	$92,555
$38.6m	742.26	$52,003	-251.13	$153,704	1073.47	$35,958	-41.21	$936,731	684.82	$56,365	-506.22	$76,251	487.27	$79,217	-417.18	$92,525
$38.7m	743.79	$52,031	-253.27	$152,803	1074.94	$36,002	-43.15	$896,873	688.22	$56,232	-507.26	$76,291	489.50	$79,061	-418.40	$92,496
$38.8m	745.31	$52,059	-255.41	$151,914	1076.42	$36,046	-45.10	$860,405	691.63	$56,099	-508.72	$76,270	497.00	$78,068	-419.61	$92,467
$38.9m	746.83	$52,087	-257.55	$151,038	1077.89	$36,089	-47.04	$826,870	694.23	$56,033	-509.41	$76,363	499.04	$77,950	-422.14	$92,149
$39.0m	748.35	$52,115	-259.69	$150,177	1079.36	$36,133	-49.00	$795,971	697.64	$55,902	-510.16	$76,447	501.27	$77,802	-423.35	$92,121
$39.1m	749.87	$52,142	-261.84	$149,326	1080.83	$36,176	-50.95	$767,372	698.96	$55,940	-511.61	$76,426	502.02	$77,885	-425.70	$91,848
$39.2m	751.39	$52,170	-263.99	$148,488	1082.30	$36,219	-52.91	$740,856	701.76	$55,860	-515.95	$75,977	493.60	$79,416	-426.91	$91,822
$39.3m	752.90	$52,198	-266.15	$147,661	1083.77	$36,262	-54.87	$716,232	702.51	$55,942	-516.38	$76,107	495.65	$79,290	-428.12	$91,796
$39.4m	754.42	$52,226	-268.31	$146,847	1085.23	$36,306	-56.84	$693,222	705.93	$55,813	-517.82	$76,088	500.00	$78,800	-429.33	$91,771
$39.5m	755.93	$52,254	-270.47	$146,044	1086.70	$36,349	-58.80	$671,726	707.15	$55,858	-518.51	$76,179	502.20	$78,655	-430.53	$91,746
$39.6m	757.44	$52,281	-272.63	$145,251	1088.17	$36,391	-60.77	$651,595	709.71	$55,797	-519.26	$76,262	504.44	$78,503	-431.74	$91,722
$39.7m	758.95	$52,309	-274.80	$144,470	1089.63	$36,434	-62.75	$632,704	713.13	$55,670	-520.70	$76,243	505.19	$78,584	-432.94	$91,699

	λ7								λ8							
	Agent has good information				Agent has poor information				Agent has good information				Agent has poor information			
	Net Investment		Net Disinvestment		Net Investment		Net Disinvestment		Net Investment		Net Disinvestment		Net Investment		Net Disinvestment	
Budget impact	$E(\Delta E)^{a}$	$E(\lambda_G^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^-)^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^-)^{d}$	$E(\Delta E)^{a}$	$E(\lambda_G^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_G^-)^{d}$	$E(\Delta E)^{a}$	$E(\lambda_P^+)^{b}$	$E(\Delta E)^{c}$	$E(\lambda_P^-)^{d}$
$39.8m	760.46	$52,337	-276.97	$143,699	1091.10	$36,477	-64.72	$614,925	716.56	$55,543	-521.39	$76,334	507.25	$78,463	-435.27	$91,438
$39.9m	761.97	$52,364	-279.14	$142,939	1092.56	$36,520	-66.70	$598,174	719.98	$55,418	-521.82	$76,463	509.50	$78,312	-436.94	$91,316
$40.0m	763.47	$52,392	-281.32	$142,189	1094.03	$36,562	-68.69	$582,347	723.42	$55,293	-523.26	$76,443	511.57	$78,191	-424.20	$94,296
$40.1m	764.98	$52,420	-283.50	$141,448	1095.49	$36,605	-70.67	$567,397	725.99	$55,235	-524.01	$76,526	513.84	$78,040	-425.40	$94,265
$40.2m	766.48	$52,447	-285.68	$140,717	1096.95	$36,647	-72.66	$553,259	729.43	$55,112	-525.45	$76,507	514.59	$78,120	-426.60	$94,235
$40.3m	767.99	$52,475	-287.86	$139,996	1098.41	$36,689	-74.65	$539,821	732.24	$55,036	-526.13	$76,597	516.81	$77,978	-427.79	$94,205
$40.4m	769.49	$52,502	-290.05	$139,286	1099.87	$36,732	-76.65	$527,071	735.69	$54,915	-527.57	$76,577	508.49	$79,451	-428.99	$94,175
$40.5m	770.99	$52,530	-292.24	$138,585	1101.33	$36,774	-78.65	$514,944	737.01	$54,951	-528.31	$76,659	510.57	$79,324	-430.18	$94,146
$40.6m	772.49	$52,558	-294.43	$137,894	1102.79	$36,816	-80.65	$503,406	740.46	$54,831	-528.74	$76,787	512.84	$79,166	-431.37	$94,118
$40.7m	773.98	$52,585	-296.63	$137,209	1104.25	$36,858	-82.66	$492,403	743.10	$54,771	-529.77	$76,826	517.61	$78,631	-432.57	$94,090
$40.8m	775.48	$52,613	-298.83	$136,534	1105.71	$36,899	-84.66	$481,902	746.55	$54,652	-531.20	$76,807	518.37	$78,709	-434.88	$93,820
$40.9m	776.98	$52,640	-301.03	$135,868	1107.17	$36,941	-86.67	$471,880	749.13	$54,596	-531.89	$76,896	520.46	$78,585	-436.06	$93,793
$41.0m	778.47	$52,667	-303.23	$135,209	1108.62	$36,983	-88.69	$462,289	752.59	$54,479	-532.63	$76,977	522.75	$78,432	-438.55	$93,491
$41.1m	779.96	$52,695	-305.44	$134,559	1110.08	$37,024	-90.70	$453,122	756.05	$54,362	-534.06	$76,958	524.99	$78,287	-439.74	$93,465
$41.2m	781.45	$52,722	-307.65	$133,917	1111.54	$37,066	-92.72	$444,348	756.82	$54,439	-535.49	$76,939	527.29	$78,136	-440.92	$93,441
$41.3m	782.94	$52,750	-309.87	$133,283	1112.99	$37,107	-94.74	$435,912	760.28	$54,322	-536.17	$77,027	529.39	$78,015	-442.11	$93,417
$41.4m	784.43	$52,777	-312.08	$132,657	1114.45	$37,149	-96.77	$427,823	763.12	$54,251	-536.60	$77,153	530.16	$78,090	-443.29	$93,393
$41.5m	785.92	$52,804	-314.30	$132,039	1115.90	$37,190	-98.80	$420,044	766.59	$54,136	-537.33	$77,233	532.47	$77,939	-444.47	$93,369
$41.6m	787.41	$52,832	-316.52	$131,428	1117.36	$37,231	-100.83	$412,574	769.19	$54,083	-538.76	$77,214	524.23	$79,354	-446.76	$93,115
$41.7m	788.89	$52,859	-318.75	$130,824	1118.81	$37,272	-102.87	$405,383	770.53	$54,118	-540.19	$77,196	526.34	$79,226	-447.94	$93,092
$41.8m	790.38	$52,886	-320.98	$130,226	1120.26	$37,313	-104.90	$398,457	774.01	$54,005	-540.87	$77,283	530.83	$78,744	-449.12	$93,071
$41.9m	791.86	$52,913	-323.21	$129,636	1121.71	$37,354	-106.95	$391,769	775.25	$54,047	-541.60	$77,363	533.10	$78,597	-450.30	$93,050
$42.0m	793.34	$52,941	-325.45	$129,053	1123.16	$37,394	-109.00	$385,331	783.06	$53,636	-543.03	$77,344	533.87	$78,670	-450.01	$93,331
$42.1m	794.82	$52,968	-327.69	$128,476	1124.61	$37,435	-111.04	$379,129	786.54	$53,526	-543.45	$77,468	536.19	$78,516	-451.19	$93,309
$42.2m	796.30	$52,995	-329.93	$127,906	1126.06	$37,476	-113.10	$373,126	790.02	$53,416	-544.13	$77,555	538.32	$78,392	-455.15	$92,717
$42.3m	797.78	$53,022	-332.17	$127,344	1127.51	$37,516	-115.16	$367,331	793.51	$53,308	-545.55	$77,536	540.65	$78,239	-456.33	$92,697
$42.4m	799.26	$53,049	-334.42	$126,786	1128.96	$37,557	-117.22	$361,720	796.12	$53,258	-546.28	$77,615	541.43	$78,311	-457.50	$92,678
$42.5m	800.73	$53,076	-336.67	$126,236	1130.40	$37,597	-119.28	$356,302	798.79	$53,205	-547.70	$77,597	543.57	$78,187	-459.13	$92,566
$42.6m	802.29	$53,098	-338.92	$125,692	1131.85	$37,637	-121.35	$351,056	802.29	$53,098	-548.72	$77,635	545.86	$78,042	-460.30	$92,548
$42.7m	805.15	$53,033	-341.18	$125,153	1133.30	$37,678	-123.42	$345,976	805.15	$53,033	-549.40	$77,721	548.21	$77,890	-462.58	$92,309
$42.8m	808.65	$52,928	-343.44	$124,621	1134.74	$37,718	-125.50	$341,043	808.65	$52,928	-550.13	$77,800	540.06	$79,251	-463.75	$92,292
$42.9m	812.16	$52,822	-345.71	$124,093	1136.19	$37,758	-127.58	$336,269	812.16	$52,822	-551.55	$77,781	542.21	$79,121	-464.91	$92,275
$43.0m	813.51	$52,858	-347.98	$123,571	1137.63	$37,798	-129.66	$331,645	813.51	$52,858	-551.97	$77,903	542.99	$79,191	-466.08	$92,259
$43.1m	815.39	$52,858	-350.25	$123,055	1139.07	$37,838	-131.74	$327,150	815.39	$52,858	-553.38	$77,885	545.35	$79,032	-468.52	$91,992
$43.2m	818.02	$52,811	-352.53	$122,544	1140.51	$37,878	-133.83	$322,788	818.02	$52,811	-554.06	$77,970	547.72	$78,873	-469.68	$91,977
$43.3m	821.53	$52,707	-354.80	$122,039	1141.96	$37,917	-135.93	$318,548	821.53	$52,707	-554.79	$78,048	550.04	$78,722	-470.85	$91,962
$43.4m	822.31	$52,778	-357.09	$121,538	1143.40	$37,957	-138.03	$314,430	822.31	$52,778	-556.20	$78,030	552.20	$78,595	-472.01	$91,947
$43.5m	825.82	$52,675	-359.38	$121,042	1144.84	$37,997	-140.13	$310,428	825.82	$52,675	-556.62	$78,151	552.99	$78,663	-474.26	$91,721
$43.6m	829.34	$52,572	-361.67	$120,553	1146.27	$38,036	-142.23	$306,539	829.34	$52,572	-558.03	$78,133	555.37	$78,506	-475.42	$91,708
$43.7m	832.87	$52,469	-363.96	$120,067	1147.71	$38,076	-144.35	$302,745	832.87	$52,469	-558.70	$78,217	557.55	$78,379	-476.58	$91,694
$43.8m	835.76	$52,408	-366.26	$119,588	1149.15	$38,115	-146.46	$299,059	835.76	$52,408	-559.43	$78,294	549.48	$79,712	-477.74	$91,681
$43.9m	838.40	$52,362	-368.56	$119,113	1150.58	$38,155	-148.58	$295,471	838.40	$52,362	-560.84	$78,276	554.12	$79,224	-478.90	$91,669
$44.0m	841.93	$52,261	-370.86	$118,644	1152.02	$38,194	-150.70	$291,976	841.93	$52,261	-561.51	$78,360	556.51	$79,063	-480.05	$91,656
$44.1m	845.46	$52,161	-373.16	$118,179	1153.45	$38,233	-152.82	$288,569	845.46	$52,161	-562.92	$78,342	557.31	$79,130	-481.21	$91,644
$44.2m	846.73	$52,201	-375.47	$117,719	1154.89	$38,272	-154.95	$285,248	846.73	$52,201	-563.64	$78,419	559.66	$78,976	-482.36	$91,633
$44.3m	848.10	$52,235	-377.78	$117,264	1156.32	$38,311	-157.09	$282,006	848.10	$52,235	-564.06	$78,538	561.85	$78,846	-484.60	$91,416
$44.4m	850.80	$52,186	-380.09	$116,813	1157.75	$38,350	-159.23	$278,847	850.80	$52,186	-565.46	$78,520	564.26	$78,688	-485.75	$91,406
$44.5m	854.34	$52,087	-382.41	$116,367	1159.18	$38,389	-161.37	$275,771	854.34	$52,087	-566.13	$78,604	566.46	$78,558	-486.90	$91,395
$44.6m	857.89	$51,988	-384.74	$115,924	1160.61	$38,428	-163.51	$272,760	857.89	$51,988	-566.85	$78,680	567.27	$78,622	-488.05	$91,385
$44.7m	860.55	$51,944	-387.06	$115,485	1162.04	$38,467	-165.66	$269,822	860.55	$51,944	-568.26	$78,662	569.69	$78,464	-489.19	$91,375

	λ7								λ8							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$	$E(\Delta E)^a$	$E(\lambda_G^+)^b$	$E(\Delta E)^c$	$E(\lambda_G^-)^d$	$E(\Delta E)^a$	$E(\lambda_P^+)^b$	$E(\Delta E)^c$	$E(\lambda_P^-)^d$
$44.8m	864.10	$51,846	-389.39	$115,051	1163.47	$38,505	-167.82	$266,952	864.10	$51,846	-569.26	$78,699	561.70	$79,758	-490.79	$91,281
$44.9m	867.01	$51,787	-391.73	$114,621	1164.90	$38,544	-169.98	$264,152	867.01	$51,787	-570.66	$78,681	564.07	$79,600	-493.19	$91,041
$45.0m	870.57	$51,690	-394.07	$114,194	1166.33	$38,583	-172.14	$261,413	870.57	$51,690	-571.33	$78,764	566.29	$79,464	-494.33	$91,032
$45.1m	874.13	$51,594	-396.41	$113,771	1167.75	$38,621	-174.31	$258,738	874.13	$51,594	-571.74	$78,881	568.72	$79,300	-495.48	$91,024
$45.2m	874.93	$51,662	-398.76	$113,352	1169.18	$38,660	-176.48	$256,114	874.93	$51,662	-572.47	$78,957	569.54	$79,363	-496.62	$91,016
$45.3m	877.60	$51,618	-401.11	$112,937	1170.60	$38,698	-178.66	$253,554	877.60	$51,618	-573.86	$78,939	571.98	$79,198	-498.84	$90,811
$45.4m	881.17	$51,523	-403.46	$112,526	1172.03	$38,736	-180.84	$251,054	881.17	$51,523	-578.04	$78,541	574.22	$79,064	-499.98	$90,804
$45.5m	882.54	$51,555	-405.82	$112,117	1173.45	$38,775	-183.02	$248,603	882.54	$51,555	-579.44	$78,524	566.30	$80,346	-501.12	$90,797
$45.6m	886.12	$51,460	-408.19	$111,713	1174.87	$38,813	-185.21	$246,202	886.12	$51,460	-580.11	$78,606	567.12	$80,406	-502.26	$90,790
$45.7m	889.70	$51,366	-410.55	$111,313	1176.29	$38,851	-187.41	$243,853	889.70	$51,366	-580.83	$78,681	569.53	$80,242	-503.39	$90,784
$45.8m	893.29	$51,271	-412.92	$110,916	1177.71	$38,889	-189.61	$241,553	893.29	$51,271	-582.22	$78,664	571.99	$80,072	-504.53	$90,778
$45.9m	895.97	$51,229	-415.30	$110,523	1179.13	$38,927	-191.81	$239,299	895.97	$51,229	-582.63	$78,780	574.24	$79,932	-505.67	$90,772
$46.0m	898.91	$51,173	-417.67	$110,135	1180.55	$38,965	-194.02	$237,094	898.91	$51,173	-583.30	$78,862	576.71	$79,763	-507.87	$90,575
$46.1m	901.66	$51,128	-420.06	$109,747	1181.97	$39,003	-196.23	$234,928	901.66	$51,128	-584.69	$78,845	581.52	$79,275	-509.00	$90,570
$46.2m	905.25	$51,036	-422.44	$109,365	1183.39	$39,040	-198.45	$232,804	905.25	$51,036	-585.41	$78,919	583.78	$79,139	-510.13	$90,565
$46.3m	908.85	$50,944	-424.83	$108,984	1184.80	$39,078	-200.67	$230,727	908.85	$50,944	-586.80	$78,903	584.61	$79,198	-511.26	$90,560
$46.4m	910.14	$50,981	-427.23	$108,607	1186.22	$39,116	-202.89	$228,691	910.14	$50,981	-587.46	$78,984	587.10	$79,033	-515.08	$90,084
$46.5m	913.74	$50,890	-429.62	$108,234	1187.63	$39,153	-205.13	$226,687	913.74	$50,890	-588.18	$79,058	579.26	$80,276	-516.21	$90,080
$46.6m	916.44	$50,849	-432.03	$107,863	1189.05	$39,191	-207.36	$224,726	916.44	$50,849	-589.56	$79,042	581.69	$80,111	-517.33	$90,077
$46.7m	917.84	$50,881	-434.44	$107,495	1190.46	$39,229	-209.61	$222,798	917.84	$50,881	-589.97	$79,156	583.98	$79,969	-504.04	$92,651
$46.8m	921.45	$50,790	-436.85	$107,130	1191.87	$39,266	-211.85	$220,909	921.45	$50,790	-590.97	$79,192	586.48	$79,799	-506.40	$92,418
$46.9m	925.06	$50,699	-439.27	$106,768	1193.28	$39,303	-214.10	$219,055	925.06	$50,699	-592.35	$79,176	587.31	$79,855	-507.52	$92,409
$47.0m	928.68	$50,609	-441.69	$106,410	1194.70	$39,341	-216.36	$217,234	928.68	$50,609	-593.02	$79,256	589.83	$79,685	-508.65	$92,402
$47.1m	931.65	$50,555	-444.11	$106,056	1196.11	$39,378	-218.62	$215,446	931.65	$50,555	-593.73	$79,329	592.12	$79,544	-510.83	$92,202
$47.2m	932.46	$50,619	-446.53	$105,703	1197.52	$39,415	-220.88	$213,689	932.46	$50,619	-595.11	$79,313	595.64	$79,243	-511.96	$92,195
$47.3m	935.17	$50,579	-448.97	$105,353	1198.93	$39,452	-223.15	$211,968	935.17	$50,579	-595.52	$79,426	587.86	$80,461	-513.52	$92,109
$47.4m	938.80	$50,490	-451.40	$105,006	1200.33	$39,489	-225.41	$210,279	938.80	$50,490	-596.90	$79,410	590.34	$80,293	-514.65	$92,102
$47.5m	942.44	$50,401	-453.84	$104,662	1201.74	$39,526	-227.69	$208,616	942.44	$50,401	-597.56	$79,490	591.18	$80,347	-515.77	$92,096
$47.6m	946.08	$50,313	-456.28	$104,322	1203.15	$39,563	-229.97	$206,981	946.08	$50,313	-598.27	$79,562	593.71	$80,174	-516.89	$92,090
$47.7m	948.86	$50,271	-458.73	$103,984	1204.55	$39,600	-232.26	$205,373	948.86	$50,271	-599.65	$79,546	596.03	$80,030	-518.01	$92,084
$47.8m	950.27	$50,302	-461.18	$103,648	1205.96	$39,637	-234.55	$203,792	950.27	$50,302	-600.31	$79,625	598.57	$79,857	-519.12	$92,078
$47.9m	953.92	$50,214	-463.63	$103,314	1207.36	$39,673	-236.85	$202,237	953.92	$50,214	-601.69	$79,609	600.90	$79,713	-521.29	$91,887
$48.0m	956.65	$50,175	-466.10	$102,983	1208.77	$39,710	-239.15	$200,711	956.65	$50,175	-602.40	$79,682	601.75	$79,767	-522.41	$91,882
$48.1m	960.30	$50,088	-468.56	$102,655	1210.17	$39,747	-241.46	$199,206	960.30	$50,088	-602.81	$79,794	594.05	$80,969	-523.52	$91,877
$48.2m	963.30	$50,036	-471.03	$102,329	1211.57	$39,783	-243.77	$197,724	963.30	$50,036	-604.18	$79,777	596.61	$80,790	-524.64	$91,873
$48.3m	966.96	$49,950	-473.50	$102,005	1212.97	$39,820	-246.09	$196,267	966.96	$49,950	-604.84	$79,856	599.12	$80,618	-525.75	$91,869
$48.4m	970.63	$49,865	-475.98	$101,685	1214.37	$39,856	-248.41	$194,835	970.63	$49,865	-605.55	$79,928	601.47	$80,469	-526.86	$91,865
$48.5m	973.37	$49,827	-478.47	$101,365	1215.77	$39,892	-250.74	$193,426	973.37	$49,827	-606.92	$79,912	604.05	$80,292	-527.97	$91,861
$48.6m	974.69	$49,862	-480.95	$101,049	1217.17	$39,929	-253.07	$192,041	974.69	$49,862	-607.90	$79,947	609.04	$79,797	-530.29	$91,648
$48.7m	978.37	$49,777	-483.44	$100,736	1218.57	$39,965	-255.40	$190,678	978.37	$49,777	-609.27	$79,931	609.91	$79,848	-531.40	$91,645
$48.8m	982.05	$49,692	-485.94	$100,424	1219.96	$40,001	-257.74	$189,340	982.05	$49,692	-609.93	$80,009	602.27	$81,027	-533.55	$91,463
$48.9m	983.47	$49,722	-488.44	$100,115	1221.36	$40,037	-260.07	$188,027	983.47	$49,722	-610.33	$80,120	604.86	$80,845	-534.66	$91,460
$49.0m	984.28	$49,782	-490.95	$99,807	1222.75	$40,073	-262.41	$186,734	984.28	$49,782	-611.04	$80,191	607.23	$80,695	-535.76	$91,458
$49.1m	987.97	$49,698	-493.46	$99,501	1224.15	$40,110	-264.74	$185,462	987.97	$49,698	-612.41	$80,175	609.78	$80,521	-536.87	$91,456
$49.2m	990.74	$49,660	-495.97	$99,199	1225.54	$40,146	-267.09	$184,211	990.74	$49,660	-613.78	$80,159	612.38	$80,342	-537.97	$91,454
$49.3m	993.76	$49,609	-498.49	$98,899	1226.94	$40,181	-269.43	$182,979	993.76	$49,609	-614.43	$80,237	613.25	$80,391	-539.08	$91,453
$49.4m	997.46	$49,526	-501.01	$98,601	1228.33	$40,217	-271.77	$181,769	997.46	$49,526	-615.13	$80,308	615.64	$80,241	-540.18	$91,451
$49.5m	1000.29	$49,486	-503.54	$98,304	1229.72	$40,253	-274.12	$180,577	1000.29	$49,486	-616.50	$80,292	608.07	$81,405	-541.71	$91,377
$49.6m	1003.99	$49,403	-506.07	$98,009	1231.11	$40,289	-276.47	$179,406	1003.99	$49,403	-616.90	$80,402	610.69	$81,219	-542.81	$91,376
$49.7m	1007.70	$49,320	-508.62	$97,716	1232.50	$40,325	-278.82	$178,252	1007.70	$49,320	-617.56	$80,478	613.10	$81,063	-544.95	$91,201

	λ7								*λ8*							
	Agent has good information				***Agent has poor information***				***Agent has good information***				***Agent has poor information***			
	Net Investment		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***		***Net Investment***		***Net Disinvestment***	
Budget impact	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_G^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_G^-)}$[d]	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_P^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_P^-)}$[d]	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_G^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_G^-)}$[d]	$\boldsymbol{E(\Delta E)}$[a]	$\boldsymbol{E(\lambda_P^+)}$[b]	$\boldsymbol{E(\Delta E)}$[c]	$\boldsymbol{E(\lambda_P^-)}$[d]
$49.8m	1010.48	$49,284	-511.16	$97,426	1233.89	$40,360	-281.17	$177,117	1010.48	$49,284	-618.92	$80,463	613.98	$81,110	-544.64	$91,437
$49.9m	1014.19	$49,202	-513.71	$97,137	1235.28	$40,396	-283.52	$176,000	1014.19	$49,202	-619.62	$80,533	622.89	$80,111	-545.74	$91,436
$50.0m	1015.63	$49,231	-516.26	$96,850	1236.67	$40,431	-285.88	$174,899	1015.63	$49,231	-620.98	$80,518	625.53	$79,933	-546.83	$91,435

[a] Agent's estimate of the minimum incremental benefit (QALYs) required for a net investment to be considered cost-effective; [b] Agent's estimate of the optimal cost-effectiveness threshold for a net investment;
[c] Agent's estimate of the minimum incremental benefit (QALYs) required for a net disinvestment to be considered cost-effective; [d] Agent's estimate of the optimal cost-effectiveness threshold for a net disinvestment.

Appendix 3 (Chapter 3)

Appendix 3.1: Search strategy used for scoping review

Searches run February - April 2013

1. PubMed (www.pubmed.gov, searched 26 Feb 2013 with updates to October 2013**)**

Search	Query	Items found
#85	Search #83 OR #84	735
#83	Search #17 AND #70 Filters: Publication date from 1990/01/01; Humans; English; French	728
#84	Search (#17 AND #70) AND (in process[sb] OR publisher[sb] OR pubmednotmedline[sb])	7
#71	Search #17 AND #70	887
#82	Search #17 AND #70 Filters: Publication date from 1990/01/01; English; French	804
#81	Search #17 AND #70 Filters: Publication date from 1990/01/01; English	740
#80	Search #17 AND #70 Filters: Publication date from 1990/01/01	858
#77	Search #17 AND (in process[sb] OR publisher[sb] OR pubmednotmedline[sb])	136
#17	Search #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #8 OR #14	5238
#75	Search #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #8 OR #14 Filters: Publication date from 1990/01/01; Humans; English; French	4215
#74	Search #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #8 OR #14 Filters: Publication date from 1990/01/01; Humans; English	3999
#73	Search #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #8 OR #14 Filters: Publication date from 1990/01/01; Humans	4723
#72	Search #1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #8 OR #14 Filters: Publication date from 1990/01/01	4964
#70	Search #46 OR #69	2231090
#69	Search #47 OR #48 OR #49 OR #50 OR #51 OR #52 OR #53 OR #54 OR #55 OR #56 OR #57 OR #58 OR #59 OR #62 OR #63 OR #64 OR #65 OR #66 OR #67 OR #68	515355
#68	Search insurance[ti]	17294
#67	Search budget*[ti]	5090
#66	Search framework*[ti]	17267
#65	Search regulat*[ti]	320095
#64	Search legislat*[ti]	9931
#63	Search HTA[ti]	108
#62	Search "technology assessment*[ti]	1632
#59	Search policy*[ti]	27068

#58	Search policies[ti]	7202
#57	Search policy[ti]	26684
#56	Search decision*[ti]	36977
#55	Search catastrophic[ti]	1585
#54	Search "co-pay*"[ti]	19
#53	Search copay*[ti]	223
#52	Search cost-shar*[ti]	303
#51	Search access[ti]	26086
#50	Search coverage[ti]	9825
#49	Search fund*[ti]	28223
#48	Search financ*[ti]	12120
#47	Search reimburs*[ti]	4205
#46	Search #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 OR #43 OR #44 OR #45	1847462
#45	Search ethics	166830
#44	Search economics	571693
#43	Search standards	594053
#42	Search legislation and jurisprudence	205662
#41	Search technology assessment, biomedical[mh]	8805
#40	Search cost control[mh]	27221
#39	Search cost sharing[mh]	3376
#38	Search National Health Programs[mh]	70119
#37	Search insurance, health[mh]	116457
#36	Search insurance, health, reimbursement[mh]	36230
#35	Search insurance coverage[mh]	9741
#34	Search models, econometric[mh]	3654
#33	Search models, economic[mh]	9054
#32	Search economics[mh]	464528
#31	Search budgets[mh]	11595
#30	Search moral obligations[mh]	5415
#29	Search financing, organized[mh]	189397
#28	Search cost-benefit analysis[mh]	55269
#27	Search health services accessibility[mh]	77273
#26	Search health care rationing[mh]	9999
#25	Search delivery of health care[mh]	731728
#24	Search reimbursement mechanisms[mh]	29260
#23	Search state medicine[mh]	44588
#22	Search public policy[mh]	102864
#21	Search health policy[mh]	75898
#20	Search policy making[mh]	17436
#19	Search decision making, organizational[mh]	10214

#18	Search decision making[mh]	109061
#14	Search "rare cancer*"[ti]	85
#8	Search "ultra rare"[ti]	9
#6	Search "orphan drug*"[ti]	145
#5	Search "orphan disease*"[ti]	60
#4	Search "rare disorder"[ti]	110
#3	Search "rare disease*"[ti]	594
#2	Search orphan drug production[mh]	700
#1	Search rare diseases[mh]	4023

2. The Cochrane Library (issue 1 of 12, 2013, John Wiley & Sons)

Total results: 509 (0 relevant from 280 Cochrane Reviews, 6 from DARE, selected 1 from 172 Central trials, 0 relevant from 19 Methods, 19 from 19 from HTA, & 10 from 10 of NHS EED

#1 rare diseases:ti,ab,kw (Word variations have been searched)803
#2 orphan drug production 24
#3 "rare disease*" 236
#4 "rare disorder*" 30
#5 "orphan disease*" 15
#6 "orphan drug*" 23
#7 "ultra rare" 0
#8 "rare cancer*" 10
#9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 1022
#10 decision making 17699
#11 policy making 4341
#12 health policy 6651
#13 public policy 1962
#14 state medicine 15996
#15 reimbursement mechanisms 147
#16 delivery of health care 4769
#17 health care rationing 160
#18 health services accessibility 669
#19 cost-benefit analysis 14224
#20 financing, organized 90
#21 moral obligations 21
#22 economics 19665
#23 models, economic 9091
#24 models, econometric 414
#25 insurance coverage 292
#26 insurance, health 2291
#27 insurance, health, reimbursement 338
#28 national health programs 6984
#29 cost sharing 1154

#30 cost control 36744
#31 technology assessment, biomedical 921
#32 legislation and jurisprudence 482
#33 standards 65025
#34 economics 19665
#35 ethics 2384
#36 #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 115592
#37 reimburs* or financ* or fund* or coverage or access* or cost* or copay* or "co-pay*" or catastrophic or decision* 82452
#38 #36 or #37 138747
#39 policy or policies or legislat* or regulat* or "technology assessment" or HTA or framework or budget or insurance 39100
#40 #38 or #39 158417
#41 #9 and #40 509

3. Centre for Reviews & Dissemination (CRD): DARE, NHS EED & HTA databases http://www.crd.york.ac.uk/crdweb/HomePage.asp (searched 28 Feb 2013)

1	MeSH DESCRIPTOR Rare Diseases EXPLODE ALL TREES	5
2	MeSH DESCRIPTOR Orphan Drug Production EXPLODE ALL TREES	4
3	("rare disease*") OR ("orphan drug*") OR ("ultra rare")	36
4	#1 OR #2 OR #3	36

4. EMBASE (Ovid, 1974 to 17 Feb 2013)

1	exp *rare disease/	1485
2	exp *orphan drug/	610
3	ultra rare.mp.	42
4	1 or 2 or 3	2049
5	exp *decision making/	37041
6	exp *health care policy/	50482
7	exp *policy/	19015
8	exp *national health service/	21553
9	exp *economic aspect/	331813
10	exp *reimbursement/ or exp *"health care cost"/ or exp *"cost"/	67527
11	exp *health care delivery/	443114
12	exp *"cost benefit analysis"/	7327
13	exp *financial management/	91938
14	exp *morality/	7445
15	exp *ethics/ or exp *medical ethics/	84249
16	exp *budget/	4298
17	exp *economics/ or exp *health economics/	197002
18	exp *health insurance/	82038
19	exp *"cost effectiveness analysis"/	11995
20	exp *biomedical technology assessment/	3840
21	exp *law/	33751
22	exp *jurisprudence/	19123
23	5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	964538
24	4 and 23	253
25	**limit 24 to yr="1990 -Current"**	**248**

5. Web of Science (Thomson Reuters, searched 13 Mar 2013)

3 579 #2 AND #1

Timespan=1990-2013

Search language=English

2 Topic=(decision* OR policy OR policies OR reimbursement OR rationing OR access OR accessibility) OR Topic=(financing OR economic* OR model* OR cost* OR assessment* OR budget*) OR Topic=(moral OR ethic* OR legislation)

Timespan=1990-2013

Search language=English

1 Title=("rare diseases" OR "rare disorder*" OR "orphan drug*" OR "orphan disease*" OR "ultra rare")

Timespan=1990-2013

Search language=English

6. EconLit (EBSCOHost, searched 13 Mar 2013)

S1	rare disease* OR rare disorder* OR orphan drug* OR "ultra rare"	Limiters- Published Date from: 19900101-20131231 Search modes- Find all my search terms	(72)

7. PAIS International (ProQuest, searched 14 Mar 2013)

= 60 results

(rare disease*) OR (rare disorder* OR orphan drug*) OR (ultra rare) limited 1990 to date

8. Sociological Abstracts (ProQuest, searched 14 Mar 2013)

= 305 results

(rare disease*) OR (rare disorder* OR orphan drug*) OR (ultra rare) limited 1990 to date

9. Canadian Business and Current Affairs (CBCA Complete, Proquest, searched 20 Mar 2013)

= 546 results

ti(rare disease*) OR ti((rare disorder* OR orphan drug*)) OR ti(ultra rare) limited 1990 to date, English or French

10. ABI/INFORM Global (Proquest, searched 20 Mar 2013)

= 335 results

ti((rare disease*) OR (rare disorder*) OR (orphan drug*) OR (ultra rare)) limited 1990 to date, English or French

11. Scopus (SciVerse, searched 20 Mar 2013)

= 110 results

(TITLE("rare disease*" OR "rare disorder*" OR "orphan drug* "OR "ultra rare") AND PUBYEAR> 1989) AND (TITLE(decision* OR policy* OR policies OR reimbursement OR delivery OR rationing OR access* OR financing OR economic*OR coverage OR cost* OR legislation* OR funding))

12. Proquest Dissertations & Theses Fulltext (Proquest, searched 20 Mar 2013)

= 157 results

all((rare disease*) OR (rare disorder*) OR (orphan drug*) OR (ultra rare)) AND all(decision* OR policy OR policies OR reimbursement OR rationing OR access* OR economic* OR funding OR legislation OR coverage) limited 1990 to date, English or French

13. Canadian Newsstand Complete (Proquest, searched 20 Mar 2013)

= 7 results

ti((rare disease*) OR (rare disorder*) OR (orphan drug*) OR (ultra rare)) AND ti(decision* OR policy OR policies OR reimbursement OR economic* OR rationing OR access* OR fund* OR legislation OR catastrophic OR regulat*) limited to 1990 to date, English or French, document type: Article, Bibliography, Book, Commentary, Conference, Editorial, Essay, Feature, General Information, Government & Official Document, Review

Grey literature search (searched April 2013; *unless otherwise noted, the search terms were: rare disease* or rare disorder* or orphan drug*)

- www.google.ca ("rare disease*" OR "rare disorder*" OR "orphan drug*" OR "ultra rare") AND (decision* OR policy OR policies OR reimbursement OR economic* OR rationing OR access* OR fund* OR legislation OR catastrophic OR regulat*) *scanned first 300 hits

Canada

- KU-UC (Quebec Population Health Research Network (QPHRN)) http://www.santepop.qc.ca/en/index.html

- Canadian Organization for Rare Disorders http://www.raredisorders.ca/ *scanned web site

- National Library of Canada. AMICUS: Canadian National Catalogue http://www.collectionscanada.gc.ca/amicus/index-e.html

US

- New York Academy of Medicine Grey literature collection http://www.greylit.org/home

- RAND www.rand.org

- US Food and Drug Administration. Rare Diseases Program http://www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CDER/ucm221248.htm *scanned web page and publications

- US Food and Drug Administration. Humanitarian Device Exemptions http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/HowtoMarketYourDevice/PremarketSubmissions/HumanitarianDeviceExemption/default.htm *scanned web page

- National Institutes of Health Office of Rare Diseases Research http://rarediseases.info.nih.gov/ *scanned web page and resources

- National Organization for Rare Disorders (NORD) www.rarediseases.org *scanned web site and publications

-Patient-Centred Outcomes Research Institute http://www.pcori.org/ *scanned web page

Europe

- NHS Evidence www.evidence.nhs.uk *rare diseases in their filter categories: management, commissioning, policy and service development

- Open Grey http://www.opengrey.eu/

- Rare Cancers Foundation http://www.rarercancers.org.uk/ *scanned policy section / reports

- Genetic Alliance UK http://www.geneticalliance.org.uk/ *scanned publications

- Orphanet: the portal for rare diseases and orphan drugs http://www.orpha.net/consor/cgi-bin/index.php *scanned web page sections and 2012-2013 issues of newsletter

- EURORDIS: Rare Diseases Europe http://www.eurordis.org/about-eurordis

- European Commission http://ec.europa.eu/index_en.htm *scanned web page on health / human diseases / policy

- European Union Committee of Experts on Rare Diseases http://www.eucerd.eu/?page_id=13 *scanned web page sections on recommendations / reports / and national resources http://www.eucerd.eu/?page_id=154 *scanned country-by-country publications

Australia

- Rare Voices Australia http://www.rarevoices.org.au/ *scanned web page

- Australian Government. Life Saving Drugs Program http://www.health.gov.au/lsdp *scanned web page

Appendix 3.2: Data extracted during scoping review

Table A3.2.1: Data extracted during scoping review (1 of 6)

Study	Purpose	Sources	Opportunity-cost determining factors	
			Cost (price) of treatment	Budget impact of treatment
Barrett et al. (2012)	To explore the genomic pathophysiology of cystic fibrosis, and how genomically guided therapies such as ivacaftor provide benefit to those with the disease but at a considerably elevated price point	The authors provide a brief overview of: CF; the CFTR protein; the CFTR gene and its mutations; ivacaftor; and future directions, including efforts to reduce the cost of such therapies.	The yearly cost per patient is $294,000, and patients are likely to receive such therapies for 30 years or more. The author cites other orphan drugs with similar price points (eculizimab costs $409,500 per year, galsulfase costs $365,000 per year, etc.) and warns that orphan drug prices may be "unsustainable".	
Clarke (2006)	To advocate for a "national orphan drug review policy" in Canada	Opinion, supported by the author's review of Common Drug Review (CDR) reviews undertaken from 2003 to 2005		
Clarke et al. (2009)	To describe the policy framework for assessing rare diseases developed by the Drugs for Rare Diseases Working Group (DRD WG) of the Ontario Public Drug Programs	Policy framework for assessing rare diseases developed by the Drugs for Rare Diseases Working Group (DRD WG) of the Ontario Public Drug Program		Considered as part of the author's proposed framework
Claxton et al. (2008)	To explain the key principles of value based pricing (VBP) and consider some of the concerns about such a scheme	Opinion, which builds upon a theoretical model and example of VBP developed by the authors	Price negotiation and guidance ought to account for both the value of the technology and the value of the evidence that may be forgone for future NHS patients. For "me too" drugs the manufacturer can charge the same price as the incumbent, or they can charge a higher price if they can demonstrate additional health benefits	While VBP may lead to lower prices for some drugs, the overall NHS spend on drugs may increase if new and valuable drugs are developed that command higher prices
Denis et al. (2010)	To calculate the budget impact of orphan drugs in Belgium in 2008 and to forecast how this budget impact will evolve over the next 5 years (2008-2013)	Budget impact analysis conducted by the authors		The budget impact of orphan drugs in Belgium in 2008 was €66.2 million,equivalent to 0.3% of overall health expenditure. The estimated 2013 budget impact in the medium-growth scenario is €162 million, €130 million in the low-growth scenario, and €204 million in the high-growth scenario
Desser (2013)	To examine Norwegian doctors' preferences for prioritizing rarity in the allocation of health resources and to compare these preferences with those previously elicited from the general population	Results from a surveys given to 551 members of the Norwegian Medical Association and compared with results from general population surveys	When the cost of treating rare disease patients is equal to the cost of treating common disease patients (equal-cost scenario), the majority of doctors (69.5%) indicated indifference between the two. When the cost of treating rare disease patients is greater than the cost of treating common disease patients (costly-rare scenario), the majority of doctors will treat the common disease group. When respondents were permitted to divide funds in the equal-cost scenario, the mean share of funds allocated to the rare disease group was 41.5%. When respondents were permitted to divide funds in the costly-rare scenario, the mean share of funds allocated to the rare disease group was 27.3%	
Dickson et al. (2011)	To foster dialogue between stakeholders (academia, industry, government and patient groups) of treatments for inborn errors of metabolism (IEM) with CNS manifestation	The proceedings of a workshop entitled Research Challenges in CNS Manifestations of Inborn Errors of Metabolism		
Drakulich (2011)	To describe an approach by the International Rare Disease Consortium to increase development of treatments for rare diseases, aiming for 200 new therapies by 2020	The author describes the activities and goals of the International Rare Disease Research Consortium.		

Study	Purpose	Sources	Opportunity-cost determining factors	
			Cost (price) of treatment	Budget impact of treatment
Drummond et al. (2007)	To discuss whether standard methods for HTA are adequate for assisting decisions on patient access to and funding of orphan drugs, and to outline a research agenda to help understand the societal value of orphan drugs and issues surrounding their development, funding, and use	The authors draw on discussions that took place at a Roundtable on the Use of Health Economics for Orphan Drugs, held at the LSE in 2005	Health insurers cannot, and should not, be expected to fund, at any price, all effective orphan drugs	Budget impactof orphan drugs is modest
Dunoyer (2011)	To highlight areas in which "novel approaches" could facilitate regulatory approval and access to treatments for rare diseases	Opinion, based upon author's experiences as head of GSK's Rare Diseases team		
Garattini (2012)	To propose that we revisit, and make changes to, the EU's orphan drug law	Opinion, citing Italian data on the yearly cost of orphan drugs (662m EUR), from which the authors estimates the average cost of a daily defined dose (DDD) and hence the maximum gross income for an orphan drug in Europe.	The average cost of a daily defined dose (DDD) of orphan drugs in Italy is about €97	
Gupta (2012)	To advocate for a comprehensive legislative strategy to improve Canadian orphan disease care and research	A review of legislation initiated to promote R&D related to rare disease in Australia, France, Germany, Japan, Singapore, Spain, Taiwan, the USA, and the EU. The author also reviews multi-national initiatives		
Hughes et al. (2005)	To explore whether ultra-orphan drugs merit special status in health system funding decisions.	Opinion, supported by the results of the authors' survey of the funding status of ultra-orphan drug laronidase across European countries		The budget impact of orphan drugs is "limited".
Hughes-Wilson et al. (2012)	To propose the development of a new assessment system for use by Member State governments in the evaluation of new orphan drugs at the time of pricing and reimbursement	Opinion	Two main criticisms of the current regulatory system for orphan drugs are: the high prices of orphan drugs and their inability to meet standard cost-effectiveness thresholds; and the system itself which allows companies to benefit from achieving orphan drug designation on their product	
Hutchings et al. (2012)	To provide preliminary insight into the elements of value which are important when assessing rare disease treatments and how they might be considered together within a value framework	A conceptual framework was designed based on the literature gathered and tested with rare disease experts, patient group representatives, and payers. A literature review was utilized to identify elements of value.		Economic and budgetary implications considered as part of the author's proposed framework
Joppi et al. (2012)	To assess the methodological quality of Orphan Medicinal Product (OMP) submissions to the European Medicines Agency and discuss possible reasons for the small number of products licensed	Information was obtained for the period 2000 to 2010 on orphan drug designation, and methodological details were obtained from the EMA website and European Public Assessment reports, and descriptive statistics were produced.		
Kanavos & Nicod (2012)	To respond to Cote & Keating's critique of orphan drug policies, and to offer the authors' own perspective	Opinion	There is an absence of appropriate benchmarks to gauge whether prices are low, high, or too high relative to expectations – prices are relative to value, and not all value parameters have been (or can be) incorporated in informing pricing decisions. Our standard tools are not sufficient to take all value considerations into account, partly due to lack of data and incomplete registries	
Kesselheim et al. (2011)	To compare characteristics of pivotal clinical trials of orphan drugs for cancer with non-orphan cancer drugs approved between 2004 and 2010	Authors identified all new orphan (15) and non-orphan (12) cancer drugs approved by the FDA between 2004-2010. The authors then compared the design features (randomization, blinding, primary end point) of the pivotal trials supporting approval of orphan and non-orphan drugs, and rates of adverse safety outcomes		

Study	Purpose	Sources	Opportunity-cost determining factors	
			Cost (price) of treatment	Budget impact of treatment
		(deaths not due to disease progression, serious adverse events, dropouts) in pivotal trials.		
Largent & Pearson (2012)	To outline and deconstruct the argument from the "rule of rescue" that is made in support of coverage of orphan drugs	Opinion, drawing on Adams & Brantner's $1bn estimate of the cost to bring a new drug to market		
Laupacis (2009)	To critique Drummond et al.'s review "Evidence and Values: Requirements for Public Reimbursement of Drugs for Rare Diseases", which looked at the requirements for public reimbursement of drugs for rare diseases	Opinion, based on previous review by Drummond et al.	Drug prices have been increasing over time, and the price generally has little to do with the drug's incremental cost benefit. This might be addressed by indicating to the pharmaceutical companies that they must meet a certain standard of efficiency	
Liang & Mackev (2010)	To review current legislation on off-label drug use and to recommend permittance of appropriate off-label drug promotion by drug manufacturers in order to improve orphan disease patients' access to necessary treatments	Reviews the 1983 Orphan Drug Act (ODA); The Food, Drug, and Cosmetic Act; and the 1997 FDA Modernization Act		
Luisetti at al. (2012)	To review current sources of clinical data for rare lung diseases and the regulatory challenges facing their treatment	A roundtable session was held by the 8 authors of this paper		
Matthews and Glass (2013)	To assess the impact of market-based economic factors on orphan drug adoption across France, Germany, Spain, the UK, and the USA	The authors studied 13 orphan drugs, approved for 15 indications, which were available for purchase across all the study countries in 2007.	A negative nonsignificant relationship exists among market-based pricing of pharmaceutical products and the adoption of orphan drugs	
Mavris & Le Cam (2012)	To describe initiatives of patient organizations to promote research into rare diseases	A survey of 772 rare disease organizations in Europe was conducted		
McCabe et al. (2005)	To examine justification for special status for rare diseases, and to ask whether the cost effectiveness of drugs for rare or very rare diseases should be treated differently from that of other interventions	The authors review current practice and regulations around orphan drugs in the UK and US, and summarize the funding status and costs of some example ultra-orphan drugs in the UK		Special status for orphan drugs may also impose substantial and increasing costs on the healthcare system – costs borne by other, unknown patients
McCabe et al. (2010)	To respond to the study by Desser et al., and to argue that decision makers "revisit" orphan drug policies to better reflect society's values and to address the increasing fiscal challenge.	Opinion, supported by a survey by Desser et al. which asked a representative sample of the Norwegian population whether society should pay more to treat rare diseases	The increasing number of orphan drugs, and the prices charged for them, pose a substantial and growing fiscal challenge for healthcare systems	
Meekings et al. (2012)	To demonstrate that the revenue-generating potential of orphan drugs is as great as for non-orphan drugs	Information on drugs with orphan drug designation was collected from Thomson Reuters' Integrity and publically available sources of orphan drug approvals published by the FDA and EMA. Global sales forecasts for orphan drugs were obtained from the Thomson Reuters' Forecast.		
Mentzakis et al. (2011)	A pilot study of a discrete choice experiment (DCE) to investigate individual preferences regarding the public funding of orphan drugs	Discrete choice experiment. For every decision, 213 respondents decided between: a drug treatment for a rare disease with specified attribute levels for cost-per-patient, total budget impact, severity of disease, and life-years gained through treatment; and a drug treatment for a common disease with correspondingly specified attribute levels.	The coefficients for both total budget impact and cost per patient are not statistically significant for either common or rare disease; neither cost attribute influences preferences over drug funding. Individuals do not prefer to have the Ontario government spend more for orphan drugs than for drugs for common diseases	The coefficients for both total budget impact and cost per patient are not statistically significant for either common or rare disease; neither cost attribute influences preferences over drug funding

Study	Purpose	Sources	Opportunity-cost determining factors	
			Cost (price) of treatment	Budget impact of treatment
		A pilot DCE was carried out on 208 participants (mostly students) in the McMaster University Experimental Economics Laboratory.		
Michel & Toumi (2012)	To summarise current and future issues in the development of and access to orphan drugs in Europe	A review of the relevant incentivizing, regulatory, pricing, and reimbursement processes in the European Union and individual Member States	A trend has been noted between prevalence of a disease, availability of alternative treatment, and price of the corresponding orphan drug . Prices also varied widely, up to 160% higher in some countries compared to others. Prices were lowest in France, Belgium, The Netherlands, and Romania, and highest in Italy, Greece and Denmark	The economic burden of orphan drugs is increasing
Moberly (2005)	To look at the implications of giving special status to orphan drugs, and the difficulties justifying this	McCabe (2005), Hughes (2005), West Midlands Specialised Services Agency (WMSSA), Burls (2005)		
Owen (2008)	To describe a "unique risk-sharing model" utilised in Australia, aimed at providing clinical evidence to support modelled predictions of longer-term health outcomes for an orphan drug product	Authors describe a risk-sharing model for bosentan utilised in Australia	The future price of bosentan is linked to registry survival outcomes	
Picavet et al. (2011)	To analyze the influence, if any, of orphan drug designation status on the price setting of drugs for rare disease indication	Drug prices were obtained from Belgian hospitals, the Belgian Centre for Pharmaco-therapeutic Information, or directly from pharmaceutical companies. The defined daily dose (DDD) was used to convert these prices into daily prices.	The median price per DDD was higher for designated orphan drugs (€138.56 [interquartile range; IQR €406.57) than for non-designated drugs (€16.55[IQR €28.05]) [p<0.01] The authors concluded that awarding orphan designation status, in itself, is associated with higher prices for drugs for rare disease indications.	
Picavet et al. (2012)	To obtain the views of orphan drug experts in Europe on existing regulations, and to evaluate orphan drug policies in Europe	A 2 round Delphi survey of 47 European experts was conducted, to evaluate existing orphan drug policies in Europe and to formulate recommendations for future policy development		
Pinxten et al. (2012)	To analyze the ethical aspects of funding R&D in the field of rare disease, and to propose an ethical framework to help policy makers fairly allocate resources "at the macro level" for the prevention, diagnosis and treatment of rare diseases	Opinion		
Prevot & Watters (2011)	To examine the use of HTA's in assessing rare disease treatments, specifically for primary immunodeficiencies (PID), and suggesting additional factors that should be considered when making a reimbursement decision	Cites quotes from patients diagnosed and treated for PID, and data that suggests late diagnosis and treatment results in increased morbidity, complications and mortality	Should be taking into account only alongside other factors, and should include the impact of a restricted access to the appropriate therapy and the medical costs that would be incurred in the treatment of the symptoms (rather than the cause).	
Schey et al. (2011)	To estimate the budget impact of orphan medicines in Europe between 2010 and 2020, as a percentage of total European pharmaceutical expenditure	A disease-based epidemiological model was developed based upon trends in the designation and approval of new orphan medicines, prevalence estimates of orphan diseases, and historical price and sales data for orphan drugs in Europe	The median cost of existing orphan drugs is 32,242 EUR per year	The share of the pharmaceutical market represented by orphan drugs is predicted to increase from 3.3% in 2010 to a peak of 4.6% in 2016, before leveling off until 2020. In sensitivity analyses the peak-year budget impact ranged from 3% to 6.6%. "Fears of unsustainable cost escalation should not be used as rationale to review the orphan drug regulation"
Siddiqui & Rajkumar (2012)	To examine the reasons behind the high costs of cancer drugs and to suggest policies and interventions that can be used to lower the cost of these drugs	Opinion	The retail prices of drugs are a function of the costs of development, the addressable patient population, the patent life, and the projected returns on investment. The development of new cancer drugs is usually associated with	Due to the soaring cost of cancer drugs, the absolute cost to society will become increasingly unaffordable

Study	Purpose	Sources	Opportunity-cost determining factors	
			Cost (price) of treatment	Budget impact of treatment
			metrics such as “superior responses” and “longer overall survival” Thus, new versions of old cancer drugs do not become alternatives that create competition for price. The soaring cost of cancer drugs has at least 3 major problems: 1) the absolute cost to society will become increasingly unaffordable; 2) it will become difficult for insurance companies to price policy premiums accurately because the approval, clinical acceptance and incorporation of expensive new drugs is unpredictable and geographically variable; and 3) almost all approved cancer drugs will eventually be used for conditions and settings not approved by the FDA (off-label).	
Stafinski et al. (2011)	To develop a technology funding decision-making framework informed by the experiences of multiple healthcare systems and the view of senior-level decision makers in Canada	A 1-day, facilitated workshop with 16 senior-level healthcare decision makers in Canada, supported by findings from a critical review of health technology coverage decision-making processes in 20 countries		Considered by workshop participants to be a critical input into decision-making processes
Stolk et al. (2006)	To propose that the WHO adopt an “Orphan Medicines Model List” as an addition to the Model List of Essential Medicines (EML), and to propose selection criteria for this new list	This paper was based upon an Invited Discussion Paper for the 14th Meeting of the WHO Committee on the Selection and Use of Essential Medicines		
Sullivan (2008)	To outline emerging strategies and case study examples for the medical and pharmacy benefits management of specialty pharmaceuticals	The author gives a brief overview of speciality pharmaceuticals, then uses two case studies to describe the steps taken by payers to determine their overall value		It is anticipated that by 2030, specialty pharmaceuticals will account for up to 44% of a plan’s total health expenditure. Costs associated with these agents are projected to have a significant impact on health care systems and play a large role in determining coverage and reimbursement
Valverde (2011)	To advocate for greater involvement of key stakeholders in HTA processes for rare disease therapies	Opinion		
Wild et al. (2011)	To review the six orphan oncology drugs assessed by the Austrian Horizon Scanning System in Oncology (HSS-O)	Authors' review of the LBI-HTA assessments approving 6 orphan drugs with oncological indications (Azacitidine, Everolimus, Trabectedin, Plerixafor, Nilotinib, and Dasatinib)		
Winquist et al. (2012)	[Similar to Clarke et al.] To develop a framework for informing funding decisions for drugs for rare diseases in Ontario, using enzyme replacement therapies for diseases of inherited metabolic enzyme deficiency as an example	A policy framework for funding drugs for rare diseases developed by the Drugs for Rare Diseases working group convened by the Ontario Public Drug Programs		Considered as part of the author's proposed framework

Table A3.2.2: Data extracted during scoping review (2 of 6)

Study	Disease-related value-bearing factors					
	Prevalence (rarity) of disease	Severity (seriousness) of disease	Identifiability of the beneficiaries of treatment	Extent to which the disease is life-threatening or chronically debilitating	Impact of treatment upon the distribution of health	Availability of treatment alternatives
Barrett et al. (2012)						
Clarke (2006)		The author asks whether Canadian patients should be "denied access to potentially effective new treatments for formerly untreatable and serious diseases only because it is virtually impossible to evaluate the cost-effectiveness of those treatments using conventional criteria"?				The author asks whether Canadian patients should be "denied access to potentially effective new treatments for formerly untreatable and serious diseases only because it is virtually impossible to evaluate the cost-effectiveness of those treatments using conventional criteria"?
Clarke et al. (2009)	Considered as part of the author's proposed framework					
Claxton et al. (2008)						
Denis et al. (2010)						
Desser (2013)	When the cost of treating rare disease patients is equal to the cost of treating common disease patients (equal-cost scenario), the majority of doctors (69.5%) indicated indifference between the two. When the cost of treating rare disease patients is greater than the cost of treating common disease patients (costly-rare scenario), the majority of doctors will treat the common disease group. When respondents were permitted to divide funds in the equal-cost scenario, the mean share of funds allocated to the rare disease group was 41.5%. When respondents were permitted to divide funds in the costly-rare scenario, the mean share of funds allocated to the rare disease group was 27.3%				The authors find little support among Norwegian doctors for prioritizing the treatment of rare diseases, although a preference for allocating resources in accordance with the principle of reserving a small portion of resources for rare disease patients is noted. 48.3% prefer allocating funds so that the largest number of patients receives treatment, while 44.4% believe a small share should go towards the rare disease group, 5.3% believe the budget should be divided equally, and 2.0% believe the majority of the budget should be allocated to the rare disease group	
Dickson et al. (2011)						
Drakulich (2011)						
Drummond et al. (2007)	Research needed on impact of rarity on ICER of orphan drugs	Considered by PBAC				Considered by PBAC

Study	Disease-related value-bearing factors					
	Prevalence (rarity) of disease	Severity (seriousness) of disease	Identifiability of the beneficiaries of treatment	Extent to which the disease is life-threatening or chronically debilitating	Impact of treatment upon the distribution of health	Availability of treatment alternatives
Dunoyer (2011)						
Garattini (2012)						
Gupta (2012)						
Hughes et al. (2005)	Key issue is whether "rarity" represents a rational basis to apply a different value to patients' health gains.	Key issue is whether "gravity of the condition" represents a rational basis to apply a different value to patients' health gains.				
Hughes-Wilson et al. (2012)						
Hutchings et al. (2012)	Rarity is a requirement for treatments to be assessed under author's proposed framework	Burden of disease considered as part of the author's proposed framework				
Joppi et al. (2012)						
Kanavos & Nicod (2012)		It is socially desirable to develop treatments for conditions with high disease severity or unmet medical need, irrespective of rarity				It is socially desirable to develop treatments for conditions with high disease severity or unmet medical need, irrespective of rarity
Kesselheim et al. (2011)						
Largent & Pearson (2012)		When few people have an illness, it is easier to see them as individuals rather than anonymous members of a group of patients. This is even more the case when a rare condition produces visible signs of illness and when individuals are publicized through photo campaigns and telethons.	When few people have an illness, it is easier to see them as individuals rather than anonymous members of a group of patients. Identifiability is not an appropriate ethical justification for providing preferential coverage. A counterpoint to this might be contractualist theory: first, the public are generally willing to give preference to patients with life-threatening or severe illnesses; second, the literature suggests that people desire reassurance that they live in a compassionate society, which might be provided by spending more on the rescue of an identified few. But "it strains credulity to say that the more caring society is the one that sacrifices several anonymous lives in order to save an identifiable one". Finally, fairness requires that we not discriminate on morally irrelevant grounds. For rare disease patients, identifiability results from undeserved	Prioritarianism is an ethical argument for favouring the worst off. A sickest-first principle might require allocation of resources even when only minor gains can be achieved and the cost is very high. "Lifesaving orphan therapies and therapies that restore of maintain capabilities central to functioning in society should be covered. Orphan therapies that do not achieve these health outcomes clearly should not".	"It strains credulity to say that the more caring society is the one that sacrifices several anonymous lives in order to save an identifiable one"	

Study	Disease-related value-bearing factors					
	Prevalence (rarity) of disease	Severity (seriousness) of disease	Identifiability of the beneficiaries of treatment	Extent to which the disease is life-threatening or chronically debilitating	Impact of treatment upon the distribution of health	Availability of treatment alternatives
			properties, both advantageous and disadvantageous. They should not receive any preference in health resource allocation because they are identifiable			
Laupacis (2009)	Rareness should not be used as a justification for a high price, only to be followed by a huge market expansion of the drug					
Liang & Mackev (2010)						
Luisetti at al. (2012)						
Matthews and Glass (2013)						
Mavris & Le Cam (2012)						
McCabe et al. (2005)	The justification for special status for rare diseases must rest on the question: do we value the health gain to two individuals differently because one individual has a common disorder and the other has a rare disorder? Valuing health outcomes more highly for no other reason than rarity of the condition seems unsustainable and incompatible with other equity principles and theories of justice.		Special status for orphan drugs may also impose substantial and increasing costs on the healthcare system – costs borne by other, unknown patients		Special status for orphan drugs may also impose substantial and increasing costs on the healthcare system – costs borne by other, unknown patients	
McCabe et al. (2010)	Existing arguments that society values providing access to orphan drugs have not been based on evidence, and are contradicted by the evidence on social values collected by Desser et al.	Existing arguments that society values providing access to orphan drugs have not been based on evidence, and are contradicted by the evidence on social values collected by Desser et al.				
Meekings et al. (2012)						
Mentzakis et al. (2011)	The probability that participants would prefer funding a drug increases by about 30 % from a rare to a common disease.	The coefficient for disease severity and life-years gained are both significant and positive. The probability of preferring funding a drug for a severe condition is 22%				

Study	Disease-related value-bearing factors					
	Prevalence (rarity) of disease	Severity (seriousness) of disease	Identifiability of the beneficiaries of treatment	Extent to which the disease is life-threatening or chronically debilitating	Impact of treatment upon the distribution of health	Availability of treatment alternatives
		higher than for a moderate condition. \				
Michel & Toumi (2012)	A trend has been noted between prevalence of a disease, availability of alternative treatment, and price of the corresponding orphan drug					A trend has been noted between prevalence of a disease, availability of alternative treatment, and price of the corresponding orphan drug
Moberly (2005)	WMSSA found that rarity should not be an overriding factor when considering funding		WMSSA found that identifiability should not be an overriding factor when considering funding		Citing Hughes, notes that political concerns over postcode prescribing contributed to the UK DoH moving commissioning away from WMSSA, and suggests that equity weights should be assigned to QALYs	
Owen (2008)						
Picavet et al. (2011)	Prevalence of rare diseases did not significantly differ between designated orphan drugs and non-designated drugs (p=0.71).					
Picavet et al. (2012)					The authors favour reducing cross-country inequalities in access to orphan drugs by regulating compassionate access at the European level	
Pinxten et al. (2012)				Orphan drug development is compliant with the core biomedical objectives of health care because the rare disease patients that these drugs treat have urgent, objective medical needs and their lives are in danger if they do not receive necessary care	The major challenge is to "address the ethical dilemma of 'opportunity cost'… [this] has to be assessed according to the various existing concepts of distributive justice". It is very difficult for the utilitarian concept of distributive justice to support the development and supply of orphan drugs. Also the principle of 'non-abandonment' does not automatically entail a full realisation of equality of opportunity in all of its different concepts (equal access, equal resources, and equal outcomes)	
Prevot & Watters (2011)						
Schey et al. (2011)						
Siddiqui & Rajkumar (2012)	The retail prices of drugs are a function of the costs of development, the addressable patient population, the patent life, and the projected returns on investment	The seriousness of a cancer diagnosis influences how much cost patients and physicians are willing to bear for minimal				

Study	Disease-related value-bearing factors					
	Prevalence (rarity) of disease	Severity (seriousness) of disease	Identifiability of the beneficiaries of treatment	Extent to which the disease is life-threatening or chronically debilitating	Impact of treatment upon the distribution of health	Availability of treatment alternatives
		incremental benefits. Cancer drugs are expensive partly because of the seriousness of the disease				
Stafinski et al. (2011)		Considered by workshop participants to be a critical input into decision-making processes				Considered by workshop participants to be a critical input into decision-making processes
Stolk et al. (2006)	Proposed criteria include requirement that disease prevalence is < 5-7.5 per 10,000 population			Proposed criteria include requirement that disease is life-threatening or chronically debilitating		Proposed criteria include requirement that there be no alternatives on the WHO Essential Medicines List
Sullivan (2008)						
Valverde (2011)						
Wild et al. (2011)						
Winquist et al. (2012)	Considered as part of the author's proposed framework					

Table A3.2.3: Data extracted during scoping review (3 of 6)

*Note: Columns marked with * are duplicated from earlier tables*

Study	Treatment-related value-bearing factors					
	Evidence of treatment efficacy or effectiveness	Magnitude of treatment benefit	Safety profile of treatment	Innovation profile of treatment	Societal impact of treatment	Impact of treatment upon the distribution of health*
Barrett et al. (2012)		While ivacaftor represents a major step forward in terms of disease management, it remains a symptomatic treatment (rather than a cure)				
Clarke (2006)	1. The author asks whether Canadian patients should be "denied access to potentially effective new treatments for formerly untreatable and serious diseases only because it is virtually impossible to evaluate the cost-effectiveness of those treatments using conventional criteria"? 2. It is difficult to evaluate effectiveness due to the nature of rare diseases (complex, multi-system, highly variable clinical courses, lack of knowledge about the untreated course of disease)					
Clarke et al. (2009)	Considered as part of the author's proposed framework					
Claxton et al. (2008)		Manufacturer can charge a higher price if they can demonstrate additional health benefits		Value of innovation – why should the NHS pay more than the value of the benefits from a new technology in the hope that a more valuable future technology will be developed – paying twice for innovation		
Denis et al. (2010)						
Desser (2013)		48.3% prefer allocating funds so that the largest number of patients receives treatment				The authors find little support among Norwegian doctors for prioritizing the treatment of rare diseases, although a preference for allocating resources in accordance with the principle of reserving a small portion of resources for rare disease patients is noted. 48.3% prefer allocating funds so that the largest number of patients receives treatment, while 44.4% believe a small share should go towards the rare disease group, 5.3% believe the budget should be divided equally, and 2.0% believe the majority of the budget should be allocated to the rare disease group
Dickson et al. (2011)						

Study	Treatment-related value-bearing factors					
	Evidence of treatment efficacy or effectiveness	Magnitude of treatment benefit	Safety profile of treatment	Innovation profile of treatment	Societal impact of treatment	Impact of treatment upon the distribution of health*
Drakulich (2011)						
Drummond et al. (2007)	Health insurers cannot, and should not, be expected to fund, at any price, all effective orphan drugs				Standard HTA methods may not capture the full societal value of some health technologies, and there are serious shortcomings in the evaluation of orphan drugs	
Dunoyer (2011)						
Garattini (2012)						
Gupta (2012)						
Hughes et al. (2005)						
Hughes-Wilson et al. (2012)						
Hutchings et al. (2012)		Theraputic benefit of treatment considered as part of the author's proposed framework		Scientific innovation considered as part of the author's proposed framework	Familial and societal impact considered as part of the author's proposed framework	
Joppi et al. (2012)	More stringent criteria recommeded by authors					
Kanavos & Nicod (2012)						
Kesselheim et al. (2011)	Orphan drug trials were more likely to assess disease response (68% vs. 27%) rather than overall survival (8% vs. 27%)		Orphan drug trials resulted in more patients with serious adverse events (48% vs. 36%; p=0.04).			
Largent & Pearson (2012)		Potential health gains must be evaluated in context to determine if they provide a benefit over what is currently available				"It strains credulity to say that the more caring society is the one that sacrifices several anonymous lives in order to save an identifiable one"
Laupacis (2009)						
Liang & Mackev (2010)						
Luisetti at al. (2012)						
Matthews and Glass (2013)						

Study	Treatment-related value-bearing factors					
	Evidence of treatment efficacy or effectiveness	Magnitude of treatment benefit	Safety profile of treatment	Innovation profile of treatment	Societal impact of treatment	Impact of treatment upon the distribution of health*
Mavris & Le Cam (2012)						
McCabe et al. (2005)	The level of evidence required should depend on the consequences of the uncertainty – how much will society lose in terms of resources and health foregone if a wrong decision is made?			Cost of production and value of innovation cannot justify special treatment for orphan drugs		Special status for orphan drugs may also impose substantial and increasing costs on the healthcare system – costs borne by other, unknown patients
McCabe et al. (2010)		Existing arguments that society values providing access to orphan drugs have not been based on evidence, and are contradicted by the evidence on social values collected by Desser et al.				
Meekings et al. (2012)						
Mentzakis et al. (2011)		The coefficient for disease severity and life-years gained are both significant and positive. the probability of preferring a drug that increases life by 1 year increase by 4.5%				
Michel & Toumi (2012)	Information may be collected through patient registries		Information may be collected through patient registries	cost-containment measures – which may be necessary due to the strain that orphan drugs put on national health budgets – will not be productive or appropriate for the long term development of drugs for rare diseases		
Moberly (2005)						Citing Hughes, notes that political concerns over postcode prescribing contributed to the UK DoH moving commissioning away from WMSSA, and suggests that equity weights should be assigned to QALYs
Owen (2008)	The primary outcomes measured varied for each approved drug and included: overall survival, progression-free survival, and surrogate parameters (e.g., molecular response). Overall survival was used as a primary outcome measure for only one of the 6 drugs studied. There is a lack of proven effectiveness at the time of approval					
Picavet et al. (2011)						
Picavet et al. (2012)						The authors favour reducing cross-country inequalities in access to orphan drugs by regulating compassionate access at the European level
Pinxten et al. (2012)						The major challenge is to “address the ethical dilemma of ‘opportunity cost’… [this] has to be assessed according to the various existing

Study	Treatment-related value-bearing factors					
	Evidence of treatment efficacy or effectiveness	Magnitude of treatment benefit	Safety profile of treatment	Innovation profile of treatment	Societal impact of treatment	Impact of treatment upon the distribution of health*
						concepts of distributive justice". It is very difficult for the utilitarian concept of distributive justice to support the development and supply of orphan drugs. Also the principle of 'non-abandonment' does not automatically entail a full realisation of equality of opportunity in all of its different concepts (equal access, equal resources, and equal outcomes)
Prevot & Watters (2011)		The impact of therapy on life expectancy and quality of life should be taken into account when considering funding for PID treatment			Impact on societal and professional life should be taken into account when considering funding for PID treatment. Collection of data on broader economic value of PID diagnosis and treatment is necessary	
Schey et al. (2011)						
Siddiqui & Rajkumar (2012)		The development of new cancer drugs is usually associated with metrics such as "superior responses" and "longer overall survival" Thus, new versions of old cancer drugs do not become alternatives that create competition for price. There is no requirement for a minimum magnitude of benefit. Cancer drugs are expensive partly because of the lack of thresholds for clinical benefit				
Stafinski et al. (2011)	Considered by workshop participants to be a critical input into decision-making processes				Considered by workshop participants to be a critical input into decision-making processes	
Stolk et al. (2006)	Proposed criteria include requirement that treatment is effective		Proposed criteria include requirement that treatment has a positive safety profile			
Sullivan (2008)		Well-designed disease-based pharmacoeconomic models will in some cases help to identify subpopulations where the drug will have greater benefit				
Valverde (2011)	There is a need to look beyond medical and cost-effectiveness factors to include the societal impact of health technologies in the HTA process				There is a need to look beyond medical and cost-effectiveness factors to include the societal impact of	

Study	Treatment-related value-bearing factors					
	Evidence of treatment efficacy or effectiveness	Magnitude of treatment benefit	Safety profile of treatment	Innovation profile of treatment	Societal impact of treatment	Impact of treatment upon the distribution of health*
					health technologies in the HTA process	
Wild et al. (2011)	there is a strong and outspoken agreement among HTA agencies that orphan drugs have to prove effectiveness like any other drug. Overall survival was used as a primary outcome measure for only one of the 6 drugs studied. There is a lack of proven effectiveness at the time of approval					
Winquist et al. (2012)	Considered as part of the author's proposed framework					

Table A3.2.4: Data extracted during scoping review (4 of 6)

*Note: Columns marked with * are duplicated from earlier tables*

Study	Socio-economic-related value-bearing factors				
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives	Industrial and commercial policy considerations	Legal considerations
Barrett et al. (2012)					
Clarke (2006)					
Clarke et al. (2009)					
Claxton et al. (2008)				Domestic research and development: current pharmaceutical price regulation does not incentivise inward investment – choice of location is influenced by incentives including investment in infrastructure, degree of public investment in research, and local costs – is it appropriate to use NHS resources for industrial policy rather than improvement in health?	
Denis et al. (2010)					
Desser (2013)		The authors find little support among Norwegian doctors for prioritizing the treatment of rare diseases, although a preference for allocating resources in accordance with the principle of reserving a small portion of resources for rare disease patients is noted. 48.3% prefer allocating funds so that the largest number of patients receives treatment, while 44.4% believe a small share should go towards the rare disease group, 5.3% believe the budget should be divided equally, and 2.0% believe the majority of the budget should be allocated to the rare disease group			
Dickson et al. (2011)					
Drakulich (2011)					
Drummond et al. (2007)	Standard HTA methods may not capture the full societal value of some health technologies, and there are serious shortcomings in the evaluation of orphan drugs		Health insurers cannot, and should not, be expected to fund, at any price, all effective orphan drugs		
Dunoyer (2011)					
Garattini (2012)				The average cost of a daily defined dose (DDD) of orphan drugs in Italy is about €97, which translates into a total gross income of €885 million for 1 year of treatment for 25,000 people in Europe. Even after ex-factory price is applied, with 10-year market exclusivity the pharmaceutical company will amply recover their expenses of developing the drug	

Study	Socio-economic-related value-bearing factors				
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives	Industrial and commercial policy considerations	Legal considerations
Gupta (2012)					
Hughes et al. (2005)					
Hughes-Wilson et al. (2012)					
Hutchings et al. (2012)	Familial and societal impact considered as part of the author's proposed framework				
Joppi et al. (2012)					
Kanavos & Nicod (2012)				What is considered to be "sufficiently profitable" needs to be defined. Appropriate benchmarks are needed to argue that returns from orphan drugs are excessive. Orphan drugs are supported by a regulatory framework which, in principle, should make the cost of drug discovery and development lower	
Kesselheim et al. (2011)					
Largent & Pearson (2012)		"It strains credulity to say that the more caring society is the one that sacrifices several anonymous lives in order to save an identifiable one"			
Laupacis (2009)					
Liang & Mackev (2010)					
Luisetti at al. (2012)				There should be tax exemptions for R&D for orphan drugs	
Matthews and Glass (2013)					
Mavris & Le Cam (2012)					
McCabe et al. (2005)		Special status for orphan drugs may also impose substantial and increasing costs on the healthcare system – costs borne by other, unknown patients	The justification for special status for rare diseases must rest on the question: do we value the health gain to two individuals differently because one individual has a common disorder and the other has a rare disorder?	Cost of production and value of innovation cannot justify special treatment for orphan drugs	
McCabe et al. (2010)			The increasing number of orphan drugs, and the prices charged for them, pose a substantial and growing fiscal challenge for healthcare systems		

Study	Socio-economic-related value-bearing factors				
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives	Industrial and commercial policy considerations	Legal considerations
Meekings et al. (2012)				The average orphan drug generates more revenue than the average non-orphan drug. Also the costs of developement are expected to be lower for orphan drugs, since clinical trials are shorter, regulatory findings are more successful, and R&D costs can be lowered as a result of the various ODA benefits (fee waivers, R&D grants, tax incentives, etc.), The mean present value (PV) per drug over the period 1987-2030 was $12.1bn for orphan drugs and $11.5bn for non-orphan drugs, corresponding to an average PV of $406m and $399m per year respectively. Whereas the mean PV for non-orphan drugs remained approximately constant between 2000 and 2010, at $600m per year, the mean PV of orphan drugs nearly doubled from $351 in 2000 to $637m in 2010. Orphan drugs have greater profitability than other drugs when considered in the full context of developmental drivers, including: government financial incentives, smaller clinical trial sizes, shorter clinical trial times, and higher rates of regulatory success	
Mentzakis et al. (2011)					
Michel & Toumi (2012)					
Moberly (2005)		Citing Hughes, notes that political concerns over postcode prescribing contributed to the UK DoH moving commissioning away from WMSSA, and suggests that equity weights should be assigned to QALYs			Legal concerns over commercial expectation contributed to the UK DoH moving commissioning away from WMSSA
Owen (2008)					
Picavet et al. (2011)					
Picavet et al. (2012)		The authors favour reducing cross-country inequalities in access to orphan drugs by regulating compassionate access at the European level			
Pinxten et al. (2012)		The major challenge is to "address the ethical dilemma of 'opportunity cost'… [this] has to be assessed according to the various existing concepts of distributive justice". It is very difficult for the utilitarian concept of distributive justice to support the development and supply of orphan drugs. Also the principle of 'non-abandonment' does not automatically entail a full realisation of equality of opportunity in all of its different concepts (equal access, equal resources, and equal outcomes)			
Prevot & Watters (2011)	Impact on societal and professional life should be taken into account when considering funding for PID treatment. Collection of data on broader				

Study	Socio-economic-related value-bearing factors				
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives	Industrial and commercial policy considerations	Legal considerations
	economic value of PID diagnosis and treatment is necessary				
Schey et al. (2011)					
Siddiqui & Rajkumar (2012)				The retail prices of drugs are a function of the costs of development, the addressable patient population, the patent life, and the projected returns on investment	The retail prices of drugs are a function of the patent life, among other things. Cancer drugs are expensive partly because of the 'monopoly' position many pharmaceutical companies find themselves in and the lack of a true generic price check in cancer
Stafinski et al. (2011)	Considered by workshop participants to be a critical input into decision-making processes				
Stolk et al. (2006)				"Because of their small market potential, [orphan drugs] are not attractive for pharmaceutical companies to develop and market".	
Sullivan (2008)					
Valverde (2011)	There is a need to look beyond medical and cost-effectiveness factors to include the societal impact of health technologies in the HTA process				
Wild et al. (2011)					
Winquist et al. (2012)					

Table A3.2.5: Data extracted during scoping review (5 of 6)

*Note: Columns marked with * are duplicated from earlier tables*

Study	Population-related value-bearing factors			Other factors		Cost-effectiveness
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives*	Feasibility of diagnosing the disease	Feasibility of providing treatment	Cost-effectiveness of treatment
Barrett et al. (2012)						
Clarke (2006)						The author asks whether Canadian patients should be "denied access to potentially effective new treatments for formerly untreatable and serious diseases only because it is virtually impossible to evaluate the cost-effectiveness of those treatments using conventional criteria"?
Clarke et al. (2009)						Considered as part of the author's proposed framework
Claxton et al. (2008)						Assessment ought to be transparent and based on independent scientific analysis
Denis et al. (2010)						Given the budget impact of orphan drugs in Belgium in 2008, the total number of QALYs required to satisfy a €34,000 per QALY threshold value varied from 1 (Increlex) to 229 (Myozyme)
Desser (2013)		The authors find little support among Norwegian doctors for prioritizing the treatment of rare diseases, although a preference for allocating resources in accordance with the principle of reserving a small portion of resources for rare disease patients is noted. 48.3% prefer allocating funds so that the largest number of patients receives treatment, while 44.4% believe a small share should go towards the rare disease group, 5.3% believe the budget should be divided equally, and 2.0% believe the majority of the budget should be allocated to the rare disease group				
Dickson et al. (2011)						
Drakulich (2011)						
Drummond et al. (2007)	Standard HTA methods may not capture the full societal value of some health technologies, and there are serious shortcomings in the evaluation of orphan drugs		Health insurers cannot, and should not, be expected to fund, at any price, all effective orphan drugs			Standard HTA methods may not capture the full societal value of some health technologies, and there are serious shortcomings in the evaluation of orphan drugs
Dunoyer (2011)						
Garattini (2012)						
Gupta (2012)						

Study	Population-related value-bearing factors			Other factors		Cost-effectiveness
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives*	Feasibility of diagnosing the disease	Feasibility of providing treatment	Cost-effectiveness of treatment
Hughes et al. (2005)						
Hughes-Wilson et al. (2012)						1. Two main criticisms of the current regulatory system for orphan drugs are: the high prices of orphan drugs and their inability to meet standard cost-effectiveness thresholds; and the system itself which allows companies to benefit from achieving orphan drug designation on their product. 2. Given the inability of orphan drugs to meet current cost-effectiveness thresholds, the standard methodologies of Health Technology Assessments must be updated and tailored specific to orphan drugs
Hutchings et al. (2012)	Familial and societal impact considered as part of the author's proposed framework					Economic and budgetary implications considered as part of the author's proposed framework
Joppi et al. (2012)						More stringent criteria recommeded by authors
Kanavos & Nicod (2012)						
Kesselheim et al. (2011)						
Largent & Pearson (2012)		"It strains credulity to say that the more caring society is the one that sacrifices several anonymous lives in order to save an identifiable one"				The opportunity costs must be weighed to determine if they are acceptable. In health care, the desire to save lives at any cost must be reconciled with the reality of resource scarcity. It is essential to find a way to quantify the opportunity costs associated with coverage of expensive orphan drugs, regardless of how small an overall expense these may be to a healthcare system or insurance company. Funding orphan drugs is acceptable only if the benefits to rare disease patients are seen to outweigh to costs to others. However, prioritarianism is an ethical argument for favouring the worst off - a sickest-first principle might require allocation of resources even when only minor gains can be achieved and the cost is very high.
Laupacis (2009)						The author agrees with Drummon et al's statement that elements of social value are not incorporated in traditional measures of benefit in economic studies. The author disagrees with Drummon et al's sole definition of equity as "fairness in access to therapies", and provides two further definitions: "freedom from bias or favouritism" and "fairness; impartiality justice." Based on these definitions, the author argues that cost-effectiveness or cost-utility ratios are an equitable way of guiding decision-making
Liang & Mackev (2010)						
Luisetti at al. (2012)						
Matthews and Glass (2013)						
Mavris & Le Cam (2012)						

Study	Population-related value-bearing factors			Other factors		Cost-effectiveness
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives*	Feasibility of diagnosing the disease	Feasibility of providing treatment	Cost-effectiveness of treatment
McCabe et al. (2005)		Special status for orphan drugs may also impose substantial and increasing costs on the healthcare system – costs borne by other, unknown patients	The justification for special status for rare diseases must rest on the question: do we value the health gain to two individuals differently because one individual has a common disorder and the other has a rare disorder?			Cost effectiveness should be treated the same way for orphan drugs and those for more common conditions
McCabe et al. (2010)			The increasing number of orphan drugs, and the prices charged for them, pose a substantial and growing fiscal challenge for healthcare systems			Orphan drugs do not meet conventional measures of good value
Meekings et al. (2012)						
Mentzakis et al. (2011)						Individuals do not prefer to have the government pay more for each life-year gained for a rare diseases than for a common one
Michel & Toumi (2012)						
Moberly (2005)		Citing Hughes, notes that political concerns over postcode prescribing contributed to the UK DoH moving commissioning away from WMSSA, and suggests that equity weights should be assigned to QALYs				"Complete restriction of funding for orphan drugs may be justifiable from a health economics perspective… but that is not the only basis on which we judge access to treatment. A more pragmatic approach is to find ways to make such treatments available." - Hughes
Owen (2008)						Modelling of long term clinical and economic outcomes is often employed by the sponsors of orphan drugs, since large scale clinical trial data are usually unavailable. The accuracy of this modelling is difficult to assess, resulting in uncertainty in the long-term cost-effectiveness of orphan drugs
Picavet et al. (2011)						
Picavet et al. (2012)		The authors favour reducing cross-country inequalities in access to orphan drugs by regulating compassionate access at the European level				
Pinxten et al. (2012)		The major challenge is to "address the ethical dilemma of 'opportunity cost'… [this] has to be assessed according to the various existing concepts of distributive justice". It is very difficult for the utilitarian concept of distributive justice to support the development and supply of orphan drugs. Also the principle of 'non-abandonment' does				The major challenge is to "address the ethical dilemma of 'opportunity cost'… [this] has to be assessed according to the various existing concepts of distributive justice".

Study	Population-related value-bearing factors			Other factors		Cost-effectiveness
	Societal impact of treatment*	Impact of treatment upon the distribution of health*	Socio-economic policy objectives*	Feasibility of diagnosing the disease	Feasibility of providing treatment	Cost-effectiveness of treatment
		not automatically entail a full realisation of equality of opportunity in all of its different concepts (equal access, equal resources, and equal outcomes)				
Prevot & Watters (2011)	Impact on societal and professional life should be taken into account when considering funding for PID treatment. Collection of data on broader economic value of PID diagnosis and treatment is necessary					Authors acknowledge that HTA and comparative effectiveness analysis are increasingly used to guide healthcare budgetary decisions
Schey et al. (2011)						
Siddiqui & Rajkumar (2012)						The seriousness of a cancer diagnosis influences how much cost patients and physicians are willing to bear for minimal incremental benefits. Economic analysis should be conducted to manage the cost of cancer drugs
Stafinski et al. (2011)	Considered by workshop participants to be a critical input into decision-making processes					Considered by workshop participants to be a critical input into decision-making processes
Stolk et al. (2006)				Proposed criteria include requirement that diagnosis of the disease is technically feasible	Proposed criteria include requirement that any necessary specialist training, knowledge and infrastructure is available	
Sullivan (2008)						Methods of determining value of specialty drugs are restricted by a lack of clinical & economic data. Sophisticated disease-based pharmacoeconomic models have been developed to fill this gap. Well-designed models will indicate the extent to which drug costs may be offset by reductions in other medical costs, will evaluate the cost-effectiveness of new treatment, and in some cases will help to identify subpopulations where the drug will have greater benefit
Valverde (2011)	There is a need to look beyond medical and cost-effectiveness factors to include the societal impact of health technologies in the HTA process					There is a need to look beyond medical and cost-effectiveness factors to include the societal impact of health technologies in the HTA process
Wild et al. (2011)						There is a concern among HTA agencies that many orphan drugs fail conventional cost-effectiveness considerations
Winquist et al. (2012)						Considered as part of the author's proposed framework

Table A3.2.6: Data extracted during scoping review (6 of 6)

Study	Stakeholder preferences			Value propositions		
	Preferences of patients	Preferences of physicians	Preferences of society	The “rule of rescue”	The "equity principle"	The "rights-based approach"
Barrett et al. (2012)						
Clarke (2006)						
Clarke et al. (2009)						
Claxton et al. (2008)						
Denis et al. (2010)						
Desser (2013)		Substantial differences exist between the preferences of doctors and the general population. When treating rare disease is more costly, a larger share of doctors than the general population prioritize treating the largest number of patients. The author finds “some support” for the idea that these differences reflect doctors’ greater experience in making difficult medical decisions and choice avoidance by the general population.	Substantial differences exist between the preferences of doctors and the general population. When treating rare disease is more costly, a larger share of doctors than the general population prioritize treating the largest number of patients. The author finds “some support” for the idea that these differences reflect doctors’ greater experience in making difficult medical decisions and choice avoidance by the general population.		When respondents were permitted to divide funds in the equal-cost scenario, the mean share of funds allocated to the rare disease group was 41.5%. When respondents were permitted to divide funds in the costly-rare scenario, the mean share of funds allocated to the rare disease group was 27.3%	
Dickson et al. (2011)						
Drakulich (2011)						
Drummond et al. (2007)			More research is needed to assess the societal value of health technologies and the methods of funding the development and use of orphan drugs			
Dunoyer (2011)						
Garattini (2012)						
Gupta (2012)						
Hughes et al. (2005)				The “rule of rescue” proposes a commitment to non-abandonment of those with rare diseases.	The “equity principle” argues against special consideration for patients with rare diseases	The “rights-based approach”, in which individuals are entitled to a decent minimum level of health care (as adopted in EU legislation), requires that treatments for rare diseases are made available
Hughes-Wilson et al. (2012)						

Study	Stakeholder preferences			Value propositions		
	Preferences of patients	Preferences of physicians	Preferences of society	The “rule of rescue”	The "equity principle"	The "rights-based approach"
Hutchings et al. (2012)						
Joppi et al. (2012)						
Kanavos & Nicod (2012)						
Kesselheim et al. (2011)						
Largent & Pearson (2012)			The public are generally willing to give preference to patients with life-threatening or severe illnesses. Also, the literature suggests that people desire reassurance that they live in a compassionate society, which might be provided by spending more on the rescue of an identified few	There are three constituent parts to the rule of rescue: identifiable individuals; endangered lives; and opportunity costs. “There is no ethically sound argument for allocating resources on the basis of Identifiability… By shifting the discussion to focus on [the other two] elements of the rule of rescue, it is possible to justify giving priority consideration to some – though not all – orphan therapies”.	Fairness requires that we not discriminate on morally irrelevant grounds. Rare disease patients should not receive any preference in health resource allocation because they are identifiable	
Laupacis (2009)					The author disagrees with Drummond et al’s sole definition of equity as “fairness in access to therapies”, and provides two further definitions: “freedom from bias or favouritism” and “fairness; impartiality; justice” Based on these definitions, the author argues that cost-effectiveness or cost-utility ratios are an equitable way of guiding decision-making	
Liang & Mackev (2010)						
Luisetti at al. (2012)						
Matthews and Glass (2013)					Some countries “place more importance on equity versus concern for an efficient pharmaceutical market”	
Mavris & Le Cam (2012)						
McCabe et al. (2005)			The justification for special status for rare diseases must rest on the question: does society value the health gain to two individuals differently because one individual has a common disorder and the other has a rare disorder?		Valuing health outcomes more highly for no other reason than rarity of the condition seems unsustainable and incompatible with other equity principles and theories of justice.	
McCabe et al. (2010)						
Meekings et al. (2012)						

Study	Stakeholder preferences			Value propositions		
	Preferences of patients	Preferences of physicians	Preferences of society	The "rule of rescue"	The "equity principle"	The "rights-based approach"
Mentzakis et al. (2011)						
Michel & Toumi (2012)						
Moberly (2005)	Lobbying by patient groups contributed to the UK DoH moving commissioning away from WMSSA					
Owen (2008)						
Picavet et al. (2011)						
Picavet et al. (2012)						
Pinxten et al. (2012)				It is unethical to preclude rare diseases from public health care resources as this violates the principle of non-abandonment. It is also unethical to allocate unlimited resources to a single field in healthcare, such as rare diseases. A compromise must be reached, taking opportunity costs into consideration		
Prevot & Watters (2011)						
Schey et al. (2011)						
Siddiqui & Rajkumar (2012)						
Stafinski et al. (2011)	Considered by workshop participants to be a critical input into decision-making processes					
Stolk et al. (2006)						
Sullivan (2008)						
Valverde (2011)						
Wild et al. (2011)						
Winquist et al. (2012)						

Appendix 4 (Chapter 4)

Appendix 4.1: Objectivity and Equity: Clarity Required. A Response to Hill and Olson

Mike Paulden[1], James F. O'Mahony[2], Anthony J. Culyer[3,4] and Christopher McCabe[1]

[1] Department of Emergency Medicine, University of Alberta, Edmonton, AB, Canada

[2] Department of Health Policy and Management, Trinity College Dublin, Dublin, Ireland

[3] Centre for Health Economics, University of York, Heslington, UK

[4] Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, ON, Canada

Acknowledgements

All authors assisted with the writing and editing of this letter. MP is supported by grants from the Canadian Institutes of Health Research (CIHR) and Genome Canada. JOM is supported by Ireland's Health Research Board. CM is supported by a Capital Health Research Chair Endowment. None of the authors has any relevant conflicts of interest. MP is the overall guarantor.

We thank Hill and Olson for their thoughtful commentary on our article.[2,3] We would like to take the opportunity to clarify our position and to correct some important matters of fact.

Hill and Olson write that "at the heart of the argument of Paulden *et al.* is an ethical claim: that all QALYs are of equal value". We did not make this claim, and such a claim is not required for our arguments to hold. Our arguments rely instead upon a less controversial ethical claim: that equal value should be assigned to the QALYs of individuals with identical characteristics whose circumstances differ only to the extent that some are the identifiable beneficiaries of an intervention while others are the non-identifiable bearers of the opportunity cost. While not ethically incontestable, this is no more than an application of the principle of horizontal justice, namely that people with like characteristics (of ethical relevance) be treated the same.[44] That means that the QALYs of those who are alike in the relevant respects ought to receive the same weight, whatever it may be. A different conclusion follows if the relevant respects differ. In such cases we are concerned with determining the appropriate *vertical* differentiation between people with different characteristics. To accord some people more favourable treatment by weighting their QALYs more than those of others is an easily justifiable departure from the QALY=QALY=QALY principle, appealing as it does to a principle of vertical justice, for which we expressed neither approval nor disapproval. One such vertical principle suggested by NICE has been to accord benefits accruing to people at the 'end of life' a greater weight. Our point was merely that the procedure, as applied hitherto by NICE, involves a conflict with *horizontal* justice by virtue of not according the anonymous losers *who have the same characteristics* a similar favourable weight. The solution is (at least in principle) plain – to weight the health gains (or losses) of all patients at the 'end of life' in the same way.

Although we did not make the claim that all QALYs are of equal value, we did call for NICE to return (for the time being) to the position that all QALYs are valued equally. This suggestion was not motivated by any belief that all QALYs should necessarily be equally weighted, but rather by a concern that the current and recently proposed methods of applying preferential weights do so inconsistently. To reiterate the point made in our paper, we feel that reverting to the equal valuation of QALYs is a pragmatic position to hold until such time as both a sound rationale and a consistent means of applying preferential weighting have been established.

Elsewhere, Hill and Olsen defend the use of ‘arbitrary’ cut points as providing “ethical advantages of certainty and transparency”, while acknowledging that they may “disadvantage some people in ways that may be unfair”. As we demonstrated in our paper, NICE’s use of arbitrary cut points in its amended methods guidance not only disadvantages people in ways that are “unfair” (an ethical problem in itself), but may in some cases disadvantage the very individuals that NICE intends to benefit. This is a manifest inconsistency. It is also a problem regardless of the ethical position adopted, and clearly diminishes the “certainty and transparency” of NICE’s guidance.

Our criticisms of ‘selective discounting’ were not “largely ethical”, as Hill and Olson suggest – rather, we demonstrated explicitly that ‘selective discounting’ is logically inconsistent, *regardless of the ethical position adopted*. Moreover, we did not “question whether small absolute gains in survival, even if they are large in relative terms, really do represent ‘additional value’”. Obviously, small absolute gains in survival represent ‘additional value’; the question is whether this additional value should be given even greater weight simply because the gains are large in relative terms. Whatever our views on the intrinsic merits of this (which we have not expressed) it seems that some ethical justification is required and, again, that some appeal to the public view may be appropriate.

Our primary concern is that the values of NICE and similar agencies are defensible and applied consistently. If there is a wish to prioritize the health of individuals with specific ethically appealing characteristics (e.g. those at the ‘end of life’), policy makers must be cognizant of the possibility that individuals other than those who are the immediate focus of policy may also have those characteristics and may bear the opportunity cost of their decisions. Failure to account for this risks biasing assessments in favour of the adoption of new interventions, and may compromise the health of all patients, including the very individuals whose needs NICE has said it wishes to prioritize.

Yours sincerely,

Mike Paulden, James F O’Mahony, Anthony J Culyer, Christopher McCabe