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To Measure the Cost of Collaborative Partnership for the Healthy Alberta Communities Project

by

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ABSTRACT

The Healthy Alberta Communities (HAC) is a community-based chronic disease prevention project that draws on a wide spectrum of community-initiated interventions undertaken as a cluster in four Alberta communities since 2005. HAC-funded collaborative projects are undertaken with local stakeholders. Community stakeholders who buy in contributed their own resources in kind in the collaborative process. These in kind resources are considered HAC's indirect costs from a societal perspective since stakeholders forgo the benefit of using these resources for themselves, a forgone best alternative. This study proposes a methodology to identify, catalogue and count these in kind resources, called indirect cost, which will be used in HAC economic evaluation. Methodological challenges of identifying, cataloguing and counting both direct and indirect costs for a cluster of diverse interventions, and the manner with which these challenges were addressed, are explained. Both direct and indirect cost data that span up to the first 24 months in two HAC communities were analyzed. Some results included are: (1) in kind resources are counted in number of in kind person-hours; (2) a combined total of 11,483 in kind person-hours from community stakeholders were catalogued and counted over an eight-month period; (3) in a monetary context, a suggested typical operating expenditure to generate one in kind person-hour using a HAC model (one head office, two community offices) was $15.58. This is the first study to directly measure resources donated in kind in public health.

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Chapter 1

Introduction

Chronic diseases have been responsible for rising disease burden over the past decade, and have accounted for an estimated 72% of global burden of illness in adults 30 years and older (Genuis, 2007). They are also the leading causes of death and disability worldwide (WHO, n.d. para.1).

Principal chronic diseases that are related to high morbidity and mortality are cardiovascular diseases such as heart diseases and stroke, cancer, diabetes, and chronic obstructive lung diseases such as bronchitis and emphysema. In Canada, approximately two-thirds of total deaths are due to these six diseases (Advisory Committee on Population Health, 2002). Approximately 1 in 20 Canadians have Type 2 Diabetes which shortens life expectancy. Diabetes Mellitus is the fourth leading cause of death in Newfoundland, New Brunswick, and Manitoba (Statistics Canada, 2008). Diabetics are twice as likely to be admitted to a hospital or nursing home, three times more likely to use home care services, and have twice as many consultations with doctors (Health Council of Canada, 2007).

Like chronic diseases, overweight and obesity is another health problem that has seen alarming rates of increase in the population. In 2004, 23% of Canadians were obese and another 36% were overweight (Tjepkema, 2005). Between 2003 and 2009, obesity among men rose from 16.0% to 19.0%, and among women, from 14.5% to 16.7% (Statistics Canada, 2009a, Chart 1).

The troubling aspect of overweight, obesity and chronic diseases is that it is not only a public health problem, but an economic problem to the individuals and the society. In terms of direct medical cost, the Mirolla study (2004) suggested that a direct medical cost

to manage the seven leading chronic diagnostic categories to be an estimated $38.9 billion in 2004.

Fortunately, most chronic diseases, including diabetes, are largely preventable. “These problems are related to our diet, exercise, and health behaviours. To a large extent, social and cultural factors ... influence these behaviours” (CIHI, 2004). “People’s health choices and practices are strongly influenced by the conditions of society and the environment where they live, learn, work and play” (Public Health Agency, 2006). In fact, a handful of avoidable risk factors that are by and large lifestyle-related and modifiable, and include physical activity, reducing or eliminating the use of tobacco products, and healthful dietary behaviour contribute to disease incidence. Other risk factors include high blood pressure, high cholesterol, obesity, heavy drinking, and not eating enough fruit and vegetables (Health Council of Canada, 2007). Also, a body of evidence points to the importance of environmental factors in influencing individual’s health. For example, the Public Health Agency of Canada (2006) indicates the need to support and increase accessibility for community-based physical activities and for healthy food. Since these environmental and behavioural risk factors, the social determinants of health, and the powerful and indisputable effect of the social gradient in health[1] (Wilkinson & Marmot 2003) can be considered ‘precedent’ factors to disease risks, intervention efforts could be efficacious when they are directed towards mitigating these ‘precedent’ factors. One of the principle actions put forth by the WHO’s Commission on Social Determinants of Health is to improve daily living condition (WHO, 2008, 1).

Inferring from the above discussion then, interventions that target environmental risk factors, such as access to nutritious food and healthy workplaces, behavioural factors such as lifestyle and dietary habits, and the social determinants of health such as social support, literacy, and poverty, would hold out hope in the fight to reduce the incidence of chronic diseases in the population. Intervention could combine “educational and environmental support for actions and conditions of living conducive to health” (Green

[1] Generally, the lower individuals’ socioeconomic positions, the worse their health. It has been shown that this gradient holds globally, in countries of low, middle, and high income.

and Kreuter, 1990). In 1986, in the Ottawa Charter, the World Health Organization (WHO) defines health promotion as:

> the process of enabling people to increase control over, and to improve, their health. … health promotion is not just the responsibility of the health sector, but goes beyond healthy lifestyles to wellbeing. (para. 3)

Health is "a resource for every day life, … a positive concept emphasising social and personal resources, as well as physical capacities" (WHO, 1986, para. 3). Health promotion can serve as a mediating strategy between individuals and their environments (WHO, 1986, para. 4), and support individuals as they fortify this "resource for everyday life" – health.

1.1 Health Promotion and the Healthy Alberta Communities Project

Over the past five decades, the objective of health promotion moved beyond cultivating individual behaviour change to developing healthy communities. Raine et al (in press) suggested that "the population health perspective on determinants of obesity calls for broader social change in environments and policy".

Integrated health promotion is a strategy with a broad approach. The State Government of Victoria (2009) describes this strategy as a program or project or initiative in which

> agencies and organisations from a wide range of sectors and communities in a catchment working together in a collaborative manner using a mix of health promotion interventions and capacity building strategies to address priority health and wellbeing issues. (Introduction section, para 2)

An example of such intervention that used this strategy is the North Karelia Project in Finland. This Finnish successful and long running Coronary Heart Disease (or CHD) prevention project (Puska et al, 1996) had two focuses, "people participation" and "inter-sectoral collaboration" (Puska et al, 1985). Researchers collaborated with local municipalities, the National Board of Education, primary health care centres, schools and adult education institute (Kumpusalo et al, 1996). The resulting community

infrastructure, created from integrative and collaborative expertise and resources, supported "heart healthy" behaviours and brought about changes in smoking habits, cholesterol and blood pressure levels (Vartiainen et al, 1994).

The North Karelia Project became a model for the Canadian Heart Health Initiative (CHHI), and in Alberta, the Alberta Hearth Health Project between 1993 and 2004, was part of the CHHI. Elaborating on heart health and enacting the AHHP model in practice is the Healthy Alberta Communities (or HAC) project.

HAC aims to build community capacity to influence community health, so that "[making] healthy choices are easier" (HAC 2004). HAC strengthens community action through facilitating community capacity building and collaboration between individuals and communities. Health-promoting and health-enhancing activities, initiated by individual(s) in the community, are financially supported by the HAC project. HAC addresses the environmental and behavioural risk factors, and the social determinants of health. Since HAC targets chronic disease prevention, the range of initiatives supported financially by HAC is as wide as the community's imagination is broad. (See Chapter Two for details of HAC)

HAC is an important element of the on-going research program in the Centre for Health Promotion Studies, at the University of Alberta. Included in HAC is an extensive evaluation component – outcome, program, and economic. This thesis relates to HAC economic evaluation by proposing a methodology to measure the costs of HAC (direct and indirect) that are part of the economic evaluation.

1.2 Economic Evaluation

Burden of chronic diseases has its economic toll both in terms of work time lost for the individual and the economy and in terms of resources channelled into treatment and rehabilitation. These resources are taken away from other societal uses. An important question to be asked from a public health program is what "value" does a program offer

to the society. The problem of scarce resources is as pressing for the society as it is for its health care system, whatever the health care system's organizational structure is (Shiell et al, 1987). The economic question thus is "not whether health promotion saves resources but whether health promotion produces health gains more cost effectively" (Cohen, 1994). In other words, the underlying rationale for an economic appraisal of public health project and for HAC, is whether one project is a better value for money than some other alternatives.

The notion of 'cost' in economics is the lost opportunity in which resources that are used in one program are no longer available for the next best alternative program, that is, the benefits of the alternative program is lost. This economic cost of a program is the benefit of the next best alternative that is given up. Therefore, from a society's point of view, if resources are devoted to a health promotion program to reduce chronic disease prevalence, the society could then be conceived of giving up the beneficial consequences of some other program(s) that will not proceed. Choices thus, have to be made in the face of trade-offs between programs. Is going ahead with one, and thus giving up the possibility of proceeding with another, the better choice for the society? In other words, does the selected program return the maximum benefits, given its use of available resources, from the society's point of view? An economic evaluation of a public health project when compared to an alternative project, must weigh the evidence of the costs outlays against the benefits accrued. As a result, an economic appraisal can inform "the likelihood of interventions being good buys or cost-saving for government [and the society]" (State Government of Victoria, 2006, p.4).

1.3 Study Motivation and Objectives

1.3.1 Why this study?

Part of HAC evaluation framework included an economic evaluation which would be completed after the conclusion of HAC. At the beginning stage of HAC, it became apparent that HAC's mission of developing "sustainable collaborative partnerships to improve the health of the community ... [entails] ... building relationships with local

stakeholders ... [and that] ... the collaborative, participatory process required a significant "up front" time investment" (Raine et al, in press). That means that HAC would draw on quantities of resources from local stakeholders in the form of personnel, time and local expertise. Such quantities of resource would be available to HAC without charge, but would have an economic cost that represents some forgone benefits of the resources' next best alternative use. It was also apparent that the quantity of local resource used by HAC has to be included in the economic evaluation. A means has to be devised to catalogue and count the resources. A preliminary literature search yielded no previous work that deals with such contributions given in kind in a public health project. In fact, as Shiell et al (1987) said: "part of the problem is that economic evaluation of health care has … suffered from a lack of data" (p.322). In addition to capturing direct HAC costs, this study represents a pioneer attempt to address the gap by devising a means to identify, catalogue and count resources given in kind to HAC.

1.3.2 Objective of the Study

The objective of this study is to lay the foundation to the economic evaluation of the HAC. The first stage of the evaluation comprises the following tasks: identify and define the nature and the types of economic information that will be needed, then create instruments to capture the information and data, initiate the process of data collection, and finally analyse the results from the project initiation and early operating stages.

The principal type of economic information to be assembled here will relate to the 'cost' side. This study will first quantify and capture direct cost of the HAC project. Secondly, the study will create a methodology to define, catalogue, and count the indirect costs. The objective of this study does not include placing a value for the in kind contributions because it would be more meaningful to go through this exercise at the final stage of HAC at which time this value will be needed for the cost effectiveness study. The study covers the first two years of HAC, between March 2005 and August 2007.

The outcome measure for HAC economic evaluation in the final analysis will come from HAC's Outcome Evaluation. Measuring program outcomes will not be a concern of this study.

1.4 Outline of the Study

The enquiry will be pursued in the manner set out in the remaining chapters of the study as follows:

Chapter Two provides background information on the HAC project. This chapter presents the objectives and scope of HAC, its structure and organization, and the approach in which HAC initiates changes in the community environment.

The **Literature Review** will be presented in **Chapter Three**. From the Literature Review, we are able to identify gaps in the research, that include addressing challenges related to undertaking an economic evaluation of health promotion project such as HAC, as well as the lack of economic evaluation undertaken for integrated health promotion projects.

The methods of measuring costs in the economic evaluation of HAC are addressed in **Chapter Four.** This chapter describes the following, (1) the approach to the economic analysis, what are the challenges and how are they resolved (2) what types of data is used, and what instruments are used to collect the data, and (3) how is the data organized, stored, analysed and documented.

In the final chapters, **Chapters Five and Six, Results and Discussion** of the study results and implications for future work will be presented.

Chapter 2

The Healthy Alberta Communities Project

It was Lalonde's Health Field Concept (1974, also LaFramboise, 1973) that launched the shift in public health from a medical and hospital focus towards the importance of lifestyle and environment. Since then, extensions to the Health Field Concept continued to inform health promotion practice. In Britain, Wilkinson and Marmot (2003) noted some years later, that the focus continued to broaden and now included the impact of the social determinants of health – the social gradient, early life factors, social exclusion and social support, work and unemployment, among others.

Recognizing that the determinants of health consist of a complex, diverse, multi-dimensional web of interrelated social, environment, and individual or personal factors, to enhance public health through prevention and risk reduction for the individual alone would address just one part of the problem. Equally important is for public health projects to focus on the individual's environment.

The project design of the Healthy Alberta Communities embraces the premise that the individual and his/her environment are immutably linked, that factors influential to the health of an individual do not act alone. HAC is the facilitating instrument that mediates this two-way relationship to achieve advancements in well-being for the individual and his/her community.

2.1 HAC Objectives

Requested and funded by Alberta Health and Wellness, the Alberta ministry of health, to explore if chronic disease risk could be reduced in Alberta based on the North Karelia model of community-based intervention, HAC has two overarching goals:

(1) To provide evidence for decisions regarding health promotion activities and resources which may eventually be incorporated into standard practice for communities;

and

(2) To provide practice-based evidence and effectiveness data to identify minimum practice needed to affect change in chronic disease in Alberta (from HAC proposal).

HAC's objectives are rooted firmly in the Ottawa Charter for Health Promotion (WHO 1986) in which five broad strategies were identified:

- Build healthy public policy
- Create supportive environments
- Strengthen community action in priority setting, decision making and the planning and implementation of strategies to achieve better health
- Develop personal skills through provision of information, education for health, and the enhancement of life skills
- Re-orient health services towards a focus on health promotion

2.2 HAC Approach

HAC's approach is to bring about system changes in community public health, in line with an integrated health promotion approach, and encompasses the following:

- Collaboration between individuals and a wide range of sectors in the intervention communities. For instance:
    - ✓ Involve community stakeholders in the planning and operation of interventions, thus giving HAC an entry to the community;
    - ✓ Use community champions to establish community support;

- ✓ Create community ownership of initiatives by encouraging the individual(s) receiving interventions to be the decision maker(s).

- Use a variety of intervention programs that target and support individuals across all ages, gender, socioeconomic levels, ethnic groups, etc.
- Facilitate empowerment of individuals; and
- Build community capacity through collaborative programming which is achieved using HAC funding.

Through these mechanisms, it is expected that increased community capacity will assimilate structurally and functionally in the community, assuring sustainability. Increased community capacity will also augment the social capital and social support networks to nurture individual health and well-being. Individuals in the community can thus be set on a health-enhancing trajectory. (see also HAC, 2007; SGV 2009; or CSDH 2008) HAC thus, not just promote health, but works to enable and motivate individuals and local community stakeholders as "ambassadors" to further promote health within their communities.

Over the life of HAC, the interventions are expected to change in number, scope, scale, diversity and "the range of partnership" (Raine et al, in press). For example, during the first year, the emphasis was on building relationships with stakeholders, and "momentum developed around opportunistic projects" (Raine et al, in press). In subsequent years, after "community priorities for action to supplement ongoing opportunistic interventions [were identified] a number of inter-related initiatives [would be] implemented with participation of community stakeholders". (Raine et al, in press)

2.3 The Scope of HAC

The scope of HAC spans two pillars of activities, community intervention and academic research, to fulfill its principal and its overarching objectives.

Interventions in the community are built upon two cornerstones. The first one is an academic-community partnership in program coordination and funding; and the second one consists of community-individual partnerships that drive the planning, implementation, and evaluation of community interventions.

The research element consists of the following multifaceted work to generate practice-based evidence (see section 2.1):

- Program evaluation to provide inputs to develop a model for effective community participation in health promotion;
- Outcome evaluations to assess the extent to which health improvements could be attributable to HAC's interventions. Pre- and post-intervention anthropometric and quantitative measures and a biomarker sub-study are used to make recommendations for provincial surveillance to inform community evaluation of chronic disease prevention initiatives;
- Community evaluation to appraise the extent to which environmental factors and disease risk factors change between pre-intervention and post-intervention;
- Economic evaluation to find out the extent to which HAC is worth the resources expended and partly as an accountability exercise for the funding body.

2.4 The Structure of HAC

Figure 2.1 schematically represents the elements in the HAC structure – intervention communities, Community Coordinators, Project Coordinator, and HAC research team.

FIGURE 2.1 STRUCTURE OF HAC

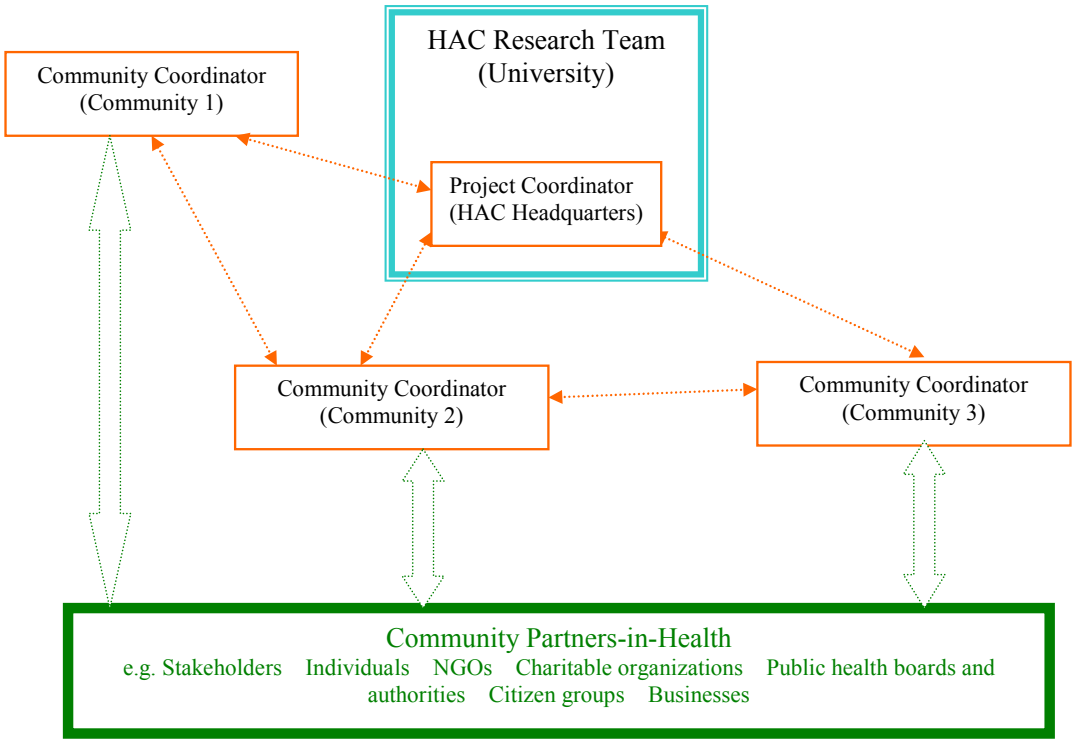


Figure 2.1 shows the original HAC structure with three intervention communities. In 2008, one of the three, St. Paul and Bonnyville, were separated into two communities. The research for this study was carried out before the separation, so references here are generally made to three communities. The **four intervention communities** are Norwood, which is an inner-city neighbourhood in north central Edmonton; Medicine Hat and area is the "sunniest spot in Canada" that is located in south-eastern Alberta; St. Paul, the town which is home to the world's first U.F.O. landing pad in north-eastern Alberta; and Bonnyville, a town that is not far from St. Paul in north-eastern Alberta.

The residential **Community Coordinators** are the link in both partnerships: academic-community and community-individual. Community Coordinators deliver HAC interventions by:

- Building new and strengthening existing networks with partners-in-health in the community. A partner-in-health could be any individual or groups of individuals who expresses interests in taking action to advance healthy living or health-enhancing activities in the community. Groups can be of any size and form. They can be organized formally or informally, they can be governmental or private, for profit or not for profit.
- Continually expanding the partner-in-health network by promoting HAC; connect with, assist in, and encourage existing and potential partners-in-health to generate and follow through with ideas on their initiatives.
- Assisting partners-in-health, where needed, to turn ideas into workable projects and to submit proposals for funding considerations at HAC headquarters.
- HAC provides total financial support for the Community Coordinators and their offices

The offices of the **Project Coordinator** reside at HAC headquarters, and include project management and administration functions. The Project Coordinator assists the Community Coordinator with promotions, community workshops, and enrichment through a support network of the Community Coordinators in the communities. The support network enriches through shared experience and mutual inspirations. The Project Coordinator also assists Community Coordinators to develop community project or initiative proposals by scrutinizing and suggesting amendments to proposals, in consultation with HAC Principal Investigators, to help approve funding. The Project Coordinator also participates in HAC evaluation and research. In addition, HAC Head Office also has a project administrative back office staff.

The academic side consists of the **HAC research team,** which is made up of the Principal Investigators, other University academics, and a Research Coordinator. The research team is responsible for all research-related activities such as overall planning and design of HAC and the general overseeing of HAC activities.

Chapter 3

Literature Review

The discussion in Chapter two singles out the following four elements that are central to both HAC's interventions and the economic evaluation:

- Collaborations of academic, community, individual, and partners-in-health;
- Interventions that consist of community-initiated health promotion projects or activities of diverse nature, size, and scope, as well as of increasing number, diversity and the range of partnership;
- Funding of community-initiated activities come from academic research grant, and in kind contributions, personnel, local knowledge, and so on, from community partners-in-health;
- The need to incorporate the above characteristics as far as possible in the economic evaluation.

The central tenet of this study is to enable a full economic evaluation to occur at the end of HAC. The literature review will span the four elements listed above and will occur at the confluence of diverse community-initiated health promotion activities and economic evaluation.

3.1 Literature Search Strategy

The existing literature in Ovid Medline, Web of Science, CINAHL Plus, Cochrane Library, and ECONLIT was reviewed. In the first attempt, trial searches, using a narrowly focused perspective were completed but yielded no results. The search was then broadened in stages and employed more generic and general terms as keywords; it covers only economic analysis and community-developed multi-level health promotion

initiatives. However, neither approach yielded any significant difference in search results (see section 3.2).

The initial search terms used consisted of all the possible combinations of the following, limited to English language publications, reviews, and meta-analyses:

- <health promotion OR health education OR public health>
- <community health OR community partnership OR community collaboration OR community health services OR community health planning OR community health education>
- <economic analysis OR economic evaluation OR costs OR cost analysis OR cost effective studies OR cost effectiveness analysis OR cost benefit analysis>

Then the search strategy was expanded by exploding those keywords that yielded some promise. The following terms were exploded and added to the subsequent rounds of searches:

- health promotion
- health education
- program evaluation
- program development
- health plan implementation
- cost and cost analysis OR cost-benefit analysis

Working independently with two reference librarians with a specialty in public health to ensure objectivity, the final search strategy was refined to include the following exploded and non-exploded keywords. The **Final Search Strategy** is,

(<exploded Health Promotion> OR <exploded Health Education>)
AND

(<exploded Community Health Services> OR <exploded Community Health Planning>)
AND
(<exploded Health Promotion OR exploded Health Education>) AND (<exploded Community Health Services OR Community Health Planning>)
AND
{(<exploded Health Promotion> OR <exploded Health Education>) AND (<exploded Community Health Services> OR <exploded Community Health Planning>)} AND ("costs and cost analysis" OR <cost-benefit analysis>)
AND
Limit to English language articles
Limit to time: from 1950 to the week of July 26, 2010

This search strategy was executed in Ovid Medline, Web of Science, CINAHL Plus, Cochrane Library, and ECONLIT. In addition, an automated Ovid Medline search was launched that returned weekly auto-alert of search results between May 2007 and June 2010. The weekly search trawled through all published and newly published articles, reviews, and citations. Manual searches were also carried out where needed.

3.2 Search Results

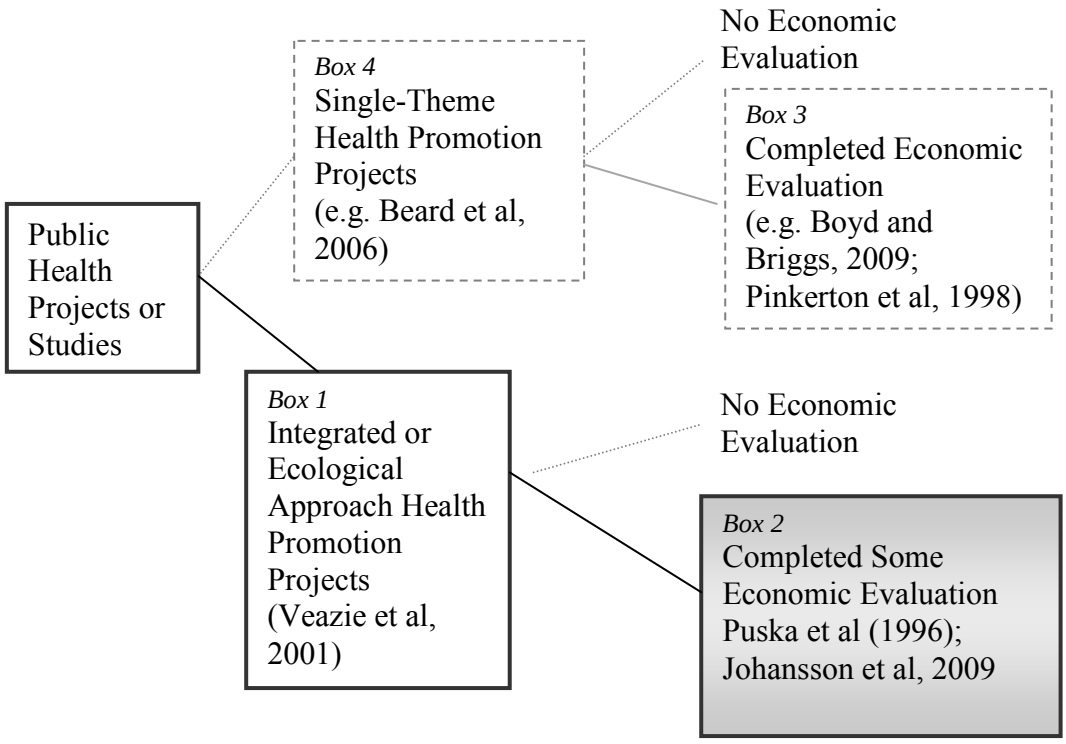
The literature revealed a number of health projects that contain one or two of the four elements, but not all four elements in one project or study. Figure 3-1 shows the path by which studies in the search results were eliminated relative to their relevancies to the present purpose.

Over the course of the lengthy search period of over 36 months, a large number of titles, over 350, were returned. The bulk of them were of no or very limited relevance. As a result, records were not kept on the exact total number of studies that were retrieved and reviewed. As explained below, the principal interest of the search is to identify studies

that have elements that can relate to the present thesis. Therefore tally was not made to show the number of retrieved articles in each of the boxes in Figure 3.1.

Figure 3.1 present schematically the pathways with which the literature search result was grouped.

Figure 3.1
Literature Search Result – Pathways



The existing literature shows that most of the health promotion projects that included an economic analysis or evaluation are by and large "single-theme" studies (*Box 3* in Figure 3.1). Here, "single-theme" studies refers to studies that target a single health-related concern, such as reducing HIV risk behaviour (Pinkerton et al, 1998), tobacco cessation (Boyd and Briggs, 2009), diabetes prevention (Ritzwoller et al, 2006), injury prevention (Beard et al, 2006), alcohol-use disorder prevention (Spoth et al, 2002), and so on. Interventions are typically intended for a subgroup of the population, such as homosexual males, youths, seniors and so on. Economic evaluations of "single-theme" projects are

not comparable to HAC for a number of reasons. Almost all of the single-theme studies which had completed an economic evaluation (*Box 3* in Figure 3.1) are either community trials (e.g. Pinkerton et al, 1998), randomized controlled trials or RCT (e.g. Boyd and Briggs, 2009), or their study design is not comparable to HAC (see also Table 3.1). For example Boyd and Briggs (2009) compared two smoking cessation interventions, a pharmacy-based compared to a group-based support for cessation. Their incremental cost per QALY was £4,400 and £5,400 respectively compared to no treatment for the two interventions. The principal differences in the design and operation between HAC and single-theme interventions or trials are summarized in Table 3.1 below.

Table 3.1
Comparison of Program Characteristics - HAC and Other Programs

HAC	Community-Level Trials or Single-Theme Interventions
Interventions - nature, scope	
range of interventions	singular intervention
overarching goal engenders a range of intervention types and sizes	singular goal and singular intervention type
Participants	
no pre-selection	need to meet criteria
number changes	constant number
Participation of non-project or community collaborators	
do not know who are collaborators a priori	know who they are at the outset
number not known a priori	number known a priori
number changes	constant number
type(s) not known a priori	type(s) known a priori
type(s) changes	type(s) unchanged
Contributions from collaborators	
amount not known a priori	amount agreed at the outset
amount changes throughout	amount normally remains unchanged
types of contribution not known	contribution type(s) known a priori
types of contribution change	contribution type(s) constant

The nature and the scope of single-theme interventions including community trials, has a singular objective, such as investigating a program for seniors that could help prevent falls at home (Beard et al, 2006). Thence came a host of comparability issues that set them apart from HAC. First, single-theme interventions are directed at participants that meet certain criteria, for example they have to be 65 years and over. HAC does not pre-

select participants. Second, the number of participants remains constant from the beginning to the end in single-theme studies, whereas this number changes throughout HAC life. Third, when collaborative inputs from external partners are sought, researchers of single-theme interventions generally know who are the collaborators, how many are consulted or what type and quantity of help can be expected from them. The number of these collaborators will generally remain constant through the project. Except for some agencies to whom HAC sought to consult at the outset, HAC does not know, a priori, of all stakeholders who will be buying in or will collaborate. Nor would the number of and the type of collaborators remains unchanged throughout the project lifespan. Fourth, when external contributions, monetary or in kind, are sought or used, the amount of contribution is known at the outset for single-theme interventions, and the amount would by and large remain constant, or as agreed. For HAC, neither the quantity nor the type of contribution is known before the intervention begins. Also, the quantity and the type of contribution will change over the duration of HAC. For these differences, studies in Boxes 3 and 4 are not comparable to HAC and were not included in the review.

Ten studies were found to have either the format or some discussions that had one or two elements which are similar to HAC's study design. These elements are small grants, state-academic-community partnership, and diverse and expanding program of interventions, (*Box 1* in Figure 3.1). For example, the partnership model between the state, the academic, and the community was discussed in Quill et al (2000), Berkowitz (2000), Israel et al (1998), and Veazie et al (2001); and put into practice by Kumpsalo et al (1996) in Finland[2], Johansson et al (2008) in Sweden[3], and in HAC, Raine et al (in press) in Canada. Studies that discuss or use small grant programs to target the intervention population include Bobbitt-Cooke (2005), Forster-Cox et al (1996), Johnson et al (2007), and Wagner et al (2000). Of these ten studies, only two performed some economic analyses, the North Karelia project described in Kumpusalo et al (1996) and the Safe Seniors at Sundbyberg program in Johansson et al (2009) in Box 2.

[2] Here, the 'state' is the local village boards. (Kumpusalo et al, p. 106).
[3] Here, the 'state' is the regional health-care administration. (Johansson et al, p.178).

Of these two community-level non-RCT studies in *Box 2,* Figure 3.1, only Johansson et al (2009) completed an economic evaluation for the program in Sweden. Kumpusalo et al (1996) presented some costs comparison of health status indicators for the North Karelia Healthy Village Study in Finland. Both projects built upon community participation, used community resources, and garner, to varying extent, inter-sectoral collaboration. The Safe Seniors at Sundbyberg program took place between 1995 and 1999 in a local community in Stockholm. The project's aim was to "decrease injuries among elderly ... by combining structural changes in the environment with individually based measures for the target group." (Johansson et al, 2009, p. 178) Johansson's theoretical framework is community organization (Johansson et al, 2009, p. 178) and employees from collaborating organizations[4] served in a reference group and a steering group. The project fund of SEK 2.5 million (or US $340,000[5] or CAN $414,800[6]) came from the regional health-care administration. Kumpusalo's "theoretical framework incorporated behaviour change, communication and community organization principles" (McLaren et al, 2007, p. 414), and the target population was working age individuals aged 20 to 64 years. Kumpusalo's study design is "quasi-experimental" (Kumpusalo et al, 1996, p. 106) community trial which comes closest to HAC since HAC is modeled after the North Karelia Healthy Village Study project (see also Section 1.2 in this study for more detail).

As mentioned before, Kumpusalo did not do a formal economic evaluation, but presented some cost results: program costs and survey costs. For example "total survey costs for the evaluation of the programme per participant were about £40 (or FIM 320) [or CAN $84.00][7]" (Kumpusalo et al, 1996, p. 112) and the annual extra costs per village were approximately £750 (or FIM 6,000) [or CAN $1,575][8]" (Kumpusalo et al, 1996, p. 112). When the costs were compared against the "net changes in health behaviour and health status indicators, ... one can conclude that the program was cost-effective" (Kumpusalo et

[4] The steering group consists of representatives from regional health-care management, primary care, local authority care of elderly people and a regional health planner; the reference groups consists of representatives from local public organizations, commercial companies and non-governmental organizations (Johansson et al (2009) p. 179.
[5] Using the author supplied exchange rate for 2004 of 1 USD=7.35 SEK (Johansson et al, p. 178).
[6] Using the conversion rate of US$1.00=CAN$1.22 in 2009).
[7] Using the conversion rate of £1=CAN $2.10 in 1996.
[8] Using the conversion rate of £1=CAN $2.10 in 1996.

al, 1996, p. 112). Johansson et al used "costs avoided" as an indication of the benefits of their program. The researchers "estimated that 14 hip fractures had been prevented ... due to the intervention" (Johansson et al, 2009, p. 170). The cost effectiveness study for the Safe Seniors at Sundbyberg concluded that "societal costs avoided [ranged between] SEK 280-550,000 per hip fracture prevented, depending on age and gender of the individual" (Johansson et al, 2009, p. 179) over the five year of the program; which would convert to about US$38,000- $74,800[9] or CAN$46,360 - $91,250[10]. Notwithstanding, the principal difference between HAC and these two studies is the treatment of indirect costs. Community collaboration is an important element in both studies. Kumpusalo did not account for these collaborative costs, while Johansson et al included them obliquely, assuming the amount from inference rather than through direct measurement (see discussion in Chapter 6).

In addition to individual studies, there are a few review or census articles that relate to health promotion or public health projects which contained some economic analysis (for example, Rush et al, 2004, Hagberg and Lindholm, 2006, Shemilt et al 2006, Dalzil et al, 2008). Dalzil et al (2008) systematically reviewed health economic evaluation of 245 interventions in Australia reported between 1966 and 2008. They found that the median cost-effectiveness ratio was A$17,830 (or about CAN$15,560[11]) per QALY/DALY (p. 6). Among the 40 studies reviewed in Hagberg and Lindholm, cost-effectiveness results presented ranged from £42 or CAN$98.30[12] per reduced fall (Hagberg and Lindholm, 2006, p. 645) in a randomized controlled trial in1998 to [US]$24,400 or CAN$35,380[13] per gained QALY for a diabetes prevention program in 2000 (Hagberg and Lindholm, 2006, p. 646).

The following four general observations can be drawn from the results of the literature search. First, there is a paucity of economic evaluations, particularly cost-effectiveness analyses, of community-level, collaborative public health projects. A conclusion from

[9] Using the author-supplied conversion rate of 1 USD=7.35 SEK, from Johansson et al (2009) p. 179.
[10] Using the conversion rate of US$1.00=CAN $1.22 in 2009.
[11] Using the conversion rate of AUD 1 = CAD 0.873 in 2008.
[12] Using the conversion rate of £1 = CAD 2.34 in 1998.
[13] Using the conversion rate of USA 1 = CAD 1.45 in 2000.

Banta and de Wit (2008), in their review of cost-effectiveness analysis in public health services, was that "the total body of cost-effectiveness analyses in health care is actually rather small, and high-quality studies are rather rare" (Banta and de Wit, 2008, p. 383).

Second, when narrowed to health promotion, those with economic analyses completed were largely "single-theme" studies or randomized controlled trials.

The third observation is aptly summed up by Rush et al (2004) who conducted a census of "economic evaluation in health promotion",

> Since 1990, there have been over 400 economic evaluations of health-promoting interventions in the peer review and grey literatures. Of these, 90% address biological or behavioural determinants of health. Relatively little is known about … interventions to tackle the social and economic determinants of health. (p. 707).

Fourth, community-level studies that target more than one or two risk factors (e.g. Kelly et al 1991, Whiting 2004, Wagner 2000, Berkowitz 2000) were largely researcher-driven. That is, researchers conceived the interventions with no community input; delivered the interventions, collaboratively or otherwise, in the community; and then reported and/or evaluated the results. The delivery of the interventions and the economic evaluation, if it is done, follow a pre-planned and thus more or less predictable path. Direct program and operating costs are analyzed in these economic evaluations. The principal differences between these projects and HAC are many. For example, the diversity and the number of HAC's intervention initiatives is not known *a priori.* HAC's interventions were not pre-conceived by the researchers, but are community-initiated, planned and delivered by the communities, and target a range of health determinants. So that HAC interventions and costs evolve as time progress. More importantly, HAC costs involve not just operating costs, but indirect cost borne by community partners. The economic evaluation and the evaluative methodology thus have to accommodate this evolutionary and unpredictable aspect of the project.

In conclusion, economic analyses of collaborative, community-driven health promoting projects were scarce; and those that directly take into account indirect costs are, to the best of our knowledge, absent in the literature.

Chapter 4

Methodology

With no previous economic analysis of multilevel and/or multi-sector integrated health promotion project in the literature, this study will propose a pioneer methodology to directly catalogue and count in kind donations or indirect cost that will eventually be used in the 'cost' side of HAC economic analysis. All costs – direct and indirect – will be identified, defined, measured and the data collected. This methodology will create a measure for indirect cost. Indirect cost in this study will be expressed in terms of some quantity of resource given up. It will not be expressed in money terms, nor will a value be placed on it.

The first section of this chapter states the Economic question and the relevant parameters of the economic analysis. The main challenges encountered in defining and capturing costs for HAC are discussed in Section 4.2. The new methodology proposed in Section 4.3 explains a way to address these challenges. Data collection and the design of the data set will be presented in Section 4.4.

4.1 Parameters of the Economic Evaluation

The design for the first stage of the economic analysis, the data capturing exercise discussed in this study, will be guided by the economic question and its parameters. Set out in HAC's mandate on economic evaluation, and in concordance with its stated goals, **HAC's economic evaluation's objective** is:

> To evaluate the cost and economics of replicating the HAC model of effective community participation in health promotion as standard practice in communities other than the four 'experimental' communities. (HAC 2004)

A cost effectiveness study would "determine whether a particular intervention is cost-effective relative to other uses for scarce resources." (Byford & Sefton, 2003, p. 98). A comparator is used to weigh against the effect of this intervention relative to other uses for resources. The comparator represents the next best alternate intervention or course of action. Where there is no clear next best alternative, as it is with HAC, a "do nothing" alternative is commonly used as a comparator.

In assessing the extent to which society's scarce resources used in an intervention did improve societal well-being relative to a comparator, the scope of the evaluation should be societal in perspective. A societal perspective is the broadest perspective. This perspective would account for all the resources in the society that are used by the intervention, no matter who pays for them.

The target population of the intervention is the residents of the four communities: the Edmonton neighbourhood of Norwood, the city of Medicine Hat in Southern Alberta, the two cities of St. Paul and Bonnyville in north east Alberta. All residents in these communities are potentially included.

In summary, the parameters for the economic evaluation of HAC are:

- **Economic Question:** To study the cost and the economics of establishing and operating the HAC model in four intervention communities.

- **Comparator:** Do nothing.

- **Perspective:** Societal.

- **Study population**: Residents of Norwood, Medicine Hat, St.Paul and Bonnyville.

➲ **Inclusion-Exclusion Criteria:** All residents in the four communities are included.

4.2 Principal Methodological Challenges in Cataloguing and Counting Indirect Cost for HAC

Cataloguing and counting direct costs for HAC is straightforward (see sections 4.4.1 and 4.4.3). But cataloguing and counting indirect cost, which is the resource that HAC is able to use but does not have to pay for, is not so straightforward. The need to catalogue and count this resource relates to the economic principle of scarcity.

The comparison of marginal costs and benefits of alternative interventions or comparator (which is 'do nothing' in this study) relates directly to the principal Economic rationale that society's resources are scarce and have competing uses. Using it for something means the resources is denied from being used for another. So, the decision to use resources in one activity means giving up the benefits the society could receive for using the resource in another activity. Cost then arises in the form of forgone benefit because the alternate activity would not occur. As a result, everything or every activity in a society has a cost and there is no free lunch. If one person receives a service and does not have to pay for it, some other person in the society has in fact paid for it by forgoing something that he or she could have. The free service, an economic cost, is measured by the forgone next best alternative for which the resource could have been used. The salary of HAC Community Coordinators is an example of this economic cost. Their salaries are a reasonable yardstick that reflects the forgone alternative use of the Coordinators' time and talents in the society.

This economic rationale is poignant for HAC because the in kind contribution HAC receives "free" from partners is a forgone benefit to the partner, an economic cost. If a Regional Health Authority (or RHA) "lends" their staff to HAC, the time the staff spent may be free to HAC, but is a cost to the RHA for forgoing the benefit of the work that could be produced by the staff. From a societal perspective, these "free" contributions

have a cost and have to be counted. An economic analysis must at least ensure that all "significant costs and benefits are identified even if they cannot be measured and valued." (as cited in Shiell, 2007, p. 334).

Having established the need to account for any "free" contributions received, this section will discuss the challenges that a methodology has to overcome in order to account for such contributions. The first stage of HAC economic analysis has to address the following challenges, bearing in mind that HAC is not a singular program, but a multiplicity of initiatives. The term 'initiative' will be used to distinguish between the HAC project from the HAC intervention which consist of community initiatives.

First, the need to evaluate a cluster of initiatives – HAC's interventions consist of a cluster of initiatives which have broad scope and are multilevel; they reflect the products of effective community participation in health promotion. Thus the interventions of HAC is the cluster of varied initiatives of different forms, shapes and sizes; have a range of objectives, durations, target different or same segment of the population, and have different collaborative partners. For example, HAC Community Coordinator helped organize a community barbeque to deliver a HAC message – improve social cohesion. Another example of collaborative initiative was the production of a video by the local high school. The video "tell[s] the story of community-based capacity-building" (Raine et al, in press). This initiative uses in kind resources from the school – the teacher's time and experience; the students' time, effort and ideas; the school's equipment and production studio. Not only did the initiative provide practical experience for the performing arts students, it also helps strengthen ties between the school and the community. Since every initiative is an intervention for HAC, yet every one engages different or the same collaborative partners, the challenge then is to find an efficient and effectual means to count and to cost the resource used in this cluster of initiatives.

Second, many initiatives within the cluster run concurrently – the number of initiatives that will take place is not known before HAC begins, nor is the way the initiatives would develop known, since there is no prescribed intervention protocol to

follow. That means that as initiatives develop spontaneously, their occurrences are expected to overlap in time. Their number multiplies as the Community Coordinators 'work' in the communities and engage an ever-increasing number of collaborative partners. Each initiative is the fruit of engaging local stakeholders and each has its start date. At any period in time, the number of initiatives running in a community could be different from the previous period. The initiatives are run using HAC funding as well as partners' resources given in kind. Over the operating horizon of HAC, some initiatives may not even show a well-defined start date or end date because some on-going initiatives or programs precede HAC; and HAC joins as a partner midstream. Others continue on even after the HAC project is completed, thus recording no end date during HAC's life. The challenge here is the need to both avoid double counting and avoid missing counting resource used in initiatives that run concurrently.

Third, the intervention reaches individuals in uneven 'dose' -- HAC interventions do not reach all individual with the same "dose". Some individuals could 'receive' more than one initiative, while others receive none.

Fourth, there are multiple benefits that multiply over time – Generally speaking, the benefits that arise out of integrated health promotion interventions are manifold. Furthermore, the impact of any one intervention on the health of the communities will continue to be felt as time progresses since "the effects of an intervention ... [will] ripple outward almost endlessly." (Foster et al, 2007, p. 264) The impact of HAC benefit travels across neighbourhoods as individuals influence others in the family and the community. Multiplied benefits can also come in the form of new projects or initiatives that occur independently of HAC but came about because HAC is in the community. An idea for a new initiative may come up during some HAC engagement in the community. The Community Coordinator may not be aware of the new idea or may only become aware of it until much later, say, after a new program commences – with no HAC involvement. These multiplied benefits are important results of HAC work since they happen because of HAC. They are evidence of successful network building that stems from HAC, and they should be accounted for as far as possible.

Fifth, in kind contribution from partners is an important component of HAC – One of HAC aims is to galvanize as many local stakeholders as partners-in-health to buy in to its work. These partners could make contributions in kind consisting of any resource owned by the partners and used by HAC. The resource can include staff representation in HAC to observe, to liaise, to collaborate, to help coordinate, or to generate independent initiatives (mentioned above). Two difficulties arise in trying to estimate these in kind contributions. The first one is that, for any initiative that move forward, we need to be able to separate partners' resources contributed to the initiative from resources that come from HAC own inputs; particularly in collaborative work. The second difficulty is that these contributions given 'free' to HAC need to be accounted for and measured.

Sixth, in addition to interventions, HAC has a research element – The research element comprises the work of academic researchers from the University of Alberta in the planning and design of HAC. After HAC became operational, ongoing research continues in order to establish evidence for best practice. Inputs from the principal investigators and the Research Coordinator are respectively, 'donated' or directly paid out of HAC budget. How does the economic study treat the monetary cost of the research element? Does it have to be recognized, measured or estimated?

From the discussion of the six methodological challenges, a methodology to catalogue and count kind resources needs to take into account the following: (1) identify resources that are donated in kind; (2) be able to count the amount of in kind resources used by HAC; (3) avoid as much as possible, miss counting or double counting the resource, particularly with those initiatives that take place at the same time; (4) consider the issue of resources used in other initiatives that happened as a result of, yet independent of HAC; and (5) consider the issue of HAC research activities. The conventional approach of totalling up all the running costs and program costs such as those associated with a trial or a single-theme intervention will not be inadequate for the purpose here. There are a number of reasons, stemming from the differences in design and operation between these single-theme interventions and HAC. First, the design and the method of

intervention for a trial or a single-theme intervention are generally established before the trial or intervention begins. So the necessary resource is planned for and may well be assembled at the outset. Second, the cost and quantity of all resources, material or personnel, is known for the trials or single-theme interventions. For HAC, only the quantity and cost of HAC's own resources are known. The type of intervention or the quantity of non-HAC resources that will be used are not known to HAC before the intervention begins. To address these six challenges, the cataloguing and counting exercise for in kind resources (or indirect cost) used by HAC needs to address these challenges. The next section describes the methodology created to do that.

4.3 A New Methodology to Address the Challenges and to Catalogue and Count Indirect Cost for HAC

The methodology and precept in identifying, defining, cataloguing and counting cost, and then in collecting the data will be guided by the economic question and the economic evaluation's perspective that was set out before (Section 4.1). The methodology created here will attempt to address all the six methodological challenges (Section 4.2) to the greatest extent possible.

First, to measure the costs of a cluster of initiatives -- a choice has to be made to whether evaluate the initiatives as a cluster or individually. Evaluating the cluster as a whole is preferred because it is simple, feasible, and thus easier. Viewing each initiative on its own merit implies evaluating each individually; this approach would commit unjustifiably high levels of resources. *The new methodology will evaluate the initiatives as a cluster*.

Second, to measure resource used in a cluster of *concurrent* initiatives – the challenge here is threefold. First, the costs of coincidentally occurring initiatives have to be measured without double counting the resources used. Second, as the number of initiatives change, the methodology needs to have the capacity to accommodate this change. Third, not only will the number of initiative change, but there is no constancy in the nature, the scope and the size of the initiatives in the cluster. This non-constancy and

diversity needs to be reflected in the costs since the amount and the type of resources utilized will also be changing accordingly.

The proposed methodology will separate these initiatives into two piles. One pile consists of those that involve HAC, and the others are those that operate without HAC direct involvement. I will address the former first. The latter group will be discussed with 'multiple benefits' below.

To count resources used in a cluster of concurrent initiatives involving HAC, the new methodology will measure 'activities' using units of person-time. First, it is necessary to clarify the meaning of two terms: resource and activity. Here, resources refer to any 'inputs' that are used to generate activity; they include time, material, persons, as well as other implements used. Activity refers to any 'work-related' time spent by persons. For HAC, activity would include 'work-related' time spent by the Community Coordinators plus the time spent by those people with whom the Coordinators associate in the course of the Coordinators' work day. The principal resource expended in such activity would consist of the person and the time the person spent, measuring resources expended as 'activities' will avoid double-counting resources spent for the individual who is 'being measured'. To illustrate this idea, consider the Community Coordinator on any given day, the Coordinator could work on one or more than one initiatives. But regardless of the number of task or initiative, the Community Coordinator has a finite quantity of resources at her disposal on any given day. If we tally her activities in person-time units, say person-hours, rather than the number of her tasks, then the day's activities is summed in person-hours spent regardless of the number of different tasks being worked on. Thus at any point in time, whether the Community Coordinator is working on three initiatives or one initiative would not make a difference.

Furthermore, counting activities is an accurate reflection of the resource use because it has the flexibility to accommodate differences in the number or the complexity of projects, since the level of activity is directly proportional to both the number of initiatives and the complexity of the initiatives.

As for resources such as material used in an initiative, the monetary value will be captured in HAC's administrative accounts.

Third, to measure the multiple effects of HAC that multiply over time -- this concern is difficult to address but needs to be considered. These multiple effects came from community initiatives that happened subsequent to the initial HAC interventions. These 'subsequent' initiatives took place because of HAC. Where these subsequent initiatives can be linked to HAC, they will be evidence of HAC achieving its mission to build collaborative network.

I will divide this type of effects into three groups: (a) the effects derived from initiatives that have direct HAC involvement; (b) the effects derived from initiatives with no HAC involvement but HAC is aware of them; and (c) the effects derived from initiatives with neither HAC involvement nor awareness. The methodology proposed in this study has the capacity to account for the effects derived from group 'a' initiatives. Additional attempts, described below, are made to also account for some of the group 'b' initiatives and their effects.

To attempt to account for the effects from group 'b' initiatives, *these 'multiplied' benefits will be captured by a two-step approach that will tally and later, impute a value***.** This two-step approach will value effects by inference and would presume that the participants have received the effects at the time the effects was estimated and measured. In the first step, an indicator of multiplied effects, called it *spin off activities,* is created. These activities are defined to be any initiatives that are generated in the community, have no direct involvement from HAC Community Coordinators, but could attribute their 'initiation' to HAC from some earlier encounter(s) with HAC. Spin off activities are 'interventions' or they are initiatives undertaken solely by partners. In the second step, these independent initiatives would be counted when the Community Coordinators become aware of them and are able to trace their origins to some previous engagement(s) with HAC. An example is the Young Chefs Program. The pastor of St Faiths Church

organized this eight-week long program with the Food Bank and Parkdale School, to teach youths food and nutrition. This initiative was conceived after the pastor learnt about the concept of food security during meetings of the Eastwood and Area Food Security Network chaired by HAC.

'Spin off activities' will be measured, as the name suggests, as activities using units of person-time, the same way the cluster of initiatives will be measured. Community Coordinators are the conduit that informs about these activities. The spin off activity method is admittedly, a crude measure at best since it counts only activities *known* to Community Coordinators. As a result, I expect the amount of quantitative data that will be generated from it to be limited. Nevertheless, at the conclusion of HAC, this measure could, at the very least, be a rich source of valuable descriptive information. Another method of accounting for these benefits would be to model it, but this method will be out of the scope of this study.

The effects of Group 'c' initiatives come from activities with neither HAC involvement nor awareness. It will not be possible to track these benefits within the scope of this study. Therefore, these benefits will be acknowledged but not measured.

Fourth, to measure in kind contributions by partners – As HAC's influence expands in the community; the number of partners-in-health who buy in is expected to rise. This expanding number of partners, who can be an individual, a non-profit or a profit-making entity, donates or contributes their own resources – time or material – to HAC. This is an important component of HAC, and is an excellent indicator of the success of the HAC model. The issue here is to tally these 'non-invoiced' contributions 'donated' by partners who buy in.

A survey of these partners was at first broached. However, since HAC would run for at least three years, the timing of the survey is problematic. An annual survey would provide useful information but may be taxing for many of the partners. A one-time survey of all partners at the conclusion of HAC could run into considerable recall bias

and participation bias. Not all partners remain HAC collaborator for the entire duration of HAC. Instead, the 'activities' indicator will be used to address this challenge of in kind contributions.

In kind contributions will be counted as 'activities' and will be measured in units of person-time. For example, when partners participate in a HAC event, the partner is donating their resources to HAC. The contribution could be in the form of bringing in expertise or spreading HAC message before and/or after the engagement. This contribution is measured by units of person-time the partner spent in the engagement. Since these activities come from collaborations with HAC, tracking contributions this way is feasible. The tally is expected to be quite comprehensive. Counting partner's activities would represent a measure of the best alternative forgone for the partners.

Notwithstanding this method counts only in kind 'personnel' contributions. A reason for counting only personnel is that HAC funding provides for the running of initiatives. Also, non-personnel contributions have not been major hitherto compared to 'personnel' contributions. As aforementioned, only the personnel contributions from collaborative activities are counted here. Subsequent initiatives undertaken by partners, but known to HAC, will be captured as spin off activities (described before).

Thus 'indirect cost' for HAC will be counted in terms of units of person-time here and will not be expressed in money terms.

Fifth, to measure the research element in HAC – Research is an integral part of HAC. The research component comes from the contribution of academic researchers from the University of Alberta. There are two phases of high research intensity over the life of HAC: planning and design, and outcome measurement. Inputs from the planning and design phase will be approximated using researchers' self estimate of units of time spent. For the outcome measurement phase, the research component will be embodied in the activities of HAC Research Coordinator and the resources used to 'measure' outcomes.

The monetary value of the research element will *not* be included in the costing exercise since it is not intervention.

It should be noted that an economic cost is not always expressed in money terms. Since this study considers the first 24 months of HAC operation, imputing a value to the in kind person-hour 'donated' will be left to the full economic evaluation at the conclusion of HAC. In this study, HAC indirect cost is not expressed in money term, but in the number of person-hours. The number of person-hours is the forgone benefit that HAC partners give up; but at the same time, it is also the 'unpaid' benefit HAC received.

The next section describes the instrument created and the process with which 'activities' and cost data are captured, measured, collected and stored.

4.4 Data Collection and Data Set Design

Having identified the types of data needed, this section will discuss the instruments that are created to collect the data and the structure of the 'cost' data set. Primary data collection from a bottom-up approach will be used. That means that the cost of the resource used is measured and quantified directly.

The discussion hitherto reveal that some costs incurred in the operation of HAC have to be inferred and estimated, since no invoice was sent, neither was there any direct payment made by HAC. These costs are the costs of the in kind contributions and as mentioned before, are re referred to as **indirect costs**, since they are outside HAC's budget.

Direct costs are expenses that HAC paid for and where an invoice or bill of purchase is normally generated. These costs for an entity are usually methodically kept in a ledger, and would be available for audit where needed. HAC is no different. A set of books is kept to record all direct costs.

Therefore, the primary data collection instruments used here can be conveniently categorized into direct cost collection instrument and indirect cost collection instrument. This section will discuss each in turn (Sections 4.4.1 and 4.4.2).

4.4.1 Data collection instrument – direct costs

A single instrument is used to collect direct costs, HAC's monthly expense account entered on an accrual basis. The account is comprehensive and details every dollar spent. For the economic evaluation, these spending are grouped into seven broad categories such as Administration, Program Costs, Personnel, Telecommunications, and so on. (See Section 4.4.3)

Direct costs incurred in the operation of HAC can be **either fixed cost or variable cost**. Fixed costs are those costs that do not change with the level of activities. An entity still has to pay fixed cost even if the activity level is nil. Fixed costs **can be recurring**, such as rent payments for HAC offices, **or one-off or one-time**, such as the purchase of furnishings and computers at start up. Variable costs are charges whose amount changes with the level of activities. At zero level of activity, variable cost is zero. Variable costs can be a one-time expenditure such as the expenses used in delivering certain interventions, for example printing information pamphlets and creating a dedicated webpage, or they can be on-going or recurrent outlays such as payments for office supplies. The different direct costs for HAC are summarized in Figure 4.1. It is worthy to note that some of the variable costs in Figure 4.1 relates to research activities, and will not be included in the analysis here.

Figure 4.1
HAC Direct Costs

Cost Types		Examples
FIXED	One-time	▪ Purchase of computer and peripheries, office furniture ▪ Software site license
	Recurring	▪ Monthly office rents for HAC Head Office and the four community offices ▪ Lease of equipment e.g. photocopier ▪ Salaries of personnel (Community Coordinators, Project Coordinator, HAC administrative staff, Research Coordinator)
VARIABLE	One-time	▪ Workshops e.g. Capacity Building and Asset Mapping ▪ Pre-intervention Measurement Clinics ▪ Post-intervention Measurement Clinics
	Recurring	▪ Costs related to funding community initiatives, travel and accommodation, public relations and marketing, freight and courrier services, postage and telecommunications, team meeting and hosting, and other supplies

4.4.2 Data collection instrument – indirect costs

The principal indirect costs to be measured are the costs of in kind activities that HAC partners contribute to HAC. Just as for direct costs, indirect costs can be fixed or variable, and can be one-time or recurring. The intent is to be as comprehensive as possible, so the instrument will attempt to measure as many of these costs as possible. The most important of these costs are described and defined in Section 4.4. The various types of indirect costs for HAC are summarized in Figure 4.2 on the next page. Figure 4.2 also shows which types of indirect costs are measured and which will not be measured in this study.

Figure 4.2
HAC Indirect Costs

Cost Types		Examples
FIXED	One-time / recurring	▪ Buy in partners' fixed costs (not measured)
VARIABLE	One-time	▪ The planning and design work of HAC research team during HAC pre-implementation (measured but excluded here) ▪ HAC partners' personnel costs spent in one-time collaborative HAC project ▪ HAC partners' personnel costs spent in one-time non-collaborative HAC project (not measured) ▪ HAC partners' other variable costs incurred in one-time collaborative or non-collaborative HAC project (not measured)
	Recurring	▪ HAC partners' personnel costs of collaborative on-going HAC activities ▪ HAC partners' personnel costs of non-collaborative HAC-induced activities (not measured) ▪ HAC partners' other variable costs (not measured) ▪ HAC partners' other program expenses in non-collaborative HAC-induced activities (not measured)

To put a value to indirect costs when HAC economic evaluation is to be undertaken at the conclusion of HAC, the value will be estimated using the following three-step method:

1. The level of activities is an indicator for the *quantity* of in kind resources used. The level of activities are measured in units of person-time (hours and fractions thereof for a person) as they occur;
2. A *value* for a unit of the activity will be obtained by using some selected average salary measure that is considered a reasonable reflection of the value of these activities. An example of such a salary measure would be the average hourly earnings or the average weekly earnings for Alberta;
3. The *estimated cost* of the in kind resource will be imputed by applying the unit cost in value per hour per person ($) on the total units of activities (number of person-hours).

These three steps are summarized schematically below:

units of activities x unit cost of activities = estimated cost of in kind resource

As mentioned before, this study will only be concern with the first of these three steps – of measuring and quantifying indirect costs by tallying units of activities in terms of person-hours and fractions thereof.

Two instruments were created to collect the indirect cost data. Both instruments are completed by the Community Coordinator in the respective community. Since the Community Coordinators are HAC frontline staff, they engage partners-in-health and build networks, so they are well-position to inform on HAC or HAC-induced activities in the communities.

Data capture is enabled by making use of the Community Coordinator's regular reporting requirement to the Project Coordinator. The two data collection instruments are:

1. **Activity Tracking Form** (high frequency completion) – this Form was originally intended as a reporting tool that the Community Coordinators complete for the Project Coordinator. The form was designed to record the work of the Community Coordinators, providing background, context and contact detail. Each engagement with community partner triggers a form to be filled out to record details of the engagement. The data collected in this Form includes the type, name and purpose of each event or activity and its duration (in hours and parts thereof). For the purpose of capturing additional information on partners' in kind contribution, this Form was modified for this study to include additional information. The modified form includes the total number of non-HAC persons (that is, partners) present, the units of time spent, and the capacity of each non-HAC persons. The capacity of non-HAC persons are separated into three types: employed representative of partner organizations, employees of HAC partners who is present in a voluntary capacity, and member of the public at large. The modified Form was pilot tested

by the Community Coordinators during the first part of January, 2007 and then brought into full use the following month. A copy of this form is presented in Appendix I.

2. **Spin off Activity Reporting Form** (completion where needed) – this form was created to capture dedicated data on *known* non-collaborative HAC-inspired activities generated independently of HAC. The trigger is when the Community Coordinators become aware of them, and could trace the activity to some previous HAC encounters. The form (see Appendix II) was piloted by the Norwood Community Coordinator in January 2007, and was adopted for use in all communities from February 2007. The data collected in this form include the date, name, purpose, and duration of an Event, the organizing agency or agencies, target population, and estimated attendance or participants. The Community Coordinator will also include comments on how or why the activity was spawned from HAC. Both qualitative and quantitative information are collected. The data generated is designed to allow us to eventually put an estimate on the cost of in kind resources that are indirectly generated from HAC.

4.4.3 Data set design

All primary data collected as described above now reside in one of two data sets: the direct cost data set and the indirect cost data set.

The direct cost data set

The direct cost data set is in Excel format and is structured to permit the greatest flexibility for analysis. For example, evaluation can be carried out at the program level or detail analysis can be undertaken at disaggregated community level. This flexibility is achieved by tagging every data point in the data set with three dimensions: the date of occurrence, the location of occurrence, and the type of expenditure (See Appendix III). The detail of the three tags is as follow:

- ✓ Date tag – consists of the month and year the money was spent.

- ✓ Location tag – identifies five[14] locations at which the money was spent: (1) HAC head office, (2) Norwood, (3) Medicine Hat, (4) St Paul and Bonnyville, and (5) unspecified.

- ✓ Expenditure Type tag – there are nine categories to which an expenditure could belong: (1) program staff salary, (2) administrative staff salary, (3) rent, (4) telecommunications, land and cellular, (5) shipping, freight and deliveries, (6) travels, transportation and parking, (7) promotion, marketing, stationery and supplies, (8) other variable costs not elsewhere specified, (9) funding of community initiatives

With these tags, analyses can be carried out at aggregated or disaggregated levels; for any specified period(s) of time, or by specified type(s) of expenditures. The tags also facilitate sensitivity analyses because expenses can be quickly identified and excluded from the calculations if needed. There is a version of the data set in SPSS and in Excel.

The indirect cost data set

At the time this data set was designed, there was only a handful of spin off activities returned by the Community Coordinators. But the volume of Activity Tracking Forms returned was considerable. Therefore the data set was designed and set up to capture contributed in kind person-hour data from the Activity Tracking Forms only. This data set consists of four Excel worksheets, one for each of the community, and one summary sheet.

Each worksheet has six columns of actual data entered straight from the Activity Tracking Form and six columns of calculated person-time data generated in Excel. (See Appendix IV). Every single HAC event that involves person(s) other than the Community Coordinator is recorded here. For each event, the Excel sheet records the date of the event, the duration of the event, the number of volunteers present, the number

[14] At the time the data set was set up, the two cities of St. Paul and Bonnyville were considered one community, and were served by one Community Coordinator.

of paid personnel present, and the number of members from the community present. The generated columns calculate the number of in kind person-hours by type, for each event, and the monthly total in kind person-hours by type.

The setup of this data set permits detail analyses and cross tabulations on in kind contributions by type as well as longitudinal analyses and comparisons over time and across community. The next chapter presents results from the data collected over the first 15 months of HAC operation.

Chapter 5

Results

This chapter presents results and analyses of the 24 months of data that were collected which include operating expenditure and in kind contributions donated by HAC partners. The collection of in kind contribution data commenced later, and eight months of it were collected that allows the computation of number of person-hours. The results from these two categories of data will be presented separately; then, they will be combined for further analysis in the last section of the chapter.

The recording of accounting data, or direct costs, commenced in April 2005 with the entry of the first expense item in the HAC ledger. This is also the first month of available program cost data for the economic evaluation. The conclusion of HAC will be the end date of the cost data collection. The direct cost data presented for this study covers the period between September 2005 and August 2007. Results from these first 24 months would relate to this study's objective of designing and planning for the economic evaluation, including the early stages of data collection. Thus the Direct Cost category of data presented here span a 24-month period.

The Indirect Cost category that counts in kind person-hours for HAC was first implemented in December 2006, 15 months after the start of record keeping for direct costs. Thus, just eight months of indirect costs data are included here which covers the period between December 2006 and July 2007. Where needed in the analyses, results and findings may be truncated to match the relevant time periods for analysis and comparison. Table 5.1 summarizes the different time periods for which the two sets of data have been collected for this study in each location. The 'unspecified' location in the database, albeit has the same length of data collection, has nil data entry throughout the 24 month period, indicating minimal data entry error in the location field.

Table 5.1
Data Collection Periods
by Location and Type of Data

	Direct Cost Data		In kind Person-Hour Data	
Location	**Collection period**	**Months of data**	**Collection period**	**Months of data**
Head Office	March 2005 to August 2007	30 months	n/a	n/a
Norwood	September 2005 to August 2007	24 months	December 2006 to July 2007	8 months
Medicine Hat	September 2005 to August 2007	24 months	December 2006 to July 2007	8 months
St Paul and Bonnyville	September 2005 to August 2007	24 months	December 2006 to July 2007	8 months
Unspecified	September 2005 to August 2007	nil	December 2006 to July 2007	nil

The Direct Cost set of data will be examined and analysed first in section 5.1. Then results from the Indirect Cost set of in kind person-hour contribution data will be presented in section 5.2. In section 5.3, some results showing returns on expenditures will be analyzed. Section 5.4 summarizes all the results presented in the chapter.

5.1 Direct Cost Data

Total expenditures for the various locations and the distribution of these expenditures will first be presented in section 5.1.1. Then in section 5.1.2, expenditure trends over the 24 months will be discussed.

5.1.1 Total expenditures by location

For the purpose of comparability, all cost comparisons and analyses that involve both HAC head office and the communities will be confined to the 24 months between September 2005 and August 2007, for which data was available for the communities. Although the choice of these 24 months was for reason of comparability, this reason is also justified in relation to activity level at HAC Head Office during this period. Although expenses began to be incurred at head office from March 2005, head office activity was low during the first six months (March 2005 to September 2005). The

Project Coordinator took up the position in May/June 2005, and a half-time administrative staff did not begin until July 2005. Including the first six months would give a falsely lowered average monthly expenditure for Head Office. For the purpose of information, Table 5.2 shows the comparable statistics for Head Office over the entire thirty-month period. In the final analysis for HAC economic evaluation, these six months of expenditure has to be included

Table 5.2
Average Monthly Total Expenditures for Thirty Months
Head Office, March 2005 to August 2007

	Total Expenditure	Average Monthly Total Expenditure	Fixed Costs (% of total expenditures)	Variable Costs (% of total expenditures)
Head Office	$540,724,000	$15,951	85.1%	18.5%
Head Office (adjusted)	$454,186,000	$13,190	77.6%	22.4%

In Table 5.2 and subsequent analyses here, head office expenditure was adjusted to reflect the fact that HAC occupied just one-third of the rented office space even though the entire rent was entered into HAC monthly expense account. The rest of the office space was shared by other research functions of the Center for Health Promotional Studies. Therefore, the rent will be adjusted to reflect the portion that is used by the HAC project. This adjustment is included in the data presented for the Head Office (adjusted) line in Tables 5.2. In all subsequent tables and discussions, where relevant, all expenditures that include the rent component for Head Office are adjusted values.

The community offices began operating in September 2005, which is the first month for the analysis in this chapter. For the head office, the comparison will also be confined to the twenty-four month period between September 2005 and August 2007. As mentioned before, the St. Paul/Bonnyville community office did not have a Community Coordinator for three months between December 2006 and February 2007. During those three months, no salary was paid out but rent and expenses such as telecommunication charges continued to be paid. Tables in this chapter that have community office will show

additional data for this community office for the 21-month period – with the three months taken out.

Table 5.3 shows total expenditures averaged over the 24-month period for the four locations individually, with a percentage breakdown between fixed costs[15] and variable costs[16]. HAC head office had the highest average monthly total expenditures of the four locations, and St. Paul, Bonnyville the lowest.

Table 5.3
Average Monthly Total Expenditures
by Location, September 2005 to August 2007

Sep 2005 to Aug 2007	Average Monthly Total Expenditures	Fixed Costs of total expenditures)	(% Variable Costs (% of total expenditures)
Head Office	$14,202	77.2%	22.8%
Norwood	$5,309	82.7%	17.3%
Medicine Hat	$6,070	84.5%	15.5%
St. Paul, Bonnyville	$4,703	84.6%	15.4%
St. Paul, Bonnyville (21 mos)	$5,274	84.3%	15.7%

However, the pattern in which their average total expenditure per month is distributed between fixed costs and variable costs is similar for all four locations. Fixed costs which consists of rent, staff salary, furnishing, computer and peripherals, represent the bulk of total expenditures, ranging between 77.2% and 84.6% in the four locations. Variable costs made up a relatively smaller portion of total expenditure, and consist mainly of telecommunications, hosting, freight and deliveries, and funding for community initiatives. (See Table 5.3)

The average total expenditures per month among the three communities were quite similar if we take the St. Paul/Bonnyville with 21-month data for comparison. St.Paul, Bonnyville (21 months) has the lowest average monthly expenditures while Medicine Hat the highest. Norwood expenditure is slightly higher than St Paul/Bonnyville. (See Table

[15] Fixed costs include rent, salaries, furniture, computers and any expenditure that would be incurred regardless of the level of HAC activity.
[16] Variable costs include travel and communication expenses, freight and delivery charges, marketing and printing, hosting etc. The levels of these expenditures change depending on the level of HAC activity.

5.3) A principal reason for the differences is the amount of rent paid for the community offices. The monthly rent for the Medicine Hat office is the highest of the three communities – between 30% and 73% higher than the other two offices. Aside from rent, the data shows that travel expenses are also higher for Medicine Hat than for St. Paul/Bonnyville. The actual amounts of rent and travel expenses were not presented for confidentiality reason.

Table 5.4 on the next page shows that for HAC head office, high staff cost is a principal expenditure item every month, followed by rent, which contributed to the significantly higher level of monthly expenditure compared to the community offices. Rents[17] are 9.3% of average total expenditures for HAC head office, compared to 8% or lower for the community offices (see Table 5.4).

The expenditure pattern in Table 5.4 reflects the high reliance of the HAC project on one input, the "labour" input. This input is possibly the cornerstone in HAC operation. Salary and compensation made up between two-thirds to three-quarter of total expenditures of HAC offices. Staff cost is a principal expenditure item every month, followed by rent.

For HAC head office, 'other' expenditures also contribute to the higher average monthly expenditure. Other expenditures include the centralized HAC administrative function that is borne solely by Head Office. As well, there were incidental expenditures on centrally organized activities such as marketing and promotion (e.g. printing of posters and pamphlets), telecommunications, some travel expenses (e.g. four separate segments of travel taken to deliver the Asset Mapping and Capacity Building Workshops in each of the four communities), and hosting expenses (e.g. during workshops).

[17] The office space in which HAC Head Office was located was adjusted and assumed that about a third is attributable to HAC. Therefore, this item is adjusted by taking only one-third of the monthly rent to belong to HAC. This apportioning is reflected in all calculations related to Head Office rent.

Table 5.4
Distribution of Total Expenditures
by Item and Location, September 2005 to August 2007

	Telecommunication, Travels, Deliveries	Rent	Salary and Compensations	Other
Head Office	5.1%	9.3%	66.2%	19.4%
Norwood	3.0%	2.5%	76.5%	18.0%
Medicine Hat	6.0%	7.4%	66.6%	20.0%
St.Paul, Bonnyville	6.9%	8.0%	74.1%	11.0%

The share of rent in total expenditures is smallest in Norwood. Being a disadvantaged neighbourhood is a likely influence on the pattern of its operating costs: rent makes up just 2.5% of its total expenditures, compare to over 7% for the other two community offices. (See Table 5.4)

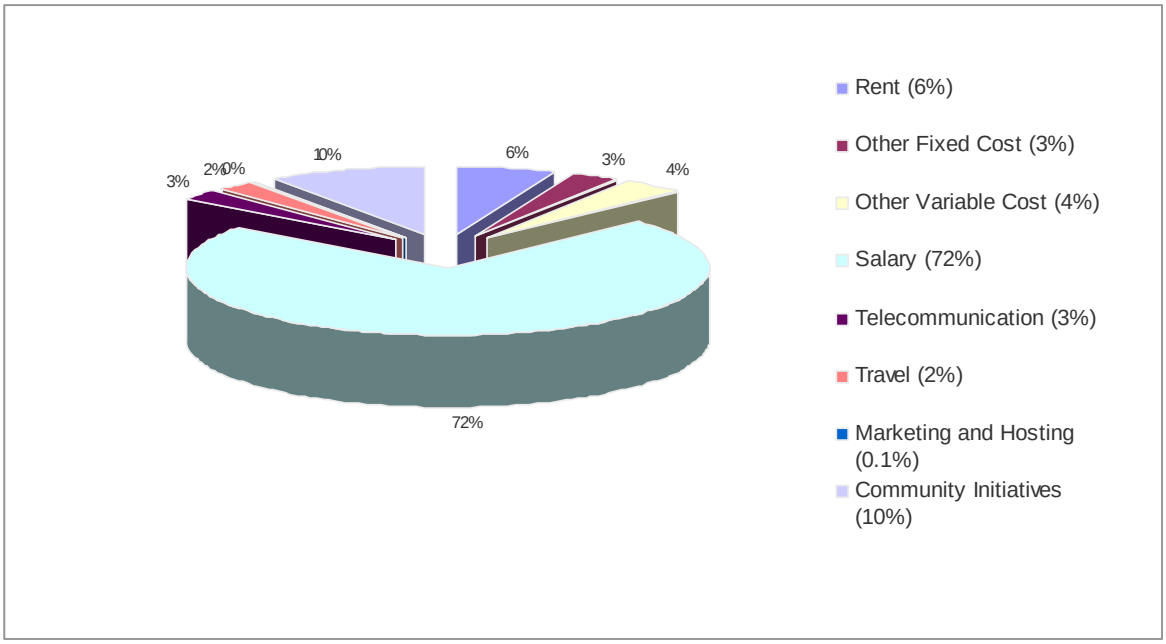
Additionally, the expenditure data shows that 'distance from head office' as a noticeable explanatory factor for the differences in average monthly total expenditures among the communities. Such location-related expenses as telecommunication, travel, freight and delivery for Medicine Hat and for St. Paul/Bonnyville are about ten times higher than those for Norwood in nominal or money term. The share of this expense as a percent of average total expenditures is the lowest in Norwood, 3.0% compared to at least 6% for the other two communities. The location-related expenditure for Head Office expenditures is 5.1% of total expenditures reflecting some of the coordinating function that Head Office undertakes.

5.1.2 Combined total community expenditures

Figure 5.1 aggregates all the expenses for the three communities (using a total of 792 data points), and then break the aggregated sum down by principal item to illustrate some 'typical' expenditure pattern for the average HAC community office. It is apparent from Figure 6.1 that if the HAC model were replicated, salary would be expected to be the single most important item (72%) in the monthly expenses of a typical community office. The second largest item of monthly expenditure would be funding for community

initiatives. About 10% of total community expenses would relate to such funding. As HAC takes root in the community, this item of expenditure could be expected to rise. Overall, an average rent for a typical community office using the HAC model comes to about 6% of all community expenses.

Figure 5.1
Average Expenditure Items as Percent of Overall Expenditures
Combined Expenditures for Three Community Offices
September 2005 to August 2007



5.1.3 Expenditure trend: start-up versus operating expenditure

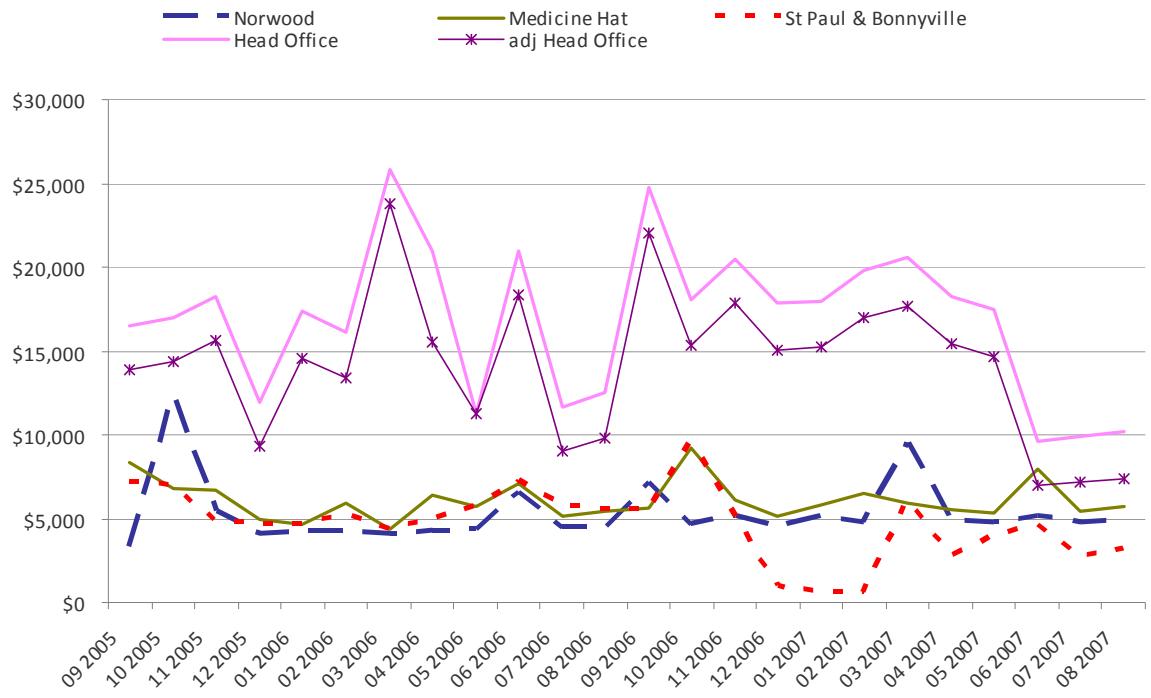
Figure 5.2 shows monthly total expenditures for each of the four locations over the twenty-four month period – between September 2005 and August 2007. Not included in Figure 5.2 are expenses related to pre-project implementation activities such as planning and proposal writing, HAC research activities such as Research Coordinator compensations, and expenses related to the collection of pre- and post-intervention measurements, surveillance, or biomarker measurement clinic.

For the three communities, the average total expenditures during the first two months (September and October, 2005) were higher than the remainder of the 24-month period, with the exception of some spikes in community spending that represented irregular pay-outs. After October 2005, spending appeared to settle to a level that ranged between $5,000 and $7,500 per month, except for some spikes (see below), which largely represented fixed costs. This pattern of expenditure for the communities would suggest a short but discernible start-up period during the initial three months, with higher levels of expenditures. Averaging the six data points over these two months of 'start-up' would suggest an overall average of about $6,890 start-up expenses per month per community.

After October 2005, the end of the two-month 'start-up', expenses became stable except for irregular pay-outs for community initiatives; for example, the spikes in expenditure in July 2006, October 2006, or March 2007. The three-month drop in expenditures for St Paul and Bonnyville between December 2006 and February 2007 was the period when the community office was 'on hold' because it did not have a Community Coordinator. Excluding these six months of 'outliers', and then averaging the remaining 57[18] data points for the period from November 2005, or post-'start-up', suggested that the monthly 'operating expenditure' of HAC's community-level operation settled to around $5,360, and represented mainly fixed costs.

[18] There are 63 data points between November 2005 and August 2007 for three communities, or 21 per community. Then, six data points of 'outliers' were excluded: three spikes each for the community, and three months of 'on hold' for St. Paul/Bonnyville.

Figure 5.2
Monthly Expenditures by Location
September 2005 to August 2007

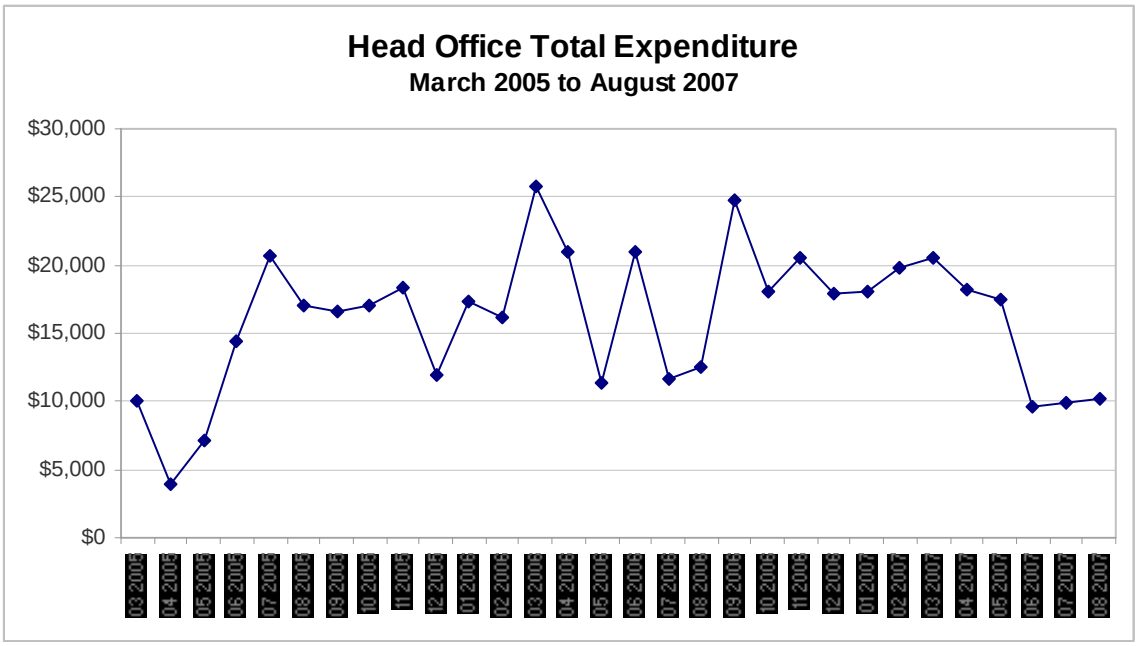


Average total expenditures at Head Office remained at a high level for the first nineteen months of the period and then dropped off perceptibly afterwards, albeit still well above the community levels. However, if the first six months, the period before the community offices came on board (that is, March 2005 to August 2005), were included, the picture is different; a five-month period of lower expenditure levels was discernible (see Figure 5.3 on the next page). Between March 2005 and July 2005, monthly expenditures consisted of rents and the variable costs related to setting up, such as rent deposit (the spike in the first month, March 2005), deposit on telecommunication connection start up (the spike in May 2005). During this period from March 2005 to May 2005, there were no staffs on the payroll. The first Salary was recorded in June 2005, creating a spike for that month. By July 2005, the administrative function was in place. Therefore, these five months could be considered as start up. As soon as the first salary payment began in June 2005, the monthly expenditure went up and remained more or less at this higher level, except for some spikes of incidental payments (explained below). Examination of the full 30 months

of direct cost data for HAC Head Office *would* suggest that *HAC Head Office has a five-month start-up period of planning and staff recruitment*.

The peaks and troughs in Head Office expenditure levels during this period are mainly results of incidental payouts. For example between May and August in 2006, two months of rent (for April and May, 2006) were made in one payment in April, resulting in a spike in April and a drop in the May expenses. Also, the three spikes in Head Office expenditures in March, June and September 2006 were irregular expenses, relating to purchases of promotion material; and an earlier irregular staff compensation that was accrued then. Activities such as introducing and promoting HAC in order to engage the communities were indispensable during this early period. *The expenditure level for Head Office over the thirty-month period was a steady average of around $13,204 a month*. The strength of this estimate could benefit from using a longer data series when it becomes available.

Figure 5.3
Monthly Expenditures, Head Office
March 2005 to August 2007



Nevertheless, if the results drawn from this section were validated and are found to be close to what is reported here, then they would imply that the HAC design does not need a long lead period to become fully operational, since the lead time needed before becoming fully operational for both Head Office and the community offices is relatively short. This would be a cost saving attribute.

5.2 Indirect Cost Data or In Kind Person-Hour Data

The set of indirect cost statistics is the data obtained in capturing donations in kind contributed by partners who buy in. These contributions were captured in the form of "in kind person-hours" (see Section 4.4). For this study, eight months of in kind person-hour data was collected between October 2006, when Medicine Hat entered the first in kind person-hour data using the modified Activity Tracking Form that included known partners' activities, and July 2007 (see also Table 5.1). Norwood first recorded this data in December 2006. For much of this period, the St.Paul/Bonnyville community either did not have a Community Coordinator, or a newly-hired Coordinator needed time to get to speed with including in kind activities. For comparability then, the results presented here thus pertain only to the Norwood and Medicine Hat communities, and between the eight-month period of December 2006 and July 2007.

5.2.1 In kind person-hour data for Norwood and Medicine Hat
December 2006 to July 2007

During these eight months, more community in kind person-hours were recorded in Norwood, while a considerable number of employee in kind person-hours were logged in Medicine Hat. Table 5.5 shows the breakdown by type of the total 7,155 in kind person-hours generated in Norwood and 4,328 in kind person-hours in Medicine Hat. We can see that the distribution of the different types of in kind person-hours collected in the two communities exhibits a similar pattern: over 85% of all in kind person-hours were derived from employees and community members at large during the first eight months of operation.

Table 5.5
Total In Kind Person-Hours by Type and by Community
December 2006 to July 2007

	Norwood		Medicine Hat	
	Number	% of total	Number	% of total
Employeed in kind person-	2,566	35.9%	3,205	74.1%
Volunteer in kind person-	808	11.3%	163	3.8%
Community in kind person-	3,781	52.8%	960	22.2%
Total	**7,155**	**100.0%**	**4,328**	**100.0%**

5.2.2 Combined total in kind person-hours
December 2006 to July 2007

As with direct costs in Section 5.1, the combined results for the two communities over the eight-month period are presented here to illustrate the average in kind person-hours that could be achieved over eight months using the HAC model. This combined total number of in kind person-hours accumulated is summarized in Table 5.6 below.

Over this eight-month period, 11,483 in kind person-hours were documented for HAC in the two communities. Over 50% of these came from engagement with persons employed by partners who buy in, which amounts to 5,771 employee in kind person-hours. Over 40%, or 4,741 in kind person-hours, came from engagement with community members, that is, the general public. The community in kind person-hours were, for the most part, generated from some community-wide events that HAC Community Coordinators attended. During these events, the Coordinators set up HAC displays to engage members of the community. Lastly, the volunteer in kind person-hours represents the person-hours gained either from engagement of employees of organizations on a voluntary basis, or from *individual* member(s) of the community who volunteer their time. The volunteer in kind person-hours represented 8.4% of the overall in kind person-hours.

Table 5.6
Total In Kind Person-Hours by Type
Sum of two Communities, December 2006 to July 2007

	Total in kind person-hours	Average in kind person-hour per month	
	number	number	% of total
Employee in kind person-hours	5,771	721	50.2%
Volunteer in kind person-hours	971	121	8.4%
Community in kind person-hours	4,741	593	41.3%
Total	11,483	1,435	100.0%

Averaged over the eight months, a combined monthly average of 1,435 in kind person-hours was generated in the two communities together (See Table 5.6).

Lastly, it would also be of interest to take a look at what is the expenditure needed to generate these in kind person-hours. Section 5.3 combines the two sets of data from Sections 5.1 and 5.2, direct cost and in kind person-hour or indirect cost, to illustrate the expenditures needed to generate these person-hours.

5.3 Combining Direct Costs with In Kind Person-Hours – What is the typical expenditure to generate one in kind person-hour for HAC?

Total expenditure for the community offices between September 2005 and August 2007 were averaged over the total number of in kind person-hours to come up with a dollar amount needed to generate one in kind person-hour.

From Table 5.3, we know that the average total expenditures in Norwood between September 2005 and August 2007 were lower than in Medicine Hat. These eight months is the period for which in kind person-hour data is available. During these eight months, average expenditures for Norwood was about 10% lower than for Medicine Hat, and the number of in kind person-hours generated was about 65% higher. At this stage of HAC, the Community Coordinators' immediate task was to engage local community

stakeholders to foster collaboration. With the commencement of stakeholder engagement, the generation of in kind person-hours began, and the logging of the number and type of in kind person-hours started to appear. The modified Activity Tracking Form was put into use from December 2006 (see Section 4.4.2).

With eight months of in kind person-hour data collected, it is possible to take a first look at the money outlay used to generate these in kind person-hours. The money outlay consists of operating expenditures of head office and the community offices, such as rents, salaries and so on, tallied in HAC monthly expense account. Using the location code, the money outlay for Norwood and Medicine Hat could be identified separately. With information on the total expenditure over this eight-month period, an average total expenditure needed to generate one in kind person-hour is calculated for the two communities to be: $6.09[19] in Norwood and $14.06 for Medicine Hat[20].

It would also be instructive to consider what potentially could be a *typical overall operating expenditure* needed to *generate* one in kind person-hour using the HAC model? Albeit with only two communities, some generalized overall cost analyses can be drawn from the eight-month data set. In total, there are 368 data points of in kind person-hours over this eight-month period. A combined overall average of these data points yielded *717.7 person-hours per month*, which could be taken to be illustrative of the ***typical number of in kind person-hours generated per community per month*** (derived from Tables 5.4 and 5.6). When this number is combined with the *typical* average operating expenditure of $5,702[21] per community per month, it would suggest that a ***typical community operating expenditure*** of generating one in kind person-hour using the HAC

[19] Norwood: first, total expenditure between December 2006 and July 2007 is $43,589.91. Second, total in kind person hours during the same period is 7,155; and third, an average total expenditure needed to generate one in kind person-hour is $43,589.91/7,155 = $6.09.
[20] Medicine Hat: first, total expenditure between December 2006 and July 2007 is $60,857.88. Second, total in kind person-hours generated during the same period is 4,328; and third, an average total expenditure needed to generate one in kind person-hour is $60,857.88/4328=$14.06.
[21] Total operating expenditures for the 8 months for Norwood is $43,589.91, and for Medicine Hat is $47,647.88; which together sum to $45,618.90. So the per community per month operating expenditure is $91,237.79 ÷ 2 ÷ 8=$5,702.36.

model to average $7.95[22]. If two-third[23] of the *typical Head Office operating expenditure* of $10,949.53 per month (between the same eight-month period of December 2006 and July 2007) were added to the typical expenditure of running two community offices, then ***a typical combined expenditure of generating one in kind person-hour using the HAC model (one head office, plus two community offices) would suggest*** **to be $15.58[24].**

5.4 Adjusting the Community In Kind Person-Hour Number

The number of community in kind person-hour typically relates to the number of people that HAC comes into contact with in large community functions. The idea is that these people, by attending the function, become aware of HAC. At the same time, the Community Coordinators also used these occasions to engage a numerous and diverse audience all at once. The Community Coordinator should typically estimate this number, judging by number of people who they talked to, people who stopped by, or people who strolled by and read the display. However, sometime the hubbub made it difficult for the Community Coordinator to do the estimation. So that there may be the possibility that the community-at-large in kind person-hours to be overestimated.

An exercise to adjust this community person-hour downward can be tried here, to see what impact the downward adjustment would have on the number of community person-hour. Suppose that the Community Coordinators were able to reach twenty-five out of every hundred attendees in all large community events. The adjusted monthly total in

[22] First, operating expenditure for one community per month is $5702.36 (averaged of the overall total for both communities between December 2006 and July 2007). Second, average monthly in kind person-hours generated per community is 717.7 (averaged of the overall total of 11,483 person-hours for both communities between December 2006 and July 2007). Third, the operating expenditure on a per community per month basis, $5,702.36 ÷ 717.7 gives $7.95.

[23] Two-thirds of Head Office expenditures is used because only two out of three community offices were considered in this calculation. So the assumption is that only two-thirds of the Head Office resources were needed to coordinate and supervise the two community offices. Two-thirds of the typical Head Office operating expenditure of $16,424.30 per month is $10,949.53 over the *eight months* period.

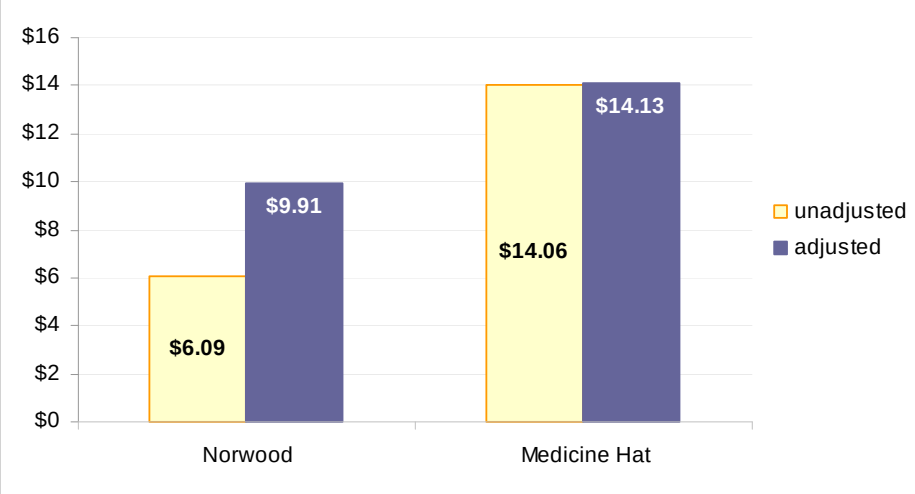
[24] First, Head Office operating expenditure is estimated to be $10,949.53 per month over this eight-month period. Add this to the monthly operating expenditure of two communities of ($5,702.36 by 2 or) $11,405 yield a combined operating expenditure of $22,354.53. Second, use the overall total in kind person-hours for two communities of 1,435 (or 717.7 x 2) per month for two communities combined. Third, the typical expenditures per month, one head office and two community offices using the HAC model, come to $22,354.53 ÷ 1,435 = $15.58,

kind person-hour will become 984.3[25] person-hours per community compared to an unadjusted total of 1,435 person-hours per month for the two communities combined. This would imply an adjusted average 5.6[26] in kind person-hours generated for each hour of the Community Coordinators' work, compared to an unadjusted 8.1 in kind person-hours. Alternatively, the adjusted monthly average in kind person-hours generated for Norwood and Medicine Hat would become 540 and 451 compared to the unadjusted 894 and 516 respectively. This adjustment lowers Norwood's average in kind hours by 50%, and Medicine Hat's average by 13.8%. The larger difference for Norwood was because the Community Coordinator attended more community events.

The adjusted average cost needed to create one in kind person-hour for Norwood and Medicine Hat becomes $9.91 and $14.13 respectively. Figure 5.4 compares the adjusted and unadjusted average operating expenditure that generated a typical in kind person-hour. The absolute cost difference is just above $3.00 per in kind person-hour for both communities. In percentage term, the difference is bigger for Norwood, 62.7% increase, than for Medicine Hat, 27.4% increase. The adjustment reduced the dissimilarity in the average costs between the two communities. Medicine Hat's adjusted average cost is 42% higher than Norwood's compare to over 80% before adjustment.

[25] First, total community in kind hours of 4,540 is adjusted to be 1,135 (i.e. 4540×0.25). Add this to 5,771 employee in kind hours and 969 volunteer in kind hours gives 7,875 total in kind hours over eight months (December 2006 to July 2007). Third, the average total in kind hours per month is 984.3 (i.e. 7875÷8).
[26] Calculated by using the same assumption of 7 hours in a work day, 25 days or 175 hours in an average work month for each community Coordinator. The adjusted average in kind person-hours generated per hour worked is 984.3÷175=5.6 in kind person-hours.

Figure 5.4
Adjusted Total Expenditure to Generate One In Kind Person-Hour by Community
December 2006 to July 2007



5.5 A Snapshot of the Results Presented

The main results from the above discussion are summarized as follows:

HAC community offices (September 2005 to August 2007)

- Start-up period in the community was about two month in duration, and start-up expenditure was around $6,890 per month. (p.51)
- Average operating expenditure in a community office was around $5,360 per month, post start-up. (p.51)
- Fixed cost which included salary is the dominant item in the monthly expenditure, making up between 82.7% and 84.5% of the total expenditures. (p.47)
- During the first 24 months, salary was the largest component (over 66%) of total monthly expenditure. Pay-out to community initiatives was the next largest expenditure item.
- The average operating expenditure needed to generate one in kind person-hour is $6.09 in Norwood, and $14.06 in Medicine Hat.

- When the community in kind person-hour is adjusted downward by 75%, the average operating expenditure needed to generate one kind person-hour becomes $9.91 for Norwood, and $14.13 for Medicine Hat. (p. 59)

HAC head office (September 2005 to August 2007)

- Five-month of start up period was apparent. (p. 53)
- Average expenditure for HAC Head Office was $14,202 per month. (p.47)
- Fixed cost including salary was over 77%, and variable cost was 22.8% of average total monthly expenditures. (p.47)
- Average monthly total expenditures for Head Office during the first 24 months were almost three times higher than the community offices. (p.47)
- The main reasons cited for the higher monthly expenditures are salary, rent, centralized administrative function, and marketing and promoting activities. (pp. 47 - 49)

Calculated Typical Expenditure, Using the HAC model (December 2006 to July 2007)
Using combined data

- Typical number of in kind person-hours generated per community per month is 717.7. (p. 58)
- Typical average monthly operating expenditure for a community office is $5,702 per community. (p.58)
- Typical average monthly operating expenditure for head office was $10,949.53. (p.57)
- Typical expenditure needed to generate one in kind person-hour is $15.58 using a model with one head office and two community offices.
- Typical expenditure needed in a community office only to generate one in kind person-hour is $7.95.
- Typically, the expenditure for head office only, to generate one in kind person-hour is $7.63[27].

[27] $10,949/1435 = $7.63. Using the number of in kind person-hours for one community.

These results are summarized in Tables 5.6 to 5.8 in the following pages.

Table 5.7
Direct Costs - Summary
September 2005 to August 2007

		Communities	Head Office (adjusted)
Start-up		discernible three-month period with average monthly expenditure of $7,700 per community	five months of startup expenditure during the first 30 months
Operational period		Estimated average monthly running cost of $5,360 per community	Estimated average monthly running cost of $16,890 (25 months)
Monthly average total expenditures (direct costs)		Norwood: $5,309 Medicine Hat: $6,070 St. Paul/Bonnyville: $4,700	$14,204
Monthly	***Fixed cost:***	82.7% - 84.5%	77.2%
	Variable cost:	15.5% - 17.3%	20.0%
	Rent:	2.5% - 8.0%	9.3%
	Salaries:	66.6% - 76.5%	66.2%
Share of location-related expenditures*		Norwood: 3.0% Medicine Hat: 6.0% St. Paul/Bonnyville: 6.9%	5.1%

Table 5.8
Indirect Costs - Summary
December 2006 to July 2007

		Norwood	Medicine Hat	Two Communities Combined
Total In kind person-hour		7,155	4,328	11,483
of which:	***employee***	2,566	3,205	5,771
	volunteer	808	163	971
	community	3,781	960	4,741
Total expenditure		$43,589.90	$60,857.88	$104,447.78
Average monthy expenditure		$5,448.70	$7,607.20	$13,055.97
Total expenditure per in kind person-hour		$6.09	$14.06	$9.10

Table 5.9
Typical Operating Expenditure to Generate one In Kind Person-Hour Using the HAC Model - Summary
Combined Direct Costs per In Kind Person-Hour (386 data points), December 2006 to July 2007

	One Community Office	One Head Office*	One Head Office*, Two Community Offices
Typical monthly operating expenditures	$5,702	$10,949	$22,353
Typical total in kind person-hours (8 months)	5,742	n/a	11,483
Typical in kind person-hours per month	717.7	n/a	1,435
Typical community expenditure to generate one in kind person-hour	$7.94	n/a	n/a
Typical head office expenditure to generate one in kind person-hour	n/a	$7.63	n/a
Typical overall expenditure to generate one in kind person-hour	n/a	n/a	$15.58

*The numbers for Head Office reflect adjusted rent.

Chapter 6

Discussion

This study lays the groundwork for the economic evaluation of the Healthy Alberta Communities project (or HAC). When considered in a wider perspective of the health economic evaluation literature, this study also lays the groundwork in pioneering a new methodology to define, measure and value the indirect cost of resources received in kind of community-based health promotion program. The direct cost incurred in the program was also assembled

HAC is an integrated health promotion project that is run by the Centre for Health Promotion Studies at the University of Alberta. HAC is centrally administered at HAC Head Office at the University, and implemented in four communities – Norwood, Medicine Hat, and St. Paul and Bonnyville[28]. Since interventions consist of HAC-funded, collaboratively developed, stakeholder- or partner-run initiatives, engaging a wide spectrum of partners which includes individuals, schools, charitable organizations, NGOs, health authorities, are indispensable. Partners who buy in to HAC thus contribute or donate their own resources in kind to the project.

This study is the first cost study that captures and directly measures these resources donated in kind. The in kind resource contribution is an indirect cost for HAC from a societal perspective. To date, the literature has yielded no published research that directly measures these resources.[29] A new methodology is developed here that defines in kind resource to be all HAC-related activities put out by non-HAC personnel, and measures the resource by time spent cum number/type of persons involved to generate one 'in kind person-hour'.

[28] Three communities, Norwood, Medicine Hat, and St Paul/Bonnyville, were established at the outset (end of 2005), but recruitment challenges in the St Paul/Bonnyville community led to the separation of this into two, served by two part time Coordinators from the beginning of 2008.
[29] One study, Johansson et al (2008, 2009) attempted to provide a value of "resource mobilization" by using an indirect imputation method.

Highlights of some general study results are as follows:

Direct Cost - General (September 2005 to August 2007)

- Expenditures at Head Office were two to three times higher than the Community Office costs because of higher rents and salary; and the cost of centralized functions such as marketing and hosting

Direct costs – Communities

- Total expenditures for each Community Office differed, on average, by a margin of between 15% and 40%, due largely to differences in rents and travel expenses
- Fixed costs represented over 77% of total expenditure
- The greater the distance from HAC Head Office, the greater the share of location-related expenses (telecommunications, travel, freight and delivery)

Indirect Costs (December 2006 to July 2007)

- Indirect cost is expressed in number of in kind person-hours
- Data was collected for Norwood and Medicine Hat only
- A total of 11,483 in kind person-hours logged in an eight-month period
- 50.2% were employee person-hours and 41.3% were community person-hours

The heavier bias towards employee-hours reported for both communities during the beginning phase of the operation may reflect a situation in which it is easier to engage the relatively more 'structured' part of the community, the public or private organizations, than the less structured volunteers or community members.

On an average monthly basis as well as on an overall eight-month basis, Norwood reported more community in kind person-hours, while Medicine Hat had more employee in kind person-hours. This difference may be a reflection of the personal strengths and experience of the respective Coordinators. In Norwood, the Coordinator works effectively with the local community and community groups. The Coordinator in Medicine Hat is more familiar with organizations in that city (see also Figure 4.3).

Monetary context to generate a typical in kind person-hour using the HAC model (using eight months of data)

- Total operating expenditure needed to generate a typical in kind person-hour, on average, is $6.09 in Norwood and $14.06 in Medicine Hat (Table 5.7)
- A typical monthly operating expenditure to generate an in kind person-hour using the HAC model (one Head Office and two community offices), between December 2006 and July 2007, is $19.39 with no rent adjustment and $17.45 with rent adjustment (section 5.3 and Table 5.9)
- Typical monthly community operating expenditure to generate an in kind person-hour is $7.95 (i.e. not counting Head Office costs; Table 5.8 and section 5.3)

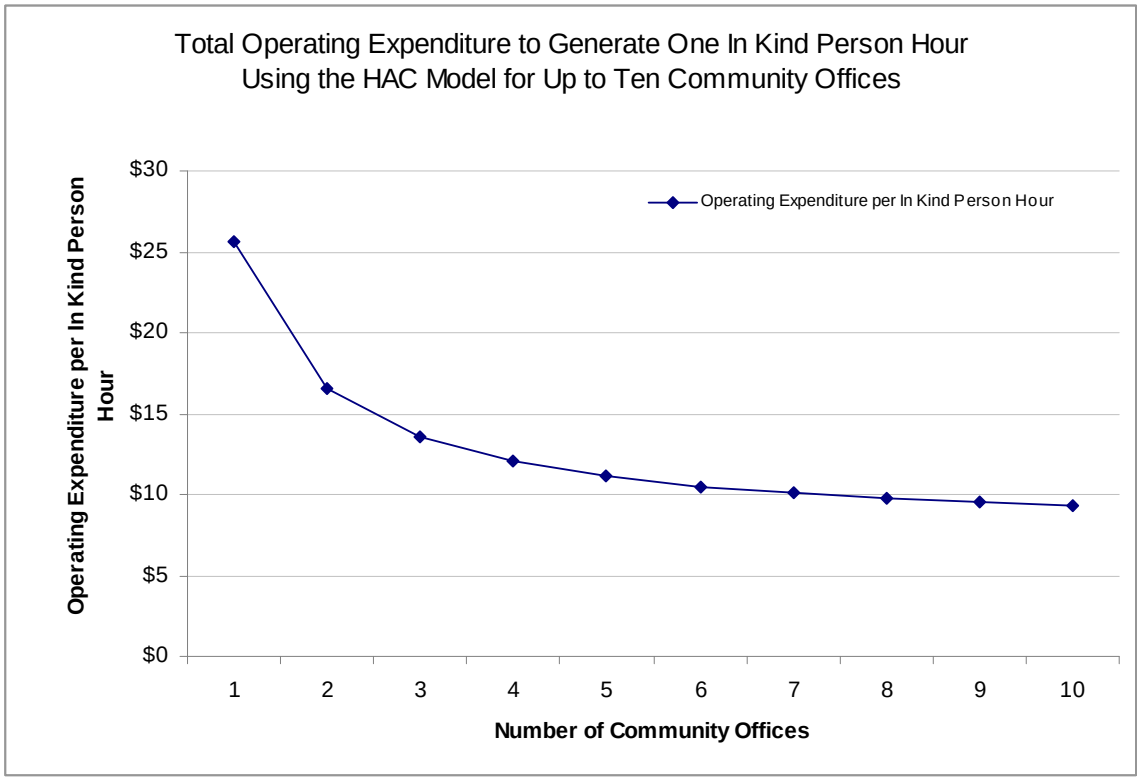
6.1 Economies of Scale in HAC Operations

The typical monetary context also suggests the presence of economies of scale in the HAC project, assuming constant head office costs. The expenditure per in kind person-hour falls quickly as more community offices are added. As one head office is able to oversee the work of a number of community coordinators (see Figure 6.1). The expenditure needed to generate an additional in kind person-hour falls $9.11 as the second community office is added; falls $3.04 with the addition of the third community office; falls $1.52 for the fourth, and $0.91 for the fifth. The savings in expenditure to generate an in kind person-hour continue to fall, but by an increasingly smaller amount as the number of community offices is added to the operation.

Beyond the sixth community office, the savings in expenditure of adding another office fall quickly. The seventh community office would result in savings of less than $0.50 per in kind person-hour. Adding a ninth community office would result in savings of less than $0.30 per in kind person-hour. Adding the fifteenth would result in savings of less than $0.10 per in kind person-hour. Figure 6.1 illustrate these changes that as the number

of community office increases, the advantages of economies to scale become smaller. However, since each new or additional community offices would also raise head office's variable costs, that are relatively small, the fall in total costs would be somewhat smaller than shown in Figure 6.1.

Figure 6.1
Economies of Scale in the HAC Model – Operating Expenditure Per In Kind Person-Hour from Adding Community Offices



6.2 Comparison with Other Study Results

As discussed in Chapter Four, the literature does not have any economic evaluations of community-based, ecological approach, public health programs that are multi-level, multi-sector in nature. However, economic evaluations of community-based randomized

controlled trials or single-theme intervention[30] programs have been done. Of non-RCT programs, only Johansson et al (2009) tried to account for indirect costs for the Safe Seniors in Sundbyberg (or SSS), a five-year community-based elderly safety promotion program in Sweden (Johansson et al, 2008 and 2009). Very few community-based randomized controlled trials consider indirect costs; one that does is the CENEX study on nutritional supplements for seniors in Chile (Walker et al, 2009). In addition to addressing the economics of the evaluation, which includes identifying expenses and/or cost savings, and calculating some outcomes in money terms; these studies took or would take into account indirect costs. That is, they define the indirect costs and devise a methodology to quantify, measure, and value them.

The economics of an evaluation generally involves using direct expenses from the program's financial records and calculating some money outcomes or benefits that come about because of the program. Expenses would include the costs in program setup, running the program, and administrative expenses. A money outcome could be some total cost savings, such as Johansson et al "total societal intervention costs" of SEK 6.45 million[31] [or USD 877,000][32] or CAD 1,008,550[33], and a "societal cost avoided" at conclusion that totalled SEK 280 - 550,00 [or USD 38 – 74,830] or CAD 43,700 – 86,054 per hip fracture prevented (Johansson et al, 2009, p. 179). Like HAC, the CENEX study is not completed and no results have been reported.

Addressing the issue of indirect cost in community-based programs requires researchers to characterize and measure the indirect costs or opportunity costs of the intervention which usually come from community participation. Attempts at this have been scarce hitherto. Being in uncharted territory, identifying and measuring indirect costs are open to the researcher's imagination and interpretation. Johansson et al defines 'resource

[30] As mentioned in Chapter 3, single-theme intervention means interventions that target a single specific health or health-related problem. The intervention typically is intended for certain sub-group(s) in the population. Examples of these programs are smoking cessation for youths, psychoeducation for bipolar disorder, fall prevention for seniors, weight management clinics.
[31] Johansson et al (2009), p. 179. Also to be noted here is that Johansson has discounted annually and then converted to 2004 price level.
[32] 1 USD=7.35 SEK from Johansson et al (2009), p. 179.
[33] Using 1 USD = 1.15 CAD.

mobilization' as the "resources committed by collaborating organizations ...[consisting of]...unpaid time or goods." (Johansson et al, 2009, p. 178). Walker et al defines opportunity cost to be the RCT participants' costs of forgoing the opportunities of doing other activities (Walker et al, 2009, p. 88). For HAC, the cost of the time donated by local community stakeholders who buy in is considered indirect costs.

The method used to measure indirect costs is as diverse as it is being defined. HAC measures and Walker et al will measure them directly, while Johansson et al measured them indirectly. Walker et al will use exit interviews to capture the RCT "patients' time [spent in the program] …valued in monetary units" (Walker et al, 2009, p. 88) to estimate participants' shadow wage of "what they would have been doing otherwise" (Walker et al, 2009, p. 88). This shadow wage rates will be based on "stated losses … valued at average wage rates [on] activities that would have been carried out if they were not at the health centre or exercise class" (Walker et al, 2009, p. 88). Johansson's "resource mobilization", based on Rifkin's definition,[34] was indirectly measured as the "proportion of total intervention costs paid by collaborators" (Johansson, 2009, p. 177). To find this proportion, Johansson split the total program costs by payer (p.180), then "the division of intervention costs between project funds and the local community collaborators" (Johansson et al, 2009, p. 180) was found to be 50% (Johansson et al, 2009, p. 181). This '50%' was then considered the share of local community contributions, and was taken to "be a measure of resource mobilization among collaborators" (Johansson et al, 2009, p. 181). The mobilized resources was taken to include participants' time costs, participants' fees, volunteers' time costs, and a wage cost (a money value of the time spent) for employees from collaborating organizations (Johansson et al, 2009, p. 179). HAC directly measures the number of person-hours donated by stakeholders who buy in, and a value will later be imputed by applying some provincial average wage rate.

Walker et al has not completed the study and no results were available. Johansson's total intervention costs were estimated to be SEK 6.45 million (Johansson et al, 2009, p. 179),

[34] where "community participation is a social process whereby specific groups with shared needs living in a defined geographic area actively pursue identification of their needs, take decisions and establish mechanisms to meet these needs." Rifkin et al (1988), p. 933.

and as mentioned, 50 per cent of this was assumed to be the "measure of local resource mobilization" (Johansson et al, 2009, p. 181). Thus the value of 'community participation' over the five years came to be SEK 3.2 million (Johansson et al, 2009, p. 180) or USD 435,370[35] or CAD 500,680[36] . HAC collected 11, 483 in kind person hours during the first eight months.

It is possible to do some crude comparison between HAC and SSS if Johansson's 'resource mobilization' was converted to an hourly amount and put against HAC indirect cost. First, a per-year average 'resource mobilization' for SSS would be CAD 100,136.[37] Secondly, Johansson et al reported that over the five years, the "total number of hours spent in the programme was 42,000 … [and] participants spent nearly half of these" (Johansson et al, 2009, p. 180); which comes to 21,000 hours by collaborators in five year, or 4,200 hours in a year. Thus the hourly value of the resources mobilized for collaborators would come to about CAD 23.84 in Canadian dollar.[38] This estimate is higher than HAC's community expenditure to generate a typical in kind person-hour of CAD 7.95 (p. 60), and the CAD 15.58 per in kind person-hour of HAC model with one head office, two community offices using adjusted head office rent (Table 5.9). However, because of the economies of scale in HAC operation, the addition to operating expenditure for one head office and four community offices would come to CAD12.70, which come closest to Johansson. Beyond that, HAC average expenditure would be lower than Johansson's.

It would also be instructive to construct some broad contrasts between HAC first 24-month results and the reported results from five years of SSS, bearing in mind that Johansson's costs were inferred estimates and not actual values. The above constructed dollar values would suggest that HAC compares favourably with SSS and that HAC has an efficient project design. That is to say that it is comparatively more economical to use

[35] 1 USD=7.35 SEK from Johansson et al (2009), p. 179.
[36] Using an exchange rate of USD 1 = CAD 1.15.
[37] $435,370 ÷ 5 years = $87,070 per year. Then using USD 1=CAD 1.15, it will convert to CAD 100,135.
[38] Using an exchange rate of USD1=CAD1.15; and Johansson et al (2009)'s SEK to USD exchange rate, p. 179. The per hour resources mobilized is CAD 100136 ÷ 4200 hrs = CAD23.84 per hour; where 4,200 hrs= 42,000 x 50% ÷ 5 years.

the HAC model to deliver a range of interventions and tackle the social determinants of health. To illustrate this statement, construct the following comparisons. The overall average hourly values of community resources mobilized or donated in the two studies are remarkably close at the community level, $11.92 for SSS and $7.95 for HAC (for a community office). Chapter Five reported that HAC generated collaborator involvement of 11,483 in kind person-hours over an eight-month period (Tables 5.6 and 5.8). In SSS, 42,000 hours were spent by participants in the program over the five years (Johansson et al, 2009, p. 180), or an average 8,400 hours in a typical year. When HAC eight-month in kind person hours are apportioned[39] to a twelve-month period, it would be a yearly 17,225 person-hours for two communities or 8,612 person-hours for one community. So the HAC project generated slightly more number of yearly hours of participation but has an hourly cost that is about 35% lower in a community than the derived $11.92 per hour estimated worth of Johansson's resources mobilized. Moreover, HAC per hour cost generates a bag of diverse interventions that benefit a cross section of the population.

The intention of this study is to lay the foundation to the economic evaluation of HAC by assembling data for the 'cost' side of the evaluation, thus the 'effectiveness' side of the evaluation is not part of this study. The effectiveness side of HAC economic evaluation will be drawn from results of HAC Outcome Evaluation that compares changes in community health, health activities or community capacity between the pre-intervention and post-intervention periods to give an indicator of the benefits of HAC.

Major design differences between HAC and SSS: When comparing these results dollar for dollar, other non-quantifiable differences between the two programs need to be taken into account as much as possible. For example, the dissimilarities in the nature, the scope, and the manner in which indirect resources were donated and recorded. HAC ecological approach involves a multiplicity of collaborators and interventions, as well as multiple health benefits. While the SSS is a single-theme intervention program that also involves public and some private sector resources. Although the theoretical framework of the Safe

[39] Assuming a zero rate of growth, and apportion an eight-month value to a twelve-month value. Thus, (11,483 x 12 ÷ 8 = 17,225 person-hours).

Seniors at Sundbyberg program was "community organization, a process of purposeful change and of mobilizing citizens and communities for health action" (Johansson et al, 2009, p. 178), and although local resources 'external' to the programs, such as "local public organizations, commercial companies and non-governmental organizations" (Johansson et al, 2009, p. 179) steered the project, the types and the extent of 'external' resources used was known by the time the economic evaluation was undertaken five years later. In addition, the number of collaborators remained unchanged throughout the life of the SSS. For HAC, community resources steer the development of all its intervention initiatives, but the type and the quantity of 'external resources' or who the local collaborators/partners are or will be mobilized are not known *a priori*. Not all of the partners join at the outset of HAC, nor do all partners remain for the entire duration. Nevertheless, both HAC and Johansson's studies are important first attempts at valuing societal resource contributions. Despite the differences, neither HAC's nor Johansson's methods are without shortcoming.

6.3 Do the Limitations of Johansson's Methodology Inform?

It is instructive to consider the limitations in Johansson's study. First, some important costs data were not collected but were estimated. For example, Johansson did not know the actual running costs of the program, such as expenses on telephone and office supplies, but estimated them to be "at 20 per cent of the wage cost" (Johansson et al, 2008, p. 13 and Johansson et al, 2009, p. 179) without rationalizing the choice of '20%'. If we use data from HAC operation, this percentage varies by location. For HAC Head Office, this could be up to 47.6%[40] of staff costs, or for the communities, 12.6% for Norwood, or 13.1% for Medicine Hat. Is Johansson's 20% a reasonable choice?

Secondly, there was no differentiating between the amounts of resources used by the steering group[41] versus the reference group[42] in Johansson's study. The two groups have

[40] The total of variable costs, plus costs of freight, telecommunication, promotion and trip as a percent of staff costs. Rents are excluded.
[41] They are "representatives from regional health-care management, primary care, local authority care of elderly people and a regional health planner."Johansson et al (2009) p. 178

different compositions, functions, and possibly intensity of involvement. Yet Johansson assumed that all engagements, regardless of the group, to be meetings with a fixed two-hour duration. This limitation also relates to the third shortcoming.

Third, as all meetings were assumed to be 2 hours long plus 1 hour travel time (Johansson et al, 2008, p. 13) this assumption works against the spirit of measuring the quantity of involvement, that is, the 'amount' of resources mobilized; as well as the quality of involvement. Underlying this assumption is the assumption that all resources are non-differentiated. In addition, the constant three-hour meeting assumes a constant "intensity of use" of mobilized resources.

Fourth, to estimate wage cost of employees in collaborating organizations, every employees were assigned into one of seven wage categories (Johansson, 2009, p. 179). This raises the question of how well are occupations represented by seven categories. The estimation errors could be amplified twofold due to error in assigning occupation and error in using an incorrect wage because of an erroneously assigned occupation.

Fifth, volunteers' time was valued at a discounted rate by using the "Swedish valuation of leisure time" (Johansson et al, 2009, p. 179); this is only tenable if volunteers were assumed not to hold a job.

Sixth, Johansson et al assumed the value of a meeting room to be 200 SEK, or equivalent value of USD 27.21 for the two hours, or USD 13.65 or CAD 15.70 per hour,[43] which suggest that either meeting rooms are quite inexpensive in Sweden or the cost was underestimated.

These shortcomings would suggest the importance of putting in place an evaluative framework at the outset of the project, so that relevant and meaningful data can be

[42] They are "representatives from local public organizations, commercial companies and non-governmental organizations."Johansson et al (2009), p. 179
[43] Since meetings were assumed to be two hour long

collected as the project progresses, instead using estimates. High data reliability strengthens the evaluation results and improves their utility in public policy decisions.

6.4 Limitations of HAC Methodology

HAC methodology also has its limitations. First, only resources donated to initiatives that receive direct HAC involvement are counted. Other initiatives 'induced' by HAC which could be considered 'second-round' benefits, are only counted where they can be tracked and by and large, in descriptive format. Certainly, the most relevant and paramount benefits are those that come about directly because of the intervention. So it is acceptable to count only benefits that result directly from HAC funded initiatives. Nonetheless, the Spinoff Activity Reporting Form was introduced to attempt to capture some of these second round benefits, at least for anecdotal analysis.

A second drawback is that non-personnel contributions were not directly counted. The rationale here was that HAC provides project funding to community initiatives, which would become self-sustaining over time. The project funding would pay for a large part of non-personnel expenses. The amount of funding is captured in HAC 'direct costs' and is recorded in HAC financial accounts. Also, whether it is the conception and planning stages of an initiative, or the running of the project, personnel resources are indispensable. However, this methodology does imply that contributions from personnel time are the principal source of in kind donations which is reasonable during the first years of "building relationships with local community stakeholders" (Raine et al, in press). There is no doubt that other in kind resources was donated. For example, the principal of Queen Alexandra School allowed the Boys and Girls Club to hold their activities in a room in the school. A comprehensive review of the HAC funded initiatives will be needed to determine how significant or otherwise is the donated non-personnel resources.

A third limitation is the possibility of a tendency for the community-at-large in kind hours to be overestimated. In Chapter 5, this number for both communities was adjusted

downward, and the results narrowed the dissimilarities between the two communities – increasing Norwood's expenditure needed to generate one in kind person-hour, while Medicine Hat's was changed slightly. HAC's presence in large community events no doubt create awareness to some members of the community who attended. The question is how many did benefit. This number who benefitted could also be influenced by factors other than talking with the Coordinator: factors such as the physical location of the HAC booth, the nature of the other activities happening at the same time, the size of the HAC booth or display compared to other display, and so on. In the Activity Tracking Form, the Community Coordinators have generally entered an approximate total number of attendees for the event. In the final economic analysis, a sensitivity analysis can be carried out to better estimate the proportion of persons who could be exposed and who buy in.

6.5 Strengths of the HAC methodology

Notwithstanding some limitations, the strength of HAC method rest in a number of advantages. The principal advantage mentioned in Chapter Four, of measuring in kind contributions in terms of 'activities' using the person-hour methodology is its great malleability. The in kind person-hour measure can accommodate changes or unforeseen events. It is able to measure not just the quantity of resource use, but reflect the nature and intensity of usage. It is also able to reveal the differences in complexity between initiatives; initiatives that are more complex will log more in kind person-hours. As well, it has the ability to tally resources expended in initiatives happening simultaneously without double counting the resource used.

Another advantage is that the measurement provides some useful detail because of its ability to distinguish donated resources into three types: volunteer, employees, or community, thereby yielding a richer database for fine-tuning in evaluation and analyses.

A third advantage is that the data collection method can yield highly reliable and comprehensive data at very low cost. The Community Coordinators' reporting

mechanism is comprehensive because it is like an office diary that keeps track of the Community Coordinators' work time. The data collected with this instrument is high in reliability and accuracy because the Community Coordinators know the collaborators and the capacity in which the person was present. Accuracy in reporting time can also be expected since there is no inducement for the Community Coordinator to do otherwise; and because their compensation are not time-dependent nor related to the number of people they met. Using this reporting instrument creates minimal burden for the Community Coordinators, but guarantees ease of collection, ensures high data validity and accuracy, and creates no extra expense.

Another advantage is that the data available in this study can support comparative analyses of cost effectiveness of different delivery methods to consider which method would have higher likelihood of success. For example, statistical inferences can be drawn to throw light on the relative significance of two delivery methods – personal networking compared to media-promoting/marketing – in generating community buy in. Since over 70% of HAC monthly expenditures are salary-related, this may imply that direct, personal networking, operating at ground level is a principal means in the current delivery mode of HAC interventions. Further analyses can look at what likely impacts or benefits HAC head office marketing and promotion expenses of over $26,000 (during the first 24 months) have on generating in kind hours in the communities?

A fifth advantage is that this method could easily be reproduced for any community-level project with similar setting. In fact, the Safe Seniors at Sundbyberg program employed a project coordinator (Johansson et al, 2009, p. 179) who would be able to gather similar data.

6.6 Implications and Contributions to Future Research

Going forward, the discussion and results presented here suggest a number of avenues that could be pursued for future research on evaluative work.

1. Implications for the design of the HAC model

By the conclusion of HAC, many more months of data will be added to extend the current database. The cost of generating a typical in kind person-hour using the HAC model can be more accurately calculated and assessed. The current analysis suggested an overall HAC community cost[44] of $7.95 per in kind person-hours generated, which is lower than Johansson's $23.84. However, when HAC head office costs are added, then the cost to generate an in kind person-hour (with one head office, two community offices) becomes $17.05[45], which more than doubles the overall expenses per in kind person-hour generated. This comparison suggests that HAC could be considerably more cost-efficient if head office expenses can be trimmed.

For example, HAC head office expenditures, even after rent adjustment, were found to be two to three times higher than the community offices'. These head office expenses, if added to the community cost, had greatly inflated the overall expenditure that is needed to generate in kind person hours. Future project design could make use of this information to devise means for budgetary control in project operations. Noteworthy though is the presence of economies of scale to head office functions for small increases in the number of community offices. However, beyond the sixth community office (section 6.1), this economies of scale quickly dissipate.

Another implication noted in this study for future work is to improve the way the community in kind person-hour is measured. An adjustment was made here to demonstrate one way of modifying it. This study also provided some suggestion on alternate method of measuring this. For example during large events, the Community Coordinators could tally, on the spot, the number of people who had talked to the Coordinators. This way, the recorded value will more accurately gauge of the number of community members with whom the Community Coordinators engage in a large event.

[44] That is, excluding head office expenses.
[45] The Head Office average expenditures between December 2006 and July 2007 were $13,056 a month. This is added to the estimated operating costs for the two communities of $5,702 per month. So an average monthly expenditure of $24,460 for 1435 monthly in kind person-hours; would yield $17.05 per in kind person-hour (see Table 5.8).

However, this method would also exclude those people who learned about HAC but did not talk with the coordinator. Therefore, further refinement could address this issue. Future application of this study's methodology could adapt methods that are streamlined to the specific project.

Another implication if the HAC model were replicated, is to ensure the mechanisms for collecting data, in particular the indirect cost data, are in place at the outset, as was done in this study. In so doing, errors and/or data deficiencies as occurred in the Johansson study could be avoided.

Lastly, if it is possible for future studies to take into account non-personnel resource donations from stakeholders, it would certainly enrich the indirect cost measure and enhance its accuracy. However, doing so will entail considerably more research input and resources to be committed to gather the data. This would be a project planning executive decision.

2. Contribution to the body of Public Health research

The foremost contribution to Public Health research is that for the first time, public health professionals have a method to gauge community participation in community level programs or projects. The importance of having this instrument is that the tenet of public health rests in the community and the individuals that make up the community. Albeit project outcome or changes in community health was not measured in this study, they belong to HAC outcome evaluation, the in kind person-hours instrument reflects activities of community groups, which is the significant apparatus that develops community programs, and which in turn is expected to help influence health outcomes. The in kind person-hour numbers thus is a demonstration of project results, an indirect link to health. Measures that reflect the extent of collaborative activities and community partnership is becoming an integral input for the success of public health programs and will become necessary inputs for public health research. Thus the methodology adds

considerable value to public health research by creating one of the significant wherewithal for research.

The value of using the in kind person-hour methodology also comes from the ease of use and the wide applicability of this methodology. It is exploitable under any circumstances for any program design as long as on the ground program operational personnel are in place. As well, the methodology can be used anywhere in the world, and within the public health context, for any community level health program. The methodology is particularly useful in jurisdictions or for public agencies without a large budget to spend; since this method is achievable with little or no extra budgetary requirement

3. Contributions to operational evaluative and monitoring of collaborative community-level public health programs or studies

For the public health professionals, the methodology affords a significant evaluative and monitoring tool for program planners or program coordinators. Capturing in kind person-hour data makes it possible to determine the volume and estimate the value of community participation in public health projects, which is one significant indicator of the project's success in the community. Program planners will be able to evaluate the success of their community level, collaborative programs. As the community-level approach to health promotion holds more promise over the successive former approaches, the need to evaluate community participation is increasingly in demand.

Moreover, the methodology can be used as a monitoring tool during the implementation of community-level collaborative health programs. As a monitoring tool, the in kind person-hour data affords a way to gauge the efficiency of the project design and the project operation. When these data are combined with operating expenses, the measure would give project leaders an on-going perspective on the productivity and the cost-efficiency of the resources used. The current and continuous feedback on the program's progress is a way to scrutinize a program's path and development.

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Appendix I

Activity Tracking Form

Healthy Alberta Communities
Centre for Health Promotion Studies
University of Alberta

Activity Tracking Form **Week of:**

Date:	
Location:	
Community Coordinator	
Name of Event	
Purpose of Event	
Event duration (no. hours)	
Reason for attending (awareness, networking, etc.)	
Sponsoring Agency (ies)	
Other agencies in attendance	
Attendees (#, descriptions):	
1.Employee, other agencies	
2.Volunteer, other agencies	
3.Public at large	
Description or other information about event	
Key Contacts	

Appendix II

Spin Off Activity Reporting Form

Healthy Alberta Communities
Centre for Health Promotion Studies
University of Alberta

Spin off Activity Reporting Form

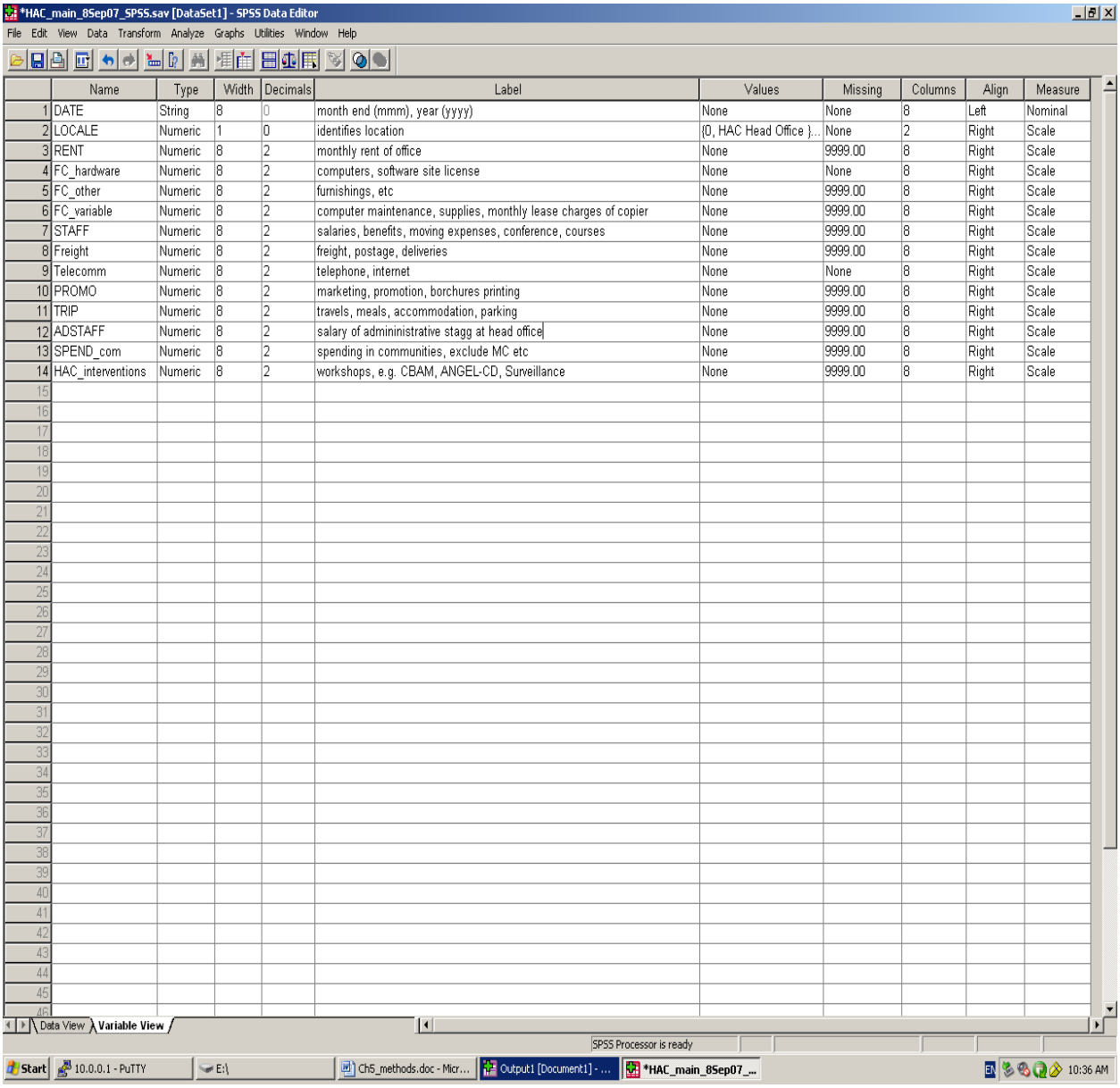
Date submitted:

Community Coordinator:	
Date(s) of event	
Name of Event	
Location	
Purpose of Event	
Event duration (hrs, days, wks)	
Organizing Agency (ies)	
Sponsoring agencies	
Other agencies involved	
Target population	
Estimated attendance	
Key Contacts	

Description: (e.g. how this come about? other thoughts, your comments etc)

Appendix III

Direct Cost Data Set
File Layout – Variable View


*HAC_main_8Sep07_SPSS.sav [DataSet1] - SPSS Data Editor

File Edit View Data Transform Analyze Graphs Utilities Window Help

	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure
1	DATE	String	8	0	month end (mmm), year (yyyy)	None	None	8	Left	Nominal
2	LOCALE	Numeric	1	0	identifies location	{0, HAC Head Office }...	None	2	Right	Scale
3	RENT	Numeric	8	2	monthly rent of office	None	9999.00	8	Right	Scale
4	FC_hardware	Numeric	8	2	computers, software site license	None	None	8	Right	Scale
5	FC_other	Numeric	8	2	furnishings, etc	None	9999.00	8	Right	Scale
6	FC_variable	Numeric	8	2	computer maintenance, supplies, monthly lease charges of copier	None	9999.00	8	Right	Scale
7	STAFF	Numeric	8	2	salaries, benefits, moving expenses, conference, courses	None	9999.00	8	Right	Scale
8	Freight	Numeric	8	2	freight, postage, deliveries	None	9999.00	8	Right	Scale
9	Telecomm	Numeric	8	2	telephone, internet	None	None	8	Right	Scale
10	PROMO	Numeric	8	2	marketing, promotion, borchures printing	None	9999.00	8	Right	Scale
11	TRIP	Numeric	8	2	travels, meals, accommodation, parking	None	9999.00	8	Right	Scale
12	ADSTAFF	Numeric	8	2	salary of admininistrative stagg at head office	None	9999.00	8	Right	Scale
13	SPEND_com	Numeric	8	2	spending in communities, exclude MC etc	None	9999.00	8	Right	Scale
14	HAC_interventions	Numeric	8	2	workshops, e.g. CBAM, ANGEL-CD, Surveillance	None	9999.00	8	Right	Scale

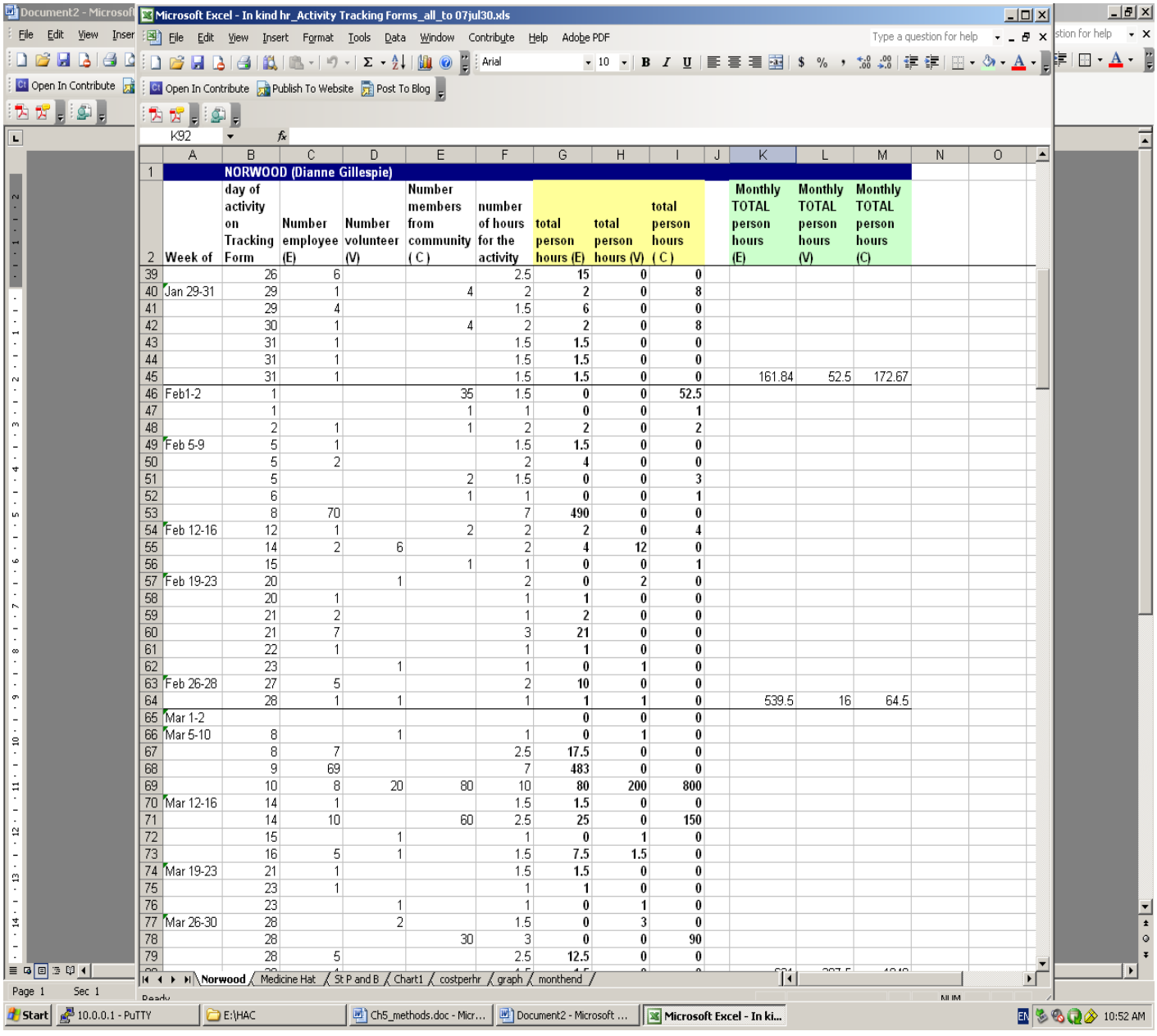
Data View | Variable View

SPSS Processor is ready

Start | 10.0.0.1 - PuTTY | E:\ | Ch5_methods.doc - Micr... | Output1 [Document1] - ... | *HAC_main_8Sep07_... | 10:36 AM

Appendix IV

Indirect Cost Data Set



Microsoft Excel - In kind hr_Activity Tracking Forms_all_to 07jul30.xls

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1		NORWOOD (Dianne Gillespie)													
2	Week of	day of activity on Tracking Form	Number employee (E)	Number volunteer (V)	Number members from community (C)	number of hours for the activity	total person hours (E)	total person hours (V)	total person hours (C)		Monthly TOTAL person hours (E)	Monthly TOTAL person hours (V)	Monthly TOTAL person hours (C)		
39		26	6			2.5	15	0	0						
40	Jan 29-31	29	1		4	2	2	0	8						
41		29	4			1.5	6	0	0						
42		30	1		4	2	2	0	8						
43		31	1			1.5	1.5	0	0						
44		31	1			1.5	1.5	0	0						
45		31	1			1.5	1.5	0	0		161.84	52.5	172.67		
46	Feb1-2	1			35	1.5	0	0	52.5						
47		1			1	1	0	0	1						
48		2	1		1	2	2	0	2						
49	Feb 5-9	5	1			1.5	1.5	0	0						
50		5	2			2	4	0	0						
51		5			2	1.5	0	0	3						
52		6			1	1	0	0	1						
53		8	70			7	490	0	0						
54	Feb 12-16	12	1		2	2	2	0	4						
55		14	2	6		2	4	12	0						
56		15			1	1	0	0	1						
57	Feb 19-23	20		1		2	0	2	0						
58		20	1			1	1	0	0						
59		21	2			1	2	0	0						
60		21	7			3	21	0	0						
61		22	1			1	1	0	0						
62		23		1		1	0	1	0						
63	Feb 26-28	27	5			2	10	0	0						
64		28	1	1		1	1	1	0		539.5	16	64.5		
65	Mar 1-2						0	0	0						
66	Mar 5-10	8		1		1	0	1	0						
67		8	7			2.5	17.5	0	0						
68		9	69			7	483	0	0						
69		10	8	20	80	10	80	200	800						
70	Mar 12-16	14	1			1.5	1.5	0	0						
71		14	10		60	2.5	25	0	150						
72		15		1		1	0	1	0						
73		16	5	1		1.5	7.5	1.5	0						
74	Mar 19-23	21	1			1.5	1.5	0	0						
75		23	1			1	1	0	0						
76		23		1		1	0	1	0						
77	Mar 26-30	28		2		1.5	0	3	0						
78		28			30	3	0	0	90						
79		28	5			2.5	12.5	0	0						

Norwood | Medicine Hat | St P and B | Chart1 | costperhr | graph | monthend