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Home Intravenous Anti-Infective Therapy:

A Systematic Overview of the Literature

by

Catherine P. Berry

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Nursing

Faculty of Nursing

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Faculty of Graduate Studies and Research

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled **Home Intravenous Anti-Infective Therapy: A Systematic Overview of the Literature** submitted by Catherine P. Berry in partial fulfillment of the requirements for the degree of Master of Nursing.

Dedication

This thesis is dedicated to my husband Stuart, our children Ashley and Alyssa,

and to my parents Pat and Vern Harvey.

Abstract

The purpose of this systematic review was to provide a valid overview of the best scientific evidence available regarding the physiological and psychosocial outcomes of home intravenous anti-infective therapy (HIVAT). More than eleven hundred potentially relevant studies were identified from a variety of sources including electronic databases, reference lists of retrieved articles, key informants, and the table of contents of key journals. Twenty-five of the studies measured the physiological and/or psychosocial outcomes of HIVAT on the patient and/or his or her informal caregiver(s) using a comparison group or control group and so were selected for inclusion. Validity criteria included design and allocation, inclusion and follow-up, control of extraneous variables, intervention, data collection, and data analysis. Using these criteria, eight studies were judged to be strong, eight moderate, and ten weak. At the time of validity testing, data relating to the physiological and/or psychosocial outcomes of HIVAT were extracted. Due to important differences in study participants, interventions, outcomes and designs, the extracted data were summarized but not statistically combined. The results suggest that HIVAT research is in its infancy and there is little scientific evidence to guide the use of HIVAT for children and adults with an infectious disease. Rigorously designed studies of sufficient size and breadth of outcome measures are needed to examine the physiological and psychosocial outcomes of HIVAT particularly among high-risk groups.

Acknowledgement

No achievement is truly the sole claim of one person and I would like to acknowledge those individuals who have assisted me in completing this thesis. First and foremost, I would like to sincerely thank my committee members Dr. Strang, Dr. Allen, Dr. Taylor and Sarah Hayward whose enthusiasm and knowledge made my thesis work a positive and empowered learning experience. I appreciate both the time and effort that each one exerted on my behalf.

I would like to thank Diane Goodwin and all of my other colleagues at the Calgary Regional Health Authorities Home Parenteral and Enteral Therapy Program for stimulating my interest in HIVAT and for providing me with the time away from work needed to complete this review. I am also grateful to the University of Alberta Faculty of Nursing, who in the provision of funding, helped to ease the financial burden and validated the merit of this research.

I would like to thank Cheryl Sharkey who spent countless hours assisting me with data collection, Barb Astle who served as the second reviewer, Ann Comeau who edited my thesis, and Darlene Bundgaard who provided secretarial support. Their enthusiasm never waned and I feel fortunate to have had the benefit of their knowledge, hard work, and support.

My appreciation goes out to all my family and friends who provided endless moral and practical support throughout the duration of this project. In particular, I would like to thank my mom, Pat Harvey, and my mother-in-law, Jean Berry, for all of their help with child care and meal preparation when I was having difficulty juggling family, work and thesis responsibilities. I would also like to thank my dear friends Gail Wyatt and Ann Comeau who so patiently listened to my despair and in so doing helped me to move forward.

Most of all, I would like to thank my husband, Stuart, and our daughters, Ashley and Alyssa, for their ongoing inspiration, patience, and acceptance. They shared in all the emotional highs and lows inherent in completing a thesis and were the source of many precious moments of revitalization.

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Chapter 1

Introduction

A physician is asked to see a patient with a history of intravenous drug abuse who has been diagnosed with Staphylococcus *aureus* endocarditis. The patient requires three more weeks of intravenous cloxacillin and gentamicin. The physician must decide whether to keep the patient in hospital for the duration of his/her treatment, or to discharge the patient home on intravenous anti-infective therapy. When making this decision, the physician questions whether the physiological outcomes of patients treated for Staphylococcus *aureus* endocarditis in hospital are the same as those who are treated with home intravenous anti-infective therapy (HIVAT). The physician also questions whether or not it is appropriate to prescribe HIVAT to a patient who has a history of intravenous drug abuse.

A nurse, new to the HIVAT team, faces an equally difficult decision. He/she is asked to see an elderly patient with a history of insulin dependent diabetes who has been diagnosed with contiguous osteomyelitis of her right foot due to Staphylococcus *aureus*. The woman has been assessed by an infectious diseases specialist who prescribed six weeks of HIVAT with cloxacillin. While in hospital, the nurses have had to restart the patient's peripheral intravenous every one or two days and the drug prescribed for HIVAT is known to cause phlebitis. The nurse must decide which of the various types of venous access devices currently available is most likely to provide the best HIVAT outcome.

Clinicians who face difficult decisions, such as those described above, and who want to incorporate evidence from the literature in their decision making, face a formidable task (Haynes, 1992; Oxman & Guyatt, 1988). As Haynes (1992) stated, "Most studies provide preliminary evidence at best because of limited scope, poor design or execution, or a sample size inadequate for important clinical benefits or adverse effects to be detected, or because of the play of chance" (p. 330). Therefore, prior to integrating the results of the original studies in his/her practice, the clinician must not only locate the studies, but also appraise and synthesize the information in them, all of which take time and skill (Haynes, 1992; Oxman et al., 1991).

A review article, in which someone else has taken the time to gather, appraise and synthesize the best available evidence, offers one solution to this problem (Haynes, 1992; Mulrow, 1987; Oxman & Guyatt, 1988; Oxman et al., 1991). However, unless the authors of the review used scientifically sound

methods to construct the review, the reader may end up with false conclusions (Haynes, 1992; Mulrow, 1987; Oxman & Guyatt, 1988). Indeed, the author of this thesis found that none of the published HIVAT related reviews met all eight criteria of a scientifically sound summary of evidence published by Mulrow (1987). Most distressingly, only one of the fifty-three reviews analyzed employed explicit criteria for identifying, selecting, and validating included information, potentially leaving the reviewers recommendations open to systematic and random error (Detsky, Naylor, O'Rourke, McGreer & L'Abbe, 1992). In this thesis the results of a new review, conducted utilizing scientific methods to limit the potential systematic and random errors associated with previously published reviews of HIVAT related literature, is presented.

Purpose of the Study

The purpose of the review was to provide a valid and current overview of the best scientific evidence available regarding the physiological and psychosocial outcomes of HIVAT.

Research Questions

A key component of any high quality systematic review is well-formulated research questions that clearly specify the types of people, intervention, and outcomes of interest (Counsell, 1997; Klassen, Jadad & Moher, 1998; Mulrow & Oxman, 1997; Oxman, 1994). The questions serve to guide the review by defining which studies will be included, what the search strategy to identify the relevant primary studies should be, and which data need to be extracted from each study (Counsell, 1997; Mulrow, 1987; Mulrow & Oxman, 1997). In addition, the questions aid the reader in rapidly judging whether or not the review is relevant to the issues he/she faces (Counsell, 1997; Hutchison, 1993; Klassen, Jadad & Moher, 1998; Mulrow & Oxman, 1997; Oxman, 1994; Oxman, Cook & Guyatt, for the Evidence-Based Medicine Working Group, 1994; Oxman & Guyatt, 1988).

The research questions used to guide the systematic review of the HIVAT literature were as follows:

1. What is known about the physiological and psychosocial outcomes of HIVAT in children and adults with an infectious disease and his/her informal caregivers?
2. What is known about the physiological and psychosocial outcomes of HIVAT among high-risk groups in comparison to inpatient treatment?

3. Are differences in the physiological and psychosocial outcomes of HIVAT associated with differences in diagnosis, medication, venous access device (VAD), method of delivery, and support?

Definitions of Relevant Terms

1. Anti-Infective - An antibacterial, antiviral or antifungal agent.
2. Community-Based Parenteral Anti-Infective Therapy (CoPAT) - A broad term used interchangeably with outpatient parenteral anti-infective therapy (OPAT) to describe the intravenous or intramuscular administration of an antiviral, antifungal, or antibacterial agent in various outpatient settings (i.e. a home, an infusion center, a physician's office, a skilled nursing facility, or a rehabilitation center) (Williams, Rehm, Tice, Bradley, Kind & Craig, 1997).
3. Comparison Group - A group of subjects whose scores on a dependent variable are used to evaluate the scores of the group under study when a control group is not part of the research design (Norwood, 2000). This definition includes before and after studies as well as other time series studies in which subjects serve as their own comparison group.
4. Control Group - Subjects in an experiment who do not receive the experimental treatment and whose performance provides a baseline against which the effects of the treatment can be measured (Polit & Hungler, 1983).
5. High-risk Groups - Patients that do not meet the stringent admission criteria traditionally used to assess eligibility for HIVAT (i.e. patient's with history of drug abuse, elderly, patient's with inadequate housing).
6. Home - The place where one lives. This definition does not include institutional homes where patients have access to more trained personnel than would typically be found in a patient's home (i.e. nursing homes, hospices, assisted living homes, or extended care facilities).
7. Home Intravenous Anti-Infective Therapy (HIVAT) - A type of CoPAT or OPAT that involves the intravenous administration of an anti-infective agent in the patient's home. See the definitions of home, intravenous, and anti-infective.
8. Informal Caregivers - Laypersons whom the patient identifies as being responsible for assisting him/her with HIVAT.

9. Intravenous Therapy - The administration of an anti-infective agent into venous circulation. This therapy does not include the administration of an intraluminal anti-infective agent as a "lock solution".

10. Meta-analysis - A statistical technique for assembling the results of several studies in a review into a single numerical estimate (McKinnell & Elliot, 1997).

11. Outcomes - All the possible results that stem from a therapeutic intervention such as HIVAT.

12. Outpatient Anti-Infective Therapy (OPAT) - A broad term used interchangeably with CoPAT to describe the intravenous or intramuscular administration of an antiviral, antifungal, or antibacterial agent in various outpatient settings (i.e. a home, an infusion center, a physician's office, a skilled nursing facility, or a rehabilitation center).

13. Physiological Outcomes - All possible results stemming from an intervention such as HIVAT that relate to the processes and function of the patient's body (i.e. temperature, forced vital capacity, weight, pain, and wound healing).

14. Psychosocial Outcomes - All possible results stemming from an intervention such as HIVAT that relate to the patient and/or his or her caregiver's mental health, social status and functional capacity (i.e. anxiety, stress, coping, satisfaction, and quality of life).

15. Review - Any attempt to synthesize the results and conclusions of two or more publications on a given topic (McKinnell & Elliot, 1997).

16. Systematic Reviews - Systematic reviews are scientific investigations in themselves, with pre-planned methods and an assembly of original studies as their 'subjects'. They synthesize the results of multiple primary investigations by using strategies that limit the bias and random error. These strategies include a comprehensive search for all potentially relevant articles and the use of explicit, reproducible criteria in the selection of articles for review. Primary research designs and study characteristics are appraised, data are synthesized, and results are interpreted (Cook, Mulrow & Haynes, 1997).

Chapter 2

Literature Review

In the second chapter of this thesis, relevant literature is reviewed. This review is divided into three sections. In the first section, the need for a review of the HIVAT literature is discussed. In the second section, the scientific methods necessary to limit the systematic and random errors frequently associated with reviews are detailed. In the final section, the methods used in previously published reviews of the HIVAT related literature are critically appraised.

Need for a Review of the HIVAT Literature

Rising health care costs has been the norm. Even after accounting for inflation and a growing population, health care spending in Canada rose steadily from 1975 until the early 1990s. Between 1993 and 1996 there were relatively small annual drops in expenditure per capita; however, this trend reversed in 1997 and 1998, the latest years for which inflation-adjusted figures are available. In 1999, per capita spending, unadjusted for inflation, was expected to have grown by another 4% (Canadian Institute for Health Information, 1999).

In an attempt to reduce deficits, Canadian and other governments have sought ways to slow the rising costs of health care. Given that hospital care is by far the largest category of health care expenditure, many of the attempts to reduce the costs of health care have been aimed at reducing hospital costs. Consequently, the hospital sector has changed. Most notably, the number of hospital beds, the number of overnight admissions to hospitals, as well as the length of hospital stays, have all been reduced (Canadian Institute for Health Information, 1999).

Largely as a result of the aforementioned changes in the hospital sector, a number of innovative home based infusion programs have emerged. Of these home based infusion programs, HIVAT, which involves the intravenous administration of antiviral, antifungal, and/or antibacterial agents to treat a variety of infectious diseases, has been and remains one of the fastest growing. In fact, in the United States home based infusion therapy has become a multi-billion-dollar-a-year industry, and HIVAT accounts for the largest share of both patients (60%) and revenues (38%). It is estimated that each year more than 400,000 patients requiring intravenous anti-infective therapy will be treated in the home and this figure is expected to grow by more than 25% per year (Saladow, 1995).

As the number of HIVAT programs have flourished, so has the research about the effectiveness of this type of therapy. In fact, a very precise search of the electronic databases, conducted prior to undertaking this systematic overview of the HIVAT literature, revealed numerous studies. Specifically the database entitled Embase, from 1988 to present, revealed 180 articles. Medline, 1986 to February 1998, revealed 116 articles and Healthstar, 1975 to February 1998, yielded an additional 12 articles.

Constrained by time, this explosion of HIVAT and other related biomedical literature is especially problematic to clinicians who want to incorporate the best available evidence in their decision making (Haynes, 1992; Klassen, Jadad & Moher, 1998; Mulrow, 1994; Oxman & Guyatt, 1988). As a guide to clinical action, the use of original research has other limitations as well. Haynes (1992) states,

> Most studies provide preliminary evidence at best because of limited scope, poor design or execution or a sample size inadequate for important clinical benefits or adverse effects to be detected, or because of the play of chance. Thus the reader must appraise each report and compare and integrate it with previous evidence to reach a decision about whether clinical policy should be changed on the basis of the accumulated information. Even when an original study is definitive by itself it will seldom address more than a portion of the clinical range of the problem. Inclusion and exclusion criteria for clinical trials, for example, typically select for the patients who are at highest risk of suffering bad consequences from their disorders and are most likely to respond to the intervention being tested, leaving the reader to speculate whether other patients might benefit (p. 330).

A review of the literature, defined as "... any attempt to synthesize the results and conclusions of two or more publications on a given topic", potentially offers one solution to the problem (McKinnell & Elliot, 1997, p. 1). However, reviews are retrospective, observational research studies and are therefore subject to both systematic and random errors (Cook, Mulrow & Haynes, 1997; Meade & Richardson, 1997). Therefore the usefulness of reviews as a guide to clinical action depends on the extent to which scientific methods have been used to minimize these errors (Cook, Mulrow & Haynes, 1997; Hunt & McKibbon, 1997).

Science of Review Articles

What are the specific scientific methods needed to minimize the systematic and random errors associated with review articles? As with any research, a review needs to answer a clearly defined research question. The question should clearly specify the population (such as mothers of newborns), the condition (for example, vaginal delivery), an intervention (such as discharge within 48 hours after delivery) and outcome (for example, maternal-infant bonding) of interest (Cook, Mulrow & Haynes, 1997; Counsell, 1997; Haynes, 1992; Klassen, Jadad & Moher, 1998; Mulrow, 1987; Mulrow & Oxman, 1997; Oxman, 1994; Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994; Oxman & Guyatt, 1988). Therefore, an example of a well-formulated research question is, Is maternal-infant bonding affected by the early discharge of mothers within 48 hours of vaginal delivery? As was noted in chapter one, the research question serves to guide the review by defining what the search strategy should be, which studies should be included, and which data need to be extracted (Counsell, 1997; Mulrow, 1987; Mulrow & Oxman, 1997). In addition, the question aids the reader in rapidly judging whether or not the review is relevant to the issues he/she faces (Counsell, 1997; Hutchison, 1993; Klassen, Jadad & Moher, 1998; Mulrow & Oxman, 1997; Oxman, 1994; Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994; Oxman & Guyatt, 1988).

A high quality review requires unbiased and complete identification of all studies that are relevant to the focus of the review and that are of sufficient quality (Dickerson, Scherer & Lefebvre, 1994; Mulrow, 1987; Mulrow & Oxman, 1997). Given that the studies may not have been published for reasons related to the findings and even when published may be difficult to find (Dickersin, Scherer & Lefebvre, 1994), the identification of all relevant studies for a systematic review is a most fundamental challenge requiring a variety of different search strategies (Dickersin, Scherer & Lefebvre, 1994; Hutchison, 1993; Jadad & McQuay, 1993; Klassen, Jadad & Moher, 1998; Oxman & Guyatt, 1988). Such strategies include the use of on-line databases, a manual search of journals not indexed, perusal of the reference lists of all relevant papers found, and personal communication with key informants (Counsell, 1997; Jadad, Moher & Klassen, 1998; Jadad & McQuay, 1993; Mulrow, 1987; Mulrow & Oxman, 1997; Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994; Oxman & Guyatt, 1988).

A comprehensive search utilizing a combination of the aforementioned search strategies will likely

lead to the retrieval of numerous articles that may not be directly relevant or that may be methodologically weak (Meade & Richardson, 1997; Oxman & Guyatt, 1988). Therefore, the reviewer must sort through all of the potentially relevant articles and select those that will be included. In order to do so in a way that minimizes bias, reviewers require a set of selection criteria that clearly specify the patients, exposures, outcome measures and study designs of interest (Klassen, Jadad & Moher, 1998; Meade & Richardson, 1997; Mulrow, 1987; Oxman, 1994; Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994; Oxman & Guyatt, 1988). As well, the selection criteria should clearly specify any time, language or publication restrictions (Klassen, Jadad & Moher, 1998). The selection criteria should be itemized on customized forms and be applied by two independent reviewers to each potentially relevant primary study (Meade & Richardson, 1997). Each reviewer should be blind to the other's decision and the extent of agreement recorded (Mulrow & Oxman, 1997; Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994; Oxman & Guyatt, 1988). Although agreement between two reviewers does not guarantee accurate decisions, the greater the agreement among reviewers, the more confidence readers can have in the results of the review (Meade & Richardson, 1997). Disagreements about whether or not a study should be included in a review are generally due to misunderstandings or oversights and should be resolved by discussion (Mulrow & Oxman, 1997).

The quality (defined as the "... extent to which the study design, conduct and analysis minimize the potential for bias) then needs to be assessed in all articles selected for inclusion (Meade & Richardson, 1997, p. 534). As Meade and Richardson (1997) explain, biased primary studies are more likely to be misleading and are therefore more likely to generate misleading reviews. There are a variety of techniques for assessing the methodologic quality of selected studies. Some reviewers may choose to focus on a few key design features. For example, if a review deals with treatment the reviewers might focus on randomization, concealment of randomization, and blinding to treatment allocation (Hunt & McKibbon, 1997; Meade & Richardson, 1997; Oxman & Guyatt, 1988). Other reviewers may choose to customize more comprehensive checklists (Jadad, Moher & Klassen, 1998; Meade & Richardson, 1997) or to use quantitative scales that provide a summary score for the overall quality of individual studies (Jadad, Moher & Klassen, 1998; Meade & Richardson, 1997). The results of the quality assessment can be used in many ways including: (1) as a threshold for inclusion (Cook, Sackett & Spitzer, 1995; Jadad, Moher & Klassen,

1998; Meade & Richardson, 1997; Mulrow & Oxman, 1997); (2) to simply inform the reader about the credibility of evidence (Jadad, Moher & Klassen, 1998; Meade & Richardson, 1997); (3) as a possible explanation for heterogeneity (Cook, Sackett & Spitzer, 1995; Meade & Richardson, 1997; Mulrow & Oxman, 1997); (4) in sensitivity analysis of the results (Cook, Sackett & Spitzer, 1995; Jadad, Moher & Klassen, 1998; Meade & Richardson, 1997; Mulrow & Oxman, 1997); (5) and/or as weights in statistical analysis of the results (Jadad, Moher & Klassen, 1998; Meade & Richardson, 1997; Mulrow & Oxman, 1997). Some of the strategies commonly used to minimize the potential for error during the quality assessment include the use of two independent reviewers (Hunt & McKibbon, 1997; Meade & Richardson, 1997; Mulrow, 1987; Mulrow & Oxman, 1997; Oxman & Guyatt, 1988), correspondence with study authors to clarify issues (Meade & Richardson, 1997; Mulrow & Oxman, 1997; Oxman, 1994; Oxman & Guyatt, 1988), and blinding to study results (Jadad, Moher & Klassen, 1998; Meade & Richardson, 1997; Mulrow & Oxman, 1997; Oxman & Guyatt, 1988). Again, the extent of agreement between the reviewers should be calculated and recorded (Hunt & McKibbon, 1997; Meade & Richardson, 1997; Oxman & Guyatt, 1988). When disagreements occur the reasons for the disagreements should be explored and consensus reached (Meade & Richardson, 1997).

At the time of assessing quality, data need to be extracted utilizing a pretested data collection form that serves three important functions. The data collection form is a visual representation of the review question and planned critical appraisal of included studies, it is the historical record of the decisions made throughout the review process, and it is the repository from which the analysis will emerge. Although the data collection form for each review will vary, there are similarities regarding the types of information that are needed including information about the study references and reviewers, verification of study eligibility, methods, participants, interventions, outcome measures, and results (Mulrow & Oxman, 1997).

If the extracted data are considered to be of poor quality they should be discarded. All other data need to be synthesized (Mulrow, 1987). This synthesis may involve quantitative and/or qualitative methods (Hunt & McKibbon, 1997; Mulrow, 1987; Mulrow & Oxman, 1997). In a qualitative review, the results of primary studies are compared, grouped, and contrasted but not statistically combined. In a quantitative review statistical methods are used to combine the results of two or more studies (Lau, Ioannidis & Schmid, 1997). Although it is generally desirable to utilize quantitative techniques to

synthesize study results, it is not always appropriate (Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994). For example, a meta-analysis should not be done if there is a lack of relevant data or if important differences in study participants, interventions, outcomes, or designs are recognized (Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994). Regardless of which method is chosen, the analysis requires a systematic approach. The first and most important step is to decide what comparisons to make. The next step is to prepare tabular summaries of the characteristics and results of the studies that are included in each comparison. This enables the reviewer to systematically investigate differences among studies, make estimates of effect across studies, and to judge how much confidence should be placed in those estimates (Mulrow & Oxman, 1997).

Finally, conclusions need to be drawn. Such statements are justified only when data have been collected, analyzed and integrated using the aforementioned scientific methods (Mulrow, 1987). The conclusions should be succinct and logically ordered summations of the data (Mulrow, 1987) that do not exceed the evidence of the review (Oxman, 1994). When applicable, these summations should be linked to the strength of evidence (Mulrow, 1987; Oxman, 1994) and should help the reader to understand the implications of the evidence in relation to practical decisions (Mulrow & Oxman, 1997).

Appraisal of Previously Published Reviews of the HIVAT Related Literature

Given that the aforementioned scientific methods must be used to limit systematic and random errors, assessing a review is a necessary step in determining whether results of a systematic review should be used in practice and if so, how they should be used (Cook, Mulrow & Haynes, 1997; Hunt & McKibbon, 1997; Hutchinson, 1993; Jadad, Cook & Browman, 1997). Several "checklists" for assessing the quality of a review have been published (Hutchinson, 1993; Jadad, Moher & Klassen, 1998; Klassen, Jadad & Moher, 1998; Moher, Jadad & Klassen, 1998; Mulrow, 1987; Oxman, 1994; Oxman & Guyatt, 1988; Oxman, Cook & Guyatt, for the Evidence-Based Working Group, 1994). While there are some differences in these lists, they all focus on the same sources of bias: how the problem was formulated; how studies were identified, selected for inclusion, and critically appraised; how data were collected and synthesized; and how the results were interpreted (Oxman, 1994). "Regardless of the method used to assess the quality, if a review is judged as having few flaws, and only minor ones, it may be appropriate for use in decision-making; if the flaws are critical or numerous, the review may be unsuitable in guiding

health care decisions" (Jadad, Cook & Browman, 1997, p. 1412).

Fifty-three reviews of the community-based parenteral anti-infective therapy (CoPAT) literature including HIVAT have been published since 1995. A critical appraisal of the scientific methods used in each of these reviews was conducted utilizing the checklist published by Mulrow (1987). Each criterion in this particular checklist is formatted as a question and was classified as specified, unclear, or not specified. The results of the methodologic assessment are summarized in Table 1. As can be seen from the table, no single review clearly specified all eight criteria. In fact, only two met five criteria, and the remaining 51 met three or less criteria. Eighteen of the reviews were written by more than one author (range 1 to 5) and the average number of references was 33 (range 2 to 175).

Table 1 Assessments of Methods Used in Previously Published HIVAT Related Reviews (N=53)

	Specified	Unclear	Not Specified
←---------- n = 53 ----------→			
Purpose	2	51	0
Data Identification	1	1	51
Data Selection	1	1	51
Validity Assessment	0	1	52
Qualitative Synthesis	5	10	38
Quantitative Synthesis	0	0	53
Summary	49	0	4
Future Directives	14	12	27
Adapted from: Mulrow, C. D. (1987). The medical review article: State of the science. Annals of Internal Medicine, 106(3), 485 – 488.			

Was the specific purpose of the review stated?

While all of the reviews analyzed had a statement regarding the population and exposure or intervention of interest, only a few articles included a clear statement regarding the outcomes of interest (Table 1). For example, Dalavasio (1997) simply stated that the focus of his review would be the use of OPAT for community-acquired pneumonia. Furthermore, the purposes of the reviews tended to be broad and exhaustive (Table 2). In fact, the majority of reviews synthesized literature involving both children and adults with a variety of different infections. These infections were treated with several different anti-infectives by the intravenous, intramuscular and in some cases the oral routes in a variety of community settings (i.e. patient's home, an infusion center or physician's office, a skilled nursing facility, and/or rehabilitation center). In the process of writing up these broad reviews, the authors typically covered numerous topics. For example, Tice (1997a) discussed evolution, benefits and risks, models, roles, patient

Table 2

Analysis of Previously Published HIVAT Related Reviews

	Published as a Series	POPULATION: Age: Children & Adults	POPULATION: Age: Children	POPULATION: Age: Adults	POPULATION: Diagnosis: A Variety of Diagnoses	POPULATION: Diagnosis: A Variety of Infections	POPULATION: Diagnosis: A Specific Infection	INTERVENTION: Drug: A Variety of Drugs	INTERVENTION: Drug: A Variety of Anti-infectives	INTERVENTION: Drug: One Specific Anti-infective	INTERVENTION: Rule: A Variety of Routes	INTERVENTION: Rule: Intravenous Only	INTERVENTION: Setting: A Variety of Settings	INTERVENTION: Setting: One Specific Setting	OUTCOMES: Economic	OUTCOMES: Clinical	OUTCOMES: Psychosocial	OUTCOMES: Pharmacological	ISSUES: Evolution	ISSUES: Benefits & Risks	ISSUES: Models	ISSUES: Roles	ISSUES: Patient Selection	ISSUES: Education	ISSUES: Anti-infective Selection	ISSUES: VAD Selection	ISSUES: Reimbursement	ISSUES: Quality Assurance	ISSUES: Amenable Infections	ISSUES: Infusion Devices	ISSUES: Legalities	ISSUES: Diagnostics/Monitoring	ISSUES: Infection Control	ISSUES: Other
Andes & Craig (1998)	▲	●				●			●			●	●												●				●					
Balinsky & Mollin (1998)		●			●			●				●	●							●	●	●	●	●		●	●		●	●	●			
Barman Balfour & Lamb (1998)		●				●				●	●		●						●	●	●		●		●	●	●		●	●		●		●
Barrio (1998)		●				●			●		●			●						●			●		●				●			●		
Brown (1998)	▲	●					●		●		●			●									●						●					●
Conlon (1996)		●				●			●			●	●							●	●	●	●		●	●			●	●				
Dagan (1995)				●			●			●		●		●						●	●		●	●	●	●			●	●				●
Dalovisio (1997)	■	●					●		●		●		●										●		●				●			●		●
Dalovisio & Dodd (1997)	■	●			●			●				●	●						●	●	●	●					●	●						●
Fox & Karachmer (1996)		●					●		●		●			●						●		●	●		●	●			●			●		●
Francioli, Stamboulin et al. (1998)		●					●		●		●		●							●	●	●	●	●	●	●	●		●	●		●		●
Gilbert, Dworkin et al. (1997)		●				●			●			●	●							●			●		●	●	●		●	●				
Grainger-Rousseau & Segal (1995)		●			●			●				●		●	●	●	●																	
Gunner Deery II (1998)	▲	●					●		●		●		●										●		●				●			●		●
Kayley (1996)		●				●			●			●		●						●	●		●	●		●			●	●		●		●
Klarnet (1997)	■																			●			●		●				●					●
Kreegal (1997)	■	●				●			●		●			●						●	●	●												
Kunkel (1997a)	■	●				●			●			●	●															●						
Kunkel (1997b)	■	●					●		●		●		●							●	●		●		●				●			●		
Kunkel (1998)	▲	●				●			●			●	●															●						
Leaver, Radivan et al. (1997)			●				●		●			●		●								●	●	●		●			●					●
Lutz Pitre et al. (1998)	▲	●					●	●				●		●							●	●	●		●	●	●	●	●			●		●
McKinley (1997)	■	●					●		●		●		●								●		●		●				●					●

▲ Published as one review in a series of reviews in the Infectious Disease Clinics of North America (1998), Volume 12, Number 4.

■ Published as one review in a series of reviews in a special report from Scientific American Medicine (1997).

Table 2

Analysis of Previously Published HIVAT Related Reviews Continued

	Published as a Series	POPULATION: Age: Children & Adults	Age: Children	Age: Adults	Diagnosis: A Variety of Diagnoses	Diagnosis: A Variety of Infections	Diagnosis: A Specific Infection	INTERVENTION: Drug: A Variety of Drugs	Drug: A Variety of Anti-infectives	Drug: One Specific Anti-infective	Rule: A Variety of Routes	Rule: Intravenous Only	Setting: A Variety of Settings	Setting: One Specific Setting	OUTCOMES: Economic	Clinical	Psychosocial	Pharmacological	Evolution	ISSUES: Benefits & Risks	Models	Roles	Patient Selection	Education	Anti-infective Selection	VAD Selection	Reimbursement	Quality Assurance	Amenable Infections	Infusion Devices	Legalities	Diagnostics/Monitoring	Infection Control	Other
Milkovich (1995)		●				●			●		●		●							●							●								
Milkovich & Reifan (1997)	■	●			●			●			●		●		●											●								
Mortlock & Schleis (1998)	▲	●				●			●			●	●						●				●		●				●					
Nathwani (1996)		●				●				●	●		●						●	●	●	●	●		●	●	●		●	●	●	●		●
Nathwani (1998)		●				●				●	●									●	●		●		●	●	●		●	●		●		●
Nathwani, Seaton et al. (1997)		●				●			●		●								●	●	●	●	●		●	●	●	●	●	●		●		●
Nolet (1997)	■	●				●			●			●													●				●				
Nolet (1998)	▲	●				●			●		●								●	●	●	●	●	●		●			●					●
Petrak (1998)	▲	●				●			●		●									●	●	●	●		●	●	●	●	●	●		●		●
Phillips (1997)				●			●		●			●										●	●	●		●			●			●		●
Poretz (1998)	▲	●				●			●		●								●		●		●		●	●	●	●	●	●				●
Powell (1997)	■		●			●			●		●												●						●				
Powers (1997a)	■	●				●			●		●			●							●	●				●			●				
Powers (1997b)	■	●					●		●		●		●								●		●	●	●				●			●		●
Rehm (1998)	▲	●					●		●		●		●						●	●			●	●	●	●			●	●		●		●
Schleis (1997)	■	●				●			●		●		●												●								
Schleis & Tice (1996)		●			●			●				●	●																●				
Tice (1995)		●				●			●			●	●						●		●	●									●		●
Tice (1997a)		●				●			●			●	●						●	●	●	●	●	●	●	●	●	●	●	●	●		
Tice (1997b)	■	●				●			●		●			●						●	●	●				●							
Tice (1997c)	■	●					●		●		●		●										●		●	●			●	●		●		●
Tice & Nolet (1997)	■	●				●			●		●		●								●	●											

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Table 2

Analysis of Previously Published HIVAT Related Reviews Continued

	Published as a Series	Age: Children & Adults	Age: Children	Age: Adults	Diagnosis: A Variety of Diagnoses	Diagnosis: A Variety of Infections	Diagnosis: A Specific Infection	Drug: A Variety of Drugs	Drug: A Variety of Anti-infectives	Drug: One Specific Anti-infective	Rule: A Variety of Routes	Rule: Intravenous Only	Setting: A Variety of Settings	Setting: One Specific Setting	Economic	Clinical	Psychosocial	Pharmacological	Evolution	Benefits & Risks	Models	Roles	Patient Selection	Education	Anti-infective Selection	VAD Selection	Reimbursement	Quality Assurance	Amenable Infections	Infusion Devices	Legalities	Diagnostics/Monitoring	Infection Control	Other
		POPULATION						INTERVENTION							OUTCOMES				ISSUES															
Tice, Nolet et al. (1997)	■	●				●			●		●		●									●												
Tice (1998a)		●				●			●		●		●						●	●	●	●			●	●		●	●					
Tice (1998b)	▲	●					●		●		●		●							●	●		●		●	●	●	●	●	●				
Tice (1998c)	■	●					●		●		●		●						●	●	●		●		●	●	●		●	●		●		●
Wade & Bush (1998)	▲	●				●			●			●	●											●		●		●				●		●
Williams (1996)		●				●			●			●		●						●	●		●		●	●	●		●	●		●		●
Williams et al. (1997)		●				●			●		●		●							●	●	●	●	●	●	●	●	●	●			●		●
Williams & Raymond (1998a)	▲	●				●			●		●		●												●		●			●		●		
Williams & Raymond (1998b)		●				●			●				●									●		●			●					●		●
Wright (1996)		●				●			●		●		●										●	●	●	●		●		●				

▲ Published as one review in a series of reviews in the Infectious Disease Clinics of North America (1998), Volume 12, Number 4.

■ Published as one review in a series of reviews in a special report from Scientific American Medicine (1997).

selection, education, anti-infective selection, venous access device selection, economics, quality assurance, amenable infections, infusion devices, legalities, and monitoring. The fact that the purpose of most reviews was broad and exhaustive is problematic. While such reviews may be useful for clinicians seeking a broad overview of HIVAT, according to Oxman and Guyatt (1988), they tend not to provide support for the inferences they make. Rather inferences are presented as facts followed by one or more citations. As a result, unless the clinician reads all the articles cited, he or she has no basis upon which to judge the strength or validity of the inferences.

Were sources and methods of the citation search identified?

The source and methods of the citation search were clearly identified in only one of the HIVAT literature reviews (Barman Balfour & Lamb, 1998). While Grainger-Rousseau and Segal, (1995) stated the source of data collection (Medline), they did not identify any time, language or publication restrictions. Nor did they specify which search terms were utilized. Given that all other reviewers failed to provide any information about their sources and/or methods of citation search, readers are left to speculate whether included information was identified from "... automated databases, expert consensus, textbooks, present contents of personal files, or personal-favorite selections" (Mulrow, 1987, p. 486).

Were explicit guidelines provided that determined the material included in and excluded from the review?

Only Barman Balfour and Lamb (1998) clearly identified a set of explicit guidelines used to determine what data were included and excluded from their review. Grainger-Rousseau and Segal (1995) simply stated empirical studies concerning the effect of home infusion therapy on economic, clinical and/or psychosocial outcomes were selected but did not identify any other design or population characteristics used to include or exclude from their review. Nor did they specify whether selections for inclusion were made by more than one reviewer. The fact that all but these two reviews failed to identify the procedures used to select data means that readers must judge whether data reviewed represent all the information available on the subject or whether authors preferentially cited data that supported their views. This judgement requires either considerable knowledge of the topic and/or considerable faith in the objectivity of the reviewers (Mulrow, 1987).

Was a methodologic validity assessment of material in the review performed?

Although one of the critically appraised reviews of the HIVAT literature appears to have performed a methodologic validity assessment of material included in the review, it is unclear how this assessment was conducted (Grainger-Rousseau & Segal, 1995). For example, Grainger-Rousseau and Segal (1995) did not identify whether a standardized appraisal form was used to optimize uniform assessment. Nor did they identify whether assessments were conducted by more than one reviewer to avoid single reviewer bias. Because all but one review failed to perform a methodologic validity assessment, it is difficult for the reader to judge what conclusions are justifiable and whether or not the results of the reviews are generalizable (Mulrow, 1987).

Was the information systematically integrated with explication of data limitations and inconsistencies?

Although many of the reviewers (n = 38) merely listed findings, some (n = 10) provided a degree of qualitative integration by mentioning limitations and inconsistencies in existing data. Although this qualitative synthesis was often brief, five reviews explored differences in published reports concerning home infusion therapy in greater detail. For example, Tice (1998c) explored differences in studies about the use of OPAT for fever and neutropenia in light of differences in protocols and readmission criteria. Francioli, Stamboulin, and the Endocarditis Working Group of the International Society of Chemotherapy (1998), discussed differences in studies about the use of OPAT for infective endocarditis in light of patient selection criteria. These more thorough analyses provided the reader with useful insights about the generalizability of findings.

Was the information integrated and weighted or pooled metrically?

None of the reviews weighted or pooled data metrically.

Was a summary of pertinent findings provided?

Pertinent findings were summarized in the initial abstract or the last paragraphs in 49 reviews. These summaries tended to be very broad and varied in length from one sentence to several paragraphs. Given that scientific methods were not used to collect, analyze or synthesize the data, the summaries must be interpreted with caution (Mulrow, 1987).

Were directives for new research initiatives proposed?

The authors of 12 reviews clearly identified gaps in existing knowledge. Fourteen reviews also suggested specific directives for future studies. Examples of the types of directives provided included: (1) need to conduct studies of drug stability under conditions imposed by various infusion devices used in OPAT (Gilbert, Dworkin, Raber & Leggett, 1997); (2) multi-center outcome studies regarding the use of venous access devices for OPAT (Nolet, 1997); (3) clinical and economic outcome studies of the use of OPAT in long term care facilities (Petrak, 1998); (4) cost analyses that consider pump acquisition costs, reimbursement, patient training time and cost of disposable supplies (Scleis & Tice, 1996).

Conclusion

The pace of HIVAT research, our increasing need for valid, relevant information and limited resources to find, appraise and apply this information underscore the need for a rigorous review of the HIVAT literature. Unfortunately, none of the fifty-three HIVAT related reviews, critically appraised in the latter part of this chapter, used scientific methods to identify, assess, and synthesize the information. Although purposes were stated in most reviews, the sources and selection methods of reviewed data were only defined in two of the reviews. Standardized methodologic criteria for assessing the validity of the data were only used in one review and synthesis of data tended to involve informal qualitative critiques rather than quantitative methods. Summaries were made without showing careful reviewing techniques, and future research directives were often neglected. Although most of the reviews provided useful overviews of topics, their methods were not replicable and therefore their conclusions may not be valid. In order to advance scientific knowledge a new review that utilizes methods to limit some of the systematic and random errors potentially associated with the previously published HIVAT related reviews is needed.

Chapter 3

Methods

In the third chapter of this thesis, the methods used to review the HIVAT literature are described. This description is divided into two sections. In the first section, the systematic review method is defined. In the second section, the specific strategies used to limit the bias and random errors in the review are discussed. The latter section is organized according to the steps involved in conducting a good systematic review namely, study identification, study selection, study validation, data extraction, and data analysis.

Definition

In order to provide a valid and current overview of the best scientific evidence available regarding the physiological and psychosocial outcomes of HIVAT, a systematic review of the HIVAT literature was conducted. Cook, Mulrow and Haynes (1997) define systematic reviews as,

> ... scientific investigations in themselves, with pre-planned methods and an assembly of original studies as their 'subjects'. They synthesize the results of multiple primary investigations by using strategies that limit the bias and random error. These strategies include a comprehensive search for all potentially relevant articles and the use of explicit, reproducible criteria in the selection of articles for review. Primary research designs and study characteristics are appraised, data are synthesized, and results are interpreted (p. 377).

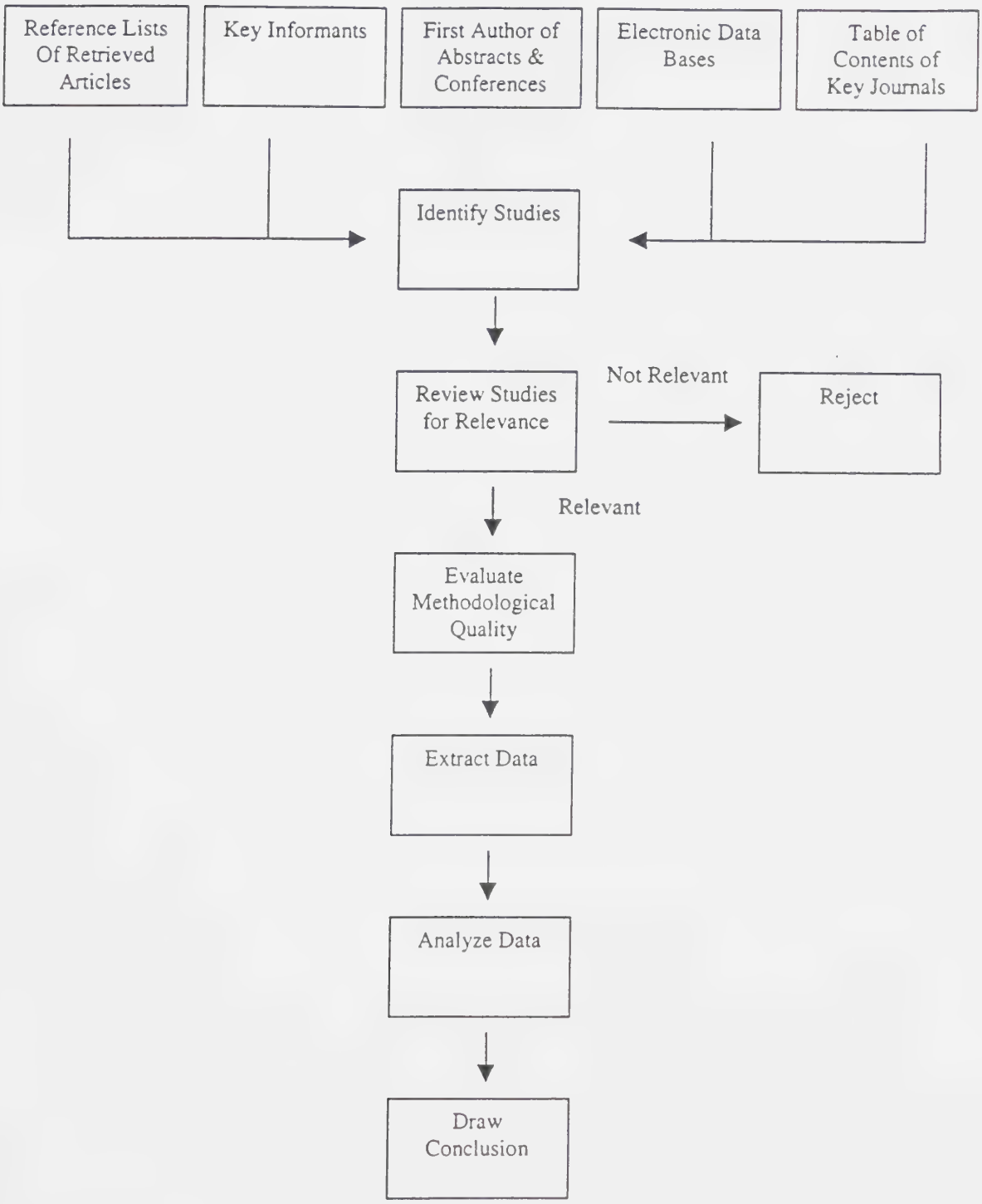
Steps

As outlined in Figure 1, this systematic review of the HIVAT literature involved several steps including identifying studies, reviewing studies for relevance, evaluating methodologic quality of selected studies, extracting and analyzing data, as well as drawing conclusions. In accordance with the recommendations of Cook, Mulrow & Haynes (1997), scientific methods aimed at limiting the bias and random errors frequently associated with review articles were incorporated into each of the steps.

Study Identification

A variety of complementary search strategies were used to identify potentially relevant articles beginning with an on-line search of Medline, EMBASE, CINAHL, HealthSTAR, Dissertation Abstract International, The Cochrane Controlled Trial Register, Papers First, Proceedings First, and ProQuest

Figure 1
Overview of the Systematic Review Process
Adapted from: Hayward, S. (1997). Systematic Research Overview Pilot. Alberta Heritage Foundation for Medical Research



Digital Dissertations (Appendix A). This search was conducted under the direction of a medical librarian and dated back to 1974 when, according to Balinsky and Nesbitt (1989) and Bertino (1984), the first HIVAT study was conducted. Although not ideal, due to limited resources this search was limited to the English language. Key words used in the search were taken from the titles and abstracts of relevant articles that were already gathered and included "community", "home", "outpatient", "clinic", "ambulatory", "parenteral", "intravenous", "infusion", "anti-infective", "antibiotic", "antifungal", and "antiviral".

The table of contents of key medical, pharmaceutical and nursing journals (Infectious Diseases Clinics of North America, Clinical Infectious Diseases, Antimicrobial Agents and Chemotherapy, Drugs, Journal of Intravenous Nursing, Canadian Intravenous Nursing, and Canadian Intravenous Nurses Association) were manually searched back to 1990. In addition, several key informants (Appendix B) who recently co-authored a set of clinical practice guidelines for CoPAT, as well as twenty-four members of the OPAT Registry were contacted (Appendix C) to help locate published and unpublished papers. Finally, the reference lists of all articles reviewed for relevance were manually checked for studies not previously identified through other sources.

Study Selection

To sort through all of the potentially relevant articles and select those that would be included in the review, an explicit set of selection criteria and a dictionary were developed, pretested, and revised (Appendix D). As outlined in the selection criteria, for an article to be included in the review the study must have measured the physiological and/or psychological outcomes of HIVAT on the patient, and/or his or her informal caregiver(s) utilizing a comparison or control group.

Both the primary and secondary reviewers reviewed a randomly chosen subset of twenty articles. As there was a high level of agreement between reviewers on the overall rating of an article as relevant (kappa = 0.83), the primary reviewer independently reviewed the remaining articles (Appendix E). The one disagreement that occurred was resolved through discussion between the reviewers.

Study Validation

To evaluate the methodological quality of the relevant studies, a validity tool which had been used in another review (Godkin, Onyskiw & England, 1997) was modified, pretested, and revised (Appendix F). This tool included criteria for each of the following six categories: (1) inclusion criteria and follow-up; (2)

design and allocation to intervention; (3) control of extraneous variables; (4) control of intervention; (5) data collection; (6) data analysis and conclusions.

As specified in the validity tool, criteria in each category were assigned a score. Scores were summed to provide a category score. The category score was rated as weak, moderate, or strong depending on this score. The number of weak, moderate and strong category scores was summed to provide an overall validity rating. Any study which had two or more weak scores received an overall weak rating; any study with three or more strong scores and no weak scores received an overall strong rating; any study with less than two weak scores and less than three strong scores received an overall moderate rating.

It is important to note that the current state of research in the area of HIVAT was considered when the validity and overall rating systems were modified. In fact, few studies used experimental or even before-after designs with a control group. Hence, a "strong" rating in this overview reflects the strongest design of the studies that were available for this review and it should not be directly compared to a strong rating in other reviews that may have used more stringent validity tools.

It was not possible to achieve a Kappa of 0.8 between the two reviewers when ten articles were randomly selected from the twenty-five relevant articles (Appendix G). Therefore, both reviewers reviewed all remaining articles. Most discrepancies occurred as a result of oversights and/or misunderstandings related to the validity tool and were resolved through discussion resulting in consensus.

Data Extraction

At the time of reviewing the studies for validity, the primary reviewer independently extracted the study findings utilizing a data collection tool that was developed, pretested and modified for this review (Appendix H). This tool included background information (i.e. country where study conducted), as well as information about the purpose of the study, the research methods, and the participants (i.e. age, gender, diagnosis, inclusion and exclusion criteria, and setting of studies). The tool also included information about the intervention and how it was delivered (i.e. agents and doses, duration of therapy, provider, education, venous access device, infusion device, and follow-up). Finally the tool included information about outcomes.

Data Analysis

Data from studies that received a moderate or strong rating were synthesized using descriptive techniques. This means that the results from the moderate and strong primary studies were compared, grouped, and contrasted but not statistically combined. The reasons for not statistically combining the data included the lack of relevant, valid data and data that were too heterogeneous. As recommended by Mulrow and Oxman (1997) a systematic approach was taken to this summary. This two-step approach first involved preparing tabular summaries of the characteristics and results of the studies. Common themes and differences among the studies were then explored in relation to the research questions.

Conclusions

Based on the systematic collection, analysis, and integration of data, conclusions were drawn. These conclusions are succinct summations of the data linked to the strength of evidence and aimed at helping the clinicians and researchers to understand the implications of the evidence in relation to practical issues they may face.

Conclusion

In order to provide a valid and current overview of the best scientific evidence available regarding the physiological and psychosocial outcomes of HIVAT, a systematic review of the HIVAT literature was conducted. In accordance with the recommendations of Cook, Mulrow and Haynes (1997), this systematic review included a comprehensive search for all potentially relevant articles and the use of explicit reproducible criteria in the selection of articles for review. Primary research designs and study characteristics were appraised, data was synthesized and results were interpreted using strategies aimed at limiting systematic and random errors.

Chapter 4

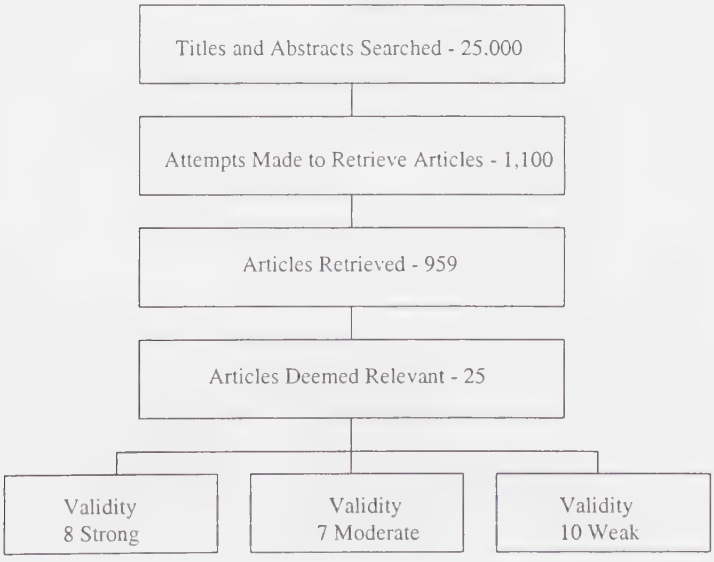
Findings

In the fourth chapter of this thesis, the findings of the review are presented. This presentation is divided into three broad sections. In the first section, the results of the study selection process are reported. In the second section, characteristics of study participants (i.e. age, diagnosis), interventions (i.e. type of medication regimen, venous access device, method of delivery, support) and outcomes (i.e. physiological, psychosocial) are reviewed. In the final section, the findings of the strong and moderate articles are described.

Results of the Study Selection Process

The various search strategies undertaken during the conduct of this systematic review of the HIVAT literature resulted in the screening of more than 25,000 abstracts and titles (Figure 2). Of the more than 25,000 abstracts and titles screened, approximately 1,100 of them were deemed potentially relevant and so attempts were made to retrieve them. Of the 959 successfully retrieved articles, 934 did not meet one or more of the relevance criteria and so were excluded. The remaining 25 studies were subjected to validity testing. As a result of the validity testing, eight of the studies were judged to be "strong", seven "moderate", and ten "weak" (Appendix I).

Figure 2 - Results of Study Selection Process



As can be seen from Table 3, all of the studies reviewed, including even the strongest studies, had a variety of methodological weaknesses. The findings of this review must be considered in light of these limitations.

Table 3 – Methodological Assessment by Category of Relevant Studies

	Number (Percentage) of Studies (Total n = 25)		
Category	**Strong**	**Moderate**	**Weak**
Inclusion and Follow-Up	12(48%)	12(48%)	1(4%)
Design and Allocation	3(12%)	18(72%)	4(16%)
Control of Extraneous Variables	11(44%)	9(36%)	5(20%)
Intervention	3(12%)	10(40%)	12(48%)
Data Collection	8(32%)	10(40%)	7(28%)
Data Analysis and Conclusions	14(56%)	9(36%)	2(8%)

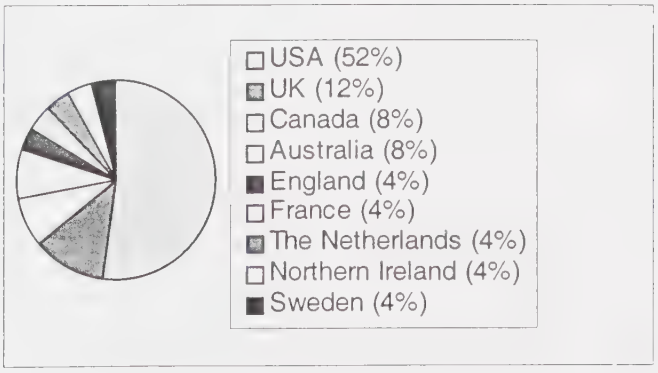
Characteristics of Relevant Studies

Specific details regarding study design, purpose, rating, weaknesses, subjects, interventions, statistical analysis, and outcomes of each of the relevant studies have been thoroughly summarized. The results of these summaries are organized according to the validity rating and can found in Table 4 located at the end of this chapter.

Origin of Studies

The majority of the studies (52%) were conducted in the United States (Figure 3). The remaining studies were conducted in United Kingdom (12%), Canada (8%), Australia (8%), England (4%), France (4%), The Netherlands (4%), Northern Ireland (4%), and Sweden (4%).

Figure 3 - Country Where Study was Conducted.



Journals

The relevant studies included 21 articles published in 18 different journals as well as, three unpublished masters theses and one unpublished doctoral dissertation. The majority of the published articles (61.9%) were found in medical journals (Table 5). Nursing journals accounted for 23.8% and the remaining articles (14.3%) were published in pharmacology journals.

Table 5 – Journals in Which HIVAT Studies Were Published In

Journal (N=21)	Number
Acta Paediatrics	1
American Journal of Health-System Pharmacy	1
American Journal of Hospital Pharmacy	1
Annals of Internal Medicine	1
Archives of Disease in Childhood	1
Archives of Disease in Children	1
Australia & New Zealand Journal of Medicine	1
Canadian Journal of Infectious Diseases	1
European Respiratory Journal	2
Excerpta Medica International Congress Series	1
Irish Journal of Medical Science	1
Journal of Advanced Nursing	1
Journal of Antimicrobial Chemotherapy	1
Journal of Clinical Oncology	1
Journal of Intravenous Nursing	3
Journal of Pediatric Nursing	1
Pediatric Pulmonology	1
The Journal of Pediatrics	1

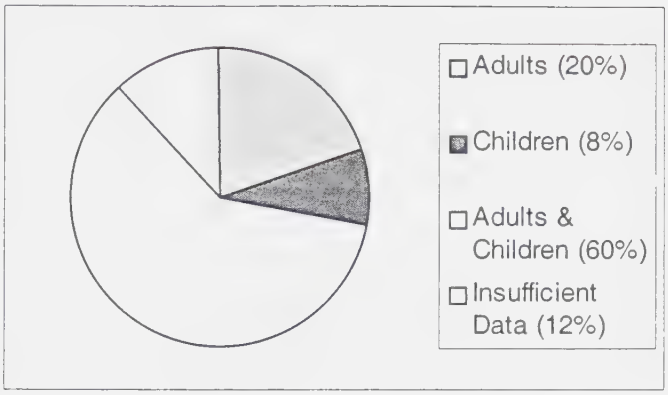
Date of Publication

Most of the studies (76%) were published during the 1990s. Twenty percent were published during the 1980s. The remaining 4% were published during the 1970s.

Population

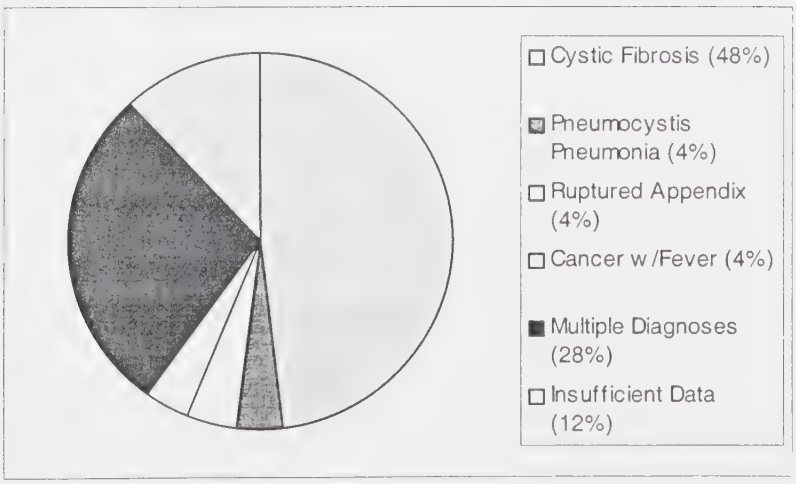
Age. Eight percent of the relevant studies involved children only (Figure 4). Twenty percent of the studies involved adults only (defined as 18 years of age and older). Sixty percent of the studies included both children and adults. The remaining 12% of the studies offered insufficient information about the demographics of the subjects to tell whether the study involved children, adults or a combination of the two.

Figure 4 - Age of Subjects Included in Studies



Diagnosis. The majority of the studies (48%) focused on subjects with pulmonary exacerbations of cystic fibrosis (Figure 5). Twenty-eight percent of the studies involved subjects with a variety of diagnoses. For example, subjects in the study by Stiver, Telford, Mossey, Cote, van Middlesworth, Trosky, McKay and Mossey (1978) were diagnosed with bone and joint infection (14), blastomycosis (2), actinomycosis (2), staphylococcal bacteremia (2), endocarditis (2), and candidal pyelonephritis (1). Four percent of studies focused on patients with pneumocystis carinii pneumonia (PCP) and acquired immunodeficiency syndrome (AIDS), 4% focused on patients with ruptured appendix, and 4% focused on low risk cancer patients with fever and neutropenia. The remaining 12% of the studies offered insufficient information about the demographics of subjects to determine what diagnoses they were being treated for.

Figure 5 - Primary Diagnosis of Subjects Included in Study



Intervention

Medication. The type of medication prescribed for the subjects in each study was usually based on the results of drug sensitivity tests and so varied considerably between studies (Table 6). All subjects in the study by Stovroff, Totten and Glick (1994) for example, were given three anti-infectives including ampicillin, gentamicin, and clindamycin. Subjects in six other studies (24%) were given a two-drug regimen. These two-drug regimens almost always involved the administration of an antipseudomonal penicillin or cephalosporin and an aminoglycoside. For example, in the study by Vic, Ategbo, Gottand, Launay, Loeuille, Elian, Farriaux and Turck (1997) subjects were prescribed ceftazidime and either amikacin or tobramycin.

Some studies (8%) involved the administration of a single antibiotic. All the subjects in the study by Loos, Baker and Bergers (1989) received pentamidine, and all the subjects in the study by Vinks, Brimicombe, Heijerman and Bakker (1997) received ceftazidime. Other studies (20%) involved the use of both single and double drug regimens. For example, in the study by Talcott, Whalen, Clark, Reiker and Finberg (1994), half of the subjects were given mezlocillin six times per day, and gentamicin three times per day; the other half of the subjects were given ceftazidime. Other antibiotics, most commonly vancomycin, were added to the initial regimen at the discretion of the treating physician, as were subsequent antibiotic changes.

Although the authors of four studies (16%) identified the type of medications used for subjects, they did not specify whether the drugs were given in combination or not. For example, Martel (1994) simply stated that the most commonly prescribed HIVAT medications in his study were penicillin G, cloxacillin, cephalothin, cefazolin, cefoxitin, cefotaxime, cefoperazone, ceftriaxone, ceftazidime, gentamicin, netilmicin, tobramycin, amikacin, clindamycin, erthromycin, ganciclovir, and amphotericin B. The authors of the remaining studies (28%) only stated that parenteral anti-infectives were given.

Method of Medication Delivery. The prescribed medications were delivered to the subjects in each study using a variety of infusion methods (Table 6). In two of the studies (8%) all of the medications were infused with the aid of an infusion pump and in two studies (8%) the medications were delivered using gravity. The medications were delivered via injection in yet another two studies. In many of the other studies (28%) a combination of the aforementioned methods were utilized to deliver the medications.

Table 6

Details of HIVAT Interventions Studied

	Drug Regimens						Delivery Methods					Venous Access Devices										Support			
	Intervention																								
	3 Drug Regimens	2 Drug Regimens	1 Drug Regimens	Variety of Drug Regimens	Unclear	Not Stated	Infusion Pump	Gravity	Injection	Variety of Methods	Not Stated	Short Stay Peripheral	Midlines	Midclavicular Lines	PICCs	Non-tunnelled CVC	Tunnelled CVC	Implanted CVC	Variety of Devices	Unclear	Not Stated	Patient/Informal Caregiver	Nurse/Pharmacist	Both	Not Stated
Strong Articles																									
Baumle (1992)						•				•										•					•
Bosworth & Nielson (1997)		•									•										•	•				
Cornell (1990)						•					•										•	•				
Donati, Guenette, & Auerbach (1987)		•								•									•			•				
Pond, Newport, Joanes, & Conway (1994)		•									•								•			•				
Vie, Ategbo, Gottand, Launay, Locuille, Ehan, Farriaux, & Turck (1997)		•									•										•					•
Vinks, Brimicombe, Heijerman, & Bakker (1997)			•				•					•										•				
Wolter, Bowler, Nolan, & McCormack (1997)		•									•								•			•				
Moderate Articles																									
Bradley, Wallace, Elhorn, Howard, & McCoy (1999)						•					•										•	•				
Chattopadhyay (1989)						•					•									•		•			•	
Chattopadhyay, Catania, & Mergener (1990)						•					•										•					•
Montalto, & Dunt (1997)				•							•										•		•			
Stovroff, Totten, & Glick (1994)	•										•				•							•				
Strandvik, Hjelte, & Widen (1988) & Strandvik, Hjelte, Malmborg, & Widen (1992)				•				•												•		•				
Talcott, Whalen, Clark, Rieker, & Finberg (1994)				•						•										•		•				
Weak Articles																									
Bramwell, Halpin, Duncan-Skingle, Hodson, & Geddes (1995)		•								•									•			•				
Dahlgren (1997)					•					•											•					•
Gilbert, Robinson, & Littlewood (1988)					•					•									•			•				
Loos, Baker, & Bergers (1989)			•				•														•			•		
Maloney Folkmer (1988)						•					•									•				•		
Martel (1994)					•				•											•		•				
Poole, Nowobilski-Vasilios, & Free (1999)					•					•									•			•				
Rogers, Millar-Jones, Knowles, & Goodchild (1993)						•			•												•	•				
Stiver, Telford, Mossey, Cote, Van Middlesworth, Troskey, McKay, & Mossey (1978)				•				•				•										•				
Strumpfer (1991)				•							•	•													•	

For example, in the study by Donati, Guenette and Auerbach (1987), only six of the 26 HIVAT patients used infusion pumps. The majority of studies (48%) however, did not specify the methods used to deliver the medications.

Venous Access Devices. Given the variety of medications prescribed as well as the variety of methods used to deliver the medications in each of the studies, it is not surprising to find that a variety of venous access devices were also used (Table 6). Three studies (12%) used only short-stay peripheral catheters such as the Quik-Cath or Aquavene and one study (4%) used only peripherally inserted central catheters (PICCs). Some studies (24%) used several different types of catheters. For example, Poole, Nowobilski-Vasilios and Free (1999) used short stay peripheral catheters, midlines, midclavicular lines, PICCs, non-tunneled central venous catheters, tunneled central venous catheters and implantable central venous catheters. Six studies offered insufficient data to be able to state exactly what type of catheters were used. For example, Strandvik, Hejelte, Malmborg and Widen (1992) stated that six patients had a Port-A-Cath and the rest of the patients had peripheral intravenous access. The type of peripheral venous access was not identified. Nine studies provided no information about what type of venous access device was used.

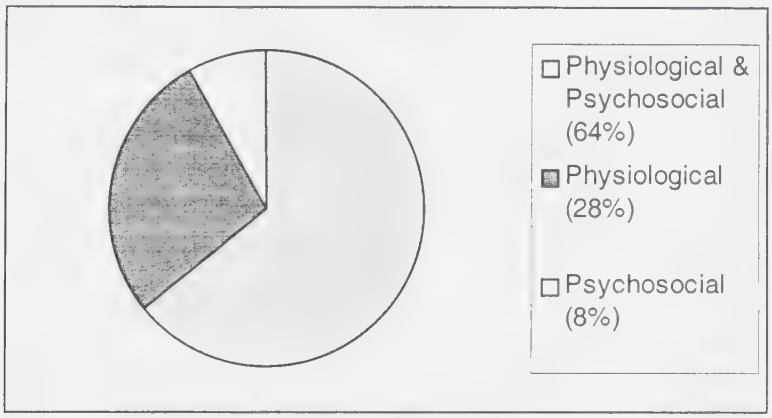
Support. In the majority of studies (64%) all of the patients and/or their informal caregivers administered the prescribed medications (Table 6). In one study (4%) all of the prescribed HIVAT medications were administered by the nurse. In three studies (12%) some patients and/or their informal caregivers administered the medication and other patients had the nurse administer the medication. For example, in the study by Loos, Bakers and Bergers (1989) 15 patients were responsible for self-administering their pentamidine and ten patients had the nurse administer their pentamidine. Five studies (20%) did not specify whether the doses were administered by the patient and/or informal caregiver or by a nurse.

Outcomes

All 25 studies involved some measure of the physiological and/or psychosocial outcomes of HIVAT on the patient and/or his or her informal caregiver (Figure 6). The majority of these studies (64%) measured both the physiological and psychosocial outcomes of HIVAT on the patient. For example, in the study by Wolter, Bowler, Nolan and McCormack (1997) body weight, 12 minute walking distance, sputum

weight, pulse oximetry, lung function (forced expiratory volume, forced vital capacity) as well as dyspnea, fatigue, emotion, and mastery (feeling of control over the disease and its consequences) were measured. Twenty-eight percent of the studies measured only the physiological outcomes and eight percent of the studies measured only the psychological outcomes of HIVAT on the patient. A few of the studies (32%) also involved some measure of the psychosocial outcomes of HIVAT on the informal caregiver. For example, Wolter, Bowler, Nolan, and McCormack (1997) included a measure of the amount of family disruption that HIVAT caused.

Figure 6 –Patient Outcomes of HIVAT



As can be seen in Tables 7 and 8, the specific measures used to assess the physiological and psychosocial outcomes of HIVAT varied considerably from study to study even when the populations were similar. For example, both Pond, Newport, Joanes and Conway (1994), and Wolter, Bowler, Nolan and McCormack (1997) compared the outcomes of HIVAT with inpatient treatment in adults with pulmonary exacerbations of cystic fibrosis. In the study by Pond, Newport, Joanes and Conway (1994) pulmonary expiratory flow rate (PEFR), forced expiratory volume (FEV), forced vital capacity (FVC), c-reactive protein, plasma viscosity, total white blood cell count (WBC), absolute neutrophil, immunoglobulin G (IgG), Northern CXR Score, Clinical Score, Shwachman-Kulyski Score, weight and adverse reactions were measured. In contrast, in the study by Wolter, Bowler, Nolan and McCormack (1997) creatinine, audiology, saturated oxygenation (SaO2), sputum weight, 12 minute walking distance, adverse reactions,

Table 7

Direct and Indirect Physiological Measures

* Used as part of an overall rating and/or lacking details	Vital Signs	Weight	Weight/Height Ratio	Fat Mass & Fat Free Mass	Energy Intake	Bloodwork	Cultures	Shwachman-Kulczyki Score	Sa02	Sputum Production	Cough	Lung Auscultation	FEV	FVC	PEFR	FEF	Northern CXR Score	12-Minute Walking	Pain	Adverse Reactions	Adverse Event	Remission of Symptoms	Cure/Failure Rates	Deaths	Readmissions	Number & Length Courses	Time between Courses	Additional Services	Changes in Therapy
	Direct																								Indirect				
Strong Articles																													
Baumle (1992)																			●										
Bosworth & Nielson (1997)	●	●							●	*	*		●	●		●						*			●	●			
Cornell (1990)																													
Donati, Guenette, & Auerbach (1987)	●	●				●							●	●	●						●				●	●			
Pond, Newport, Joanes, & Conway (1994)		●				●		●					●	●	●		●			●					●	●			●
Vic, Ategbo, Gottand, Launay, Locuille, Elian, Farriaux, & Turck (1997)		●	●	●	●	●							●	●		●									●				
Vinks, Brimicombe, Heijerman, & Bakker (1997)		●				●	●			*	*	*	●	●	●					●	●				●		●		
Wolter, Bowler, Nolan, & McCormack (1997)		●							●	●			●	●				●		●	●			●	●	●	●		
Moderate Articles																													
Bradley, Wallace, Elhorn, Howard, & McCoy (1999)									●				●	●	●	●													
Chattopadhyay (1989)	*																			*	*	*	●		*	●			
Chattopadhyay, Catania, & Mergener (1990)	*																			*	*	*	●		*				
Montalto, & Dunt (1997)	*																			*		*	●		*			●	
Stovroff, Totten, & Glick (1994)																				*	*		●		*	●			
Strandvik, Hjelte, & Widen (1988) & Strandvik, Hjelte, Malmborg, & Widen (1992)		●				●	●			*		*	●								*					●			
Talcott, Whalen, Clark, Ricker, & Finberg (1994)	*																			*					●	●			●
Weak Articles																													
Bramwell, Halpin, Duncan-Skingle, Hodson, & Geddes (1995)		●								●			●	●									●	●	●	●			●
Dahlgren (1997)																				●			●	●	●				
Gilbert, Robinson, & Littlewood (1988)		●				●							●	●	●					●		●		●	●	●			
Loos, Baker, & Bergers (1989)																				●						●			
Maloney-Folkmer (1988)																													
Martel (1994)																				●									
Poole, Nowobilski-Vasilios, & Free (1999)																				●						●			
Rogers, Millar-Jones, Knowles, & Goodchild (1993)		●			●				●				●	●	●	●							●						
Stiver, Telford, Mossey, Cote, Van Middlesworth, Troskey, McKay, & Mossey (1978)							●																			●			
Strumpfer (1991)																				●	●								

Table 8

Direct and Indirect Psychosocial Measures

	Direct																				Indirect				
	QOL						Disruption				Mood										Other				
	Dyspnea	Fatigue	Emotion	Mastery	Appetite	Energy	Family	Personal Life	Sleep	Eating	Vigor	Depression	Tension	Anger	Confusion	Anxiety	Stress	Satisfaction/Acceptance	Overall Well-being	Perceived Adv & Disadv	Preference	Compliance	Ability to Work/School	Time
* Used as part of an overall rating and/or lacking details																								
Strong Articles																								
Baumle (1992)		*																				*		
Bosworth & Nielson (1997)																●				●			●	
Cornell (1990)					*														*		*			
Donati, Guenette, & Auerbach (1987)																								
Pond, Newport, Joanes, & Conway (1994)																								
Vic, Ategbo, Gottand, Launay, Locuille, Elian, Farriaux, & Turck (1997)					*														*		*		*	
Vinks, Brimicombe, Heijerman, & Bakker (1997)	●	●	●	●			●	●	●	●														
Wolter, Bowler, Nolan, & McCormack (1997)																								
Moderate Articles																								
Bradley, Wallace, Elhorn, Howard, & McCoy (1999)																						*		
Chattopadhyay (1989)																						*		
Chattopadhyay, Catania, & Mergener (1990)																								
Montalto, & Dunt (1997)																								
Stovroff, Totten, & Glick (1994)						*										●			*		●		●	
Strandvik, Hjelte, & Widen (1988) & Strandvik, Hjelte, Malmborg, & Widen (1992)																								
Talcott, Whalen, Clark, Ricker, & Finberg (1994)		●			●			●			●	●	●	●	●				●		●			●
Weak Articles																								
Bramwell, Halpin, Duncan-Skingle, Hodson, & Geddes (1995)	●		●		●	●			●									●	●					●
Dahlgren (1997)																	●			●	●		●	
Gilbert, Robinson, & Littlewood (1988)																		●		●				●
Loos, Baker, & Bergers (1989)																		●		●				
Maloney-Folkmer (1988)																		●		●				
Martel (1994)																				●	●			
Poole, Nowobilski-Vasilios, & Free (1999)																								
Rogers, Millar-Jones, Knowles, & Goodchild (1993)					●		●														●	●	●	
Stiver, Telford, Mossey, Cote, Van Middlesworth, Troskey, McKay, & Mossey (1978)																							●	
Strumpfer (1991)																								●

deaths, readmissions, adverse events, weight, FEV, FVC, dyspnea, fatigue, emotion, mastery, disruption to family life, personal life, sleeping and eating, and number of services were measured.

Findings of the Relevant Studies

As has been noted, detailed summaries of all relevant articles can be found in Table 4 located at the end of this chapter. In the sections that follow the findings of only the "strong" and "moderate" studies are described, with particular emphasis on the outcomes and authors' conclusions. Due to the extent of methodological and/or reporting problems associated with the weak studies, they have been excluded from this discussion.

Physiological Outcomes

Strong Studies. A total of seven strong studies measured the physiological outcomes of HIVAT (Baumle, 1992; Bosworth & Nielson, 1997; Donati, Guenette & Auerbach, 1987; Pond, Newport, Joanes & Conway, 1994; Vic, Ategbo, Gottrand, Launay, Loeuille, Elian, Druon, Farriaux & Turck, 1997; Vinks, Brimicombe, Heijerman & Baker, 1997; Wolter, Bowler, Nolan & McCormack, 1997). Four of these studies compared the physiological outcomes of patients who were treated with HIVAT with the physiological outcomes of patients who were treated in hospital (Bosworth & Nielson, 1997; Donati, Guenette & Auerbach, 1987; Pond, Newport, Joanes & Conway, 1994; Wolter, Bowler, Nolan & McCormack, 1997). Two of these studies compared the physiological status of cystic fibrosis patients before HIVAT with their physiological status after HIVAT (Vic, Ategbo, Gottrand, Launay, Loeuille, Elian, Druon, Farriaux & Turck, 1997; Vinks, Brimicombe, Heijerman & Baker, 1997). The other study compared the pain response of a group of patients (with a variety of diagnoses) on long-term HIVAT whose duration of cannulation was 72 hours with a group of people whose duration of cannulation was 168 hours (Baumle, 1992). The specific measures used to assess the physiological outcomes of HIVAT in each of these studies varied considerably as did their conclusions.

Pond, Newport, Joanes and Conway (1994) used PEFR, FVC, FEV_1, C-reactive protein, plasma viscosity, total white cell count, absolute neutrophil count, total immunoglobulin G (IgG) concentration, Northern Chest X-ray score, Clinical score, Shwachman-Kulczyki score and weight to evaluate the physiological outcomes of HIVAT. With the exception of the total white cell count, all the measured variables improved to a similar degree, with no significant differences between the home and hospital

treated groups ($p<0.05$). Although the difference in improvement in total white cell count reached statistical significance, the magnitude of the difference was small and the improvement in neutrophil count did not differ between the two groups. Therefore, the authors concluded intravenous treatment at home or in hospital was equally effective.

Weight, 12-minute walking distance, sputum weight, oximetry, and pulmonary function tests were used by Wolter, Bowler, Nolan and McCormack (1997) to assess the physiological outcomes of HIVAT. Although there were some changes from baseline, mean improvements in body weight, 12-minute walking distance, sputum weight and pulse oximetry were not statistically significant between home and hospital groups. There were significant differences over time in changes from baseline noted for FEV_1 ($p=0.006$) and FVC ($p=0.02$). However, there was no statistically significant difference between home and hospital arms in overall improvement in lung function (FEV_1 $p=0.27$; FVC $p=0.30$). According to the researchers these findings confirmed the clinical efficacy of HIVAT for adult patients with cystic fibrosis.

Donati, Guenette and Auerbach (1987) measured respiratory rate, pulse, arterial partial pressure of oxygen (Pa02), vital capacity (VC), forced expiratory volume in one second (FEV_1), and pulmonary flow rate (PFR). Both the home and hospital groups showed a statistically significant improvement in each of these measures. Furthermore, except for admission pulse rate there were no significant differences between home and hospital groups when admission or discharge values of each home care patient were compared specifically with those of the matched in-hospital control patient. However, because the number of matched pairs for the assessment of Pa02 differed on admission and discharge, a comparison of independent samples at admission and discharge was performed. Again, there was no significant difference between the groups. Although, calculation of the change in VC ($p\leq0.03$) and change in Pa02 ($p\leq0.05$) from admission to discharge showed that hospitalized patients had a statistically significant improvement in these two values. Given that these differences were probably due to differences in pretreatment values, with hospital treated patients starting with lower values and thus having more potential for improvement, the researchers still concluded that treatment at home was as effective as in-hospital treatment.

Bosworth and Nielson (1992) used changes in pulmonary function between the start of treatment and after 2 weeks of therapy, duration of treatment, and intervals between antibiotic courses to assess the physiological outcomes of HIVAT. While the FVC, FEV_1 and FEF_{25-75} (forced expiratory flow) all

increased significantly ($p<0.001$) in the hospitalized patients, none of these measures increased significantly in the home patients. Similar results were found in five patients completing both home and hospital treatment. Home care patients received significantly longer courses of IV antibiotics than did hospital patients ($p<0.001$), but prolonging the treatment did not produce any further improvement compared with two weeks of therapy. Not only did the home treatment courses last longer, they also resulted in shorter intervals between treatment courses. By Fisher's exact test, the average time between the end of a home treatment course and the start of the next IV antibiotic course was significantly less for the home group ($p<0.01$). In light of these results, the authors concluded that HIVAT was less effective than hospital care.

Weight, weight/height ratio, energy intake, prealbumin, FVC, FEV_1, FEF_{25-75}, fat-mass, and fat-free mass were measured by Vic, Ategbo, Gottrand, Launay, Loeuille, Elian, Druon, Farriaux and Turck (1997) before and after HIVAT in order to assess the effects of HIVAT on nutritional status of cystic fibrosis patients. According to the researchers, all of these measures, except fat-free mass, improved significantly demonstrating a real nutritional improvement and ruling out a variation in water or sodium balance induced by the antibiotic infusions. The researchers concluded HIVAT improves the nutritional status of cystic fibrosis patients, with a gain in fat mass.

In the before/after study by Vinks, Brimicombe, Heijerman and Baker (1997) the effects of the continuous infusion of ceftazidime in cystic fibrosis patients undergoing HIVAT was examined. Clinical improvement, evaluated by weight gain, auscultation, pulmonary findings, laboratory results and subjective findings including sputum color and volume, appetite and general well-being, was achieved in 91% of the patients and in 70% this improvement lasted at least until 4-6 weeks after the end of therapy. The number of cultures positive for pseudomonas aeruginosa decreased significantly during antibiotic treatment and multiple courses of ceftazidime monotherapy did not result in a lasting increase of ceftazidime-resistant pseudomonas strains. Therefore, the researchers concluded HIVAT with ceftazidime administered by continuous infusion proved clinically effective and did not result in an increase in lasting resistance.

Baumle (1992) used the Bourbonnais Pain Ruler to measure the pain response of people on long-term HIVAT whose duration of cannulation was 72 hours and those whose duration of cannulation was 168 hours. The dependent t-test results of this quasi-experimental study indicated that there were no significant

differences between the expected and the actual pain levels when both groups were combined. The analysis of variance (ANOVA) results demonstrated a significant main effect for group (3 day, 7 day, significance of F=.001), but a nonsignificant effect for time (expected, actual, significance of F=.252). In addition, the expected pain level of the experimental group was higher than the actual pain level, whereas the expected and actual pain levels for the control groups was similar. Based on these results, the author concluded that persons receiving long-term HIVAT expected a higher level of pain when intravenous catheter was inserted and changed every seven days as opposed to every three days.

Moderate Studies. All seven moderate studies measured the physiological outcomes of HIVAT (Bradley, Wallace, Elhorn, Howard & McCoy, 1999; Chattopadhyay, 1989; Chattopadhyay, Catania & Mergener, 1990; Montalto & Dunt, 1997; Stovroff, Totten & Glick, 1994; Strandvik, Hjelte, Malmborg & Widen, 1992; Talcott, Whalen, Clark, Rieker & Finberg, 1994). Four of these studies compared the physiological outcomes of patients (with various diagnoses) who were treated with HIVAT with the physiological outcomes of patients who were treated in hospital (Montalto & Dunt, 1997; Stovroff, Totten & Glick, 1994; Strandvik, Hjelte, Malmborg & Widen, 1992; Talcott, Whalen, Clark, Rieker & Finberg, 1994). One of these studies compared the effect of IV antibiotic therapy given at home with therapy given at hospital, and therapy given both in hospital and at home, in cystic fibrosis patients (Bradley, Wallace, Elborn, Howard & McCoy, 1999). One study compared the outcomes of elderly patients receiving HIVAT from three different Home Health Care Pharmacies (HHCPs) with those of younger patients receiving the same therapy (Chattopadhyay, Catania & Mergener, 1990). Like the study by Chattopadhyay, Catania and Mergener (1990), the last moderate study also compared the outcomes of HIVAT provided by three different HHCPs. In addition, this study compared the outcomes of HIVAT for osteomyelitis patients discharged to one HHCP and those that remained in hospital. Again the measures used to assess the physiological outcomes in each of these studies varied as did the researchers conclusions about the effectiveness of HIVAT.

Montalto and Dunt (1997) measured temperature and calculated mean time to febrefuge for patients with cellulitis and pyelonephritis treated with intravenous antimicrobials at home and in hospital. They also measured patient incidents and status at discharge. In the group with cellulitis, mean time to febrefuge was 1.96 days in the home group and 2.00 days in the hospital group, difference in means 0.04 (-

0.63, 0.71). There were two incidents in the home group and seven in the hospital group. In the home group, 51 patients were expected to recover fully, while four showed recovery back to a stable pre-existent condition. In contrast in the hospital group seven incidents occurred and all 22 were expected to recover fully. In the group with pyelonephritis, mean time to febrefuge was 1.79 days in the home group and 2.40 days in the hospital group with a difference of means 0.61 (-0.37, 1.60). Incidents were recorded in one home episode and in three traditional episodes. In both groups, one patient was expected to return to a stable pre-existent condition, while in all other patients a full recovery was expected. The author concluded that these preliminary results were promising for HIVAT but further studies, controlled trials if possible, are required to establish the findings more definitively.

Stovroff, Totten and Glick (1994) compared children with ruptured appendix who were treated using short plastic cannulas and conventional inpatient therapy with children with ruptured appendix who were treated with peripherally inserted central catheters and home care therapy. Primary measures used in the comparison included the number of IV cannulas, complications, cure/failure rates, and readmissions. Whereas the children on conventional inpatient therapy required more than five IV catheters during their hospitalization, the home group had PICC lines successfully placed, and no further IV access was necessary ($p=0.001$). There were no complications from the PICC lines. Neither group experienced recurrent infections nor required readmission. The researcher concluded that home care is an effective alternative to hospital care for patients who have undergone repair of a ruptured appendix.

Strandvik, Hjelte, Malmborg and Widen (1992) measured the weight, FEV_1, PO2, erythrocyte sedimentation rate (ESR), WBC, and serum haptoglobin (s-haptoglobin) of patients with pulmonary exacerbation of cystic fibrosis to assess the physiological outcomes of HIVAT. Of these measures, weight, WBC and s-haptoglobin improved significantly ($p<0.001$) in both the home and hospital groups with no differences between the groups. FEV_1, and ESR also improved significantly in both groups; however, the significance of this improvement was greater in the home group than in the hospital group ($p<0.001$ vs. $p<0.01$). Although the PO2 increased significantly in the home group ($p<0.01$), it did not improve significantly in the hospital group. The researchers concluded, in comparison to traditional treatments in hospital, HIVAT was safe and effective.

In the fourth study, Talcott, Whalen, Clark, Rieker and Finberg (1994) compared the outcomes of "low risk" patients with fever and neutropenia who were treated at home to medically eligible patients who were treated in hospital using readmission rates and complications. Five of the HIVAT patients had to be readmitted to hospital for observation because of recurrent or prolonged fever (> 5 days). Four of the HIVAT patients had one or more serious medical complications during or arising from the period of neutropenia (13.3%; 95% confidence interval, 4% to 32%). No patients died or had irreversible complications. None of the 27 medically eligible patients who did not enter the home trial had complications. The medical complication rate for all medically eligible patients was 4 of 57 (7%; 95% CI, 2% to 18%). Of the 15 patients without serious concurrent comorbidity or uncontrolled cancer, who were excluded because of specifically excluded infections or age 65 years or greater, 3 had complications. The researchers concluded that, early discharge of low risk patients to home intravenous antibiotic therapy is feasible but acknowledged that this conclusion must be validated in a large randomized trial.

Pulmonary function tests of cystic fibrosis patients were used by Bradley, Wallace, Elhorn, Howard and McCoy (1999) to measure the effect of IV antibiotic therapy at home, in hospital, or in a combination of home and hospital settings. All of the tests (FVC, FEV_1, FEF_{25-75}, and PEFR) improved significantly ($p<0.05$) irrespective of where patients were treated. However, the percentage improvement in FEV_1, FVC and FEF_{25-75}, were significantly greater in patients treated in hospital compared to those who had home IV treatment ($p<0.05$). In light of these findings, the authors concluded that hospital IV antibiotic therapy was more effective than home therapy in improving FEV_1, FVC and FEF_{25-75} in cystic fibrosis patients with an acute respiratory infection.

Chattopadhyay, Catania and Mergener (1990) compared the outcomes of elderly patients receiving HIVAT from three different Home Health Care Pharmacies (HHCPs) with those of younger patients receiving the same therapy. Outcomes were classified as adequate or inadequate based on predetermined criteria involving temperature, remission of symptoms, rehospitalization, adverse reactions and events, and compliance. Sixty-nine percent, 67%, and 77% of the elderly patients and 69%, 82%, and 79% of the nonelderly patients' outcomes were rated as "adequate" at HHCP I, HHCP II, and HHCP III, respectively. Outcomes for the pooled sample were rated adequate for 70% of the elderly patients and 76% of the nonelderly patients. Nine of the patients had diabetes as a part of their medical histories and 44% of these

patients had inadequate outcomes, including both patients over 62 years of age. This contrasts with "inadequate" outcomes for 30% and 24% respectively, of the elderly and nonelderly groups as a whole. The importance of this latter finding could not be ascertained from the study, and the researchers concluded that in this very carefully selected population, elderly and nonelderly patients receiving home IV antimicrobial therapy had similar therapeutic outcomes.

Like the study by Chattopadhyay, Catania and Mergener (1990), the study by Chattopadhyay (1989) compared the physiological outcomes of clients receiving HIVAT from three different HHCPs. In addition, the physiological outcomes of HIVAT for osteomyelitis patients were compared with that of osteomyelitis inpatients discharged to HHCP I from the referral hospital. Outcomes were classified as success, complication and failure using predetermined criteria involving temperature, remission of symptoms, rehospitalization, adverse events and reactions, compliance and improvement. From the results it was concluded that the outcome of HIVAT may not be dependent on the HHCP (i.e. whether the HHCP is hospital-based or independent). New regulations in HHCP did not influence the outcome of HIVAT. HIVAT in geriatric patients is equally safe and effective as in nongeriatric patients. With prolonged duration of therapy (i.e. osteomyelitis) the complications may increase with home care, but the therapeutic outcome in home health care is equivalent to that reported for inpatient therapy. From the frequency of problems associated with both antibiotics and administration procedures and the management of these problems in Home Healthcare, as observed in this study, it can be concluded that HIVAT in all age groups is as safe as inpatient therapy. However, the authors acknowledged the need for more mulitcenter studies to validate these conclusions.

Psychosocial Outcomes

Strong Studies. Three strong studies measured the psychosocial outcomes of HIVAT (Cornell, 1990; Donati, Guenette & Auerbach, 1987; Wolter, Bowler, Nolan & McCormack, 1997). One of the three studies compared the results of quality of life (dyspnea, fatigue, emotion and mastery) and disruption (family life, personal life, sleeping, eating) in groups of cystic fibrosis patients treated at home and in hospital (Wolter, Bowler, Nolan & McCormack, 1997). One of the studies compared concerns of cystic fibrosis patients before and after HIVAT (Donati, Guenette & Auerbach, 1987). The last study compared the anxiety experienced by HIVAT patients at week one, two and three (Cornell, 1990). Each of these

studies used different measures to assess the psychosocial outcomes of HIVAT and, not surprisingly, reached different conclusions about the effectiveness of HIVAT.

Wolter, Bowler, Nolan and McCormack (1997) used the Chronic Respiratory Disease questionnaire (dyspnea, fatigue, emotion and mastery) as well as a disruption scale (family life, personal life, sleeping, eating) to assess the psychosocial impact of HIVAT for patients with cystic fibrosis. Overall, there were significant changes from Day 0 to Post treatment in all scores ($p<0.001$). These changes were of a similar magnitude for home and hospital arms for dyspnea ($p=0.25$) and emotional scores ($p=0.11$). Hospital patients fared better in terms of fatigue, mastery and total scores ($p<0.05$). Home patients fared better in terms of family life, personal life, sleep and total disruption ($p<0.005$). Based on these mixed results the researchers concluded that there were advantages and disadvantages to HIVAT in terms of quality of life.

Donati, Guenette and Auerbach (1987) compared concerns of cystic fibrosis patients before and after HIVAT. At the onset of treatment, patients reported that their decision to accept home care as an alternative to hospital treatment originated from a desire to avoid the hospital, to engage in normal activities in a familiar setting, and to avoid nosocomial infections. Of the 63% of home patients usually engaged in full-time work or school, approximately 40% were able to maintain full activity and an additional 45% maintained at least some of their normal activity. Prior to home care treatment, patients reported being concerned about IV access, isolation in case of emergency, and scheduling of necessary treatments. On completion if therapy, the greatest single disadvantage reported was loss of sleep related to the medication schedule; the benefits were a greater sense of comfort and ease at home, more privacy, less disruption of family routine, and greater control and confidence in their own health management. No statistical analysis of the significance of these findings was conducted and despite the fact that three patients elected to discontinue HIVAT for what they described as insufficient emotional support at home, the researchers concluded that home treatment for cystic fibrosis patients was as effective as hospital treatment.

Finally, Cornell (1990) used the State Trait Anxiety Inventory to assess the level of anxiety experienced by patients undergoing HIVAT. The statistical findings of this study suggested a significant level of anxiety was experienced during the first three weeks of HIVAT. This anxiety decreased most

significantly from week two to three (p=0.001). The following demographic groups experienced higher levels of anxiety: (a) females; (b) married; (c) white collar workers; (d) less educated and; (e) no pre-hospital discharge hands-on experience with HIVAT. The author concluded that HIVAT provoked significant levels of anxiety.

Moderate Studies. Only two of the moderate studies measured the psychosocial outcomes of HIVAT (Strandvik, Hjelte, Malmborg & Widen, 1992; Talcott, Whalen, Clark, Rieker & Finberg; 1994). Whereas the former study compared the psychosocial outcomes of cystic fibrosis patients treated at home with those treated in hospital (Strandvik, Hjelte, Malmborg & Widen, 1992), the latter study compared the psychosocial status of cancer patients with fever and neutropenia before and after HIVAT (Talcott, Whalen, Clark, Rieker & Finberg, 1994).

In the study by Strandvik, Hjelte, Malmborg and Widen (1992) the home patients were found to be more physically active than the hospital patients. In 77% of the treatments the patients themselves initiated the physiotherapy and performed it by self-treatment (57% of the courses). Seventy-seven percent of patients also undertook responsibility for inhalation, mixing and administration of the antibiotics. During 61% of the home treatments the patients did not miss school or work; 30% stayed at home 5 or more days. Spare-time occupations were maintained in 82% of the home treatment periods. In contrast, in the hospitalized patients only 50% of the patients initiated the physiotherapy and performed it by self-treatment (6% of the courses). Twenty-nine percent of the in-hospital patients undertook whole responsibility for inhalation, mixing and administration of the antibiotics. During 22% of the hospital treatments the patients did not miss a single day at school or work; 61% of patients missed more than 5 days at school or work. Spare-time occupations were maintained in 44% of the hospital treatments. Thirty-six percent of the treatments at home were not experienced as being difficult in any aspect. Of those who reported some problems, maintaining the spare-time occupations were most frequently mentioned (79%) and attendance to infusions (65%). The fear of cannula difficulties was as frequent in the home group as among patients in hospital, 65% and 67% respectively. Anxiety about the disease itself increased in accordance with the number of treatment courses in both groups from about 30% to about 60%. On the other hand, in the patients treated at home concern regarding infusions and keeping up the spare-time activities decreased to about 30% during the year. All patients except one (96%) in this group would

choose this form of treatment for the next IV antibiotic course. The one patient who stated they would not choose HIVAT wanted the extra physiotherapy in hospital. The authors concluded that in comparison to traditional treatments in hospital, HIVAT offers advantages.

In the study by Talcott, Whalen, Clark, Rieker and Finberg (1994) patients tended to improve in all areas during the course of HIVAT according to the LASA scale, with significant improvements in overall well-being, appetite, and social activities. Patient scores for the POMS, which assesses 6 affective domains, also improved significantly in all areas except vigor (i.e. in depression, tension, anger, fatigue, and confusion). This improvement probably reflected, in part, physical recovery from symptoms of fever and neutropenia, which occurred during HIVAT. Before HIVAT, patients enrolled in the study overwhelmingly preferred home to hospital therapy and had little fear of isolation from their physician if a serious problem occurred. After they completed treatment at home, these convictions were unchanged. The report of family comfort with home care increased after patients were treated at home; support for the statement, "My family would rather have me near them than be in the hospital when something happens like this (developing fever and neutropenia)" increased from 42% agreement to 70% after home HIVAT. However, there was some evidence that patients feel slightly more isolated at home than in the hospital; agreement with the statement "I feel uneasy about calling my doctor from home with a complaint that worries me a little, for fear that I will be disturbing him or her with such a minor problem" increased from 10% to 24% after HIVAT. Little time loss from work by caregivers assisting in homecare was reported; 27 patients reported no time lost, and 3 patients reported fewer than 8 total hours lost, the smallest time category available. The authors concluded that early discharge to home intravenous therapy is well received by patients but more research is needed.

Conclusion

The various search strategies undertaken during the conduct of this systematic review yielded more than 25,000 abstracts and titles. Of the more than 25,000 abstracts and titles screened, approximately 1,100 of them were deemed potentially relevant and so attempts were made to retrieve them. Of the 959 successfully retrieved articles, 934 did not meet one or more of the relevance criteria and so were excluded. The remaining 25 studies were subjected to validity testing. As a result of the validity testing, eight of the studies were judged to be "strong", seven "moderate", and ten "weak".

The 25 relevant studies were characterized by diversity, that is, each of the studies focused on different populations (age, diagnosis), interventions (medications, methods of delivery, venous access devices, support), outcomes (physiological, psychosocial) and designs. For example, although 48% of the studies focused on subjects with pulmonary exacerbation's of cystic fibrosis, 28% focused on patients with a variety of diagnoses, 4% focused on patients with PCP, 4% focused on patients with ruptured appendix, and 4% focused on low risk cancer patients with fever and neutropenia. Given the diversity of study participants, interventions, outcomes, and designs, the findings of the relevant studies were summarized (with particular emphasis on findings and conclusions) but not statistically combined.

From the summaries, it is evident that the researchers of seven strong studies and seven moderate studies measured the physiological outcomes of HIVAT. Most, but not all of these researchers, found that HIVAT resulted in sufficient significantly positive physiological outcomes that they supported the continued use of HIVAT. The researchers of three strong and two moderate studies also measured the psychosocial outcomes of HIVAT. Again most, but not all of these researchers, found that HIVAT resulted in sufficient significantly positive psychosocial outcomes that they supported the continued use of HIVAT.

Table 4 - Summary of Relevant Studies	
Key	
Letter	Study Weaknesses
a	Sample not clearly defined
b	Nonprobability sample
c	Sample not followed across time
d	Attrition greater than 20%
e	Not prospective
f	No random assignment
g	Extraneous variables not controlled for
h	Intervention not clearly described
i	Intervention not controlled for
j	Outcome measures and data collection protocols not adequately described
k	Issues of reliability and validity not adequately addressed
l	Data analysis not adequate
m	Conclusions not supported by data and/or not thorough

Table 4 - Summary of Relevant Studies

Authors: Baumle (1992).	**Design:** Quasi-experimental.	**Purpose:** To compare the pain response of persons on long-term, HIVAT whose duration of cannulation was 72 hours and 168 hours. Specifically, the focus of this research was: (1) to compare a person's pain expectation before intravenous catheter insertion and actual pain after the insertion; (2) to compare the expectation and the actual pain response between the control group (catheter change every 3 days) and the experimental group (catheter change every 7 days); and (3) to analyze the effect that previous pain experience has on the person's subjective pain response.	**Rating:** Strong.	**Weakness:** a, b, k, l.

Subjects: A sample of 12 subjects (8 men and 4 women) were selected based on the following characteristics: (1) adult men and women aged 18 to 75 years of age; (2) recipients of HIVAT; (3) persons admitted to home health agencies in Northwest Ohio; (4) persons legally able to give consent; (5) persons who consented to participate. The majority of subjects were married (n=8), the others were widowed (n=1) and single or divorced (n=2). All subjects were Caucasian. The majority (8 out of 12) were unemployed. All subjects were on a regular diet, ambulatory, received IV antibiotic, and lived in a clean environment. Once selected, these subjects were randomly assigned to either the control group (n = 6) or to the experimental group (n = 6). There were no significant differences between groups in terms of marital status, occupation, occupational status, educational level, coffee consumption, tobacco use, diagnosis, health alterations, number of caregivers, reason for antibiotic use, IV antibiotic prescribed, IV antibiotic dose, IV catheter make, IV catheter size, gender, alcohol use, diet, IV dilutant, use of pump ($p<0.05$).	**Intervention:** All subjects were recipients of HIVAT. The "majority" of subjects from both groups had "angio" intravenous catheters. Subjects in the experimental group had their IV catheters changed once per week (every 168 hours) by the home health nurse using a catheter insertion protocol developed by the nurse researcher. Subjects in control group had their IV catheters changed by the home health nurse every 3 days (72 hours) according to current CDC guidelines.
Statistical Analysis: Data analysis included the use of descriptive statistics, a t-test, and a two-way ANOVA.	
Results: The dependent t-test results indicated there was no significant difference between the expected and the actual pain levels when both groups were combined. The ANOVA results indicated there was a significant main effect for group (3 day, 7 day, significance of F=.001), but a nonsignificant effect for time (expected, actual, significance of F=.252). In addition, the expected pain level of the experimental group was higher than the actual pain level, whereas the expected and actual pain levels for the control groups were similar. Finally, an analysis of 12 subjects' response to intravenous therapy revealed several common themes: (1) 11 subjects stated that they had previous experience with intravenous therapy; (2) 4 subjects stated that the intravenous therapy was "part of my care"; (3) 3 subjects expressed a strong dislike for intravenous therapy, one stated, "I don't like needle sticks. I'm afraid of needles." Based on this analysis the authors concluded that previous pain experience did affect the subjects subjective pain response to intravenous catheter insertion.	

Table 4 - Summary of Relevant Studies

Authors: Bosworth & Nielson (1997).	**Design:** Retrospective comparative.	**Purpose:** To compare the outcomes of HIVAT with minimal assistance to outcomes of hospital care for cystic fibrosis patients with pseudomonas lung infections.	**Rating:** Strong.	**Weakness:** b, d, e, f, h, i, j, m.

Subjects: During the 2 years covered by this report, Intermountain Cystic Fibrosis Center at the University of Utah provided care to 350 people with CF. During this period 130 center patients completed 244 courses of IV antibiotics. Of these 149 were completed in hospital and 95 were completed at home. Requirements for patients to have received HIVAT for their CF exacerbation included the availability of family members to deliver care, financial feasibility and their demonstrated ability to perform care. To achieve a valid comparison this study reviewed only treatment outcomes of patients from whose sputum p. aeruginosa alone or in combination with s. aureus was recovered and who were able to perform reliable spirometry. Patients with incomplete charts were eliminated; in addition, a few patients were eliminated because there were none in the comparison group of similar age and lung function. Finally HIVAT patients who stayed in hospital for more than 4 days were eliminated. This selection process resulted in 2 groups consisting of 19 patients who completed 17 HIVAT treatments (10 male/17 female; age 7 – 31 years) and 21 patients who completed 32 hospital treatments (20 male/12 female; age 8 – 29 years) (range, 7 – 31 years in the HIVAT group and 8 – 29 years in the hospitalized groups). All had acute exacerbation of CF-associated lung disease due to p. aeruginosa alone or in combination with s. aureus. There were no measurable differences in the specific antibiotics used to treat or in serum concentrations of aminoglycosides. There were no differences in respiratory rate or heart rate between groups at the beginning and the initial data of age adjusted values for FVC ($p = 0.35$), FEV_1 ($p = 0.24$), FEF_{25-75} ($p = 0.14$) decreases in lung function from baseline, weight ($p = 0.63$), and SaO2 ($p = 0.55$) did not differ significantly. However, FEV/FVC might have differed ($p = 0.07$) between the 2 groups, with the group treated at home having slightly worse airway obstruction.

Intervention: Patients in both comparison groups received 2 drug antibiotic therapy, including an aminoglycoside and, in most cases, a B-lactam-resistant antibiotic. Patients and families receiving HIVAT were instructed in the techniques of HIVAT and chest physiotherapy. Prior to receiving HIVAT, patients stayed in hospital for up to 4 days. During this time tobramycin doses were adjusted to achieve a peak serum concentration of 8-10 μg/mL and a trough level of less than 2 μg/mL. They also received a second antibiotic such as ceftazidime or ticarcillin, with the dose based on body weight. Antibiotics were given q8h. Patients received chest physiotherapy qid while in hospital and were to continue this frequency at home. Following discharge, nurses employed by a HIVAT company visited the patient at home at least once a week. These nurses also responded to any problems concerning the IV line or antibiotic preparations 24 hours/day. Weekly tobramycin levels were drawn and doses adjusted accordingly. Patients returned to CF clinic every 2 weeks for evaluation. Hospitalized patients received their antibiotics every 8 hours and chest physiotherapy qid. Peak and trough levels of tobramycin were determined initially and then weekly. Lung function was also measured weekly. The decision to continue or stop treatment in this group was again made by the attending physician based on spirometric data and the clinical course.

Statistical Analysis: The data was analyzed using the t-test, paired sample t-test, and Fisher's exact test as appropriate to each data set with significance chosen at $p \leq 0.05$.

Results: There were no differences in respiratory rate or heart rate at the end of treatment between the 2 groups. Weight and SaO2 did not change significantly in either group. In patients in whom lung function did not improve with treatment, symptoms and signs of acute deterioration such as cough, sputum production, and tiredness did improve by the end of treatment.

Inpatient treatment resulted in more improvement of lung function than did home treatment. FVC ($17.4 \pm 3.1\%$, $p < 0.001$), FEV_1 ($23.3 \pm 4.1\%$, $p < 0.001$); FEV/FVC (4.75 ± 0.8, $p < 0.01$), FEF_{25-75} 30.7 ± 5.4, $p < 0.001$) calculated at the end of therapy showed significant improvement in the patients treated in the hospital. Patients treated at home did not show significant improvements in FVC ($10.2 \pm 2.0\%$, $p = 0.08$), FEV_1 ($13.7 \pm 2.6\%$, $p = 0.11$), FEV_1/FVC (1.7 ± 0.3, $p = 0.61$), FEF (17.6 ± 3.4, $p = 0.11$). Of the 32 inpatient courses, 7 produced no improvement in FVC, FEV_1, FEF_{25-75}, and 9 produced no improvement in FEV_1/FVC. Of the 27 home courses, 10, 12, 11, and 15 resulted in no improvement in FVC, FEV_1, FEV_1/FVC and FEF_{25-75}, respectively. By Fisher's exact test, inpatient treatment resulted in improvement of FEV_1 and FEF_{25-75} more often than home care.

During the 2 years of experience reported, 5 patients in the comparison groups received 6 courses of both home and hospital IV antibiotic therapy. The data of these 5 patients showed no significant differences in decline from baseline or initial FVC, FEV_1, FEV_1/FVC, FEF_{25-75}, weight, or SaO2 before home or inpatient treatment. By all measures, pulmonary function improved more with hospital therapy than with home therapy. Once again, the improvement in lung function in the inpatient treatment group was highly significant (FVC 20.5 $\pm$ 3.0, $p = 0.01$; FEV_1 28.6 $\pm$ 2.7, $p = 0.007$; FEV_1/FVC 5.9 $\pm$ 1.4, $p = 0.11$; FEF_{25-75} 47.9 $\pm$ 3.1, $p = 0.002$) but it did not improve significantly in the home treatment group (FVC 7.3 $\pm$ 6.9, $p = 0.17$; FEV_1 11.2 $\pm$ 11.0, $p = 0.12$; FEV_1/FVC -2.3 $\pm$ 2.1, $p = 0.24$, FEF_{25-75} 20.7 $\pm$ 8.8, $p = 0.18$). Gender did not affect the difference in outcome of hospital versus home treatment and duration of treatment did not differ between males and females. Separating the data by gender demonstrated that the patients treated in the hospital improved significantly in all measures of lung function ($p = 0.03$ to $p < 0.001$), except for FEV_1/FVC in females ($p = 0.12$). There was no significant improvement in any measure of lung function with home treatment in either males or females ($p = 0.15$ to 0.61), as was the case for combined data.

HIVAT patients received longer courses of IV antibiotics than hospital patients (32.5 +/- 3.8 vs 15.9 +/-0.8; $p < 0.001$, unpaired t-test), but prolonging the antibiotic courses in the home care patients did not produce any further improvement compared with 2 weeks of therapy. The range for the hospital courses was 10-29 days, and for home treatment, it was 13-77 days. In the hospital group 10 of 32 courses exceeded 2 weeks, while in the home treatment group 21 of 27 courses exceeded 2 weeks ($p < 0.001$, Fisher's exact test). In the 5 patients who had both hospital and home treatment, the home treatment lasted 26.7 +/- 7.2 days and the hospital courses lasted 18.2 +/- 2.5 days. Not only did the home treatment courses last longer, they also resulted in shorter intervals between treatment courses. The average time between the end of a home treatment course and the start of a next IV antibiotic course was 15.1 +/- 3.3 weeks (mean +/- SEM), and for the hospitalized group it was 23.1 +/-3.0 weeks. This difference did not achieve statistical significance by the t-test, but by Fisher's exact test there was a significant difference ($p < 0.001$). Following home treatment, only 13 of 27 patients started their next course of IV antibiotics more than 12 weeks after completing the previous course. Following hospital treatment, 28 of 32 patients started their next course of IV antibiotics more than 12 weeks after completing the previous course. In the 5 patients who received treatment in both settings, the average interval between treatment after home therapy was 8.0 +/- 2.3 weeks, and after hospital treatment it was 25.8 +/- 5.2 weeks ($p = 0.05$ by the t-test). The number of intervals greater than 12 weeks after home treatment (1of 6) was again significantly less than those after hospital treatment (6 of 6); $p < 0.01$ by Fisher's exact test. There were no reports of unused drugs.

HIVAT patients reported less frequent chest physiotherapy than inpatients (2.4 +/- 1.2/day vs. 4.0 +/- 0.2/day; $p < 0.01$). There were no other measures of adherence for this variable. Also there was no measure of intensity or duration of CPT at home. All families received training in CPT before the patients were discharged home, and they all had years of prior experience delivering CPT.

Table 4 - Summary of Relevant Studies

Authors: Cornell (1990).	**Design:** Longitudinal panel.	**Purpose:** To explore and describe levels of anxiety that clients experience during the initial 3 weeks of HIVAT.	**Rating:** Strong.	**Weakness**: b, d, f, h, k, l.

Subjects: A sample of 45 volunteer subjects were selected from 2 HIVAT companies in the Reno, Carson City area based on the following criteria: (1) they were admitted as a client into the HIC service; (2) they would be receiving antibiotic therapy for a minimum of 3 weeks; (3) they were 18 years of age or older; (4) they lived in Carson City, Gardnerville or the immediate Reno/Sparks area. Of the 45 accepted into the study, 30 completed all 3 questionnaires. The reasons for not completing the 3 questionnaires included discontinuation of iv therapy before the third week and/or withdrawal from the study per subject request. Demographic data revealed that the majority of the sample was comprised of a) males (60%), b) Caucasians (87%), c) age 60 – 69 years (32%), d) married (54%), e) blue collar (50%), and f) 12 – 14 years education (33.3%). The majority also had no prior HIVAT experience (86%) nor did they have the opportunity for self-administration of HIVAT prior to discharge (67%).	**Intervention:** All of the subjects received teaching for administration of HIVAT before leaving the hospital. The teaching format was the same for both home infusion companies.
Statistical Analysis: The raw scores from the STAI for all 3 tests were obtained and then the basic parametric procedure for testing differences in the means was performed by completing a t-test for the dependent variable. Differences according to the demographic data between STAI scores were analyzed by using MANOVA and ANOVA. F-ratio ,<.05 was considered significant, and results <.01 highly significant	
Results: A t-test of the dependent variable was conducted on each STAI. The S-Anxiety scores revealed the decrease in anxiety from week 2 to 3 was highly significant at .001. The decrease in S-Anxiety scores from week 1 to 3 would be expected and was also highly significant at .000. The T-Anxiety score decreased, but not to the degree of the S-Anxiety scores. The mean T-Anxiety scores were lower throughout the study and differed from test 1 to 3 by 2.76. T-tests, ANOVA and MANOVA analysis on T-Anxiety scores revealed no significant changes. Specific demographic information revealed that the differences according to sex with S-Anxiety using a one way ANOVA ($p < .05$) was significant at .0234, females experiencing higher S-Anxiety than males. MANOVA was used to analyze the remaining demographic information consisting of marital status, occupation, education and pre-hospital discharge experience with HIVAT. The only significance was found in S-Anxiety scores between test 1 and 3 and test 2 and 3. For the purpose of analyzing marital status, 2 categories were formed out of the original 4: a) married, and b) not married. Not married included single, divorced and widowed. The results were highly significant between the 2 tests at .000, with the married group experiencing more anxiety. White collar, blue collar and retired subjects were analyzed; the remaining 3 percent, which was comprised of a student and housewife, were not. The results were highly significant at .000 for the comparisons. The white collar worker experienced the greatest initial S Anxiety followed by the retired and blue collar subjects. The greatest decrease in mean S-Anxiety scores occurred between test 2 and 3 for the blue collar worker, 3.07, and the retired subject, 10.7. The white collar worker experienced an equal decrease in mean S-Anxiety score, that being 4.86. The less educated, those with 8 - 12 years of education had the highest mean S-Anxiety scores followed by 13-15 years and 16-19 years. The results were highly significant at .000 between tests 1 and 3 and .001 between tests 2 and 3. The greatest decrease in mean S-Anxiety scores occurred between tests 2 and 3 with 8 - 12 years decreasing by 5.1, 13 - 15 years decreasing by 3.9 and 16-19 years decreasing by 7.1. Overall, 8-12 years experienced the greatest decrease in mean S-Anxiety scores, followed by 16 - 19 years, then 13 - 15 years. The difference in mean S-Anxiety scores of those who had hands-on experience with HIVAT prior to hospital discharge was separated by .95. However, those who had hands-on experience before discharge demonstrated a greater decrease in mean S-Anxiety overall. The results between tests 1 and 3 were highly significant at .000, as was the significance between tests 2 and 3 at .001. In summary the data analyzed in this study demonstrated significant patterns of anxiety during the first 3 weeks of HIVAT. S-Anxiety scores indicated that S-Anxiety decreased significantly from week 2 to week 3, and that the following demographic groups experienced higher levels of anxiety: a) females, b) married, c) white collar, d) less educated and e) no pre-hospital discharge hands-on experience with HIVAT.	

Table 4 - Summary of Relevant Studies

Authors: Donati, Guenette & Auerbach (1987).	**Design:** Prospective matched pair comparison.	**Purpose:** To compare the efficacy and benefits of home and hospital treatment for CF patients with exacerbations of pulmonary disease.	**Rating:** Strong.	**Weakness:** b, f, h, i, j, l, m.

Subjects: Patients treated at the CF Clinic at The Children's Hospital, Boston were selected for HIVAT based on the following selection criteria: (1) 12 years of age or older; (2) lived within 1 hour drive of the hospital, and (3) judged by their clinic physician to require IV antibiotic therapy for exacerbation of cystic fibrosis pulmonary disease. Patients meeting the same criteria except for distance from hospital and who were admitted to hospital for IV antibiotic therapy within 4 weeks of a HIVAT patient, served as controls. As a result of this selection process, 41 home care treatments and 41 hospital admissions were analyzed. These treatments were administered at home to 26 individuals (14 male patients), aged 13 to 33 years, and to 38 individuals (20 female patients), aged 13 to 39 years, in the hospital. The groups did not differ significantly on admission or discharge for age, number of home care services received (chest physiotherapy, visiting nurse, psychologic or social service counseling), or any clinical or laboratory measurements taken except admission pulse rate. The mean number of treatment days for both groups was also equivalent.	**Intervention:** All but 2 patients were given an aminoglycoside and a second antibiotic. 6 patients in the HIVAT group and 8 in the in-hospital group were given tobramycin and a cephalosporin. 34 treatments in the HIVAT group and 30 in the in-hospital group consisted of tobramycin and a semisynthetic penicillin. One HIVAT patient did not receive an aminoglycoside and 1 hospital patient only received an aminoglycoside. Antibiotics were infused at the same 6 or 8 hour regimen to each group through a 22g peripheral catheter. 3 HIVAT patients had central lines. In these patients and 3 HIVAT patients with peripheral catheters, pumps were used. Indwelling catheters were locked between infusions. Parents of 4 HIVAT patients administered, the rest self-administered. Nurses made an initial visit within 24 hours and daily thereafter. Medical backup was provided by the attending physician, and all HIVAT cases were presented at weekly rounds. All medications were premixed and delivered to the HIVAT group by a home care pharmacy.

Statistical Analysis: Student t tests for paired and independent samples, nonparametric Wilcoxon matched-pairs signed rank test, and Mann-Whitney U tests were utilized to analyze data. Significance set at $p=0.05$

Results: Both the home and hospital groups showed a statistically significant improvement in FVC ($p<0.001$, $p<0.001$), PFR ($p<0.001$, $p<0.001$), FEV_1 ($p=0.005$, $p<0.001$), PaO2 ($p=0.006$, $p<0.001$), pulse ($p=0.004$, $p<0.0001$) and respiratory rates ($p=0.005$, $p<0.001$), respectively. Furthermore, there were no significant differences between home and hospital groups when admission or discharge values of each HIVAT patient were compared with those of the matched, in-hospital control patient, except for admission pulse rate. Because the number of matched pairs for the assessment of PaO2 differed on admission (n=34 pairs) and discharge (n=24 pairs), a comparison of independent samples at admission and discharge was performed. Again, there was no significant difference between the groups (admission, home care n = 38, hospital n = 37, $p\leq0.21$; discharge, home care n = 33, hospital n = 32, $p\leq0.56$). However, calculation of the change in VC (home 7.9 ± 1.7, hospital 13.9 ± 1.9, $p\leq0.03$) and change in PO2 (home 3.8 ± 1.7, hospital 7.9 ± 1.4, $p\leq0.05$) from admission to discharge showed that the hospitalized patients had a statistically significant greater improvement in these 2 values ($p\leq0.03$ and $p\leq0.05$, respectively).

Further analysis of the differences in VC was done to determine any association between severity of illness (VC≤50% predicted) and response to treatment. There were no statistically significant differences between home and hospital patients with VC>50% predicted (home n=11, mean rank 13.0; hospital n=14, mean rank 13.0; Mann-Whitney U 76.5, $p\leq0.98$). Hospitalized patients with VC<50% predicted had a slightly greater improvement in VC than did home patients with VC<50% (hospital n=11, mean rank 13.3; home n=10, mean rank 8.4; Mann-Whitney U 29.5, $p\leq0.07$).

Although in the 18 months before the study, both groups had a mean of 2 admissions to the hospital for intravenous antibiotic therapy per patient, during the 18 months of the study the home group received treatment 3.7 times per patient and the hospital group 3.0 times per patient; that is, the rate of admission increased significantly for both groups during the study period, with no significant difference between groups. Seventeen (65%) HIVAT patients required readmission during the study, compared with 26 (68%) control patients. When the intervals between IV antibiotic treatments before and after the study treatment were compared, no significant differences were noted for either the home (before 5.9 ± 1.9 months, after 4.1 ± 1.1, $p \leq 0.18$) or hospital (before 6.2 ± 1.3, after 7.0 ± 1.0, $p \leq 0.48$, Wilcoxon) patients. Similar results were obtained when matched pairs (n=13) were compared for posttreatment intervals ($p \leq 0.15$, Wilcoxon).

At onset patients reported that their decision to accept HIVAT originated from a desire to avoid the hospital, to engage in normal activities, and to avoid nosocomial infections. In fact, of the 63% of HIVAT patients usually engaged in full-time work or school, approximately 40% were able to maintain full activity and an additional 45% maintained at least some of their normal activity. Prior to home care treatment, patients were concerned about IV access, isolation in case of emergency, and scheduling of necessary treatments, yet on completion, the greatest single disadvantage reported was loss of sleep. The benefits were a greater sense of comfort at home, more privacy, less disruption of family routine, and greater control in their own health management. Three patients elected to discontinue HIVAT for what they described as insufficient emotional support at home, and were admitted to hospital.

The charges billed to the 2 groups were significantly different, with a mean charge of approximately $10,000 ($600/d) for HIVAT patients and more than $18,000 ($1000/d) for hospitalized patients, resulting in $370,000 reduction in charges for 41 home care treatments during the study. Nurses made an average of 0.7 unscheduled home visits, received 2.0 calls, and made 0.4 referrals to additional services per treatment. Extra visits and calls were related to problems with the IV site or difficulties with infusion. No significant differences in the number of home care services required by patients with VC<50% was compared with the number of home care services required by patients with VC>50%

Table 4 - Summary of Relevant Studies

Authors: Pond, Newport, Joanes & Conway (1994).	**Design:** Retrospective comparative.	**Purpose:** To compare the results of HIVAT with in-patient therapy in young adults with CF using multiple, objective outcome measures.	**Rating:** Strong.	**Weakness:** e, f, h, i, j.

Subjects: The records of all patients attending the Leeds adult cystic fibrosis clinic were reviewed to identify all those who had received HIVAT treatments for pulmonary exacerbation of CF. These patients were selected for HIVAT if they were considered compliant enough to perform regular physiotherapy at home, and were able to reconstitute and administer intravenous antibiotics with adequate sterile technique. For each home treatment thus identified, the temporally closest hospital treatment for that patient was then selected for comparison. Thus patients acted as their own controls. As a result of this selection process, 51 paired home/hospital treatments in 25 patients were compared. All 25 subjects were young adults (mean age 22 years, range 17-29 years) and were chronically colonized with p. aeruginosa. There were no significant differences in the following pretreatment patient characteristics between the home and hospital group: age, height for age % predicted, weight for age % predicted, weight for height % predicted, FEV_1 % predicted, FVC % predicted, Shwachman-Kulczyki score, Northern chest x-ray score.	**Intervention:** All patients spent 2-3 days in hospital before their first course of HIVAT during which time they were taught to reconstitute and administer the intravenous antibiotics using sterile technique. In those patients without totally implanted venous access devices, an intravenous long-line was inserted in the antecubital fossa for HIVAT. All patients, whether at home or in hospital, were treated with 2 antipseudomonal antibiotics, based on the sensitivities of the most recent sputum culture. Frequency of antibiotic administration in home/hospital was as follows: Piperacillin 9/11, Azlocillin 11/15, Tobramycin 31/36, Ceftazidime 26/23, Aztreonam 20/22, Imipenem 3/10, Colistin 4/4. Where aminoglycosides were prescribed, doses were adjusted according to blood levels. Each treatment course lasted approximately 2 weeks (home 14.1 days, hospital 16.7 days). Prophylactic nebulized anti-pseudomonal antibiotics were discontinued, but oral antistaphylococcal agents continued during intravenous treatment. Hospital patients received supervised physiotherapy twice daily, whilst patients treated at home were encouraged to perform their own physiotherapy twice daily. Patients on HIVAT treatment attended the unit at the start, midpoint and end of the course, and performance of physiotherapy was assessed at these times. Sputum samples were obtained for antibiotic sensitvity testing at each unit attendance (usually twice) in the home treatments, and twice weekly in hospital treatments.
Statistical Analysis: To avoid bias in the selection of treatments for comparison, all home treatments of pulmonary exacerbations were included in the analysis. This meant including up to 6 comparisons for some patients. This resulted in 51 home/hospital treatment pairs in 25 patients. To correct for any bias that might arise from incorporating multiple treatment pairs for some patients, the (post-treatment– pre-treatment) difference for each variable was analyzed using a mixed crossed/nested design, with terms for patients, treatment pairs within patients, place (i.e. home or hospital treatment), and patient x place interaction. The magnitude of the changes observed with treatment is likely to be dependent on the absolute pretreatment values, and, therefore, analysis of covariance was performed, with the pre-treatment values treated as covariates. Adjusted means were calculated to predict the mean change for a pre-treatment value common to both hospital and home groups.	
Results: There was a total of 4 adverse reactions to administered antibiotics, 2 in each treatment group, all consisting of mild skin rashes, which subsided with withdrawal of the offending antibiotic (imipenem, tobramycin, and azlocillin twice). One rash in each group occurred early in the treatment course, necessitating a change of antibiotic. Antibiotics were changed on the basis of resistant p. aeruginosa isolates from sputum culture in 1 home treatment and in 19 hospital treatments. The improvement in total white cell count was found to be significantly greater in the hospital group ($p<0.05$ using two-tailed two sample t-test) but the difference was very small. All other measured variables including the absolute neutrophil count, (PEFR), (FVC), (FEV_1), c-reactive protein (CRP), plasma viscosity, total immunoglobulin G (IgG) concentration, Northern chest x-ray score, clinical score, Shwachman-Kulczyki score and weight, improved to a similar degree with no significant differences between the home and hospital treated groups ($p>0.05$).	

Table 4 - Summary of Relevant Studies				
Authors: Vic, Ategbo, Gottrand, Launay, Loeuille, Elian, Druon, Farriaux & Turck (1997).	**Design:** Before/after.	**Purpose:** To evaluate the short-term effects of HIVAT on the nutritional status of CF patients chronically colonized with p aeruginosa	**Rating:** Strong.	**Weakness:** b, f, h.
Subjects: A sample of 38 patients from the Lille University Hospital, Dunkirk and Camiers City Hospital Cystic Fibrosis Centers were selected. The mean age of the sample was 10.9 (SD 4.3) years (range 4.3 to 22.2 years). 18 were girls aged 10.5 (4.0) years and 20 were boys aged 11.2 (4.6) years. All had CF and presented with pulmonary exacerbations of p. aeruginosa infection		**Intervention:** Patients received IV anti-pseudomonas antibiotics - ceftazidime (200 mg/kg/d) (n = 38) and either amikacin (35 mg/kg/d) (n = 20) or tobramycin (15 mg/kg/d) (n = 18) - according to the sensitivities of the strains of p.aeruginosa found in the sputum. Treatment was given for 14 days; the first day was spent in hospital, after which the children were discharged. For the study, patients were readmitted for 24 hours on day 14. Adjuvant treatment remained unchanged during antibiotic treatment (physiotherapy, pancreatic enzymes, and vitamins) and no specific dietetic recommendations were given. The patients did not receive parenteral or enteral nutritional support.		
Statistical Analysis: The non-parametric Wilcoxon signed rank test for paired samples was used to compare data between days 1 and 14 with the Bland-Altman plot to assess the degree of agreement between BIA and anthropometry to evaluate body composition. All results were expressed as mean (SD).				
Results: Weight gain was observed in all patients: weight increased by 1.0 (0.8 kg) ($p<0.001$); weight/height ratio increased from 94.4 (12.2)% (range 73.6 - 128.6%) on day 1 to 98.0 (12.7)% (range 77.3 - 130.2%) on day 14 ($p<0.001$). Energy intake increased from 107 (32)% of RDA to 119 (41%) ($p<0.02$). Prealbumin concentrations increased from 183 (63) mg/l to 276 (89) mg/l ($p<0.001$). Inflammatory markers improved, with a decrease in ESR from 15 (20) mm (range 2 - 180 mm) on day 1 to 9 (21) mm (range 1 - 40 mm) on day 14 ($p<0.001$), and a decrease in neutrophil count from 6671 (3524) per mm^3 (range 1900 - 16,400) on day 1 to 3558 (1408) (range 2080 - 8800) on day 14 ($p<0.001$). Spirometric indices also improved from days 1 to 14: FVC increased from 65(17)% to 79(15)% ($p<0.01$), FEV_1 increased from 58(20)% to 72(18)% ($p<0.01$), and FEF_{25-75} increased from 37(16)% to 52(18)% ($p<0.001$). FM-A (kg) – Fat mass calculated by anthropometry increased from 4.7 (3.5) on day 1 to 5.5 (4.1) on day 14 ($p<0.001$). FM-I (kg) – Fat mass evaluated by impedance increased from 5 (3.7) on day 1 to 5.7 (3.9) on day 14 ($p<0.001$). FFM-A (kg) – Fat free mass evaluated by anthropometry increased from 25.5 (10.5) on day 1 to 25.8 (10.8) on day 14 ($p=0.2$). FFM-I (kg) – Fat-free mass evaluated by impedance increased from 25 (10.9) on day 1 to 25.3 (10.0) on day 14 ($p=0.2$). Therefore, for both methods used, an increase in fat mass of 0.8 (1.0) kg was found, without any significant change in fat-free mass. Using the Bland-Altman method, comparison of the 2 methods (BIA and anthropometry) showed a difference of 0.2 (0.45) kg for fat free mass on day 1. Therefore the limits of agreement were -0.7 kg and +1.1 kg. The same limits of agreement were found on day 14. No difference was observed between patients receiving amikacin or tobramycin.				

Table 4 – Summary of Relevant Studies

Authors: Vinks, Brimicombe, Heijerman & Bakker (1997).	**Design:** Before/after.	**Purpose:** To evaluate the clinical outcome, microbiology and pharmacokinetics of continuous infusion of ceftazidime using an ambulatory infusion pump in CF patients undergoing HIVAT.	**Rating:** Strong.	**Weakness:** b, f, m.

Subjects: A sample of 17 subjects with CF were selected from the Adults Cystic Fibrosis Center, Leyenburg Hospital, The Hague, The Netherlands based on the following criteria: (1) they must have had an acute lower respiratory tract exacerbation due to p. aeruginosa defined according to standard clinical criteria; (2) the p. aeruginosa strains isolated from the sputum had to be susceptible to ceftazidime; (3) they had to be well enough to be discharged home except for the need of intravenous antibiotic treatment. Patients with cultures positive for staphylococcus aureus were excluded. Of the 17 subjects accepted into the study 9 were female and 8 were male; mean age 26.9 +- 7.6 years (range 15 - 52); mean body weight 56.7 kg (range 40.4 - 73.1 kg). These subjects received a total of 33 courses of continuous ceftazidime. Of the 33 courses administered, 25 were clinically evaluable in 12 out of 17 patients. Of these 12 patients, 4 received 1 course, 4 - 2 courses, 3 - 3 courses and 1 - 4 courses. In 5 patients each receiving 1 course, clinical parameters were not fully collected, but clinical response was monitored and bacteriology results were available. Drug levels were measured in 10 patients.

Intervention: Each first HIVAT course began with a 2 - 3 day in hospital training of the patient in infusion technique, maintenance of the IV cannula and use of the portable pump. After an IV ceftazidime bolus injection of 15 mg/kg, a continuous infusion of 100 mg/kg/24h was delivered by means of a portable pump. Antibiotics were infused through a peripheral 0.6 - 0.8 gauge short-stay cannula. After discharge from the hospital, HIVAT continued for 21 days. In all instances the dose for the continuous infusion was prepared in a 100 mL cassette by the local pharmacist. The medication was delivered twice a week to the patient and kept refrigerated at 4°C until use. Patients had to disconnect the infusion system and exchange the medication cassette once a day. There was always a physician and a technician on call. Patients were seen at the outpatient department by their attending physician once a week for evaluation of clinical progress and lab tests. No home visits were made.

Statistical Analysis: Objective clinical parameters on days 0 and 21 and 4-6 weeks after completion of HIVAT were compared. The subjective clinical parameters were scored as "improved", "no change" or "worsened". The Wilcoxon signed rank sum test was used to analyze continuous variables. Discrete variables were compared by means χ^2 contingency analysis by using McNemar's test for paired samples. A p value of < 0.05 was considered significant. Results expressed as mean ± SD.

Results: At the end of the treatment clinical condition was "excellent" in 21 (84%), "good" in 2 (8%) and "moderate" in 2 (8%) of the courses, evaluated by weight gain, auscultation, pulmonary findings, lab results, and subjective findings including sputum color and volume, appetite and general well-being. At follow-up, a stable clinical condition was observed in 17 of 25 (68%) courses and exacerbation was noted in 8 of 25 (32%) courses. Of the clinical objective parameters, FEV_1 ($p < 0.05$), VC ($p < 0.05$), peak expiratory flow rate ($p < 0.001$), and bodyweight improved significantly ($p < 0.001$), and lasted for at least 4 - 6 weeks after the end of therapy in 70% of the cases. The number of sputum cultures classified as pseudomonas-positive was significantly reduced at the end of treatment (day 21; $p < 0.01$). The number of pseudomonas-positive cultures returned to pretreatment values 4 - 6 weeks after the end of the ceftazidime continuous infusion course ($p = 0.49$). During antibiotic treatment the number of susceptible strains cultured decreased and significantly more resistant strains were cultured over time ($p < 0.01$). However, the number of susceptible strains returned to pretreatment values at follow-up. The susceptibility pattern before antibiotic treatment was not significantly different from that at follow-up, 4 - 6 weeks after end of therapy. The mean total body clearance of ceftazidime was 9.1 L/h resulting in a mean serum concentration during continuous infusion of 28.4 mg/L. Ceftazidime serum concentrations attained during the course of treatment were well above 20 mg/L in all patients. Sputum concentrations (mean +/- S.D.) during continuous infusion at the start of treatment (day 3) were 1.6 +/- 1.6 mg/L, with a range from undetectable (<0.5 mg/L) to 3.6 mg/L (24 h collection period). Later samples were incomplete; concentrations ranged from not detectable to 1.1 mg/L (day 14; n = 3) and from not detectable to 0.6 mg/L(day 21; n = 3). The mean duration of treatment of the 33 evaluable courses was 21.0 +/- 1.8 days (range 14-24). There were no clinical reasons for interrupting treatment. 7 out of 25 (28%) courses required 1 cannula. In 28% 2 IV cannulas were used; and in 44% 3 IV cannulas had to be inserted. The median cannula use was 2 per course (range 1 - 3) per patient. Eighteen new catheter insertions were due to thrombophlebitis (60%) and 12 due to leakage (40%). Except for changing the cannula there were no extra visits to the outpatient department. Technical problems with the pump occurred twice. One patient suffered from photosensitivity. No other adverse events occurred. All patients were able to attend work or school as usual, and all patients preferred this HIVAT over hospitalization.

Table 4 - Summary of Relevant Studies				
Authors: Wolter, Bowler, Nolan & McCormack (1997).	**Design:** Randomized, two - factor mixed.	**Purpose:** To determine if HIVAT in adult patients with CF is a feasible, effective and less costly alternative to hospitalization, and to assess the impact of home therapy on quality of life.	**Rating:** Strong.	**Weakness:** a, b, h, i, j, k.

Subjects: 54 patients with an infective exacerbation of CF attending 2 Brisbane hospitals had 114 admissions during the enrollment period. 37 (83 admissions) of these patients were excluded based on the following criteria: (1) unstable disease; (2) dwelling outside Brisbane; (3) history of noncompliance; (4) inability to learn treatment techniques; (5) personal request; (6) lung transplant; (7) first admission. The 17 enrolled subjects had 31 admissions (13 home and 18 hospital). 9 patients had 1 admission, 5 had 2, 1 had 3, 1 had 4, and 1 had 5. Ages ranged from 19-41 (median 22 years). There were no significant differences between home and hospital admissions with respect to gender, age or the proportions recruited from the 2 hospitals ($p>0.70$ in all cases). Admission FEV_1 was also comparable.	**Intervention:** Initial antibiotic therapy was with ceftazidime, 2 g every 12 hours, and tobramycin, 4 –6 mg/kg daily as a single bolus. Therapy was then guided by clinical response and treatment continued for a minimum of 10 days. VAD included peripheral (18), portacath (10) and central (3). All patients received physiotherapy twice daily, plus 20 min. of aerobic exercise. Other usual therapy, including oral or nasogastric supplementation, was continued unaltered. Patients randomized to home therapy spent 2 – 4 days in hospital before discharge and were taught to prepare and administer their own IV antibiotics. Patients were discharged with medication and equipment for the duration of the proposed course of treatment. Home visits were conducted by research staff to follow progress and to assess and change IV lines.
Statistical Analysis: Home and hospital treatment groups were compared using unpaired t-tests and Mann-Whitney tests. Differences over time in outcome variables were determined by ANOVA. Nonparametric Mann-Whitney tests were used to consider the significance of the difference in actual costs.	
Results: There were no significant differences in the duration of treatment or use of antibiotics. The median duration of treatment was 11 days (range 7-26 days) for the hospital arm and 12 days (range 10-24 days) for the home arm ($p=0.2$). Patients undergoing HIVAT spent a median of 3 days in hospital before discharge (range 1-5 days). There was no significant difference in time to next admission between each arm ($p=0.68$). Doses of tobramycin were not statistically different between arms ($p=0.35$). Imipenem was used on 7 occasions due to allergy or failure to respond to study drugs. There were no adverse drug reactions. 71% (hospital) and 46% (home) of patients ($p=0.14$) continued on low-dose home maintenance antibiotics (in most cases nebulized tobramycin, gentamcin or ticarcillin) after IV treatment at the discretion of their physician, and remained on these antibiotics until the final assessment day. Home patients had significantly fewer investigations performed than in-patients ($p=0.002$). Hospital patients routinely received twice daily physiotherapy. Home patients performed either twice daily physiotherapy or an extended once-a-day session provided by community physiotherapists or family members. General activity was higher in the home group as patients performed routine household and social duties. Most patients had 3 home visits (range 1-5 visits) taking an average total of 4 h per patient (range 2-10 h). There were no deaths, no short-term readmissions and no events attributable to the drugs used. One patient had a pneumothorax associated with central line insertion. Most patients had peripheral IV lines. There were no significant differences in IV complication rates ($p=0.57$) or in the number of line changes required ($p=0.5$) by patients at home or in hospital. There were no significant changes in serial serum creatinine (16 admissions) or serial audiometric (15 admissions) measurements. Although there were some changes from baseline, mean improvements in body weight ($p=0.10$), 12 MWD ($p=0.11$), sputum weight ($p=0.09$) and pulse oximetry ($p=0.44$) were not statistically significant between home and hospital groups. There were significant differences over time in changes from baseline noted for FEV_1 ($p=0.006$) and FVC ($p=0.02$). However, there was no statistical difference between home and hospital arms in overall improvement in lung function (FEV_1 $p=0.27$; FVC $p=0.30$). QOL data were divided into 4 component scores and a total score. Disruption scores were measured individually and as a total. Overall, there were significant changes from Day 0 to Post- Rx in all scores ($p<0.001$). These changes were of a similar magnitude for home and hospital arms for dyspnea ($p=0.25$), and emotional scores ($p=0.11$). Hospital patients fared better in terms of fatigue, mastery and total scores ($p<0.05$). Home patients fared better in terms of family, personal, sleep and total disruption ($p\leq0.005$). Most patients (67% of hospital and 69% of home) were students or invalid pensioners and did not suffer financially due to loss of income from hospitalization.	

Table 4 - Summary of Relevant Studies				
Authors: Bradley, Wallace, Elborn, Howard & McCoy (1999).	**Design:** Retrospective comparative.	**Purpose:** To compare the effects on pulmonary function of IV antibiotic delivered at home, or in hospital, or in a combination of home and hospital settings, as part of routine practice.	**Rating:** Moderate.	**Weakness**: a, b, e, f, h, i, j.
Subjects: Pulmonary function data for 51 acute respiratory infections treated by parenteral antibiotics at the Regional Adult Cystic Fibrosis Unit, Belfast City Hospital were used for this study. This data was divided into 3 separate groups. Group A - IV antibiotics were given to inpatients (n = 29, 24 males, mean age 24 year, mean height 1.68 m, 17 of whom were colonized with Burkholderia cepacia). Group B - IV antibiotics were started in hospital but completed at home (n = 14, 8 males, mean age 24 yr, mean height 1.60 m, 12 of whom colonized with B. cepacia). Group C - IV antibiotics were given at home (n = 8, 4 males, mean age 26 year, mean height 1.60 m, 6 of whom were colonized with B. cepacia). Patients in Group A tended to have lower FEV_1, FVC, FEF_{25-75}, and PEFR at the beginning of the course of IV antibiotics than group B, or group C and there was no significant difference in the baseline lung function parameters between group B and group C.		**Intervention:** Treatment in the hospital was provided by a specialized multidisciplinary team including medical staff, nurses, physiotherapists and dieticians. Patients at home were required to reconstitute and administer IV antibiotics, perform physiotherapy as well as continue on their usual inhaled and oral therapies.		
Statistical Analysis: Lung function variables were compared between groups on commencement and on completion, of an IV course of antibiotics. The percentage of change for each of the lung function variables was also compared. Descriptive statistics (means and standard deviations) were calculated for the groups for each of the lung function variables on commencement, at completion, and for percentage change as defined above. Given that the size of the groups in the study were unequal and exploratory data analysis revealed unequal variances between groups, non-parametric tests were used in the statistical data analysis. The Wilcoxon test was used to compare the mean rank difference within each group for each of the lung function variables from commencement to completion of a course of IV antibiotics. The Kruskal-Wallis test and the Mann-Whitney test were used for comparison between groups at the beginning and end of treatment and for percentage of change. The level of significance was determined at $p < 0.05$.				
Results: Intravenous antibiotic treatment significantly improved ($p < 0.05$) spirometric measurements of lung function in all 3 treatment groups. On completion of IV antibiotics there was no significant difference between groups in FEV_1, FVC, or FEF_{25-75}. PEFR was significantly greater in Groups 2 and 3 than in Group 1 ($p < 0.05$). The absolute measured change in each of the lung function variables was then expressed as a percentage of the baseline values. In each of the 3 groups FEF_{25-75} showed a large improvement in response to IV antibiotics. There was a significantly greater improvement in FVC, FEV_1, and FEF_{25-75} in Group A, compared to Groups B and C ($p < 0.05$). There were no significant differences in the change in lung function variables between Group B and Group C. To summarize hospital IV therapy resulted in greater improvements in FEV_1, FVC and FEF_{25-75} than HIVAT in CF patients with an acute respiratory infection.				

Table 4 - Summary of Relevant Studies

Authors: Chattopadhyay (1989).	**Design:** Retrospective multicenter comparative.	**Purpose:** To investigate the safety and efficacy of HIVAT provided by independent and hospital based home health care pharmacies (HHCPs) during 2 different years (1986 and 1987).	**Rating:** Moderate.	**Weakness**: e, f, g, h, i, j, k

Subjects: 457 charts for patients who received HIVAT from 1 independent and 2 community-based home health care pharmacies (HHCPs) in California and Nevada during 1986 and 1987 were screened. Using the following predetermined criteria, 30 patients were selected randomly from each center for each year: (1) the patient received at least 4 doses of IV antibiotics from the HHCP; (2) initial diagnosis was confirmed by the physician prior to the end of the course of therapy; (3) patients did not have AIDS or were not in the end stages of other terminal diseases such as cancer; (4) patients were not hospitalized during the study for reasons unrelated to the infection for which they were being treated with HIVAT; (5) patients did not die due to reasons unrelated to the infections for which they were being treated; (6) information available for a patient must have been adequate for the purpose of this study (n=180). Outcome data of all patients with osteomyelitis who received HIVAT provided by the 3 HHCPs in both 1986 and 1987 were also included using the same inclusion criteria (n=90). For those osteomyelitis patients in the hospital-based HHCP, who were discharged on HIVAT from the referral hospital, the outcome data on antibiotic therapy during their inpatient treatment in the referral hospital were also collected (n=13).

1986/1987 HHCP I - 30/30 patients.

Age: (1) mean 51.87/49.03; (2) SD 20.58/20.50; (3) range 19-84/2-77. Sex: (1) male 18/19; (2) female 12/11. Duration of therapy (days): (1) mean 15/11.6; (2) SD 11.43/6.48; (3) range 2-42/4-28. Antibiotics administered by: (1) self/family assisted 19/15; (2) nurse/pharmacist assisted 11/15. Venous line used: (1) central 10/8; peripheral 20/22.

1986/1987 HHCP II – 30/30 patients.

Age: (1) mean 48.37/46.23; (2) SD 20.89/20.15; (3) range 2-74/4-75. Sex: (1) male 15/17; (2) female 15/13. Duration of therapy (days): (1) mean 14.03/17.77; (2) SD 9.23/13.76; (3) range 2-40/3-42. Antibiotics administered by: (1) self/family assisted 14/20; (2) nurse/pharmacist assisted 16/10. Venous line used: (1) central 11/7; peripheral 19/23.

1986/1987 HHCP III– 30/30 patients.

Age: (1) mean 44.07/44.23; (2) SD 18.13/20.75; (3) range 4-79/2-79. Sex: (1) male 20/18; (2) female 10/12. Duration of therapy (days): (1) mean 22.97/16.00; (2) SD 15.32/11.09; (3) range 4-55/3-36. Antibiotics administered by: (1) self/family assisted 20/17; (2) nurse/pharmacist assisted 10/13. Venous line used: (1) central 14/11; peripheral 16/19.

Age, sex, antibiotic administrator, type of venous line used and diagnosis were comparable among the 3 HHCPs ($p > 0.05$). However, in 1986, the duration of therapy was significantly different among the HHCPs ($F=4.79$, $p<0.05$, $p>0.01$). The mean durations of therapy in 1986 in HHCP 1, HHCP 2, and HHCP 3 were 15 ± 11.43, 14.03 ± 9.29, and 22.97 ± 15.32, respectively. While the ranges were 2 – 42, 2 – 40, and 4 – 55, respectively. This difference appeared to be related to the difference in length of therapy for osteomyelitis patients treated during that year.

Intervention: A standard treatment protocol was not used at the 3 HHCPs. Rather, each had established protocols for patient selection, teaching, dispensing, and monitoring functions. In general, however, the policies were quite similar and are summarized as follows. After the patient is recommended by the infectious diseases specialist or the attending physician for HIVAT, the pharmacist evaluates the patient for suitability. The pharmacist is responsible for teaching the proper aseptic technique, reconstitution of the antibiotic when needed, proper storage condition of antibiotics, and monitoring for drug related problems. Both patient and/or the primary caregiver are taught by the pharmacist. Patients are informed how to contact the pharmacist in case of any problem related to HIVAT, and are available to the patients 24 hours a day. In case of allergy, rashes, diarrhea, the patients are taught to contact the health care professionals immediately. They are also informed to contact primarily the nurse or the pharmacist in case of IV administration set malfunctions or any injection site problem. Patients are given general information about the potential adverse reactions of the antibiotic.

Statistical Analysis: Outcomes were classified as "success", "complication", and "failure". The outcome was classified as "success" when the IV antibiotic therapy was completed and met the following criteria: (1) if the patient's temperature was elevated at the initiation of therapy, it returned to normal; (2) there was complete remission of other symptoms related to the infection; (3) there was no rehospitalization due to the infection or the antibiotic therapy; (4) there was no allergic reaction or adverse reaction to the antibiotic; (5) there was no catheter, injection site, or IV antibiotic administration related problem; (6) patient was completely compliant with the antibiotic therapy; (7) the therapy was completed as it was prescribed with signs of improvement, and without any undesirable reaction. The outcome was categorized as "complication" when IV antibiotic therapy was completed with one or more complications from the following category: (1) adverse drug reaction reported by the patient, nurse or pharmacist; (2) allergic reaction from the IV antibiotics which necessitated a change in drug regimen; (3) any catheter or administration related problem or other problems at the infusion site; (4) any problem related to patient compliance which required the pharmacist or nurse to visit the patient at home to complete the antibiotic therapy. Finally, the outcome was categorized as "failure" as a result of any of the following conditions; (1) the IV antibiotic therapy was discontinued due to any of the reasons described under "complication"; (2) patient had to be rehospitalized for any other reason related to HIVAT. Types and frequency of problems was categorized as problems with antibiotics, and problems with administration procedures. Demographic data were analyzed to test the homogeneity of each group of patients. Data were then analyzed using chi-square test, ANOVA, Kruskal-Wallis test and multiple comparison among proportions. A probability level of 0.05 was used to determine the significance.

Results: The outcome data for this study revealed that: (1) The outcome of HIVAT provided by the 3 HHCPs was the same both in 1986 and 1987 ($p>0.05$); (2) The pooled outcome of HIVAT in 1986 and 1987 was the same ($p>0.05$); (3) No significant difference in outcome of HIVAT was observed between HHCP1 and HHCP 2, HHCP 1 and HHCP 3 (hospital based and independent home health care pharmacy) ($p>0.05$); (4) A significant difference in outcome of HIVAT was observed between HHCP 2 and HHCP 3 ($p<0.05$); (5) The observed significant difference in outcome of HIVAT between HHCP 2 and HHCP 3 was due to the difference in "complication", i.e., a category of outcome ($p<0.05$); (6) The quality of outcome of HIVAT in 1986 and 1987 was the same both in HHCP 1 and HHCP 2 ($p>0.05$); (7) The quality of outcome of HIVAT in 1986 and 1987 was the same in California ($p>0.05$). In HHCP 2, the percentage of patients who initially encountered problems but were ultimately converted into success (i.e., categorized as "complication") was higher in 1987 (84.61%) than that in 1986 (81.82%); however, this difference was not statistically significant; (8) The observed significant difference in "complication" between HHCP 2 and HHCP 3 was due to the difference in "complication" in nongeriatric patients ($p<0.05$), but no significant difference in outcome was observed between HHCP 2 and HHCP 3 in geriatric patients ($p>0.05$); (9) There was no significant difference in outcome between geriatric and nongeriatric patients in either of the 2 study years ($p>0.05$); (10) There was no significant difference in outcome between geriatric and nongeriatric patients during the entire study period ($p>0.05$); (11) Outcome data in "success" and "complication" were not independent of duration of therapy ($p<0.05$); but outcome data "failure" was independent of duration of therapy ($p>0.05$); (12) The problems associated with the antibiotics and IV administration in home care was not the same in all HHCPs ($p<0.05$). No significant difference was observed in occurrence of problems in HHCP 1, and HHCP 2; but, the occurrence of problems in HHCP 3 in both antibiotics and IV administration was significantly different from HHCP 1 and HHCP 2; (13) In this study, the observed frequency of the incidence of adverse drug reactions in geriatric patients in each of the three HHCPs was very similar, and this was consistent with the reported frequency of adverse drug reactions observed in this patient group in both inpatient and outpatient therapy; (14) With HIVAT, the incidence of rash, GI problems, and serum level collectively accounted for more than 80% of total problems associated with antibiotics; problems with rash ranked highest in both hospitalized and home health care patients; (15) General problems (e.g. pain at injection site, swelling, bruised site, redness, itching, etc.) associated with IV administration were ranked highest in both hospitalized and home health care patients; (16) Therapeutic outcome of IV antibiotic therapy for osteomyelitis patients was the same whether the patients were treated in the HHCP or as inpatients in the referral hospital ($p>0.05$); and (17) Ceftrizoxime sodium and cefonicid sodium can be used in HIVAT program by using the syringe pump with plastic syringe. The reconstituted ceftrizoxime sodium and cefonicid sodium solutions in normal saline can be stored in a plastic syringe at room temperature for 2.5 days and 3.5 days, and under refrigeration for 8 days and 13 days, respectively, without significant loss in potency.

Table 4 - Summary of Relevant Studies

Authors: Chattopadhyay, Catania & Mergener (1990).	**Design:** Retrospective comparative.	**Purpose:** To compare the therapeutic outcomes of elderly patients receiving HIVAT with those of younger patients receiving the same therapy.	**Rating:** Moderate.	**Weakness:** b, e, f, g, h, i, j.

Subjects: 169 patients received HIVAT from 1 of 3 different HHCPs during 1986 and 1987. Guidelines that were used by the HHCPs to accept these patients for HIVAT included: (1) all signs and symptoms of infection had to be under control, and the patient's conditions had to be stable at the time of discharge from the hospital except for the need to continue IV antimicrobial therapy; (2) the patient and his or her family had to understand the necessity of continued IV therapy at home and agree with the treatment plan; (3) the patient had to be willing to receive IV therapy at home; (4) the patient had to understand and perform IV infusion techniques to the satisfaction of the pharmacist or nurse after the completion of in-hospital training; (5) the patient's home environment had to be safe and the patient had to have a telephone, a refrigerator, and dependable transportation; (6) the patient's vein had to be able to endure repeated cannulation; (7) arrangements for regular change of the catheter had to be made before the patient was discharged for HIVAT. Of the 169 patients who were treated with HIVAT, 159 were accepted into the study based on the following inclusion criteria: (1) patients must have needed at least 4 doses of IV antimicrobial agents from the HHCP; (2) initial diagnosis must have been confirmed by the physician before the end of the course of therapy; (3) patients must not have had AIDS and must not have been in the end stages of other terminal diseases; (4) patients must not have been hospitalized during the study for reasons unrelated to the infection for which they were being treated with HIVAT; (5) patients must not have died from causes unrelated to the infections for which they were being treated; (6) information available for patients must have been adequate for the purposes of the study. Once accepted into the study, patients were classified as elderly (≥ 62 years) or nonelderly.

HHCP I = 58 patients, mean age 48 ± 18; 42 nonelderly (40 ± 14); 16 elderly (70 ± 5). % male:female 59:41. Mean duration 16 ± 12 days. Osteomyelitis 28%, cellulitis, 12%, wounds 34%, "other" 18%.

HHCP II = 35 patients, mean age 56 ± 21; 17 nonelderly (38 ± 13); 18 elderly (73 ± 7). % male:female 69:31. Mean duration 14 ± 9 days. Osteomyelitis 20%, cellulitis, 11%, wounds 23%, "other" 46%.

HHCP III = 57 patients, mean age 44 ± 19; 44 nonelderly (36 ± 15); 13 elderly (69 ± 6). % male:female 67:33. Mean duration 18 ± 12 days. Osteomyelitis 35%, cellulitis, 21%, wounds 18%, "other" 26%.

Pooled = 150 patients, mean age 48 ± 19; 103 nonelderly (38 ± 14); 47 elderly (71 ± 6). % male:female 65:35. Mean duration of therapy ± 12 days. Osteomyelitis 29%, cellulitis 15%, wounds 25%, "other" 31%.

Intervention: All subjects received HIVAT from one of three home health care pharmacies (HHCP).

Statistical Analysis: Outcomes were classified as adequate or inadequate. To be classified as adequate, all the following criteria had to be met: (1) if the temperature was elevated at the start of therapy, it returned to normal during therapy; (2) there was complete remission of other symptoms related to the infection; (3) there was no re-hospitalization resulting from the infection or the antimicrobial therapy; (4) there were no allergic or other adverse drug reactions necessitating discontinuing HIVAT; (5) there were no other complications resulting from antimicrobial therapy, the catheter, or the injection site; (6) the patient complied with the prescribed therapy and procedures. Inadequate outcomes were defined as those courses of therapy in which 1 or more of the above criteria were not met, resulting in unscheduled intervention by a member of the health care team or discontinuation of the antimicrobial therapy. Data for the patients from each HHCP as well as the pooled data were then subjected to chi-square test with Yates correction. Significance was set at $p<0.05$.

Results: Outcomes were rated as adequate for 69%, 67%, and 77% of the elderly and 69%, 82%, and 79% of the nonelderly at HHCP I, II, and III, respectively. Outcomes of the pooled sample were rated as adequate for 70% of the elderly and 76% of the nonelderly. The difference between the outcomes in the two age groups was not significant. HHCP I (Chi-square with Yates correction = 0.089; $p > 0.7 < 0.8$); HHCP II (Chi-square with Yates correction = 0.455; $p > 0.5 < 0.7$); HHCP III (Chi-square with Yates correction = 0.034; $p > 0.8 < 0.9$). In terms of the pooled data for the nonelderly, the percentage of adequate outcomes ranged from 63% for patients 56-62 years old to 76% for patients younger than 16 years old. For the elderly, the percentage of adequate outcomes ranged from a high of 80% for patients 76-80 years old to zero for the single patient in the 86-90 age group. None of the patients in this study received steroid or immunosuppressive therapy. None had severe peripheral vascular diseases; however, 9 patients had diabetes. 44% of these patients had inadequate outcomes, including both patients over age of 62. This contrasts with inadequate outcomes for 30% and 24%, respectively, of the elderly and nonelderly groups as a whole. The importance of this finding cannot be ascertained from this study.

Table 4 - Summary of Relevant Studies

Authors: Montalto & Dunt (1997).	**Design:** Retrospective comparative.	**Purpose:** To compare the outcomes of patients with cellulitis and pyelonephritis treated with intravenous antibiotics in either a hospital in the home unit (HHU) or traditional inpatient beds.	**Rating:** Moderate.	**Weakness:** d, e, f, g, h, i, j, l, m.

Subjects: The sample of patients was selected from the HHU at Mornington Peninsula Hospital based on the following criteria: (1) stable diagnosed medical condition able to be managed at home without expected emergency interventions; (2) availability of a carer at home; (3) the patient's ability to move to and from an accessible toilet; (4) an appropriate standard of housing, telephone connection, and patient consent. The study population comprised patients who met the selection criteria for HIVAT care and were deemed to require HIVAT for the treatment of pyelonephritis or cellulitis between January 1995 and January 1996. The study population was then divided into two groups. One group was assessed and received HIVAT and the other group was assessed and received traditional hospital ward care. The latter either were not formally referred by their medical unit, did not consent to transfer, lived outside geographic boundaries, were placed on dosing requirements unable to be offered by the HIVAT program or lacked enough home supervision. On clinical and general social grounds, however, those in the traditional group were assessed as suitable for treatment in the HIVAT, and the HIVAT would have accepted these patients were it not for the aforementioned barriers.

Cellulitis:

Group A (HHU) – n = 55 Goup B (Traditional) – n = 22

The patients' mean age in Group A was 51.5 and in Group B was 50.9 with a difference of estimates (95% CI) –0.6 (-10.2, 9.0). Female patients (%) in Group A was 40.0 and in Group B was 27.2 with a difference of estimates (95% CI) 12.8 (-10.0, 35.6). Mean temperature in Group A was 37.54 and in Group B was 37.54 with a difference of estimates (95% CI) of 0 (-0.47, 0.46). Mean leukocyte count in the Group A was 10.79 and in Group B was 10.83 with a difference of estimates (95% CI) of 0.05 (-2.29, 2.40). Finally treatment with antibiotics (%) was 54.5 in the Group A and 59.1 in Group B. Difference of estimates (95% CI) was 4.6 (-19.8, 29.0). In both groups, the most frequent site of cellulitis was the lower limbs representing 74.5% (n =41) in the Group A and 72.7% (n = 16) in Group B. Cellulitis of the upper limb was treated in 14.5% (n = 8) of Group A and 9.1% (n = 2) of Group B. Pre-existing co-morbidities in the Group A included: venous insufficiency (5); past cerebrovascular accident (2); non-insulin dependent diabetes mellitus (NIDDM) (5); recurrent cellulitis (3); insulin dependent diabetes mellitus (IDDM) (2); recurrent ulcers (2); and single patients with peripheral arteriovascular disease, obesity, lymphoedema due to mastectomy, chronic

Intervention: The HHU nurse assessed each referral and ensured that the unit's medical and social criteria were met, and if ancillary services such as physiotherapy or personal attendant care were required, these were arranged. The HHU medical director provided input into the choice of antibiotic agent through discussions with the referring unit. The specific intravenous therapies for patients with cellulitis in the HHU group included flucloxacillin 2 (3.6%), ceftriaxone 39 (70.9%), vancomycin 2 (3.6%), penicillin 1 (1.8%), penicillin + flucloxacillin 5 (9.1%), others 2 (3.6%), cephalothin 4 (7.3%). The intravenous therapies used for patients in the Traditional Groups included flucloxacillin 5 (22.7%), ceftriaxone 1 (4.5%), vancomycin 1 (4.5%), penicillin 1 (4.5%), penicillin + flucloxacillin 10 (45.5%), others 3 (13.6%), cephalothin 1 (4.5%). Nine (16.4%) Group A and 12 (54.5%) Group B patients were also treated with subcutaneous heparin. Differences in antibiotic utilization for patients with pyelonephritis were apparent. In Group A, 8 patients (57.1%) were treated with ceftriaxone alone and 6 patients (42.9%) were treated with gentamicin alone. In the Group B, 5 patients (50%) were treated with gentamicin and amoxycillin, 2 patients (20%) with gentamicin and penicillin, and 1 patient (10%) with gentamicin and ceftriaxone. Patients had intravenous access established and, if they consented, were discharged home with a lockable kit containing drugs, dressing tray, IV replacement equipment, anaphylaxis pack, and the original hospital medical record. Patients were visited and IV drugs administered by the HHU nursing team. Every patient received a written emergency plan which explained the 24 hour telephone backup service. This backup was provided by a HHU nurse and doctor. The medical director undertook ward rounds 3 times weekly. At the conclusion of treatment, patients who had retained their status as hospital inpatients in every way throughout their time in the HHU, were formally discharged. .

lymphatic leukaemia, spina bifida, iron deficiency, osteoarthritis. Co-morbidities in Group B included: venous insufficiency (3); recurrent cellulitis (2); dental caries (2); osteoarthritis (2); and single patients with NIDDM, IDDM, recurrent ulcers, peripheral arteriovascular disease, obesity. Pyelonephritis: Group A (HHU) – n =14 Group B (Traditional) – n = 10 The patients' mean age in Group A was 30.1 and in Group B was 34.6 with a difference of estimates (95% CI) 4.5 (-6.7, 15.6). Female patients (%) in the Group A was 100 and in the Group B was 70 with a difference of estimates (95% CI) 30 (1.6, 58.4). Mean temperature in Group A was 37.74 and in Group B was 37.74 with a difference of estimates (95% CI) of 0 (-0.80, 0.79). Mean creatinine (mmol/L) in Group A was 0.091 and in Group B was 0.088 with a difference of estimates (95% CI) of 0.003 (-0.44, 0.37). Mean leukocyte count in the Group A was 10.95 and in Group B was 11.98 with a difference of estimates (95% CI) of 1.03 (-3.43, 5.48). Finally treatment with antibiotics (%) was 50 in the Group A and 30 in Group B. Difference of estimates (95% CI) was 20 (-18.7, 58.7). Relevant pre-existing co-morbidities in Group A included recurrent cystitis (4); recurrent pyelonephritis (2); recent J stent removal (2); and single patients with previous urinary calculi and indwelling ureteric stent with chronic renal failure. Relevant pre-existing co-morbidities in Group B included 3 patients with previous pyelonephritis and single patients with past ureteric calculi, recurrent cystitis, current pregnancy, duplex collecting system, and ureteric kinking.	
Statistical Analysis: Patient incidents were defined as: adverse drug reaction; phlebitis requiring treatment; unexpected operation or procedure; other adverse event; and unexpected readmission to hospital for a related condition within four weeks of discharge. An adverse event was defined as an unintended injury or complication which results in disability, death, prolonged hospital stay and is caused by health care management. Means or proportions were calculated and 95% confidence intervals were prepared for the differences.	
Results: Cellulitus: Mean time to febrefuge in the Group A was 1.96 and in the Group B was 2.00 with a difference in means (95% CI) of 0.04 (-0.63, 0.71). Mean total length of stay in the Group A was 6.00 and in the Group B was 8.55 with a difference in means 2.55 (0.24, 4.85). Finally the mean in hospital length of stay in the Group A was 1.51 and in Group B was 8.55 with a difference in means of 7.04 (4.84, 9.23). If the patient with the longest length of stay in the Group B is excluded the difference in the means no longer lies outside the 95% confidence intervals. Two incidents were recorded in the Group A admissions (3.6%) and seven (31.8%) in the Group B admissions. In the Group A episodes, 2 required return to hospital for drainage of an abscess. In Group B: 2 patients had an unexpected non-urgent operation (excision of sapheno-femoral thrombus, transurethral resection of prostate); 1 patient had a drug reaction requiring treatment, and 4 patients unexpectedly returned to hospital within 4 weeks for cellulitis related problems (3 of whom were admitted to hospital). Fifty-one Group A patients were expected to recover fully, while 4 (7.3%) showed recovery back to a stable pre-existent condition. In all 22 Group B patients full recovery was expected. Pyelonephritis: Mean time to febrefuge in the Group A was 1.79 and 2.40 in Group B with a difference in means (95% CI) of 0.61 (-0.37, 1.60). Mean total length of stay in the Group A was 4.57 and in Group B was 4.00 with a difference in means 0.57 (-1.86, 0.72). Finally the mean in hospital length of stay in Group A was 1.43 and in Group B was 4.00 with a difference in means of 2.57 (1.61, 3.53). Incidents were recorded in one HHU episode (7.1A%) and in three (30%) traditional episodes. In Group A, 1 patient suffered a vasovagal episode at the time of medication administration. In Group B, 1 patient suffered anaphylaxis requiring treatment, 1 was readmitted within	

4 weeks for a related condition and 1 patient underwent an unexpected procedure (gastroscopy). In each group, 1 patient was expected to return to a stable pre-existent condition, while in all other patients full recovery was expected.

Table 4 - Summary of Relevant Studies

Authors: Stovroff, Totten & Glick (1994).	**Design:** Prospective nonrandomized comparative.	**Purpose:** To compare the use of short plastic cannulas (SPC) and inpatient care (IPC) to peripherally inserted central (PIC) lines and home care (HC) in terms of cost, length of hospitalization, morbidity, and patient/family acceptance.	**Rating:** Moderate.	**Weakness:** f, g, h, i, j, l, m.

Subjects: A sample of 16 consecutive patients who were treated for a perforated appendix at the Children's Hospital of Buffalo, Buffalo, New York, were selected. Once selected the children were divided into the following 2 groups

Group A (SPC – IPC) = 8 male subjects (9.0 ± 1.5 years).

Group B (PIC – HC) = 7 male and 1 female subject (9.1 ± 1.7 years).

Intervention: All subjects underwent appendectomy and placement of intraabdominal drains by a single surgeon. Intravenous antibiotics (ampicillin, gentamicin and clindamycin) were continued for 10 days postoperatively or until the patient was afebrile and had a WBC of < 10,000/mm^3. Group A patients had IV access via a standard short plastic cannula and were treated as inpatients until their entire postoperative course of antibiotic therapy was completed. Group B patients were given a 2.9F PIC line inserted by the House Staff using the technique described by Dolcourt and Bose by the first postoperative day and were discharged on HIVAT as soon as gastrointestinal function had returned. Parents were taught to care for the PIC line and to administer the antibiotics by the home care team before discharge. The home care team was available 24 hours a day for problems, checked WBC counts when appropriate and, after physician approval, removed the PIC line at the conclusion of therapy. At the first postoperative clinic appointment, all children and parents were questioned by the surgeon for their opinions regarding their experience with PIC lines and home care.

Statistical Analysis: Results were expressed as mean ± standard deviations. Differences between groups were assessed by the Student's T-test. Significance was set at $p<0.05$.

Results: All children in Group B were discharged to home care by the seventh postoperative day, and they received an additional 5 days of antibiotics at home (6.38 ± 1.36). The children in Group A stayed in the hospital an additional 6 days (12.4 ± 0.84) ($p=0.002$); thus, the number of total care days was comparable. Children with PIC lines had lower inpatient costs ($p=0.002$), and despite the additional cost of homecare, had a significantly lower total care cost than those who had conventional inpatient therapy ($p = 0.004$), amounting to a savings of almost 40% in the cost of care. The children in Group A required placement of more than 5 IV catheters during hospitalization (5.75 ± 0.77). In contrast, all Group B patients had PIC lines successfully placed and no further IV access was necessary (1.25 ± 0.16) ($p=0.001$). All PIC lines were removed electively after completion of antibiotic therapy, and no patient suffered a catheter-related complication. In addition, neither group experienced recurrent intraabdominal or wound infections or required readmission. The patients' and families' subjective acceptance of the PIC line/home care concept (i.e. line placement, line care, and early hospital discharge) was unanimously favourable.

Table 4 - Summary of Relevant Studies

Authors: Strandvik, Hjelte, Malmborg & Widen (1992); Strandvik, Hjelte & Widen (1988).	**Design:** Prospective nonrandomized comparative.	**Purpose:** To describe the experience of 1 year of HIVAT for cystic fibrosis patients with exacerbation of pulmonary symptoms.	**Rating:** Moderate.	**Weakness:** a, b, f, g, h, i, j, k, l, m..

Subjects: 39 CF patients who attended the CF Center in Stockholm were offered HIVAT. All patients lived within a distance of 100 km from the hospital and needed frequent IV antibiotics. 31 patients chronically colonized with p. aeruginosa accepted. 13 patients also had staphylococcus aureus. The mean age of the HIVAT group was 21 (range 4-67 years). Mean clinic score according to Shwachman was 77 (range 46-95). During the same period of time, 21 patients, 8 of whom were living a further distance away from the hospital or were abstaining from home treatment, were hospitalized for one or more IV antibiotic treatments. The mean age of the hospital group was 15 (range 4 - 24). Mean clinical score according to Shwachman was 90 (range 81 - 94). 13 of the inpatients had received other treatments with IV antibiotics at home either before or after the hospitalized treatment. The mean age of the home/hospital group was 17(range 10 - 24). Mean clinical score according to Shwachman was 73 (46 - 94). No significant differences in clinical status between groups were noted.

Intervention: The patients and/or their parents were taught how to administer IV antibiotics by a nurse. When confidence in the technique was obtained, the patient and/or parents were allowed to practice at home during day leaves and subsequently to complete the course at home. The teaching process varied in length for different patients. Six patients had a Port-A-Cath system and the rest of the patients had peripheral IV access. The first doses of antibiotics were always given in the hospital. The antibiotics were given as short-term infusions, usually 3 times a day (every 8 h) in high doses as recommended in CF. The serum trough and peak concentrations of aminoglycosides were determined on the second day of treatment at home or at school/work by the CF nurse, and, if more than a 10 day treatment was indicated, on a weekly basis. When the treatment was prolonged (i.e. > 10 days), the patient was seen at least once a week by a CF doctor. The patients could get in contact with the CF center by phone during the day. No restrictions were placed on activity. Insurance coverage was as good for HIVAT as for inpatients.

Statistical Analysis: Student's t-test, chi-square and Wilcoxon's matched paired signed ranks tests were utilized to analyze data.

Results: 92 IV antibiotic treatments were given to 31 patients at home, i.e. a mean of 3.0 treatments/patient/year. The mean duration of the treatments was 15.4 days of which 13.6 days on average were performed at home. 70% of the treatments were carried out entirely at home (except for the first dose). In 83% of the treatments the patients spent less than 2 days in hospital. During the same period of time the inpatient group had a total of 41 IV antibiotic treatments (mean 2.0 treatments/patient/year). The mean duration of therapy was 11.4 days. In 94% of the HIVAT courses the patients were treated with 2 antibiotics, usually an aminoglycoside and a ß-lactam. The corresponding figure for the inpatient group was 86%. In 30% of treatments the HIVAT patients required 1 IV cannula and in 37% of the treatments the HIVAT patients required more than 3 IV cannulas. This was significantly less than in the inpatient group who needed more than 3 insertions in 83% of the treatments and never carried out a treatment with only 1 cannula ($p < 0.05$). At home the infusions were time displaced more than three times in 34% of the treatments compared with 50% in the inpatient group ($p < 0.05$). The efficacy of treatments was assessed as excellent in 33%, good in 54% and less good in 10% of the HIVAT group, evaluated by weight gain, pulmonary findings at auscultation, laboratory data and subjective statements concerning sputum volume and colour, appetite and general well-being. No significant differences were seen between the groups treated at home or in hospital in the following parameters. Weight in the home group at the start was 52.2 (29.6 - 67.0) and at the end was 53.4 (29.5 - 67.5) ($p<0.001$) and in the hospital group at the start was 43.8 (17.2 - 64.8) and at the end 44.6 (17.0 - 65.7) ($p<0.001$). FEV_1 (% of predicted) in the home group at start was 45 (19 - 95) and at end was 53 (21 - 103) ($p<0.001$) and in the hospital group at start was 64 (18 - 115) and at end was 70 (21 - 123) ($p<0.01$). PO2 in the home group at start was 8.9 (7.1 - 11.2) and at end 9.4 (7.1 - 11.9) ($p<0.01$) and in the hospital group at start was 9.3 (7.0 - 11.1) and at end was 9.6 (7.4 - 11.3). ESR in the home group at start was 25 (2 - 100) and at end was 16 (2 - 62) ($p<0.001$) and in the hospital group at start was 18 (1 - 45) and at end was 13 (1 - 30) ($p<0.01$). WBC in the home group at start 10.5 (4.8 - 19.2) and at end was 8.2 (3.5 - 17.3) ($p<0.001$) and in the hospital group at start was 9.2 (3.9 - 19.7) and at end was 6.8 (2.8 - 11.3) ($p<0.001$). S-Haptoglobin (g/l) in the home group at start was 2.0 (0.5 - 3.5) and at end was 1.5 (0.3 - 2.4) ($p<0.001$) and in the hospital group at start was 1.6 (0.1 - 3.1) and at end 1.1 (0.0 - 2.2) ($p<0.001$). P. aeruginosa was temporarily eradicated or reduced in 71% of the courses. Multi-resistant strains did not develop in any patient.

The home patients were physically active. In 77% of the treatments the patients themselves initiated the physiotherapy and performed it by self-treatment (57% of the courses). 77% of patients undertook responsibility for inhalation, mixing and administration of the antibiotics also. During 61% of the home treatments the patients did not miss school or work. 30% stayed at home 5 or more days. Spare-time occupations were maintained in 82% of the home treatment periods. In contrast, in the hospitalized

patients only 50% of the patients initiated the physiotherapy and performed it by self-treatment (6% of the courses). 29% of the patients undertook whole responsibility for inhalation, mixing and administration of the antibiotics. During 22% of the hospital treatments the patients did not miss a single day at school or work. 61% of patients missed more than 5 days at school or work. Spare-time occupations were maintained in 44% of the hospital treatment. 36% of the treatments at home were not experienced as being difficult in any aspect. Of those who reported some problems, maintaining the spare time occupations were most frequently mentioned (79%) and attendance to infusions (65%). The fear of cannula difficulties was as frequent in the home group as among patients in hospital, being 65% and 67%, respectively. Anxiety about the disease itself increased in accordance with the number of treatment courses in both groups from about 30% to about 60%. On the other hand, concern regarding the infusions and keeping up the spare-time activities decreased to about 30% during the year in the patients treated at home. All patients except 1 (96%) in this group would choose this form of treatment for the next IV antibiotic course. The 1 patient wanted the extra physiotherapy in hospital. Throughout the year, 1267 days were spent exclusively at home with IV antibiotic treatment, corresponding to a mean of 3.5 beds/day in hospital.

Table 4 - Summary of Relevant Studies

Authors: Talcott, Whalen, Clark, Rieker & Finberg (1994).	**Design:** Prospective nonrandomized comparative.	**Purpose:** To assess the feasibility of early discharge to home therapy with standard intravenous antibiotics in 30 patients with fever and neutropenia at low risk by a validated clinical decision rule.	**Rating:** Moderate.	**Weakness:** b, d, f, g, h, i, j, k, l.

Subjects: All cancer patients admitted to Dana-Farber Cancer Institute (DFCI), Boston with fever (≥ 100.5°F) and neutropenia (granulocyte count < 500/μL) were prospectively identified. Patients with chronic neutropenia were excluded. In addition, the following 3 groups at high risk based on a validated risk assessment tool were excluded: (1) patients who developed fever and neutropenia as inpatients; (2) patients who demonstrated serious concurrent comorbidity during the in-hospital observation period; (3) those with inadequate control of their underlying cancer. To further reduce the risk to patients, the following criteria were also applied: (1) evidence of a significant source of infection, including an infiltrate on chest radiograph or bacterial growth from initial blood or urine cultures; (2) age 65 years or older; (3) a 24 hour companion at home; (4) less than 1 hour's surface travel between the patient's home and the DFCI; (5) permission of the patient's physician; and (6) informed consent. Two of these requirements were later relaxed: instead of a 24 hour companion, the ability to use available emergency assistance was required, and the allowable distance from DFCI was extended from 1 to 2 hours.

During the first 6 months of the study, 50 of 84 patients (60%) evaluated for the HIVAT trial were medically ineligible. Neutropenia resolved in another 8 patients (10%) during the in-hospital observation period. Of the remaining 26 medically eligible patients, only 9 (35%) were enrolled onto the trial. However, during the remainder of the study 21 of the 31 medically eligible patients (68%) were enrolled. The 30 patients enrolled in the HIVAT trial included 17 women (57%). Patients had a median age of 38 years (range 19 to 63). Soft tissue sarcoma and acute myelogenous leukemia were most common diagnoses, with 6 patients each. Patients were severely neutropenic, with median admission granulocyte counts of 9/μL (range 0 to 360/μL). All but 4 enrolled patients had granulocyte counts < 100/μL, and 14 patients had no granulocytes. The median duration of neutropenia was 6 days (mean 8.2). Nearly half had 7 or more days of neutropenia: 9 had from 7 to 10 days of neutropenia, and 5 had from 13 to 36 days, including 2 with 13 days, 1 with 14 days, 1 with 26 days, and 1 with 36 days. Five patients with clinically documented localized infections were enrolled: 4 with cellulitis, including 1 with inflammation at the Hickman catheter skin exit site, and 1 with a recently repaired and tender tooth, raising the clinical suspicion of a dental abscess.

Intervention: All patients were given standard broad-spectrum intravenous antibiotics until granulocyte levels increased to greater than 500/μL. Half the patients were arbitrarily assigned to receive mezlocillin, 6 times daily, and gentamicin, 3 times daily. The other half the patients were assigned to receive ceftazidime, three times daily. Other antibiotics, most commonly vancomycin, were added to the initial regimen at the discretion of the treating physician, as were subsequent antibiotic changes. The use of colony-stimulating factors (CSFs), including granulocyte CSF (G-CSF) and interleukin-3 (IL-3), was also allowed. The antibiotics were delivered to the patients homes every 2 or 3 days and stored in their refrigerators until 1 to 4 hours before they were to be infused. Indwelling central venous catheters were not required for HIVAT, although 23 patients had them. Seven patients had peripheral venous access only. Mezlocillin was administered via programmable infusion pumps, while other antibiotics were administered via individual bags infused by gravity. Patients or their companions were instructed by the nurse to perform infusion tasks, such as changing pump cassettes or attaching antibiotic bags. After discharge, patients were evaluated daily at home for new signs and symptoms of infection by a nurse using a written protocol. Blood samples were drawn daily for CBC and every third day for serum creatinine levels. Peak and trough gentamicin and vancomycin levels were drawn at the third dose after a change in these drug's dosages or schedules. Patients were examined in-clinic by a physician 2 to 4 days after discharge and weekly thereafter, or whenever a change in therapy was being considered, usually due to prolonged (> 5 days) or recurrent fever. Continuing fevers did not prevent discharge home, since prior studies determined that fevers persisted for a median of 3 days in low-risk patients. Patients were readmitted at the discretion of treating physicians, or when a complication occurred.

Statistical Analysis: Fisher's exact ($p < .05$) and Wilcoxan rank sum tests were used.

Results: Enrolled patients were treated at home for a median of 3.5 days (range 1 to 24). The longest home treatment period of 24 days followed intensive postremission therapy for acute myelogenous leukemia. For 5 patients, antibiotic therapy was modified after discharge home. Five patients were readmitted for observation because of

recurrent or prolonged (> 55 days) fever and remained hospitalized for a median of 3 days (range 1 to 6). Antibiotics were added on readmission in each case; 4 received empiric vancomycin and 1, who was already receiving vancomycin, was given empiric amphotericin. Two patients had evidence of infection in addition to persisting fever: 1 had sinusitis with facial pain, and another genital labial inflammation. Four had prompt response of fever and were discharged when neutropenia resolved. One patient had a generalized rash and fever ultimately attributed to ceftazidime hypersensitivity, which persisted 2 days after neutropenia resolved. Four other patients were readmitted for a median of 17 days (range 10 to 36) because of medical complications.

Of 30 patients treated with HIVAT, 4 had 1 or more serious medical complications during or arising from the period of neutropenia (13.3%; 95% confidence internal (CI), 4% to 32%). No patients died or had irreversible complications. None of the 27 medically eligible patients who did not enter the home trial had complications. The medical complication rate for all medically eligible patients was 4 of 57 (7%; 95% CI, 2% to 18%). Of the 15 patients without serious concurrent comorbidity or uncontrolled cancer, who were excluded because of specifically excluded infections or age 65 years or greater, 3 had complications. Two of these patients had transient hypotension on the third hospital day and the third developed supraventricular tachycardia. Complications of HIVAT included transient hypotension in 2 patients, which resolved after brief saline infusions. Both patients had associated acute increases in serum creatinine to approximately 2 mg/dL, which later resolved. Patient #3 had persistent fevers, and amphotericin was later added empirically. Her neutropenia resolved 10 days after readmission. Hypotension in patient #11 coincided with recurrent fever 1 day after antibiotics and G-CSF administration had been stopped, following a steep increase in granulocyte levels from 0 to 2,360/μL in 48 hours. Inflammation was present at the site of her subcutaneous infusion port, which resolved after the indwelling catheter was removed. Patient #21 who lived beyond the 2 hour required distance and who was monitored by her private physician at home, developed systemic mucor infection, associated with recurrent fever and hypotension. Despite the 36 day duration of fever and neutropenia that followed her postremission intensification therapy for acute myelogenous leukemia with mitoxantrone and diazoquinone (AZQ), who recovered fully after prolonged amphotericin therapy. Patient #26 received an outpatient platelet transfusion contaminated with coagulase-negative Staphylococcus on her fourth day of HIVAT. After she was reevaluated and felt to be stable, vancomycin was added to her regimen of mezlocillin and gentamicin. Despite appropriate gentamicin levels and a normal serum creatinine level had increased to 4.5 mg/dL the day her neutropenia resolved and 2 days after vancomycin was added. Her creatinine level increased to 9.3 mg/dL before returning to normal, and she developed a severe, desquamating rash attributed to mezlocillin hypersensitivity. Of the 14 patients treated with ceftzidime, 9 also received gentamicin added according to the usual practice of the treating physician, and 1 received vancomycin added because of cellulitis. Of 16 patients treated with mezlocillin and gentamicin, 2 also received vancomycin because of cellulits, and 1 clindamycin because of oral mucositis. After discharge home, vancomycin was added for 2 patients, 1 because of new evidence of skin inflammation (later diagnosed as due to systemic Mucor) and the other because of the infected platelet transfusion described earlier. Interestingly, 3 of the 4 patients treated at home with mezlocillin, gentamicin, and vancomycin had at least twofold increases in serum creatinine levels after therapy with vancomycin was begun. However, each had another potential cause for renal failure: systemic hypotension (2 patients) and iatrogenic bacteremia (1 patient).

Patient tended to improve in all areas during the course of HIVAT according to the LASA scale, with significant improvements in overall well-being, appetite, and social activities. Patient scores for the POMS, which assesses 6 affective domains, also improved significantly in all areas except vigor (ie, in depression, tension, anger, fatigue, and confusion). This improvement probably reflected, in part, physical recovery from symptoms of fever and neutropenia, which occurred during HIVAT. Before HIVAT, patients enrolled in the study overwhelmingly preferred home to hospital therapy and had little fear of isolation from their physician if a serious problem occurred. After they completed treatment at home, these convictions were unchanged. The report of family comfort with home care increased after patients were treated at home: support for the statement, "My family would rather have me near them than be in the hospital when something happens like this (developing fever and neutropenia)" increased from 42% agreement to 70% after home HIVAT. However, there was some evidence that patients feel slightly more isolated at home than in the hospital: agreement with the statement "I feel uneasy about calling my doctor from home with a complaint that worries me a little, for fear that I will be disturbing him or her with such a minor problem" increased from 10% to 24% after HIVAT. Total charges for enrolled patients were not significantly different than those for medically eligible patients not enrolled ($p = .24$), despite double the duration of therapy. However, median daily charges were 44% higher for eligible patients treated in the hospital ($p < .0001$). Increased charges were associated with readmission in the HIVAT group, particularly if complications were also present. Little time loss from work by caregivers assisting in homecare was reported: 27 patients reported no time lost, and 3 patients reported fewer than 8 total hours lost, the smallest time category available.

Table 4 - Summary of Relevant Studies

Authors: Bramwell, Halpin, Duncan-Skingle, Hodson & Geddes (1995).	**Design:** Before/after.	**Purpose:** To describe the first year's experience using the "Intermate" for the home treatment of patients with cystic fibrosis.	**Rating:** Weak.	**Weakness:** a, b, e, f, g, h, i, j, k, m.
Subjects: During 1991, CF patients at the Royal Brompton Hospital, London, England, were given 187 courses of IV antibiotics, at least in part, at home and during the same period 256 courses were completed in hospital. 93 patients received a total of 166 courses of IV antibiotics using 'Intermates' during the year and are the focus of this study. The age range of patients treated was 10 – 44 years, with equal numbers of male and female patients.		**Intervention:** Patients requiring IV antibiotics were assessed for suitability for HIVAT by the hospital doctors and clinical nurse specialist. Some patients received the whole of their treatment at home, whilst others used HIVAT to complete courses started in hospital. Patients had IV lines placed in hospital, either as inpatients or on the day case ward. Venflons were used to provide IV access in 21 patients (13%); longlines were used in 95 patients (57%); and 50 patients (30%) had implantable venous access systems implanted. Patients were usually treated with a combination of an antipseudomonal penicillin, or cephalosporin, and an aminoglycoside. Whenever possible the following drugs were administered via an "Intermate" infusion device: ceftazidime (1-3g tds), ticarcillin (1-5g tds), aztreonam (2g tds), and carbenicillin (5g tds). 21 patients were given the drugs by conventional infusion or injection. 41 patients received more than 1 course (range of 2 – 6). Average length of treatment was 12.5 days (range 10-27) and an average 70% of the treatment was given at home. Those unfamiliar with the technique were taught self-administration by ward nurses according to a standard protocol. Regardless of the drug, all first doses were administered under supervision. Patients were given an initial supply of the drugs from the hospital and then additional IV antibiotics were delivered to the patient's home. 31 patients lived within the area covered by the home care sister and 47 of these were visited. 8 patients outside the area were also visited but the remaining 34 patients received local supervision. Aminoglycoside levels were drawn by the home care sister. Results were reported to a doctor on the team who made the necessary adjustments to the dose. At the end of the treatment course the patient was either visited by the home care sister, or returned to the hospital to have the IV line removed, spirometry, and final assessment.		
Statistical Analysis: The results of the questionnaire were expressed as median response and the significance of differences during treatment were determined using a Mann-Whitney U-test. Differences between spirometric results and the patient's weight before and after treatment were assessed using a paired Student's t-test.				
Results: Five courses were not completed as originally intended. Two were due to changes in drugs and 2 to the development of allergic rashes. Only 1 patient was unable to cope with HIVAT. Both the mean predicted FEV_1 and FVC showed significant improvement after treatment ($p < 0.05$). The mean improvements in FEV_1 and FVC in individual patients were 0.23+/- 0.06 L and 0.43 +/- 0.06 L respectively. The mean improvements in a group of 26 patients admitted before the development of the HIVAT service were 0.21 +/- 0.05 L and 0.41 +/- 0.07 L respectively; however, the mean pretreatment percentage predicted FEV_1 was lower in this group (25.8 +/- 1.9). There was no significant difference between the mean weight before and after treatment. The results of the quality of life questionnaire demonstrated a significant fall in the level of breathlessness and sputum volume following treatment ($p < 0.0001$) and appetite, sleep, mood, energy and overall well-being showed significant improvements ($p < 0.0001$). Median estimates for time involved in the treatment included: attending hospital (7 – 12 h), visiting GP (0 h), visiting local chemist (0 h), mixing and giving IV antibiotics (10 – 19 h), seeing home care sister (1 – 2 h.). The median time lost from school/work in 41 patients was 3 – 5 days and the median number of days with lost income amongst 49 patients and their carers was 0. On a scale of 1 (totally unsatisfied) to 5 (extremely satisfied) the median satisfaction with the treatment and supervision was 5. On average, 30.5% of a course was given in hospital and 69.5% at home.				

Table 4 - Summary of Relevant Studies

Authors: Dahlgren (1997).	**Design:** Retrospective comparative.	**Purpose:**.To determine whether the prevalence of reactions was greater in HIVAT patients receiving nafcillin or oxacillin than in those receiving other IV anti-infectives.	**Rating:** Weak.	**Weakness:** a, e, f, g, h, i, k, l.

Subjects: Records of 2,488 patients treated at Care Tech, an independent, home infusion company in Northeast Illinois, were reviewed. 28 women and 71 men, ages 1 month to 78 years (median 46 years; mean 43.6 years), received 105 courses of nafcillin or oxacillin therapy, which was 4.2% of the courses of anti-infective therapy. These 99 patients had the following diagnoses: osteomyelitis (25); septic arthritis (20); cellulitis (11); unspecified infection (11); venous access line infection (9); abscess (8); infected disc (4); septicemia (4); subacute bacterial endocarditis (3); bacteremia (2); pneumonia (1); meningitis (1) and parametritis (1). 1 patient had both staphylococcal endocarditis and septic arthritis. 31 of 99 patients had a documented infection with methicillin-sensitive staphylococcus aureus (MSSA).	**Intervention:** There were 2,488 courses of anti-infective therapy administered during the study period. 33.8% percent (n=834) were cephalosporins administered every 6-24 hours; 22.9% (n=570) were vancomycin administered every 8 hours to 7 days; 14.6% (n=364) were penicillins other than nafcillin and oxacillin administered every 4-8 hours; 4.2% (n=105) were nafcillin and oxacillin administered every 4-6 hours; 5.6% (n=140) were aminoglycosides administered every 8 – 72 hours; 19.1% (n=475) were other anti-infectives administered at various intervals. Ninety-eight percent of all doses of nafcillin and oxacillin were administered over a period of at least 60 minutes. Seventy-eight courses were given by electronic infusion pump and 25 courses given by minibag or elastomeric infuser. In all but 3 courses of therapy, nafcillin and oxacillin were diluted in 0.9% sodium chloride injection. Drug concentration in the electronic infusion pump was 13-83 mg/mL (median, 52 mg/mL; mean, 41.6 mg/mL); in the minibag or elastomeric infuser, 7-40 mg/mL (median, 20 mg/mL; mean, 19.5 mg/mL); and in the mechanical syringe infuser, 7 and 50 mg/mL.

Statistical Analysis: Descriptive statistics were used.

Results: Rate of ADRs by anti-infective group were as follows: all anti-infective agents (10.9%); cephalosporins (7.0%); vancomycin (13.3%); penicillins other than nafcillin and oxacillin (4.1%); nafcillin and oxacillin (31.4%); aminoglycosides (11.4%); other (not evaluated). 75 of the patients (75.8%) receiving nafcillin or oxacillin did not have an ADR to therapy. The infection under treatment resolved in 62 (82.7%) of these patients. Of the 13 patients who did not have an ADR but whose anti-infective therapy was unsuccessful, 1 had a recurrence of the infection, 3 were hospitalized for reasons related to the infection being treated, 4 were discharged from Care Tech services during therapy because of relocations and changes in home care providers, 4 were unable to complete therapy because of loss of IV access, and 1 died before completing therapy. 24 (24.2%) of the 99 patients receiving nafcillin or oxacillin had at least 1 ADR associated with their HIVAT. Percent occurrence of ADR in all patients who received nafcillin or oxacillin were as follows: rash (10.1%), phlebitis (6.1%), fever (5.1%), neutropenia (4.0%), itching (3.0%), shortness of breath (1.0%), diarrhea (1.0%), nausea and vomiting (1%), candidal infection (1%), mottling of teeth (1%). Occurrence of ADRs did not seem to differ substantially by method of delivery or by diluent used. There were 18 occurrences per 78 courses (23.1%) given by electronic pump and 5 occurrences per 25 courses (20%) given by minibag or elastomeric infuser. Neither of 2 courses of therapy delivered by mechanical syringe infuser was associated with an adverse reaction. Of the patients who had an ADR from nafcillin or oxacillin therapy, 15 (62.5%) were seen by a physician. 8 (33.3%) other patients were assessed by the physician over the telephone and 1 patient was not assessed by a physician. Anti-infective therapy was changed to another IV drug for 13 of the 24 (54.2%) patients who had an ADR from nafcillin or oxacillin therapy. 5 patients were hospitalized because of the ADR; 4 of these patients were in the group whose anti-infective therapy was changed. 5 patients discontinued therapy early. 4 patients, despite having an ADR, completed therapy with nafcillin or oxacillin. 1 patient received an oral antibiotic in place of IV therapy. Vancomycin, clindamycin, ciprofloxacin, cefazolin, and ticarcillin-clavulanate were the alternative anti-infectives used when a patient required a change in therapy. Vancomycin was used for 8 of the 13 patients who were changed to another anti-infective. 7 of those patients completed the prescribed course of therapy. 1 had an allergic reaction to vancomycin and was changed to oral antibiotics. 2 patients who were changed to clindamycin and 1 who was changed to IV ciprofloxacin completed their courses of therapy. The patient who was changed to cefazolin lost peripheral IV access and received the remainder of therapy as IM ceftriaxone. The patient who was changed to ticarcillin-clavulanate developed catheter sepsis and was started on oral antibiotics. Overall, 10 of the 13 (76.9%) patients' infections resolved after completion of therapy with the second-choice agent. Hospitalizations were due to neutropenia, fever accompanied by a rash or nausea and vomiting, and phlebitis. For 1 patient who was hospitalized, therapy was discontinued early. ADRs resulting in hospitalization or a change in anti-infective therapy occurred anywhere from 1 to 26 days in nafcillin or oxacillin therapy. The majority of these reactions occurred during week 2 and 3 of HIVAT (30% and 40%, respectively).

Table 4 - Summary of Relevant Studies

Authors: Gilbert, Robinson & Littlewood (1988).	**Design:** Nonrandomized comparative. Unclear if prospective or retrospective.	**Purpose:** To describe the use of home intravenous antibiotic therapy treatment in cystic fibrosis.	**Rating:** Weak.	**Weakness:** e, f, h, i, j, k, l, m.

Subjects: A sample of 13 CF patients (8 girls, 5 boys) from Leeds Regional Cystic Fibrosis Unit were selected for HIVAT based on the following criteria: (1) the patient had to have at least 1 course of IV treatment in hospital; (2) the patient and family had to be considered compliant with other forms of treatment; (3) IV access had to be reliable enough to ensure several days of treatment without the need for revision; (4) the home had to have been visited by the CF liaison sister to establish that there were suitable areas for safe storage of equipment and a clean area to prepare drugs; (5) the family practitioner had to agree to HIVAT starting; (6) the family had to be able to cope with current levels of stress and responsibility; (7) the family had to have telephone access. The subjects ranged in age from 9 to 28 years and required 40 courses totaling 596 days of HIVAT. 1 patient received 8 courses. At the start of the first course of HIVAT treatment Shwachman scores ranged from 50 to 90 (mean 72) and Chrispin Norman xray scores from 6 to 26 (mean 12). Pseudomonas aeruginosa was the main pathogen at the start of 38 courses. 1 course Haemophilus influenzae and in another course Staphylococcus aureus and Haemophilus influenzae were isolated at the start of treatment but in both instances Pseudomonas aeruginosa had been isolated from the previous culture.

Intervention: While in hospital patients were taught to prepare and administer the drugs by slow bolus injection. Depending on the type of IV access being used (cannula (15), Port-A-Cath (12), intermittent injection (11), neonatal long line (6)), instructions were also given on VAD care. The following antibiotics were used (# of courses): tobramycin (25), ceftazidime (22), azlocillin (12), amikacin (9), aztreonam (4), ticarcillin (4), and piperacillin (1). A syringe pump was used for drugs that had to be infused over a long period. Final instruction was given during the administration of the first dose of the first course of HIVAT. The patient or parent gave the second dose under close observation. All subsequent first doses were also given in hospital and the patient was observed for 30 minutes and asked to stay in the hospital for a further 90 minutes. If a drug was used that the patient had not had before then the second dose was also given in hospital. During this time the patient was examined and tests performed. The patient left the hospital with all equipment needed for the first week. They were also given the phone number of the liaison sister and a member of the unit's medical staff. Aminoglycoside levels were drawn by the liaison sister on the second or third day of treatment. The patient kept a record of his peak expiratory flow and the liaison sister visited at least once/week.

Statistical Analysis: Descriptive statistics.

Results: Courses of HIVAT lasted from 7 to 36 days (mean 15) and in 15 courses there was some associated inpatient treatment lasting from 2 to 18 days (mean 6). Reasons for associated inpatient treatment before HIVAT included: (1) initial stabilization - 6; (2) previous drug reaction - 2; (3) post partum - 1; (4) insertion of a port-a-cath - 1. Reasons for inpatient treatment between HIVAT included: (1) chest pains - 1. Reasons for inpatient treatment after HIVAT included: (1) drug reactions - 3; (2) failure to improve - 1. Cannulas lasted between 2 and 13 days (mean 4) and neonatal long lines between 4 and 17 days (mean 9). Drug reactions occurred in 5 courses. 2 patients complained of aches and tiredness that resolved within 24 hours of stopping azlocillin. 2 patients had a rash and were admitted for change of treatment while 1 patient developed an urticarial rash within minutes of receiving tobramycin and ceftazidime. Subsequent challenge with ceftazidime precipitated anaphylaxis. There were highly significant improvements in weight (n=34, $p<0.0003$), peak expiratory flow (n = 38, $p<0.0001$), forced expiratory flow (n=34, $p<0.0001$), forced vital capacity (n=34, $p<0.0001$), and white cell count (n=20, $p=0.009$) during HIVAT. There was symptomatic improvement during all courses of treatment except for 4: (1) 1 patient had very advanced disease and died within 2 months of treatment; (2) 1 patient was admitted because of failure to improve adequately and did not start to improve until 1 week later; (3) 1 patient showed deterioration in respiratory function that was not in keeping with his otherwise good response to treatment; (4) 1 patient showed clinical improvement but CXR showed signs of allergic bronchopulmonary aspergillosis and there was a rise in IgE. Steroid treatment produced a further improvement of respiratory function and clearing of the CXR. Weight, FEV and FVC were compared at the end of the most recent course of hospital treatment with the end of the course of HIVAT closest to it. All 3 of these were better after HIVAT than after hospital treatment and this reached significance for FVC (weight (n=11), nonsignificant; FEV_1 (n=10), not significant; and FVC (n=10), $p=0.025$).

The reaction of families to home and hospital treatment was canvassed using a postal questionnaire that included a visual analogue scale to assess the stress of inpatient and outpatient treatment. All families preferred HIVAT. Reasons for preferring HIVAT included: better food, more facilities to exercise, better sleep patterns, better timing of drug administration, and less interruption of education and career. The advantages of hospital treatment were considered to be more effective physiotherapy and the reassurance of having medical help at hand. During HIVAT 8 patients attended work/school for > 50% of the time and most families found financial advantages (of up to £110 per week) because of reduced travelling expenses to hospital and because earnings were not lost. All families felt some degree of stress during HIVAT but only 2 considered this greater than the stress of the hospital (and even these patients preferred to continue with HIVAT).

Table 4 - Summary of Relevant Studies				
Authors: Loos, Baker & Bergers (1989).	**Design:** Randomly selected retrospective chart review.	**Purpose:**.To evaluate the extent of nursing involvement required for patients receiving daily pentamidine infusions. Both groups were evaluated for: (1) incidence and severity of side effects; (2) prophylactic measures; (3) length of infusion and/or nursing visit.	**Rating:** Weak.	**Weakness:** a, b, c, e, f, h, i, j, k, m.
Subjects: A total of 25 patients treated at a national HIVAT company based in Houston, were randomly selected for retrospective review. All were HIV positive and had pneumocystis carinii pneumonia. 15 of the patients were selected to self-administer pentamidine based on the following criteria: (1) received a physician order for self-administration; (2) received the initial pentamidine infusion in the hospital without significant side effects or side effects controlled by premedicaton; (3) had a significant other present in the home during the infusion; (4) demonstrated knowledge and understanding of infusion technique; (5) demonstrated proficiency with infusion pump; (6) verbalized knowledge of drug side effects and intervention. This group consisted of 15 males, average age 32, White (10), Latin (2), Black (1). The other group had their medications administered by a nurse. This group consisted of 10 males, average age 34, White (7); Latin (2), Black (1).		**Intervention:** All patients received daily pentamidine infusions at a dose of 4mg/kg via a pump. 15 patients self-administrated the drug and the other 10 had the drug administered by a registered nurse.		
Statistical Analysis: Descriptive statistics.				
Results: The average length of therapy in the self-administered group was 10.7 days and in the nurse-administered group was 10.3 days. The average infusion time was 75 minutes. Likewise, there was actually minimal difference in subjective symptoms of side effects between the two groups. There were 3 episodes of hypoglycemia reported, one in the self-administered group and 2 in the RN-administered group. The predominant complaints were sweating and nervousness experienced toward the end of the infusion. All episodes were treated effectively with orange juice. Blood glucose levels were not obtained. There were no reported hypoglycemic symptoms following the infusion or at any other time of day during the courses of therapy. The most common hypotensive symptom reported was lightheadedness. Two patients in the self-administered group and 5 patients in the RN-administered group reported symptoms. Patients were placed supine and the infusions were completed. There were 4 episodes of nausea in the self-administered group. Two episodes of nausea and 2 episodes of vomiting occurred in the RN-administered group.				

Table 4 - Summary of Relevant Studies

Authors: Maloney (1988).	**Design:** Retrospective comparative.	**Purpose:** To assess CF patient and parental satisfaction with the type of HIVAT they had received (i.e. self-administered or nurse-administered). In addition, a comparison of satisfaction with and perceptions of HIVAT and satisfaction/perceptions of inpatient IV therapy was performed.	**Rating:** Weak.	**Weakness:** a, b, e, f, g, h, i, k.
Subjects: A sample of 13 CF patients who had already received HIVAT, as well as conventional inpatient therapy and their parents were elicited from 3 of 5 CF treatment centers serving Missouri. The patients ranged in age from 8 to 33 (mean 18.4). Mothers ranged in age from 36 to 67 (mean 44.4). Fathers ranged in age from 36 to 65 (mean 46.6). Data for 2 mothers and 2 fathers were unavailable. 11 of the patients had from 1 - 4 siblings, the remaining 2 patients did not have any siblings. 3 families had more than 1 child with CF, but in all 3 cases, only the child in the study had received HIVAT. All patients and their families were caucasian. The majority of the families included married parents with at least a high school education. Income varied from < $10,000/year to > $50,000/year. 11 families reported receiving insurance coverage or other financial assistance for HIVAT (2 families did not answer). 10 families stated they paid 0-25% of the bills for both HIVAT and total medical care costs (3 families did not answer). Estimated medical bills paid by the family for previous year ranged from $0 to $2,000 by 6 families. 7 families were unable to recall. All but 2 of the patients were hospitalized 8 or more times for IV therapy since diagnosis with CF. The majority were hospitalized > 15 times. The number of times the patients received HIVAT, ranged from once to "a lot". 4 patients were on a protocol receiving IV antibiotics continuously, bid, with intermittent 2-3 week periods of "free time". 1 patient worked full time. The rest were unemployed. 8 reported attending school. Families lived anywhere from < 10 to > 100 miles away from their physician. All lived within 25 miles of the nearest emergency room. Various types of VAD were utilized by patients while on HIVAT. Central line (Hickman/Broviac) - 5, peripheral central line - 3, peripheral line - 3, port-a-cath/infus-a-port - 2. There were 3 reports of complications including: (1) clotted broviac (n=1); (2) difficulties with peripheral IVs (n=2). 1 subject who had continual IV difficulties required readmission to hospital to finish therapy. When comparing the in-home nursing group (n=3) to the nurse-instructed group (n=10), several demographic differences were noted. First of all, these patients were the oldest 3 and their parents were not involved in HIVAT. None of the in-home patients worked or attended school. Income tended to be lower but insurance coverage was a high percentage.		**Intervention:** Only 3 patients were identified as having received "in-home" nursing assistance. "In-home" nursing for this group of 3 included having the nurse come out the first day to set up equipment and assist the family. One patient had a nurse come out to restart her peripheral IV. Another had once a week visits to have the needle changed on her Infus-a-port. The "in-home" nursing received by patients in this study was not as comprehensive as some of the "in-home" nursing reported in other studies. The remaining patients managed their own intravenous therapy following nurse instruction.	
Statistical Analysis: Satisfaction scores were compared using the Wilcoxon rank sum test. Significance was tested by using the Z-value with p=.05. Responses to the open-ended questions were subjected to content analysis.				
Results: No significant differences were found among self-rated satisfaction scores of patients for the 2 types of HIVAT (p=0.86). Similarly, no significant difference was found between hospital satisfaction scores of the patients for the 2 types of HIVAT (p=0.93). The difference between HIVAT and inpatient satisfaction scores for patients was significant (p=0.016). No significant difference was found between home IV therapy and inpatient iv therapy satisfaction scores for parents (p=0.43). Content analysis revealed that although patients and their parents report satisfaction with both inpatient and home IV therapy, the number of advantages listed for HIVAT outnumbered those listed for inpatient therapy and disadvantages of inpatient therapy outnumbered those for HIVAT. Whereas, the inpatient therapy offers the comfort of available expertise, lack of responsibility, and emotional support from others, HIVAT offers the ability to be with family and friends, normal activities and environment, and decreased hospital stays. All 9 parents and all but one patient stated that they would choose HIVAT again in the future in the event the patient required IV antibiotics. When asked why, the child who said "no" cited frequent return visits to restart peripheral IV's as his reasoning.				

Table 4 - Summary of Relevant Studies

Authors: Martel (1994)	**Design:** Prospective nonrandomized comparative	**Purpose:** To compare the outcomes of patients treated with HIVAT with those who preferred to carry out treatment in hospital	**Rating:** Weak	**Weakness:** a, b, c, f, g, h, i, j, k, l, m.

Subjects: From January 1984 to May 1989, more than 116 patients from Le Centre Hospitalier de l'Universite Laval were treated with HIVAT based on the following admission criteria: (1) 18 - 65 years old; (2) no oral alternatives and no other treatments while on IV antibiotics; (3) clinical stability, with a lack of complications due to infection or treatment; (4) easy IV access. Of these, 33 were evaluated prospectively and compared with 17 patients who preferred to carry on their treatment in the hospital. There were 28 females and 88 males. Mean age was 41 years in females (range 16 to 60) and 36 years in males (range 16 to 62). Diagnoses were as follows: osteomyelitis (56), septic arthritis (12), septic bursitis (7), cellulitis (8), cystic fibrosis (9), cytomegalovirus retinitis (5), cryptococcosis (2), mycobacterium avium (1), cerebral toxoplasmosis (2), syphilis (1), urinary tract infection (2), external otitis (3), sinusitis (3), blastomycosis (1), endocarditis (2), lung abscess (1), liver abscess (1). The pathogens most frequently isolated reflected those most often involved in such infectious diseases. Gram-positive cocci, mainly staphylococcus aureus, Staphylococcus epidermidis and Streptococcus species were the most frequently isolated pathogens, followed by Gram-negative bacilli such as Pseudomonas aeruginosa, Xanthomonas maltophilia, Escherichia coli and Serratia marcescens, and anaerobes such as Bacteroides fragilis, Fusobacterium species and Streptococcus anaerobius.

Intervention: Patient's were taught the various techniques of intravenous self injection. The patient's training program lasted from three to five days and was presented by the doctors. Nurses and Pharmacists standardized participant interventions, to familiarize patients with infusion material, antibiotics, solutions, to demonstrate methods to the patients' families and to check for the appropriate execution of the techniques by the patient. Nurses and pharmacists were also referred to as a backup for patients at home as in- or out-of-hospital contacts. Antibiotics used during treatment included: penicillin G, cloxacillin, cephalothin, cefazolin, cefoxitin, cefotaxime, cefoperazone, ceftriaxone, ceftazidime, gentamicin, netilmicin, tobramycin, amikacin, clindamycin, erythromycin, ganciclovir, and amphotericin B. Peripheral venous access was used whenever possible and central venous catheters such as Port-A-Cath, Broviac catheters or simply subclavian vein catheter were used when peripheral vein access was impossible.

Statistical Analysis: Descriptive statistics.

Results: Complications related to the HIVAT were as frequent as in the hospital and included headache, severe reversible neutropenia, generalized maculopapular rash, nausea, diarrhea, pseudomembranous colitis, loss of appetite and weight loss, buccal ulcers, vaginal discharge and transient elevation of liver enzymes. Complications related to the intravenous lines included local infiltrations, edema, redness and pain at insertion sites and thrombosis, pneumothorax, local hematoma and, for the long lasting catheters, local and systemic infections. These complications were not more frequent in hospital than in home treatment and were not more serious in either alternative. Preliminary results of the prospective analysis have shown that the clinical outcomes of the patients treated in hospital versus home were the same (two patients treated with home treatment were readmitted for a major side effect and a treatment failure and one patient with hospital treatment was readmitted for treatment failure). All the clinical and laboratory follow up exams were comparable between the two treatment groups. The psychosocial analysis showed a significantly different locus of control between the two groups: those who wanted to go home had a significantly higher internal locus of control while the hospital group had a significantly higher external locus of control. The main reasons for accepting the home treatment option were sociofamilial (which was termed a higher quality of life), wanting to carry on normal activities and to have a higher autonomy or liberty. The hospital group had a low confidence in their own efficacy. If patients who went home were asked if they would use home treatment again, 89% answered affirmatively if the cost of antibiotics were to be paid by a third party. Thirty-two per cent agreed to participate again even if they were to be responsible for the cost of antibiotics.

Table 4 - Summary of Relevant Studies				
Authors: Poole, Nowobilski-Vasilios & Free (1999).	**Design:** Prospective nonrandomized multisite comparative.	**Purpose:** To compare the IV push method of administration to other methods of administration by access device and drug. Other variables assessed included dose, diluents, and patient satisfaction with method of delivery.	**Rating:** Weak	**Weakness:** a, b, c, d, e, f, g, h, i, j, k, l, m
Subjects: A total of 2072 case reports from fifty sites in the United States were screened. Of the 2072 analyzed, 1116 case reports analyzed.		**Intervention:** The most frequently used drugs in this study were ceftriaxone, cefazolin, and ceftazidime. Other anti-infective agents that may have been self-administered by intravenous push included: azlocillin, aztreonam, cefamandole, cefazolin, cefonicid, cefoperazone, cefotaxime, cefotetan, cefoxitin, ceftazidime, ceftizoxime, ceftriaxone, cefuroxime, chloramphenicol, methicillin, mezlocillin, nafcillin, oxacillin, piperacillin. Distribution by type of device for IV push method was as follows: port (5%); peripheral (44%); midline (7%); MCV (24%); PICC (9%); CVC 2%; tunnelled CVC (9%). Distribution by type of device for IV mini bag was as follows: port (2%); peripheral (41%); midline (7%); MCV (31%); PICC (7%); CVC (6%); tunnelled CVC (6%). Distribution of total days by devices for IV push was as follows: port (14%); peripheral (18%); midline (8%); MCV (28%); PICC (15%); CVC (4%); tunnelled CVC (13%). Distribution of total days by devices for IV minibag was as follows: port (2%); peripheral (24%); midline (3%); MCV (38%); PICC (8%); CVC (7%); tunnelled CVC (18%).		
Statistical Analysis: Descriptive statistics (complication rate per 1000).				
Results: Total complication rates for the IV push and minibag method were not significantly different (1.89/1,000 catheter days for IV push and 1.69/1,000 catheter days for minibag). Phlebitis rates (the most common concern) for IV push and minibag were not significantly different (0.6/1,000 catheter days for IV push and 0.79/1,000 catheter days for minibag). Patient satisfaction ratings with the delivery methods for most frequently used drugs (ceftriaxone, cefazolin, ceftazidime) were as follows (1 = poor, 4 = excellent): IV push 99% rated as 3 or 4; minibag 96% rated as 3 or 4; elastomer 96% rated as 3 or 4; large volume pump 100% rated as 3 or 4; syringe pump 97% rated as 3 or 4; other 100% rated as 3 or 4. Employee satisfaction included "it's so easy to teach", "my patients love it", and "it takes less time to teach".				

Table 4 - Summary of Relevant Studies

Authors: Rogers, Morais, Millar-Jones, Knowles & Goodchild (1993).	**Design:** Nonrandomized comparative. Unclear if prospective or retrospective.	**Purpose:** To compare the efficacy of home and hospital treatment for cystic fibrosis patients.	**Rating:** Weak.	**Weakness:** a, b, e, f, g, h, i, j, k, l, m.

Subjects: Since 1986, 25 patients (aged 4 - 18 years) from the Paediatric Cystic Fibrosis Clinic at Cardiff have had an exacerbation of CF pulmonary disease and received IV therapy in both home and hospital. Objective comparisons of anthropometric data and lung function tests, possible for 9 patients (mean ages 10.33 ± 2.64 years (hospital); 10.74 ± 2.61 years (home)) who were treated within 1 year, were analyzed. 23 of 25 families were asked to complete a questionnaire about their experience. 2 patients died during the study and 4 were transferred to the Adult CF Clinic.	**Intervention:** Inevitably, all patients received treatments in hospital first, while instruction was given. Parents giving the injections were asked to give the complete injection on at least 3 separate occasions, having drawn up the antibiotics and diluents from the vials. Typed sheets giving details of technique and drug dosage were provided. Contact with the CF Unit was encouraged. Support was provided by a Physiotherapist and/or Nurse Specialist who conducted one home visit per course.

Statistical Analysis: Analyses were done using Wilcoxan signed rank test, comparing the pair of values in each case.

Results: Questionnaire completed by 23 families revealed that in 17 (74%) IV injections were given by the mother; in 4 both parents were involved and 2 patients gave themselves. Although all felt confident with technique, there was 1 error related to dosing and another parent expressed some difficulty with calculation of dose. Frequency of physiotherapy was increased over baseline for 16 families (70%) while receiving HIVAT and 18 families (78%) while in hospital. 8 families (35%) thought physiotherapy in hospital was more effective, but 9 other families (39%) considered compliance better at home. 16 families (70%) found appetite and food intake better at home. This seemed to be unrelated to the use of supplements or enteral feeding which remained unchanged. School or college work was relevant for 22 patients. 5 patients (23%) on HIVAT attended school full-time and another 15 went to school part-time. 6 patients in hospital did some work. All people giving IV injections preferred to do this at home. 21 families (91%) thought HIVAT was less disruptive to family life.

Comparison of IV treatments in hospital and home was limited to 9 patients whose treatments were within a single year (mean interval ± SD = 0.41 ± 0.35 years). Courses were a minimum of 10 days. All values expressed as mean ± SD. Weight (kg) when treated in hospital increased 2.56 ± 3.5 and when treated at home increased 4.57 ± 5.8. SaO2 (%) when treated in hospital increased 1.93 ± 2.3 and when treated at home increased 0.46 ± 1.25. FEV_1 when treated in hospital increased 18.6 ± 27.4 and when treated at home increased 24.3 ± 45.3. FVC when treated in hospital increased 9.3 ± 21.5 and when treated at home increased 15.0 ± 19.9. PEFR when treated in hospital increased 10.4 ± 13.8 and when treated at home increased 15.6 ± 10.8. FEF 50% when treated in hospital increased 27.6 ± 45.0 and when treated at home increased 83.0 ± 204. None of these comparisons showed a significant difference ($p>0.05$ for each pair).

Weight, SaO2 and lung function (% predicted) results, before and after IV therapy at home were available for 15-17/23 patients. Values are expressed as mean ± SD. Weight (kg) before treatment at home (n=17) was 31.27 ± 9.16 and after 32.37 ± 8.97. SaO2 (%) before treatment at home (n=17) was 95.65 ± 3.0 and after 96.65 ± 1.58. FEV_1 (n=16) before treatment at home was 68.6 ± 22.2 and after 78.3 ± 21.3. FVC (n=16) before treatment at home was 83.0 ± 32.1 and after was 91.3 ± 19.7. PEFR (n=16) before treatment at home was 95.1 ± 17.4 and after 106 ± 20.1. Finally FEF 50% (n=15) was 52.5 ± 33.3 and after 64.9 ± 35.3. Treatment was significantly effective ($p<0.05$) for weight, FEV, FVC, PEFR, and FEF 50%. Changes in SaO2 were not significant.

Table 4 - Summary of Relevant Studies

Authors: Stiver, Telford, Mossey, Cote, Van Middlesworth, Trosky, McKay & Mossey (1978).	**Design:** A combination prospective/retrospective comparative.	**Purpose:** To compare the complication rates of heparin lock IV antibiotic therapy at home with conventional continuous drip in hospital therapy.	**Rating:** Weak.	**Weakness:** a, b, e, f, g, h, i, j, k, l, m.

Subjects: A sample of 23 subjects were selected for HIVAT from those seen by the Infectious Diseases Service at St. Boniface Hospital and the Health Sciences Centre, University of Manitoba, Winnipeg based on the following criteria: (1) patient could be discharged home were it not for the need for continued IV antibiotics; (2) patient understood the treatment program and gave signed consent; (3) patient had reasonably good veins; (4) he or she satisfactorily completed a 1 to 3 day in-hospital training program on aseptic technique and use of the heparin lock system of drug administration; and (5) patient's family was agreeable to HIVAT. These subjects (13 males and 10 females) ranged in age from 12 to 78 years and had a variety of diagnoses including osteomyelitis or septic arthritis (14), staphylococcal bacteremia (2), infective endocarditis (2), North American blastomycosis (2), actinomycosis (2), and chronic Candida albicans pyelonephritis (1). 3 patients had no family assistance at home, 5 had family present part-time, and the rest had some family member(s) present most of the time. In additon, the medical records of 23 patients treated in hospital for osteomyelitis, septic arthritis, endocarditis and fungal diseases requiring amphotericin therapy were analyzed. Appropriate matches were obtained for each study patient by approximate age and type, dose, and duration of therapy (data not provided).

Intervention: All patients were initially hospitalized during which time they completed a training session (i.e. aseptic technique and heparin lock system). All patients were discharged with a heparin-lock IV cannula in-situ. Antibiotics were mixed in minibags by the hospital pharmacy and sent out to each patient's home. The IV devices used included teflon catheters (2), Angiocath (7), and the Jelco Cathlon fitted with a heparin-lock adaptor (14), as well as the Miniset Intermittent infusion set (2). Types of antibiotics used for HIVAT included: penicillin (7), cloxacillin (9), gentamicin plus carbenicilli (2), amphotericin B (3), cefamandole (1), and cephalothin plus gentamicin (1). HIVAT patients gave their doses at 3 or 5 h intervals from 0700 h to 2200 h instead of the usual 4 or 6 h intervals. 8 h doses were spaced evenly as in hospital. All antibiotics were infused over 30 - 60 minutes except for amphotericin (4 or 5 h). Specimens were obtained at least once a week. The IV cannula tips were cultured. Blood was drawn just before and 1/2 h after a dose of antibiotic to ascertain peak and trough serum inhibitory titers. Patients were visited daily by home care nurses. The nurses were available 24 hours a day for problems. Patients were seen once a week by an Infectious Diseases physician or by their own physician. The Infectious Diseases physician made recommendations for therapy but left the final decision to patient's own doctor.

Statistical Analysis: Descriptive statistics.

Results: Mean duration of HIVAT was 23 days (range 8 to 46). Antecedent hospital treatment averaged 12 days (range 0 - 27). 19 patient received most of their antibiotic course at home. While receiving HIVAT, 4 students were able to return to school and 2 adults were able to return to work. The infection was cured in 18 patients and unaffected in 4. Treatment failed in 3 with osteomyelitis, 1 who had diabetic neuropathy in an infected foot and 1 who had femoral osteomyelitis for > 20 years. In both of these patients debridement was not feasible. The third patient relapsed after 6 weeks of IV carbenicillin and gentamicin for pseudomonas aeruginosa sternal osteomyelitis but was later cured after surgical debridement and another 6 weeks of IV carbenicillin and tobramycin in hospital. The fourth treatment failure occurred in an elderly woman with chronic C. albicans pyelonephritis when amphotericin B had to be withdrawn because of a rising serum creatinine level. Renal function returned to normal shortly thereafter. A final patient, with perirectal actinomycosis unrecognized as such for 9 years, improved after 6 weeks of IV penicillin at home and was subsequently cured after another 6 months of oral penicillin G and doxycycline. In the 23 hospital-treated patients there were 2 treatment failures, 1 with pseudmonas sternal osteomyelitis and 1 with tarsal osteomyelitis and diabetic neuropathy. Complications (%) for the HIVAT patient as compared with the 23 in-hospital patients were as follows: eosinophilia 35%/17%; nephrotoxicity 9%/13%; ototoxicity 4%/0%; alopecia 4%/0%; leukopenia 4%/9%; phlebits 26%/53%; and colonization 26%. The most common side effects (eosinophilia and phlebitis), usually occurred where penicillin-like drugs were used in high doses for > 3 weeks. Decreased renal function was noted in 2 patients on HIVAT (Amphotericin B); the drug was withdrawn in 1 of them. 3 hospital-treated patients, 2 receiving aminoglycoside antibiotics and 1 receiving methicillin, showed signs of renal failure. 4 patients received gentamicin as part of their HIVAT. Peak levels were in the toxic range initially in 2, but were acceptable after the dose was reduced. 1 of these patients developed vestibular toxicity but subsequently recovered. The other had an audiogram at the time of his high serum gentamicin levels that indicated high-tone hearing loss. However, no change was noted on repeat audiograms throughout his continued course of gentamicin and carbenicillin and a subsequent 6-week course of tobramycin and carbenicillin for relapse. Cannula tip cultures were done after removal of 48 cannulae from 19 HIVAT patients. Colonization diphtheroids or s. epidermidis (4), Klebsiella pneumoniae, Citrobacter diversus, and s. epidermidis (1), and C. albicans (1)) in the absence of any signs of infection, in 6 devices from 6 patients. The antibiotics were administered for 525 days at home out of a total of 797 days of treatment for 23 patients.

Table 4 - Summary of Relevant Studies

Authors: Strumpfer (1991).	**Design:** Prospective nonrandomized comparative.	**Purpose:** To compare the performance of a nonconventional short peripheral catheter made of elastomeric hydrogel material with that of the conventional short peripheral catheters used to administer IV therapy to patients before the study was undertaken.	**Rating:** Weak.	**Weakness:** a, b, f, g, h, i, j, k, m.

Subjects: 80 IV insertions in 48 HIVAT patients from Caremark Homecare Mt Laurel, New Jersey were included. 48 HIVAT subjects requiring a total of 80 IV insertions were included. 92% of the test catheter group and 93% of the control catheter group were diagnosed as having Lyme disease. The remainder of the patients with test-catheter insertions had diagnoses as follows: osteomyelitis (2 insertions), liver abscess (1 insertion), infected knee (1 insertion). The remainder of the control catheter insertions consisted of ovarian abscess (2 insertions). Average age was 40 for both groups (p=0.80) although age range was wider for test-catheter patients 3 to 76) compared with control catheter (10 to 68). The test catheter patients had a wider weight range (33 to 350 lb) than the control catheter group (107 to 125 lb). Activity level which showed an effect on dwell time for the test catheter was significantly higher in test catheter patients (p=0.01). Of the test catheter patients, 20% were in the "high" activity level compared with 4% of the control-catheter patients. Vein accessibility was essentially the same for both groups (p=0.70).	**Intervention:** All of the IV therapies administered consisted of antibiotics. The number and type of infusions with test catheters were as follows: 38 cefotaxime, 11 ceftriaxone, 1 penicillin, 1 antibiotic that was not identified by name, and 1 with no medication recorded. The number and type of infusions with control catheters were as follows: 17 ceftriaxone, 4 cefotaxime, 2 cefotaxime with metronidazole, 1 vancomycin and 3 antibiotics that were not identified by name. The average length of time that IV therapy had been administered to patients before receiving a study catheter was quite short but differed between the 2 patient groups (p=0.01). Test catheter patients averaged 3 days of previous therapy (range = 0-14 days) and control-catheter patients averaged 4 days of previous therapy (range = 0-11 days). Nurses' level of IV catheter insertion experience was virtually identical for both groups (p=1.00). All nurses had inserted more than 100 peripheral catheters prior to the study.
Statistical Analysis: A comparison of baseline and treatment patient variables for any significant differences between the test- and control-catheter patient groups was conducted using the Mann-Whitney U and chi-square tests. Subjective grading scales were used for the following variables: patient activity level, venous access, and catheter insertion ease. A comparison of catheter performance for any significant differences was made with the Mann-Whitney U test, chi-square test, unpaired two-tailed t-test, Kaplan-Meier product limit estimator, and Gehan's test. Statistical significance was set at $p<0.05$.	
Results: The test catheters were considered much easier to insert. The average grade for insertion ease was extremely significant in favor of the test catheters (p=0.0001). In addition, 94% of the test catheters vs. 19% of the control catheters were considered "easy" to insert. None of the test-catheter insertions were considered "difficult" compared with 15% of the control-catheter insertions that were graded "difficult". The number of catheters used per insertion was similar for the 2 catheter groups and averaged 1.2 catheters per insertion (p=0.90). The average insertion time, which included the total visit time, was 82 minutes for the test catheters and 61 minutes for the control catheters (p = 0.01). The test catheters reached the median time to complication at 7.4 days compared with the control catheters at 2.9 days, which demonstrates a 155% improvement in performance over the control catheters ($p<0.01$). The percentage of catheters reaching end of therapy was nearly twice as great for test catheters: 21% and 11%, respectively (p=0.39). The average dwell time for the test catheters was 6.5 days, which was significantly greater than the control catheter average dwell of 4.4 days (p=0.04). The percentage of test catheters removed for a catheter-related complication was significantly less than that for the control catheters (48% vs 82%, respectively; p=0.006). The catheter infiltration rate was significantly less for the test catheters. The test-catheter infiltration rate was 4% compared with 29% for the control catheters (p=0.005). The trend for phlebitis through 7 days of dwell was less for the test catheters than for the control catheters (27% and 39%, respectively: P=0.34). One patient who had 3 different test-catheter insertions had 2 episodes of chemical phlebitis. The first test catheter inserted in this patient was removed on Day 6, when the patient developed an allergy to cefotaxime. An alternative antibiotic, ceftriaxone, was administered via a second and third test catheter; however, both of these catheters were removed because of chemical phlebitis, which occurred in the first 2 days of dwell. The same percentage of catheters in both groups was removed for obstruction; however, the average time to occurrence of obstruction was substantially later for the test catheters than for the controls (10 days vs 1 day, respectively). The percentage of test catheters removed for leakage at the site was lower, and these catheters delivered 7 days of therapy on the average before leaking compared with 2 days with the control catheters.	

Four of the test catheters were removed before any complication occurred at 2 weeks of dwell, which is the maximum dwell time that was set by some patient's physicians policy. Another home care agency has set 2 weeks as a site rotation for Aquavene catheters with the exception of specifically agreed-upon criteria for leaving the catheter in for more than 14 days. One control catheter was removed at 7 days, which was the maximum dwell time set by that patient's physician for a Teflon catheter. The test catheters in this study delivered a total of 336 days of therapy. Using the median time to complication, 45 test catheters would be needed to complete 336 days of therapy, whereas if control catheters were used, 116 catheters would be required. Therefore, use of the test catheters allowed 71 control-catheter restarts to be avoided because of the lower complication rate of the test catheters. This means that a Lyme disease patient receiving a 3 week course of antibiotics via a control catheter would require a minimum of 7 catheter insertions to complete the therapy, whereas only 2 to 3 test-catheter insertions would be required to complete 3 weeks of therapy.

Chapter 5

Discussion

In the fifth chapter of this thesis, the principal findings of the review are discussed. This discussion is divided into four sections. In the first section the findings of the review are summarized. In the second section the findings of the review are discussed. In the third section, recommendations for practice and research are offered. Strengths and limitations of the review are presented in the last section.

Summary of the Review Findings

In an attempt to reduce costs, governments and insurers have sought ways to slow the rising costs of health care. Given that hospital care is by far the largest category of health care expenditure, many of the attempts to reduce the costs of health care have been aimed at reducing hospital costs. Consequently, Canada's hospital sector has changed. Most notably, the number of hospital beds, the number of overnight admissions to hospitals, as well as the length of hospital stays, have all been reduced (Canadian Institute for Health Information, 1999).

Driven in part by the changes in the hospital sector, a number of innovative home based infusion programs have emerged. Of these home based infusion programs, HIVAT has been and remains one of the fastest growing. In fact, in the United States home based infusion therapy has become a multi-billion-dollar-a year industry, and HIVAT accounts for the largest share of both patients (60%) and revenues (38%). It is estimated that each year more than 400,00 patients requiring intravenous anti-infective therapy will be treated in the home and this figure is expected to grow by more than 25% per year (Saladow, 1995).

As the number of HIVAT programs flourished, so has the research about the effectiveness of this type of therapy. In fact, a search for literature that measured the physiological and/or psychosocial outcomes of HIVAT in children and adults with infectious diseases yielded numerous articles. In order to provide a valid and current overview of this literature, a systematic review was conducted using methods aimed at limiting the bias associated with previously conducted commentaries and reviews of the HIVAT literature.

In accordance with the recommendations of Cook, Mulrow and Haynes (1997) the methods used to limit the bias associated with previous reviews included a comprehensive search for all potentially relevant articles and the use of explicit reproducible criteria in the selection of articles for review. Primary

research designs and study characteristics were appraised, data was synthesized and results were interpreted.

The results suggest that although numerous HIVAT related studies have been published, there is a lack of scientific evidence, of sufficient quality, to definitively support or refute its effectiveness. In fact, despite an extensive search only 25 articles that measured the physiological and psychosocial outcomes of HIVAT using a comparison or control group were deemed relevant. Of the 25 relevant studies eight were judged to be "strong", seven "moderate", and ten "weak" using predetermined validity criteria.

The results of relevant studies were scrutinized to see if there was a consistent pattern in terms of what measures were used to assess the physiological outcomes of HIVAT in each diagnostic group and whether, on the whole, the results increased or decreased. The results of this scrutiny were mixed, that is, there was no consistent pattern in terms of what measures were used and/or the results. For example, eight of the 14 "strong" and "moderate" studies measured the physiological outcomes of HIVAT in cystic fibrosis patients (Bosworth & Nielson, 1997; Bradley, Wallace, Elhorn, Howard & Bakker, 1999; Donati, Guenette & Auerbach, 1987; Pond, Newport, Joanes & Conway, 1994; Strandvik, Hjelte, Malmborg & Widen, 1992; Vic, Ategbo, Gottrand, Launay, Loeuille, Elian, Druon, Farriaux & Turck, 1997; Vinks, Vinks, Brimicombe, Heijerman & Bakker, 1997; Wolter, Bowler, Nolan & McCormack, 1997). The type of pulmonary function tests used in each of the studies was different. For example, some studies used FEV, FVC, and PEFR, other studies only used FVC. Regardless of the type of pulmonary function tests used the results did improve in all of the studies. However, six of the eight studies went on to compare the improvement in lung function seen in patients treated at home, with the improvement seen in patients treated in hospital and achieved different results (Bosworth & Nielson, 1997; Bradley, Wallace, Elhorn, Howard & Bakker, 1999; Donati, Guenette & Auerbach, 1987; Pond, Newport, Joanes & Conway, 1994; Strandvik, Hjelte, Malmborg & Widen, 1992; Wolter, Bowler, Nolan & McCormack, 1997). Three studies found no differences in improvement between the two groups (Pond, Newport, Joanes & Conway, 1994; Strandvik, Hjelte, Malmborg & Widen, 1992; Wolter, Bowler, Nolan & McCormack, 1997), the other three found differences (Bosworth & Nielson, 1997; Bradley, Wallace, Elborn, Howard & McCoy, 1999; Donati, Guenette & Auerbach, 1987). One of the studies that reported differences in improvement found that while the lung function of both home and hospital patients improved, the improvement was only significant in the

patients treated in hospital (Bosworth & Nielson, 1997). Another study showed that while treatment resulted in a significant improvement in lung function irrespective of where the patient was treated, the percentage improvement was significantly greater in patients treated in hospital (Bradley, Wallace, Elborn, Howard & McCoy, 1999). The final study found that both the home and hospital groups showed a significant improvement in FVC, PFR, and FEV_1; however, calculation of the change in vital capacity from admission to discharge showed that the hospitalized patients had a statistically significant greater improvement (Donati, Guenette & Auerbach, 1987).

The results of relevant studies were also scrutinized to see if there was a consistent pattern in terms of what measures were used to assess the psychosocial outcomes of HIVAT in each diagnostic group and whether, on the whole, the results increased or decreased. Again the results of this scrutiny were mixed, that is, there was no consistent pattern in terms of what was assessed and/or the results. For example, psychosocial outcomes were measured in five of the "strong" and "moderate" studies but different measures were used in each study (Cornell, 1990; Donati, Guenette & Auerbach, 1987; Strandvik, Hjelte, Malmborg & Widen, 1992; Talcott, Whalen, Clark, Rieker & Finberg, 1994; Wolter, Bowler, Nolan & McCormack, 1997). While one of these studies measured anxiety (Cornell, 1990), another study measured perceived advantages and disadvantages (Donati, Guenette & Auerbach, 1987). One study measured quality of life and disruption (Wolter, Bowler, Nolan & McCormack, 1997) and another study measured anxiety, preference and ability to go to work or school (Strandvik, Hjelte, Malmborg & Widen, 1992). The final study primarily measured quality of life, disruption, and mood (Talcott, Whalen, Clark, Rieker & Finberg, 1994). Furthermore, while one of these studies suggested that HIVAT improves quality of life and other psychosocial measures (Talcott, Whalen, Clark, Rieker & Finberg, 1994), the results of the other another study were not so positive (Wolter, Bowler, Nolan & McCormack, 1997). Wolter, Bowler, Nolan and McCormack (1997) found both advantages and disadvantages in terms of quality of life. Whereas hospital patients fared better in terms of fatigue, mastery and total quality of life scores, home patients fared better in terms of family life, personal life, sleep and total disruption.

Discussion of the Review Findings

The findings of the studies, as summarized above, suggest that there is considerable heterogeneity in the results of measures used to assess the physiological outcomes of HIVAT. There is also considerable variation in the results of measures used to assess the psychosocial outcomes of HIVAT. There are at least four possible explanations for these differences.

The heterogeneity may be related to differences in the study participants. For example, in the studies by Wolter, Bowler, Nolan and McCormack (1997) and Pond, Newport, Joanes and Conway (1994), both of which reported positive results, all patients were carefully selected. In fact, in the study by Wolter, Bowler, Nolan and McCormack (1997), 83 of 114 admissions were excluded from enrolling in the trial for reasons of: noncompliance (20%); home outside of Brisbane metropolitan area (19%); an unrelated admission (16%); patient request (14%); too unwell (8%); post-lung transplant (6%); first admission to hospital (6%); no notification of patients admission (2%); non-Pseudomonal infection (3%); and, in three cases, the reasons for exclusion were not specified. In contrast in the retrospective study by Bosworth and Nielson (1997) that reported negative results, patients were not selected with the same level of concern and care as in the reports that noted positive results.

The variation in the outcomes of measures may also be linked to differences in the intervention. In fact, there were notable differences in the studies as to what HIVAT entailed. For example, in the study by Donati, Guenette and Auerbach (1997) in which positive outcomes were reported the home IV group was visited within 24 hours of a patient's enrollment into the program, and daily thereafter. During the visits, intravenous catheters were inserted when needed, clinical status was assessed, and patient/family competence and comfort with the home care regimen were evaluated. In another study in which positive outcomes were reported all patients undergoing HIVAT spent a median of three days (range 1 - 5) in hospital before discharge. They had three home visits (range 1-5), taking an average of four hours per patient, and were also offered daily physiotherapy at home during the study period (Wolter, Bowler, Nolan & McCormack, 1997). However, in the study by Bradley, Wallace, Elborn, Howard and McCoy (1999) that reported negative outcomes, patients at home were required to reconstitute and administer IV antibiotics, perform chest physiotherapy as well as continue on their usual inhaled and oral therapies study and no home visits were made (Bradley, Wallace, Elborn, Howard & McCoy, 1999).

Differences in the outcomes of the studies may be linked to differences in what measures were used and how they were used. For example, some of the investigators concluded that home therapy is associated with better psychosocial outcomes. These conclusions were based on questionnaires that could not be evaluated statistically (Donati, Guenette & Auerbach, 1987; Strandvik, Hjelte, Malmborg & Widen, 1992). In the study by Wolter, Bowler, Nolan and McCormack (1997) a more sensitive measure of psychosocial outcomes (Chronic Respiratory Disease Questionnaire) was used and significant differences between home and hospital arms were demonstrated in some of the domains. Whereas hospital patients fared better in terms of fatigue, mastery and total scores, changes in dyspnea and emotional scores were of a similar magnitude in both the home and hospital groups.

Finally, the heterogeneity in results may be linked to differences in the designs used in each study. For example, two of the three studies reporting negative physiological outcomes for cystic fibrosis patients (i.e. hospital patients showed greater improvement in lung function than did home patients), were retrospective studies (Bosworth & Nielson, 1997; Bradley, Wallace, Elhorn, Howard & McCoy, 1999). Other limitations included a lack of clearly defined sample, use of nonprobability sample, sample not followed across time, attrition greater than twenty-percent, non random assignment, and inadequate control for confounders. Furthermore, in many of the studies the intervention was not clearly described and/or controlled for, outcome measures and data collection protocols were not adequately described. Issues of reliability and/or validity were not adequately addressed, there was inadequate data analysis, and/or conclusions were not supported by data and/or were not thorough.

Given the heterogeneity of the studies in terms of population, intervention and outcomes as well the methodological weaknesses, the usefulness of this review as a guide to clinical action remains unclear. The review is most useful as a guide to future research.

Recommendations for Practice and Research

The currently available literature provides clinicians with little scientific evidence to guide the use of HIVAT for children and adults with infectious diseases particularly among higher risk populations. Although the majority of studies report positive physiological and psychosocial outcomes, these studies were done under highly restricted circumstances, had important methodological flaws, and/or were too small to detect clinically significant effects on key outcomes. In addition, some studies have reported

either statistically significant or potentially clinically significant negative physiological and/or psychosocial outcomes.

In light of the mixed results and despite the powerful impetus to move or keep patients out of the hospital, it is prudent that clinicians continue to thoroughly screen patients for HIVAT. This screening must be conducted considering a number of factors including the disease involved, the patient's clinical status, his or her personal desires, attitudes, and abilities, as well as the available support system and the home situation. For those patients deemed inappropriate for HIVAT, alternative health care programs such as community or hospital based infusion centers or intermediate care facilities might be considered. Adequate in-home support (i.e. assistance with chest physiotherapy) as well as ongoing monitoring (i.e. serum levels of anti-infectives) also appear to be important aspects of limiting the negative physiological and/or psychosocial outcomes of HIVAT documented in some of the studies.

Obviously more studies with better designs are recommended. Specifically randomized trials that clearly specify how randomization was achieved, the level of agreement to participate and the attrition rate are needed. Collecting information about possible confounders and controlling for these, using blinded data collectors, discussing the psychometric properties of the instruments used, and conducting analyses to determine the level of significance to enhance the validity of the findings are also needed. Furthermore to enhance the generalizability of the results, these studies should involve multiple centers and include sufficient numbers of patients, longer follow-up periods (one year and more) and a broad range of outcome measures. One of the more pressing questions for these studies is: For whom is HIVAT appropriate and when?. For example, Is HIVAT appropriate for patients with newly diagnosed endocarditis? Is HIVAT appropriate for pregnant patients with pyelonephritis? Is HIVAT appropriate for cancer patients with febrile neutropenia? If so, then when? Given the heterogeneity of what HIVAT entails, it is also important to determine which aspects of HIVAT (i.e. medication regimen, venous access device, method of delivery, support) contribute to its success or failure?

In order to efficiently integrate the information generated from the suggested studies and provide a basis for rational decision making, other reviews will need to be conducted. In order to ensure that these reviews reflect balanced inferences based on a collation and analysis of the available evidence rather than the views of 'content experts', it is important that these reviews are conducted using replicable, scientific

and transparent methods aimed at limiting bias. In addition, existing reviews such as the recently completed review entitiled Home Intravenous Antibiotics for Cystic Fibrosis by Marco, Asensio, Bosque, de Gracia and Serra (2001), will need to be updated. The design and conduct of these high quality studies and reviews will require increased funding. Policy makers and administrators have an important role in supporting this additional research. They also have an important role in facilitating the implementation of HIVAT strategies that show significant, positive effects.

Strengths and Limitations of the Review

The strength of this systematic review lies in the fact that "replicable, scientific and transparent" methods were used in order to minimize the bias associated with more traditional reviews and commentaries of the HIVAT literature (Khan, ter Riet, Glanville, Sowden & Kleijnen, 2001, p. 4). This approach included the use of precisely formulated research questions that were developed a priori and clearly specified the types of people, intervention, and outcomes of interest. A thorough search for all relevant documents was conducted under the auspices of a medical librarian. Studies were selected based on an explicit set of criteria that flowed directly from the review questions. These criteria were pilot-tested and then applied by two independent reviewers to a randomly chosen subset of twenty articles. Percent agreement and agreement beyond chance (kappa) was 0.83. In addition, the quality of all relevant studies was systematically assessed using an explicit set of validity criteria based on components of study design for which there is theoretical evidence of bias. These criteria were pilot-tested and then applied to all articles by two independent reviewers. Data about the relevant features and results of selected studies were extracted by the primary reviewer using a standardized form. This form was pretested and finalized before data extraction began. Finally, the extracted data about the characteristics and results of the studies included in the review were tabulated and summarized in tables and conclusions were drawn. Hence, rather than reflecting the views of "experts", this review generated balanced inferences based on a collation and analysis of available evidence.

Due to limited time and resources as well as the fact that the science of systematic reviews is relatively young, this review also has some limitations. Although attempts were made to include unpublished information the retrieval of this type of data proved difficult. For example, two posters presented at the 4th North-American-Cystic-Fibrosis-Conference entitled A Randomized Trial of Home

Intravenous Antibiotic Therapy (HIVAT) in Cystic Fibrosis (CF): Short-Term Safety and Efficacy and A Randomized Trial of Home Intravenous Antibiotic Therapy (HIVAT) in Cystic Fibrosis (CF): Short-Term Psychological Effects were likely relevant. However, neither of these studies have been published yet and attempts to obtain more information about them were unsuccessful. Assessment of the quality of relevant studies also proved difficult. Whereas at least twenty-five checklists have been developed for assessing the methodological quality of randomized controlled studies, there are no proven tools for assessing non-randomized studies. Given that that there are no proven tools for assessing the quality of non-randomized studies, a tool was developed specifically for this study. Despite the enormous time and energy used to develop this tool, as evidenced by the poor interrator reliability, some difficulties were still encountered in using it and the results did not always agree with the raters' intuitive perceptions of study quality.

Conclusion

This systematic review was designed to provide a valid and current overview of the best scientific evidence available regarding the physiological and psychosocial outcomes of HIVAT. Given that there was a lack of scientific evidence of sufficient quality, to support or refute its effectiveness, the usefulness of this review as a guide to clinical action remains unclear. Given that largely for economic reasons, HIVAT is here to stay and the lack of clear scientific evidence supporting the effectiveness of HIVAT, it is recommended that rigorously designed studies of sufficient size and breadth be conducted to examine the physiological and psychosocial outcomes of HIVAT particularly among high-risk groups.

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Appendix A
Database Searches

Database: Medline <1966 to present>

SET	SEARCH	RESULTS
1	exp anti-infective agents/	662484
2	anti-infective$.tw,sh. or anti-infective.hw. or anti-infectives.hw	22615
3	antibiotic$.tw,sh. or antibiotic.hw. or antibiotics.hw.	151824
4	antiviral$.tw,sh. or antiviral.hw. or antivirals.hw.	23619
5	antifungal$.tw,sh. or antifungal.hw. or antifungals.hw.	16550
6	1 or 2 or 3 or 4 or 5	692500
7	exp infusions, parenteral/	46388
8	exp infusions, intravenous/	21808
9	infusion$.tw.sh. or infusion.hw. or infusions.hw.	133931
10	parenteral.tw,sh,hw.	46456
11	intravenous.tw,sh,hw	166065
12	7 or 8 or 9 or 10 or 11	271559
13	exp ambulatory care/	25075
14	ambulatory.tw,sh,hw.	49880
15	exp community health services/	208033
16	community.tw,sh,hw.	95991
17	exp outpatients/	1747
18	exp outpatient clinics, hospital/	8250
19	outpatient$.tw,sh. or outpatient.hw. or outpatients.hw.	38876
20	exp home care services/	17291
21	home.tw,sh,hw.	53725
22	(clinic or clinics).mp.	57616
23	13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	395131
24	6 and 12 and 23	1629
25	limit 24 to human	1590
26	limit 25 to english language	1369
27	limit 26 to yr=1974-1999	1363

Database: CINAHL <1982 to December 1998>

SET	SEARCH	RESULTS
1	exp antiinfective agents/	5169
2	antiinfective$.tw,sh. or antiinfective.hw. or antiinfectives.hw.	553
3	antibiotic$.tw,sh. or antibiotic.hw. or antibiotics.hw.	2729
4	antiviral$.tw,sh. or antiviral.hw. or antivirals.hw.	591
5	antifungal$.tw,sh. or antifungal.hw. or antifungals.hw.	241
6	1 or 2 or 3 or 4 or 5	5894
7	exp infusions, intravenous/	369
8	exp infusions, parenteral/	740
9	infusion$.tw,sh. or infusion.hw. or infusions.hw.	2016
10	intravenous.tw,sh,hw.	4201
11	parenteral.tw,sh,hw.	1349
12	7 or 8 or 9 or 10 or 11	6267
13	exp ambulatory care/	1007
14	ambulatory.tw,sh,hw.	3823
15	exp community health services/	42434
16	community.tw,sh,hw.	19070
17	exp outpatients/	8939
18	outpatient$.tw,sh. or outpatient.hw or outpatients.hw.	10525
19	exp home health care/	8966
20	home.tw,sh,hw.	18415
21	(clinic or clinics).mp.	3760
22	13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21	68190
23	6 and 12 and 22	164
24	limit 23 to english	164

Database: HealthSTAR <1975 to present>

SET	SEARCH	RESULTS
1	exp anti-infective agents/	136150
2	anti-infective$.tw,sh. or anti-infective.hw or anti-infectives.hw	6277
3	antibiotic$.tw,sh. or antibiotic.hw or antibiotics.hw	47583
4	antiviral$.tw,sh. or antiviral.hw. or antivirals.hw.	5622
5	antifungal$.tw,sh. or antifungal.hw. or antifungals.hw.	3794
6	1 or 2 or 3 or 4 or 5	148512
7	exp infusions, parenteral/	19511
8	exp infusions, intravenous/	11246
9	infusions$.tw,sh. or infusion.hw. or infusions.hw	43609
10	parenteral.tw,sh,hw.	19353
11	intravenous.tw,sh,hw.	54351
12	7 or 8 or 9 or 10 or 11	88788
13	exp ambulatory care/	21143
14	ambulatory.tw,sh,hw.	43466
15	exp community health services/	188816
16	community.tw,sh,hw.	89974
17	exp outpatients/	1826
18	exp outpatient clinics, hospital/	6378
19	outpatient$.tw,sh. or outpatient.hw or outpatients.hw	32992
20	exp home care services/	19689
21	home.tw,sh,hw.	51339
22	(clinic or clinics).mp.	43460
23	13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	345919
24	6 and 12 and 23	1287
25	limit 24 to enlgish language	1126
26	limit 25 to yr=1974-1999	1126
27	limit 26 to nonmedline	62

Database: Cochrane

SET	SEARCH	RESULTS
1	(((Anti-infective* or Antibiotic*) or Antiviral*) or Antifungal*)	9104
2	Anti-infective-Agents*1:ME	6318
3	(#1 or #2)	10521
4	Ambulatory-Care*:ME	1283
5	Ambulatory*	4300
6	(#4 or #5)	4300
7	Community-Health-Services*1:ME	3774
8	Community*	2952
9	(#7 or #8)	6036
10	Outpatient-Clinics-Hospital*:ME	236
11	Outpatient*	5400
12	(#10 or #11)	5403
13	Home-Care-Services*1:ME	367
14	Home*	4055
15	(#13 or #14)	4060
16	(Clinic or Clinics)	4068
17	((((#6 or #9) or #12) or #15) or #16)	19034
18	Infusions-Intravenous*1:ME	3233
19	((((Parenteral or Infusion*) or Intravenous*)	23529
20	(#18 or #19)	23530
21	((#3 or #17) and #20)	168

Database: Papers First 3/18/99

SET	SEARCH	RESULTS
1	antibiotic* or antiviral* or antifungal* and home in subject index	8
2	antibiotic* or antiviral* or antifungal* and community* in subject index	6
3	antibiotic* or antiviral* or antifungal* and outpatient* in subject index	10
4	antibiotic* or antiviral* or antifungal* and ambulatory* in subject index	0
5	antibiotic* or antiviral* or antifungal* and clinic* in subject index	0

Database: Proceedings First 3/18/99

SET	SEARCH	RESULTS
1	antibiotic* or antiviral* or antifungal* and community * in subject index	0
2	antibiotic* or antiviral* or antifungal* and clinic* in subject index	0
3	antibiotic* or antiviral* or antifungal* and outpatient* in subject index	1
4	antibiotic* or antiviral* or antifungal* and ambulatory* in subject index	0
5	antibiotic* or antiviral* or antifungal* and home in subject index	0

Database: ProQuest Digital Dissertations 3/18/99

SET	SEARCH	RESULTS
1	(intravenous or infusion* or parenteral)	4354
2	(antiinfective* or antibiotic* or antiviral* or antifungal*)	3179
3	ambulatory	757
4	clinic or clinics	4481
5	home	22035
6	outpatient*	2197
7	community health services or community care	141
8	(#7 or #6 or #5 or #4 or #3)	28380
9	(#1 and #2 and #8)	6

Database: EMBASE <1988 to present>

SET	SEARCH	RESULTS
1	exp antiinfective agent/	111507
2	antiinfective$.tw,sh. or antiinfective.hw or antiinfectives.hw.	5341
3	antibiotic$tw,sh. or antibiotic.hw or antibiotics.hw	30486
4	antiviral$.tw,sh. or antiviral.hw. or antivirals,hw	5741
5	antifungal$.tw,sh. or antifungal.hw or antifungals.hw	4362
6	1 or 2 or 3 or 4 or 5	118792
7	exp intravenous infusion/	186
8	exp intravenous drug administration/	41849
9	exp parenteral drug administration	236
10	intravenous.tw,sh,hw.	52510
11	infusion$.tw,sh. or infusion.hw. or infusions.hw.	20617
12	parenteral.tw,sh,hw.	4056
13	7 or 8 or 9 or 10 or 11 or 12	67034
14	exp ambulatory care	1817
15	ambulatory.tw,sh.hw.	6604
16	exp community care/	2397
17	community.tw,sh,hw.	15834
18	exp outpatient/	1602
19	exp outpatient care/	1349
20	outpatient$.tw,sh. or outpatient.hw or outpatients.hw	9378
21	exp home care/	1954
22	home.tw,sh,hw.	9379
23	(clinic or clinics).mp.	12299
24	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23	46915
25	6 and 13 and 24	849
26	limit 25 to human	820
27	limit 26 to english	706

Appendix B
List of Key Informants

Dr. John C. Bradley
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Chief of Infectious Diseases Section
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Phone (608) 256-1901 ext 11745
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Dr. Susan Rehm
The Cleveland Clinic Foundation
Cleveland, Ohio
Phone (216) 444-6847
Email rehm@ccf.org

Dr. Alan Tice
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Tacoma, Washington
98405
Phone (253) 274-0833
Email alantice@idlinks.com

Dr. David N. Williams
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Minneapolis, MN 55415
Phone (612) 347-2121
Email david.williams@co.hennepin.mn.us

Appendix C

Sample Letter to Key Informants

To: Dr. William A. Craig.
Professor of Medicine
University of Wisconsin Medical School
Chief of Infectious Diseases Section
William S. Middleton Memorial Veterans Hospital, Madison
Phone (608) 256 - 1901 ext 11745
Email wac@medicine.wisc.edu

From: Cathy Berry
12028 - Lake Emerald Cresent SE
Calgary, Alberta
Canada
T6J 3G4
Phone (403) 225 - 2609
Email sberry@telusplanet.net

Dear Dr. Craig

I am in the process of completing my Masters of Nursing degree from the University of Alberta under the direction of Drs. Strang, Allen, and Taylor as well as Sarah Hayward. For my thesis, I am conducting a systematic review of home intravenous anti-infective therapy (HIVAT) literature and I am seeking all studies that measure the physiological and/or psychological outcomes of HIVAT. To be eligible for inclusion, studies must have a comparative or control group.

To date, I have conducted an electronic search of relevant databases, checked references of all articles being reviewed for relevance, and hand searched the table of contents of key journals. This search has yielded 30+ studies, a list of which is attached.

I am now in the process of trying to contact a number of key informants in the area of HIVAT, including you, to help locate any additional studies. If you are aware of any additional published or unpublished, completed or ongoing trials in this area, I would greatly appreciate you sharing those references/contacts with me.

In addition, I am trying to contact Dr. Allan C. Kind who coauthored the CoPAT guidelines with you. I would appreciate it if you would forward any phone numbers and/or email addresses that you might have for him.

If you have any questions or concerns you can call me collect at (403) 225 - 2609. The attached response form can be emailed to me at sberry@telusplanet.net. Thank you in advance for your help with these questions.

Sincerely,

Cathy Berry

References

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Davis, S., Davis, P., Mather, F., Waring, W., & The Home IV Antibiotic Study Group. (1990). A randomized trial of home intravenous antibiotic therapy (HIVAT) in cystic fibrosis (CF): Short-term psychological effects. A poster presented at the 4th Annual North American Cystic Fibrosis Conference (abstract).

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Wynn, S. F., & Cheater, F. M. (1990). Families'opinions on home intravenous therapy in cystic fibrosis (CF). A poster presented at the 4th Annual North American Cystic Fibrosis Conference (abstract).

To: Cathy Berry
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T2J 2J5
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From: Dr. Craig
Professor of Medicine
University of Wisconsin Medical School
Chief of Infectious Diseases Section
William S. Middleton Memorial Veterans Hospital, Madison
Phone (608) 256-1901 ext 11745
Email wac@medicine.wisc.edu

I am not aware of any further references of studies measuring the physiological and/or psychological outcomes of HIVAT.

I am aware of the following additional references:

Author _____
Title _____
Journal _____
Date _____
Volume (Issue) _____
Pages _____

Author _____
Title _____
Journal _____
Date _____
Volume (Issue) _____
Pages _____

Author _____
Title _____
Journal _____
Date _____
Volume (Issue) _____
Pages _____

Author _____
Title _____
Journal _____
Date _____
Volume (Issue) _____
Pages _____

Author _____
Title _____
Journal _____
Date _____
Volume (Issue) _____
Pages _____

Appendix D

Relevance Tool

Reference: _____
Reviewer: _____

Instructions:

1. Circle Y or N for each relevance criteria.
2. Record the inclusion decision by circling Y or N. Article must meet all 3 of the relevance criteria to be marked as Y.
3. Indicate if additional references are to be retrieved by circling Y or N. If Y is marked, hi-lite the items on the reference list of the article.
4. Note whether or not there was a discrepancy in the inclusion decision. If there is a discrepancy, the reason for the discrepancy as well as the final decision must be recorded by circling Y or N.

Relevance Criteria:

1.	Does this article involve the administration of home intravenous anti--infective therapy (HIVAT)?	Y	N
2.	Does this study measure the physiological and/or psychosocial outcomes of HIVAT on the patient, and/or his or her informal caregiver(s)?	Y	N
3.	Does this study use a comparison group or a control group to measure the physiological and/or psychosocial outcomes of HIVAT on the patient, and/or his or her informal caregiver(s)?	Y	N

Inclusion Decision:

1.	Should this article be included in the critical appraisal?	Y	N

Additional References:

1.	Are additional references to be retrieved? If Y, hi-lite items on reference list of article.	Y	N

Discrepancy in Inclusion Decision:

1.	Was there a discrepancy in the inclusion decision?	Y	N
2.	If Y, what was the reason for the discrepancy?		
	A. Oversight	Y	N
	B. Differences in interpretation of criteria	Y	N
	C. Differences in interpretation of study	Y	N
3.	Is the final decision to include this study in the review?	Y	N

Remarks (11/15/99):

_____
_____
_____
_____
_____

Relevance Tool Definition List

HIVAT
Home intravenous anti-infective therapy.

Home
The place where one lives. Institutional homes where patients have access to more trained personnel than would typically be found in a patient's home (i.e. nursing homes, hospices, assisted living homes, or extended care facilities) will be excluded.

Intravenous Anti-infective Therapy
The administration of an antibiotic, antiviral or anti-fungal agent into the venous circulation. The administration of an intraluminal antibiotic, antiviral or anti-fungal agent as a "lock solution", will be excluded.

Outcomes
All the possible results that stem from the therapeutic intervention – HIVAT.

Physiological Outcomes
All possible results stemming from HIVAT that relate to the processes and function of the patient's body. For example, temperature, forced vital capacity, weight, pain and wound healing.

Psychosocial Outcomes
All possible results stemming from HIVAT that relate to the patient and/or his or her caregiver's mental health, social status, and functional capacity. For example, anxiety, stress, coping, satisfaction, and quality of life.

Informal Caregiver
The layperson whom the patient identifies as being responsible for assisting him with HIVAT.

Comparison Group
A group of subjects whose scores on a dependent variable are used to evaluate the scores of the group under study when a control group is not part of the research design.

Control Group
Subjects in an experiment who do not receive the experimental treatment and whose performance provides a baseline against which the effects of the treatment can be measured.

Appendix E

Kappa Calculation for Relevance Testing

	Yes	No	Row Total
Yes	3	1	4(20%)
No	0	16	16(80%)
Column Total	3(15%)	17(85%)	20(100%)

Summary

Each rated 20 articles. Of the 20 articles, we agreed on 19. Of the 19 that we agreed on, there was 16 no and 3 yes. Of the one that we did not agree on, the secondary reviewer said yes and the primary reviewer said no.

Calculation

1. If rankings were independent you would expect 3% of the papers would be rated as yes by both 3% (20% x 15%). Similarly, 68% would be rated as no 68% (85% x 80%). Thus, 71% of all the papers would be classified the same merely by chance.
2. The difference between the observed proportion of cases in which the raters agree and that is expected by chance is 0.24 (0.95 - .71).
3. Cohen's kappa (1960) normalizes this difference by dividing it by the maximum difference possible for the marginal totals. In this case the largest possible "non-chance" agreement is

$$\frac{0.24}{(1 - 0.71)} = 0.83 \text{ level of agreement beyond chance}$$

Appendix F

Validity Tool

Reference: _____

Reviewer: _____

Instructions:

1. For each criteria, circle the appropriate number
2. Sum all criteria and assign a score
3. Using the score, rate the category as weak, moderate or strong
4. Total the number of weak, moderate, and strong category ratings for an overall validity rating
5. Note whether or not there is a discrepancy in the validity tool decision. If there is a discrepancy, the reason for the discrepancy as well as the final decision must also be recorded.

Inclusion Criteria and Follow-Up:	
1. Is the sample clearly defined?	
Yes (The definition of the sample clearly identifies where the sample came from and over what time period. The definition also includes a thorough description of the key characteristics of the population and sample, i.e. age, gender, diagnosis, and comorbid conditions).	3
Somewhat (The definition of the sample may not identify where the sample came from and/or over what time period, but it does include a description of the key characteristics of the population and sample, i.e. age, gender, diagnosis, and comorbid conditions).	2
No (The definition of the sample includes a description of some but not all key characteristics of the population and sample, i.e. age, gender, diagnosis, and comorbid conditions).	1
Unable to Assess (The sample is not defined).	0
2. How was the sample chosen?	
Probability Sample (Either everyone seen was included in the sample or the sample was chosen utilizing one of the following probability methods: simple random samples; stratified random samples; cluster samples).	2
Nonprobability Sample (The sample was chosen utilizing one of the following nonprobability methods: convenience sample; network sample; quota sample; systematic sample).	1
Unable to Assess (The method used to chose the sample is either unclear or not stated).	0
3. Is the same sample followed across time?	
Yes	2
No	1
Unable to Assess	0
4. What is the attrition rate?	
<20%	2
21 – 50%	1
>50%	0
Not applicable i.e. Retrospective	0
5. Sub – Total	

Design and Allocation to Intervention:	
1. Is this a prospective or retrospective study?	
Prospective (A study that looks at events that are underway or expected to occur in the future, i.e. experimental or time series).	3
Retrospective (A study that focuses on events that have occurred in the past, i.e. correlational or historical).	2
Combination of Prospective and Retrospective (A study that has both prospective and retrospective components to it).	1
Unable to Assess (The design used is either unclear or not identified).	0
2. How are subjects assigned to groups?	
Random assignment (The selection of a sample such that each member of a population has an equal chance of being selected, i.e. random numbers table).	4
Matched (The pairing of subjects in one group with those in another group based on their similarity on one or more dimensions, done in order to enhance the overall comparability of groups, i.e. when matching is performed in the context of an experiment, the procedure results in a randomized block design).	3
Non-equivalent (The selection of a comparison group that was not developed on the basis of random assignment, or matching).	2
Subjects as own controls (Studies in which subjects serve as their own controls such as in before-after studies).	1
Unable to Assess (The method used to assign subjects to groups is either unclear or not identified).	0
3. Sub – Total	

Control of Extraneous Variable:	
1. Are the extraneous variables controlled for in such a way that the group receiving the intervention and the control/comparison group are reasonably equivalent?	
Yes (There are no differences between the intervention and comparison/control groups in terms of gender, age, physical status, comorbid conditions or if there are differences they are controlled for statistically).	3
Somewhat (There are a few minor differences between the intervention and comparison/control groups in terms of gender, age, physical status, and/or comorbid conditions which are not controlled for statistically).	2
No (There are significant differences between the intervention and comparison/control groups in terms of gender, age, physical status, and/or comorbid conditions which are not controlled for statistically).	1
Unable to Assess (It is unclear whether or not such extraneous variables as gender, age, physical status, and/or comorbid conditions are controlled for).	0
2. Sub - Total	

Control of Intervention:	
1. Is the intervention (independent variable) clearly defined?	
Yes (There is a thorough description of the intervention [independent variable] that tells you what, why, and how it was done in sufficient detail that you could easily replicate it).	3
Somewhat (There is a description of the intervention [independent variable] but it is lacking some detail. You have a good idea of what the author has done, but not quite enough detail to use the information).	2
No (There is a description of the intervention (independent variable) but it is lacking significant detail. You have only a vague idea of what the author has done, but definitely not enough detail to use the information).	1
Unable to Assess (The intervention [independent variable] is not described)).	0
2. Is the intervention regimen controlled for?	
Yes (The intervention is implemented consistently in terms of intensity, duration, etc.).	3
Somewhat (There is minor variation in the way the intervention is implemented in terms of intensity, duration, etc).	2
No (There is significant variation in the way the intervention is implemented in terms of intensity, duration, etc).	1
Unable to Assess (It is unclear whether or not the intervention regimen is controlled for in terms of intensity, duration, etc).	0
3. Sub – Total	

Data Collection:	
1. Are the outcome measures (dependent variables) and the data collection protocols adequately described?	
Yes (There is a thorough description that tells you what, why and how it was done in sufficient detail that you could replicate it).	3
Somewhat (There is a description but it is lacking some minor details, i.e. there is not quite enough detail provided to replicate it).	2
No (There is a description but it is lacking significant detail, i.e. "an interview was conducted", "a questionnaire was constructed", and "available data were used").	1
Unable to Assess (There is no description of the data collection protocol).	0
2. Were issues of reliability and validity of measurement adequately addressed?	
Yes (Either well known standardized tools such as pulmonary function tests are used, or evidence for the reliability and validity of the instruments is thoroughly presented).	3
Somewhat (Evidence for the reliability and validity of the instruments is presented but lacking some details).	2
No (Evidence for the reliability and validity of the instruments is presented but it is lacking significant details).	1
Unable to Assess (Evidence for the reliability and validity of the instruments is not presented).	0
3. Sub – Total	

Data Analysis and Conclusions	
1. Is the data analysis adequate?	
Yes (The analysis is comprehensible, responsive to the data, and congruent with all preceding material in the article).	3
Somewhat (The analysis shows bias toward one aspect of the data over another or does not thoroughly present the results of all data collection tools).	2
No (The analysis is unclear, ambiguous, unrelated to the data, or inconsistent with the rest of the research).	1
Unable to Assess (The data analysis is not described).	0
2. Are the conclusions drawn supported by the data and thorough?	
Yes (All of the conclusions drawn are supported by the data and include a thorough description of the various statistical findings, implications of the study, and recommendations for new avenues of research).	3
Somewhat (All conclusions drawn are supported by the data but some minor details regarding the various statistical findings, implications of the study, and recommendations for new avenues of research are lacking).	2
No (Not all conclusions drawn are supported by the data and/or significant details regarding the various statistical findings, implications of the study, and recommendations for new avenues of research are lacking).	1
Unable to Assess (There is no conclusion).	0
3. Sub – Total	

Overall Assessment of Study

1. Calculation of Validity Score:

Categories	Sub - Total	Rating
1. Inclusion and Follow-Up		
2. Design and Allocation		
3. Control of Extraneous Variables		
4. Intervention		
5. Data Collection		
6. Data Analysis and Conclusions		
7. Overall Rating		

2. Subscale Validity Ratings:

1. Inclusion and Follow-Up	
0-3	Weak
4-6	Moderate
7-9	Strong
2. Design and Allocation	
0-2	Weak
3-5	Moderate
6-7	Strong
3. Control of Extraneous Variables	
0-1	Weak
2	Moderate
3	Strong
4. Intervention	
0-2	Weak
3-4	Moderate
5-6	Strong
5. Data Collection	
0-2	Weak
3-4	Moderate
5-6	Strong
6. Data Analysis and Conclusions	
0-2	Weak
3-4	Moderate
5-6	Strong

3. Overall Validity Ratings:

≥ 2 weaks	weak
< 2 weaks, < 3 strongs	moderate
≥ 3 strongs, 0 weaks	strong

4. If there is a discrepancy in the validity decision, indicate the reason(s):

Oversight	Y	N
Difference in interpretation of criteria	Y	N
Difference in interpretation of study	Y	N

5. Circle the final decision:

Strong
Moderate
Weak

Appendix G

Kappa Calculation for Validity Testing

	Strong	Moderate	Weak	Row Total
Strong	3	0	0	3(30%)
Moderate	1	0	2	3(30%)
Weak	0	0	4	4(40%)
Column Total	4(40%)	0(0%)	6(60%)	10(100%)

Summary

Each rated 10 articles. Of the 10 articles, we agreed on 7. Of the 7 that we agreed on, there were 3 that we both rated as strong, 0 that we both rated moderate and 4 that we both rated weak. Of the three articles that we did not agree on, the primary reviewer rated one moderate that the secondary reviewer rated as strong, and two moderate that the secondary reviewer rated as weak.

Calculation

1. If rankings were independent you would expect 12% of the papers would be rated as strong by both (30% x 40%). Similarly, 0.3%% would be rated as moderate (30% x 0%) and 24% would be rated as weak (40% x 60%). Thus, 36.3% of all the papers would be classified the same merely by chance.
2. The difference between the observed proportion of cases in which the raters agree and that is expected by chance is 0.337 (0.70 - .363).
3. Cohen's kappa (1960) normalizes this difference by dividing it by the maximum difference possible for the marginal totals. In this case the largest possible "non-chance" agreement is

$$\frac{0.337}{(1 - .363)} = .53 \text{ level of agreement beyond chance}$$

Appendix H

Data Collection Tool

Background Information:

Reference Number: _____

Authors: _____

_____ Year of Publication: _____

Title: _____

_____

Journal: _____

_____

Country (where study was conducted): _____

Objective:

_____

_____

_____

Research Methods:

1. Prospective?
   a. Prospective
   b. Retrospective
   c. Combination
   d. Unable to Assess
2. Study Design?
   a. Random
   b. Matched
   c. Non-equivalent
   d. Subjects as own controls
   e. Combination of above (circle the applicable designs)
   f. Unable to assess
3. Types of Analysis?

   _____

   _____

   _____

Participants:

1. Sample Size?
   a. Sample size at baseline _____
   b. Number of groups _____
      Size of control group _____
      Size of experimental group _____
   c. Sample size at completion of study _____
2. Study Population?
   Age: Mean age _____ Range _____
   Gender: Male _____% Female _____%
   Diagnosis: _____
   _____
   _____
   _____
   _____
3. Inclusion Criteria?
   _____
   _____
   _____
   _____
   _____
   _____
4. Exclusion Criteria?
   _____
   _____
   _____
   _____
   _____
5. Setting?
   _____
   _____
   _____
   _____
   _____

Intervention:

1. Agent and Dose?

2. Duration of Therapy?

3. Provider?

4. Education Provided?

5. Venous Access Devices?

6. Infusion Device?

7. Follow-Up?

_____

_____

_____

Outcome Category	Focus (Patient or Caregiver)	Outcome Indicators	Significant Effect	Comments

Appendix I
Articles Identified for Retrieval: Source, Relevance, and Validity

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
STUDIES RATED AS STRONG							
Baumle, W. M. (1992). A comparison of the psychological pain response of persons on long-term intermittent intravenous antibiotic therapy. Unpublished master's thesis, Medical College of Ohio, Toledo, Ohio.	Electronic Database	Yes	Yes◇	Yes◇	Strong*	Strong*	Strong
Bosworth, D. G., & Nielson, D. W. (1997). Effectiveness of home versus hospital care in the routine treatment of cystic fibrosis. Pediatric Pulmonology, 24(1), 42-47.	Electronic Database	Yes	Yes		Moderate*	Strong*	Strong
Cornell, D. L. (1990). Patterns of anxiety with home parenteral antibiotic therapy. Unpublished master's thesis, University of Nevada, Reno, Nevado.	Electronic Database	Yes	Yes◇	Yes◇	Strong◇*	Strong◇*	Strong
Donati, M. A., Guenette, G., & Auerbach, H. (1987). Prospective controlled study of home and hospital therapy of cystic fibrosis pulmonary disease. The Journal of Pediatrics, 111(1), 28-33.	Reference List	Yes	Yes◇	Yes◇	Strong◇	Strong◇	Strong
Pond, M. N., Newport, M., Joanes, D., & Conway, S. P. (1994). Home versus hospital intravenous antibiotic therapy in treatment of young adults with cystic fibrosis. European Respiratory Journal, 7(9), 1640-1644.	Electronic Database	Yes	Yes◇	Yes◇	Strong◇	Moderate◇	Strong
Vic, R., Ategbo, S., Gottand, F., Launay, V., Loeuille, G. A., Elian, J. C., Farriaux, J. P., & Turck, D. (1997). Nutritional impact of antipseudomonas intravenous antibiotic courses in cystic fibrosis. Archives of Disease in Childhood, 76(5), 437-440.	Electronic Database	Yes	Yes		Strong*	Strong*	Strong
Vinks, A. A., Brimicombe, R. W., Heijerman, H. G., & Bakker, W. (1997). Continuous infusion of ceftazidime in cystic fibrosis patients during home treatment: clinical outcome, microbiology and pharmacokinetics. Journal of Antimicrobial Chemotherapy, 40(1), 125-133.	Electronic Database	Yes	Yes		Strong	Strong	Strong

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Wolter, J. M., Bowler, S. D., Nolan, P. J., & McCormack, J. G. (1997). Home intravenous therapy in cystic fibrosis: a prospective randomized trial examining clinical, quality of life and cost aspects. European Respiratory Journal, 10(4), 896-900.	Electronic Database/ Key Informant	Yes	Yes◇	Yes◇	Strong	Strong	Strong
STUDIES RATED AS MODERATE							
Bradley, J. M., Wallace, E. S., Elhorn, J. S., Howard, J. L., & McCoy, M. P. (1999). An audit of the effect of intravenous antibiotic treatment on spirometric measures of pulmonary function in cystic fibrosis. Irish Journal of Medical Science, 168(1), 25-28.	Electronic Database	Yes	Yes		Moderate◇	Moderate◇	Moderate
Chattopadhyay, T. (1989). Outcome of home parenteral antibiotic therapy. Unpublished doctoral dissertation, University of the Pacific, Stockton, California.	Electronic Database	Yes	Yes		Strong	Moderate	Moderate
Chattopadhyay, T., Catania, P. N., & Mergener, M. A. (1990). Therapeutic outcome of elderly and nonelderly patients receiving home intravenous antimicrobial therapy. American Journal of Hospital Pharmacy, 47(2), 335- 339.	Electronic Database	Yes	Yes◇	Yes◇	Moderate	Moderate	Moderate
Montalto, M., & Dunt, D. (1997). Home and hospital intravenous therapy for two acute infections: an early study. Australian & New Zealand Journal of Medicine, 27(1), 19-23.	Electronic Database	Yes	Yes		Moderate◇	Moderate◇	Moderate
Stovroff, M. C., Totten, M., & Glick, P. L. (1994). PIC lines save money and hasten discharge in the care of children with ruptured appendicitis. Journal of Pediatric Surgery, 29(2), 245-247.	Electronic Database	Yes	Yes		Weak	Moderate	Moderate

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Strandvik, B., Hjelte, L., & Widen, B. (1988). Home intravenous antibiotic treatment in cystic fibrosis. Scandinavian Journal of Gastroenterology, 23(Suppl. 143), 119-120. and Strandvik, B., Hjelte, L., Malmborg, A-S., & Widen, B. (1992). Home intravenous antibiotic treatment of patients with cystic fibrosis. Acta Paediatrica, 81(4), 340-344.	Electronic Database	Yes	Yes		Moderate	Moderate	Moderate
Talcott, J. A., Whalen, A., Clark, J., Rieker, P. P., & Finberg, R. (1994). Home antibiotic therapy for low risk cancer patients with fever and neutropenia: A pilot study of 30 based on a validated predicted rule. Journal of Clinical Oncology, 12(1), 107-114.	Electronic Database	Yes	Yes		Moderate	Strong	Moderate
STUDIES RATED AS WEAK							
Bramwell, E. C., Halpin, D. M. G., Duncan-Skingle, F., Hodson, M. E., & Geddes, D. M. (1995). Home treatment of patients with cystic fibrosis using the 'Intermate': the first year's experience. Journal of Advanced Nursing, 22(6), 1063-1067.	Electronic Database	Yes	Yes◇	Yes◇	Weak◇*	Weak◇*	Weak
Dahlgren, A. F. (1997). Adverse drug reactions in home care patients receiving nafcillin or oxacillin. American Journal of Health-System Pharmacy, 54(10), 1176-1179.	Electronic Database	Yes	Yes		Weak*	Weak*	Weak
Gilbert, J., Robinson, T., & Littlewood, J. M. (1988). Home intravenous antibiotic treatment in cystic fibrosis. Archives of Disease in Childhood, 63, 512-517.	Reference List	Yes	Yes		Moderate*	Moderate*	Weak
Loos, J. M., Baker, N. L., & Bergers, R. M. (1989). Evaluation of the extent of nursing involvement required with home pentamidine isethionate infusions. Journal of Intravenous Nursing, 12(1), 52-56.	Electronic Database	Yes	Yes		Moderate*	Weak*	Weak

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Maloney-Folkemer, M. L. (1988). Cystic fibrosis patient and parent satisfaction with two forms of home intravenous therapy and a comparison with inpatient services. Unpublished master's thesis, University of Missouri-Columbia, Missouri.	Electronic Database	Yes	Yes◇	Yes◇	Weak	Moderate	Weak
Martel, A. Y. (1994). Home intravenous self-injection of antibiotic therapy. Canadian Journal of Infectious Diseases, 5(Suppl. C), 51C-55C.	Electronic Database	Yes	Yes		Weak	Moderate	Weak
Poole, S. M., Nowobilski-Vasilios, A., & Free, F. (1999). Intravenous push medications in the home. Journal of Intravenous Nursing, 22(4), 209-215.	Key Informant	Yes	Yes		Weak	Weak	Weak
Rogers, D., Millar-Jones, L., Knowles, R., & Goodchild, M. C. (1993). Intravenous antibiotic treatment for cystic fibrosis patients: home versus hospital. Excerpta Medica International Congress, 1034, 103-107	Electronic Database	Yes	Yes		Weak*	Weak*	Weak
Stiver, H. G., Telford, G. O., Mossey, J. M., Cote, D. D., Van Middlesworth, E. J., Trosky, S. K., McKay, N. L., & Mossey, W. L. (1978). Intravenous antibiotic therapy at home. Annals of Internal Medicine, 89(5 Part 1), 690-693.	Electronic Database	Yes	Yes		Moderate*	Weak*	Weak
Strumpfer, A. L. (1991). Lower incidence of peripheral catheter complications by the use of elastomeric hydrogel catheters in home intravenous therapy patients. Journal of Intravenous Nursing, 14(4), 261-267.	Electronic Database	Yes	Yes		Weak	Weak	Weak
STUDIES RATED AS NOT RELEVANT							
Ackerman, B. H., & Wolfe, J. J. (1991). Monitoring chronic outpatient infections: Providing comprehensive home healthcare pharmacy services. DICP, The Annals of Pharmacotherapy, 25(7-8), 840-848.	Electronic Database	Yes	No				Not Relevant
Adams, A. (1995). Venous access devices: Case studies for appropriate selection. Infusion, May, 11-14.	Reference List	Yes	No				Not Relevant
Agnew, T. (1997). Delivering high tech home care. Pharmacy in Practice, 7, 222-223.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Alderman, C. (1998). Homing instinct. Nursing Standard, 13(1), 25-27.	Electronic Database	Yes	No				Not Relevant
Aldrete, J. A., & Williams, S. K. (1998). Infections from extended epidural catheterization in ambulatory patients. Regional Anesthesia and Pain Medicine, 23(5), 491-495	Electronic Database	Yes	No				Not Relevant
Allen, R. (1993). Cost-effectiveness issues for home IV therapy in the United States. Hospital Formulary, 28(Suppl. 1), 37-40	Electronic Database	Yes	No				Not Relevant
Altilio, D., Tierney, A. R., & Kotler, D. P. (1988). Application of home parenteral therapies to the treatment of patients with AIDS. Nutrition in Clinical Practice, 3(5), 171-172	Electronic Database	Yes	No				Not Relevant
Ameh, E. A. (1999). Acute retropharyngeal abscess in children. Annals of Tropical Paediatrics, 19(1), 109-112.	Electronic Database	Yes	No				Not Relevant
Amir, J., Harel, L., Eidlitz-Markus, T., & Varsano, I. (1996). Comparative evaluation of cefixime versus amoxicillin-clavulanate following ceftriaxone therapy of pneumonia. Clinical Pediatrics, 35(12), 629-633.	Electronic Database	Yes	No				Not Relevant
Anastasi, J. M. (1998). Innovations in care: Neonatal home antibiotic infusion therapy. Neonatal Network, 17(4), 33-38.	Electronic Database	Yes	No				Not Relevant
Ancona-Berk, V. A., & Chalmers, T. C. (1986). An analysis of the costs of ambulatory and inpatient care. American Journal of Public Health, 76(9), 1102-1104.	Reference List	Yes	No				Not Relevant
Andersson, M. (1989). Drugs prescribed for elderly patients in nursing homes or under medical home care. Comprehensive Gerontology, 3(Suppl. A & B), 8-15	Electronic Database	Yes	No				Not Relevant
Andersson, M., Gottries, C-G., & Tomsic, E. (1989). The home care patient. A comparison with the nursing home patient. Comprehensive Gerontonology, 3A + B, 39-50.	Electronic Database	No					
Andes, D., & Craig, W. A. (1998). Pharmacokinetics and pharmacodynamics of outpatient intravenous antimicrobial therapy. Infectious Disease Clinics of North America, 12(4), 849-860	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Andriole, V. T. (1991). Cost-effective use of once-daily ceftriaxone in the treatment of moderate to severe infections: Introduction to a symposium. Chemotherapy, 37(Suppl. 3), 1-2.	Reference List	Yes	No				Not Relevant
Angel, J. V. G., & The HIAT Study Group. Outpatient antibiotic therapy for elderly patients. The American Journal of Medicine, 97(Suppl. 2A), 43-49.	Electronic Database	Yes	No				Not Relevant
Anger, D. M., Ledbetter, B. R., Stasikelis, P. J., & Calhoun, J. H. (1995). Injuries of the foot related to the use of lawn mowers. The Journal of Bone & Joint Surgery, 77(5), 719-725.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1978). Do-it-yourself IV therapy. Emergency Medicine, 10(7), 69, 71.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1983A). IV therapy in the home . . . antibiotic therapy. Emergency Medicine, 15(4), 82-84, 86.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1983B). Third-party payers create snags for home IV antibiotic programs. Hospital Peer Review, 8(5), 60-62.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1984). The National Intravenous Therapy Association's Intravenous Nursing Standards of Practice. NITA, 7, 93.	Reference List	Yes	No				Not Relevant
Anonymous. (1985). Medicare reimbursement for outpatient intravenous antibiotics. American Journal of Hospital Pharmacy, 42(8), 1712.	Electronic Database	No					
Anonymous. (1989). Assessing candidates for home-infusion therapy. Journal of the Association of Nurses in AIDS Care, 1(1), 7.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1993A). Ceftriaxone-associated biliary complications of treatment of suspected disseminated Lyme disease. MMWR, 42(2), 39-42.	Electronic Database	No					
Anonymous. (1993B). Home infusion therapy market profiled in new report. Hospital Home Health, 10(6), 85-87.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Anonymous. (1993C). Report provides profile of home infusion services, patients. American Journal of Hospital Pharmacy, 50, 846, 849, 850, 853, 858.	Reference List	Yes	No				Not Relevant
Anonymous. (1994). Infusion antibiotics: Out of the hospital, into the home. American Journal of Nursing, 94(11), 55.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1996A). Home IV anti-infective therapy an attractive alternative to inpatient management. Drugs & Therapy Perspectives, 7(8), 13-16.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1996B). Treatment of pyelonephritis during pregnancy. American Family Physician, 53(3), 950-951.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1997A). Advanced way of administering antibiotics. Nursing News - South Africa, 21(3), 41.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1997B). Deciding when to treat pneumonia at home. Hospital Technology Scanner, 16(3), 8-9.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1997C). Early intravenous to oral switch therapy in community-acquired pneumonia is advantageous. Drugs & Therapeutics Perspectives, 10(3), 10-13.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1997D). Managing childhood pneumonia. Drug and Therapeutics Bulletin, 35(12), 89-92.	Electronic Database	Yes	No				Not Relevant
Anonymous. (1998). Clinical role of cefixime in community-acquired infections. Chemotherapy, 44(Suppl. 1), 35-38.	Electronic Database	Yes	No				Not Relevant
Anthony, J. P., & Mathes, S. J. (1991). Update on chronic osteomyelitis. Clinics in Plastic Surgery, 18(3), 515-523.	Electronic Database	Yes	No				Not Relevant
Antoniskis, A., Anderson, B. C., Van Volkinburg, E. J., Jackson, J. M., & Gilbert, D. N. (1978). Feasibility of outpatient self-administration of parenteral antibiotics. Western Journal of Medicine, 128(3), 203-206.	Electronic Database	Yes	No				Not Relevant
Aquino, V. M., Buchanan, G. R., Tkaczewski, I., & Mustafa, M. M. (1997). Safety and early discharge of selected febrile children and adolescents with cancer with prolonged neutropenia. Pediatric Oncology, 28, 191-195.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Aquino, V. M., Tkaczewski, I., & Buchanan, G. R. (1997). Early discharge of low-risk febrile neutropenic children and adolescents with cancer. Clinical Infectious Diseases, 25, 74-78.	Reference List	Yes	No				Not Relevant
Arditi, M., & Yogev, R. (1990). Convalescent outpatient therapy for selected children with acute bacterial meningitis. Seminars in Pediatric Infectious Diseases, 1(4), 404-410.	Reference List	Yes	No				Not Relevant
Aristimuno, B., Nirankari, V. S., Hemady, R. K., & Rodrigues, M. M. (1993). Spontaneous ulcerative keratitis in immunocompromised patients. American Journal of Ophthalmology, 115(2), 202-208.	Reference List	Yes	No				Not Relevant
Arlotta, J., & Steele, S. L. (1984). Analysis of the home health care market: The vendor's perspective. Topics in Hospital Pharmacy Management, 4(3), 72-79.	Electronic Database	Yes	No				Not Relevant
Armbruster, C., Armbruster, C., Dittrich, K., & Vetter, N. (1993). Permanent central venous access in AIDS patients - A helpful device for homecare or an unacceptably high infection risk? International Conference on AIDS, 9, 518.	Reference List	No					
Armstrong, E. P., & Rush, D. R. (1983). Treatment of osteomyelitis. Clinical Pharmacy, 2(3), 213-224.	Electronic Database	Yes	No				Not Relevant
Armstrong, R. W., Bolding, F., & Joseph, R. (1992). Septic arthritis following arthroscopy: Clinical syndromes and analysis of risk factors. Arthroscopy: The Journal of Arthroscopic and Related Surgery, 8(2), 213-223.	Electronic Database	Yes	No				Not Relevant
Arras, J. D., & Dubler, N. N. (1994). Bringing the hospital home: Ethical and social implications of high-tech home care. Hastings Center Report 24, (Suppl. 5), S19-S28.	Key Informant	Yes	No				Not Relevant
Atlas, S. J., Benzer, T. I., Borowsky, L. H., Chang, Y., Burnham, D. C., Metlay, J. P., Halm, E. A., & Singer, D. E. (1998). Safely increasing the proportion of patients with community-acquired pneumonia treated as outpatients. An interventional trial. Archives of Internal Medicine, 158, 1350-1356.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Attilio, R. M. (1984). Ambulatory infusion therapy. Hospital Pharmacy, 19, 662-673.	Reference List	No					
Auble, T. E., Yealy, D. M., & Fine, M. J. (1998). Assessing prognosis and selecting an initial site of care for adults with community-acquired pneumonia. Infectious Disease Clinics of North America, 12(3), 741-759.	Electronic Database/ Key Informant	Yes	No				Not Relevant
August, D. A. (1987). Venous access in the outpatient: Techniques and devices. Outpatient Therapy Medicine, 2, 1-7.	Reference List	No					
Babiker, M. A. (1986). Prophylaxis of pneumococcal infection in sickle-cell disease by the combined use of vaccination and penicillin. Annals of Tropical Paediatrics, 6, 179-181.	Electronic Database	Yes	No				Not Relevant
Bach, M. C., & Cocchetto, D. M. (1987). Ceftazidime as single-agent therapy for gram-negative aerobic bacillary osteomyelitis. Antimicrobial Agents and Chemotherapy, 31(10), 1605-1608.	Electronic Database	Yes	No				Not Relevant
Bailie, G. R., Morton, R., Ganguli, L., Keaney, M., & Waldek, S. (1987). Intravenous or intraperitoneal vancomycin for the treatment of continuous ambulatory peritoneal dialysis associated gram-positive peritonitis? Nephron, 46(3), 316-318.	Electronic Database	Yes	No				Not Relevant
Bain, P. D. (1995). Antibiotic therapy at home. What your patient needs to know. Nursing, 25(12), 24C-24D, 24F.	Electronic Database	Yes	No				Not Relevant
Bakken, J. S. (1990). Home treatment with parenteral antibiotics - a treatment alternative for Scandinavian patients. Nordisk Medicine, 105, 328-330.	Reference List	Yes	No•				Not Relevant
Bakken, J. S. (1992). Antibiotic administration options. OPIVITA Newsletter, 3(6), 5-6.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Bakker, W., Vinks, A. A. T. M. M., Mouton, J. W., Verzijl, J. G., & Heijerman, H. G. M. (1993). Continuous intravenous treatment at home of respiratory tract infections with ceftazidime using a portable pump in cystic fibrosis (CF) patients in The Netherlands: a multicentre study. Ned Tijdschr Geneeskd, 137(48), 2486-2491.	Reference List	Yes	No•				Not Relevant
Bakshi, S. S., Grover, R., Cabezon, E., & Wethers, D. L. (1991). Febrile episodes in children with sickle cell disease treated on an ambulatory basis. Journal of the Association for Academic Minority Physicians, 2(2), 80-83.	Electronic Database	No					
Balinsky, W. (1986). Home care prescription drug reimbursement: A case for intravenous antibiotics. Nutley, New Jersey: Hoffman-LaRoche, 1-28.	Reference List	Yes	No				Not Relevant
Balinsky, W. (1987). Reimbursement of outpatient/home intravenous therapy. Outpatient Delivery of Parenteral Antibiotic Therapy, Nutley, New Jersey, 50-54.	Reference List	No					Not Relevant
Balinsky, W. (1991). Reimbursement for outpatient parenteral antibiotic therapy: Update. Reviews of Infectious Diseases, 13(Suppl. 2), S193-S195.	Electronic Database	Yes	No				Not Relevant
Balinsky, W. (1995A). High tech home care. Caring Magazine, 14(5), 7-9.	Electronic Database	Yes	No				Not Relevant
Balinsky, W. (1995B). Home IV drug therapy reimbursement. In R. B. Connnors, & R. W. Winters (Eds.), Home infusion: Current status and future trends (pp. 143-150). Chicago: American Hospital Publishing.	Reference List	No					
Balinsky, W., & Mollin, A. (1998). Home drug infusion therapy: A literature update. International Journal of Technology Assessment in Health Care, 14(3), 535-543.	Electronic Database	Yes	No				Not Relevant
Balinsky, W., & Nesbitt, S. (1989). Cost effectiveness of outpatient parenteral antibiotics: A review of the literature. The American Journal of Medicine, 87, 301-305.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Ball, L. M., Siddal, S., & van Saenen, H. (1993). Teicoplanin in home therapy of the terminally ill child. European Journal of Haematology, 51(Suppl. 54), 14-17.	Reference List	Yes	No				Not Relevant
Baptista, R. J., & Mitrano, F. (1989). Experience with 211 courses of intravenous antimicrobial therapy. American Journal of Hospital Pharmacy, 46, 315-316.	Electronic Database	Yes	No◇	No◇			Not Relevant
Baraff, L. J., & Ablon, W. D. (1984). Cefaclor vs ampicillin for outpatient treatment of urinary tract infections. American Journal of Emergency Medicine, 2, 327-330.	Reference List	No					
Baraff, L. J., Bass, J. W., Fleisher, G. R., Klein, J. O., McCracken, G. H., Jr., Powell, K. R., & Schriger, D. L. (1993). Practice guideline for the management of infants and children 0 to 36 months of age with fever without source. Annals of Emergeny Medicine, 22(7), 1198-1210.	Electronic Database	Yes	No				Not Relevant
Baraff, L., Oslund, S., & Prather, M. (1993). Effect of antibiotic therapy and etiologic microorganism on the risk of bacterial meningitis in children with occult bacteremia. Pediatrics, 92(1), 140-143.	Electronic Database	Yes	No				Not Relevant
Barfoot, K. R., & Ross, K. L. (1988). Intravenous therapy at home: An overview. Home Healthcare Nurse, 6(4), 11-3.	Reference List	Yes	No				Not Relevant
Barget, C. D., & Zink, M. R. (1989). Evaluation of clinical indicators in IV home care. Journal of Nursing Quality Assurance, 3(3), 64-74.	Reference List	Yes	No				Not Relevant
Barman Balfour, J. A., & Lamb, H. M. (1998). Outpatient parenteral antibacterial therapy of serious infections: The role of ceftriaxone. Disease Management & Health Outcomes, 4(4), 222-236.	Electronic Database	Yes	No				Not Relevant
Barrio, D. J. (1998). Antibiotic and anti-infective agent use and administration in homecare. Journal of Intravenous Nursing, 21(1), 50-58.	Electronic Database	Yes	No				Not Relevant
Bartlett, J. G., & Mundy, L. M. (1995). Community-acquired pneumonia. The New England Journal of Medicine, 333(24), 1618-1624.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Bartolozzi, S., Clerico, A., Properzi, E., Minori, A., & Castello, M. A. (1997). Ceftriaxone as a single agent in empirical therapy of unexplained fever in granulocytopenic children with solid tumors. Journal of Chemotherapy, 9(3), 227-231.	Electronic Database	Yes	No				Not Relevant
Bash, R. O., Katz, J. A., Cash, J. V., & Buchanan, G. R. (1994). Safety and cost effectiveness of early hospital discharge of lower risk children with cancer admitted for fever and neutropenia. Cancer, 74(1), 189-196.	Reference List	Yes	No				Not Relevant
Baskin, M. N., O'Rourke, E. J., & Fleisher, G. R. (1992). Outpatient treatment of febrile infants 28 to 89 days of age with intramuscular administration of ceftriaxone. The Journal of Pediatrics, 120(1), 22-27.	Reference List	Yes	No				Not Relevant
Baumgartner, J. D., & Glauser, M. P. (1983). Single daily dose treatment of severe refractory infections with ceftriaxone. Cost savings and possible parenteral outpatient treatment. Archives of Internal Medicine, 143(10), 1868-1873.	Electronic Database	Yes	No				Not Relevant
Bayer, A. S. (1989). Clinical utility of new quinolones in treatment of osteomyelitis and lower respiratory tract infections. European Journal of Clinical Microbiology & Infectious Diseases, 8(12), 1102-1110.	Electronic Database	Yes	No				Not Relevant
Bean, B., & Aeppli, D. (1985). Adverse effects of high-dose intravenous acyclovir in ambulatory patients with acute herpes zoster. The Journal of Infectious Diseases, 151(2), 362-365.	Electronic Database	Yes	No				Not Relevant
Bennett, M., & Allen, R. (1990). High technology home pharmacotherapy. I. An overview of antiinfective and antineoplastic therapies. Journal of Pharmacy Practice, 3, 34-39.	Reference List	No					
Bennett, M., & Allen, R. (1990). High technology home pharmacotherapy. II. An overview of the newest home therapies. Journal of Pharmacy Practice, 3, 40-47.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Benoit, J. L., Carandang, G., Sitrin, M., & Arnow, P. M. (1995). Intraluminal antibiotic treatment of central venous catheter infections in patients receiving parenteral nutrition at home. Clinical Infectious Diseases, 21(5), 1286-1288.	Electronic Database	Yes	No				Not Relevant
Benoit, J. L., Carandang, G., Sitrin, M., & Arnow, P. M. (1997). Intraluminal antibiotic treatment of central venous catheter infections in patients receiving parenteral nutrition at home. Clinical Infectious Diseases, 24(4), 743-744.	Electronic Database	No					
Bergers, R. M., Baker, N. L., & Loos, J. (1987). Eleven hundred outpatient days of amphotericin B therapy. NITA, 10(4), 292-296.	Electronic Database	Yes	No				Not Relevant
Bergers, R. M., Martin, J., & Streckfuss, B. L. (1985). A home I.V. antibiotic program. NITA, 8(3), 238-239.	Electronic Database	Yes	No				Not Relevant
Bernstein, L. H. (1989). Home intravenous antibiotics: A physician's perspective. Pride Institute Journal of Long Term Home Health Care, 8(3), 4-7.	Electronic Database	Yes	No				Not Relevant
Bernstein, L. H. (1991). An update on home intravenous antibiotic therapy. Geriatrics, 46(6), 47-48, 50-52, 54.	Electronic Database	Yes	No				Not Relevant
Bernstein, L. H. (1992). Marketing home iv antibiotic therapy to physicians. Caring Magazine, 11(5), 50-52, 54, 56.	Electronic Database	Yes	No*	No*			Not Relevant
Bernstein, L. H., Rehm, S., & Faith, S. R. P. (1989). When to consider home IV antibiotics. Patient Care, 15, 161-184.	Reference List	No					
Bertino, J. S., Jr. (1984). Home antibiotic therapy. U.S. Pharmacist, September, H13-H15.	Reference List	Yes	No				Not Relevant
Beveridge, R. A., Adawadkar, S., Miller, J. A., Kales, A. N., Binder, A., & Robert, N. J. (1995). Outpatient treatment of febrile neutropenia (abstract 5). Proceedings of the Second International Symposium of Febrile Neutropenia, Brussels, Belgium.	Literature Search	No					
Bhasin, K. K. (1995). Antibiotic therapy of neonates with bacterial sepsis. Pediatric Infectious Disease Journal, 14(2), 166-167.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Biggert, R. A., Watkins, J. L., & Cook, S. E. (1992). Home infusion service delivery system model. A conceptual framework for family-centered care in pediatric home care delivery. Journal of Intravenous Nursing, 15(4), 210-218.	Reference List	Yes	No				Not Relevant
Bilton, D., & Mahadeva, R. (1997). New treatments in adult cystic fibrosis. Journal of the Royal Society of Medicine, 90(Suppl. 31), 2-5.	Electronic Database	Yes	No				Not Relevant
Birmingham, J. (1994). Home infusion therapy is more than just a drug. Infusion, 1, 41-43.	Reference List	No					
Birmingham, J. J. (1997). Decision matrix for selection of patients for a home infusion therapy program. Journal of Intravenous Nursing, 20(5), 258-263.	Reference List	Yes	No				Not Relevant
Birnbaum, H. G., & Tang, M. (1998). The home infusion therapy/relative benefit index. Summary of an analysis using insurance claims data. Medical Care, 36(5), 757-765.	Reference List	Yes	No				Not Relevant
Black, A., Redmond, A. O. B., Steen, H. J., & Oborska, I. T. (1990). Tolerance and safety of ciprofloxacin in paediatric patients. Journal of Antimicrobial Chemotherapy, 26(Suppl. F), 25-29.	Electronic Database	Yes	No				Not Relevant
Bledsoe, L. (1985). Discharge planning for the home care I.V. therapy patient. NITA, 8, 486-487.	Reference List	Yes	No				Not Relevant
Blendowski, C. (1994). Outpatient clinic uses ambulatory infusion devices. Oncology Nurses Forum, 21(7), 1250.	Reference List	Yes	No				Not Relevant
Bloom, B. J., Wyckoff, P. M., Meissner, H. C., & Steere, A. C. (1998). Neurocognitive abnormalities in children after classic manifestations of Lyme disease. Pediatric Infectious Disease Journal, 17(3), 189-196.	Electronic Database	Yes	No				Not Relevant
Blumer, J. L., O'Brien, C. A., Lemon, E., & Capretta, T. M. (1985). Skin and soft tissue infections: pharmacologic approaches. Pediatric Infectious Disease, 4(3), 336-341.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Boccazzi, A., Tonelli, P., Bellosta, C., & Careddu, P. (1998). Clinical & pharmacological evaluation of a modified cefotaxime bid regimen versus traditional tid in pediatric lower respiratory tract infections. Diagnostic Microbiology & Infectious Diseases, 32(4), 265-272.	Electronic Database	Yes	No				Not Relevant
Bodey, G. P. (1997). Community respiratory viral infections in the immunocompromised host: Past, present, and future directions. The American Journal of Medicine, 102(3A), 77-80.	Electronic Database	Yes	No				Not Relevant
Bolton-Maggs, P. H. B, van Saene, H. K. F., McDowell, H. P., & Martin, J. (1991). Clinical evaluation of ticarcillin, with clavulanic acid, and gentamicin in the treatment of febrile episodes in neutropenic children. Journal of Antimicrobial Chemotherapy, 27(5), 669-676.	Electronic Database	Yes	No				Not Relevant
Bonadio, W. A., Hagen, E., Rucka, J., Shallow, K., Stommel, P., & Smith, D. (1993). Efficacy of a protocol to distinguish risk of serious bacterial infection in the outpatient evaluation of febrile young infants. Clinical Pediatrics, July, 401-404.	Reference List	Yes	No				Not Relevant
Bonadio, W. A., Jeruc, W., Anderson, Y., & Smith, D. (1992). Systemic infection due to group B beta-hemolytic streptococcus in children. A review of 75 outpatient-evaluated cases during 13 years. Clinical Pediatrics, April, 230-233.	Reference List	Yes	No				Not Relevant
Bonadio, W. A., Lehrmann, M., Hennes, H., Smith, D., Ruffing, R., Melzer-Lange, M., Lye, P., & Isaacman, D. (1991). Relationship of temperature pattern and serious bacterial infections in infants 4 to 8 weeks old 24 to 48 hours after antibiotic treatment. Annals of Emergency Medicine, 20(9), 1006-1008.	Electronic Database	Yes	No				Not Relevant
Bontempo, T., & Eggland, E. T. (1988). Nursing implications for home parentral therapy. Home Healthcare Nurse, 6(4), 14-19.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Borrego, F., & Gleckman, R. (1997). Principles of antibiotic prescribing in the elderly. Drugs & Aging, 11(1), 7-18.	Electronic Database	Yes	No				Not Relevant
Bosshardt, T. L., Henderson, V. J., & Organ, C. H., Jr. (1996). Necrotizing soft-tissue infections. Archives of Surgery, 131(8), 846-854.	Electronic Database	Yes	No				Not Relevant
Bosso, J. A. (1982A). Clinical evaluation of a new small volume infusion system in ambulatory volunteers. The American Journal of Intravenous Therapy & Clinical Nutrition, 9, 15-16, 18, 21-22.	Reference List	Yes	No				Not Relevant
Bosso, J. A. (1982B). Experience with a new small-volume infusion system in pediatric patients. Hospital Formulary, 17, 214-216, 218, 222.	Reference List	Yes	No				Not Relevant
Bosso, J. A., Stephenson, S. E. H., & Herbst, J. J. (1985). Feasibility and cost savings of intravenous administration of aminoglycosides in outpatients with cystic fibrosis. Drug Intelligence & Clinical Pharmacy, 19(1), 52-54.	Electronic Database	Yes	No				Not Relevant
Bottino, J., McCredie, K. B., Groschel, D. H. M., & Lawson, M. (1979). Long-term intravenous therapy with peripherally inserted silicone elastomer central venous catheters in patients with malignant diseases. Cancer, 43, 1937-1943.	Reference List	Yes	No				Not Relevant
Bowler, W. A., Weiss, P. J., Hill, H. E., Hoffmeister, K. A., Fleck, R. P., Blacky, A. R., & Oldfield, E. C., III. (1992). Risk of ventricular dysrhythmias during 1-hour infusions of amphotericin B in patients with preserved renal function. Antimicrobial Agents & Chemotherapy, 36(11), 2542-2543.	Electronic Database	Yes	No				Not Relevant
Boyer, C. L., & Wade, D. C. (1998). The impact of compliance on quality outcomes in the home infusion population. Journal of Intravenous Nursing, 21(Suppl. 5), S161-S165.	Reference List	Yes	No				Not Relevant
Boylan, L., et al. (1994). Parenteral antibiotic therapy: the Australian emergency room model (abstract). Presented at OPIVITA II.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Bradley, J. (1991). Once-daily ceftriaxone in the outpatient treatment of paediatric infections. Chemotherapy, 37(Suppl. 3), 3-6.	Electronic Database	Yes	No				Not Relevant
Bradley, J. S. (1993). Meningitis. Hospital Practice, 28(Suppl. 2), 15-19.	Electronic Database	Yes	No				Not Relevant
Bradley, J. S. (1993). Pediatric considerations. Hospital Practice, 28(Suppl. 1), 28-32.	Electronic Database	Yes	No				Not Relevant
Bradley, J. S., Ching, D. K., & Hart, C. L. (1987). Invasive bacterial disease in childhood: Efficacy of oral antibiotic therapy following short course parenteral therapy in non-central nervous system infections. Pediatric Infectious Disease Journal, 6(9), 821-825.	Reference Liste	Yes	No				Not Relevant
Bradley, J. S., Ching, D. K., & Phillips, S. E. (1988). Outpatient therapy of serious pediatric infections with ceftriaxone. Pediatric Infectious Disease Journal, 7(3), 160-164.	Electronic Database	Yes	No				Not Relevant
Bradley, J. S., & Williams, D. N. (1997). Parenteral anti-infective therapy in pediatric outpatients. Into the second decade. The Report of Pediatric Infectious Diseases, 7(2), 7-8.	Electronic Database	Yes	No				Not Relevant
Brandt, S. K., & Bugg, J. L., Jr. (1984). Problems of medication with the pediatric patient. Dental Clinics of North America, 28(3), 563-579.	Electronic Database	Yes	No				Not Relevant
Branson, A. K., Brooks-Brunn, J. A., Rosenberg, G. J., & Goodman, M. R. (1984). Infuse-a-port-implantable drug delivery system for intermittent IV antibiotic therapy at home. Infuse-a-Port-Implantable Drug Delivery, 97.	Electronic Database	Yes	No				Not Relevant
Brennan, N., Caplan, G., Ward, J., et al. (1997). A randomised controlled trial of hospital in the home. Australian Home and Outpatient Intravenous Society. Proceedings of the Annual Scientific Meeting, Sydney.	Reference List	No					
Britton, K., Powers, T., & Gordon, A. (1997). Home antimicrobial therapy: A study of demographics and clinical outcomes. Infusion, 3(8), 28-33.	Electronic Database	Yes	No◇	No◇			Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Brogden, R. N., & Peters, D. H. (1994). Teicoplanin. A reappraisal of its antimicrobial activity, pharmacokinetic properties and therapeutic efficacy. Drugs, 47(5), 823-854.	Reference List	Yes	No				Not Relevant
Brown, D. F., Muirhead, M. J., Travis, P. M., Vire, S. R., Weller, J., & Hauer-Jensen, M. (1997). Mode of chemotherapy does not affect complications with an implantable venous access device. Cancer, 80(5), 966-972.	Electronic Database	Yes	No				Not Relevant
Brown, G., Chamberlain, R., Goulding, J., & Clarke, A. (1996). Ceftriaxone versus cefazolin with probenecid for severe skin and soft tissue infections. Journal of Emergency Medicine, 14(5), 547-551.	Electronic Database	Yes	No				Not Relevant
Brown, J. M. (1988). Innovative antibiotic therapy at home. Journal of Intravenous Nursing, 11(6), 397-401.	Electronic Database	Yes	No				Not Relevant
Brown, J. M. (1989). Perphierally inserted centeral catheters - use in the home care. Journal of Intravenous Nursing, 12(3), 144-147.	Reference List	Yes	No				Not Relevant
Brown, J. M. (1995). An overview of vascular access for the alternate care setting. Infusion, 1(8), 11-14.	Reference List	No					
Brown, R. B. (1988). Prescribing antibiotics in home health care: Problems and prospects. Geriatrics, 43(12), 43-46, 49.	Electronic Database	Yes	No				Not Relevant
Brown, R. B. (1991A). Once-daily ceftriaxone in the treatment of lower respiratory tract infections. Chemotherapy, 37(Suppl. 3), 11-14.	Electronic Database	Yes	No				Not Relevant
Brown, R. B. (1991B). Selection and training of patients for outpatient intravenous antibiotic therapy. Reviews of Infectious Diseases, 13(Suppl. 2), S147-S151.	Electronic Database	Yes	No				Not Relevant
Brown, R. B. (1993A). Community-acquired pnemonia: Diagnosis and therapy of older adults. Geriatrics, 48(2), 43-50.	Electronic Database	Yes	No				Not Relevant
Brown, R. B. (1993B). Selecting the patient. Hospital Practice, 28(Suppl. 1), 11-15.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Brown, R. B. (1998). Outpatient parenteral antibiotic therapy in the management of community-acquired lower respiratory infections. Infectious Disease Clinics of North America, 12(4), 921-933.	Electronic Database	Yes	No				Not Relevant
Brown, R. B., & Sands, M. (1989). Outpatient intravenous antibiotic therapy. American Family Physician, 40(4), 157-162.	Electronic Database	Yes	No				Not Relevant
Bruera, E. (1990). Ambulatory infusion devices in the continuing care of patients with advanced diseases. Journal of Pain Symptom Management, 5, 287-296.	Reference List	No					
Buchanan, G. R. (1993). Approach to treatment of the febrile cancer patient with low-risk neutropenia. Hematology/Oncology Clinics of North America, 7(5), 919-935.	Electronic Database	Yes	No				Not Relevant
Buck, C., Holl, R., Kohne, E., &Wolff, A. (1997). Silastic catheters for home antibiotic therapy in patients with cystic fibrosis. European Journal of Pediatrics, 156(3), 209-211.	Electronic Database	Yes	No				Not Relevant
Bufo, A. J., Chen, M. K., Lobe, T. E., Laird, D., Burman, G., Hixson, D. S., Hollabaugh, R. S., Schropp, K. P., & Cyr, N. (1997). Pilot assessment of interval laparoscopic appendectomy for treatment of perforated appendicitis in children. Pediatric Endosurgery and Innovative Techniques, 1(2), 127-130.	Electronic Database	Yes	No				Not Relevant
Bufo, A. J., Shah, R. S., Li, M. H., Cyr, N. A., Hollabaugh, R. S., Hixson, S. D., Schropp, K. P., Lasater, O. E., Joyner, R. E., & Lobe, T. E. (1998). Interval appendectomy for perforated appendicitis in children. Journal of Laparoendoscopic & Advanced Surgical Techniques, 8(4), 209-214.	Electronic Database	Yes	No				Not Relevant
Bulich, R. (1987). Cost analysis of ambulatory antibiotic delivery. Pharmacology Practice News, November, 4-16.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Burks, J. H., Fliegelman, R., & Sokalski, S. J. (1989). An unforseen complication of home parenteral antibiotic therapy. Archives of Internal Medicine, 149(7), 1603-1604.	Electronic Database	Yes	No				Not Relevant
Burton, C. S. (1991). Venous ulceration. Clinical Materials, 8(3-4), 203-208.	Reference List	Yes	No				Not Relevant
Callaham, M. (1988). Controversies in antibiotic choices for bite wounds. Annals of Emergency Medicine, 17(12), 1321-1330.	Electronic Database	Yes	No				Not Relevant
Camerini-Otero, C., & Fink, R. J. (1980). Home antibiotic therapy in cystic fibrosis via a central venous catheter. Cystic Fibrosis Club, 21, 57.	Reference List	No					
Caplan, G. A., Ward, J. A., Brennan, J., Coconis, J., Board, N., & Brown, A. Hospital in the home: A randomized controlled trial. MJA, 170, 156-160.	Key Informant	Yes	No				Not Relevant
Carmody, M., Sturm, D., Piccoli, L., & Schlamm, H. T. (1989). Psychosocial benefits of home-infusion for AIDS patients. JANAC, 1, 5-7.	Reference List	No					
Carr, P. (1995). We can do that at home, but should we? Home Healthcare Nurse, 13(2), 69-70.	Electronic Database	Yes	No				Not Relevant
Carratala, J., & Karthaus, M. (1998). Topic session 3: Evolution towards community treatment of neutropenic patients. International Journal of Clinical Practice, Suppl. 95, 51-52.	Electronic Database	Yes	No				Not Relevant
Carter, E. (1984). Intravenous antibiotic therapy administered to patients in an outpatient setting. Office of Health Technology Assessment, Department of Health and Human Services.	Electronic Database	No					
Casado, J. L., Navas, E., Garcia, A., Antela, A., Redondo, E., Fortun, J., & Guerrero, A. (1996). Central venous catheter infections in AIDS patients receiving daily home infusion therapy for cytomegalovirus disease. QJM, 89(9), 695-699.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Catania, P. N. (1997). When patients ask. Storing parenteral medication at home. Home Care Provider, 2(6), 292-294.	Electronic Database	No					
Catchpole, A. (1989). Cystic fibrosis: Intravenous treatment at home. Nursing Times, 85(12), 40-42.	Electronic Database	Yes	No				Not Relevant
Chakraborty, R., Graffino, D., Holland, B., Fernando, K., & Oleske, J. (1998). Sinusitis in 180 children infected with human immunodeficiency virus. Infectious Diseases in Clinical Practice, 7(7), 345-350.	Electronic Database	Yes	No				Not Relevant
Chamberlain, T. M., Lehman, M. E., Groh, M. J., Munroe, W. P., & Reinders, T. P. (1988). Cost analysis of a home intravenous antibiotic program. American Journal of Hospital Pharmacy, 45(11), 2341-2345.	Electronic Database	Yes	No◇	No◇			Not Relevant
Charnas, R., Luthi, A. R., & Ruch, W. (1997). Once daily ceftriaxone plus amikacin vs. three times daily ceftazidime plus amikacin for treatment of febrile neutropenic children with cancer. Pediatric Infectious Disease Journal, 16(4), 346-353.	Electronic Database	Yes	No				Not Relevant
Chattopadhyay, T., Catania, P. N., Vasser, J., et al. (1988). Effect of age on outcome of home parenteral antibiotic therapy (abstract). Proceedings of the American Society of Hospital Pharmacy, 206.	Reference List	No					
Chatwani, A., Martens, M., Blanco, J., Gall, S., Przybylko, K., Wajszczuk, C. P., & Nickens, D. (1997). Double-blind, multicenter, prospective randomized study of trospectomycin vs. clindamycin, both with aztreonam, in non-community acquired obstetric and gynecologic infections. Infectious Disease in Obstetrics and Gynecology, 5(4), 280-285.	Electronic Database	Yes	No				Not Relevant
Cheung, W. C., Yuen, K. Y., Chang, C. M., & Cheng, K. P. (1991). Herpes zoster associated encephalitis in dialysis patients. Journal of Infection, 23(2), 169-174.	Electronic Database	Yes	No				Not Relevant
Chielli, J. (1997). Canada's emerging home infusion market. Caring Magazine, July, 36-38.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Chiu, J., Nussbaum, J., Bozzette, S., Tilles, J. G., Young, L. S., Leedom, J., Heseltine, P. N. R., McCutchan, A., & the California Collaborative Treatment Group. (1990). Treatment of disseminated mycobacterium avium complex infection in AIDS with amikacin, ethambutol, rifampin, and ciprofloxacin. Annals of Internal Medicine, 113(5), 358-361.	Electronic Database	Yes	No				Not Relevant
Chodosh, S. (1991). Temafloxacin compared with ciprofloxin in mild to moderate lower respiratory tract infections in ambulatory patients. A multicenter, double-blind randomized study. Chest, 100(6), 1497-1502.	Reference List	Yes	No				Not Relevant
Chrystal, C. (1985). Making the NITA standards work for you. NITA, 8(5), 363-364.	Electronic Database	Yes	No				Not Relevant
Clergeot, A., Steru, D., Rosset, M-A., & Carbon, C. (1989). Efficacy and safety of low dose aztreonam in the treatment of moderate to severe gram-negative bacterial infections. Journal of Antimicrobial Chemotherapy, 23(5), 753-758.	Electronic Database	Yes	No				Not Relevant
Colardyn, F. (1995). The efficacy and safety of isepamicin and ceftazidime compared with amikacin and ceftazidime in acute lower respiratory tract infection. Journal of Chemotherapy, 7(2), 129-135.	Electronic Database	Yes	No◇	No◇			Not Relevant
Colby, K. (1999). Management of open globe injuries. International Ophthalmology Clinics, 39(1), 59-69.	Electronic Database	Yes	No				Not Relevant
Coley, C. M., Yi-Hwei, L., Medsger, A. R, Marrie, T. J., Fine, J. M., Kapoor, W. N., Lave, J. R., Detsky, A. S., Weinstein, M. C., & Singer, D. E. (1996). Preferences for home vs. hospital care among low-risk patients with community-acquired pneumonia. Archives of Internal Medicine, 156, 1565-1571.	Reference List/ Key Informant	Yes	No				Not Relevant
Colford, J. M., Corelli, R. L., Ganz, J. W., Guglielmo, B. J., & Jacobs, R. A. (1993). Home antibiotic therapy for streptococcal endocarditis: A call for a controlled trial. The American Journal of Medicine, 94(1), 111-112.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Colombani, P. M., Dudgeon, D. L., Buck, J. R., Miller, D. M., Ghory, M. J., Buckloo, C., & Haller, J. A., Jr. (1985). Multipurpose central venous access in the immunocompromised pediatric patient. Journal of Parenteral and Enteral Nutrition, 9(1), 38-41.	Electronic Database	Yes	No				Not Relevant
Cone, L. A., Barton, S. M., & Woodard, D. R. (1987). Treatment of scleroma with ceforanide. Archives of Otolaryngology- Head-Neck Surgery, 113(4), 374-376.	Reference List	Yes	No				Not Relevant
Congeni, B. (1990). The use of ceftriaxone for bacterial pneumonia in pediatric patients. Clinical Pediatrics, 29(11), 640-641.	Reference List	Yes	No				Not Relevant
Congeni, B. L., Chonmaitree, T., Rakusan, T. A., & Box, Q. T. (1985). Once-daily ceftriaxone therapy for serious bacterial infections in children. Antimicrobial Agents and Chemotherapy, 27(2), 181-183.	Electronic Database	Yes	No				Not Relevant
Conlon, C. P. (1996). Outpatient intravenous antibiotic therapy. Journal of Antimicrobial Chemotherapy, 38(4), 557-559.	Electronic Database	Yes	No				Not Relevant
Conlon, C. P., Cooke, J., & Crook, D. (1995). Non-inpatient use of parenteral antibibiotics. In R. Finch, & P. Davey (Eds.), Discussions of a National Working Party Meeting (pp. 1-36). Oxford: Medicine Group.	Reference List	No					
Conlon, C. P., Kayley, J., Lalloo, D. G., & Berendt, A. R. (1997). Intravenous antibiotic treatment at home can provide higher quality care. BMJ, 314(7093), 1551.	Electronic Database	Yes	No				Not Relevant
Conway, A. (1996). Home intravenous therapy for bronchiectasis patients. Nursing Times, 92(45), 34-35.	Electronic Database	Yes	No				Not Relevant
Conway, S. P. (1996). Ceftazidime 3G BD is as effective as ceftazidime 2G TDS in the treatment of respiratory exacerbations in cystic fibrosis (abstract). Proceedings of the 12th International Cystic Fibrosis Conference, S256.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Cooper, J. W. (1997). Anti-infective infusion therapy in the geriatric patient: Special Considerations. Infusion, 3(6), 10-19.	Electronic Database	Yes	No				Not Relevant
Corbett, S. (1995). Intravenous modalities in the treatment of bloodborne pathogem illnesses. Antibiotics, antifungals, and antivirals. Journal of Intravenous Nursing, 18(Suppl. 6), S17-S21.	Electronic Database	Yes	No				Not Relevant
Corby, D., Schad, R. F., & Fudge, J. P. (1986). Intravenous antibiotic therapy: Hospital to home. Nursing Management, 17(8), 52-54, 56, 58, 60-61.	Electronic Database	Yes	No◇	No◇			Not Relevant
Corsten, M. J., Shamji, F. M., Odell, P. F., Frederico, J. A., Laframboise, G. G., Reid, K. R., Vallieres, E., & Matzinger, F. (1997). Optimal treatment of descending necrotising mediastinitis. Thorax, 52(8), 702-708.	Electronic Database	Yes	No				Not Relevant
Cortese, M. M., Goepp, J., Almeido-Hill, J., Barlage, C., Collins, T., Hohenboken, M., Reid, R., & Santosham, M. (1992). Children with haemophilus influenzae bacteremia initially treated as outpatients: Outcome in 85 American Indian children. Pediatric Infectious Diseases Journal, 11(7), 521-525.	Reference List	Yes	No				Not Relevant
Cosentino, F. (1988). Preparing your patient for home I.V. therapy. Nursing, 18(11), 87-88.	Electronic Database	Yes	No				Not Relevant
Cote, D., Oruck, J., & Thickson, N. (1989). A review of the Manitoba home iv antibiotic program. The Canadian Journal of Hospital Pharmacy, 42(4), 137-141.	Electronic Database	Yes	No◇	No◇			Not Relevant
Cottrell, J. (1997). Cystic fibrosis: Advances in care. Practice Nurse, 14(7), 455-458.	Electronic Database	Yes	No				Not Relevant
Couch, L., Cierny, G., & Mader, J. T. (1987). Inpatient and outpatient use of the Hickman catheter for adults with osteomyelitis. Clinical Orthopaedics and Related Research, 219, 226-235.	Electronic Database	Yes	No				

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Coulter, K. (1992). Intravenous therapy for the elder patient: Implications for the intravenous nurse. Journal of Intravenous Nursing, 15(Suppl.), S18-S23.	Reference List	Yes	No				Not Relevant
Craig, W. A. (1993). Selecting the antibiotic. Hospital Practice, 28(Suppl. 1), 16-20.	Electronic Database	Yes	No				Not Relevant
Craig, W. A. (1995). Antibiotic selection factors and description of a hospital-based outpatient antibiotic therapy program in the USA. Europeon Journal of Clinical Microbiology and Infectious Diseases, 14(7), 636-642.	Electronic Database	Yes	No				Not Relevant
Craig, W. A. (1995). Kinetics of antibiotics in relation to effective and convenient outpatient parenteral therapy. International Journal of Antimicrobial Agents, 5, 19-22.	Reference List	Yes	No				Not Relevant
Crandall, W. V., Norlin, C., Bullock, E. A., Shearrow, M. E., Tani, L. Y., Orsmond, G. S., & Shaddy, R. E. (1996). Etiology and outcome of outpatient fevers in pediatric heart transplant patients. Clinical Pediatrics, 35(9), 437-442.	Electronic Database	Yes	No				Not Relevant
Craven, P. C. (1993). Treating bone and joint infections with teicoplanin: Hospitalization vs. outpatient treatment cost issues. Hospital Formulary, 28(Suppl. 1), 41-45.	Electronic Database	Yes	No				Not Relevant
Craven, P. C., & Gremillion, D. H. (1985). Risk factors of ventricular fibrillation during rapid amphotericin B infusion. Antimicrobial Agents and Chemotherapy, 27(5), 868-871.	Electronic Database	Yes	No				Not Relevant
Crocker, K. S., Devereaux, G. B., Ashmore, D. L., & Coker, M. H. (1990). Clinical evaluation of elastomeric hydrogel peripheral catheters during home infusion therapy. Journal of Intravenous Nursing, 13(2), 89-97.	Reference List	Yes	No				Not Relevant
Crocker, K. S., & Rosenblum, B. (1990, May). Early experience with peripherally placed midline catheters during home infusion therapy. Paper presented at the Intravenous Nurses Society 1990 Annual Meeting and Industrial Exhibition, Reno, Nevada.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Cross, J. T., & Jacobs, R. F. (1993). Tularemia: Treatment failures with outpatient use of ceftriaxone. Clinical Infectious Diseases, 17, 976-980.	Reference List	Yes	No				Not Relevant
Cruz, J. M., Peacock, J. E., Jr., Loomer, L., Holder, L. W., Evans, G. W., Powell, B. L., Lyerly, E. S., & Capizzi, R. L. (1992). Rapid intravenous infusion of amphotericin B: A pilot study. The American Journal of Medicine, 93(2), 123-130.	Electronic Database	Yes	No				Not Relevant
Culbertson, V. L., Rhodes, R. S., Hill, E. P., & Rhodes, P. J. (1988). Impact of home infusion therapy on the Colorado medicaid program budget. American Journal of Hospital Pharmacy, 45(6), 1346-1349.	Electronic Database	Yes	No				Not Relevant
Cunha, B. A. (1995). The antibiotic treatment of community-acquired, atypical, and nosocomial pneumonias. Medical Clinics of North America, 79(3), 581-597.	Electronic Database	Yes	No				Not Relevant
Cunha, B. A. (1996). Community-acquired pneumonia. Cost-effective antimicrobial therapy. Post Graduate Medicine, 99(1), 109-110, 113-114, 117-119.	Electronic Database	No					
Cunha, B. A. (1997A). Current concepts in the antibiotic therapy of Legionnaires' disease. Drugs of Today, 33(4), 213-220.	Electronic Database	Yes	No				Not Relevant
Cunha, B. A. (1997B). New uses for older antibiotics: The 'rediscovery' of four beneficial and cost-effective antimicrobials. Postgraduate Medicine, 101(4), 68-70, 73-74, 79-80, 86, 88.	Electronic Database	Yes	No				Not Relevant
Cunha, B. A. (1998A). Current concepts in the antimicrobial therapy of community-acquired pneumonia. Drugs of Today, 34(2), 107-123.	Electronic Database	Yes	No				Not Relevant
Cunha, B. A. (1998B). Prescribing antimicrobials in the managed care area. JAAPA, 11(3), 18-20, 23-24, 27-28.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Cunningham, F. G., Hauth, J. C., Strong, J. D., Herbert, W. N. P., Gilstrap, L. C., Wilson, R. H., & Kappus, S. S. (1977). Evaluation of tetracycline or penicillin and ampicillin for treatment of acute pelvic inflammatory disease. The New England Journal of Medicine, 296(24), 1380-1383.	Reference List	Yes	No				Not Relevant
Curtiss, F. (1983). Third-party reimbursement for home parenteral nutrition and I.V. therapy. NITA, 6, 193-197.	Reference List	Yes	No				Not Relevant
Cuthrell, P. J. (1994). Safe medical devices act: Impact on a hospital-based home infusion agency. Journal of Home Health Care Practice, 9(1), 41-46.	Reference List	No					
Da Lalla, F., & Tramarin, A. (1995). A risk-benefit assessment of teicoplanin in the treatment of infections. Drug Safety, 13(5), 317-328.	Reference List	No					
Dagan, R. (1993). Management of acute hematogenous osteomyelitis and septic arthritis in the pediatric patient. Pediatric Infectious Disease Journal, 12(1), 88-93.	Reference List	Yes	No				Not Relevant
Dagan, R. (1995A). How far can the paediatric patient with a serious infection be managed as an outpatient? Journal of Hospital Infection, 30(Suppl.), 172-178.	Electronic Database	Yes	No				Not Relevant
Dagan, R. (1995B). Indications for outpatient treatment with parenteral antibiotics in children. International Journal of Antimicrobial Agents, 5(1), 23-26.	Reference List	Yes	No				Not Relevant
Dagan, R., & Einhorn, M. (1991). A program of outpatient parenteral therapy for serious pediatric bacterial infections. Reviews of Infectious Diseases, 13(Suppl. 2), S152-S155.	Electronic Database	Yes	No				Not Relevant
Dagan, R., Einhorn, M., Howard, C. B., & Williams, A. H. (1991). Infections due to gram-positive organisms in children: Possible role for teicoplanin. Journal of Antimicrobial Chemotherapy, 27(Suppl. B), 37-41.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Dagan, R., Einhorn, M., Howard, C. B., & Williams, A. H. (1993). Outpatient and inpatient teicoplanin treatment for serious gram-positive infections in children. Pediatric Infectious Disease Journal, 12(Suppl. 6), S17-S20.	Reference List	Yes	No				Not Relevant
Dagan, R., Fliss, D. M., Einhorn, M., Kraus, M., & Leiberman, A. (1992). Outpatient management of chronic suppurative otitis media without cholesteatoma in children. Pediatric Infectious Disease Journal, 11(7), 542-546.	Electronic Database	Yes	No				Not Relevant
Dagan, R., Phillip, M., Watemberg, N. M., & Kassis, I. (1987). Outpatient treatment of serious community-acquired pediatric infections using once daily intramuscular ceftriaxone. Pediatric Infectious Disease Journal, 6(12), 1080-1084	Reference List	Yes	No				Not Relevant
Dagan, R., Sofer, S., Phillip, M., & Shachak, E. (1988). Ambulatory care of febrile infants younger than 2 months of age classified as being low risk for having serious bacterial infections. The Journal of Pediatrics, 112(3), 355-360.	Reference List	Yes	No				Not Relevant
Dagan, R., Syrogiannopoulos, G., Ashkenazi, S., Engelhard, D., Einhorn, M., Gatzola-Karavelli, M., Shalit, I., & Amir, J. (1994). Parenteral-oral switch in the management of paediatric pneumonia. Drugs, 47(Suppl. 3), 43-51.	Electronic Database	Yes	No				Not Relevant
Daifuku, R., Movahhed, H., Fotheringham, N., Bear, M. B., & Nelson, S. (1996). Time to resolution of morbidity: an endpoint for assessing the clinical cure of community-accquired pneumonia. Respiratory Medicine, 90(10), 587-592.	Electronic Database	Yes	No				Not Relevant
Dalovisio, J. R. (1997). OPAT for community-acquired pneumonia. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 69-72). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Dalovisio, J. R., & Dodd, K. (1997). OPAT, the physician, and the nurse specialist in managed care. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 22-27). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Daly, J. S., Worthington, M. G., Andrews, R. J., Brown, R. B., Schwartz, R., & Sexton, D. J. (1990). Randomized, double-blind trial of cefonicid and nafcillin in the treatment of skin and skin structure infections. Antimicrobial Agents and Chemotherapy, 34(4), 654-656.	Electronic Database	Yes	No				Not Relevant
Danzig, L. E., Short, L. J., Collins, K., Mahoney, M., Sepe, S., Bland, L., & Jarvis, W. R. (1995). Bloodstream infections associated with a needleless intravenous infusion system in patients receiving home infusion therapy. JAMA, 273(23), 1862-1864.	Reference List	Yes	No				Not Relevant
Dapena, F., Selgas, R., Garcia-Perea, A., Del Peso, G., Bajo, M. A., Fernandez Reyes, M. J., Jimenez, C., Sanchez, C., Munoz, I., & De Alvaro, F. (1994). Clinical significance of exit-site infections due to xanthomonas in CAPD patients: a comparison with pseudomonas infections. Nephrology, Dialysis, Transplantation, 9(12), 1774-1777.	Electronic Database	Yes	No				Not Relevant
Davey, P. G., Dodd, T., Kerr, S., & Malek, M. (1990). Audit of IV antibiotic administration. The Pharmaceutical Journal, 244, 793-796.	Reference List	Yes	No				Not Relevant
Davey, P. G., Phillip, G., & Rawley, D. (1994). Outpatient management of osteomylitis. Infectious in Medicine, 11(Suppl. C), 16-19.	Reference List	No					
Davey, P. G., Rowley, D. R., & Phillips, G. A. (1992). Teicoplanin - Home therapy for prosthetic joint infections. European Journal of Surgery, 567(Suppl.), 23-25.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Davey, P. G., South, R., & Malek, M. (1996). Impact of glycopeptide therapy after hospital discharge on inpatients costs: a comparison of teicoplanin and vancomycin. Journal of Antimicrobial Chemotherapy, 37, 623-633.	Reference List	Yes	No				Not Relevant
David, S. (1975). Comment on outpatient intravenous therapy. Pediatrics, 55(6), 896-897.	Electronic Database	Yes	No				Not Relevant
David, T. J. (Ed.). (1986). Cystic fibrosis in children. Practical and legal aspects of intravenous antibiotics and administration at home. Excerpta Medica, Amsterdam.	Reference List	No					
David, T. J. (1989). Intravenous antibiotics at home in children with cystic fibrosis. Journal of the Royal Society of Medicine, 82(3), 130-131.	Electronic Database	Yes	No				Not Relevant
David, T. J. (1997). Preface. Journal of the Royal Society of Medicine, 90(Suppl. 31), 1.	Electronic Database	Yes	No				Not Relevant
Davies, J. M., Newland, A. C., & Finch, R. G. (1998). Patient education and communication in non-inpatient intravenous therapy – a review. European Journal of Haematology, 59(Suppl. 62), 18-24.	Electronic Database	Yes	No				Not Relevant
Davis, D. D., & Raebel, M. A. (1998). Ambulatory management of chemotherapy-induced fever and neutropenia in adult cancer patients. The Annals of Pharmacotherapy, 32(12), 1317-1323.	Electronic Database	Yes	No				Not Relevant
Davis, J. L., Taskintuna, I., Freeman, W. R., Weinberg, D. V., Feuer, W. J., & Leonard, R. E. (1997). Iritis and hypotony after treatment with intravenous cidofovir for cytomegalovirus retinitis. Archives of Opthamology, 115(6), 733-737.	Electronic Database	Yes	No				Not Relevant
Davis, R., & Bryson, H. M. (1994). Ceftriaxone. A pharmacoeconomic evaluation of its use in the treatment of serious infections. PharmacoEconomics, 6(3), 249-269.	Electronic Database	No					
Davis, S. (1990). Outpatient management of pulmonary exacerbations in children with cystic fibrosis. Seminars in Pediatric Infectious Diseases, 1(4), 393-403.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Davis, S., Mather, F., Tankersly, P., Waring, W., and the MCH Home IV Antibiotic Study Group. (1990A). A randomized trial of home intravenous antibiotic therapy (HIVAT) in cystic fibrosis (CF): Short-term safety and efficacy. 4th North-American-Cystic-Fibrosis-Conference.	Electronic Database	Yes-Abstract	Yes				Unable to obtain further detail
Davis, S., Mather, F., Tankersly, P., Waring, W., and the MCH Home IV Antibiotic Study Group. (1990B). A randomized trial of home intravenous antibiotic therapy (HIVAT) in cystic fibrosis (CF): Short term psychological effects. 4th North-American-Cystic-Fibrosis-Conference.	Electronic Database	Yes-Abstract	Yes				Unable to obtain further detail
Davis, S., & Waring, W. W. (1984). Antibiotics administered at home through central venous catheters in patients with cystic fibrosis (abstract). Clinical Research, 32(908A).	Reference List	Yes-Abstract	No				Not Relevant
Davis, W. A., & Andrews, P. (1992). Midline catheter experience in 153 home IV antibiotic therapy patients: Alternative to central lines and multiple peripheral catheter restarts (abstract 88). In Abstracts of The Infectious Diseases Society of America 30th Annual Meeting, Anaheim, California.	Reference List	No					
Dayton, M. T., & Larson, K. P. (1997). Outcome of pouch-related complications after ileal pouch-anal anastomosis. The American Journal of Surgery, 174(6), 728-732.	Electronic Database	Yes	No				Not Relevant
de Lalla, F. (1997). Antibiotic treatment of febrile episodes in neutropenic cancer patients. Clinical and economic considerations. Drugs, 53(5), 789-804.	Electronic Database	Yes	No				Not Relevant
de Lalla, F., & Tramarin, A. (1995). A risk-benefit assessment of teicoplanin in the treatment of infections. Drug Safety, 13(5), 317-328.	Electronic Database	Yes	No				Not Relevant
De Pauw, B. E., & Anaissie, E. (1997). Controversies in management of candidiasis in neutropenic patients treated for malignant diseases: New versus old or better versus worse. International Journal of Infectious Diseases, 1(Suppl. 1), S32-S36.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
DeAngelis, C., Joffe, A., Willis, E., & Wilson, M. (1983). Hospitalization v outpatient treatment of young, febrile infants. American Journal of Diseases of Children, 137, 1150-1152.	Reference List	Yes	No				Not Relevant
Deery, H. G., II. (1998). Outpatient parenteral anti-infective therapy for skin and soft-tissue infections. Infectious Disease Clinics of North America, 12(4), 935-949.	Electronic Database	Yes	No				Not Relevant
Devuyst, O., Goffin, E., & van Ypersele de Strihou, C. (1995). Recurrent hemiparesis under amphotericin B for candida albicans peritonitis. Nephrology, Dialysis, Transplantation, 10(5), 699-701.	Electronic Database	Yes	No				Not Relevant
Diamont, J., & Tanael, L. (1987). Decubitus ulcers: when to suspect osteomyelitis. Geriatrics, 42(6), 74, 79, 83.	Reference List	No					
DiBaise, J. K., & Quigley, E. M. M. (1999). Efficacy of prolonged administration of intravenous erythromycin in an ambulatory setting as treatment of severe gastroparesis: One center's experience. Journal of Clinical Gastroenterology, 28(2), 131-134.	Electronic Database	Yes	No				Not Relevant
Dickey, R. L., Barnes, B. C., Kearns, R. J., & Tullos, H. S. (1989). Efficacy of antibiotics in low-velocity gunshot fractures. Journal of Orthopaedic Trauma, 3(1), 6-10.	Electronic Database	Yes	No				Not Relevant
Dickson, K. T. (1987). Home intermittent intravenous antibiotic therapy: Selected practices in for-profit and nonprofit home care services. Unpublished master's thesis, University of Florida College of Nursing, Orlando, Florida.	Electronic Database	Yes	No				Not Relevant
Dimant, J., & Tanael, L. (1987). Decubitus ulcers: When to suspect osteomyelitis. Geriatrics, 42(6), 74, 79, 83.	Electronic Database	Yes	No				Not Relevant
Dimayuga, E., & Brown, R. B. (1995). Outpatient parenteral antibiotic therapy for infective endocarditis. Infectious Diseases in Clinical Practice, 4(6), 468-471.	Electronic Database	Yes	No				Not Relevant
Dinerman, H., & Steere, A. C. (1992). Lyme disease associated with fibromyalgia. Annals of Internal Medicine, 117(4), 281-285.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
DiStefano, A., Blumenschen, G., Fanning, J., Jampolis, S., Firstenberg, B., Kelly, J., et al. (1989). Outpatient administration of multiple antibiotics to neutropenic cancer patients using automatic programmable drug delivery system (abstract A1331). Proceeding of the Annual Meeting of the American Society of Clinical Oncology, USA, 8.	Reference List	No					
Dix, S. P., & Wingard, J. R. (1996). Management of viral infections in bone marrow transplant recipients. Clinical Immunotherapeutics, 6(5), 352-382.	Electronic Database	Yes	No				Not Relevant
Dolbee, S. F., & Creason, N. S. (1988). Outcome criteria for the patient using intravenous antibiotic therapy at home. Home Healthcare Nurse, 6(4), 22-29.	Electronic Database	Yes	No*	No*			Not Relevant
Dominguez, J. C., & Muszynski, M. J. (1989). Outpatient management of bacterial meningitis. The Pediatric Infectious Disease Journal, 8(4), 258, 259.	Electronic Database	Yes	No				Not Relevant
Donald, I. P., Baldwin, R. N., & Bannerjee, M. (1995). Gloucester hospital-at-home: A randomized controlled trial. Age & Ageing, 24, 434-439.	Reference List	Yes	No				Not Relevant
Dorruci, M., Pezzotti, P., Phillips, A. N., Alliegro, M. B., Rezzo, G., & the HIV Italian Seroconversion Study. (1997). Antiretroviral treatment and progression to AIDS in HIV seroconverters from different risk groups. AIDS, 11(4), 461-467.	Electronic Database	Yes	No				Not Relevant
Drusano, G. L., Yuen, G. J., Lambert, J. S., Seidlin, M., Dolin, R., & Valentine, F. T. (1992). Relationship between dideoxyinosine exposure, CD4 counts, and p24 antigen levels in human immunodeficiency virus infection. A phase I trial. Annals of Internal Medicine, 116(7), 562-566.	Electronic Database	Yes	No				Not Relevant
Dubois, J., Garel, L., Tapiero, B., Dube, J., Laframboise, S., & David, M. (1997). Peripherally inserted central catheters in infants and children. Radiology, 204(3), 622-626.	Electronic Database	Yes	No				Not Relevant
Duncan-Skingle, F., & Bramwell, E. (1992). Home help. Nursing Times, 88(51), 34-35.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Durack, D. (1993). Endocarditis. Hospital Practice, 28(Suppl. 2), 6-9.	Electronic Database	Yes	No				Not Relevant
Durack, D. T., Karchmer, A. W., Blair, R., Wilson, W., Dismukes, W., Tice, A., Gilbert, D., Tenenbaum, M., Farber, B., & Tauber, M. (1993). Home intravenous antibiotic therapy. The American Journal of Medicine, 94(1), 114.	Electronic Database	Yes	No				Not Relevant
Duval, A. (1982). Intermittent I.V. antibiotic therapy at home. NITA, 5, 278-279.	Reference List	Yes	No				Not Relevant
Eaton, D. G. (1995). Infusion techniques for perinatal home care. Caring, 14(5), 40-42.	Reference List	Yes	No*	No*			Not Relevant
Edelstein, H. E., Oster, S. E., Chirurgi, V. A., Karp, R. A., Cassano, K. B., & McCabe, R. E. (1991). Intravenous or intramuscular teicoplanin once daily for skin and soft-tissue infections. DICP, The Annals of Pharmacotherapy, 25(9), 914-918.	Electronic Database	Yes	No				Not Relevant
Edge, M. D., & Rimland, D. (1996). Community-acquired bacteremia in HIV positive patients: Protective benefit of co-trimoxazole. AIDS, 10(14), 1635-1639.	Electronic Database	Yes	No				Not Relevant
Edmonston, G. R., & Baldwin, R. J. (1989). Information sheet for discharge counseling of home i.v. antimicrobial therapy patients. American Journal of Hospital Pharmacy, 46(3), 483-484.	Electronic Database	Yes	No				Not Relevant
Edwards, K. M., Jones, L. M., & Stephens, D. S. (1985). Clinical features of mild systemic meningococcal disease with characterization of bacterial isolates. Clinical Pediatrics, 24(11), 617-620.	Electronic Database	Yes	No				Not Relevant
Edwards, M. S. (1995). Antibiotic therapy of neonates with bacterial sepsis. The Pediatric Infectious Disease Journal, 14(2), 166-167.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Einhorn, M., Fliss, D. M., Leiberman, A., & Dagan, R. (1992). Otolaryngology and infectious disease team approach for outpatient management of serious pediatric infections requiring parenteral antibiotic therapy. International Journal of Pediatric Otorhinolaryngology, 24(3), 245-251.	Electronic Database	Yes	No				Not Relevant
Eisenberg, J. M., & Kitz, D. S. (1986). Savings from outpatient antibiotic therapy for osteomyelitis. Economic analysis of a therapeutic strategy. JAMA, 255(12), 1584-1588.	Electronic Database	Yes	No				Not Relevant
Eisenberg, J. M., Koffer, H., & Finkler, S. A. (1984). Economic analysis of a new drug: Potential savings in hospital operating costs from the use of a once-daily regimen of a parenteral cephalosporin. Reviews of Infectious Diseases, 6(Suppl. 4), S909-S923.	Electronic Database	Yes	No				Not Relevant
Ekambaram, A., Madhaven, T., & Meyette, E. (1998). Efficacy, safety, and cost-effectiveness of cefepime in an outpatient intravenous infusion therapy program. Home Healthcare Consultant, 5(9 Suppl. B), 1-5.	Electronic Database	No					
Ellis, J. M. (1989). Let parents give the care: IV therapy at home in cystic fibrosis. The Professional Nurse, 4(12), 587-592.	Electronic Database	Yes	No				Not Relevant
Ely, E. W. (1997). Pneumonia in the elderly: Diagnostic and therapeutic challenges. Infections in Medicine, 14(8), 643-654.	Electronic Database	Yes	No				Not Relevant
Engel, J. P., Englund, J. A., Fletcher, C. V., & Hill, E. L. (1990). Treatment of resistant herpes simplex virus with continuous-infusion acyclovir. JAMA, 263(12), 1662-1664.	Electronic Database	Yes	No				Not Relevant
Eron, L. J. (1984A). Intravenous antibiotic administration in outpatient settings. Journal of Infectious Diseases, 1, 4-11.	Electronic Database	No					
Eron, L. J. (1984B). Intravenous antibiotic administration in outpatient settings. Journal of Infectious Diseases, 14, 49.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Eron, L. J. (1985). The therapy of osteomyelitis in outpatient settings. Cutis, 36(5A), 15-20.	Electronic Database	Yes	No				Not Relevant
Eron, L. J. (1986). Intravenous antibiotic therapy in outpatient settings. Oohsner Clinic Reports on Serious Infections, 2, 1-6.	Electronic Database	No					
Eron, L. J. (1988). IV antibiotic therapy in an outpatient setting: Report of a joint venture program. Hospital Formulary, 23(5), 440-442, 447.	Electronic Database	Yes	No				Not Relevant
Eron, L. J. (1990). The changing scene of outpatient intravenous antibiotic therapy in the 1990s. P & T, 15(10), 1283, 1286-1289, 1292-1293.	Reference List	Yes	No				Not Relevant
Eron, L. J. (1991). Parenteral antibiotic therapy in outpatients: Quality assurance and other issues in a hospital protohospital. Chemotherapy, 37(Suppl. 2), 14-20.	Electronic Database	Yes	No				Not Relevant
Eron, L. J., Goldenberg, R. I., & Poretz, D. M. (1984). Combined ceftriaxone and surgical therapy for osteomyelitis in hospital and outpatient settings. The American Journal of Surgery, 148(4A), 1-4.	Electronic Database	Yes	No				Not Relevant
Eron, L. J., Park, C. H., Hixon, D. L., Goldenberg, R. I., & Poretz, D. M. (1983). Ceftriaxone therapy of bone and soft tissue infections in hospital and outpatient settings. Antimicrobial Agents and Chemotherapy, 23(5), 731-737.	Electronic Database	Yes	No				Not Relevant
Eron, L. J., Poretz, D. M., Goldenberg, R., et al. (1985). Treatment of infections with cefoperazone in outpatients. The efficacy and safety of cefoperazone: A two year review. New York: Pfizer.	Electronic Database	No					
Escalante, C. P., Rubenstein, E. B., & Rolston, K. V. (1996). Outpatient antibiotic treatment in low-risk febrile neutropenia patients. Supportive Care in Cancer, 4(5), 358-363.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Escalante, C. P., Rubenstein, E. B., & Rolston, K. V. I. (1997). Outpatient antibiotic therapy for febrile episodes in low-risk neutropenic patients with cancer. Cancer Investigation, 15(3), 237-242.	Electronic Database	Yes	No				Not Relevant
Everett, M. T. (1983). Major chest infection managed at home. Practioner, 277, 1743-1746, 1748, 1751-1752, 1754.	Reference List	Yes	No				Not Relevant
Fadahunsi, H. O., Coker, A. O., & Usoro, P. D. (1987). Rheumatic heast disease in Nigerian children: clinical and preventative. Annals of Tropical Paediatrics, 7(1), 54-58.	Electronic Database	Yes	No				Not Relevant
Fagerman, K. E. (1994). Erroneous tobramycin sampling in home intravenous therapy avoidable with modified blood draw. Journal of Intravenous Nursing, 17(3), 135-137.	Electronic Database	Yes	No				Not Relevant
Failla, D. M., Dalovisia, J. R., & Miller, W. E. (1995). Outpatient antibiotic infusion therapy (OPAT) at the Ochsner Medical Institutions - A retrospective analysis (abstract). Presented at OPIVITA III.	Electronic Database	No					
Failla, D. M., & Pankey, G. A. (1994). Optimum outpatient therapy of skin and skin structure infections. Drugs, 48(2), 172-178.	Reference List	Yes	No				Not Relevant
Fay, L., & Evans, M. (1997). Direct line to home care. Nursing Times, 93(37), 29-30.	Electronic Database	Yes	No				Not Relevant
Fekety, R., & Lynch, J. P., III. (1994). Community-acquired pneumonia: What role for new antibiotics? The Journal of Respiratory Diseases, 15(2), 132-134, 137-140, 142-144.	Electronic Database	Yes	No				Not Relevant
Ferris, E. W. (1990). A neonatal home intravenous antibiotic therapy program. Journal of Intravenous Nursing, 13(6), 383-387.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
File, T. M., Jr., Segreti, J., Dunbar, L., Player, R., Kohler, R., Williams, R. R., Kojak, C., & Rubin, A. (1997). A multicenter, randomized study comparing the efficacy and safety of intravenous and/or oral levofloxacin versus ceftriaxone and/or cefuroxime axetil in treatment of adults with community-acquired pneumonia. Antimicrobial Agents and Chemotherapy, 41(9), 1965-1972.	Electronic Database	Yes	No				Not Relevant
Finch, R. (1987). Treatment of respiratory tract infections with cephalosporin antibiotics. Drugs, 34(Suppl. 2), 180-204.	Electronic Database	Yes	No*	No*			Not Relevant
Finch, R., & Davey, P. (1995, February). Non-inpatient use of parenteral antibiotics. Discussions of a national working party meeting. Oxford: Medicine Group (Education) Ltd.	Reference List	No					
Fine, M. J., Hough, L. J., Medsger, A. R., Li, Y-H., Ricci, E. M., Singer, D. E., Marrie, T. J., Coley, C. M., Walsh, M. B., Karpf, M., Lahive, K. C., & Kapoor, W. N. (1997). The hospital admission decision for patients with community-acquired pneumonia. Results from the pneumonia patient outcomes research team cohort study. Archives of Internal Medicine, 157(1), 36-44.	Electronic Database	Yes	No				Not Relevant
Fine, M. J., Singer, D. E., Marrie, T. J., Lave, J. R., Coley, C. M., Schulz, R., Rogers, J. C., Stone, R. A., Karpf, M., Ricci, E. M., Obrosky, D. S., Hough, L. J., & Kapoor, W. N. (1994). Medical outcomes of ambulatory and hospitalized low risk patients with community-acquired pneumonia (abstract). Journal of General Internal Medicine, 9(Suppl. 2), 29.	Reference List	Yes-Abstract	No				Not Relevant
Fine, M. J., Smith, D. N., & Singer, D. E. (1990). Hospitalization decision in patients with community-acquired pneumonia: A prospective cohort study. American Journal of Medicine, 89(6), 713-721.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Flanigan, M. J., & Lim, V. S. (1991). Initial treatment of dialysis associated peritonitis: A controlled trial of vancomycin versus cefazolin. Peritoneal Dialysis International, 11, 31-37.	Reference List	Yes	No				Not Relevant
Fleisher, G., & Ludwig, S. (1980). Cellulitis: A prospective study. Annals of Emergency Medicine, 9(5), 246-249.	Electronic Database	Yes	No				Not Relevant
Flesch, R. (1989). Antibacterial chemotherapy for treatment of infections in outpatient surgery. European Surgical Research, 21(Suppl.1), 52-54.	Electronic Database	Yes	No				Not Relevant
Flynn, S. (1999). Administering intravenous antibiotics at home. Professional Nurse, 14(6), 399-402.	Electronic Database	Yes	No				Not Relevant
Fogarty, C. M., Sullivan, J. G., Chattman, M. S., Williams, R. R., Kojak, C., & Rubin, A. (1998). Once a day levofloxacin in the treatment of mild to moderate and severe community-acquired pneumonia in adults. Infectious Diseases in Clinical Practice, 7(8), 400-407.	Electronic Database	Yes	No				Not Relevant
Fogel, M. A., Nussbaum, P. B., Feintzeig, I. D., Hunt, W. A. Gavin, J. P., & Kim, R. C. (1998). Cefazolin in chronic hemodialysis patients: A safe, effective alternative to vancomycin. American Journal of Kidney Diseases, 32(3), 401-409.	Electronic Database	Yes	No				Not Relevant
Fontaine, P. J. (1991). Performance of a new softening expanding midline catheter in home intravenous therapy patients. Journal of Intravenous Nursing, 14(2), 91-99.	Electronic Database	Yes	No				Not Relevant
Ford, C. W., Hamel, J. C., Stapert, D., Moerman, J. K., Hutchinson, D. K., Barbachyn, M. R., & Zurenko, G. E. (1997). Oxazolidinones: new antibacterial agents. Trends in Microbiology, 5(5), 196-200.	Electronic Database	Yes	No				Not Relevant
Foster, L., & McMurray, A. (1998). Community parenteral therapy project: A pilot study. Australian Health Review, 21(1), 98-115.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Fox, H. R., & Karchmer, A. W. (1996). Management of diabetic foot infections, including the use of home intravenous antibiotic therapy. Clinics in Podiatric Medicine & Surgery, 13(4), 671-682.	Electronic Database	Yes	No				Not Relevant
Foy, P., & Sharr, M. (1980). Cerebral abscesses in children after pencil tip injuries. The Lancet, 2(8196), 662-663.	Electronic Database	Yes	No				Not Relevant
Frame, P. T. (1982). Outpatient intravenous antibiotic therapy. JAMA, 248(3), 356.	Electronic Database	Yes	No				Not Relevant
Francioli, P. (1993). Ceftriaxone and outpatient treatment of infective endocarditis. Infectious Disease Clinics of North America, 7(1), 97-115.	Reference List	Yes	No				Not Relevant
Francioli, P., Etienne, J., Hoigne, R., Thys, J-P., & Gerber, A. (1992). Treatment of streptococcal endocarditis with a single daily dose of ceftriaxone sodium for 4 weeks. JAMA, 267(2), 264-267.	Electronic Database	Yes	No				Not Relevant
Francioli, P., Stamboulin, D., and the Endocarditis Working Group of the International Society of Chemotherapy. Outpatient treatment of infective endocarditis. Clinical Microbiology and Infection, 4(Suppl. 3), 3S47-3S55.	Electronic Database	Yes	No				Not Relevant
Franciolo, P. (1993). Ceftriaxone and outpatient treatment of infective endocarditis. Infectious Disease Clinics of North America, 7(1), 97-115.	Reference List	Yes	No				Not Relevant
Fredlund, H., Bodin, L., Back, E., Holmberg, H., Krook, A., & Rydman, H. (1987). Antibiotic therapy in pneumonia: A comparative study of parenteral and oral administration of penicillin. Scandinavian Journal of Infectious Diseases, 19(4), 459-466.	Electronic Database	Yes	No				Not Relevant
Freifeld, A. G., & Pizzo, P. A. (1996). The outpatient management of febrile neutropenia in cancer patients. Oncology, 10(4), 599-606, 611-612, 615-616.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Fried, T. R., van Doorn, C., O'Leary, J. R., Tinetti, M. E., & Drickamer, M. A. (1999). Older persons' perceptions ofhome and hospital as sites of treatment for acute illness. American Journal of Medicine, 107, 317-323.	Key Informant	Yes	No				Not Relevant
Fuchs, P. C., Gustafson, M. E., King, J. T., & Goodall, P. T. (1984). Assessment of catheter-associated infection risk with the Hickman right atrial catheter. Infection Control, 5(5), 226-230.	Electronic Database	Yes	No				Not Relevant
Gaillat, J., Bru, J. P., & Sedallian, A. (1994). Penicillin G/ofloxacin versus erythromycin/amoxicillin-clavulanate in the treatment of severe community-acquired pneumonia. Europeon Journal of Clinical Microbiology and Infectious Disease, 13(8), 639-644.	Electronic Database	Yes	No				Not Relevant
Gainer, R. B. (1991). Skin and soft tissue infections. Hospital Practice, 26(Suppl. 5), 24-30.	Electronic Database	Yes	No				Not Relevant
Gainer, R. B., & Smego, R. A. (1985). Intravenous home antibiotic therapy. Educational Service to the Professions by HNS, Suppl. 1.	Reference List	No					
Gall, S. A., & Constantine, L. (1990). Comparative evaluation of clindamycin versus clindamycin plus tobramycin in the treatment of acute pelvic inflammatory disease. Obstetrics & Gynecology, 75(2), 282-286.	Reference List	Yes	No				Not Relevant
Gallaway, A., Murray, E., & Montrose, C. (1990). Intravenous antibiotics at home in children with cystic fibrosis. Journal of the Royal Society of Medicine, 83(2), 128.	Electronic Database	Yes	No				Not Relevant
Gantz, N. M. (1990). Outpatient management of bacterial lower respiratory tract infections. Drug Therapy, March, 51-52, 55-58.	Reference List	Yes	No				Not Relevant
Gantz, N. M., & Noskin, G. A. (1997). Complicated UTI: Targeting the pathogens. Patient Care, 31(7), 212-216, 221-223.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Garau, J. (1996). Clinical perspectives on the management of community-acquired pneumonia. Diagnostic Microbiology & Infectious Disease, 25(4), 205-211.	Electronic Database	Yes	No				Not Relevant
Gardner, C. (1986A). Home IV therapy. Part I. NITA, 9(3), 95-103.	Electronic Database	Yes	No				Not Relevant
Gardner, C. (1986B). Home IV therapy. Part II. NITA, 9(3), 193-203.	Electronic Database	Yes	No				Not Relevant
Garrelts, J. C., & Herrington, A. M. (1996). Cost-effective treatment of lower respiratory tract infections. PharmacoEconomics, 10(1), 36-58.	Electronic Database	Yes	No				Not Relevant
Gaston, S. F., & Jones, D. R. (1982). IV antibiotics at home. The American Journal of Intravenous Therapy & Clinical Nutrition, 9(4), 21-22.	Reference List	Yes	No				Not Relevant
Geckler, R. W., McCormack, G. D., & Goodman, J. S. (1984). Comparison of cefonicid and cefamandole for the treatment of community-acquired infections of the lower respiratory tract. Reviews of Infectious Diseases, 6(Suppl. 4), S847-S852.	Electronic Database	Yes	No				Not Relevant
Genese, C., Finelli, L., Parkin, W., & Spitalny, K. C. (1993). Ceftriaxone-associated biliary complications of treatment of suspected disseminated lyme disease. Morbidity and Mortality Weekly Report, 42(2), 39-42.	Reference List	Yes	No				Not Relevant
Gentile, G., Minotti, Iori, A. P., Cavicchi, F., Barbabietola, G., Landonio, G., Ferrari, M., Baiocchi, C., Micozzi, A., Bucaneve, G., Menichetti, F., Martino, P., & Del Favero, A. (1996). Oral ciprofloxacin vs i.v. ceftriaxone in febrile 'low risk' cancer outpatients. A multicenter randomized not blind study (abstract 048A). Proceedings of the Ninth International Symposium on Infections in the Immunocompromised Host, Assisi, Italy.	Reference List	No					
Gentry, L. O. (1997). Management of osteomyelitis. International Journal of Antimicrobial Agents, 9(1), 37-42.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Gentry, L. O., Rodriguez-Gomez, G., Pien, F., Cubeddu, L., Holley, H. P., Jr., Buaron, K., Giquere, G., & Collins, J. J. (1996). Comparative effects of ceftazidime two or three times daily in patients with skin and skin structure infections. American Journal of Therapeutics, 3(3), 212-218.	Electronic Database	Yes	No				Not Relevant
George, R. H. (1985). Outpatient antibiotic therapy. Journal of Antimicrobial Chemotherapy, 15(2), 257-258.	Electronic Database	Yes	No				Not Relevant
Ghanem, H. M., Fahmy, I., & Fallon, B. (1999). Infection control in outpatient unicomponent penile prosthesis surgery. International Journal of Impotence Research, 11(1), 25-27.	Electronic Database	Yes	No				Not Relevant
Giacchino, F., Belardi, P., Merlino, C., Aimino, M., Garneri, G., Cuffini, A. M., & Tullio, V. (1997). Treatment of fusarium peritonitis in a peritoneal dialysis patient. Peritoneal Dialysis International, 17(4), 403-404.	Electronic Database	Yes	No				Not Relevant
Gibson, J. A. (1978). A program for outpatient intravenous antibiotic therapy. NITA, 1(1), 13-15.	Reference List	Yes	No				Not Relevant
Giglione, L. (1988). Home IV therapy-Who pays? Journal of Intravenous Nursing, 11(5), 294-296.	Electronic Database	Yes	No				Not Relevant
Gilbert, C., Meisenberg, B., Vredenburgh, J., Ross, M., Hussein, A., Perfect, J., & Peters, W. P. (1994). Sequential prophylactic oral and empiric once-daily parenteral antibiotics for neutopenia and fever after high-dose chemotherapy and autologous bone marrow support. Journal of Clinical Oncology, 12(5), 1005-1011.	Electronic Database	Yes	No				Not Relevant
Gilbert, D. N., Dworkin, R. J., Raber, S. R., & Leggett, J. E. (1997). Outpatient parenteral antimicrobial-drug therapy. The New England Journal of Medicine, 337(12), 829-838.	Electronic Database	Yes	No				Not Relevant
Gilbert, J., Robinson, T., & Littlewood, J. M. (1988). Home intravenous antibiotic treatment in cystic fibrosis. Archives of Disease in Childhood, 63(5), 512-517.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Gilbert, K., Gleason, P. P., Singer, D. E., Marrie, T. J., Coley, C. M., Obrosky, D. S., Lave, J. R., Kapoor, W. N., & Fine, M. J. (1998). Variations in antimicrobial use and cost in more than 2,000 patients with community acquired pneumonia. The American Journal of Medicine, 104(1), 17-27.	Electronic Database	Yes	No				Not Relevant
Gill, S. (1993). Home administration of intravenous antibiotics to children with cystic fibrosis. Bristish Journal of Nursing, 2(15), 767-770.	Electronic Database	Yes	No				Not Relevant
Girmenia, C., Moleti, M. L., Cartoni, C., Cedrone, M., De Gregoris, C., De Sanctis, V., Giovannini, M., Latagliata, R., Niscola, P., Romani, C., Rondinelli, M. B., Tosti, S., & Mandelli, F. (1997). Management of infective complications in patients with advanced hematologic malignancies in home care. Leukemia, 11(11), 1807-1812.	Electronic Database	Yes	No				Not Relevant
Glassroth, J., Jordan, M., Wallace, J. M., Kvale, P. A., Follmann, D. A., Rosen, M. J., Reichman, L. B., Mossar, M., Hopewall, P. C., & the Pulmonary Complications of HIV Study Group (1994). Use of preventive interventions by persons infected with type-1 human immunodeficiency virus (HIV-1). American Journal of Preventive Medicine, 10(5), 259-266.	Electronic Database	Yes	No				Not Relevant
Gleason, P. P., Kapor, W. N., Stone, R. A., Lave, J. R., Obrosky, D. S., Schulz, R., Singer, D. E., Coley, C. M., Marrie, T. J., & Fine, M. J. (1997). Medical outcomes and antimicrobial costs with the use of the American Thoracic Society guidelines for outpatients with community acquired pneumonia. JAMA, 278(1), 32-39.	Reference List	Yes	No*	No*			Not Relevant
Glover, J., Dibble, S., Miaskowski, C., & Geibert, R. (1995). Changes associated in taste associated with intravenous adminstration of pentamidine (revised). JANAC, 6(2), 1995.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Goffin, E., Pouthier, D., Vandercam, B., & Gigi, J. (1996). IV vancomycin-oral ciprofloxacin: A safe and efficient therapeutic protocol for CAPD peritonitis. Peritoneal Dialysis International, 16(2), 174-177.	Electronic Database	Yes	No				Not Relevant
Goldenberg, R. I. (1985). Pitfalls in the delivery of outpatient intravenous therapy. Drug Intelligience and Clinical Pharmacy, 19(4), 293-296.	Electronic Database	Yes	No				Not Relevant
Goldenberg, R. I., Poretz, D. M., Eron, L. J., Rising, J. B., & Sparks, S. B. (1984). Intravenous antibiotic therapy in ambulatory pediatic patients. Pediatric Infectious Disease, 3(6), 514-517.	Electronic Database	Yes	No				Not Relevant
Goldstein E. J. C., Reinhardt, J. F., Murray, P. M., & Finegold, S. M. (1987). Outpatient therapy of bite wounds. Demographic data, bacteriology, and a prospective randomized trial of amoxicillin/ clavulanic acid versus penicillin +/- dicloxacillin. International Journal of Dermatology, 26(2), 123-127.	Reference List	Yes	No				Not Relevant
Gordon, P. (1991). Serious bacterial infections in children. When can outpatient treatment be used? Postgraduate Medicine, 90(1), 87-90.	Reference List	Yes	No				Not Relevant
Gorski, L. A. (1987). Effective teaching of home IV therapy. Home Healthcare Nurse, 5(5), 10, 12-14, 16-18.	Reference List	Yes	No				Not Relevant
Gorski, L. A. (1997). Discharge planning for the patient requiring home intravenous antimicrobial therapy. Orthopaedic Nursing 16(3), 43-48.	Electronic Database	Yes	No				Not Relevant
Gorski, L. A., & Grothman, L. (1996). Home infusion therapy. Seminars in Oncology Nursing, 12(3), 193-201.	Electronic Database	Yes	No				Not Relevant
Gottlieb, R. D., Shah, M. K., Perlman, D. C., & Kimmelman, C. P. (1992). Community-acquired methicillin-resistant Staphylococcus aureus infections in otolaryngology. Otolaryngolgy-Head and Neck Surgery, 107(3), 434-437.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Grace, L. A., Illian, A. F., & Rivers, M. P. (1993). A clinical productivity management system for home infusion therapy. Journal of Intravenous Nursing, 16(2), 74-83.	Reference List	Yes	No				Not Relevant
Graham, D. R. (1991). Nosohusial infections: Complications of home intravenous therapy. Infectious Diseases in Clinical Practices, 2(2), 158-161.	Reference List	Yes	No				Not Relevant
Graham, D. R., Keldermans, M. M., Klemm, L. W., Semenza, N. J., & Shafer, M. L. (1991). Infectious complications among patients receiving home intravenous therapy with peripheral, central, or peripherally placed central venous catheters. The American Journal of Medicine, 91(Suppl. 3B), 95S-100S.	Reference List	Yes	No				Not Relevant
Graham, N. M. H., Galai, N., Nelson, K. E., Astemborski, J., Bonds, M., Rizzo, R. T., Sheeley, L., & Vlahov, D. (1996). Effect of isoniazid chemoprophylaxis on HIV-related mycobacterial disease. Archives of Internal Medicine, 156(8), 889-894.	Electronic Database	Yes	No				Not Relevant
Grainger-Rousseau, T. J., & Segal, R. (1995). Economic, clinical, and psychosocial outcomes of home infusion therapy: A review of published studies. Pharmacy Practice Management Quarterly, 15(1), 57-77.	Reference List	Yes	No				Not Relevant
Graninger, W., Presterl, E., Wenisch, C., Schwameis, E., Breyer, S., & Vukovich, T. (1997). Management of serious staphylacoccal infections in the outpatient setting. Drugs, 54(6), 21-28.	Electronic Database	Yes	No				Not Relevant
Graninger, W., Wenisch, C., Wiesinger, E., Menschik, M., Karimi, J., & Presterl, E. (1995). Experience with outpatient intravenous teicoplanin therapy for chronic osteomyelitis. European Journal of Clinical Microbial Infectious Disease, 14(7), 643-647.	Electronic Database	Yes	No				Not Relevant
Graves, G., Jackson, J. P., Maxwell, P. D. & Woods, T. (1987). Home intravenous antibiotic therapy in Arkansas. Journal of the Arkansas Medical Society, 84(1), 55-57.	Electronic Database	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Graves, G., Maxwell, A., & Woods, T. (1986). Home intravenous antibiotic therapy in Arkansa: A study. National Association of Retail Druggists Journal, September, 22-24.	Reference List	Yes	No				Not Relevant
Grayson, M. L. (1995). Diabetic foot infections. Antimicrobial therapy. Infectious Disease Clinics of North America, 9(1), 143-161.	Electronic Database	Yes	No				Not Relevant
Grayson, M. L., Silvers, J., & Turnidge, J. (1995). Home intravenous antibiotic therapy. A safe and effective alternative to inpatient care. The Medical Journal of Australia, 162(5), 249, 251-253.	Electronic Database	Yes	No				Not Relevant
Green, B. G., & Sloan, S. L. (1986). Penile prostheses in spinal cord injured patients: Combined psychosexual counselling and surgical regimen. Paraplegia, 24(3), 167-172.	Electronic Database	Yes	No				Not Relevant
Green, M., & Wald, E. R. (1996). Emerging resistance to antibiotics: Impact on respiratory infections in the outpatient setting. Annals of Allergy, Asthma and Immunology, 77(3), 167-175.	Electronic Database	Yes	No				Not Relevant
Green, S. L. (1991). Practical guidelines for developing an office-based program for outpatient intravenous therapy. Reviews of Infectious Diseases, 13(Suppl. 2), S189-S192.	Electronic Database	Yes	No				Not Relevant
Greene, J. W., Hara, C., O'Connor, S., & Altemeier, W. A., III. Management of febrile outpatient neonates. Clinical Pediatrics, 20(6), 375-380.	Electronic Database	Yes	No				Not Relevant
Grizzard, M. B. (1985). Home intravenous antibiotic therapy: A practical management approach for the 1980's. Postgraduate Medicine, 78(6), 187-189, 192-195.	Electronic Database	Yes	No				Not Relevant
Grizzard, M. B., Harris, G., & Karns, H. (1991). Use of outpatient parenteral antibiotic therapy in a health maintenance organization. Reviews of Infectious Diseases, 13(Suppl. 2), S174-S179.	Electronic Database	Yes	No				Not Relevant
Gross, P. A. (1997). The potential for clinical guidelines to impact appropriate antimicrobial agent use. Infectious Disease Clinics of North America, 11(4), 803-812.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Gross, R., Graziani, A. L., Laufer, D., Turner, J. L., Ondercin, J. P., & MacGregor, R. R. (1996). Adverse effects of the use of intravenous pentamidine in the home. Infectious Diseases in Clinical Practice, 5, 456-458.	Reference List	Yes	No				Not Relevant
Guest, S. S., & Erickson, L. J. (1996). Combination therapy involving ciproflaxin for peritonitis. Peritoneal Dialysis International, 16(3), 316-317.	Electronic Database	Yes	No				Not Relevant
Guiserix, J., Ramdane, M., Finielz, P., Michault, A., & Rajaonarivelo, P. (1996). Trichoderma harzianum peritonitis in peritioneal dialysis. Nephron, 74(2), 473-474.	Electronic Database	Yes	No				Not Relevant
Gundry, S. R., Borkon, A. M., McIntosh, C. L., & Morrow, A. G. (1980). Candida esophagitis following cardiac operation and short-term antibiotic prophylaxis. The Journal of Thoracic and Cardiovascular Surgery, 80(5), 661-668.	Electronic Database	Yes	No				Not Relevant
Gunner Deery, H., II. (1998). Outpatient parenteral anti-infective therapy for skin and soft-tissue infections. Infectious Disease Clinics of North America, 12(4), 935-949.	Electronic Database	Yes	No				Not Relevant
Gutierrez, K. (1996). Continuation of antibiotic therapy for serious bacterial infections outside of the hospital. Pediatric Annals, 25(11), 639-645.	Electronic Database	Yes	No				Not Relevant
Hadaway, L. C. (1995). Infusion of I.V. medications via midline catheters. A review of midline catheters & their performance in home care patients. Infusion, 1(8), 15-19.	Electronic Database	Yes	No				Not Relevant
Hadaway, L. C. (1997). Vascular access in home care: 1997 update. Infusion, 4(1), 18-36	Reference List	Yes	No				Not Relevant
Hagle, M. E., McDonagh, J. M., & Rapp, C. J. (1994). Patients with long-term vascular access devices: Care and complications. Orthopaedic Nursing, 13(5), 41-53.	Electronic Database	Yes	No				Not Relevant
Haiby, N. (1995). Isolation and treatment of cystic fibrosis patients with lung infections caused by pseudomonas aeruginosa. Netherlands Journal of Medicine, 46(6), 280-287.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Haider, T. A., & Grillo, J. A. (1997). An interdisciplinary critical pathway for home intravenous antibiotic therapies. Infusion, 3(7), 38-50.	Electronic Database	Yes	No				Not Relevant
Hammond, D. (1998). Home intravenous antibiotics. The safety factor. Journal of Intravenous Nursing, 21(2), 81-95.	Electronic Database/ Key Informant	Yes	No				Not Relevant
Hammond, J. (1979). Home health care cost effectiveness: An overview of the literature. Public Health Reports, 94(4), 305-311.	Reference List	Yes	No				Not Relevant
Hammond, L. J., Caldwell, S., & Campbell, P. W. (1991). Cystic fibrosis, intravenous antibiotics, and home therapy. Journal of Pediatric Health Care, 5(1), 24-30.	Electronic Database	Yes	No				Not Relevant
Hamrick, J. H., & Murphy, C. T. F. (1978). Bacteremia in 28 ambulatory children. Clinical Pediatrics, 17(2), 109-112.	Reference List	Yes	No				Not Relevant
Hardens, M. (1996). Ganciclovir evaluation in AIDS patients with cytomegalovirus retinitis. A European study of treatment patterns and resource allocation. AIDS, 10(Suppl. 4), S25-S30.	Electronic Database	Yes	No				Not Relevant
Harper, M. B., Bachur, R., & Fleisher, G. R. (1995). Effect of antibiotic therapy on the outcome of outpatients with unsuspected bacteremia. The Pediatric Infectious Disease Journal, 14(9), 760-767.	Electronic Database	Yes	No				Not Relevant
Harren, P., LaPointe Rudow, D., Teperman, L. W., Dietrich, D., & Diflo, T. (1996). Incidence and treatment of recurrent hepatitis C after liver transplantation. Journal of Transplant Coordination, 6(1), 24-27.	Electronic Database	Yes	No				Not Relevant
Harris, J-A. S. (1996). Antimicrobial therapy of pneumonia in infants and children. Seminars in Respiratory Infections, 11(3), 139-147.	Electronic Database	Yes	No				Not Relevant
Harris, L. F., Buckle, T. F., & Coffey, F. L., Jr. (1986). Intravenous antibiotics at home. Southern Medical Journal, 79(2), 193-196.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Harris, W. L., Jr. (1984). Home parenteral antibiotic therapy. Topics in Hospital Pharmacy Management, 4(3), 43-55.	Reference List	Yes	No				Not Relevant
Hart, J. S., & Redding, K. L. (1994). A physician's perspective on the advantages of home medical care: the other side of case management. Texas Medicine, 90(2), 50-54.	Electronic Database	Yes	No				Not Relevant
Harwood, I. R., Greene, L. M., Kozakowski-Koch, J. A., & Rasor, J. S. (1992). New peripherally inserted midline catheter: a better alternative for intravenous antibiotic therapy in patients with cystic fibrosis. Pediatric Pulmonology, 12(4), 233-239.	Electronic Database	Yes	No*	No*			
Hata, J. S., & Fick, R. B., Jr. (1988). Pseudomonas aeruginosa and the airways disease of cystic fibrosis. Clinics in Chest Medicine, 9(4), 679-689.	Electronic Database	Yes	No				Not Relevant
Hay, J. W., & Ernst, R. (1987). The cost effectiveness of home intravenous antibiotics. Outpatient Delivery of Parenteral Antibiotic Therapy, Nutley, New Jersey, 7-13.	Electronic Database	No					
Hayes, N., & Lovetang, R. (1991). Home infusion therapy options for patients with AIDS. Caring, 10, 20-21, 23-24, 26.	Reference List	Yes	No				Not Relevant
Hedges, J. R., & Lowe, R. A. (1986). Streptococcal pharyngitis in the emergency department: Analysis of therapeutic strategies. American Journal of Emergency Medicine, 4(2), 107-115.	Electronic Database	Yes	No				Not Relevant
Heley, A. (1988). Foscarnet infusion at home. The Lancet, 2(8623), 1311.	Electronic Database	Yes	No				Not Relevant
Hellmich, P. E. (1987). How to teach do-it-yourself IV therapy. RN, October, 135-136.	Reference List	Yes	No				Not Relevant
Hemsell, D. L. (1988). Acute pelvic inflammatory disease. Etiologic and therapeutic considerations. The Journal of Reproductive Medicine, 33(Suppl. 1), 119-123.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Hemsell, D. L. (1997). Infection after hysterectomy. Infectious Diseases in Obstetrics and Gynecology, 5(1), 52-56.	Electronic Database	Yes	No				Not Relevant
Hemsell, D. L., Bernstein, S. G., Bawden, R. E., Hemsell, P. G., Heard, M. C., & Nobles, B. J. (1989). Preventing major operative site infection after radical abdominal hysterectomy and pelvic lymphadenectomy. Gynecologic Oncology, 35, 55-60.	Reference List	Yes	No				Not Relevant
Hemsell, D. L., Nobles, B. J., Heard, M. C., & Hemsell, P. G. (1988). Upper and lower reproductive tract bacteria in 126 women with acute pelvic inflammatory disease. Microbial susceptibility and clinical response to four therapeutic regimens. The Journal of Reproductive Medicine, 33(10), 799-805.	Electronic Database	Yes	No				Not Relevant
Hemsell, D. L., Santos-Ramos, R., Cunningham, F. G., Nobles, B. J., & Hemsell, P. G. (1985). Cefotaxime treatment for women with community-acquired pelvic abscesses. American Journal of Obstetrics and Gynecology, 151(6), 771-777.	Electronic Database	Yes	No				Not Relevant
Henry, L., & Clemmens, M. (1988). Pediatric home infusion therapy. Caring, June, 28-30.	Reference List	Yes	No				Not Relevant
Herbert, J. R. (1996). Medicare reimbursement for home infusion therapy: A contributor to the development of community acquired vancomycin-resistant enterococci? Journal of Intravenous Nursing, 19(2), 99-101.	Electronic Database	Yes	No				Not Relevant
Herbst, S. L. (1996). Options for venous access in ambulatory care: Issues in selection and management. Journal of Infusional Chemotherapy, 6(4), 186-194.	Reference List	No					
Herbst, S. L., Kaplan, L. K., & Mckinnon, B. T. (1998). Vascular access devices: Managing occlusions and related complications in home infusion. Proceedings of National Home Infusion Association, Alexandria, Virginia, 4, 1-32.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Hertz, M. I., Jordan, C., Savik, S. K., Fox, J. M. K., Park, S., Bolman, R. M., III, & Dosland-Mullan, B. M. (1998). Randomized trial of daily versus three-times-weekly prophylactic ganciclovir after lung and heart-lung transplantation. The Journal of Heart and Lung Transplantation, 17(9), 913-920.	Electronic Database	Yes	No				Not Relevant
Hicks, W. G., & Miner, K. M. (Eds.). (1993). Alternate site care - infusion industry update. Boston: Cowen & Company.	Reference List	No					
Hindes, R., Winkler, C., Kane, P., & Kunkel, M. (1995). Outpatient intravenous antibiotic therapy in Medicare patients: Cost-savings analysis. Infectious Diseases in Clinical Practice, 4(3), 211-217.	Reference List	Yes	No				Not Relevant
Hinkle, J. L. (1990). Home antibiotic therapy for brain abscesses. Journal of Intravenous Nursing, 13(3), 172-176.	Electronic Database	Yes	No				Not Relevant
Hirata-Dulas, C. A. I., Stein, D. J., Guay, D. R. P., Gruninger, R. P., & Peterson, P. K. (1991). A randomized study of ciprofloxin versus ceftriaxone in the treatment of nursing home-acquired lower respiratory tract infections. Journal of the American Geriatrics Society, 39(10), 979-985.	Electronic Database	Yes	No				Not Relevant
Hittel, W. P. (1984). DRGs and Medicare reimbursement for outpatient intravenous antibiotic programs. American Journal of Hospital Pharmacy, 41(7), 1310, 1312.	Electronic Database	Yes	No				Not Relevant
Hittel, W. P., & Appleby, D. H. (1985). Medicare reimbursement for outpatient antibiotics. American Journal of Hospital Pharmacy, 42, 1712.	Reference List	Yes	No				Not Relevant
Hoepelman, I. M. (1995). Outpatient treatment with parenteral antimicrobial agents. International Journal of Antimicrobial Agents, 5, 1-2.	Reference List	Yes	No				Not Relevant
Hoftman, M. R. (1983). Payment for outpatient therapy. JAMA, 249(4), 473, 474.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Hoiby, N. (1995). Isolation and treatment of cystic fibrosis patients with lung infections caused by pseudomonas (burkholderia) cepacia and multiresistant pseudomonas aeruginosa. The Netherlands Journal of Medicine, 46(6), 280-287.	Electronic Database	Yes	No				Not Relevant
Holmberg, H. (1998). Community-acquired pneumonia in adults. Current Opinion in Infectious Diseases, 11(2), 147-151.	Electronic Database	Yes	No				Not Relevant
Hoppe, J. E. (1996). Rational prescribing of antibacterials in hospitalised children. PharmacoEconomics, 10(6), 575-593.	Electronic Database	Yes	No				Not Relevant
Horejsi, G. A. (1983). Intravenous therapy at home. Home and Social Work, 8, 246-247.	Reference List	No					
Horton, J. E., & Crocker, K. S. (1990). Use of streamline catheters in the home infusion therapy patient. Bayviews, 3(1), 13-15.	Reference List	No					
Houshiar, A. M., & Ercole, C. J. (1996). Urinary calculi during pregnancy. When are they cause for concern? Postgraduate Medicine, 100(4), 131-138.	Electronic Database	Yes	No				Not Relevant
Huminer, D., & Pitlik, S. (1994). Home IV antibiotic therapy in Isreal (abstract). Proceedings of the International Congress of Infectious Diseases, 97.	Reference List	No					
Iannini, P. B. (1986). DRGs and outpatient antibiotics. Infection Control, 7(5), 289-290.	Electronic Database	Yes	No				Not Relevant
Iliffe, S., & Gould, M. (1995). Hospital at home. A substitution technology that nobody wants? British Journal of Health Care Management, 1(3), 663-667.	Reference List	No					
Inaba, A. S., Zukin, D. D., & Perro, M. (1992). An update on the evaluation and management of plantar puncture wounds and pseudomonas osteomyelitis. Pediatric Emergency Care, 8(1), 38-44.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Ingram, C., Eron, L. J., Goldenberg, R. I., Morrison, A. J., Jr., Poretz, D. M., Alder, M. E., Harvey, L. K., Rising, J. B., & Sparks, S. B. (1988). Antibiotic therapy of osteomyelitis in outpatients. Medical Clinics of North America, 72(3), 723-738.	Electronic Database	Yes	No				Not Relevant
Inkisar, A. S. M. (1996). Use of cefixime in treatment of enteric fever in children. Specialist, 12(2), 185-189.	Electronic Database	No					
Jabs, D. A. (1995). Ocular manifestations of HIV infection. Transactions of the American Ophthalmological Society, 93, 623-683.	Electronic Database	Yes	No				Not Relevant
Jacobson, C., & Strausbaugh, L. J. (1990). Incidence and impact of infection in a nursing home care unit. American Journal of Infection Control, 18(3), 151-159.	Electronic Database	Yes	No				Not Relevant
Jacobson, J. M., & Hirschman, S. Z. (1982). Necrotizing fasciitis complicating intravenous drug abuse. Archives of Internal Medicine, 142(3), 634-635.	Electronic Database	Yes	No				Not Relevant
Jadavji, T., Law, B., Lebel, M. H., Kennedy, W. A., Gold, R., & Wang, E. E. L. (1997). A practical guide for the diagnosis and treatment of pediatric pneumonia. Canadian Medical Association Journal, 156(5), S703-S711.	Electronic Database	Yes	No				Not Relevant
Jaeger, H., Foertsch, M., Schoch, B., Poppinger, J., & Jaegel-Guedes, E. (1992). New infusion technology improves quality of life in AIDS outpatients, one-year-experience using a novel elastomer pump system (abstract PuB 7261). Proceedings of the International Conference on AIDS, 8, 92.	Reference List	No					
Janknegt, R. (1997). The treatment of staphylococcal infections with special reference to pharmokinetic, pharmacodynamic and pharmacoeconomic considerations. Pharmacy World & Science, 19(3), 133-141.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Jauregui, L., Bischoff, M. C., & Hageage, G. J. (1983). Combined inpatient-outpatient therapy of serious infections with a single daily dose of ceftriaxone. Proceedings of the Symposium on Progress in Therapy of Bacterial Infections. A New Cephalosporin: Ceftriaxone, Bangkok, Thailand, 19, 104-122.	Reference List	No					
Jauregui, L., Martin, M., & Hageage, G. (1987). Outpatient use of ceftriaxone in the therapy of serious infections. In L. J. Eron & C. Grassi (Eds.), Economics of Ceftriaxone Use. 14th International Congress on Chemotherapy (pp. 71-78), Tokyo, Japan.	Reference List	Yes	No				Not Relevant
Jauregui, L., Martin, M., & Hageage, G. (1988). Clinical evaluation of ceftriaxone therapy in an out-patient setting. Insights into the Treatments of Serious Infections, 2(1), 186-194.	Reference List	Yes	No				Not Relevant
Jewesson, P. J. (1996). Economic impact of intravenous–to–oral antibacterial stepdown therapy. Clinical Drug Investigation, 11(Suppl. 2), 1-9.	Electronic Database	Yes	No				Not Relevant
Johnson, A. S., Bailey, E., Wright, P. A., & Solomon, L. (1996). Malassezia furfur: A possible cause of culture-negative CAPD peritonitis. Peritoneal Dialysis International, 16(2), 187-188.	Electronic Database	Yes	No				Not Relevant
Johnson, C. C., Baldessarre, J., & Levison, M. E. (1997). Peritonitis: Update on pathophysiology, clinical manifestations, and management. Clinical Infectious Diseases, 24(6), 1035-1047.	Electronic Database	Yes	No				Not Relevant
Johnson, J. R. (1992). Urinary tract infection: Selecting the optimal agent. Physician Assistant, 16(2), 155–158, 163–164.	Electronic Database	Yes	No				Not Relevant
Johnson, J. R., & Stamm, W. E. (1989). Urinary tract infections in women: Diagnosis and treatment. Annals of Internal Medicine, 111(11), 906-917.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Johnson, R. H. (1988). Community-acquired pneumonia: Etiology, diagnosis, and treatment. Clinical Therapeutics, 10(5), 568-573.	Electronic Database	Yes	No				Not Relevant
Johnston, B. L. (1994). Methicillin-resistant staphylococcus aureus as a cause of community-acquired pneumonia-a critical review. Seminars in Respiratory Infections, 9(3), 199-206.	Electronic Database	Yes	No				Not Relevant
Johnston, J. B., & Davidson, M. R. (1984). Use of a mini-infuser syringe pump for the self-administration of I.V. antibiotics in the home. NITA, 7(5), 381-383.	Electronic Database	Yes	No				Not Relevant
Kahn, J. B. (1996). Assessment of ofloxacin for community-acquired LRTIs. Infections in Medicine, 13(2), 141-151.	Electronic Database	Yes	No				Not Relevant
Kamen, B. A., & Gunther, N. (1985). Administering a 24-hour supply of antibiotics with a programmable automated syringe pump. American Journal of Hospital Pharmacy, 42, 2715-2716.	Reference List	Yes	No				Not Relevant
Kane, R. E., Jennison, K., Wood, C., Black, P. G., & Herbst, J. J. (1988). Cost savings and economic considerations using home intravenous antibiotic therapy for cystic fibrosis patients. Pediatric Pulmonology, 4(2), 84-89.	Electronic Database	Yes	No				Not Relevant
Kaplinsky, C., Drucker, M., Goshen, J., Tamary, H., Cohen, I. J., & Zaizov, R. (1994). Ambulatory treatment with ceftriaxone in febrile neutropenic children. Israel Jounal of Medical Science, 30(8), 649-651.	Reference List	Yes	No				Not Relevant
Karam, G. H., Ackley, A. M., & Dismukes, W. E. (1983). Posttraumatic aeromonas hydrophila osteomyelitis. Archives of Internal Medicine, 143(11), 2073-2074.	Electronic Database	Yes	No				Not Relevant
Karchmer, A.W. (1994). Outpatient management of infective endocarditis. Infectious Medicine, 11(Suppl. C), 8-11.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Karthaus, M., Carratala, J., Jurgens, H., & Ganser, A. (1998). New strategies in the treatment of infectious complications in haematology and oncology: Is there a role for out-patient antibiotic treatment of febrile neutropenia? Chemotherapy, 44(6), 427-435.	Electronic Database	Yes	No				Not Relevant
Karthaus, M., Egerer, G., Kullmann, K-H., Ritter, J., & Jurgens, H. (1998). Ceftriaxone in the outpatient treatment of cancer patients with fever and neutropenia. Europeon Journal of Clinical Microbiology & Infectious Disease, 17(7), 501-504.	Electronic Database	Yes	No				Not Relevant
Kasmer, R. J., Hoisington, L. M., & Yukniewicz, S. (1987). Home parenteral antibiotic therapy. Part I: An overview of program design. Home Healthcare Nurse, 5(1), 12, 14-18.	Electronic Database	Yes	No				Not Relevant
Kasmer, R. J., Hoisington, L. M., & Yukniewicz, S. (1987). Home parenteral antibiotic therapy. Part II: Drug prescription and administration considerations. Home Healthcare Nurse, 5(1), 19-23, 26-29.	Electronic Database	Yes	No				Not Relevant
Katz, V. L., & Weinstein, L. (1982). Antepartum treatment of Listeria monocytogenes septicemia. Southern Medical Journal, 75(11), 1353-1354.	Electronic Database	Yes	No				Not Relevant
Kaufman, J. M., Kaufman, J. L., & Borges, F. D. (1998). Immediate salvage procedures for infected penile prosthesis. The Journal of Urology, 159(3), 816-818.	Electronic Database	Yes	No				Not Relevant
Kayley, J. (1995). Home intravenous therapy. Primary Health Care, 5(8), 39-46.	Reference List	No					
Kayley, J. (1996). Use of IV antibiotics at home. Community Nurse, 2(7), 15-16.	Electronic Database	Yes	No				Not Relevant
Kayley, J., Berendt, A. R., Snelling, M. J. M., Moore, H., Hamilton, H. C., Peto, T. E. A., Crook, D. W. M., & Conlon, C. P. (1996). Safe intravenous antibiotic therapy at home: experience of a UK based programme. Journal of Antimicrobial Chemotherapy, 37(5), 1023-1029.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Keeley, D. J., Nkrumah, F. K., & Kapuyaniyika, C. (1990). Randomized trial of sulfamethoxazole & trimethoprim versus procaine penicillin for the outpatient treatment of childhood pneumonia in Zimbabwe. Bulletin of the World Health Organization, 68, 185-192.	Reference List	No					
Keeton, G. R., Kehoe, B., Phillips, S. W., & Daya, H. (1983). Ceftazidime and cefamandole in the treatment of pneumonia. Journal of Antimicrobial Chemotherapy, 12(Suppl. A), 27-30.	Electronic Database	Yes	No				Not Relevant
Kentos, A., Struelens, M. J., & Thys, J. P. (1996). Antibiotic-lock technique for the treatment of central venous catheter infections. Clinical Infectious Diseases, 23(2), 418-419.	Electronic Database	Yes	No				Not Relevant
Ketley, N. J., Kelsey, S. M., & Newland, A. C. (1995). Teicoplanin and oral ciprofloxacin as outpatient treatment of infective episodes in patients with indwelling central venous catheters and haematological malignancy. Clinical & Laboratory Haematology, 17(1), 71-74.	Electronic Database	Yes	No				Not Relevant
Ketley, N. J., Maclean, M. C., Ellis, P. D., & Newland, A.C. (1995). Cost analysis of a teicoplanin-based regimen for outpatient treatment of Hickman line infections (abstract). British Journal of Haematology, 81(Suppl. 1), 248.	Reference List	Yes - Abstact	No				Not Relevant
Khatib, Z. A. (1997). New developments in the management of sickle cell disease. International Pediatrics, 12(4), 205-211.	Electronic Database	Yes	No				Not Relevant
Kibbler, C. C., & Prentice, H. G. (1997). Which febrile neutropenic patients are suitable for outpatient management? Current Opinion Infectious Diseases, 10, 251-254.	Reference List	Yes	No				Not Relevant
Kind, A. C., Williams, D. N., & Gibson, J. (1985). Outpatient intravenous antibiotic therapy. Ten years' experience. Postgraduate Medicine, 77(2), 105-109.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Kind, A. C., Williams, D. N., Persons, G., & Gibson, J. A. (1979). Intravenous antibiotic therapy at home. Archives of Internal Medicine, 139(4), 413-415.	Electronic Database	Yes	No				Not Relevant
King, D. E., & Pippin, H. J., Jr. (1997). Community-acquired pneumonia in adults: Initial antibiotic therapy. American Family Physician, 56(2), 544-550.	Electronic Database	Yes	No				Not Relevant
Kinsey, S. E. (1998). Experience with teicoplanin in non-inpatient therapy in children with central line infections. Europeon Journal of Haematology, 59(Suppl. 62), 11-14.	Electronic Database	Yes	No				Not Relevant
Kish, M. A. (1987). HMG experience and program for outpatient parenteral antibiotic therapy. Outpatient Delivery of Parenteral Antibiotic Therapy, Nutley, New Jersey, 36-39.	Reference List	No					
Kitz, D. S., & Nash, D. B. (1988). Outpatient parenteral antibiotic therapy. HMO Practice, 3, 89-92.	Reference List	No					
Klarnet, J. P. (1997). Febrile neutropenia in cancer patients: An outpatient approach. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part II. Management of Serious Infections by OPAT. A Special Report by Scientific American Medicine (pp. 73-76). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Klaus, B. N. (1983). Home IV antibiotic therapy – A valid alternative to prolonged hospitalization. Pennsylvania Nurse, 38(6), 5-7.	Electronic Database	Yes	No				Not Relevant
Klein, J. O. (1997). History of macrolide use in pediatrics. Pediatric Infectious Disease Journal, 16(4), 427-431.	Electronic Database	Yes	No*	No*			Not Relevant
Klein, J., & Cohen, R. (1998). Topic session 2: The case for injectable antibiotics in the community - the middle ear as a model. International Journal of Clinical Practice, Suppl. 95, 50-51.	Electronic Database	Yes	No				Not Relevant
Klettke, U., Magdorf, K., Staab, D., Paul, K., & Wahn, U. (1996). Can home therapy replace hospital intravenous therapy in patients with cystic fibrosis in Germany? (abstract) Pediatric Pulmonology, Suppl. 13, 474.	Electronic Database	Yes - Abstract	No				Unable to obtain details.

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Knowelden, J., Westlake, L., Wright, K. G., & Clarke, S. J. (1991). Peterborough hospital at home: an evaluation. Journal of Public Health Medicine, 13(3), 182-188.	Reference List	Yes	No				Not Relevant
Koechelor, J. A., Abramowitz, P. W., Swim, S. E., & Daniels, D. E. (1989). Indicators for the selection of ambulatory patients who warrant pharmacist monitoring. American Journal of Hospital Pharmacy, 46, 729-732.	Reference List	Yes	No				Not Relevant
Koeppen, M. A., & Caspers, S. M. (1994). Problems identified with home infusion pumps. Journal of Intravenous Nursing, 17(3), 151-156.	Reference List	Yes	No				Not Relevant
Kosseim, M., Ronald, A., Plummer, F. A., D'Costa, L., & Brunham, R. C. (1991). Treatment of acute pelvic inflammatory disease in the ambulatory setting: Trial of cefoxitin and doxycycline versus ampicilllin-sulbactam. Antimicrobial Agents and Chemotherapy, 35(8), 1651-1656.	Reference List	Yes	No				Not Relevant
Kravitz, G. R. (1993). Advances in I.V. delivery. Hospital Practice, 28(Suppl. 1), 21-27.	Electronic Database	Yes	No				Not Relevant
Kreegel, P. V. (1997). Incorporating OPAT into a primary care clinic. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 15-18). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Krothapalli, R. K., Senekjian, H. O., & Ayus, J. C. (1983). Efficacy of intravenous vancomycin in the treatment of gram-positive peritonitis in long-term peritoneal dialysis. The American Journal of Medicine, 75(2), 345-348.	Electronic Database	Yes	No				Not Relevant
Kruger, H., Heim, E., Schuknecht, B., & Scholz, S. (1991). Acute and chronic neuroborreliosis with and without CNS involvement: a clinical, MRI, and HLA study of 27 cases. Journal of Neurology, 238(5), 271-280.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Krzywda, E. A., Andris, D. A., Edmiston, C. E., Jr., & Quebbeman, E. J. (1995). Treatment of Hickman catheter sepsis using antibiotic lock technique. Infection Control and Hospital Epidemiology, 16(10), 596-598.	Electronic Database	Yes	No				Not Relevant
Kunkel, M. J. (1993). Quality assurance. Hospital Practice, 28(Suppl. 1), 33-38.	Electronic Database	Yes	No				Not Relevant
Kunkel, M. J. (1997A). Outcomes measurement in OPAT: Why and how. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 50-54). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Kunkel, M. J. (1997B). Outpatient treatment for endocarditis. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part II. Management of Serious Infections by OPAT. A Special Report from Scientific American Medicine (pp. 60-64). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Kunkel, M. J. (1998). Quality assurance and outcomes in outpatient parenteral antibiotic therapy. Infectious Disease Clinics of North American, 12(4), 1023-1034.	Electronic Database	Yes	No				Not Relevant
Kunkel, M. J., & Iannini, P. B. (1984). Cefonicid in a once-daily regimen for treatment of osteomyelitis in an ambulatory setting. Reviews of Infectious Diseases, 6(Suppl. 4), S865-S869.	Electronic Database	Yes	No				Not Relevant
Kunkel, M. J., Tice, A. D., & OPIVITA Study Group (1995). Serious adverse events in outpatient parenteral antibiotic therapy: A prospective multicenter study (abstract). Proceedings of the Infectious Disease Society of America Annual Meeting, San Francisco, 132.	Reference List	No					
Kunkel, M. J., et al. (1992). Experience with midlength catheters in 353 patients receiving home antibiotic therapy (abstract 15). Proceedings of the Infectious Diseases Society of America 30th Annual Meeting, Anaheim, California.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Kuuppelomaki, M., & Lauri, S. (1998). Ethical dilemmas in the care of patients with incurable cancer. Nursing Ethics, 5(4), 283-293.	Electronic Database	Yes	No				Not Relevant
Kuzemko, J. A. (1988). Home treatment of pulmonary infections in cystic fibrosis. Chest, 94(Suppl. 2), 162S-166S.	Electronic Database	Yes	No				Not Relevant
Kuzemko, J. A., Williams, K. J., & Bigley, J. (1986). Home intravenous treatment of pulmonary infections in cystic fibrosis. In: T. J. David (Ed.), Cystic fibrosis in children. Practical and legal aspects of intravenous antibiotic administration in the home (pp. 29-37). Amsterdam: Exerpta Medica.	Electronic Database	No					
Lai, K. K., Kleinjan, J., & Belliveau, P. (1996). Vancomycin-induced neutropenia treated with granulocyte colony-stimulating factor during home intravenous infusion therapy. Clinical Infectious Diseases, 23(4), 844-845.	Electronic Database	Yes	No				Not Relevant
Laing, R. B. S., Morgan, R., & Leen, C. L. S. (1995). Home infusion of antimicrobials as an option for patients with AIDS. American Journal of Health-System Pharmacy, 52(21), 2467-2468.	Electronic Database	Yes	No				Not Relevant
Lamb, H. M., & Goa, K. L. (1999). Management of febrile episodes in neutropenic patients: Defining the role of meropenem. Disease Management & Health Outcomes, 5(2), 101-116.	Electronic Database	Yes	No				Not Relevant
Lane, P. A. (1991). Outpatient management of febrile illness in sickle cell disease. Journal of Pediatrics, 118, 822.	Reference List	Yes	No				Not Relevant
Langtry, H. D., & Lamb, H. M. (1998). Levofloxacin. Its use in infections of the respiratory tract, skin, soft tissues, and urinary tract. Drugs, 56(3), 487-515.	Electronic Database	Yes	No				Not Relevant
Lanning, R. M., & Hrushesky, W. J. M. (1990). Outpatient time-specified infusion of fluoropyrimidines by implanted pump is less costly than flat delivery by external pump. Progress in Clinical & Biological Research, 341B, 397-409.	Electronic Database	Yes	No				Not Relevant
Larkin, M. (1984). Home intravenous care. NITA, 7, 10-11.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Larson, S. E. (1987). Home IV antibiotic therapy: The primary-care physician's role. Drug Therapy, 17(11), 67-69, 73-74.	Reference List	Yes	No				Not Relevant
Lavelle, C. L. (1993). Acyclovir: is it an effective virostatic agent for orofacial infections? Journal of Oral Pathology & Medicine, 22(9), 391-401.	Electronic Database	Yes	No				Not Relevant
Lawson, M., Bottino, J. C., & McCredie, K. B. (1979). Long term IV therapy: American Journal of Nursing, 79, 1100-1103.	Reference List	Yes	No				Not Relevant
Lawton, S. E. (1993). Legal issues. Hospital Practice, 28(Suppl. 2), 44-47.	Electronic Database	Yes	No				Not Relevant
Leaver, J., Radivan, F., Patel, L., & David, T. J. (1997). Home intravenous antibiotic therapy: practical aspects in children. Journal of the Royal Society of Medicine, 90(Suppl. 31), 26-33.	Electronic Database	Yes	No				Not Relevant
Leder, K., Turnidge, J. D., & Grayson, M. L. (1998). Home-based treatment of cellulitis with twice-daily cefazolin. Medical Journal of Australia, 169(10), 519-522.	Electronic Database	Yes	No				Not Relevant
Leder, K., Turnidge, J. D., Korman, T. M., & Grayson, M. L. (1999). The clinical efficacy of continuous-infusion flucloxacillin in serious staphyloccal sepsis. Journal of Antimicrobial Chemotherapy, 43(1), 113-118.	Electronic Database	Yes	No				Not Relevant
Lee, E. C., Roberts, P. L., Taranto, R., Schoetz, D. J., Jr., Murray, J. J., & Coller, J. A. (1996). Inpatient vs. outpatient bowel preparation for elective colorectal surgery. Diseases of the Colon & Rectum, 39(4), 369-373.	Electronic Database	Yes	No				Not Relevant
Lee, K., & Andrews, J. D. (1988). Assessment of the need for a home intravenous antibiotic program. The Canadian Journal of Hospital Pharmacy, 41(6), 295-301, 307.	Electronic Database	Yes	No				Not Relevant
LeFrock, J. L., Ristuccia, A. M., Ristuccia, P. A., Quenzer, R. W., Haggerty, P. G., Allen, J. E., Lettau, L. A., Schwartz, R., & Appleby, D. (1992). Teicoplanin in the treatment of bone and joint infections. European Journal of Surgery, 567(Suppl.), 9-13.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Leggiadro, R. J., Davis, Y., & Tenover, F. C. (1994). Outpatient drug-resistant pneumococcal bacteremia. The Pediatric Infectious Disease Journal, 13(12), 1144-1146.	Reference List	Yes	No				Not Relevant
Legha, S. S., Haq, M., Rabinowits, M., Lawson, M., & McCredie, K. (1985). Evaluation of silicone elastomer catheters for long-term intravenous chemotherapy. Archives of Internal Medicine, 145(7), 1208-1211.	Electronic Database	Yes	No				Not Relevant
Leichty, A. (1993). First dose at home. American Journal of Hospital Pharmacy, 50(10), 2058.	Reference List	No					
LeLorier, J., & Derderian, F. (1998). Effect of listing ciprofloxacin in provincial formularies on hospitalizations for bronchitis and pyelonephritis. Canadian Journal of Clinical Pharmacology, 5(3), 133-137.	Electronic Database	Yes	No				Not Relevant
Leophonte, P., Bertrand, A., Nouvet, G., Muir, J. F., Lucht, F., Delaval, P., Depierre, A., Hughes, F., Ulmer, M., Gres, J. J., & Rollin, C. (1993). A comparative study of cefepime and ceftazidime in the treatment of community-acquired lower respiratory tract infections. Journal of Antimicrobial Chemotherapy, 31(Suppl. B.), 165-173.	Electronic Database	Yes	No				Not Relevant
LeRoy, M., Theobald, W., & Mischler, E. (1985). Cost differences between home antibiotic and inpatient hospitalization. Cystic Fibrosis Club Abstracts, 26, 185.	Electronic Database	Yes	No				Not Relevant
Lewin, E. B., Orbach, S., Meachan, H., & McCormick, L. (1988). Psychosocial aspects of in-hospital vs home IV antibiotic therapy in children (abstract). Proceedings of the 28th Interscience Conference on Antimicrobial Agents and Chemotherapy, Los Angeles, 244.	Reference List	Yes - Abstract	No				Not Relevant
Lichenstein, R., King, J. C., Jr., Farley, J. J., Su, P., Nair, P., & Vink, P. E. (1998). Bacteremia in febrile human immunodeficiency virus-infected children presenting to ambulatory care settings. The Pediatric Infectious Disease Journal, 17(5), 381-385.	Electronic Database	Yes	No				Not Relevant
Liechty, A. (1993). First dose at home. American Journal of Hospital Pharmacy, 50(10), 2058.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Lieu, T. A., Baskin, M. N., Schwartz, J. S., & Fleisher, G. R. (1992). Clinical and cost-effectiveness of outpatient strategies for management of febrile infants. Pediatrics, 89(6), 1135-1144.	Electronic Database	Yes	No				Not Relevant
Lima, H. A. (1998). Cystic fibrosis: Management and treatment in the home care setting. Home Healthcare Consultant, 5(36), 6, 9-12, 15-18.	Electronic Database	No					
Lima, H. A., & Seabolt, J. (1997). Cystic fibrosis: Understanding the scope and treatment. Infusion, 3(11), 12-21.	Electronic Database	Yes	No				Not Relevant
Lindbeck, G. (1993). Emergency department and urgent care. Hospital Practice, 28(Suppl. 2), 44-47.	Electronic Database	Yes	No				Not Relevant
Lindbeck, G., & Powers, R. (1993). Cellulitis. Hospital Practice, 28(Suppl. 2), 10-14.	Electronic Database	Yes	No				Not Relevant
Lipsky, B. A., Pecoraro, R. E., Larson, S. A., Hanley, M. E., & Ahroni, J. H. (1990). Outpatient management of uncomplicated lower-extremity infections in diabetic patients. Archives of Internal Medicine, 150(4), 790-797.	Electronic Database	Yes	No				Not Relevant
Loftus, T. (1988). Reclaiming their childhood: Helping cystic fibrosis patients with high-tech homecare. Caring, 7(6), 22-27.	Electronic Database	Yes	No				Not Relevant
Lopez-Menchero, R., Siguenza, F., Caridad, A., Alonso, J. C., & Ferreruela, R. M. (1998). Peritonitis due to comamonas acidovorans in a CAPD patient. Peritoneal Dialysis International, 18(4), 445-446.	Electronic Database	Yes	No				Not Relevant
Lortholary, O., & Dupont, B. (1997). Antifungal prophylaxis during neutropenia and immunodeficiency. Clinical Microbiology Reviews, 10(3), 477-504.	Electronic Database	Yes	No				Not Relevant
Low, C. (1994). Intravenous therapy: community care in HIV-related CMV disease. British Journal of Sexual Medicine, 21, 24-26.	Reference List	No					
Lowe-Phelps, K. (1996). Managing change while maintaining quality in home infusion therapy. Journal of Intravenous Nursing, 19(1), 38-45.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Lucht, F., Vergely, N., Rousset, H., Bousquet, G., & Balique, J. G. (1989). Totally implantable vascular access for antimicrobial infusion at home and prevention of systemic candidosis. The Lancet, 1(8639), 666.	Electronic Database	Yes	No				Not Relevant
Lupa, L. J., & Liberti, L. E. (1997). An evaluation of the mini-bag plus system in the home care environment. Hospital Pharmacy, 32(1), 54-56.	Electronic Database	Yes	No				Not Relevant
Lutz, B., Pitre, R., & Landry, J. (1998). Practical considerations of outpatient infusion therapy in the HIV arena. Infectious Disease Clinics of North America, 12(4), 951-961.	Electronic Database	Yes	No				Not Relevant
MacGowan, A. P., Bowker, K. E., Lovering, A. M., Brown, I. M., Darley, E. S. R., Reeves, D. S., & Harvey, J. E. (1996). Once-a-day carbapenem therapy. Journal of Antimicrobial Therapy, 38(2), 327-328.	Electronic Database	Yes	No				Not Relevant
Madigan, E. A. (1997). An introduction to pediatric home health care. Journal of the Society of Pediatric Nurses, 2(4), 172-178.	Electronic Database	Yes	No				Not Relevant
Magid, D. M., Vokes, E. E., Schilsky, R. L., Guarnieri, C. M. Whaling, S. M., Weichselbaum, R. R., & Panje, W. R. (1989). A randomized study of inpatient versus outpatient continuous intravenous infusion chemotherapy: psychosocial aspects. Selective Cancer Therapeutic, 5(3), 137-145.	Key Informant	No					
Makua, L., Talemiai, M. A., Sitzmann, J. V., Burns, R. C., & McQuire, M. E. (1992). Long-term central venous access vs. other home therapies: complications in patients with acquired immunodeficiency syndrome. Journal of Parenteral and Enteral Nutrition, 16(5), 455-459.	Reference List	No					
Malanoski, G. J., Samore, M. H., Pefanis, A., & Karchmer, A. W. (1995). Staphylococcus aureus catheter-associated bacteremia. Minimal effective therapy and unusual infectious complications associated with arterial shealth catheters. Archives of Internal Medicine, 155(11), 1161-1166.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Malik, I. A. (1997). Out-patient management of febrile neutopenia in indigent paediatric patients. Annals Academy of Medicine, 26(6), 742-746.	Electronic Database	Yes	No				Not Relevant
Malik, I. A., Aziz, Z., & Khan, W. A. (1992). A randomized trial to evaluate the role of ofloxacin in the out-patient management of neutropenic febrile patients (abstract 686). Annals of Oncology, 3(Suppl. 5), 179.	Reference List	No					
Malik, I. A., Khan, W. A., Aziz, Z., & Karim, M. (1994). Self-administered antibiotic therapy for chemotherapy-induced, low-risk, febrile, neutropenia in patients with nonhematologic neoplasms. Clinical Infectious Diseases, 19, 522-527.	Reference List	Yes	No				Not Relevant
Malik. I. A., Khan, W. A., Karim, M., Aziz, Z., & Khan, M. A. (1995). Feasibility of outpatient management of fever in cancer patients with low-risk neutropenia: Results of a prospective randomized trial. The American Journal of Medicine, 98, 224-231.	Electronic Database	Yes	No				Not Relevant
Malinowski, R. W., Strate, R. G., Perry, J. F., Jr, & Fischer, R. P. (1979). The management of human bite injuries of the hand. The Journal of Trauma, 19(9), 655-659.	Electronic Database	Yes	No				Not Relevant
Malkin, S., & Baker, H. (1980). An evaluation of early hospital discharge to home care services. Canadian Family Physician, 26, 368, 371-372.	Reference List	Yes	No				Not Relevant
Mallory, T. H. (1978). Excision arthroplasty with delayed wound closure for the infected total hip replacement. Clinical Orthopaedics and Related Research, 137, 106-111.	Electronic Database	Yes	No				Not Relevant
Maltezou, H. C., Petropoulos, D., Gardner, M., Abi-Said, D., Mantzouranis, E. C., Rolston, K. V. I., & Chan, K. W. (1998). Varicella-zoster virus infection in children with hematopoietic stem cell transplants. International Journal of Hematology/Oncology, 5(5), 345-351.	Electronic Database	Yes	No				Not Relevant
Manzella, J. P., McConville, J. H., Klaus, B., & Brenner, T. (1985). Home intravenous antibiotic therapy. Pennsylvania Medicine, 88(10), 52-54.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Manzulla, E. F., Rubenstein, E. B, & Rolston, K. V. I. (1996). Outpatient management of the febrile neutropenic patient with cancer. Infections in Medicine, 13(5), 357-358, 361-362, 367-369.	Electronic Database	Yes	No				Not Relevant
Mao, C-A., Siegler, E. L., & Abrutyn, E. (1996). Antimicrobial resistance in long term geriatric care. Implications for drug therapy. Drugs & Aging, 8(3), 162-170.	Electronic Database	Yes	No				Not Relevant
Marcy, S. M. (1989). Outpatient management of bacterial meningitis. The Pediatric Infectious Disease Journal, 8(4), 260.	Electronic Database	Yes	No				Not Relevant
Markel, S. (1994). PIC/PICC and extended peripheral catheters: Five years' experience in home care. Journal of Home Health Care Practice, 7(1), 35-40.	Electronic Database	Yes	No				Not Relevant
Markel, S., & Reynen, K. (1990). Impact on patient care. 2652 PIC catheter days in the alternative setting. Journal of Intravenous Nursing, 13(6), 347-351.	Electronic Database	Yes	No				Not Relevant
Marrie, T. J. (1996). Pneumonia in the elderly. Current Opinion in Pulmonary Medicine, 2(3), 192-197.	Electronic Database	Yes	No				Not Relevant
Marrie, T. J. (1997). When to discharge a patient with pneumonia. The Journal of Respiratory Diseases, 18(12), 1071-1079.	Electronic Database	Yes	No				Not Relevant
Marrie, T. J. (1998). Pneumonia. Bailliere's Clinical Infectious Diseases, 5(1), 35-51.	Electronic Database	Yes	No				Not Relevant
Marrie, T. J., Peeling, R. W., Fine, M. J., Singer, D. E., Coley, C. M., & Kapoor, W. N. (1996). Ambulatory patients with community-acquired pneumonia: The frequency of atypical agents and clinical course. The American Journal of Medicine, 101, 508-515.	Reference List	Yes	No				Not Relevant
Marsh, P. K., Tice A. D., Craven, P. C., McEniry, D. W., & Sullivan, M. E. Impenem/cilastatin therapy in the management of infections in the outpatient setting. Infectious Diseases in Clinical Practice, 5(8), 498-501.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Marsh, P. K., Tice, A. D., Craven, P. C., & McEniry, D. W. (1989). Treatment of chronic PID with long-term home IV antibiotics (abstract 991). Proceedings of the 29th Interscience Conference on Antimicrobial Agents and Chemotherapy, Washington, DC, 270.	Reference List	Yes - Abstract	No				Not Relevant
Marshall, R., Teele, D. W., & Klein, J. O. (1979). Unsuspected bacteremia due to Haemophilus influenzae: Outcome in children not initially admitted to hospital. The Journal of Pediatrics, 95(5), 690-695.	Reference List	Yes	No				Not Relevant
Martel, A. (1998). Intravenous antibiotic therapy at home. The Canadian Journal of CME, July, 43-58.	Reference List	Yes	No				Not Relevant
Martel, A. Y., Valois, M., Bergeron, M. G., & Gauthier, J. (1995). Home inravenous antibiotic therapy (HIVAT): Cost analysis (abstract 0332). Canadian Journal of Infectious Diseases, 6(Suppl. C), 238C.	Electronic Database	Yes - Abstract	No				Not Relevant
Martin, J. K., Jr, O'Connell, M. J., Wieand, H. S., Fitzgibbons, R. J., Jr., Mailliard, J. A., Rubin, J., Nagorney, D. M., Tschetter, L. K., & Krook, J. E. (1990). Intra-arterial floxuridine vs systemic fluorouracil for hepatic metastases from colorectal cancer. A randomized trial. Archives of Surgery, 125(8), 1022-1027.	Electronic Database	Yes	No				Not Relevant
Masoorli, S. (1997). Vascular access devices: Legal considerations for home care. Home Health Care Consultant, 4(9), 21-24.	Reference List	No					
Masoorli, S., & Angeles, T. (1990). PICC lines: The latest home care challenge. RN, 53(1), 44-51.	Reference List	Yes	No				Not Relevant
Matsumoto, T., Kumazawa, J., Ueda, S., Eto, K., Yushita, Y., Saito, Y., Ishii, T., & Sawae, Y. (1991). Treatment of complicated urinary tract infections with ofloxacin following an aminoglycoside. Chemotherapy, 37(Suppl. 1), 60-67.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Mauceri, A. A. (1994). Treatment of bone and joint infections utilizing a third-generation cephalosporin with an outpatient drug delivery device. The American Journal of Medicine, 97(Suppl. 2A), 14-22.	Electronic Database	Yes	No				Not Relevant
May, C. (1984). Antibiotic therapy at home. American Journal of Nursing, 84(3), 348-349.	Electronic Database	Yes	No				Not Relevant
McAbee, R. R., Grupp, K., & Horn, B. H. (1991). Home intravenous therapy: Part I-issues. Home Health Care Services Quarterly, 12(3), 59-108.	Electronic Database	Yes	No				Not Relevant
McAbee, R. R., Grupp, K., & Horn, B. H. (1991). Home intravenous therapy: Part II-resource guide. Home Health Care Services Quarterly, 12(3), 109-127.	Electronic Database	Yes	No				Not Relevant
McBride, J. T. (1997). Pharmacologic therapy: Managing exacerbations of asthma. Pediatric Asthma Allergy & Immunology, 11(3), 105-121.	Electronic Database	Yes	No				Not Relevant
McCarthy, A., Byrne, M., Breathnach, F., & O'Meara, A. (1995). "In-situ" teicoplanin for central venous catheter infection. Irish Journal of Medicine, 164(2), 125-127.	Electronic Database	Yes	No				Not Relevant
McCarthy, A., Rao, J. S., Byrne, M., Breatnach, F., & O'Meara, C. A. (1998). Central venous catheter infections treated with teicoplanin. European Journal of Haematology, 59(Suppl. 62), 15-17.	Electronic Database	Yes	No				Not Relevant
McCarthy, C. A., Powell, K. R., Jaskiewicz, J. A., Carbrey, C. L., Hylton, J. W., Monroe, D. J., & Meyer, H. (1990). Outpatient management of selected infants younger than two months of age evaluated for possible sepsis. The Pediatric Infectious Disease Journal, 9(6), 385-389.	Reference List	Yes	No				Not Relevant
McCarthy, P. L., Grundy, G. W., Spiesel, S. Z., & Dolan, T. F., Jr. (1976). Bacteremia in children: An outpatient clinical review. Pediatrics, 57(6), 861-868.	Electronic Database	Yes	No				Not Relevant
McCloskey, R. V. (1991). There's no place like home. Reviews of Infectious Diseases, 13(Suppl. 2), S141.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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McCracken, M. J., Sumpman, M., & Warwick, W. J. (1985). A home care approach in CF. Cystic Fibrosis Club, 26, 187.	Reference List	No					
McCue, J. D. (1988). Outpatient IV antibiotic therapy: Practical and ethical considerations. Hospital Practice, 23(3), 208-211.	Electronic Database	Yes	No				Not Relevant
McKinley, G. F. (1997). OPAT in the setting of HIV infection. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part II. Management of Serious Infections by OPAT. A Special Report from Scientific American Medicine (pp. 77-80). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
McKinsey, D. S., Gupta, M. R., Riddler, S. A., Driks, M. R., Smith, D. L., & Kurtin, P. J. (1989). Long-term amphotericin B therapy for disseminated histoplasmosis in patients with the acquired immunodeficiency syndrome (AIDS). Annals of Internal Medicine, 111(8), 655-659.	Electronic Database	Yes	No				Not Relevant
McLaughlin, F. J., Matthews, W. J., Jr., Strieder, D. J., Sullivan, B., & Goldmann, D. A. (1983). Randomized, double-blind evaluation of azlocillin for the treatment of pulmonary exacerbations of cystic fibrosis. Journal of Antimicrobial Chemotherapy, 11(Suppl. B), 195-203.	Electronic Database	Yes	No				Not Relevant
McNulty, J. (1993). Initiation of antimicrobial therapy in the home. American Journal of Hospital Pharmacy, 50, 773-774.	Reference List	Yes	No				Not Relevant
McPherson, M. L. (1990). Monitoring home IV antibiotic therapy. Journal of Health Care Practice, 2(Suppl.), 69-77.	Reference List	No					
Meeker, D. P., & Longworth, D. L. (1996). Community-acquired pneumonia: an update. Cleveland Clinic Journal of Medicine, 63(1), 16-30.	Electronic Database	Yes	No				Not Relevant
Mellis, C. M., Peat, J. K., & Woolcock, A. J. (1993). The cost of asthma. Can it be reduced? PharmacoEconomics, 3(3), 205-219.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Menon, J., Bowen, T. M., & Neri, C. (1984). Long term outpatient intravenous antibiotic therapy for orthopedic patients. Orthopedics, 7(8), 1280-1283.	Reference List	Yes	No				Not Relevant
Messing, B. (1998). Catheter-sepsis during home parenteral nutrition: Use of the antibiotic-lock technique. Nutrition, 14(5), 466-468.	Electronic Database	Yes	No				Not Relevant
Messing, B., Peitra-Cohen, S., Debure, A., Beliah, M., & Bernier, J-J. (1988). Antibiotic-lock technique: A new approach to optimal therapy for catheter-related sepsis in home-parenteral nutrition patients. Journal of Parenteral and Enteral Nutrition, 12(2), 185-189.	Electronic Database	Yes	No				Not Relevant
Meyer, J. D., Brundige, M. L., & Kelly, W. N. (1986). Hamot Medical Center. American Journal of Hospital Pharmacy, 43(2), 406-409.	Electronic Database	Yes	No				Not Relevant
Micheal, S. L. (1978). Home IV therapy. American Journal of Nursing, 78(7), 1223-1226.	Reference List	Yes	No				Not Relevant
Milkovich, G. (1993). Costs and benefits. Hospital Practice, 28(Suppl. 1), 39-43.	Electronic Database	Yes	No				Not Relevant
Milkovich, G. (1995). Benefits of outpatient parenteral antibiotic therapy: to the individual, the institution, third-party payers and society. International Journal of Antimicrobial Agents, 5(1), 27-31.	Reference List	Yes	No				Not Relevant
Milkovich, G. (1996). Antibiotic usage: Pharmacoeconomic impact in a changing healthcare system. Drugs, 52(Suppl. 2), 80-82.	Electronic Database	Yes	No				Not Relevant
Milkovich, G., & Reitan, J. (1997). Economic assessment of outpatient services. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 32-36). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Millar, L. K., Wing, D. A., Paul, R. H., & Grimes, D. A. (1995). Outpatient treatment of pyelonephritis in pregnancy: A randomized controlled trial. Obstetrics and Gynecology, 86(4), 560-564.	Electronic Database	Yes	No◇	No◇			Not Relevant
Millar, L. K. (1993). Pyelonephritis. Hospital Practice, 28(Suppl. 1), 31-35.	Electronic Database	Yes	No				Not Relevant
Miller, Z. (1993). Health maintenance organization. Hospital Practice, 28(Suppl. 2), 48-51.	Electronic Database	Yes	No*	No*			Not Relevant
Miller, S. J., Dickerson, R. N., Graziani, A. A., Muscari, E. A., & Mullen, J. L. (1990). Antibiotic therapy of catheter infections in patients receiving home pareneteral nutrition. Journal of Parenteral and Enteral Nutrition, 14(2), 143-147.	Electronic Database	Yes	No*	No*			Not Relevant
Millikin, S. P., Matzke, G. R., & Keane, W. F. (1991). Antimicrobial treatment of peritonitis associated with continuous ambulatory peritoneal dialysis. Peritoneal Dialysis International, 11(3), 252-260.	Electronic Database	Yes	No				Not Relevant
Minogue, M. F., Coley, C. M., Hough, L. N., et al. (1996). Patients hospitalized after initial ambulatory therapy for community acquired pneumonia. Journal of General Internal Medicine, 11, 52.	Reference List	No					
Mocsny, N. (1992). Cryptococcal meningitis in patients with AIDS. Journal of Neuroscience Nursing, 24(5), 265-268.	Electronic Database	Yes	No				Not Relevant
Moeser, L. C. (1991). Anaphylaxis. A preventable complication of home infusion therapy. Journal of Intravenous Nursing, 14(2), 108-112.	Reference List	Yes	No				Not Relevant
Mole, L., Oliva, C., & O'Hanley, P. (1992). Extended stability of ganciclovir for outpatient parenteral therapy for cytomegalovirus retinitis. Journal of Acquired Immune Deficiency Syndromes, 5(4), 354-358.	Electronic Database	Yes	No				Not Relevant
Monk-Tutor, M. R., & Juergens, J. P. (1993). Provision of home infusion therapy services by U.S. hospitals in 1990. American Journal of Hospital Pharmacy, 50, 2368-69.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Montalto, M. (1995). 'First impressions": Patients and carer satisfaction with a Victorian hospital in the home visit. A paper presented at the Australian Home and Outpatient Intravenous Therapy Association Annual Scientific Meeting, Melbourne.	Reference List	No					
Montalto, M. (1996). Patients' and carers' satisfaction with hospital-in-the-home care. International Journal for Quality in Health Care, 8(3), 243-251.	Electronic Database/ Key Informant	Yes	No				Not Relevant
Montalto, M. (1997A). An audit of patients admitted for home intravenous therapy directly from the emergency department. International Journal of Clinical Practice, 51(7), 433-437.	Electronic Database	Yes	No◇	No◇			Not Relevant
Montalto, M. (1997B). Hospital in the home. Australian Prescriber, 20(4), 88-90.	Electronic Database	Yes	No				Not Relevant
Montalto, M. (1998). How safe is hospital-in-the-home care? Medical Journal of Australia, 168(6), 277-280.	Electronic Database	Yes	No				Not Relevant
Montalto, M., & Dunt, D. (1993). Delivery of traditional hospital services to patients at home. Medical Journal of Australia, 159, 263-265.	Reference List	Yes	No				Not Relevant
Montalto, M., & Wood, B. (1996). Major stroke in a patient treated for bacterial endocarditis in a hospital at home unit. Australian & New Zealand Journal of Medicine, 26(1), 105-107.	Electronic Database	Yes	No				Not Relevant
Montgomerie, J. Z., & Ota, J. K. (1980). Klebsiella bacteremia. Archives of Internal Medicine, 140(4), 525-527.	Electronic Database	Yes	No				Not Relevant
Moore, T. A. & Tuazon, C. U. (1996). Weighing the risks of outpatient versus inpatient treatment: when to hospitalize for community-acquired pneumonia. Journal of Respiratory Diseases, 17, 878-893.	Reference List	No					
Morales, J. O., & Snead, H. (1994). Efficacy and safety of intravenous cefotaxime for treating pneumonia in outpatients. The American Journal of Medicine, 97(Suppl. 2A), 28-33.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Morales, J. O., & Von Behren, L. (1994). Secondary bacterial infections in HIV-infected patients: An alternative ambulatory outpatient treatment utilizing intravenous cefotaxime. The American Journal of Medicine, 97(Suppl. 2A), 9-13.	Electronic Database	Yes	No				Not Relevant
Moreillon, P. (1994). The efficacy of amoxycillin/clavulante (Augmentin) in the treatment of severe staphylococcal infections. Journal of Chemotherapy, 6(Suppl. 2), 51-57.	Electronic Database	Yes	No				Not Relevant
Mormino, M. A., Esposito, P. W., & Raynor, S. C. (1999). Peripelvic abscesses: A diagnostic dilemma. Journal of Pediatric Orthopaedics, 19(2), 161-163.	Electronic Database	Yes	No				Not Relevant
Moore, T. A., & Tuazon, C. U. (1996). Weighing the risks of outpatient versus inpatient treatment. When to hospitalize for community acquired pneumonia. The Journal of Respiratory Diseases, 17(10), 878-893.	Reference List	No					
Morrey, B. F., Bianco, A. J., & Rhodes, K. H. (1976). Suppurative arthritis of the hip in children. The Journal of Bone and Joint Surgery, 58(3), 388-392.	Electronic Database	Yes	No				Not Relevant
Morris, D. A., Barbero, G. J., Woodruff, C., Konig, P., & Bradford, B. (1985). Home intravenous therapy in cystic fibrosis. Is it worth it? A cost analysis (abstract). Cystic Fibrosis Club Abstracts, 26, 153.	Reference List	Yes - Abstract	No				Not Relevant
Morrison, A., Eron, L., Poretz, D. M., & Goldenberg, R. (1987). Outpatient intravenous therapy of nonbacterial infections in immunocompromised patients, new directions for cost containment (abstract). Proceedings of the 27th Interscience Conference on Antimicrobial Agents and Chemotherapy, New York, 244.	Reference List	No					
Morriw, T. J. (1997). When to discharge the patient with pneumonia. Journal of Respiratory Diseases, 18(12), 1071-1079.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Mortlock, N. J., & Schleis, T. (1998). Outpatient parenteral antimicrobial therapy technology. Infectious Disease Clinics of North America, 12(4), 861-878.	Electronic Database	Yes	No				Not Relevant
Mossad, S. B., Serkey, J. M., Longworth, D. L., Cosgrove, D. M., III., & Gordon, S. M. (1997). Coagulase-negative staphylcoccal sternal wound infections after open heart operations. Annals of Thoracic Surgery, 63(2), 395-401.	Electronic Database	Yes	No				Not Relevant
Mostow, S. R., & O'Brien, R. F. (1985). Safety and effectiveness of ticarcillin plus clavulanate potassium in treatment of lower respiratory tract infections. The American Journal of Medicine, 79(Suppl. 5B), 78-80.	Electronic Database	Yes	No				Not Relevant
Mouton, Y. J., Beuscart, C., & the Meropenem Study Group. (1995). Empirical monotherpy with meropenem in serious bacterial infections. Journal of Antimicrobial Chemotherapy, 36(Suppl. A), 145-156.	Electronic Database	Yes	No				Not Relevant
Mozaffari, E., & Sullivan, S. D. (1996). Home care reimbursement for intravenous ganciclovir therapy. American Journal of Health-System Pharmacy, 53(2), 161-163.	Electronic Database	Yes	No				Not Relevant
Muhe, L. (1998). Pattern of resolution of tachypnoea and fever in childhood pneumonia. East African Medical Journal, 75(2), 63-67.	Electronic Database	Yes	No				Not Relevant
Mukau, L., Talamini, M. A., Sitzmann, J. V., Cartland Burns, R., & McGuire, M. E. (1992). Long-term central venous access vs. other home therapies: Complications in patients with acquired immunodeficiency syndrome. Journal of Parenteral and Enteral Nutrition, 16(5), 455-459.	Electronic Database	Yes	No				Not Relevant
Mulhern, J. G., Braden, G. L., O'Shea, M. H., Madden, R. L., Lipkowitz, G. S., & Germain, M. J. (1995). Trough serum vancomycin levels predict the relapse of gram-positive peritonitis in peritoneal dialysis patients. American Journal of Kidney Diseases, 25(4), 611-615.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Mulholland, E. K., Falade, A. G., Corrah, P. T., Omosigho, C., N'Jai, P., Giadom, B., Adegbola, R. A., Tschappeler, H., Todd, J., & Greenwood, B. M. (1995). A randomized trial of chloramphenicol vs. trimethoprim-sulfamethoxazole for the treatment of malnorished children with community-acquired pneumonia. Pediatric Infectious Disease Journal, 14(11), 959-965.	Electronic Database	Yes	No				Not Relevant
Mullen, C. (1998). Outpatient management of fever and neutropenia in children with cancer (abstract). International Journal of Hematology Oncology, 5(1), 63.	Reference List	Yes - Abstract	No				Not Relevant
Mullen, C. & Buchanan, G. R. (1990). Early hospital discharge of children with cancer treated for fever and neutropenia: Identification and management of the low-risk patient. Journal of Clinical Oncology, 8(12), 1998-2004.	Reference List	Yes	No				Not Relevant
Mulligan, T. (1991). Parenteral antibiotic therapy for patients in nursing homes. Reviews of Infectious Diseases, 13(Suppl. 2), S180-S183.	Electronic Database	Yes	No				Not Relevant
Munzenberger, P. J., & Levin, S. (1993). Home parenteral antibiotic therapy for patients with cystic fibrosis. Hospital Pharmacy, 28(1), 20-28.	Electronic Database	Yes	No				Not Relevant
Mustafa, M. M., Aquino, V. M., Pappo, A., Tkaczewski, I., & Buchanan, G. R. (1996). A pilot study of outpatient management of febrile neutropenic children with cancer at low risk of bacteremia. The Journal of Pediatrics, 128(6), 847-849.	Electronic Database	Yes	No				Not Relevant
Mydlik, M., Tkacova, E., Szovenyiova, K., Mizla, P., & Derzsiova, K. (1996). Saccharomyces cerevisiae peritonitis complicating CAPD. Peritoneal Dialysis International, 16(2), 188-189.	Electronic Database	Yes	No				Not Relevant
Mylotte, J. M., Beam, T. R., Jr., & Allen, J. C. (1983). Staphlococcus aureus bacteremia: A prospective study. Southern Medical Journal, 76(9), 1131-1135.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Mylotte, J. M., Naughton, B., Saludades, C., & Maszarovics, Z. (1998). Validation and application of the pneumonia prognosis index to nursing home residents with pneumonia. Journal of the American Geriatrics Society, 46(12), 1538-1544.	Electronic Database	Yes	No				Not Relevant
Nahata, M. C., King, D. R., Powell, D. A., Marx, S. M., & Ginn-Pease, M. E. (1988). Management of catheter-related infections in pediatric patients. Journal of Parenteral and Enteral Nutrition, 12(1), 58-59.	Reference List	Yes	No				Not Relevant
Nathwani, D. (1995). New option in the treatment of serious and chronic infections. Hospital Update, 21, 88-89.	Reference List	No					
Nathwani, D. (1996). Outpatient treatment with teicoplanin. Chemotherapie Journal, 5(Suppl. 11), 35-38.	Electronic Database	Yes	No				Not Relevant
Nathwani, D. (1998). Non-inpatient use of teicoplanin. IJCP, 52(8), 577-581.	Electronic Database	Yes	No				Not Relevant
Nathwani, D., Boyter, A., Fegan, P. G., & Davey, P. (1996). Switch therapy in community-acquired pneumonia. Archives of Internal Medicine, 156(11), 1235.	Electronic Database	Yes	No				Not Relevant
Nathwani, D., & Davey, P. (1996). Intravenous antimicrobial therapy in the community: underused, inadequately resourced, or irrelevant to health care in Britain? BMJ, 313(7071), 1541-1543.	Electronic Database	Yes	No				Not Relevant
Nathwani, D., Green, S. T., Goldberg, D. F., Atkinson, F., & Kennedy, D. H. (1989). Ganciclovir infusion at home. Journal of Infection, 19(3), 294.	Electronic Database	Yes	No				Not Relevant
Nathwani, D., Moitra, S., Dunbar, J., Crosby, G., Peterkin, G., & Davey, P. (1998). Skin and soft tissue infections: Development of a collaborative management plan between community and hospital care. IJCP, 52(7), 456-460.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Nathwani, D., Morrison, J., Seaton, R. A., France, A. J., Davey, P., & Gray, K. (1999). Out-patient and home-parenteral antibiotic therapy: Evaluation of the impact on one year's experience in Tayside. Health Bulletin, 57(5), 332-337.	Key Informant	No					
Nathwani, D., Seaton, A., & Davey, P. (1997). Key issues in the development of a non-inpatient intravenous (NIPIV) antibiotic therapy programme – a European perspective. Reviews in Medical Microbiology, 8(3), 137-147.	Electronic Database	Yes	No				Not Relevant
Navasa, M., Follo, A., Llovet, J. M., Clemente, G., Vargas, V., Rimola, A., Marco, F., Guarner, C., Forne, M., Planas, R., Banares, R., Castells, L., De Anta, M. T., J., Arroyo, V., & Rodes, J. (1996). Randomized, comparative study of oral ofloxacin versus intravenous cefotaxime in spontaneous bacterial peritonitis. Gastroenterology, 111(4), 1011-1017.	Electronic Database	Yes	No*	No*			Not Relevant
Neary, C. (1989). Centralising the intravenous service. Nursing Standard, 3(40), 20-23.	Electronic Database	Yes	No				Not Relevant
Nelson, D. S., Gurr, M. B., & Schunk, J. E. (1998). Management of febrile children with urinary tract infections. American Journal of Emergency Medicine, 16(7), 643-647.	Electronic Database	Yes	No				Not Relevant
Nelson, J. D. (1987). Options for outpatient management of serious infections. Pediatric Infectious Diseases Journal, 6(6), 603-606.	Reference List	Yes	No				Not Relevant
Nelson, J. D. (1992). Options for outpatient management of serious infections. Pediatric Infectious Diseases Journal, 11(2), 175-178.	Reference List	Yes	No				Not Relevant
Ness, R. B., Soper, D. E., Peiport, J., Sondheimer, S. J., Holley, R. L., Sweet, R. L., Hemsell, D. L., Randall, H., Hendrix, S. L., Bass, D. C., Kelsey, S. F., Songer, T. J., & Lave, J. R, for the PID Evaluation and Clinical Health (PEACH) Study Investigators. (1998). Design of the PID evaluation and clinical health (PEACH) study. Controlled Clinical Trials, 19(5), 499-514.	Electronic Database	Yes	No*	No*			Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Neu, H. C. (1988). Trends in treating geriatric infections at home. Geriatrics, 43(12), 11-12.	Reference List	Yes	No				Not Relevant
Neu, H. C. (1989). Antimicrobial agents: The old and the new. American Journal of Infection Control, 17(5), 276-285.	Electronic Database	Yes	No				Not Relevant
Neu, H. C. (1991). Microbiologic aspects of fluoroquinolones. American Journal of Ophtholmology, 122(Suppl. 4), 15S-24S.	Electronic Database	Yes	No				Not Relevant
Neville, L. O., Baillod, R. A., Brumfitt, W., & Hamilton-Miller, J. M. T. (1988). Efficacy and safety of teicoplanin in gram-positive peritonitis in patients on peritoneal dialysis. Journal of Antimicrobial Chemotherapy, 21(Suppl. A), 123-131.	Electronic Database	Yes	No				Not Relevant
New, P. B., Swanson, G. F., Bulich, R. G., & Taplin, G. C. (1991). Ambulatory antibiotic infusion devices: Extending the spectrum of outpatient therapies. The American Journal of Medicine, 91(5), 455-461.	Electronic Database	Yes	No				Not Relevant
Newland, A. C., & Ketley, N. J. (1998). Non-inpatient parenteral antibiotic therapy in febrile adults. European Journal of Haematology, 59(Suppl. 62), 6-10.	Electronic Database	Yes	No				Not Relevant
Nichols, R. L., Smith, J. W., Garcia, R. Y., Waterman, R. S., & Holmes, J. W. C. (1997). Current practices of preoperative bowel preparation among North American colorectal surgeons. Clinical Infectious Diseases, 24(4), 609-619.	Electronic Database	Yes	No				Not Relevant
Nicholson, S. (1990). Understanding home infusion pumps for patient quality of life. Continuing Care, 9(7), 38, 40, 42, 50.	Electronic Database	No					
Niederpruem, M. S. (1989). Factors affecting compliance in the home I.V. antibiotic therapy client. Journal of Intravenous Nursing, 12(3), 136-142.	Electronic Database	Yes	No				Not Relevant
Nieweg, R., Greidanus, J., & de Vries, E. G. E. (1987). A patient education program for a continuous infusion regimen on an outpatient basis. Cancer Nursing, 10(4), 177-182.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Ninan, T. K., & Russell, G. (1994). Intravenous antibiotic therapy in cystic fibrosis: in hospital or at home? Respiratory Medicine, 88(2), 158-159.	Electronic Database	Yes	No				Not Relevant
Noeser, L. C. (1991). Anaphylaxis. A preventative complication of home infusion therapy. Journal of Intravenous Nursing, 14(2), 108-112.	Reference List	No					
Nolet, B. (1993). Patient care issues in outpatient intravenous antibiotic therapy. Infectious Diseases in Clinical Practice, 3(3), 225-226.	Reference List	Yes	No				Not Relevant
Nolet, B. R. (1997). Selecting a venous access device for OPAT. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 37-42). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Nolet, B. R. (1998). Patient selection in outpatient parenteral antimicrobial therapy. Infectious Disease Clinics of North America, 12(4), 835-847.	Electronic Database	Yes	No				Not Relevant
Norrby, S. R. (1996). Clinical efficacy of pefloxacin in nosocomial infections. Clinical Drug Investigation, 11(Suppl. 2), 30-35.	Electronic Database	Yes	No				Not Relevant
Norrby, S. R., Geddes, A. M., & Shah, P. M. (1998). Randomized comparative trial of cefpirome versus ceftazidime in the empirical treatment of suspected bacteraemia or sepsis. Journal of Antimicrobial Chemotherapy, 42(4), 503-509.	Electronic Database	Yes	No				Not Relevant
Nowobiliski-Vasilios, A., & Markel Poole, S. (1999). Home care exchange. Development and preliminary outcomes of a program for administering antimicrobials by i.v. push in home care. American Journal of Health-System Pharmacy, 56(1), 76-79.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Nunes, P. H. F., Vargas, V. E. B., Guidi, M. C., Andrade, R. G., Disarz, A. E., & Ramos, M. L. C. (1996). Continuous expansion for the treatment of skin deformities. Aesthetic Plastic Surgery, 20(4), 347-349.	Electronic Database	Yes	No				Not Relevant
Nussbaum, E. S., Rigamonti, D., Standiford, H., Numaguchi, Y., Wolf, A. L., & Robinson, W. L. (1992). Spinal epidural abscess: A report of 40 cases and review. Surgical Neurology, 38(3), 225-231.	Electronic Database	Yes	No				Not Relevant
O'Cathain, A. (1994). Evaluation of a hospital at home scheme for the early discharge of patients with a fractured neck of femur. Journal of Public Health Medicine, 16(2), 205-210.	Reference List	Yes	No				Not Relevant
O'Halloran, S. M., & Heaf, D. P. (1989). Accident and emergency department attendance by asthmatic children. Thorax, 44(9), 700-705.	Electronic Database	Yes	No				Not Relevant
O'Hara, S. M. (1996). Workup of febrile urinary tract infections. Pediatric Radiology, 26(7), 497.	Electronic Database	Yes	No				Not Relevant
Ochs, H. D., Lee, M. L., Fischer, S. H., Delson, E. S., Change, B. S., & Wedgwood, R. J. (1987). Self-infusion of intravenous immunoglobin by immunodeficient patients at home. The Journal of Infectious Diseases, 156(4), 652-654.	Reference List	Yes	No				Not Relevant
Oh, H. M. L., & Ng, A. W. K., & Lee, S. K. (1996). Cefuroxime compared to amoxicillin-clavulanic acid in the treatment of community-acquired pneumonia. Singapore Medical Journal, 37(3), 255-257.	Electronic Database	Yes	No				Not Relevant
Oliver, G. (1991). Intravenous line care at home. Primary Health Care, 1(5), 12-16.	Reference List	No					
Ortiz, C. R., & La Force, F. M. (1994). Prevention of community-acquired pneumonia. Medical Clinics of North America, 78(5), 1173-1183.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Overturf, G. D. (1987). Use of trimethoprim-sulfamethoxozole in pediatric infections: Relative merits of intravenous administration. Reviews of Infectious Diseases, 9(Suppl. 2), S168-S176.	Electronic Database	Yes	No				Not Relevant
Pace, K. B. (1995). The medicare reimbursement puzzle for home drug infusion therapy. Caring, 14(5), 10-12.	Reference List	Yes	No				Not Relevant
Pang, D. K., Day, A. T., & Baird, R. A. (1985). Use of the broviac central venous catheter for intravenous antibiotic therapy in the orthopaedic patient. The Journal of Bone and Joint Surgery, 67(7), 1108-1112.	Electronic Database	Yes	No				Not Relevant
Pankey, G. A. (1989). Outpatient antimicrobial therapy of skin and skin structure infections. In G. A. Pankey, & G. H. Kalish (Eds.), Outpatient Antimicrobial Therapy: Recent Advances (pp. 71-80). Clifton, New Jersey: Health Care.	Reference List	Yes	No				Not Relevant
Pappas, D. E., Hayden, G. F., & Hendley, J. O. (1997). Epiglottitis and croup: Keys to therapy at home and in the hospital. Consultant, 37(4), 857-860, 863-867.	Electronic Database	Yes	No				Not Relevant
Parenti, D. M., Williams, P. L., Hafner, R., Jacobs, M. R., Hojczyk, P., Hooton, T. M., Barber, T. W., Simpson, G., van der Horst, C., Currier, J., Powderly, W. G., Limjoco, M., Ellner, J. J., & the AIDS Clinical Trials Group Protocol 135 Study Team. A phase II/III trial of antimicrobial therapy with or without amikacin in the treatment of disseminated mycobacterium avium infection in HIV-infected individuals. AIDS, 12(18), 2439-2446.	Electronic Database	Yes	No				Not Relevant
Parker, S. E., Nathwani, D., O'Reilly, D., Parkinson, S., & Davey, P. G. (1998). Evaluation of the impact of non-inpatient iv antibiotic treatment for acute infections on the hospital, primary care services and the patient. Journal of Antimicrobial Chemotherapy, 42(3), 373-380.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Pasadakis, P., Thodis, E., Euthimiadou, A., Panagoutsos, S., Oustoglou, E., Kartali, S., & Vargemezis, V. (1992). Treatment of CAPD peritonitis with clavulanate potentiated ticarcillin. Advances in Peritoneal Dialysis, 238-241.	Electronic Database	Yes	No				Not Relevant
Patel, R., Leith, P., & Hannallah, R. (1996). Evaluation of the difficult pediatric patient. Anesthesiology Clinics of North America, 14(4), 753-766.	Electronic Database	Yes	No				Not Relevant
Patel, S. S., Rutzen, A. R., Marx, J. L., Thach, A. B., Chong, L. P., & Rao, N. A. (1996). Cytomegalovirus papillitis in patients with acquired immune deficiency syndrome. Visual prognosis of patients treated with ganciclovir and/or foscarnet. Opthalmology, 103(9), 1476-1482.	Electronic Database	Yes	No				Not Relevant
Paz, H. L., & Wood, C. A. (1991). Pneumonia and chronic obstructive pulmonary disease. What special considerations does this combination require? Postgraduate Medicine, 90(5), 77-80, 83-86.	Electronic Database	Yes	No				Not Relevant
Peckham, D., & Knox, A. (1993). Intravenous antibiotic therapy in cystic fibrosis: in hospital or at home? Respiratory Medicine, 87(5), 329-330.	Electronic Database	Yes	No				Not Relevant
Pelletier, G. D. (1981). Home intravenous antibiotic therapy: A growing concept. NITA, 4, 45-47.	Reference List	Yes	No				Not Relevant
Pelletier, G. M. (1982). Responding to a need: Home intravenous therapy. NITA, 5, 383-384.	Reference List	Yes	No				Not Relevant
Pena, B. M. G., Harper, M. B., & Fleisher, G. R. (1998). Occult bacteremia with group B streptococci in an outpatient setting. Pediatrics, 102(1), 67-72.	Electronic Database	Yes	No				Not Relevant
Periti, P. (1991). Cost-effective use of once-daily ceftriaxone: Overview of a symposium. Chemotherapy, 37(Suppl. 3), 26-27.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Perry, C. R., Ritterbusch, J. K., Rice, S. H., Davenport, K., & Burdge, R. E. (1986). Antibiotics delivered by an implantable drug pump. A new application for treating osteomyelitis. The American Journal of Medicine, 80(Suppl. 6B), 222-227.	Electronic Database	Yes	No*	No*			Not Relevant
Petrak, R. M. (1998). Outpatient antibiotic therapy in long-term care facilities. Infectious Disease Clinics of North America, 12(4), 995-1008.	Electronic Database	Yes	No*	No*			Not Relevant
Peugeot, R. L., Lipsky, B. A., Hooton, T. M., & Pecoraro, R. E. (1991). Treatment of lower respiratory infections in outpatients with ofloxacin compared with erythromycin. Drugs Experimental Clinical Research, 17(5), 253-257.	Reference List	Yes	No				Not Relevant
Peyron, F., Flori, A., Galliano-Di Bernardo, S., Moreau, J., Bues-Charbit, M., & Balansard, G. (1997). Evaluation of drug use and cost of hospital care for Aids patients between 1990 and 1994. Pharmacy World & Science, 19(4), 202-207.	Electronic Database	Yes	No				Not Relevant
Phillips, A. M. (1997). Home intravenous antibiotic therapy: practical aspects in adults. Journal of the Royal Society of Medicine, 90(Suppl. 31), 34-36.	Electronic Database	Yes	No				Not Relevant
Pien, F. D., & Yamane, K. K. (1987). Ciprofloxacin treatment of soft tissue and respiratory infections in community outpatient practice. The American Journal of Medicine, 82(Suppl. 4A), 236-238.	Reference List	Yes	No				Not Relevant
Pilling, M., & Walley, T. (1996). Effective contracting of high-tech health care for patients at home. Journal of Management in Medicine, 10(3), 6-14.	Electronic Database	Yes	No				Not Relevant
Pilling, M., & Walley, T. (1997). Parenteral antibiotics at home in cystic fibrosis: Experiences and attitudes of recipients. Health and Social Care in the Community, 5(3), 209-212.	Electronic Database	No					
Pillsbury, H. C., & Shea, J. J. (1979). Luetic hydrops – diagnosis and therapy. The Laryngoscope, 89(7 Pt 1), 1135-1144.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Pinson, A. G., Philbrick, J. T., Lindbeck, G. H., & Schorling, J. B. (1994). ED management of acute pyelonephritis in women: A cohort study. American Journal of Emergency Medicine, 12(3), 271-278.	Electronic Database	Yes	No				Not Relevant
Plumridge, R. J., & Golledge, C. L. (1996). Treatment of urinary tract infection. Clinical and economic considerations. PharmacoEconomics, 9(4), 295-306.	Electronic Database	Yes	No				Not Relevant
Polak, J. F., Anderson, K., Hagspiel, K., & Mungovan, J. (1998). Peripherally inserted central venous catheters: Factors affecting patient satisfaction. AJN, 170, 1609-1611.	Key Informant	Yes	No				Not Relevant
Pomilla, P. V., & Brown, R. B. (1994). Outpatient treatment of community acquired pneumonia in adults. Internal Medicine, 154, 1793-1802.	Reference List	No					
Poretz, D. M. (1983). Home IV programs. Cost Containment, 5(4), 3-4.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1987). Outpatient intravenous antibiotic therapy. Outpatient Therapy Medicine, 2(4), 1, 12-14.	Reference List	No					
Poretz, D. M. (1988). Home management of intravenous antibiotic therapy. Bulletin of the New York Academy of Medicine, 64(6), 570-576.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1989). Home management of antibiotic therapy. Current Clinical Topics in Infectious Diseases, 10, 27-42.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1990). Clinical considerations of home intravenous therapy in the elderly. Medical Interface, 3(11), 23-27.	Reference List	No					
Poretz, D. M. (1991A). High tech comes home. The American Journal of Medicine, 91, 453-454.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1991B). Home intravenous antibiotic therapy. Clinics in Geriatric Medicine, 7(4), 749-763.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1991C). The infusion center: A model for outpatient parenteral antibiotic therapy. Reviews of Infectious Diseases, 13(Suppl. 2), S142-S146.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Poretz, D. M. (1992). Outpatient continuous 24-hour infusion of cefotaxime with a new infusion device (abstract 13). Proceedings of the Infectious Diseases Society of America - 30th Annual Meeting, Anaheim, California.	Reference List	No					
Poretz, D. M. (1993). Infusion center, office, and home. Hospital Practice, 28(Suppl. 2), 40-43.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1994). Introduction. The American Journal of Medicine, 97(Suppl. 2A), 1-2.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M. (1995). Outpatient parenteral antibiotic therapy. International Journal of Antimicrobial Agents, 5, 9-12.	Reference List	No					
Poretz, D. M. (1998). Evolution of outpatient parenteral antibiotic therapy. Infectious Disease Clinics of North America, 12(4), 827-834.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M., Eron, L. J., Goldenberg, R. I., Gilbert, A. F., Rising, J., Sparks, S., & Horn, C. E. (1982). Intravenous antibiotic therapy in an outpatient setting. JAMA, 248(3), 336-339.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M., & the HIAT Study Group. (1994A). Treatment of serious infections with cefotaxime utilizing an outpatient drug delivery device: Global analysis of a large-scale, multicenter trial. The American Journal of Medicine, 97(Suppl. 2A), 34-42.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M., & the HIAT Study Group. (1994B). Treatment of skin and soft-tissue infections utilizing an outpatient parenteral drug delivery device: A multicenter trial. The American Journal of Medicine, 97(Suppl. 2A), 23-27.	Electronic Database	Yes	No				Not Relevant
Poretz, D. M., Woolard, D., Eron, L. J., Goldenberg, R. I., Rising, J., & Sparks, S. (1984). Outpatient use of ceftriaxone: A cost-benefit analysis. The American Journal of Medicine, 77(Suppl. 4C), 77-83.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Postema, C. A. (1995). Home treatment and reimbursement in The Netherlands. International Journal of Antimicrobial Agents, 5, 39-43.	Reference List	Yes	No				Not Relevant
Potgieter, P. D., Linton, D. M., Forder, A. A., & Plumb, H. (1986). Ceftriaxone therapy in adults with severe lower respiratory tract infections. South African Medical Journal, 69(8), 495-497.	Electronic Database	Yes	No				Not Relevant
Powell, K. R., & Mawhorter S. D. (1987). Outpatient treatment of serious infections in infants and children with ceftriaxone. The Journal of Pediatrics, 110, 898-901.	Reference List	Yes	No				Not Relevant
Powell, K. R. (1997). OPAT of serious infections in children. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part II. Management of Serious Infections by OPAT. A Special Report from Scientific American Medicine (pp. 81-83). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Powers, R. D. (1997A). The role of the emergency department in OPAT. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 28-31). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Powers, R. D. (1997B). Infections of the skin and soft tissue. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part II. Management of Serious Infections by OPAT. A Special Report from Scientific American Medicine (pp. 65-68). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Pozzi, M., & Peck, N. (1986). An option for the patient with chronic osteomyelitis: Home intravenous antibiotic therapy. Orthopaedic Nursing, 5(5), 9-14.	Electronic Database	Yes	No				Not Relevant
Prabhudesai, P. P., Kuruvilla, T., & Tadvi, S. (1997). Community-acquired pneumonia. Need for a cost-effective approach to treatment. Chest, 112(3), 861-862.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Pradeepkumar, V. K., Waseem, E., Shortt, C., Barry, D., & Watson, J. B. G. (1992). Home intravenous therapy using a silastic long line catheter in cystic fibrosis patients. Irish Medical Journal, 85(3), 110-111.	Electronic Database	Yes	No				Not Relevant
Preis, S., Jurgens, H., Friedland, C., Oudekotte-David, A., Thomas, L., & Gobel, U. (1993). Ceftriaxone alone or in combination with teicoplanin in the management of febrile episodes in neutropenic children and adolescents with cancer on an outpatient base. Klinische Padiatrie, 205(4), 295-299.	Electronic Database	Yes	No				Not Relevant
Price, M. F., McBride, M. E., & Wolf, J. E., Jr. (1998). Prevalence of methicillin-resistant staphylococcus aureus in a dermatology outpatient population. Southern Medical Journal, 91(4), 369-371.	Electronic Database	Yes	No				Not Relevant
Prichard, J. G. (1988). Role of long-acting cephalosporins in ambulatory therapy. Clinical Therapeutics, 10(6), 688-693.	Electronic Database	Yes	No				Not Relevant
Proestakes, V. (1984). Intravenous Therapy Program. New Haven, Connectocut: Visiting Nurse Association of New Haven, Inc.	Reference List	No					
Pyke, K. G., Kelsey, S. M., & Newland, A. C. (1992). Outpatient treatment of Hickman catheter infections. The Lancet, 339, 1237.	Reference List	Yes	No				Not Relevant
Quintiliani, R. (1996). Cefixime: A pharmacoeconomic perspective. Current Therapeutic Research, 57(12), 892-912.	Electronic Database	Yes	No				Not Relevant
Raaf, J. H. (1985). Results from use of 826 vascular access devices in cancer. Cancer, 55(6), 1312-1321.	Electronic Database	Yes	No				Not Relevant
Raas-Rothschild, A., Lang, R., Schabtai, A., Goshen, S., & Berger, I. (1991). Ambulatory intravenous therapy for chronic suppurative otitis media. Journal of Pediatrics, 119(1), 160.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Rannem, T., Ladefoged, K., Tvede, M., Lorentzen, J. E., & Jarnum, S. (1986). Catheter-related septicaemia in patients receiving home parenteral nutrition. Scandinavian Journal of Gastroenterology, 21(4), 455-460.	Electronic Database	Yes	No				Not Relevant
Rao, J. S., O'Meara, A., Harvey, T., & Breatnach, F. (1992). A new approach to the management of broviac catheter infection. Journal of Hospital Infection, 22(2), 109-116.	Electronic Database	Yes	No				Not Relevant
Rapoport, B. L., & Uys, A. (1995). Open-label comparative study of inpatient versus outpatient treatment in cancer patients with presumed infection with empiric ceftriaxone plus an aminoglycoside and filgrastim (abstract 19). Poceedings of the Second International Symposium on Febrile Neutropenia, Brussels, Belgium.	Reference List	No					
Rasor, J. S. (1992). Safety and effectiveness of a midline catheter in hospital and home care AIDS patients (abstract 100). Proceedings of The Infectious Diseases Society of America 30th Annual Meeting, Anaheim, California.	Reference List	No					
Rausch, M., & Pollard, D. (1998). Management of the patient with sickle cell disease. Journal of Intravenous Nursing, 21(1), 27-40.	Electronic Database	Yes	No				Not Relevant
Reed, M. (1985). Evaluation of antibiotics for home care programs. Evaluation of antibiotics for home care programs. Drug Intelligence and Clinical Pharmacy, 19, 288-290.	Reference List	Yes	No				Not Relevant
Rehm, S. J. (1985). Home intravenous antibiotic therapy. Cleveland Clinic Quarterly, 52(3), 333-338.	Electronic Database	Yes	No				Not Relevant
Rehm, S. J. (1989). The economics of home intravenous antibiotic therapy. In E. Rubinstein & D. Adams (Eds.), Recent advances in chemotherapy (pp. 41.1-41.3). Jerusalem: E. Lewin-Epstein Ltd.	Reference List	No					
Rehm, S. J. (1998). Outpatient intravenous antibiotic therapy for endocarditis. Infectious Disease Clinics of North America, 12(4), 879-901.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Rehm, S. J., & Weinstein, A. J. (1983). Home intravenous antibiotic therapy: A team approach. Annals of Internal Medicine, 99(3), 388-392.	Electronic Database	Yes	No				Not Relevant
Rehm, S. J., & Weinstein, A. J. (1986). Savings from outpatient antibiotic therapy for osteomyelitis. JAMA, 256(8), 1002.	Reference List	Yes	No				Not Relevant
Renner, C., Knutson, P., & Lawson, T. (1996). Vascular access in home care: Current trends. Infusion, 3(1), 11-25.	Reference List	No					
Rich, D. (1992). Evaluation of a disposable, elastomeric infusion device in the home environment. American Journal of Hospital Pharmacy, 49(7), 1712-1716.	Electronic Database	Yes	No				Not Relevant
Rich, D. (1994). Physicians, pharmacists, and home infusion antibiotic therapy. The American Journal of Medicine, 97(Suppl. 2A), 3-8.	Electronic Database	Yes	No				Not Relevant
Rich, D., & Ayers, N. (1992). Hospital selection of home infusion therapy companies as preferred providers. American Journal of Hospital Pharmacy, 49(7), 1707-1712.	Electronic Database	Yes	No				Not Relevant
Richards, R. D., Davenport, K., & McCallum, R. W. (1993). The treatment of idiopathic and diabetic gastroparesis with acute intravenous and chronic oral erythromycin. The American Journal of Gastroenterology, 88(2), 203-207.	Electronic Database	Yes	No				Not Relevant
Rigamonti, D., Liem, L., Wolf, A. L., Fiandaca, M. S., Numaguchi, Y., Hsu, F. P., & Nussbaum, E. S. (1994). Epidural abscess in the cervical spine. The Mount Sinai Journal of Medicine, 61(4), 357-362.	Electronic Database	Yes	No				Not Relevant
Rising, J. (1983). Pioneer home IV antibiotic program leads the way. Hospital Peer Review, 8(6), 76-78.	Reference List	Yes	No				Not Relevant
Rizzato, G., & Allegra, L. (1997). Efficacy and tolerability of a teicoplanin-ciprofloxacin combination in severe community-acquired pneumonia. Comparison with ceftriaxone in a multicentre Italian study group. Clinical Drug Investigation, 14(5), 337-345.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Robertson, W. G., & Mangione, J. S. (1998). Cutaneous advancement flap closure: Alternative method for treatment of complicated anal fistulas. Diseases of the Colon & Rectum, 41(7), 884-847.	Electronic Database	Yes	No				Not Relevant
Robinson, W. M., Ravilly, S., Berde, C., & Wohl, M. E. (1997). End-of-life care in cystic fibrosis. Pediatrics, 100(2), 205-209.	Electronic Database	Yes	No				Not Relevant
Robson, M., Abbott, J., Webb, K., Dodd, M., & Walsworth-Bell, J. (1992). A cost description of an adult cystic fibrosis unit and cost analysis of different categories of patients. Thorax, 47(9), 684-689.	Electronic Database	Yes	No				Not Relevant
Roe, W., et al. (1987). The safety, effectiveness and cost-effectiveness of home intravenous antibiotic therapy for the elderly: New findings and opportunities for public policy. Unpublished research report. Washington, D. C: Lewing and Associates.	Reference List	No					
Rogus Z. R., Morrison, R. A., Vedro, D. A., & Buchanan, G. R. (1990). Outpatient management of febrile illness in infants and young children with sickle cell anemia. The Journal of Pediatrics, 117(5), 736-739.	Reference List	Yes	No				Not Relevant
Roig, J., Carreres, A., & Domingo, C. (1993). Treatment of Legionnaires' disease. Drugs, 46(1), 63-79.	Electronic Database	Yes	No				Not Relevant
Rolston, K. V. I. (1994). Outpatient management of febrile neutropenic patients. Infections in Medicine, (Suppl.), 12-15.	Reference List	No					
Rolston, K. V. I. (1996). Outpatient management of fever in neutropenia patients. Current Opinion in Infectious Diseases, 9(6), 407-410.	Electronic Database	Yes	No				Not Relevant
Rolston, K. V. I. (1998A). Expanding the options for risk-based therapy in febrile neutropenia. Diagnostic Microbiology & Infectious Diseases, 31(2), 411-416.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Rolston, K. V. I. (1998B). Risk assessment and risk-based therapy in febrile neutropenic patients. European Journal of Clinical Microbiology & Infectious Diseases, 17(7), 461-463.	Electronic Database	Yes	No				Not Relevant
Rolston, K. V. I., Manzullo, E., Elting, L., Frisbee-Hume, S., Rodriguez, S., & Rubenstein, E. B. (1998). Ambulatory management of varicella-zoster virus infection in immunocompromised cancer patients. Supportive Care Cancer, 6(1), 57-62.	Electronic Database	Yes	No				Not Relevant
Rolston, K. V. I., Rubenstein, E., & Freifeld, A. (1996). Early empiric antibiotic therapy for febrile neutropenia patients at low risk. Infectious Disease Clinics of North America, 10(2), 223-237.	Electronic Database	Yes	No				Not Relevant
Rolston, K. V. I., Rubenstein, E., Elting, L., Escalante, C., Manzullo, E., & Bodey, G. P. (1995). Ambulatory management of febrile episodes in low-risk neutropenic patients (abstract LM38). Proceedings of the 35th Interscience Conference on Antimicrobial Agents and Chemotherapy, San Francisco, 333.	Reference List	Yes - Abstract	No				Not Relevant
Rolston, K., Rubenstein, E. B., Elting, L. S., et al. (1994). Ambulatory management of febrile episodes in low-risk neutropenic patients-an acceptable alternative to hospital based therapy (abstract P-21). Program Proceedings and Abstracts of 6th International Symposium Supportive Care in Cancer.	Reference List	No					
Rolston, K., Rubenstein, E., Frisbee-Hume, S., Escalante, C., Manzulla, E., Wheeler, A., & Bodey, G. P. (1993). Outpatient treatment of febrile episodes in low risk neutropenic cancer patients (abstract 1505). Proceedings from the American Society of Clinical Oncologists, 12, 436.	Reference List	Yes - Abstract	No				Not Relevant
Romeo, C. C., & Jones, P. (1994). Home infusion therapy for obstetric patients. JOGNN, 23(8), 675-681.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Rosen, G. (1987). Neutropenic febrile patients given antibiotic therapy as outpatients. Oncology Times, July.	Reference List	Yes	No				Not Relevant
Rosenblum, B. B. (1986). An introduction to home infusion therapy. Infusion, 10, 4-5.	Reference List	No					
Rosenzweig, H. (1993). Public health, indigent care, and prisons. Hospital Practice, 28(Suppl. 2), 54.	Electronic Database	Yes	No				Not Relevant
Rubenstein, E., & Rolston, K. (1994). Outpatient management of febrile episodes in neutropenic cancer patients. Support Care Cancer, 2(6), 369-373.	Electronic Database	Yes	No				Not Relevant
Rubenstein, E., Rolston, K., Benjamin, R. S., Loewy, J., Escalante, C., Manzullo, E., Hughes, P., Moreland, B., Fender, A., Kennedy, K., Holmes, F., Elting, L., & Bodey, G. P. (1993). Outpatient treatment of febrile episodes in low-risk neutropenic patients with cancer. Cancer, 71(11), 3640-3646.	Electronic Database	Yes	No				Not Relevant
Rubenstein, E., Rolston, K., Moreland, B., Dorris, W., Kennedy, K., & Bodey, G. P. (1990). Ambulatory treatment of febrile episodes in neutropenic patients (abstract #1241). Proceedings of the American Society of Clinical Oncology, 9, 321.	Reference List	Yes - Abstract	No				Not Relevant
Rubin, J., Kirchner, K., Walsh, D., Green, M., & Bower, J. (1987). Fungal peritonitis during continuous ambulatory peritoneal dialysis: A report of 17 cases. American Journal of Kidney Disease, 10(5), 361-368.	Electronic Database	Yes	No				Not Relevant
Rubins, J. B., & Janoff, E. N. (1997). Community-acquired pneumonia. Tailoring management of adult patients according to risk category. Postgraduate Medicine, 102(6), 45-47, 52, 54-60, 62.	Electronic Database	Yes	No				Not Relevant
Rubinstein, E. (1993). Cost implications of home care on serious infections. Hospital Formulary, 28(Suppl. 1), 46-50.	Electronic Database	Yes	No				Not Relevant
Rucker, B. B., & Holmstedt, K. (1984). Trends in the home infusion therapy market. Caring, 11, 65-70.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Rucker, R. W., & Harrison, G. M. (1974). Outpatient intravenous medications in the management of cystic fibrosis. Pediatrics, 54(3), 358-360.	Electronic Database	Yes	No				Not Relevant
Rucker, B. B., & Witter, S. T. (1987). The Home Drug Delivery Industry: An Outlook. New York: Hambrecht & Quist Institutional Research, 4.	Reference List	No					
Ruga, E., Giaquinto, C., Cozzani, S., Giacomelli, A., Pagliaro, A., Mazza, A., De Manzini, A., & Laverda, A. M. (1994). The use of antibiotics in the treatment and prevention of infection in HIV-infected children. Acta Paediatrica, Suppl. 400, 70-72.	Electronic Database	Yes	No				Not Relevant
Rushton, H. G. (1997). Urinary tract infections in children: Epidemiology, evaluation, and management. Pediatric Clinics of North America, 44(5), 1133-1169.	Electronic Database	Yes	No				Not Relevant
Saadeh, C. (1998). Diagnosis and management of sinusitis. Home Health Care Consultant, 5(4), 33-34.	Reference List	Yes	No				Not Relevant
Sade, J., Lang, R., Goshen, S., & Kitzes-Cohen, R. (1989). Ciprofloxacin treatment of malignant external otitis. The American Journal of Medicine, 87(Suppl. 5A), 138S-141S.	Electronic Database	Yes	No				Not Relevant
Safrin, S., Siegel, D., & Black, D. (1988). Pyelonephritis in adult women: Inpatient versus outpatient therapy. The American Journal of Medicine, 85(6), 793-798.	Electronic Database	Yes	No				Not Relevant
Sahu, S., Bapna, A., Pai, S. K., Nair, C. N., Kurkure, P. A., & Advani, S. H. (1997). Outpatient antimicrobial protocol for febrile neutropenia: A nonrandomized prospective trial using ceftriaxone, amikacin, and oral adjuvant agents. Pediatric Hematology & Oncology, 14(3), 205-211.	Electronic Database	Yes	No				Not Relevant
Saladow, J. (1995A). Making sense of the options. Part I. Ambulatory systems for I.V. antibiotic therapy. Infusion, April, 17-29.	Reference List	Yes	No				Not Relevant
Saladow, J. (1995B). Making sense of the options. Part II. Ambulatory electronic infusion systems. Infusion, July, 9-21.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Salib, V. W., & McCloskey, W. W. (1997). Parenteral medications used to prevent relapses of multiple sclerosis. Infusion, 3(12), 21-27.	Electronic Database	Yes	No				Not Relevant
Saltiel, E., & Weingarten, S. (1993). Drug treatment in the elderly: efficacy and costs. PharmacoEconomics, 3(4), 268-275.	Electronic Database	Yes	No				Not Relevant
Sandberg, T., Alestig, K., Eilard, T., Ek, E., Hebelka, M., Johansson, E., & Olinder-Nielsen, A-M. (1997). Aminoglycosides do not improve the efficacy of cephalosporins for treatment of acute pyelonephritis in women. Scandinavian Journal of Infectious Diseases, 29(2), 175-179.	Electronic Database	Yes	No				Not Relevant
Sanders, C. V., Greenberg, R. N., & Marier, R. L. (1985). Cefamandole and cefoxitin. Annals of Internal Medicine, 103(1), 70-78.	Electronic Database	Yes	No*	No*			Not Relevant
Sanders, W. E., Jr., & Sanders, C. C. (1996). Piperacillin/tazobactam: A critical review of the evolving clinical literature. Clinical Infectious Diseases, 22(1), 107-123.	Electronic Database	Yes	No				Not Relevant
Saran, R., Goel, S., & Khanna, R. (1996). Fungal peritonitis in continuous ambulatory peritoneal dialysis. The International Journal of Artificial Organs, 19(8), 441-445.	Electronic Database	Yes	No				Not Relevant
Saravolatz, L. D., del Busto, R., & Markowitz, N. (1988). Medical management of osteomyelitis: Considerations for home antibiotic chemotherapy. Clinical Therapeutics, 10(4), 456-461.	Electronic Database	Yes	No				Not Relevant
Sarisley, C. (1987). Designing a teaching program for outpatient antibiotic therapy. Journal of Nursing Staff Development, 3(3), 128-135.	Electronic Database	Yes	No				Not Relevant
Sauerwein, M., Deamer, R. L., & Prichard, J. G. (1987). Use of long half-life parenteral cephalosporins in ambulatory practice. The Journal of Family Practice, 24(1), 47-51.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Schad, R. F., & Lucarotti, R. L. (1986). Patient-teaching program for home intravenous antimicrobial therapy. American Journal of Hospital Pharmacy, 43(2), 372-375.	Reference List	Yes	No				Not Relevant
Schaening, O., Lutwick, L. I., & Chapnick, E. K. (1996). Pseudomonas aeruginosa infections: A late complication of AIDS. Infections in Medicine, 13(2), 110-113, 151.	Electronic Database	Yes	No				Not Relevant
Scheel, O., Hoel, T., Sandvik, T., & Berdal, B. P. (1993). Susceptibility pattern of Scandinavian Francisello tularensis isolates with regard to oral and parenteral antimicrobial agents. APMIS, 101(1), 33-36.	Electronic Database	Yes	No				Not Relevant
Schlager, T. A., & Lohr, J. A. (1993). Urinary tract infections in outpatient febrile infants and children younger than 5 years of age. Pediatric Annals, 22(8), 505-509.	Reference List	Yes	No				Not Relevant
Schleis, T. (1990). Intermittent ambulatory infusion pumps. Outpatient Intravenous Infusion Therapy Association Newsletter, 1(3), 3..	Reference List	No					
Schleis, T. (In press). Ambulatory infusion devices: Current technology and selection criteria. American Journal of Hospital Pharmacy.	Reference List	No					
Schleis, T. (1997). The pharmacodynamics of antimicrobial therapy. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 43-49). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Schleis, T. G., & Tice, A. D. (1996). Selecting infusion devices for use in ambulatory care. American Journal of Health-System Pharmacy, 53, 868-877.	Reference List	Yes	No				Not Relevant
Schneider, R. (1985). How can pharmacists develop and implement a home antibiotic program? Drug Intelligence and Clinical Pharmacy, 19, 285-287.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Schneider, P. J., Simon, G. I., & Rising, J. (1986). Home intravenous antibiotic therapy. The home advantage; opportunities in hospital pharmacy. In S. Wyant (Ed.). Pracon Inc., Fairfax, Virginia, Parios C, pub., 1986; 1(2).	Reference List	No					
Schrijvers, G., & van der Linden, B. (1995). Quality, costs and cultural beliefs in outpatient treatment with parenteral antibiotics: a comment. International Journal of Antimicrobial Agents, 5, 45-46.	Reference List	No					
Schudela, K. D. (1990). Nursing aspects of pediatric home infusion therapy for treatment of serious infections. Seminars in Pediatric Infectious Diseases, 1(3), 306-317.	Reference List	No					
Schuman, E. S. (1987). Outpatient management of Hickman catheter sepsis. Infections in Surgery, 6, 103-106.	Reference List	Yes	No				Not Relevant
Schwartz, B. F., Swanzy, S., & Thrasher, J. B. (1996). A randomized prospective comparison of antibotic tissue levels in the corpora cavernosa of patients undergoing penile prosthesis implantation using gentamicin plus cefazolin versus an oral fluoroquinolone for prophylaxis. The Journal of Urology, 156(3), 991-994.	Electronic Database	Yes	No				Not Relevant
Scott, M. K., Macias, W. L., Kraus, M. A., Clark, W. R., Carfagna, M. A., & Mueller, B. A. (1997). Effects of dialysis membrane on the intradialytic vancomycin administration. Pharmacotherapy, 17(2), 256-262.	Electronic Database	Yes	No				Not Relevant
Scott, R. J., Christofersen, M. R., Robertson, W. W., Jr., Davidson, R. S., Rankin, L., & Drummond, D. S. (1990). Acute osteomyelitis in children: A review of 116 cases. Journal of Pediatric Orthopaedics, 10(5), 649-652.	Electronic Database	Yes	No				Not Relevant
Scully, B. E. (1992). Home intravenous antibiotic therapy. New Jersey Medicine, 89(1), 48-51.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Seaton, R. A., Boyter, A. C., Williams, F. L., Laing, R., & Nathwani, D. (1997). Acceptability of non-inpatient intravenous antibiotic therapy in patients with infections in north-east Scotland. Journal of Antimicrobial Therapy, 40(6), 912-913.	Electronic Database	Yes	No				Not Relevant
Segev, S., Raz, R., Rubinstein, E., Shmuely, H., Hassin, D., Rosen, N., Platau, E., Assuli, S. B., & Pitlik, S. (1995). Double-blind randomized study of 1 g versus 2 g intravenous ceftriaxone daily in the therapy of community-acquired infections. European Journal of Clinical Microbiology & Infectious Diseases, 14(10), 851-855.	Electronic Database	Yes	No				Not Relevant
Sengupta, B., Dasgupta, S., Saha, I., Mandal, A. K., & Palodhi, P. K. (1998). Experience in running a diarrhoeal training cum treatment unit (DTTU) in a state teaching hospital in Calcutta. Journal of the Indian Medical Association, 96(4), 104-5, 108.	Electronic Database	Yes	No				Not Relevant
Sexton, D. G., & Babin, R. W. (1987). Peritonsillar abscess: a comparison of a conservative and a more aggressive management protocol. Journal of Pediatric Otorhinolaryngology, 14, 129-132.	Electronic Database	Yes	No				Not Relevant
Sha, B. E., Benson, C. A., Deutsch, T. A., Urbanski, P. A., Phair, J. P., & Kessler, H. A. Suppression of cytomegalovirus retinitis in persons with AIDS with high-dose intravenous acyclovir. Journal of Infectious Diseases, 164(4), 777-780.	Electronic Database	No					
Shalaby, I. A., Dunn, J. P., Semba, R. D., & Jabs, D. A. (1997). Syphilitic uveitis in human immunodeficiency virus-infected patients. Archives of Ophthalmology, 115(4), 469-473.	Electronic Database	Yes	No				Not Relevant
Shapiro, S. (1995). Microsurgical carpal tunnel release. Neurosurgery, 37(1), 66-70.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Sharma, R., Farmer, C. K. T., Gransden, W. R., & Ogg, C. S. (1998). Peritonitis in continuous ambulatory peritoneal dialysis due to cylindrocarpon lichenicola infection. Nephrology, Dialysis, Transplantation, 13(10), 2662-2664.	Electronic Database	Yes	No				Not Relevant
Sharma, R., & Kramer, M. (1995). Focus on dirithromycin: A new once-daily macrolide antibiotic. Hospital Formulary, 30(12), 769-772, 775-776, 780.	Electronic Database	Yes	No				Not Relevant
Sharp, J. W. (1986). Social work in a home intravenous antibiotic therapy program. Social Work in Health Care, 12(1), 93-101.	Electronic Database	Yes	No				Not Relevant
Shaw, B. A., & Kasser, J. R. (1990). Acute septic arthritis in infancy and childhood. Clinical Orthopaedics & Related Research, 257, 212-225.	Electronic Database	Yes	No				Not Relevant
Shaw, H. L. (1992). Treatment of the patient with cancer using parenteral electronic drug administration. Cancer, 70(Suppl. 4), 993-997.	Electronic Database	Yes	No				Not Relevant
Shearn, N. J., & Shearn, R. J. (1995). To IV or not to IV? Home intravenous service is safe, practical, and economical. Journal of Home Health Care Practice, 8(1), 18-25.	Electronic Database	Yes	No				Not Relevant
Sheehan, K., & Gildea, J. (1985). Home antibiotic therapy: A less-than-ideal candidate. NITA, 8(2), 157-159.	Electronic Database	Yes	No				Not Relevant
Sheldon, P., & Bender, M. (1994). High-technology in home care: An overview of intravenous therapy. Nursing Clinics of North America, 29(3), 507-519.	Reference List	Yes	No				Not Relevant
Shemesh, E., Yaniv, I., Drucker, M., Hadad, S., Goshen, Y., Stein, J., Fisher, S., & Zaizov, R. (1997). Home intravenous antibiotic treatment for febrile episodes in immunocompromised pediatric patients. Medical & Pediatric Oncology, 30(2), 95-100.	Electronic Database	Yes	No				Not Relevant
Sheppard, S., & Illife, S. (1996). Hospital at home: An uncertain future. BMJ, 312, 923-924.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Shlaes, D. M., Baughman, R., Boylen, C. T., Chan, J. C., Charan, N. B., Cormier, Y. C., Erickson, A., Grossman, R., Kirmani, N., Suh, B., Williams, A., Grimord, D., Wishnow, R., Joshi, M., Krinsky, E., Mitchell, J., & Nordern, C. (1994). Piperacillin/tazobactam compared with ticarcillin/clavulanate in community-acquired bacterial lower respiratory tract infection. Journal of Antimicrobial Chemotherapy, 34(4), 565-577.	Electronic Database	Yes	No*	No*			Not Relevant
Sho, B. E., Benson, C. A., Deutsch, T. A., Urbanski, P. A., Phair, J. P., & Kessler, H. A. (1991). Suppression of cytomegalovirus retinitis in persons with AIDS with high-dose intravenous acyclovir. The Journal of Infectious Diseases, 164(4), 777-780.	Reference List	Yes	No				Not Relevant
Sidey, A. (1989). Intravenous home care. Paediatric Nursing, 1(3), 14-15.	Reference List	No					
Siegel, D. (1985). Management of community-acquired pneumonia in outpatients. The Western Journal of Medicine, 142(1), 45-48.	Reference List	Yes	No				Not Relevant
Siegel, R. E. (1999). Time to clinical stability for patients with community-acquired pneumonia. JAMA, 281(3), 231-232.	Electronic Database	Yes	No				Not Relevant
Silva, I. C., & High, K. P. (1998). Outpatient treatment for febrile neutropenic patients. Infectious Diseases in Clinical Practice, 7(7), 307-311.	Electronic Database	Yes	No				Not Relevant
Sipes, C. (1988). Giving amphotericin B in the home. American Journal of Nursing, 88(7), 965-966.	Electronic Database	Yes	No				Not Relevant
Sjogren, R. W. (1994). Gastrointestinal motility disorders in scleroderma. Arthritis & Rheumatism, 37(9), 1265-1282.	Electronic Database	Yes	No				Not Relevant
Skiest, D. J., Duong, M., Park, S., Wei, L., & Keiser, P. (1999). Complications of therapy with intravenous cidofovir: Severe nephrotoxicity and anterior uveitis. Infectious Diseases in Clinical Practice, 8(3), 151-157.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Slater, H., Goldfarb, I. W., Jacob, H. E., Hill, J. B., & Srodes, C. H. (1985). Experience with long-term outpatient venous access utilizing percutaneously placed silicone elastomer catheters. Cancer, 56(8), 2074-2077.	Reference List	Yes	No				Not Relevant
Smego, R. A., Jr. (1985). Home intravenous antibiotic therapy. Archives of Internal Medicine, 145(6), 1001-1002.	Electronic Database	Yes	No				Not Relevant
Smego, R. A., & Gainer, R. B., II. (1985). Home intravenous antimicrobial therapy provided by a community hospital and a university hospital. American Journal of Hospital Pharmacy, 42(10), 2185-2189.	Reference List	Yes	No				Not Relevant
Smerund, K. T., & Kalager, T. (1994). Outpatient intravenous antibiotic treatment in Norway: Experiences, expectations, and research (abstract). Presented at the Outpatient Intravenous Infusion Therapy Association Conference, Chicago.	Reference List	No					
Smerund, K. T., & Kalager, T. (1996). Outpatient intravenous antibiotic therapy in different countries. International Journal of Infectious Diseases, 1, 102-106.	Reference List	No					
Smith, B. A., & Ferguson, D. B. (1991). Disposition of spontaneous pneumomediastinum. American Journal of Emergency Medicine, 9(3), 256-259.	Electronic Database	Yes	No				Not Relevant
Smith, D. L. (1991). Enterobacteriaceae. Hospital Practice, 26(Suppl. 4), 29-33.	Electronic Database	Yes	No				Not Relevant
Smith, P. W. (1989). Antimicrobial therapy in special situations, including extended care facilities and the outpatient setting. American Journal of Infection Control, 17(5), 316-322.	Electronic Database	Yes	No				Not Relevant
Smith, S. (1992). Advanced states. Nursing Times, 88(44), 30-32.	Electronic Database	Yes	No				Not Relevant
Smitka, J. J. (1998). Using research to assess families managing complex home care. Kansas Nurse, 73(4), 1-2.	Electronic Database	Yes	No				Not Relevant
Snipes, C. (1988). Giving amphotericin B in the home. American Journal of Nursing, July, 965-966.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Sobel, J. D. (1995). Treating resistant vaginal infections. The Female Patient, 20(11), 32, 35-36, 46.	Electronic Database	Yes	No				Not Relevant
Sola, J. E., Stone, M. M., Wise, B., & Colombani, P. M. (1992). Atypical thrombotic and septic complications of totally implantable venous access devices in patients with cystic fibrosis. Pediatric Pulmonary, 14(4), 239-242.	Electronic Database	Yes	No				Not Relevant
Solomon, D. J., Hogan, A. J., Bouknight, R. R., & Solomon, C. T. (1989). Analysis of Michigan Medicaid costs to treat HIV infection. Public Health Reports, 104(5), 416-424.	Electronic Database	Yes	No				Not Relevant
Soo Hoo, G. W., Mohsenifar, Z., & Meyer, R. D. (1990). Inhaled or intravenous pentamidine therapy for pneumocystis carinii pneumonia in AIDS. A randomized trial. Annals of Internal Medicine, 113(3), 195-202.	Electronic Database	Yes	No				Not Relevant
Soper, D. E. (1991). Surgical considerations in the diagnosis and treatment of pelvic inflammatory disease. Surgical Clinics of North America, 71(5), 947-962.	Electronic Database	Yes	No				Not Relevant
Sorongon, E. D., Magalit, P., & Tupasi, T. E. (1995). Antibiotic usage in community-acquired pneumonia (abstract 3122). Canadian Journal of Infectious Diseases, 6(Suppl. C), 411C.	Reference List	Yes - Abstract	No				Not Relevant
South, R. (1998). Retrospective study of teicoplanin as home continuation of hospital-initiated therapy. International Journal of Antimicrobial Agents, 9(4), 219-225.	Electronic Database	Yes	No				Not Relevant
Spencer, C. M., & Bryson, H. M. (1995). Teicoplanin: A pharmacoeconomic evaluation of its use in the treatment of gram-positive infections. PharmacoEconomics, 7(4), 357-374.	Electronic Database	Yes	No				Not Relevant
Spinner, S. S., Girifalco, R. B., Gibson, E., Stavis, R. L., Greenspan, J. S., Spitzer, A. R., & The Delaware Valley Child Health Alliance. (1998). Earlier discharge of infants from neonatal intensive care units: A pilot program of specialized case management and home care. Clinical Pediatrics, 37(6), 353-357.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Stamboulian, D. (1995). Outpatient treatment of endocarditis in a clinic-based program in Argentina. European Journal of Clinical Microbiology & Infectious Diseases, 14(7), 648-654.	Electronic Database	Yes	No				Not Relevant
Stamboulian, D., Bonvehi, P., Arevalo, C., Bologna, R., Cassetti, I., Scilingo, V., & Efron, E. (1991). Antibiotic management of outpatients with endocarditis due to penicillin-susceptible streptococci. Reviews of Infectious Diseases, 13(Suppl. 2), S160-S163.	Electronic Database	Yes	No				Not Relevant
Stamboulian, D., & Carbone, E. (1997). Recognition, management and prophylaxis of endocarditis. Drugs, 54(5), 730-744.	Electronic Database	Yes	No				Not Relevant
Stamboulin, D., Carbone, E., Nagel, C., et al. (1995). Ceftriaxone (CRO) in the outpatient treatment of bacterial endocarditis (BE) (abstract 10.064). Proceedings of the 3rd International Symposium on Modern Concepts in Endocarditis, Boston.	Reference List	No					
Stamboulin, D., Carbone, E., & Pan, M. (1997). Ambulatory management of infective endocarditis (IE): pharmacoeconomic considerations (abstract 173). Proceedings of the4th International Symposium of Modern Concepts in Endocarditis and Cardiovascular Infections, Yverdon-les-Bains, Switerland.	Reference List	No					
Stamboulian, D., Bonvehi, P., Arevalo, C., Bologna, R., Cassetti, I., Scilingo, V., & Efron, E. (1991). Antibiotic management of outpatients with endocarditis due to penicillin-susceptible streptococci. Reviews of Infectious Diseases, 13(Suppl. 2), S160-S163.	Electronic Database	Yes	No				Not Relevant
Steele, R. W. (1989). Outpatient management of bacterial meningitis. The Pediatric Infectious Diseases Journal, 8(4), 259.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Stein, G. E., Havlichek, D., & Hennessey, C. (1995). Using azithromycin as adjuvant, empiric therapy for community-acquired pneumonia. Hospital Formulary, 30(12), 817-819.	Electronic Database	Yes	No				Not Relevant
Steiner, Z., Kandelis, Y., Mogilner, J., Eldar, S., & Srugo, I. (1997). The infected central line in children: Should it be removed? Pediatrik Cerrahi Dergisi, 11(1-2), 11-4.	Electronic Database	Yes	No				Not Relevant
Stephenson, K. (1989). Giving antibiotics at home. Nursing Standard, 40(3), 24-25.	Electronic Database	Yes	No				Not Relevant
Stiver, H. G. (1984). Outpatient (home) intravenous antibiotic administration. Internal Medicine for the Specialist, 4(3), 118-120, 125.	Reference List	Yes	No				Not Relevant
Stiver, H. G., Trosky, S. K., Cote, D. D., & Oruck, J. L. (1982). Self-administration of intravenous antibiotics: an efficient, cost-effective home care program. Canadian Medical Association Journal, 127(3), 207-211.	Electronic Database	Yes	No				Not Relevant
Straus, S. E., Seidlin, M., & Takiff, H. (1984). Management of mucocutaneous herpes simplex virus infections. Drugs, 27(4), 364-372.	Electronic Database	Yes	No				Not Relevant
Struijk, D. G., Krediet, R. T., Boeschoten, E. W., Rietra, P. J. G. M., & Arisz, L. (1987). Antifungal treatment of candida peritonitis in continious ambulatory peritoneal dialysis patients. American Journal of Kidney Diseases, 9(1), 66-70.	Electronic Database	Yes	No				Not Relevant
Sturgis, T. M., Yancy, W., Cole, J. C., Proctor, D. D., Minhas, B. S., & Marcuard, S. P. (1996). Antibiotic prophylaxis in percutaneous endoscopic gastrostomy. The American Journal of Gastroenterology, 91(11), 2301-2304.	Electronic Database	Yes	No				Not Relevant
Sudela, K. D. (1990). Nursing aspects of pediatric home infusion therapy for the treatment of serious infections. Seminars in Pediatric Infectious Diseases, 1(3), 306-317.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Sullivan, S. D., Mozaffari, E., Johnson, E. S., Wolitz, R., & Follansbee, S. E. (1996). An economic evaluation of oral compared with intravenous ganciclovir for maintenance treatment of newly diagnosed cytomegalovirus retinitis in AIDS patients. Clinical Therapeutics, 18(3), 546-558.	Electronic Database	Yes	No				Not Relevant
Sundararajan, V., Rubenstein, E. B., Rolston, K. V. I., & Elting, L. S. (1997). Controversies in new antibiotic therapy for ambulatory patients. Supportive Care in Cancer, 5(5), 358-364.	Electronic Database	Yes	No				Not Relevant
Sutker, W. L. (1988). Home Intravenous antibiotic therapy. Infections in Medicine, 5, 350-351, 355-358.	Reference List	Yes	No				Not Relevant
Swanston, W. H. (1997). Home parenteral antibiotic therapy: benefits in the treatment of cellulitis. Tropical Doctor, 27(2), 109-110.	Electronic Database	Yes	No				Not Relevant
Sweet, R. L. (1981). Pelvic inflammatory disease: Etiology, diagnosis, and treatment. Sexually Transmitted Diseases, 8(Suppl. 4), 308-315.	Electronic Database	Yes	No				Not Relevant
Sweet, R. L. (1993). Pelvic inflammatory disease. Hospital Practice, 28(Suppl. 2), 25-30.	Electronic Database	Yes	No				Not Relevant
Swenson, J. P. (1981). Training patients to administer intravenous antibiotics at home. American Journal of Hospital Pharmacy, 38(10), 1480-1483.	Electronic Database	Yes	No				Not Relevant
Swenson, J. P. (1983). Outpatient intravenous antibiotic therapy. JAMA, 249(5), 592.	Electronic Database	Yes	No				Not Relevant
Szunyog, C. L. (1987A). Coordinated home care: The vital link. NITA, November/December, 431-434.	Reference List	Yes	No				Not Relevant
Szunyog, C. L. (1987B). Getting IV patients ready to go home. RN, October, 136, 138.	Reference List	Yes	No				Not Relevant
Talan, D. A. (1996). Infectious disease issues in the emergency department. Clinical Infectious Diseases, 23(1), 1-14.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Talcott, J. A. (1997). Outpatient management of febrile neutropenia: Should we change the standard of care? Oncologist, 2(6), 365-373.	Electronic Database	Yes	No				Not Relevant
Talcott, J. A., Finberg, R., Mayer, R. J., & Goldman, L. (1988). The medical course of cancer patients with fever and neutropenia. Clinical identification of a low-risk subgroup at presentation. Archives of Internal Medicine, 148, 2561-2568.	Reference List	Yes	No				Not Relevant
Talcott, J. A., Siegel, R. D., Finberg, R., & Goldman, L. (1992). Risk assessment in cancer patients with fever and neutropenia: A prospective, two-center validation of a prediction rule. Journal of Clinical Oncology, 10(2), 316-322.	Reference List	Yes	No				Not Relevant
Tan, T. Q., Mason, E. O., Jr., Barson, W. J., Wald, E. R., Schutze, G. E., Bradley, J. S., Arditi, M., Givner, L. B., Yogev, R., Kim, K. S., & Kaplan, S. L. (1998). Clinical characteristics and outcome of children with pneumonia attributable to penicillin-susceptible and penicillin-nonsusceptible streptococcus pneumoniae. Pediatrics, 102(6), 1369-1375.	Electronic Database	Yes	No				Not Relevant
Tan, T. Q., Mason, E. O., Jr., & Kaplan, S. L. (1992). Systematic infections due to streptococcus pneumoniae relatively resistant to penicillin in a children's hospital: Clinical management and outcome. Pediatrics, 90(6), 928-933.	Electronic Database	Yes	No				Not Relevant
Tanner, D. J. (1985). Health care cost-containment in a changing health care world. Drug Intelligence and Clinical Pharmacy, 19(4), 291-292.	Electronic Database	Yes	No				Not Relevant
Telenti, A. (1996). Appendicitis: Spectrum of bacteria and the role of antimicrobial therapy. Digestive Surgery, 13(4-5), 301-303.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
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Tenholder, M. F. (1985). The many faces of pulmonary aspergillosis. Primary Care, 12(2), 353-368.	Electronic Database	Yes	No				Not Relevant
Tennican, P. O., Mortlock, N. J., & Tennican, S. P. (1992). Leukopenia and neutropenia: Complications of outpatient IV antimicrobial therapy (abstract 17). Proceedings of the Infectious Diseases Society of America 30th Annual Meeting, Anaheim, California.	Reference List	No					
Tenover, F. C. (1995). Emerging problems in antimicrobial resistance. Journal of Intravenous Nursing, 18(6), 297-300.	Electronic Database	Yes	No				Not Relevant
Thaler, S. J., & Rubin, R. H. (1996). Opportunistic infections in the cardiac transplant patient. Current Opinion in Cardiology, 11(2), 191-203.	Electronic Database	Yes	No				Not Relevant
The Swiss Group for Clinical Studies on the Acquired Immunodeficiency Syndrome (AIDS). (1988). Zidovudine for the treatment of thrombocytopenia associated with human immunodeficiency virus (HIV). A prospective study. Annals of Internal Medicine, 109(9), 718-721.	Electronic Database	Yes	No				Not Relevant
Thickson, N. D. (1993). Economics of home intravenous services. PharmacoEconomics, 3(3), 220-227.	Electronic Database	Yes	No◇	No◇			Not Relevant
Thin, R. N. (1991). Management of genital herpes simplex infection. International Journal of STD & AIDS, 2(5), 313-317.	Electronic Database	Yes	No				Not Relevant
Thompson, B. R., Fillingim, O., Lande, N., et al. (1990). Patient outcomes of home iv antibiotic therapy for persons with AIDS (abstract P-461D). Proceedings of the American Society of Hospital Pharmacy Midyear Clinical Meeting, 25.	Reference List	No					
Thompson, S., Holcomb, G., Cheng, S., Cunningham, G., Eschenbach, D., McCormack, W., Platt, R., Spence, M., & Sweet, R. (1980). Antibiotic therapy of outpatient pelvic inflammatory disease (abstract 671). Proceedings of The 20th Interscience Conference on Antimicrobial agents and Chemotherapy.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Thompson, S. E., Brooks, C., Eschenbach, D. A., Spence, M. R., Cheng, S., Sweet, R., & McCormack, W. M. (1985). High failure rates in outpatient treatment of salpingitis with either tetracycline alone or penicillin/ampicillin combination. American Journal of Obstetrics & Gynecology, 152(6), 635-641.	Reference List	Yes	No				Not Relevant
Thomson, S., & Lang, K. (1984). The I.V. solution. A home care alternative. NITA, 7(5), 397-400.	Electronic Database	Yes	No				Not Relevant
Thornton, G. F. (1993). Extended care facility. Hospital Practice, 28(Suppl. 2), 52-55.	Electronic Database	Yes	No				Not Relevant
Thuler, L. C. S., Jenicek, M., Turgeon, J. P., Rivard, M., Lebel, P., & Lebel, M. H. (1997). Impact of a false positive blood culture result on the management of febrile children. Pediatric Infectious Disease Journal, 16(9), 846-851.	Electronic Database	Yes	No				Not Relevant
Thys, J-P. (1988). Quinolones in the treatment of bronchopulmonary infections. Reviews of Infectious Diseases, 10(Suppl. 1), S212-S217	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1991A). An office model of outpatient parenteral antibiotic therapy. Reviews of Infectious Diseases, 13(Suppl. 2), S184-S188.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1991B). Once-daily ceftriaxone outpatient therapy in adults with infections. Chemotherapy, 37(Suppl. 3), 7-10.	Electronic Database	Yes	No◇	No◇			Not Relevant
Tice, A. D. (1992). Growing pains in outpatient intravenous antibiotic therapy. Infectious Diseases in Clinical Practice, 1(1), 74-76.	Electronic Database	No					
Tice, A. D. (1993A). Osteomyelitis. Hospital Practice, 28(Suppl. 2), 36-39.	Electronic Database	Yes	No◇	No◇			Not Relevant
Tice, A. D. (1993B). The team concept. Hospital Practice, 28(Suppl. 1), 6-10.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1994). Once-daily infusions in outpatient therapy. Infusion, November, 7-8.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Tice, A. D. (1995A). Outpatient intravenous therapy source book, Tacoma, Washington.	Reference List	No					
Tice, A. D. (1995B). Experience with a physician-directed, clinic-based program for outpatient parenteral antibiotic therapy in the USA. Europeon Journal of Clinical Microbiology and Infectious Disease, 14(7), 655-661.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1995). The importance of teamwork for outpatient parenteral antibiotic therapy. International Journal of Antimicrobial Agents, 5(1), 13-17.	Reference List	Yes	No				Not Relevant
Tice, A. D. (1996A). Alternate site infusion. The physician-directed, office-based model. Journal of Intravenous Nursing, 19(4), 188-193.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1996B). Outpatient parenteral antibiotic therapy in different countries. International Journal of Infectious Diseases, 1(2), 102-106.	Reference List	No					
Tice, A. D. (1997A). Introduction. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 5-6). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1997B). Osteomyelitis. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part II. Management of Serious Infections by OPAT. A Special Report from Scientific American Medicine (pp. 55-59). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1997C). The office/clinic model for OPAT. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine, (pp. 12-14). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1997D). Handbook of outpatient parenteal therapy for infectious diseases. Tacoma, Washington: Scientific American, Inc.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Tice, A. D. (1998A). Outpatient parenteral antimicrobial therapy as an alternative to hospitalization. International Journal of Clinical Practice, Suppl. 95, 4-8.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1998B). Outpatient parenteral antibiotic therapy for fever and neutropenia. Infectious Disease Clinics of North America, 12(4), 963-977.	Electronic Database	Yes	No				Not Relevant
Tice, A. D. (1998C). Outpatient parenteral antimicrobial therapy for osteomyelitis. Infectious Disease Clinics of North America, 12(4), 903-919.	Electronic Database	Yes	No*	No*			Not Relevant
Tice, A. D. (1998D). Preface. Infectious Disease Clinics of North America, 12(4), xi-xii.	Electronic Database	Yes	No				Not Relevant
Tice, A. D., Bonstell, R. P., Marsh, P. K., Craven, P. C., McEniry, D. W., & Harding, S. (1993). Peripherally inserted central venous catheters for outpatient intravenous antibiotic therapy. Infectious Diseases in Clinical Practice, 2, 186-190.	Reference List	Yes	No				Not Relevant
Tice, A. D., Kunkel, M. J., & OPIVITA Study Group (1995). Complications of PICC line use in outpatient care (abstract). Presented at Infectious Disease Society of America Annual Meeting, San Francisco, September, 1995, 132.	Reference List	No					
Tice, A., Marsh, P., & Craven, P. (1993). Response to a call for a randomized controlled trial. American Journal of Medicine, 94, 114-115.	Reference List	Yes	No				Not Relevant
Tice, A. D., Marsh, P. K., Craven, P. C., & McEniry, D. W. (1993). Home intravenous antibiotic therapy. The American Journal of Medicine, 94(1), 114-115.	Electronic Database	Yes	No				Not Relevant
Tice, A., & Nathwani, D. (1998). Topic session 4: Outpatient use of parenteral antibiotics in different healthcare systems. International Journal of Clinical Practice, Suppl. 95, 52-53.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Tice, A. D., & Nolet, B. R. (1997). Delivery models for outpatient parenteral antimicrobial therapy. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 7-11). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Tice, A. D., Nolet, B. R., & Schleis, T. (1997). The OPAT team. Outpatient Parenteral Antimicrobial Therapy: Current Status. Part I. Organizational, Clinical, and Socioeconomic Issues. A Special Report from Scientific American Medicine (pp. 19-21). New York: Scientific American.	Electronic Database	Yes	No				Not Relevant
Tice, A. D., Poretz, D., Cook, F., Zinner, D., & Strauss, M. J. (1998). Medicare coverage of outpatient ambulatory intravenous antibiotic therapy: A program that pays for itself. Clinical Infectious Diseases, 27(6), 1415-1421.	Electronic Database	Yes	No				Not Relevant
Tierce, J. C. (1993). Reimbursement. Hospital Practice, 28(Suppl. 1), 44-50.	Electronic Database	Yes	No				Not Relevant
To, T-P., & Garrett, M. K. (1998). Stability of flucloxacillin in a hospital in the home program. The Australian Journal of Hospital Pharmacy, 28(4), 289-290.	Electronic Database	Yes	No				Not Relevant
Todd, P. A., & Faulds, D. (1991). Ofloxacin. A reappraisal of its antimicrobial activity, pharmacology, and therapeutic use. Drugs, 42(5), 825-876.	Electronic Database	Yes	No				Not Relevant
Tokars, J., Cookson, S., McArthur, M., Boyer, C., & Jarvis, W. (1997). Risk factors for bloodstream infections in patients receiving home infusion therapy. Manuscript submitted for publication.	Reference List	No					
Torr, S. J. (1994). Hospital home care: acute health service provision in the home. North Ryde: Australian College of Health Service Executives.	Reference List	No					

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Trenholme, G. M., Schmitt, B. A., Spear, J., Gvazdinskas, L. C., & Levin, S. (1989). Randomized study of intravenous/oral ciprofloxacin versus ceftazidime in the treatment of hospital and nursing home patients with lower respiratory tract infections. The American Journal of Medicine, 87(Suppl. 5A), 116S-118S.	Electronic Database	Yes	No				Not Relevant
Trosky, S. (1985). Self-administration of intravenous antibiotics. CINA, 1(4), 17-19.	Electronic Database	No					
Trowbridge, J. F. (1993). Pneumonia and chronic lung disease. Hospital Practice, 28(Suppl. 2), 20-24.	Electronic Database	Yes	No				Not Relevant
Tulga, G. (1985). Ethical and business decisions for home IV programs. Caring, January, 19-20	Reference List	Yes	No				Not Relevant
Ujhelyi, M. R., Raasch, R. H., van der Horst, C. M., & Mattern, W. D. (1990). Treatment of peritonitis due to curvularia and trichosporon with amphotericin B. Reviews of Infectious Diseases, 12(4), 621-627.	Electronic Database	Yes	No				Not Relevant
Urquhart, J. (1992). Ascertaining how much compliance is enough with outpatient antibiotic regimens. Postgraduate Medicine, 68(Suppl. 3), S49-S59.	Reference List	Yes	No				Not Relevant
U. S. Congress, Office of Technology Assessment (1992). Home drug infusion therapy under Medicare. U.S. Government Printing Office (OTA-H-509), Washington, DC.	Reference List	No					
U.S. Department of Health and Human Services, Office of Inspector General. (1993). Medicare home infusion therapy. U.S. Government Printing Office (OET-02-92-00420), Washington, DC.	Reference List	No					
Uzun, O., & Anaissie, E. J. (1999). Outpatient therapy for febrile neutropenic: who, when, and how? Journal of Antimicrobial Chemotherapy, 43(3), 317-320.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Van Aalderen, W. M. C., Mannes, G. P. M., van Bommel, G., Voorthuis, I., & Heymans, H. S. A. (1993). Continuous home intravenous treatment of respiratory infections in 11 cystic fibrosis patient in the north of The Netherlands. Ned Tijdschr Geneeskd, 137(48), 282-286.	Reference List	Yes	No•				Not Relevant
van Aalderen, W. M. C., Mannes, G. P. M., Bosma, E. S., Roorda, R. J., & Heymans, H. S. A. (1995). Home care in cystic fibrosis patients. European Respiratory Journal, 8(1), 172-175.	Electronic Database	Yes	No				Not Relevant
van deer Meer, S. B., Poggi, F., Spada, M., Bonnefont, J. P., Ogier, H., Hubert, P., Depondt, E., Rapoport, D., Rabier, D., Charpentier, C., Parvy, P., Bardet, J., Kamoun, P., & Saudubray, J. M. (1996). Clinical outcome and long-term management of 17 patients with propionic acidaemia. European Journal of Pediatrics, 155(3), 205-210.	Electronic Database	No					
van den Brande, P., Vondra, V., Vogel, F., Schlaeffer, F., Staley, H., & Holmes, C. (1997). Sequential therapy with cefuroxime followed by cefuroxime axetil in community-acquired pneumonia. Chest, 112(2), 406-415.	Electronic Database	Yes	No				Not Relevant
van der Pijl, H., & Frissen, P. H. J. (1992). Experience with a totally implantable venous access device (Port-A-Cath) in patients with AIDS. AIDS, 6(7), 709-713.	Electronic Database	Yes	No				Not Relevant
van Niekerk, E., & Berlyn, P. T. (1999). Dangers of short intravenous lines and intravenous outpatient antibiotic therapy (OPAT). South African Medical Journal, 89(1), 10-11.	Electronic Database	Yes	No*	No*			Not Relevant
van Norman, G. A. (1996). Preoperative management of common minor medical issues in the outpatient setting. Anesthesiology Clinics of North America, 14(4), 655-677.	Electronic Database	Yes	No				Not Relevant
Vargas, H. I., Averbook, A., & Stamos, M. J. (1994). Appendiceal mass: Conservative therapy followed by interval laparoscopic appendectomy. The American Surgeon, 60(10), 753-758.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Vargemezis, V., Pasadakis, P., Thodis, H., Coucudis, P., Peihaberis, P., Jafer, H., Jara, F., & Kartali, S. (1989). Vancomycin therapy for gram-positive peritonitis in patients on CAPD. Advances in Peritoneal Dialysis, 5, 128-129.	Electronic Database	Yes	No				Not Relevant
Vellend, H. (1989). Role of flouroquinolones in lower respiratory tract infections. Clinical and Investigative Medicine, 12(1), 39-43.	Electronic Database	Yes	No				Not Relevant
Venditti, M., Gelfusa, V., Serra, P., Brandimarte, C., Micozzi, A., & Martino, P. (1992). 4-week treatment of streptococcal native valve endocarditis with high-dose teicoplanin. Antimicrobial Agents and Chemotherapy, 36(4), 723-726.	Electronic Database	Yes	No				Not Relevant
Venditti, M., Tarasi, A., Capone, A., Galie, M., Menichetti, F., Martino, P., & Serra, P. (1997). Teicoplanin in the treatment of enterococcal endocarditis: clinical and microbiological study. Journal of Antimicrobial Chemotherapy, 40(3), 449-452.	Electronic Database	Yes	No				Not Relevant
Vickery, T. R. (1986). Home parenteral antimicrobial therapy. In P. N. Catania & M. M. Rosner (Eds.), Home health care practice (pp. 328-336). Palo Alta: Health Care Market Research.	Reference List	No					
Victoroff, B. N., Robertson, W. W., Jr., Eichelberger, M. R., & Wright, C. (1994). Extremity gunshot injuries treated in an urban children's hospital. Pediatric Emergency Care, 10(1), 1-5.	Electronic Database	Yes	No				Not Relevant
Vinen, J. (1995). Intravenous antibiotic treatment outside the hospital: safety and health economic aspects. Reviews of Contemporary Pharmacotherapy, 6, 435-445.	Reference List	No					
Vinen, J., Hudson, B., Chan, B., & Fernardes, C. (1996). A randomised comparitive study of once-daily ceftriaxone and 6-hourly flucloxacillin in the treatment of moderate to severe cellulitis. Clinical efficacy, safety and pharmacoeconomic implications. Clinical Drug Investigator, 12(5), 221-225.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Vinen, J. D., Morgan, J., Chan, B., et al. (1995). A randomized prospective trial of ceftriaxone sodium in both hospital and outpatient settings for patients with serious bacterial infections. A comparison with standard regimens (abstract). Presented at OPIVITA III.	Reference List	No					
Vinks, A. A., Touw, D. J., Heijerman, H. G., Danhoff, M., de Leeda, G. P., & Bakker, W. (1994). Pharmacokinetics of ceftozidime in adult cystic fibrosis patients during continuous infusion and ambulatory treatment at home. Therapeutic Drug Monitoring, 16(4), 341-348.	Electronic Database	Yes	No*	No*			
Vinks, A. A., Touw, D. J., van Rossen, R. C. J. M., Heijerman, H. G. M., & Bakker, W. (1996). Stability of aztreonam in a portable pump reservoir used for home intravenous antibiotic treatment (HIVAT). Pharmacy World & Science, 18(2), 74-77.	Electronic Database	Yes	No				Not Relevant
Vinks, S. A., Heijerman, H. G. M., de Jonge, P., & Bakker, W. (1993). Photosensitivity due to ambulatory intravenous ceftazidime in cystic fibrosis patient. The Lancet, 341(8854), 1221-1222.	Electronic Database	Yes	No				Not Relevant
Wade, B. H., & Bush, S. E. (1998). Infection control and outpatient parenteral antibiotic therapy. Infectious Disease Clinics of North America, 12(4), 979-994.	Electronic Database	Yes	No				Not Relevant
Wagner, D. K., Collier, D., & Rytel, M. W. (1985). Long-term intravenous antibiotic therapy in chronic osteomyelitis. Archives of Internal Medicine, 145(6), 1073-1078.	Electronic Database	Yes	No				Not Relevant
Wald, E. R. (1990). Outpatient management of otitis media, mastoiditis, and sinusitis. Seminars in Pediatric Infectious Diseases, 1(4), 383-392.	Reference List	Yes	No				Not Relevant
Wale, M. C. J., Finch, R. G., Morgan, A. G., Burden, R. P., & Holliday, A. (1992). A prospective randomised trial of teicoplanin plus aztreonam verus cefuroxime in CAPD peritonitis. International Journal of Antimicrobial Agents, 1, S7-S13.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Wallace, R. J., Jr., Martin, R. R., & Greenberg, S. B. (1979). Ceforanide (BL-S786) in treatment of community-aquired bacterial pneumonia. Infection, 7(4), 176-179.	Electronic Database	Yes	No				Not Relevant
Wallace, R. J., Jr., Martin, R. R., Quinones, F. J., & Greenberg, S. B. (1981). Ceforanide and cefazolin therapy of pneumonia: Comparative clinical trial. Antimicrobial Agents and Chemotherapy, 20(5), 648-652.	Electronic Database	Yes	No				Not Relevant
Wallace, R. J., Jr., Niefield, S. L., Waters, S., Waters, B., Awe, R. J., Wiss, K., Martin, R. R., & Greenberg, S. B. (1982). Comparative trial of cefonicid and cefamandole in the therapy of community-acquired pneumonia. Antimicrobial Agents and Chemotherapy, 21(2), 231-235.	Electronic Database	No					
Wallner, K., Roy, J., & Harrison, L. (1996). Low risk of perioperative infection without prophylactic antibodies for transperineal prostate brachytherapy. International Journal of Radiation Oncology, Biology, Physics, 36(3), 681-683.	Electronic Database	Yes	No				Not Relevant
Walsh, M. L., & Johnson, C. C. (1991). Update on antimicrobial agents. Nursing Clinics of North America, 26(2), 341-360.	Electronic Database	Yes	No				Not Relevant
Walsh, T. J., Gonzalez, C., Roilides, E., Mueller, B. U., Ali, N., Lewis, L. L., Whitcomb, T. O., Marshall, D. J., & Pizzo, P. A. (1995). Fungemia in children infected with the human immunodeficiency virus: New epidemiologic patterns, emerging pathogens, and improved outcome with antifungal therapy. Clinical Infectious Diseases, 20(4), 900-906.	Electronic Database	Yes	No				Not Relevant
Wang, T. J., Sangha, O., Phillips, C. B., Wright, E. A., Lew, R. A., Fossel, A. H., Fossel, K. Shadick, N. A., Liang, M. H., & Sundel, R. P. (1998). Outcomes of children treated for lyme disease. The Journal of Rheumatology, 25(11), 2249-2253.	Electronic Database	Yes	No				Not Relevant
Ward, G., Jorden, R. C., & Severance, H. W. (1991). Treatment of pyelonephritis in an observation unit. Annals of Emergency Medicine, 20(3), 258-261.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Wasserman, G. M., & White, C. B. (1990). Evaluation of the necessity for hospitalization of the febrile infant less than three months of age. The Pediatric Infectious Disease Journal, 9(3), 163-169.	Electronic Database	Yes	No				Not Relevant
Weber, D. J., Calderwood, S. B., Karchmer, A. W., & Pennington, J. E. (1987). Ampicillin versus cefamandole as initial therapy for community-acquired pneumonia. Antimicrobial Agents and Chemotherapy, 31(6), 876-882.	Electronic Database	Yes	No				Not Relevant
Weeks-Lozano, H. (1991). Clinical evaluation of per q cath for both pediatric and adult home infusion therapy. Journal of Intravenous Nursing, 14(4), 249-256.	Reference List	Yes	No				Not Relevant
Weinberg, W. G. (1993). Safety and efficacy of teicoplanin for bone and joint infections: Results of a community-based trial. Southern Medical Journal, 86(8), 891-897.	Electronic Database	Yes	No				Not Relevant
Weingarden, S. I., & Swarczinski, C. (1991). Non-granulomatous spinal epidural abscess: A rehabilitation perspective. Paraplegia, 29(9), 628-631.	Electronic Database	Yes	No				Not Relevant
Weinhouse, G. L. (1998). Switch therapy: An economic strategy for treating lower respiratory tract infections. The National Medical Journal of India, 11(4), 179-180.	Electronic Database	Yes	No				Not Relevant
Weinstein, S. M. (1984). Intravenous therapy within the scope of home health services. NITA, 7, 39-41.	Reference List	Yes	No				Not Relevant
Weinstein, S. M. (1987). Home care forum: Cost viewpoints. NITA, November/December, 401-409.	Reference List	Yes	No				Not Relevant
Weiss, P. J., & Poirier, T. C. (1995). Medicare reimbursement for intravenous vancomycin at home. The New England Journal of Medicine, 332(15), 1037.	Electronic Database	Yes	No				Not Relevant
Welch, J., Forsey, P., & Graham, G. M. (1990). Home treatment of cytomegalovirus retinitis with intravenous ganciclovir. Genitourinary Medicine, 66(6), 460.	Electronic Database	Yes	No				Not Relevant
Wenzel, R. P., & Nettleman, M. D. (1998). Medicare and outpatient therapy for infectious diseases. Clinical Infectious Diseases, 27(6), 1422-1423.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Werk, L. N., & Bauchner, H. (1998). Practical considerations when treating children with antimicrobials in the outpatient setting. Drugs, 55(6), 779-790.	Reference List	Yes	No				Not Relevant
West, N. J. (1995). Systemic antimicrobial treatment of foot infections in diabetic patients. American Journal of Health-Systems Pharmacy, 52(11), 1199-1207, 1239-1240.	Electronic Database	Yes	No				Not Relevant
West, T. B., West, D. W., & Ohene-Frempong, K. (1994). The presentation, frequency and outcome of bacteremia among children with sickle cell disease and fever. Pediatric Emergency Care, 10(3), 141-143.	Electronic Database	Yes	No				Not Relevant
White, M. C., & Ragland, K. E. (1994). Surveillance of intravenous catheter-related infections among home care clients. AJIC, 22(4), 231-235.	Reference List	Yes	No				Not Relevant
Wiernikowski, J. T., Rothney, M., Dawson, S., & Andrew, M. (1991). Evaluation of a home intravenous antibiotic program in pediatric oncology. American Journal of Pediatric Hematologic Oncology, 13(2), 144-147.	Electronic Database	Yes	No				Not Relevant
Wijlhuizen, T. J., Van Haaren, C. P. L. C., Vermeij, P., & Van den Broek, P. J. (1995). Indications for home intravenous antibiotic therapy in the Netherlands. International Journal of Antimicrobial Agents, 5, 55-58.	Reference List	Yes	No				Not Relevant
Wijnands, G. J. A. (1992). Diagnosis and interventions in lower respiratory tract infections. The American Journal of Medicine, 92(Suppl. 4A), 4A-91S-97S.	Electronic Database	Yes	No				Not Relevant
Wilde, L. (1992). The cystic fibrosis nurse specialist and home intravenous antibiotics - cannulae, long lines, implantable devices. In T. J. David (Ed.), Proceeding of a meeting held in London November 21, 1991 (pp. 11-16). Abingdon, Oxon: Medicine Group (Education) Ltd.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Wilimas, J. A., Flynn, P. M., Harris, S., Day, S. W., Smith, R., Chessney, P. J., Rodman, J. H., Eguiguren, J. M., Fairclough, D. L., & Wang, W. C. (1993). A randomized study of outpatient treatment with ceftriaxone for selected febrile children with sickle cell disease. The New England Journal of Medicine, 329(7), 472-476.	Electronic Database	Yes	No				Not Relevant
Wilimas, J. A., Wang, W., Mack, P., Flynn, F., Eguiguren, J., Chesney, P. J., Smith, R., Day, S., & Fairclough, D. (1991). Criteria for outpatient therapy of febrile children with sickle cell disease: Preliminary results of a randomized study (abstract 789). Blood, 78, 200a.	Reference List	Yes - Abstract	No				Not Relevant
Williams, A. J., Boletis, I., Johnson, B. F., Raftery, A. T., Cohen, G. L., Moorhead, P. J., el-Nahas, A. M., & Brown, C. B. (1989). Antibiotic management of outpatients with endocarditis due to penicillin-susceptible streptococci. Peritoneal Dialysis International, 9, 65-67.	Electronic Database	No					
Williams, D. N. (1991). Home intravenous antibiotic therapy: New technologies. Recent Results in Cancer Research, 121, 215-222.	Electronic Database	Yees	No				Not Relevant
Williams, D. N. (1992). Home intravenous antibiotic therapy. International Journal of Antimicrobial Agents, 1(5-6), 253-258.	Reference List	Yes	No				Not Relevant
Williams, D. N. (1994). Reducing costs and hospital stay for pneumonia with home intravenous cefotaxime treatment: Results with a computerized ambulatory drug delivery system. The American Journal of Medicine, 97(Suppl. 2A), 50-55.	Electronic Database	Yes	No				Not Relevant
Williams, D. N. (1995). Home intravenous antibiotic therapy (HIVAT): indications, patients, & antimicrobial agents. International Journal of Antimicrobial Agents, 5, 3-8.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Williams, D. N. (1996). Home intravenous anti-infective therapy (HIVAT): Do the benefits outweigh the risks? Drug Safety, 14(1), 1-7.	Electronic Database	Yes	No*	No*			Not Relevant
Williams, D. N., Bosch, D., Boots, J., & Schneider, J. (1993) Safety, efficacy, and cost savings in an outpatient intravenous antibiotic program. Clinical Therapeutics, 15(1). 169-179.	Electronic Database	Yes	No				Not Relevant
Williams, D. N., Gibson, J. A., & Bosch, D. (1989). Home intravenous antibiotic therapy using a programmable infusion pump. Archives of Internal Medicine, 149(5), 1157-1160.	Electronic Database	Yes	No				Not Relevant
Williams, D. N., Gibson, J. A., & Kind, A. C. (1984). Outpatient intravenous antibiotic therapy. Journal of Antimicrobial Chemotherapy, 14(2), 102-104.	Electronic Database	Yes	No				Not Relevant
Williams, D. N., & Kind, A. C. (1992). Home IV antibiotic therapy for patients aged greater than 65 years (abstract). Proceedings of the Annual Meeting of Infectious Disease Society of America, Anaheim, California.	Reference List	No					
Williams, D. N., Kind, A. C., Becicka, K., & Williams, H. T. (1992). Home intravenous antibiotic therapy for infective endocarditis (abstract). Proceedings of the Annual Meeting of the Infectious Disease Society of America, Anaheim, California.	Reference List	No					
Williams, D. N., Kind, A. C., Gibson, J. A., & Person, G. (1982). Outpatient intravenous antibiotics experience with 65 patients. The American Journal of Intravenous Therapy and Clinical Nutrition, 9, 33, 37-39, 40	Reference List	Yes	No				Not Relevant
Williams, D. N., & Raymond, J. L. (1998A). Community-based parenteral anti-infective therapy (CoPAT). Pharmacokinetic and monitoring issues. Clinical Pharmacokinetics, 35(1), 65-77.	Electronic Database	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Williams, D. N., & Raymond, J. L. (1998B). Practice guidelines for community-based parenteral anti-infective therapy. Infectious Disease Clinics of North America, 12(4), 1009-1021.	Electronic Database	Yes	No				Not Relevant
Williams, D. N., Rehm, S. J., Tice, A. D., Bradley, J. S., Kind, A. C., & Craig, W. A. (1997). Practice guidelines for community-based parenteral anti-infective therapy. Clinical Infectious Diseases, 25(4), 787-801.	Electronic Database	Yes	No				Not Relevant
Williams, L. L., Wilimas, J. A., Harris, S. C., Day, S. W., Dancy, R. M., & Wang, W. C. (1996). Outpatient therapy with ceftriaxone and oral cefixime for selected febrile children with sickle cell disease. Journal of Pediatric Hematology/Oncology, 18(3), 257-261.	Electronic Database	Yes	No				Not Relevant
Williams, N., Carlson, G. L. Scott, N. A., & Irving, M. H. (1994). Incidence and management of catheter-related sepsis in patients receiving home parenteral nutrition. British Journal of Surgery, 81(3), 392-394.	Electronic Database	Yes	No				Not Relevant
Wilson, A. P. R., & Gruneberg, R. N. (1994). Use of teicoplanin in community medicine. European Journal of Clinical Microbiology & Infectious Diseases, 13(9), 701-710	Electronic Database	Yes	No				Not Relevant
Wilson, W. R. (1992). Ceftriaxone sodium therapy of penicillin g-susceptible streptococcal endocarditis. JAMA, 267(2), 279-80.	Reference List	Yes	No				Not Relevant
Winter, J. (1994). Intravenous clarithromycin. British Journal of Hospital Medicine, 51(6), 295-296.	Electronic Database	Yes	No				Not Relevant
Winter, R. J. D., Deacock, S. J., George, R. J. D., & Shee, C. D. (1984). Self-administered home intravenous antibiotic therapy in bronchiectasis and adult cystic fibrosis. The Lancet, 1(8390), 1338-1339.	Electronic Database	Yes	No				Not Relevant
Winters, R. W. (1995). The alternative-site infusion therapy marketplace: Status and future. Infectious Diseases in Clinical Practice, 4(5), 378-379.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Winters, R. W., et al. (1992). Home infusion therapy: A service and demographic profile. National Alliance for Infusion Therapy.	Reference List	No					
Wise, M., & Huff, S. (1985). Home I.V. therapy. A Hospital based program. NITA, 8, 309-311.	Reference List	Yes	No				Not Relevant
Wiselka, M. J., & Nicholson, K. G. (1997). Outpatient parenteral antimicrobial therapy: Experience in a large teaching hospital. Journal of Infection, 35(1), 73-76.	Electronic Database	Yes	No				Not Relevant
Wiseman, M. (1985). Setting standards for home IV therapy. American Journal of Nursing, 85, 421-423.	Reference List	Yes	No				Not Relevant
Wolner-Hanssen, P., Paavonen, J., Kiviat, N., Young, M., Eschenbach, D. A., & Holmes, K. K. (1998). Outpatient treatment of pelvic inflammatory disease with cefoxitin and doxycycline. Obstetrics & Gynecology, 71(4), 595-600.	Reference List	Yes	No				Not Relevant
Wood, G., Whitby, M., Hogan, P., & Frazer, I. (1989). Foscarnet infusion at home. The Lancet, 1(8630), 156.	Electronic Database	Yes	No				Not Relevant
Wood, S. (1991). Extending the principle of self-care: Intravenous therapy in the community. Professional Nurse, 6(9), 543-544, 546, 548-549.	Reference List	Yes	No				Not Relevant
Woodin, K. A., & Davis, C. J. (1990). The economic and psychosocial impact of outpatient parenteral antibiotic therapy in pediatrics. Seminars in Pediatric Infectious Diseases, 1(4), 419-428.	Reference List	Yes	No				Not Relevant
Woodin, K. A., Davis, C. J., Bauserman, D. K., Higgins, A. P., McMillan, J. A., & Powell, K. R. (1989). Inpatient (I) versus combined inpatient/outpatient therapy (CIO) of serious infections in children (abstract). AJDC, 143, 432.	Reference List	Yes - Abstract	No				Not Relevant
Woods, E. R., George, P. G., Bithony, W. G., & Wise, P. H. (1983). Sequalae of outpatient bacteremia: Improved outcome in children treated with antibiotics (abstract). American Journal of Diseases of Children, 137, 544.	Reference List	Yes - Abstract	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Woods, E. R., Merola, J. L., Bithoney, W. G., Spivak, H., & Wise, P. H. (1990). Bacteremia in an ambulatory setting. AJDC, 144, 1195-1199.	Reference List	Yes	No				Not Relevant
Wright, R. A. (1989). A cost-effective approach to managing infectious disease. Consultant, 29(5), 143-146, 150, 155.	Electronic Database	Yes	No				Not Relevant
Wright, R. A. (1996). Antibiotic therapy: How to make outpatient therapy effective-and cost-effective. Consultant, 36(2), 280-282, 294-297.	Electronic Database	Yes	No				Not Relevant
Wutzler, P., De Clercq, E., Wutke, K., & Farber, I. (1995). Oral brivudin vs. intravenous acyclovir in the treatment of herpes zoster in immunocompromised patients: A randomized double-blind trial. Journal of Medical Virology, 46(3), 252-257.	Electronic Database	Yes	No				Not Relevant
Wynn, S. (1992). The cystic fibrosis nurse specialist and home intravenous antibiotics - training and supervision. In T. J. David (Ed.), Proceeding of a meeting held in London November 21, 1991 (pp. 17-25). Abingdon, Oxon: Medicine Group (Education) Ltd.	Other	Yes	No				Not Relevant
Wynn, S. F., & Cheater, F. (1990). Families' opinions of home intravenous therapy in cystic fibrosis (abstract). Proceedings of the North American Cystic Fibrosis Conference, 5, 280.	Electronic Database	Yes - Abstract	No				Author stated study did not meet criteria.
Yap, J. C. H., Wang, Y. T., Chan, C. C., Ng, A., & Poh, S. C. (1995). Evaluation of the efficacy of sequential intravenous-oral administration of pefloxacin in community-acquired lower respiratory tract infections in patients with underlying conditions. Singapore Medical Journal, 36(5), 484-486.	Electronic Database	Yes	No				Not Relevant
Yeung, K-T., Chan, M., & Chan, C. K. N. (1996). The safety of iv pentamidine administered in an ambulatory setting. Chest, 10(1), 136-140.	Reference List	Yes	No				Not Relevant

Reference	Source	Retrieved	Relevance		Validity		Overall Rating
			#1	#2	#1	#2	
Young, S. D., & Feld, R. (1998A). Current therapeutic options in the management of chemotherapy-induced febrile neutropenia. Current Oncology, 5(3), 119-129.	Electronic Database	Yes	No				Not Relevant
Young, S. D., & Feld, R. (1998B). Fever associated with chemotherapy-induced neutropenia: a review of current therapeutic approaches. Current Opinion in Infectious Diseases, 11(4), 401-409.	Electronic Database	Yes	No				Not Relevant
Zambrano, D. (1996). Recent advances in antibiotic regimens for the treatment of obstetric-gynecologic infections. Clinical Therapeutics, 18(2), 214-227.	Electronic Database	No					
Zobel, G. B. (1987). Training paramedical personnel and patients for home care parenteral antibiotic delivery. Outpatient Delivery of Parenteral Antibiotic Therapy, Nutley, New Jersey, 15-20.	Reference List	No					
Note: Many of these references have been taken from secondary sources (i.e. databases, reference lists of retrieved articles) and are only as complete as the source would allow.							

Key for Appendix I	
Symbol	**Meaning of Symbol**
•	Article retrieved but not published in English
◇	Articles used for trial of tools
*	Articles used to calculate kappa