ATHABASCA UNIVERSITY

AN EVALUATION OF THE BRITISH COLUMBIA RURAL HEALTH VIDEO NETWORK LINK

BY
JEFF A. MAY

A project submitted to the

Athabasca University Governing Council in partial fulfillment

Of the requirements for the degree of

MASTER OF DISTANCE EDUCATION

Athabasca, Alberta
November, 2002

ATHABASCA UNIVERSITY

I hereby grant to Athabasca University the right to lend my project (the title of which is shown below) to users of the Athabasca University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users. I further agree that the Dean of Graduate Studies or I may grant permission for multiple copying of this work for scholarly purposes. It is understood that copying or publication of this work for financial gain shall not be allowed without my written permission.

Title of Project:

An Evaluation of the British Columbia Rural Health Video Network Link

Author: _____
(Signature)

_____
(Name)

_____
(Date)

ATHABASCA UNIVERSITY

The undersigned certify that they have read and recommend to the Athabasca University Governing Council for acceptance a project "AN EVALUATION OF THE BRITISH COLUMBIA RURAL HEALTH VIDEO NETWORK LINK" submitted by "JEFF A. MAY" in partial fulfillment of the requirements for the degree of MASTER OF DISTANCE EDUCATION.

Patrick J. Fahy, Ph.D.
Supervisor

Mohamed Ally, Ph.D.

Susan D. Moisey, Ph.D.

Date: November 8, 2002

DEDICATION

I want to dedicate this project to Nathalie and our children Tristan, Nikita, and Céline for their patience and support over the past three years. The dedication extends to my late grandfather, Earl E. May, whose strong work ethic motivated me to overcome the many challenges experienced during the completion of this project. I would also like to thank my parents, Gerald and Kaye May, for encouraging me to pursue post-secondary education.

ABSTRACT

The British Columbia Rural Health Video Network Link initiative strove to provide quality educational experiences, clinical consultations, and clinical service support to the population of nine physicians in Vanderhoof during the period from November 1, 2001, to November 30, 2002. The purpose of this study was to perform an evaluation of the project with a particular focus on the continuing medical education component (CME). A needs assessment, two focus groups, six CME rounds delivered via videoconference, and a final site visit, were the foci for evaluating project effectiveness. Participants reacted positively to all six sessions, reporting a moderate to high level of agreement that the videoconference medium provided the best way of delivering CME material. The findings suggest that the needs-based CME rounds were effective in fulfilling the educational requests of physicians, positively influencing their clinical practices, and improving patient care. However, the only way this group of physicians will welcome the technology again is in the form of a sustainable initiative with guaranteed funding and 24-hour, highly reliable access. Therefore, future telehealth delivery into other rural communities should follow the Telehealth Uptake Strategy, first described in this paper, with a funding guarantee for three to five years, which includes the provision of a project coordinator and identification and cooperation of a local "change agent" with administrative support. The Shared Provincial Access Network/Provincial Learning Network is underutilized and offers an opportunity to bridge the CME access gap between rural and urban physicians. The network was very reliable between the hours of 0730-0900 and 1500-2000, exceeding 95% problem-free connectivity. The evaluation produced 23 recommendations.

ACKNOWLEDGEMENTS

The author wishes to express sincere appreciation to Professors Patrick J. Fahy, Mohamed Ally, and Susan D. Moisey for their support and wisdom during the project and assistance in the preparation of this manuscript. Special thanks go to Dr. Kendall Ho for suggesting the topic and offering his expert guidance throughout the study.

TABLE OF CONTENTS

LIST OF TABLES

Number Page

LIST OF FIGURES

Number Page

CHAPTER I

INTRODUCTION

Overview

Physicians practicing in rural areas find it difficult to attend continuing medical education (CME) events as most of them take place in urban centres. Three main barriers to attending CME activities include an inability to get locums, distance to travel, and a lack of appropriate learning opportunities (Black & Dunikowski, 1985; Gill & Game, 1994; Martin, 1999). Compounding these issues is the fact that conventional educational initiatives (e.g. medical conferences) have significant limitations. Little evidence exists to suggest they are effective in helping physicians incorporate new knowledge into practice (Davis, Thomson, Oxman, & Haynes, 1992, 1995). Medical conferences are more suited for physician networking, "awakening" to new or novel treatments, and validating current practice.

Medical school, residency training, and other pre-certificate health education programs represent powerful behaviour transforming experiences largely due to trainees performing tasks under direct expert supervision. After graduating, urban physicians have opportunities to experience similar trainee-trainer activities, both formally and informally, as they work alongside specialists. Until recently, deployment of this ongoing apprenticeship (or "externship") component of health education was impractical in a rural setting. One reason is a lack of mentor or learner availability to carry out this training for prolonged periods due to the necessity of being away from their practices, families, and communities. Another barrier lies in

the apparent unpopularity of this form of continuing education (Davis, Haynes, Chambers, Neufield, McKibbon, & Tugwell, 1984, p. 281).

Consequently, rural physicians practice their professions with minimal collegial or specialty support. This situation, as substantiated by the College of Family Physicians of Canada (1998) National Family Physician Survey, contributes to a disconcerting sense of isolation. The combination of physical isolation, educational isolation, and peer support isolation leads to professional dissatisfaction, which challenges community recruitment of new general practitioners (GPs) and retention of existing ones. Overall, the situation negatively affects the optimal delivery of health care services to rural populations.

Statement of Purpose

The British Columbia Rural Health Video Network Link (RHVNL) initiative strove to provide quality CME experiences, clinical consultations, and clinical service support to physicians working in Vanderhoof. Specific RHVNL project objectives were to:

- Assess and prioritize the professional educational needs of Vanderhoof physicians.
- Develop a series of CME programming, with a mixture of videoconferencing, Internet, online rounds, CD-ROM, and other electronic based educational interventions to address the prioritized educational needs.
- Evaluate the effectiveness of the CME programming in fulfilling physician needs.
- Test the usage of the Shared Provincial Access Network (SPANBC)/Provincial Learning Network (PLNet) for real time, point-to-point videoconferencing for CME programming and clinical service delivery in B.C.

The purpose of this master's project was to perform an evaluation of the RHVNL pilot project with a particular focus on the CME component. The CME component involves evaluating six, 1-hour sessions based on the expressed needs of the participants. Topics, in order of delivery, include:

- What's New in ACLS (Advanced Cardiac Life Support)
- Palm Pilot Applications in Medicine
- Atrial Fibrillation: Management Controversies
- Diabetes: An Informal Discussion of Northern Issues
- C-Spine Imaging for Emergency Physicians
- Resistant and Chronic Depression Management: A Case-Based Round

Research Problem

Five evaluation questions focus on three areas of continuing medical education (CME) to determine how well the RHVNL achieved its objectives. The first two questions relate to CME delivery, the third seeks to determine CME impact, and questions four and five evaluate network infrastructure used for the delivery of CME. Individual questions include:

1. To what extent were the continuing educational needs of Vanderhoof physicians assessed and prioritized?
2. How effective was the series of continuing medical education programming in fulfilling physicians' educational needs?
3. How effective was the series of continuing medical education programming in influencing clinical practices?

4. How reliable was the provincial electronic infrastructure as an Internet Protocol videoconferencing venue for delivering continuing medical education?
5. How cost effective was the provincial electronic infrastructure as an Internet Protocol videoconferencing venue for delivering continuing medical education?

Significance

The significance of the study to other rural areas in British Columbia includes the development of transferable:

- Procedures and instruments for assessing the unique professional development needs of rural physicians
- Guidelines for optimal CME delivery media/modes
- "Best Practices" for CME design and delivery
- "Best Practices" for using videoconferencing to deliver CME
- Telehealth Uptake Strategy

Delimitations

The primary target population for the RHVNL included nine full-time rural GPs in Vanderhoof. Continuing nursing education (CNE) delivery and clinical service delivery comprised the other components of the pilot project. Data analysis for these areas is beyond the scope of this paper. This study evaluated CME programming and how it influenced clinical service delivery.

The analysis, design, development, and implementation of the CME delivery process fell outside the control, and therefore scope, of this study. These steps were pre-determined by the original project proposal (e.g. choice of videoconference and Internet delivery media) and individual specialist physicians (designed and presented the CME rounds).

Limitations

The logistics of having presenters design pre-assessments and post-assessments, and participants' reluctance to complete another set of forms, impeded successful application of this project evaluation strategy. In addition, there is no evidence that participants used the online feedback instrument or even accessed the website to view recorded online rounds. The participant number dropped to six when, after the third CME round, two participants moved away. Medical round feedback and post-feedback forms, face-to-face focus groups, project evaluation survey, and other anecdotal documentation comprised the instruments that provided evaluation evidence for the effectiveness of each intervention. The study is therefore limited to those who chose to participate in the individual sessions and chose to provide honest feedback on them.

Definition of Terms

Continuing Medical Education (CME). Describes the ongoing participation of physicians in medical education.

Continuing Nursing Education (CNE). Describes the ongoing participation of nurses in nursing education.

Effectiveness. Describes the relationship between an initiative and the resulting benefit(s) to groups or individuals. Effectiveness is doing the right things (Garrison, 1989; citing Davies, 1975).

Efficiency. Describes the relationship between benefit and cost, focussing on whether a less costly technology produces similar effectiveness. The term "cost-effective" is a synonym for efficiency. Efficiency is doing things right (Garrison, 1989; citing Davies, 1975).

Evaluation. The collection, analysis, and interpretation of information about any aspect of an educational or training program, as part of a recognized process of judging its effectiveness, its efficiency, and any other outcomes it may have (Mary Thorpe, 1988, p. 5; cited in Schuemer, 1991, p. 9).

Information and Communication Technologies (ICTs). Include technologies such as videoconferencing, the Internet, and other electronic devices that enable communication over large and small distances.

Internet. Includes the World Wide Web (WWW), e-mail, news-groups, chat, bulletin boards, synchronous/asynchronous modalities, and audio/video media.

Interoperability. The ability of two or more telehealth systems (e.g. licensure, remuneration, consent, liability, referral patterns, accreditation, confidentiality, funding

agencies, and the political environment) to interact with one another and exchange information in order to achieve predictable results.

Online Learning. Refers to use of audio, video, and computer-based communications tools to aid the learner in developing new knowledge, attitudes, or behaviours, by facilitating interactivity with content, peers, and the Internet.

Rural. A community more than 80 km, or one hour away by road in good weather, from a major regional hospital, a population of less than 10,000, and scores above 10 on Leduc's 6-point General Practice Rurality Index (GPRI), where "10" is the threshold for rurality (Leduc, 1997; Pavan & Makin, 2000).

Telehealth. Involves the use of information and communication technologies to deliver clinical services, information, medical image and data transfer, and educational activities over large and small distances.

Telelearning-in-health. A subset of telehealth that describes the use of information and communication technologies to design and implement educational programming over large and small distances to help physicians during their training and in active practice. Throughout this report, telelearning-in-health and telelearning are interchangeable.

Telemedicine. A subset of telehealth that describes the use of information and communication technologies over large and small distances for clinical service delivery.

Travel to Conferences. Travelling over 100 kilometres to a major centre (>200,000 population) and staying at least one night.

Virtual Externship. A pedagogical approach that uses expert urban mentors/teachers and information and communication technologies (ICTs) to deliver medical education and services to general practitioners living and working in rural areas.

WWW or W^3. The sub-set of the Internet for accessing information on the Internet.

Organization of the Project

Five chapters comprise the project. Chapter 1 introduces the specific objectives of the RHVNL and includes a statement of purpose as well as the research problem with five research questions. The chapter provides an explanation of the significance of the study relevant to GPs in other rural communities and defines delimitations, limitations, and the essential terms of the study. Chapter 2 reviews the literature relevant to this project, including a discussion of the implications of Moore's (1993) theory of transactional distance to delivering CME at a distance. The examination provides a historical overview of CME access issues faced by rural doctors, the field of telehealth, CME delivery models, evaluation methodologies, information and communication technology infrastructure, and current research as it pertains to this study. Chapter 3 details the mixed-methodology used in this study and discusses partnership arrangements and project team roles. Specifically, it distinguishes the academic and contracted roles of the author of this document, Jeff A. May. The chapter delineates physician population,

describes data collection and analyses procedures, and depicts the CME delivery process. Chapter 4 presents the findings of the study and discusses the results as they relate to each research question. The chapter organizes the results using Stufflebeam's *context, input, process, and product* (C.I.P.P.) model and Kirkpatrick's four-level evaluation model. Chapter 5 summarizes the study and describes the limitations. The chapter organizes the conclusions and recommendations addressing the five research questions and discusses recommendations for future study.

CHAPTER II

REVIEW OF RELATED LITERATURE

Overview

Today's physicians must keep up with the latest research to stay current in their practice and to act prudently as patient advocates in sorting out accurate health information from invalid or even harmful literature (Wallace, 2001). Evidence-based medicine, clinical practice guidelines, and patient-centred approaches are popular health research areas relevant to both urban and rural GPs. Due to the proliferation of health knowledge an acute need exists for members of this sector to access timely and quality continuing education. The most common barrier preventing physicians from experiencing continuing medical education (CME) is scheduling (Rourke, 1988; Gill & Game, 1994). Demand for their time and attention at the workplace is high, leaving few hours for professional development. For rural doctors, professional isolation (both geographic and peer) further impedes access to CME activities and remains a major source of job dissatisfaction (Lott, 1995; Bhatara, Fuller, O'Connor, Davis, & Misra, 1996).

A provincial priority for on-line delivery of health care services (Premier's Technology Council, 2001; 2002), increasing affordability of information and communication technologies (ICTs), and a heightened pedagogical understanding of adult learning behaviours, offer a timely opportunity to develop and implement innovative and sustainable CME initiatives. Documenting the success of a telehealth initiative is essential in order to satisfy stakeholder demands as well as to access continued funding for project sustainability.

Five sections comprise this chapter. Section one presents a historical perspective on rural physician issues, including a discussion on the implications of Moore's (1993) transactional distance theory to CME at a distance. Section 2 briefly describes the field of telehealth. Part 3 introduces telelearning-in-health. The fourth section provides an overview of pertinent evaluation methodologies. Section 5 discusses current videoconference research and how it relates to the study.

Rural Physician Issues

In order to discuss the various barriers to CME activities rural physicians face, a definition for "rural" is necessary. The term "rural" has many different meanings, even within the field of healthcare (Rourke, 1997; Gagne, Grzybowski, Iglesias, Klein, & Lalonde, 1998; Pitblado & Pong, 1999; & Kralj, 2000). Research initiatives tend to customize a meaning for "rural" by blending several definitions. For the present study, "rural practice" occurs in an environment where a major regional hospital is at least 80 km or one hour away by road in good weather, and scores above 10 on Leduc's (1997) 6-point General Practice Rurality Index (GPRI), where "10" is the threshold for rurality. Vanderhoof, British Columbia is located 103km west of Prince George and has a GPRI rating of "60" (Pavan & Makin, 2000).

Hospital closures, the "brain drain," a lack of ongoing training, and the reluctance of recent medical school graduates to practice in rural areas have all contributed to a shortage of rural doctors. In British Columbia, an overall 2% decline in physician numbers during the period of June/98 to October/99, dependence on foreign-trained physicians (46%), and an

average age of mid-40 suggest the province will soon experience severe shortages (Soles, 2001).

Are Canadian rural physician numbers really declining? Hutten-Czapski (2002) reports an unexplained *increase* in Canadian rural (i.e. communities of less than 10,000 people) physicians in 2000 compared to 1996 (p. 7). Canadian rural doctors increased by 5%, including 9% in rural British Columbia, over this timeframe. Methods used to count physicians and trends in their numbers require further research. A recent publication brings into question the reliability of the current methodology for measuring geographic distribution of physicians (Pong & Pitblado, 2002). The authors are in favour of research in the area of practitioner counting to focus on the interrelationships between availability, utilization, and patient health status.

Ways of addressing physician shortage over the years include training local citizens to treat and prevent common ailments (Wen, 1975), training medical students specifically for rural practice (Rosenthal, 1989; Jong & Beach, 1997), establishing training posts in rural hospitals (Doolan & Nichols, 1994), and encouraging rural physicians to develop hypotheses and pursue research questions arising from their practice (Manca, 2001).

Other researchers recommend that initiatives should focus on maintaining the professional interest of physicians in rural practice by addressing issues such as a reasonable workload, spousal employment opportunities, availability of quality education for children, status issues, availability of quality housing, time-off from work, and community influence towards health

needs (Kamien, 1990; Hoyal, 1994). Providing professionals in remote areas with ongoing and timely access to new medical techniques will improve GP satisfaction and patient health care. Regardless of whether the numbers are rising or falling, retaining medical personnel leads the list of rural community concerns.

Each year physicians are required to keep up professional development activities in order to maintain standing with medical affiliations or memberships. Doctors who wish to attend accredited conferences held in large centres face lost wages, a large input of travel time, and thousands of dollars in travel and conference costs. These obstacles often prevent rural doctors from attending formal CME programs, and obtaining certification (Curran, Hatcher, & Kerby, 2000). A comparison of the perceived professional development needs of semi-rural and urban physicians found the former group less satisfied than their urban counterparts (Woolf, 1991). These findings underlie the accessibility differences to CME activities between the two groups.

Mann & Chaytor (1992) increasingly regard assessing educational needs as a critical component of program planning, design, and evaluation, particularly in adult and continuing medical education. Traditional CME needs assessments, however, frequently have only identified the ones that the provider can respond to or, from the providers' perspective, should exist (Maloney & Kane, 1995). The learner's needs, expressed in the context of experience and practice, are often overlooked (Mann, 1998). *Uncertainty* and *trust* are two common themes that often emerge from focus groups and require addressing in the final project design. Qualitative methods, including focus groups, yield this necessary data on complex behaviour and enable investigators to explore attitudes toward new and unfamiliar technology. Therefore,

assessments should identify clinical deficiencies for CME remediation (Ward, 1988). Rural physicians are particularly interested in updating their knowledge and skill in cardiology, dermatology, emergency medicine, geriatrics, trauma surgery, intensive care, obstetrics, otolaryngology, pediatrics, and preventative medicine, at one, three and five year intervals (Woolf, 1990; Woolf, 1991; Gill & Game, 1994; Curran, Hatcher; Kerby, 2000).

Broadly defined, CME initiatives do positively affect physician competence, physician performance, and patient outcomes (Colle, 1978; Davis, Haynes, et al., 1984), as long as the methods that satisfy their needs are used (Davis, Thomson, et al., 1992). Physicians rate case discussion workshops, where opportunities exist to practice behaviours through interactive learning methods, as the most effective learning method (Davis, Thomson, et al., 1992; Wise, et al, 1994). However, some widely used CME methods (e.g. health conferences and educational print materials) appear to provide little improvement in physician performance or health care outcomes (Davis, Thomson, et al., 1995). In addition, many effective methods (e.g. patient-mediated interventions, outreach visits, reminders, and opinion leaders) are among the least used CME techniques (Davis, Thomson, et al.). Expense, time-consuming for instructors, and lack of time for the learner, are likely reasons for low use of these academic detailing learning strategies. Woolf (1993) argues that CME should provide a forum for critical reflection, not the didactic delivery of the presenter. Specifically, the author recommends the use of effective audio-visual materials, a comfortable number of learners, an interdisciplinary approach, and, especially, equal time allocated for the formal presentation and interactive discussion (p. 230-231). Curran's (2000) study found rural physicians rate problem-based

CME highly and suggests, “They should be given opportunities to play an active role in the learning process by formulating questions then seeking answers.…” (p. 230).

Participation difficulties in CME activities are not limited to delivery methodologies. A condition Lott (1995) calls “distance impairment” describes the real or imagined condition of geographic isolation experienced by the learner, which contributes to an unwillingness, or inability, to bridge a gap between an educational resource and a personal need, educational need or personal desire (p. 207). Therefore, some GPs may display a lack of desire, or possibly a lack of skill, to participate in various methods of self-directed learning. Lott’s “distance impairment” requires further consideration as to the causes, not the symptoms, of the condition.

Moore’s concept of “transactional distance” (TD) may provide theoretical support for Lott’s observation. Moore (1993) defines TD as the “physical separation that leads to a psychological and communication gap, a space of potential misunderstanding between the inputs of instructor and those of the learner” (p. 2). The concept of TD asserts that the amount of geographical separation is not a significant factor in distance education, but is a pedagogical distance determined by the balance of structure and dialogue. Interaction processes (learner-content, learner-instructor, learner-learner, learner-media, and learner-environment), amount of program structure, and degree of learner autonomy (including learning style) are the essential elements of TD (Moore, 1993; Burnham & Walden, 1997; Stirling, 1997a; Stirling, 1997b; Chen & Willits, 1998; Sutton, 1999). Each component requires careful planning in order to reduce transactional distance. High interactivity (i.e. the extent to which learner and instructor are able to respond to each other), low program structure, and high learner autonomy decrease

TD. Conversely, a program highly structured will limit dialogue and learner autonomy and, therefore, increase transactional distance. Chen and Willits (1998) found three studies (Bischoff, 1993; Saba & Shearer, 1998; and Bunker, Gayol, Nti & Reidell, 1996) that investigated the tenets of Moore's TD concept. All three support the hypothesis that the amount of TD is a function of dialogue (inverse) and structure (direct).

Telehealth

The literature offers a number of definitions for telehealth (Picot & Cradduck, 2000; Hailey, Roine, & Ohinmaa, 2001; McMahon, 2001; Noorani & Picot, 2001). Some authors have argued in favour of bringing telehealth and telemedicine under the umbrella of e-health, to increase cost effectiveness (Mitchell, 2000, p. 19). For the purpose of this study, telehealth, not e-health, represents the umbrella term for telemedicine and telelearning-in-health. Both telemedicine applications and telelearning-in-health (or telelearning) initiatives use ICTs over large and small distances. Telemedicine uses them to deliver clinical services to patients. Telelearning uses them to design and implement educational programming for physicians. The distinction between the terms is important in order to determine whether the telehealth initiative focuses primarily on clinical service delivery (often with a secondary telelearning component) or mainly continuing medical education delivery.

Reports by PriceWaterhouseCoopers (1999), Picot and Cradduck (2000), Watanabe (2000), and Edworthy (2001) describe the status of the telehealth industry worldwide. These publications give a very complete inventory of current telehealth initiatives and delineate the nature and scope of the obstacles facing the optimum implementation of telehealth initiatives,

as well as strategies to overcome the barriers. Growing evidence suggests that success depends upon how each program is conceived (i.e. addresses important health care needs), implemented, and able to resolve interoperability issues (Watanabe, 1998; Burns, 1999; National Telehealth Interoperability Workshop Report, 2001). A needs assessment, mentioned previously, is a critical part of the design and implementation of telehealth projects (Mann & Chaytor, 1992; Siden, 1998).

People, the telehealth application technology, and infrastructure, comprise a telehealth system. The "people" include an on site coordinator (the most important), participants, stakeholders, the project management team, and the community. Community readiness for telehealth initiatives depends on financial, structural, and cultural readiness (Welsch, 2002). The "application technology" covers the hardware and software necessary for the specific initiative. The third piece, "infrastructure," involves network connectivity components. Cornish and Monahan (1996) and Zikler and Kantor (1997) provide a basic understanding of current networks and how they are utilized in educational and clinical service delivery settings.

Telelearning-in-Health: Delivering Continuing Medical Education

The challenge for distance education (DE) providers has historically revolved around delivery methods. Africa, China, and India represent countries with a long history of DE but lack the necessary ICT infrastructure to move beyond traditional health education and technologies (e.g. print, radio, and television). By investing heavily in ICTs, countries in the western world provide new ways of delivering health care and education to rural communities. Historically, common forms of non-traditional delivery of education include slow-scan video

(Dunn et al, 1980), audio-teleconferencing (Linsday et al, 1987; McDowell et al, 1987), videotapes (Black & Dunikowski, 1985), computer-based (Oeffinger et al, 1992), desktop conferencing (Lott, 1996; Fitzpatrick, 1998), videophone (Raman, 1988), and synchronous videoconferencing (Noorani, & Picot, 2001). All of these media have unique benefits and challenges.

Rural GPs have continually stressed the need for educational opportunities in order to maintain and increase their competence (Jennett & Swanson, 1994; cited in Lott, 1996). The extensive research into the learning needs of professional adult learners can offer great insight when planning a telelearning project. Adult learners confront many conflicting demands on resources, possess a considerable amount of experience on the job, and seek applied and relevant instruction. To teach physicians effectively, CME providers must address the challenge of learner time-management. Telelearning-in-health (or telelearning) can provide this audience with an efficient means to access relevant CME.

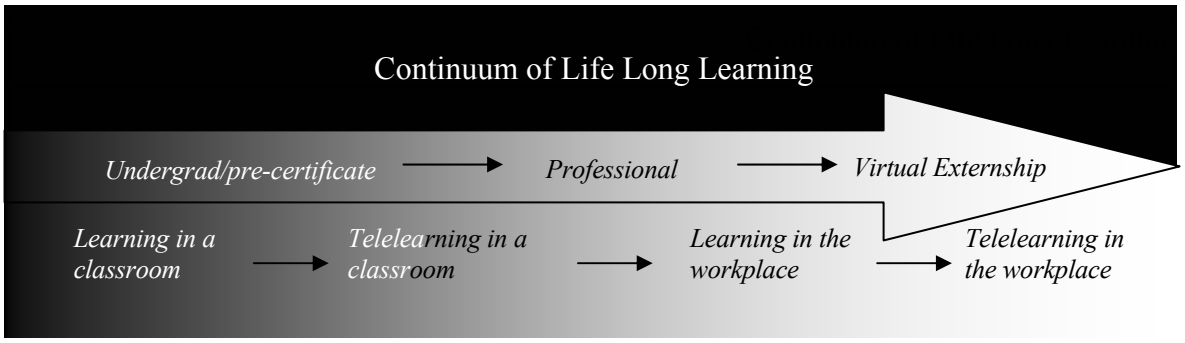
A more collaborative telelearning program involves applying the principles from business, sociology, and psychology coupled with operationalizing communication within the organization (Jennett, 2001). Of course, dialogue (e.g. telephone, email, audio/video conferencing, etc.) is essential for learning and requires careful incorporation into the telelearning design (Anderson & Garrison, 1995). For successful telelearning initiatives, Watanabe (2000) recommends the following tenets of success:

- having champions at every site
- planning with the end-user in mind

- providing adequate training, technology and administrative support
- communicating regularly between all stakeholders through a variety of media
- considering learning styles
- coordinating with professional associations to have CME programs accredited
- ensuring quality of content and quality of interaction
- focusing on quality, not quantity
- accessing public funding for sustainable programs
- considering time zones when scheduling synchronous conferencing formats

Online learning within the health field is widely available, and many qualify for study credits by the College of Family Physicians (Dunn, Acton, Conrath, Higgins, & Bain, 1980). Regardless of medium sophistication, today GPs need a continuum of lifelong telelearning in the workplace. Other methods are available; however, few have the potential of coupling CME with clinical service delivery in an "on-demand" basis (e.g. rural GPs present clinical cases to specialists via videoconferencing). Figure 1 shows a "virtual externship" model that moves physicians into a fourth area of professional education – telelearning in the workplace. For example, a rural physician (learner) can manage a patient or learn a medical procedure in the virtual presence of an urban-based specialist (mentor), via real time videoconferencing, thereby providing an opportunity for the mentor to observe the learner and make suggestions for skill improvement or alternate ways of approaching diagnosis. The videoconference component of this model provides rural physicians access to professional education that is equal to their urban counterparts who work along side specialists on a daily basis.

Figure 1. Transition to a "Virtual Externship"



Telelearning, like telemedicine, needs extensive infrastructure, ranging from low network bandwidth to far-reaching support systems. The merging of leadership and support roles is an essential component of this type of tele-infrastructure. This "blend" requires careful consideration for a cost-effective and innovative outcome. At one extreme, the technology drives the tele-infrastructure outcome, where technical developers (and advocates) force the acceptance of novel software/hardware. At the other extreme, the end-users' articulated requirements drive the outcome, which leads to a completely reactive infrastructure. A cost-effective system should address both developer and end-user needs due to the expense of technology-driven systems (i.e. many "solutions" have little to do with the real needs of users). The end-user awareness of modern developments often lags behind the developer, as they are generally not technical or pedagogical experts. For example, desktop conferencing allows physicians to:

- access the Web,
- participate in live and delayed broadcasts of medical conferences,
- engage in professional discussions with colleagues on secure chat lines, and
- have the availability of telemedicine consultation through a combination of store and forward technology; in addition, live interaction with consultants (Lott, 1996; Matthies,

von Jan, Perth, Tatagiba, Stan, & Walter, 2000; Tamai, Nakagawa, Yokomori, & Nishiyama, 2000).

Rural GPs, however, may not possess the prerequisite computer skills (Lott, 1995) time to utilize this technology, or may face the "digital divide' barrier (i.e. low bandwidth). Alternatively, physicians may prefer experiencing CME with their peers. Fitzpatrick's (1998) study found the Hervey Bay Hospital telehealth system was grossly under-utilized although there was enthusiasm for its potential. Through an interview process, he found a common request for full-time telehealth coordinators (p. 7).

Determining Effectiveness: Evaluation Methodologies

Evaluation comes in many forms (e.g. product evaluation, program evaluation, and training evaluation), and has numerous definitions categorized in groups – classificatory, comparative, operational, componential, ostensive, and synonym (Patton, 1982, p. 33; citing Gephart, 1981, p. 250-255); and includes a plethora of models. Mary Thorpe defines evaluation as the "… collection, analysis and interpretation of information about any aspect of a programme of education and training, as part of a recognized process of judging its effectiveness, its efficiency and any other outcomes it may have" (1988, p. 5; cited in Schuemer, 1991, p. 9). The term "process" implies using a systematic approach when assessing "value."

In telehealth, the ability to access continued funding beyond the pilot project stage necessitates researchers engage in rigourous and systematic evaluation of their initiatives. A

number of authors suggest there is a lack of actual research assessing telehealth initiatives (Wiggs, 1999; Hailey, Roine, Ohinmaa, & Arto, 2001). The last decade, however, has produced numerous telehealth evaluation models (European Health Telematics Observatory {EHTO}, 1996; Yellowlees, 1998; Blignault, 1999; Bruce, 1999; Picot, 1999; Randell & Delekto, 1999; Watt, 1999; ANZTC, 2000; Blignault, 2000; Kushniruk & Patel, 2001; McMahon, 2001). Although project specifics may vary, it is possible to distill the many assessment models and find the components of a common general framework for telehealth evaluation. For example, the *Project for Rural Health Communications and Information Technology* (1996) proposed a framework with the following levels:

i) reaction

ii) feedback

iii) knowledge gained

iv) capability developed by participants

v) behaviour change, and

vi) organizational outcomes and results (cited in Blignault, 1999, p. 12-13)

Many of the telehealth evaluation models mentioned above bear a striking resemblance to one or more of the original evaluation methodologies (Table 1). An explosion of educational evaluation models occurred during the 1970's and many remain relevant today. Stufflebeam's (1971) context, input, process, and product (C.I.P.P.) model and Kirkpatrick's (1998) four level model (a recent addition) are of particular interest to this project.

Table 1. Categorizing Evaluation Models[1]

MODEL	DESCRIPTION	ADVOCATES
Accreditation-ion Model	• External team determines the extent to which a program has met professional standards • Uses self-study panel review	Public School Systems
Adversary Approach	• Two teams "battle" over whether or not a program should be continued • Uses quasi-legal procedures	Owens, Levine, Wolf
Art Criticism Approach	• Makes the evaluator's own expertise-derived standards of excellence a criterion for judging a program • Uses critical review	Eisner, Kelly,
Behavioural Objectives Approach	• Targets clear, specific, and measurable goals • Uses objectives, achievement tests	Provus, Tyler, Popham
Decision-making Model	• Evaluates design determined by the specific decisions to be made • Uses surveys, questionnaires	Stufflebeam, Alkin, Kirkpatrick
Goal-free Evaluation	• Examines the extent to which client needs are met • Uses bias control logical analysis	Scriven
Systems Analysis	• Quantitatively measures program inputs and outcomes for effectiveness and efficiency • Uses cost-benefit analysis	Stake, Rivlin
Transaction Approach	• Focuses on program processes • Uses case studies, interviews, observations	Stake, Parlett & Hamilton

Stufflebeam's (1971) educational evaluation text develops a model that combines evaluation (*context*, *input*, *process*, and *product*) with an evaluation process that includes

[1] Adapted from Kennedy and Kettle, 1995, citing House, 1978

change settings and decisions for applying his theory. *Context evaluation* helps outline a rationale for determining the program objectives, defines the relevant environment, describes the desired and actual environmental conditions, and identifies unmet needs. In order to achieve program objectives *input evaluation*, the second step, produces information that determines how to use available resources, relevant organizational resources and capabilities, and strategies and designs for implementation. *Process evaluation* compiles periodic feedback for stakeholders, providing information for project decisions, and maintaining documentation of the process as it occurred. *Product* evaluation assists with the measurement and interpretation of program attainments, development of operational definitions for objectives, and the interpretation of outcomes using information from the first three steps. "Basically, the CIPP model answers four questions: What objectives should be accomplished? What procedures should be followed? Are the procedures working properly? Are the objectives being achieved?" (Stufflebeam, 1972).

In Kirkpatrick's (1998) model for the evaluation of training programs, the four level approach (*reaction*, *learning*, *behaviour*, and *results*) represents a sequential and systematic way to evaluate educational programs. The process increases in complexity as you move through the steps, providing higher quality information. *Reaction*, the first level, measures participant satisfaction (i.e. "wow" factor) with the program. The response must be positive for the participant to move on to the next level – *learning*. According to this model, learning has occurred if the participant alters his/her attitudes, knowledge, or skill level. At least one of these alterations is a prerequisite for behavioural change (i.e. change in workplace practice). A change in the third level, *behaviour*, requires the participant i) having a desire to change, ii)

knowing what to do and how to do it, iii) working in the right climate, and iv) being rewarded for changing his/her behaviour. The fourth level, *results*, is more difficult to measure, yet the most important. However, it is challenging to obtain objective data to the question *"How much did patient care improve as a result of the project?"*

Of the four conditions, *behaviour* is the least controllable. The participant's supervisor may create a climate that is preventing, discouraging, neutral, encouraging, or requiring. The first two climates will likely result in no behavioural change. In a neutral climate, behaviour change will depend on the participant's desire to change, whether or not learning has taken place, and how encouraged they are with the existing reward system. An encouraging or requiring environment reduces the importance of a reward system, leaving participant desire and degree of mastery of content as the determining factors in behavioural change.

Issues affecting current telehealth evaluation include:

- the desire of commercial companies to sell telehealth systems,
- a predisposition of telehealth participants to be in favour of the technology,
- insufficient attention as to how the telehealth application is to be used,
- a lack of specific telehealth-related protocols,
- the need for reliable documentation to demonstrate financial feasibility, and
- a fixation on conducting pilot projects rather than taking a "best practices" or case study approach (Taylor, 1998; Burns, 1999; Lehoux, Sicotte, & Lacroix, 1999; Picot, 1999).

The last two issues are also foci of the project evaluation. Lobley (1997) deals with the first, financial feasibility, by describing the costs of telehealth as falling broadly into capital costs

(e.g. equipment), and variable costs (e.g. telecommunications links, equipment maintenance, internal systems staff, training, down time, clinical staff, and administration). The author suggests that demonstrating cost-effectiveness of telehealth requires comparison with the cost of the most likely alternative approach or system. Crowe (1998) proposes a model to measure the cost-effectiveness of telehealth that is helpful for the telelearning component of the RHVNL project. His generic framework includes project costs that surround establishment, equipment, maintenance, communication, and staffing. Woolf (1990) provided educational packages (no estimate of learner time required to complete each package) to semi-rural physicians at a cost of $215 per physician (p. 326). The second issue, fixation on pilot projects, is directly relevant to this study as the RHVNL initiative is a pilot project due to its short 12-month timeframe. In this paper, the term "pilot" refers to a project with a short timeframe and limited financial resources (i.e. 12-month funding).

Current Research

Effective use of videoconferencing in telelearning is dependent upon sufficient infrastructure and standards (Noorani & Picot, 2001). The barriers of low bandwidth and poor video quality have lessened, and more data are available to determine videoconference usage in Canada (Jennett, Hunter, & Husack, 1998; PriceWaterhouseCoopers, 2000; Noorani & Picot, 2001). Of the 101 telehealth programs polled by Jennett et al. (1998), 41% were using interactive audio and videoconferencing, 25% focussed on multi-media applications, and 22% were delivering telelearning materials via the Internet (p. 240).

A conscious awareness of Moore's (1993) concept of "transactional distance" and Lott's (1995) supporting observations of "distance impairment" in physicians, together with an attempt to understand the contributing factors, are integral when planning a telelearning initiative delivered via videoconference. Physician CME improves through more interactive discussions, in-service, grand rounds, case studies, and peer network expansion when using videoconference technology (Fitzpatrick, 1998, p. 5). A project that understands the consequences of TD will incorporate these highly interactive instructional strategies.

Summary

Historically, the delivery of health education and health care services to rural communities was meant to address the challenge of GP retention and recruitment, professional development needs and requirements, and the continuum of lifelong learning. Success of these initiatives has been slow. However, the recent explosion of ICTs and their decreasing costs has enabled new ways of delivering telehealth services. Novel telehealth applications, skilled people, and upgraded infrastructure converge to provide quality CME and improved clinical services to rural communities receptive to the new delivery modalities. Recent broadening of network bandwidth has dramatically increased the quality of these ICTs (e.g. videoconferencing) to the point where real-time, two-way interactions happen with little or no interruptions. Consequently, many telehealth applications are using the videoconference medium. A number of challenges remain for this delivery method, including determining whether videoconferencing reduces the costs compared to its alternatives, and the degree Moore's (1993) concept of transactional distance applies to this unique educational medium.

Documenting telehealth initiatives comprises an important yet often overlooked component of telehealth design and delivery and is likely the reason for few projects moving beyond the pilot stage. Using a theoretically-grounded evaluation model ensures that the program fulfills a physician need, gains GP support, and produces quality publications. Achieving this level of assessment will greatly increase the likelihood of sustained funding past the pilot stage. The purpose of this master's project was to perform an evaluation of the RHVNL project with a particular focus on the CME component.

CHAPTER III

METHODOLOGY

Overview

The British Columbia Rural Health Video Network Link (RHVNL) pilot project strove to provide quality CME experiences, clinical consultations, and clinical service support to physicians in Vanderhoof, during the period from November 1, 2001, to November 30, 2002.

The purpose of this master's project was to perform an evaluation of the RHVNL initiative with a particular focus on the CME component. The five evaluation questions focusing on CME delivery and network infrastructure were:

1. To what extent were the continuing educational needs of Vanderhoof physicians assessed and prioritized?
2. How effective was the series of continuing medical education programming in fulfilling physicians' educational needs?
3. How effective was the series of continuing medical education programming in influencing clinical practices?
4. How reliable was the provincial electronic infrastructure as an Internet Protocol videoconferencing venue for delivering continuing medical education?
5. How cost effective was the provincial electronic infrastructure as an Internet Protocol videoconferencing venue for delivering continuing medical education?

The local site at Vancouver General Hospital was equipped with a Tanberg 6000 videoconferencing system with two 27-inch monitors, two VCRs, two cameras, and a document camera (Figures 2 & 3). The remote site at St. John Hospital, Vanderhoof, had a Tanberg 800 videoconferencing system with one 27-inch monitor, one VCR, and one camera. All videoconference (VC) sessions used the BC PLNet backbone with an IP Protocol connection speed of 384 kbps during the hours of 0700 to 0900 and 1600 to 2000.

Figure 2. Videoconference Equipment

Figure 3. Document Camera

The study used two evaluation methodologies based on two theoretical models to design, develop, and implement an effective evaluation approach. A blend of Stufflebeam's (1971) C.I.P.P. Model and Kirkpatrick's (1994) Summative Evaluation Model guided the project assessment. Specifically, Stufflebeam's model provided a theoretical basis for overall evaluation of the CME component, while Kirkpatrick's model evaluated CME design, development, and implementation effectiveness. A physician needs assessment, two focus groups, six CME rounds, a project web site, one CD-ROM production, and network infrastructure comprise the important areas for evaluating the RHVNL project.

Participants

The project studied the physician population in Vanderhoof, British Columbia. Eight out of nine (89%) physicians formally joined the project by completing consent forms and needs assessment questionnaires. The ethics review board from the University of British Columbia gave their approval on December 20, 2001 (Appendix M).

Sample

The sample is 8 out of 9 Vanderhoof physicians. The population is typical of a rural community with family physicians and no local specialist support.

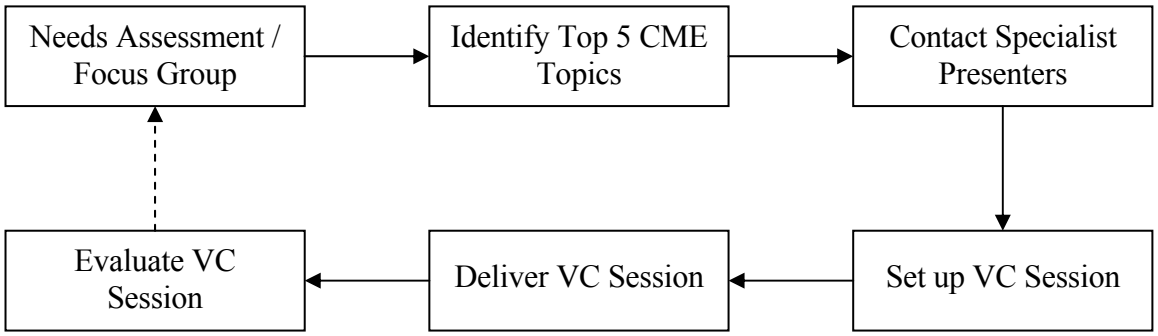
Instruments

The evaluation research instruments included a needs assessment questionnaire, participation-level tracking, focus group surveys, CME round feedback and post-feedback

forms, CME round videotape analyses, budget analysis, and anecdotal notes (from observations, telephone conversations, and email).

Figure 4 depicts the process of CME design and delivery. Identification of top CME topics came from the analysis of the needs assessments and initial focus group. The principal investigator arranged specialist presenters for each topic. The specialists designed their own content for the medical rounds. Their materials met minimum standards of well designed instruction; however, a closer match to the unique features of the videoconference medium requires more communication between presenters and the project manager. Videoconference sessions were coordinated and facilitated by the project manager and delivered on the most convenient day and time (as determined by the needs assessment questionnaire) given the restrictions of network access. Both the local and remote sites videotaped the sessions so health professionals who missed the events could view them at their convenience. Participants evaluated each session by filling out feedback surveys (immediately) and post-feedback surveys (two to three months after the event).

Figure 4. Process of Design and Delivery of CME



Evaluation Design

Method. A number of factors determined evaluation design choice, including the evaluation purpose, specific research questions, stakeholder needs, nature of project, user perspective, confounding issues, and indirect consequences (Best & Kahn, 1998, p. 124; Blignault, 1999). The initiative was a pilot project involving CME delivery and does not lend itself well to the traditional school-focused Accreditation or Adversary Approach models (Table 1). The author is not a health expert; therefore, the Art Criticism Approach was not an evaluation model candidate. Participant characteristics (i.e. physicians) eliminated the Behavioural Objectives – achievement test model. Low face-to-face contact with participants limited the applicability of the Transaction Model (case study, interview, observation). The three remaining candidates were Decision-Making, Goal-Free, and Systems Analysis. Due to the unique nature of the project (i.e. rural physician focus), a blended evaluation methodology, using the Decision-Making Approach, was chosen. Overall, RHVNL project evaluation followed Stufflebeam's (1971) *CIPP Model*; whereas CME round effectiveness adhered to Kirkpatrick's (1994) *Four Level Model*.

Needs assessment questionnaire, CME feedback and post-feedback surveys, project evaluation feedback form, participant level tracking, and budget analysis comprise the quantitative methodologies. Videoconference observations, focus groups, and anecdotal notes make up the qualitative methodologies. The blended evaluation methodology monitored the ongoing effectiveness of the project enabling necessary adjustments, and judged the degree the project met the objectives. As project manager the author of this paper, Jeff A. May, was responsible for designing the quantitative instruments and deciding on the analytical approach

for the focus group transcripts and participant level tracking. Mr. May shared decision-making regarding focus group question development, online feedback form design, and budget analysis, with the principal investigator, Dr. Kendall Ho.

Stufflebeam's C.I.P.P. evaluation model provided a very comprehensive process to evaluate the overall project. The model identifies four kinds of decisions:

1. Planning decisions (help determine objectives),
2. Structuring decisions (help determine procedural design for meeting objectives),
3. Implementing decisions (procedural design execution),
4. Recycling decisions (determine project's future) (p. 3).

Context, input, process, and product evaluation serve these types of decisions. Although the project objectives were determined prior to this evaluation, *context evaluation* helped discern the rationale for objective development, define the relevant environment, describe the desired and actual environmental conditions, and identify unmet needs. *Input evaluation*, the second step, produced information to ascertain how to use available resources to achieve the program objectives, detect and assess relevant organizational resources and capabilities, and identify strategies and designs for implementation. Input evaluation also assisted in the selection of the project strategy. *Process evaluation* proceeded on November 1, 2001, compiling periodic feedback (Interim Reports) to stakeholders, providing information for project decisions, and maintaining documentation of the process as it occurred. *Product evaluation* assisted with the measurement and interpretation of program attainments, and the interpretation of outcomes using information from the first three steps.

Kirkpatrick's focus on training program evaluation lent itself well to assessing the ongoing effectiveness of the continuing medical education rounds. His 10-step process for planning and implementing effective training programs, involves ("*" directed CME rounds delivery):

1. Determining CME needs,*
2. Setting objectives,
3. Determining CME content,*
4. Selecting participants,
5. Determining best schedule,*
6. Selecting appropriate facilities,*
7. Selecting appropriate instructors,*
8. Selecting and preparing audio visual aids,
9. Coordinating the program,*
10. Evaluating the program* (p. 3).

Kirkpatrick's Four Level Model (reaction, learning, behaviour, and product) assisted with the development of feedback, post-feedback, and project evaluation forms. The following provides sample feedback form questions for the first three levels:

- **Reaction**: "Overall, how would you rate this presentation?"
- **Learning**: "I learned a new way of approaching a task or problem."
- **Behaviour**: "I was able to successfully perform this skill on the job, or in the clinical situation." or "I've noticed a change in one or more of my colleague's learning as a result of the videoconferences."
- **Results**: "Patient care improved because of this project."

Data Collection Techniques. The project was an enumeration and, therefore, required only parameter analyses for the survey instruments. Each questionnaire and feedback form produced a frequency distribution. Table 2 summarizes the data collection instruments as they relate to each research question.

Table 2. Research Question Measurement

ACADEMIC RESEARCH QUESTIONS	N. A. Quest.	Focus Group	Feedback Surveys	Post-Feedback Surveys	CME VC Analysis Levels	Participation Survey	Project Evaluation	Budget Analysis	Anecdotal Notes
(1) To what extent were the continuing educational needs of Vanderhoof physicians assessed and prioritized?	●	●							●
(2) How effective was the series of continuing medical education programming in fulfilling physicians' educational needs?		●	●	●	●	●	●		●
(3) How effective was the series of continuing medical education programming in influencing clinical practices?		●	●	●			●		●
(4) How reliable was the provincial electronic infrastructure as an Internet Protocol videoconferencing venue for delivering continuing medical education?		●	●	●	●	●	●		●
(5) How cost effective was the provincial electronic infrastructure as an IP protocol videoconferencing venue for delivering CME?						●		●	●

Procedure

Data collection took place during the period of November 1, 2001, to September 30, 2002, from a population of nine GPs practicing in Vanderhoof. Land mail delivered the consent form

(Appendix A) and a 10-part, 29-question survey to the co-investigator who distributed them to the physician population (Appendix B). Parts I & II solicited data on learner profile (both demographic and technology). Parts III & IV gathered information about the participants' general CME learning patterns and participation levels. Part V had GPs rank their current learning needs. Parts VI, VII, and VIII related to CME access, delivery, and institutional issues. Part IX determined participant awareness of the telehealth field and Part X provided space for general comments. At the beginning and at the end of the project, live focus group sessions gave participants the opportunity to discuss specific issues surrounding their experience with continuing education, and the videoconference delivery of CME and clinical services to Vanderhoof GPs and patients (Appendix D).

During each CME round, feedback surveys gave participants an opportunity to provide information on each presentation and their learning (Appendix E). The feedback on the presentation portion of the questionnaires used a four-point Likert Scale, whereas the feedback on the participant learning section used a five-point scale. Participants completed post-feedback forms (Appendix G) two to three months after each of the six rounds, as recommended by Kirkpatrick (1994). The five-point Likert and Yes/No scale surveys served to both verify consistency in participant responses and assess any changes in workplace practices because of the intervention. At the end of the study, the participants evaluated the project by completing a print-based survey (Appendix I).

Determination of the effects of transactional distance came from videotaped CME rounds analyses. Uploading video and audio clips to the web site created a compilation of learning

objects for participants to experience asynchronously. General observations during CME videoconference rounds, teleconferences, and email were taken to keep track of network quality, participant numbers, presenter comfort levels, presenter delivery methods, involvement of the audience, challenges overcome, political issues, response bias, etc.

Methods of tracking participation levels included attendance at CME rounds, survey response rate, and web site visits. The web site provided participants with background information, announcements of upcoming CME rounds, online feedback, and multimedia educational resources (Appendix K). Determination of network reliability came from the final focus group, videotape analyses of the six CME rounds, and anecdotal notes. Budget tracking and analysis produced information on cost effectiveness of the CME delivery medium.

Summary

The British Columbia Rural Health Video Network Link (RHVNL) pilot project strove to provide quality CME experiences, clinical consultations, and clinical service support to physicians in Vanderhoof. The purpose of this master's project was to perform an evaluation of the RHVNL project with a particular focus on the CME component. The study used two evaluation methodologies firmly based on theoretical concepts to design, develop, and implement an effective evaluation approach. The project studied the physician population in Vanderhoof, British Columbia. Eight out of nine (89%) physicians formally joined the project by completing consent forms and needs assessment questionnaires. The needs assessment questionnaire, CME feedback and post-feedback forms, budget analysis, and participant level tracking comprise the quantitative methodologies. Videoconference observations, focus

groups, and anecdotal notes make up the qualitative methodologies. Identification of top CME topics came from the analysis of the needs assessments and initial focus group. The project was an enumeration and, therefore, only required a parameter analysis for the survey instruments. Data collection took place during the period of November 1, 2001 to September 30, 2002. During each CME round, feedback surveys gave participants an opportunity to provide information on each presentation and their learning. Participants completed post-feedback forms two to three months after each of the six rounds. Determination of the effects of transactional distance came from videotaped CME rounds analyses.

CHAPTER IV

RESULTS AND DISCUSSION

Overview

This chapter discusses the results of the RHVNL project evaluation, as they relate to the five research questions. The purpose of this master's project was to perform an evaluation of the RHVNL initiative with a particular focus on the CME component. Over 90 participant surveys, six videotape analyses, and two focus group sessions comprise data collection. Context evaluation helped outline the rationale for objective determination, define the relevant environment, describe the desired and actual environmental conditions, and identify unmet needs. Input evaluation produced information to determine how to use available resources to achieve the program objectives. This evaluation also identified and assessed relevant organizational resources and capabilities, and identified strategies and designs for implementation. Process evaluation proceeded after project approval providing periodic feedback to stakeholders (Interim Reports), information for project decisions, and documentation of the process as it occurred. Product evaluation assisted with the measurement and interpretation of program attainments. Although continuing nursing education (CNE) design, delivery, and evaluation took place, they are beyond the scope of this master's project. In order to present the large amount of material in an organized and clear fashion, the chapter will use a five-level heading strategy to break up the evaluation data into logical subsections.

Review of Research Questions

Research Question #1. *To what extent were the continuing educational needs of Vanderhoof physicians assessed and prioritized?* The RHVNL project's 29-item needs assessment contains questions addressing learner profile (both demographic and technology), general CME learning patterns, current learning needs, CME access, CME delivery, institutional issues, and questions that relate to participant awareness of the telehealth field. Two live focus group sessions, during project start-up and project completion, gave participants the opportunity to discuss specific issues surrounding the delivery of continuing medical education and its impact on clinical services delivery.

Research Question #2. *How effective was the series of CME programming in fulfilling physicians' educational needs?* The evaluation research instruments that answer this question include CME feedback and post-feedback forms, CME videotape analyses, participation level tracking, final project focus group, project evaluation survey, and anecdotal notes (from observations, telephone conversations, and email).

Research Question #3. *How effective was the series of CME programming in influencing clinical practices?* The evaluation research instruments that answer this research question are the CME feedback and post-feedback forms, final project focus group, project evaluation survey, and anecdotal notes (from videoconference/focus group observations, telephone conversations, and email).

Research Question #4. *How reliable was the provincial electronic infrastructure as an IP protocol videoconferencing venue for delivering CME?* Feedback and post-feedback forms, CME videotape analyses, participant-level tracking, final project focus group, project evaluation survey, and anecdotal notes address the evaluation of this research question.

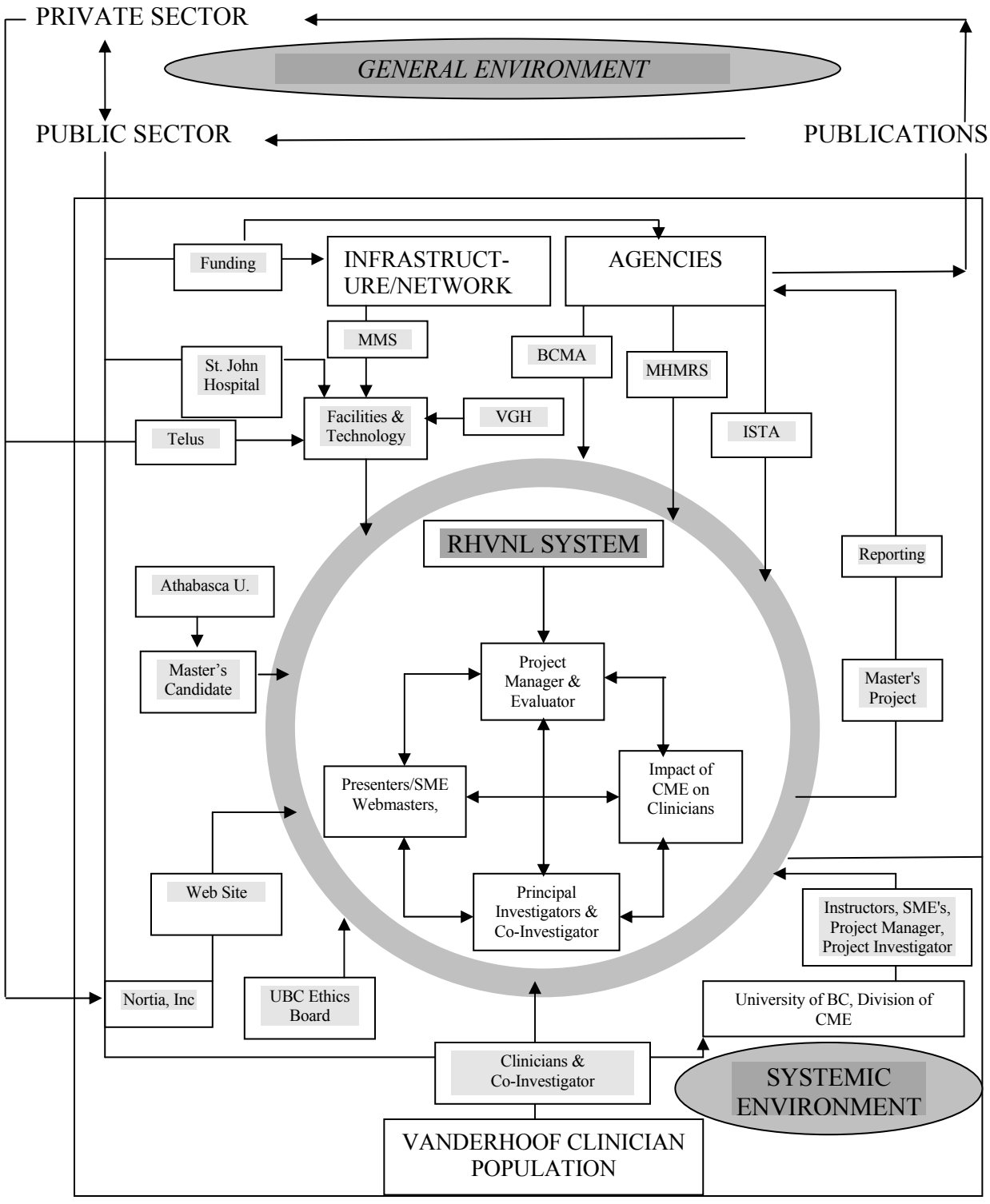
Research Question #5. *How cost effective was the provincial electronic infrastructure as an IP protocol videoconferencing venue for delivering CME?* Participant levels, budget analysis, and anecdotal notes generate the data for this research question.

Context Evaluation

Context evaluation helps outline the rationale for objective determination, defines the relevant environment, describes the desired and actual environmental conditions, and identifies unmet needs. The rationale for the RHVNL was to couple continuing professional education with clinical service delivery for the rural communities of Vanderhoof and Stoney Creek, British Columbia. Vanderhoof is located about 103 km west of Prince George and Stoney Creek is approximately 20 km southwest of Vanderhoof. The Stoney Creek-Vanderhoof link provided clinical service delivery and, therefore, was not part of this evaluation.

Figure 5 shows the general and systemic suprasystems that surround the project (adapted from Fortune, et al, 1997, p. 16). The general environment includes both the public and private sectors. The RHVNL had no control over shifts in political or business cycles. For example, early in the project one of the funding agencies canceled 30 telehealth projects, falling just short of terminating the RHVNL initiative.

Figure 5. System, Systemic and General Environmental Components.



The systemic environment provides system (project) inputs and is comprised of the Division of CME, clinicians from Vanderhoof, specialist instructors from Vancouver, private sector partners (Nortia and Telus), Athabasca University (Master's candidate), infrastructure/network support (Ministry of Management Services), funding agencies (BCMA, Ministry of Health, and Information Science and Technology Agency), and the various facilities in Vancouver and Vanderhoof. The bounded system involves the four interacting and dynamic components: participants/clinicians, presenters/webmasters, project manager/evaluator, and project investigators.

Due to circumstances beyond the control of the RHVNL, the University of British Columbia ethics board did not officially approve the project until December 20, 2001, although tentative approval came in September 2001 (Appendix M). However, on December 17, 2001, the initial site visit delivered a needs assessment, CME videoconference, and focus group. The six CME videoconferences took place during the period from January 2002 to June 2002.

Clinicians, both rural and urban, are required to participate in professional development activities each year in order to maintain standing with medical affiliations of memberships. Delivering continuing medical education (CME) to physicians working in Vanderhoof possesses unique challenges. In order to attend quality CME events, Vanderhoof physicians face additional traveling costs and lost wages as conferences are most often in large centres. A need is defined as a "… discrepancy between a current situation and a desired situation" (TIP Series, 1990, Part 1, p.9). The "current" situation for a Vanderhoof GP involves unequal access to CME when compared to their urban counterparts. The "desired" situation would be to

progress through their continuum of lifelong learning on an equal footing, thus bridging the urban-rural CME access gap. The Shared Provincial Access Network/Provincial Learning Network (SPANBC/PLNet) is underutilized and offers an opportunity to bridge the access gap.

Research Question #1. *To what extent were the continuing educational needs of Vanderhoof physicians assessed and prioritized?* The project manager sent a 10-part needs assessment questionnaire, consisting of 29 questions, to the site coordinator in Vanderhoof (Appendix B). A complete summary of the survey results is in Appendix C. The following describes selected data highlights from the needs assessment questionnaire and the focus group sessions.

Demographic profile. Table 11 (Appendix C, p.108) reports data for gender composition, medical school training, and practice certification. Of the eight physicians, five (62.5%) are male and three (37.5%) female. The gender breakdown mirrors the Janus Report, which found 61.8% of BC physicians are male and 38.2% female (College of Family Physicians of Canada, 1998). The present study contains a higher proportion of female physicians when compared to an examination in rural areas of Newfoundland and Labrador where 72.6% were male and 27.4% female (Curran, 2000). Two doctors (25%) received their education in Canada while six (75%) moved to Vanderhoof from outside North America. In contrast, Soles (2001) reports only a 46% dependence on foreign-trained GPs in his demographic study of rural British Columbian physicians. An equal split exists between CCFP and non-CCFP certification. Curran (2000) also found a similar number of CCFP GPs to non-CCFP (54.2%:45.8% respectively). Table 12 (Appendix C, p.108) lists physician age and year of graduation. The

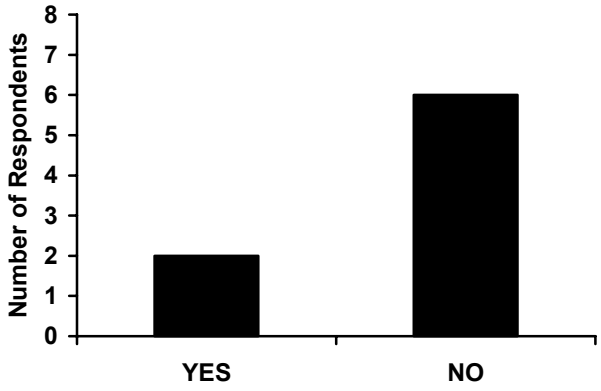
average age is 42.9 years and the mean year of medical school is 1984. In a study of B.C. physicians' use of the Internet, the authors found the mean age to be 48.7 years (AuYeung, Ho, Landolt, Brussoni, Huckell, & Woollard, 2000). Soles (2001) reports the median age for B.C. rural physicians is in the mid-40 range.

Technology profile. Figure 9 (Appendix C, p.108) graphs participant access to ICTs. All eight physicians have access to a computer, the Internet, and email. Most have a CD-ROM (n=7), three have a DVD, and just one participant uses compressed digital video (CDV). In other studies, 88% of rural B.C. family practitioners use a computer (AuYeung, et al, 2000) while 85.6% of east coast counterparts have access to a computer, 73.3% CD-ROM, 58.4% Internet, and 54.4% E-mail (Curran, 2000). Table 13 (Appendix C, p.109) ranks the ICT skills requiring continuing education. The most interest lies in computerized patient record systems, followed by billing, basic computer skills, computer-assisted diagnosis, and computerized drug interaction programs. Physicians display a low level of interest in understanding the purpose of Internet news groups or Internet searching techniques.

General CME learning patterns. Seven of 8 physicians (87.5%) report spending between one and five hours per week on informal (i.e. non-credit) CME (Table 14, Appendix C, p.109). This compares to 64.7% of rural physicians in the Newfoundland/Labrador project (Curran, 2000). Similar to Curran's study, print-based learning resources top the list of resources preferred for continuing education (Table 15, Appendix C, p.109). The least used resource was computer-based (e.g. CD ROM). Audio/video resources, including videoconferencing, fell in the middle.

CME participation levels. Four physicians (50%) reported attending between one and three "in-person" CME programs during the past 12 months; two participants (25%) fall in the range of attending between four and nine events; and two (25%) attended more than 10 (Table 16, Appendix C, p.110). This compares to Curran's 34.5%, 47.1%, and 15.1% respectively (3.4% reported no CME). Two participants "attended" between one and three CME events via the Internet in the past 12 months. Two of eight physicians (25%) felt they spent enough time on CME to keep themselves up-to-date (Figure 6). The group reports that CCFP credits for professional development are important (M=4.1{5}) (Table 17, Appendix C, p.110).

Figure 6. Do You Feel That You Currently Spend Enough Time On CME?



Current learning needs. Tables 18 (Appendix C, p.110) delineates the current general education needs. Keeping up with medical advances, maintaining standards of practice, and updating clinical skills tied for most important general education CME needs, while improving teaching skills ranked last. Emergency medicine topped the clinical skills CME needs, with cardiovascular diseases (ACLS), ophthalmology, and radiology all tying for

second (Table 3). Curran's study found ACLS and emergency medicine at the upper half of a top 10 list (2000). Rural physicians are particularly interested in updating their knowledge and skill in emergency medicine, trauma surgery, intensive care, obstetrics, and otolaryngology at one, three and five year intervals (Woolf, 1991; Gill & Game, 1994; Curran, Hatcher; Kerby, 2000).

Table 3. Clinical Skills CME Needs

Top 4 Clinical Skills CME Needs	**Mean (Out of 4)**	**SD**
Emergency Medicine	3.3	0.7
Cardiovascular Diseases	3.1	0.6
Ophthalmology	3.1	0.8
Radiology	3.1	0.6
Bottom 4 Clinical Skills CME Needs	**Mean (Out of 4)**	**SD**
Laboratory Medicine	2.3	0.7
Nutrition	2.3	0.5
Pathology	2.1	0.6
Epidemiology	1.8	0.7

CME access. Table 20 (Appendix C, p.111) depicts the best and least favoured times of the week for attending CME events. The best time is a workday evening or a day off morning, while the least desired is a workday afternoon. The most convenient days for attending CME activities are Mondays and Wednesdays, while Thursdays and Sundays are least suitable (Figure 10, Appendix C, p.111). The participants in Curran's (2000) study prefer spending a weekend (half-day) or an evening (3-hour) session.

CME delivery. Table 21 (Appendix C, p.112) shows physician preference for CME delivery. Conferences are most preferred while computer-based and web-based rank last. CME delivery via audio/video (including videoconferencing) rates in the middle. Print-based CME ranks in the bottom three most preferred modes of delivery. Curran (2000) found rural physicians wanted traditional methods of CME delivery (e.g. face-to-face group instruction).

CME department expectations. Table 22 (Appendix C, p.112) illustrates physician expectations of CME departments. Vanderhoof GPs feel that the role of a CME department is to provide continuing education programs and services.

Field of telehealth. Table 23 (Appendix C, p.113) summarizes physician awareness of, openness to, and opinions and attitudes toward telehealth. Participants tend to believe that telehealth will influence consultations (M=2.8/4) and patients will feel good about using telehealth (M=2.8/4). Low concern exists that telehealth will "de-humanize" health care (M=1.9/4).

Focus groups. Appendix D has the summary of the physician focus group analyses taken from the initial and final site visits. Prior to the project start, current experience with CME included having educational rounds on Tuesdays at noon. One of the physicians organized the sessions, taking the form of a presentation or group sharing activity. CME topics of high interest were *Radiology "Pitfalls," Atrial Fibrillation Management*, *ACLS, Refractory Depression, and Cardiology*. Preferred format was case-based, interactive discussion where the

specialist presenter understands the rural perspective. The final focus group analysis supports this presentation format.

The purpose of both the initial and final focus groups was restricted to discussing specific issues among the eight participants and one facilitator. However, a number of factors contributed to the derailing of the final focus group, including inviting 14 guests to join just 5 participants, one presenter, and one facilitator. The group dynamics were not conducive to an open discussion of participant responses to post-project questions. The overwhelming number of invited guests created an atmosphere of uncertainty and mistrust about the true nature of the focus group.

Input Evaluation

Input evaluation produced information to determine how to use available resources to achieve the program objectives, identified and assessed relevant organizational resources and capabilities, and identified strategies and designs for implementation. Input evaluation also assisted in selecting the project strategy.

Video and/or audio interruptions no longer hinder real-time, two-way interactions due to recent network bandwidth improvements enhancing the quality of videoconferencing. These improvements created an explosion of telehealth applications using the videoconference medium. Selecting the SPANBC/PLNet provider was largely due to them already connecting all British Columbia government buildings (e.g. offices, hospitals, and schools). High use hours fall between 0900 and 1500 on weekdays. The RHVNL was able to access this network during

the hours before 0900 and after 1500. Installation of a T1 line connected Vancouver General Hospital (Heather Pavilion) to the SPANBC pipeline enabling the use of PLNet. The conference room at the St. John Hospital in Vanderhoof served as the remote site videoconference facility. The Heather Pavilion at Vancouver General Hospital already serves as a videoconference facility for another project and easily accommodated the RHVNL local site requirements.

Table 4 lists the contributing agencies/organizations and Table 5 shows the individuals who played important roles in the project. The British Columbia Ministry of Health and the British Columbia Medical Association funded the initiative. The Ministry of Management Services (Information Science and Technology Agency, or ISTA) was able to expedite equipment ordering, delivery, and provided continual network troubleshooting support. A principal investigator, project manager/co-investigator, and a remote site co-investigator comprise the core project team for the CME component supported by the University of British Columbia's Faculty of Medicine, Division of CME. The first two members emailed each other on a daily basis and met weekly to discuss project progress. Communications (email, telephone, audioconference, and videoconference) with the remote site co-investigator occurred on a regular, as needed basis. Partnerships with network support personnel at the ISTA department and Telus ensured reliable videoconference connectivity. This infrastructure and personnel support was already in place prior to the hiring of the project manager; the author of this paper.

Table 4. Partnership Arrangement

Agency/Organization	Capacity
B.C. Medical Association (BCMA)	Funding partner
Ministry of Health and Ministry Responsible for Seniors (BCMHMRS)	Funding partner
Information Science and Technology Agency (ISTA)	Provide "in-kind" support of infrastructure
Nortia Learning Systems Inc.	Software engineering and web site design
Telus	Videoconference equipment support
University of British Columbia, Faculty of Medicine, Division of CME (UBC)	Project co-ordination and management
University of Northern BC (UNBC)	Project analysis

Table 5. Project Team and Roles.

Team Member	Title	Location	Role
Dr. Kendall Ho, M.D.	Assoc. Dean and Director, CME	UBC	Principal Investigator, CME Delivery
Dr. Stuart Johnston, M.D.	Clinical Associate; Professor	Vanderhoof, UBC	Principal Investigator, Clinical Service
Dr. Harvey Thommasen, M.D.	Professor and Chair, Depart. of Community Health	UNBC	External Evaluator (clinical service)
Mr. Jeff A. May, B.Sc.	Master Candidate, Athabasca University	Burnaby	Co-Investigator, CME Project Manager
Mr. Phil Bates	Senior Planning Analyst	MMS	Infrastructure Support
Mr. David Chay	Senior Planning Analyst	MMS	Infrastructure Support
Dr. Ian Humphreys, Ph.D.	Founding Partner of Nortia Learning Systems Inc.	Vancouver	Web Design & Development

Mr. Jeff A. May had two distinct roles in the RHVNL initiative: i) Co-Investigator/Project Manager (a contracted position with Division of CME at the University of British Columbia), and ii) Academic (Athabasca University Masters Project). Table 6

displays the various responsibilities assigned to Mr. May as either an academic role or a contracted role.

Table 6. Academic Role vs. Contracted Role

Tasks	Contract Role	Academic Role
Evaluate the educational outcomes		●
Engage in formative evaluation during all project phases		●
Complete a summative evaluation for the project		●
Submit master's project		●
Design needs assessment questionnaires	●	
Design face-to-face focus group questions	●	
Prioritize the educational needs of the participants.	●	
Assist with and coordinate the design, development, and pilot testing of videoconference procedures and CME programs	●	
Coordinate the design of feedback forms	●	
Coordinate the design of post-feedback forms	●	
Manage the project timeline	●	
Oversee the design of the project web site	●	
Deliver the needs assessment questionnaire	●	
Plan and attend an initial and final site visits to Vanderhoof	●	
Coordinate face-to-face focus groups	●	
Design CME round announcements	●	
Assist with preparing interim and final reports	●	

A CME round and focus group at the initial site visit signaled the beginning of the project implementation. One session every six to eight weeks with feedback instruments formed part of the formative evaluation strategy. A final site visit with a focus group and project evaluation survey marked the end of the pilot project phase and the beginning of the sustainability phase.

Process Evaluation

Process evaluation proceeded after project approval on November 1, 2001, and compiled periodic feedback to stakeholders (Interim Reports), provided information for project decisions, and maintained documentation of the process as it occurred. The RHVNL project delivered CME through videoconference and web-based (i.e. project web site) media to GPs in Vanderhoof, British Columbia. The choice of delivery medium came prior to the evaluation process. CME rounds design and delivery strategies were beyond the control of the project team as the specialist presenters took on this responsibility. Periodic feedback on potential defects in design or implementation and the provision of information for programmed decisions and the maintenance of a record of each procedure as it occurs were part of the project manager's mandate. Affecting research questions #2 and #3, delays in website launch combined with a slow response time for making changes to the site resulted in this instrument not being available until late into the project. Alternative ways of receiving participant feedback compensated for the lack of online feedback.

The literature review describes evidence suggesting a computer literacy issue among the physician population. The needs assessment results support the research. Implications for the project web site effectiveness exist. Will participants attempt to log on? Can they navigate the site easily? Nortia Learning Inc. performed web site design work with a specific emphasis on ease of use. However, little evidence of participant visits is available, as site statistics are absent. One participant reported having difficulty with site navigation. Possible reasons include a flawed website design, unclear login procedures, or low web browsing skills.

The main features of the project design include the use of videoconference and Internet media to deliver highly interactive CME rounds that reflect participant needs in a reliable and convenient fashion. The project manager also serves as the evaluator responsible for developing evaluation instruments. An ongoing reflection on how context and input evaluations are performing exists.

Table 7 depicts consistency between the feedback surveys and post-feedback surveys by comparing similar questionnaire items related to the learning from the presentations section. A high correlation exists between the two sets of data. Participants consistently rated the following three questions on both surveys: i) *I was already familiar with most of the content presented* (consistently rated as low); ii) *Interaction and discussion facilitated my learning* (consistently rated as high); iii) *The videoconference technology was an effective way of delivering the material* (consistently rated as high).

Table 7. Assessing Reliability between Feedback and Post-Feedback Forms.

Top 5 Resources	Mean (Out of 5)		SD		Mean Score Range	
	Feed	Post	Feed	Post	Feed	Post
1. I was already familiar with most of the content presented	2.6	2.7	0.6	0.5	1.7-3.4	2.0-3.3
2. Interaction and discussion facilitated my learning	3.9	4.1	0.3	0.3	3.5-4.3	3.5-4.3
3. The videoconference technology was an effective way of delivering the material	3.9	4.0	0.3	0.4	3.6-4.4	3.3-4.3

Product Evaluation

Product evaluation assisted with the measurement and interpretation of program attainments, development of operational definitions for objectives, and the interpretation of outcomes using information from the first three steps. Matching videoconference session topics to physician CME needs was essential for the initiative's success. Table 8 compares physician CME choices with videoconference session titles. All physician CME suggestions correspond to a videoconference title. During the project, physicians also showed interest in having continuing education in two other areas – Diabetes Issues and Palm Pilot medical applications – that were subsequently delivered, and evaluated.

Table 8. Matching CME Videoconference Topics to Physician Needs

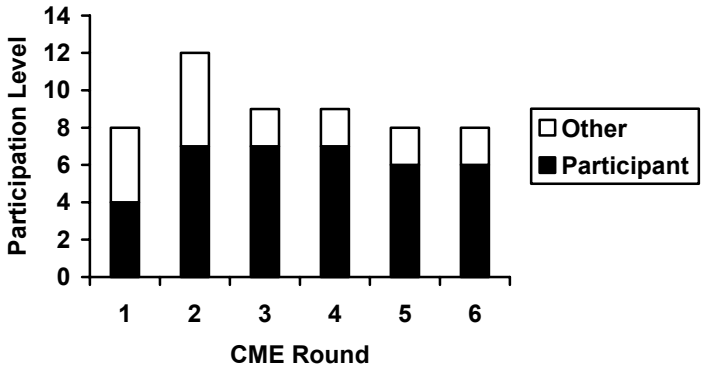
Physician CME Choices	**Round Number**	**Videoconference CME Session Titles**
Emergency Medicine	1	What's New in ACLS (Advanced Cardiac Life Support)?
Added after needs assessment, upon participant request	2	Palm Pilot Applications in Medicine Practice.
Cardiology "free-for-all" where the audience brings in questions for the expert facilitator	3	Atrial Fibrillation: Management Controversies
Added after needs assessment, upon participant request	4	Diabetes: An Informal Discussion Of Northern Issues
Review of common radiological pitfalls	5	C-Spine Imaging for Emergency Physicians
Management of difficult or refractory depression	6	Resistant and Chronic Depression Management: A Case-Based Round

Research Question #2. *How effective was the series of CME programming in fulfilling physicians' educational needs?* Appendices D, F, H, and J summarize the data for this research

question. The first two of Kirkpatrick's four evaluation levels – reaction and learning – organize the results for this research question. Feedback forms, post-feedback forms, CME videotape analyses, participant levels, project focus group, project evaluation survey, and anecdotal notes generate the data.

Reaction. Figure 7 shows the number of participants and other health professionals attending each CME round. The six sessions had 37 physician-viewings out of a possible 48 (77%) with an additional 17 "Other" health professional-viewings. Average attendance was 6.2 (SD = 1.2) for participants and 9.0 (SD = 1.5) for participants plus other healthcare professionals. The ninth physician, who did not formally participate, did support and attend the videoconferences. All six CME rounds received high ratings with an average presentation value of 3.9/4 (Table 24, Appendix F, p.121). Participants reported a moderate to high level of agreement (M=3.9/5 & 4.0/5) that the videoconference medium provided an effective way of delivering the material (Table 25, Appendix F, p.122 & Table 27, Appendix H, p.126).

Figure 7. Participation Levels at Videoconferences



Learning. Feedback form responses (Table 25, Appendix F, p.122) show a moderate to high agreement for "learning a new way of approaching a task or a problem" (M = 3.7/5) and low to moderate "familiarity with the content" over the six rounds (M = 2.6/5). "Interaction and discussion facilitated their learning" from a moderate to a high degree (M = 3.9/5). "Instructors feedback" also ranked moderate to high (M = 3.9/5). Participants felt moderately "comfortable about being able to perform the skill(s)" (M = 3.4/5) and felt they had a moderate to high chance of "applying what they learned in their practice" (M = 3.7/5).

Post-feedback results (Tables 26 & 27, Appendix H, p.126) support feedback survey data. Eleven of seventeen post-feedback participant responses to "learning a new way of approaching a task or problem" were positive. Participants report low to moderate "familiarity with the content" for the six rounds (M = 2.6/5). "Interaction and discussion facilitated their learning" was rated to a moderate to high degree (M = 4.1/5) and "effective instructor" scored high (M = 4.3/5). Participants register a moderate "change in their attitude towards managing the medical emergency" because of the CME rounds (M = 3.5/5).

Research Question #3. *How effective was the series of CME programming in influencing clinical practices?* Appendices D, F, H, and J summarize the data for this research question. Kirkpatrick's third and fourth levels – behaviour and results– organize the data for this research question. Feedback forms, post-feedback forms, CME videotape analyses, final project focus group, and project evaluation survey produce data for this research question.

Behaviour. Table 26 reports six "yes," five "no and five not responding (NR) to "I've had the opportunity to use this knowledge/skill." "This knowledge assisted me in managing the problem" had seven affirmatives, four negatives, and five NRs. "My level of comfort with the medical skill or problem is high" scored moderate (M = 3.1/5, Table 27). During an informal discussion after the sixth round one of the participants talked about his/her experience with a teledermatology clinical service consult delivered by the RHVNL's telemedicine component:

> *"The interesting thing on that dermatology was that in fact I learned an enormous amount from those discussions. So, you know the margins become blurred as to when it's CME and when it's clinical treatment. At the end of the day I will now approach all of my eczema and psoriasis patients very differently as a result of that one interaction. You could argue whichever way you like – Was it CME? Was it treatment? Was it both? It slots into both camps…. It takes me back to doing rounds with the surgeon …we are going back to the resident-specialist situation, …but it is much different because I come with much more confidence now than I did as a resident and I'm not afraid to say what I've done and what I think and I don't have the…and maybe a personal thing but I don't think it is from what I hear from others,… there's much less stress dealing with someone at [specialist's name] level when you are a practicing GP…but the same amount of learning goes on so it's a much more pleasurable interaction…it certainly speeds up the clinical consult."*

Table 28 (Appendix J, p.132) describes the impact of the CME rounds on clinical practices. Participants report a high degree of impact (4.2/5) on changes in workplace practice because of one or more "CME rounds delivered via videoconference," and a moderate level of

impact (3.6/5) on changing workplace practice in their "colleagues' clinical practice as a result of the videoconferences." Physicians rated the impact of individual rounds on changing workplace practice moderate to high (3.7/5 to 4.3/5) in Table 29 (Appendix J, p.132).

Results. Table 28 also reports general participant impressions of the project. The rating for "Patient care improved because of this project" is high (M = 4.2/5).

Transactional distance. Videotape analyses followed Moore's (1993) theory of transactional distance and Bloom's (1956) taxonomy of educational objectives. Table 9 shows preliminary data suggesting all sessions have significantly more *instructor-learner* interactions (approximately 77%) compared to *learner-content* and *learner-learner* interaction. Unfortunately, one of the more highly interactive sessions ("Diabetes: An Informal Discussion of Northern Issues") has no videotape. Bloom's Taxonomy determined question quality. Approximately 73% of presenter questions were at the basic knowledge and comprehension levels, leaving 27% for application, analysis, synthesis, and evaluation. However, three of the rounds did have a significant number of higher mental process (HMP) questions. Round 3 ("Atrial Fibrillation: Management Controversies"), had 50% (13/26) HMP questions; Round 6 ("Resistant and Chronic Depression Management: A Case-Based Round"), produced 43% (3/7) HMP questions; and Round 5 ("C-Spine Imaging for Emergency Physicians") asked 29% (5/17) HMP questions. No data is available for the "Diabetes" session (Round 4).

Table 9. Videotape Analyses Using Moore's TD and Bloom's Taxonomy

Round #	Number of Interaction Processes				Question						
	Learner-Content	Instructor-Learner	Learner-Learner	**Total #**	Quality[2]						**Total #**
					I	II	III	IV	V	VI	
1	11	23	1	**35**	15	0	3	0	0	1	**19**
2	15	43	2	**60**	28	1	0	0	0	2	**31**
3	0	34	0	**34**	10	3	6	1	3	3	**26**
4	*No data*	*No data*	*No data*	***ND***	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	***ND***
5	0	28	1	**29**	12	0	1	2	1	1	**17**
6	11	13	0	**24**	1	3	0	0	3	0	**7**
Totals:	**37**	**141**	**4**	**182**	**66**	**7**	**10**	**3**	**7**	**7**	**100**

[2] I = Knowledge, II = Comprehension, III = Application, IV = Analysis, V = Synthesis, VI=Evaluation

Research Question #4. *How reliable was the provincial electronic infrastructure as an Internet protocol videoconferencing venue for delivering CME?* Feedback forms, post-feedback forms, CME videotape analyses, participant levels, project focus group, project evaluation survey, and anecdotal notes generate the data for this research question. Of the six CME videoconferences, five were problem free. Session 4 ("Diabetes: An Informal Discussion of Northern Issues") had video difficulties for approximately 15 minutes, although the audio was still clear. Therefore, accounting for one hour for each of the six videoconferences (360 minutes) the reliability of the network was in excess of 95%. This high level of reliability is excellent as videoconferencing is a very complex medium. The project evaluation survey (Table 28) found that participants perceive network reliability as being very good (3.8/5) in delivering "the six CME videoconferences." However, reliability may decrease if used during the hours of 0900 to 1530 due to heavy use of the network by British Columbia schools.

Research Question #5. *How cost effective was the provincial electronic infrastructure as an Internet protocol videoconferencing venue for delivering CME?* Participant levels, budget analysis, and anecdotal notes generate the data for this research question. The following information breaks down the Internet Protocol (IP) network costs associated with the videoconference delivery of CME. Other components (continuing nursing education, clinical service delivery, and project meetings) of the RHVNL share these costs. The estimated share of the IP network budget attributable to the CME component is approximately 35% or $24,850 (Table 10). CME round IP network cost per participant is approximately $668 (calculating an average of 6.2 participants per CME round). Adding in the specialist presenter honorarium ($150) and administration cost ($60) brings the cost per physician per round to approximately $700.

If physicians set up their own weekly, biweekly, or monthly CME sessions over the lunch hour, the cost may approach zero. Print-based CME (e.g. course modules and medical journal subscriptions) costs as little as a few hundred dollars. Travel to conferences has direct expenses (e.g. flight, hotel, registration, car rental, and food), indirect expenses (e.g. time away from clinical practice), and opportunity costs (e.g. fatigue and convenience) for a total direct and indirect cost of $2, 000.00 for a 6-hour conference (or $333 per hour). Actual dollar value associated with opportunity costs requires more data. A comparison of IP network costs with ISDN network costs is outside the scope of this analysis. However, further cost-benefit analyses of videoconference cost-effectiveness should address the IP versus ISDN issue.

Table 10. CME Portion of Total Project Budget

Component	Budget Portion (%)	Budget Portion ($)
Continuing Medical Education	35	24,850
Continuing Nursing Education	25	17,750
Clinical Service Delivery	30	21,300
Project Meetings	10	7,100
Totals:	**100**	**71,000**

Summary

The chapter discussed project evaluation results. Data from over 90 participant surveys, six videotape analyses, and two focus group sessions addressed the five research questions. Context evaluation helped outline the rationale for objective determination, define the relevant environment, describe the desired and actual environmental conditions, and identify unmet needs. The needs assessment questionnaire-focus group strategy produced information on the demographic and technological participant profiles and CME learning patterns, participation levels, access, and delivery preference. CME topics of high interest were *Radiology "Pitfalls," Atrial Fibrillation Management*, *ACLS, Refractory Depression, and Cardiology*. Case-based and interactive instructional strategies were the most preferred especially when the specialist presenter understood the rural perspective.

Input evaluation produced information to determine how to use available resources to achieve the program objectives, identified and assessed relevant organizational resources and capabilities, and identified strategies and designs for implementation. A principal investigator, project manager/co-investigator, and a remote site co-investigator comprise the core project team for the CME component.

Process evaluation proceeded after project approval providing periodic feedback to stakeholders (Interim Reports), information for project decisions, and documentation of the process as it occurred. The needs assessment results support the research suggesting a computer literacy issue among the physician population. The main features of the RHVNL project design include the use of videoconference and Internet media to deliver highly interactive CME rounds that reflect participant needs in a reliable and convenient fashion.

Product evaluation assisted with the measurement and interpretation of program attainments. The six sessions had 37 physician-viewings out of a possible 48 with an additional 17 "Other" health professionals attending. Average attendance was 6.2 for participants and 9.0 for participants plus other healthcare professionals. All six CME rounds received high presentation ratings. Participants report a moderate to high level of agreement that the videoconference medium provided an effective way of delivering the material. Physicians rated the impact of individual rounds on changing workplace practice moderate to high. The rating for "Patient care improved because of this project" is high. All sessions have significantly more *Instructor-Learner* interactions (approximately 77%), and 73% of presenter questions were at the basic knowledge and comprehension levels. However, three sessions did produce a significant number of higher mental process questions. Participants perceive network reliability as being very good in delivering CME videoconferences. Network reliability would diminish if used during the hours of 0900 to 1530 due to heavy use of the SPANBC/PLNet by British Columbia schools. Round cost per participant is approximately $700.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Overview

This chapter presents conclusions and recommendations related to the five research questions. The project's Telehealth Uptake Model demonstrates that videoconference technology can shift the telelearning focus from just professional development to using CME as a strategy to integrate telemedicine into physicians' regular routine; however there is neither a need nor a participant desire for another pilot project or an extension of the current one. The chapter summarizes 23 recommendations and describes new areas of investigation that came out of the RHVNL pilot project and recommendations for further study.

Summary of the Results

The project progressed through formative evaluation and subsequent revision for each component of the study (i.e. CME programming, connectivity, and delivery technology). Summative evaluation judged the value of the project by determining whether the project met its objectives, and made recommendations for increasing component effectiveness. The strategies of the RHVNL project met the project objectives to a high degree. The findings suggest that the six needs-based CME sessions were effective in fulfilling the educational requests of physicians, positively influenced their clinical practices, and possibly improved patient care. The Shared Provincial Access Network/Provincial Learning Network was very reliable between the hours of 0730-0900 and 1500-2000. Delivering CME via videoconference is not cost effective when compared to traveling to conferences in urban

centres, although it is cost effective when compared to ISDN technology. The value-added benefit of receiving high quality CME sessions via videoconferencing that leads to changes in clinical practice requires close consideration. Medical educators wanting to use the videoconference medium for instruction may benefit from the "Best Practices in Videoconferencing" (Appendix L).

Implication of the Results

In this use of videoconference technology, physicians were beginning to integrate telelearning with telemedicine in their clinical practice. The project's Telehealth Uptake Model suggests that videoconference technology can shift the telelearning focus from just professional development to using CME as a strategy to integrate telemedicine into physicians' regular routine. Telelearning in the workplace should become seamless with clinical service delivery. This systematic approach has the potential for successful implementation in other rural communities.

Needs Assessment and Prioritizing

"*To what extent were the continuing educational needs of Vanderhoof physicians assessed and prioritized?"* is the research question central to evaluating this project component.

Conclusions. Results of the needs assessment are consistent with other studies of rural physicians in BC and Canada. Rural communities largely depend on foreign-trained physicians to fill personnel requirements. Overall, the demographic profile of the population of physicians in Vanderhoof matches other studies. The technology profile shows the participants as being a little more computer literate than reported in the literature, which may

reflect the computer/Internet/PDA workshops offered by the Division of CME in the Faculty of Medicine at the University of British Columbia. The community of Vanderhoof has a high-speed cable Internet provider. However, just three physicians subscribe to the service at their homes, with no connection in the medical. Although participants have access to computers and the Internet and are a little more computer literate than colleagues in the rest of Canada, most (62.5%) still report a need for improving their basic computer skills. This group (graduation year, X = 1981.4) also reports low use for computer-base or web-based resources to meet their learning needs. However, two of the remaining three physicians who report a low need for CE in "Basic computer skills" also use computer-based and/or web-based resources to a moderate extent. These two physicians graduated from medical school in 1993 and have CCFP certification. All three participants who report low need for CE in "basic computer skills" are in the group of six feeling they do not spend enough time on CME. These WWW-literate individuals may feel this way because they have seen what is available on the Internet and want more.

There is a strong need for more CME experiences as three-quarters of the participants feel they do not spend enough time keeping themselves up-to-date. Few, however, actually use computer-based or web-based resources to meet their CME needs. A shortage of time, the "digital divide" (i.e. low bandwidth), and a preference to experience CME with their peers are likely contributors to low computer use for receiving CME. Fortunately, for this project, with the exception of web site browsing, computer skills were largely unimportant

Participants list emergency medicine, cardiovascular diseases, ophthalmology, and radiology as their preferred topics for CME. Woolf (1990) found semi-rural physicians most frequently requested topics for both self-learning and structured-learning that included cardiology, pediatrics, emergency medicine, preventative medicine, and obstetrics. Cardiology and emergency medicine are high in the participant list of CME needs.

There is no overwhelming choice of times for CME availability, which agrees with the research on scheduling challenges described in Chapter II. Print-based CME falls in the bottom three most preferred modes of delivery in both the needs assessment questionnaire and the project evaluation survey, yet it is the most used continuing education resource. Until other media become more available and/or accessible, the low technology, familiar modes of delivery will continue to dominate.

Recommendations. Based on the above conclusions and the results presented in Chapter 4, the following recommendations are to:

- Continue providing CME experiences through the videoconference medium.
- Continue Division of CME efforts and address the "digital divide" (i.e. low bandwidth) issue to improve computer and Internet literacy. Each physician would need to have a computer and high-speed Internet access at home and in the office. The literature documents both issues well requiring minimal assessment at each community.
- Encourage physicians to become more familiar with the videoconference medium by offering more flexible delivery times, more CME round topics (by linking UBC grand rounds to the network), and more training (e.g. scheduled lunch hour sessions).

CME Programming Effectiveness

"How effective was the series of CME programming in fulfilling physicians' educational needs?" is the research question central to evaluating this project component.

Conclusions. Participation levels at the videoconferences were high and physicians reacted very positively to all six CME rounds. The round titles closely matched physician needs as is evident in them having a low familiarity with the content and a high agreement that they learned a new way of approaching the task or problem. Feedback, post-feedback, and the project evaluation surveys have a high degree of consistency. Throughout the project, the project managers questioned whether participants had, as Lott (1995) asked, the prerequisite skills or time to access the site. The web site failed as a participant-tracking tool designed to monitor the frequency and duration of logins, providing no evidence of participant visits. Low computer use and low web-browsing literacy negatively affected project web site use. The web site component may have lacked the required insight into the learning needs of professional adult learners (e.g. learner time-management).

Videoconferencing is a good medium for delivering CME and objective differences between sessions are indistinguishable. From general participant comments and videotape analyses, conventional use of the PowerPoint presentation modality did limit dialogue and learner autonomy. Low interaction processes and reduced learner autonomy increased the transactional distance. Preliminary data suggests rounds with a greater proportion of higher mental process questions (Table 9, p.61) had more of an impact on changing physicians' workplace practice (Table 29, Appendix J, p.132). The relationship between the minimal

number and minimal range of interaction processes and the predominance of low-level questions (i.e. basic knowledge and comprehension) from the presenter requires further study.

The BCRHVNL project owes much of its success to incorporating Watanabe's (2000) tenets for telehealth initiative success:

- having champions at every site
- planning with the end-user in mind
- providing adequate training, technology and administrative support
- communicating regularly between all stakeholders through a variety of media
- considering learning styles
- coordinating with professional associations to have CME programs accredited
- ensuring quality of content and quality of interaction
- focusing on quality, not quantity
- accessing public funding for sustainable programs
- considering time zones when scheduling synchronous conferencing formats

Unfortunately, to date, the project team was unable to secure sustainable funding. However, there is genuine interest from the funding agencies to find the necessary resources for project sustainability.

Recommendations. Based on the above conclusions and the results presented in Chapter 4, the following recommendations are to:

- Identify a willing, local "champion" to keep the telehealth project moving forward.

- Continue to match CME content with physician needs through the needs assessment-focus group approach.
- Seek out specialist presenters with an understanding/awareness of the rural health perspective.
- Design videoconferences with highly interactive instructional strategies, low program structure, and high learner autonomy.
- Conventional PowerPoint presentations have little pedagogical merit for videoconference delivery of continuing medical education and, therefore, should either be avoided or re-designed to make them more interactive and engaging.
- Invite potential specialist presenters to attend a videoconference "Best Practices" workshop to understand the uniqueness of the medium and better prepare themselves as videoconference presenters.
- Have presenters fill out surveys on their experience with the videoconference medium
- Investigate "eye-to-eye" videoconferencing techniques (Rose & Clarke, 1995).
- Do not pursue further pilot projects unless they involve a minimum two year funding plan. The first year offers the project team an opportunity to demonstrate "proof-of-concept" and use Year 2 to maintain the program and actively fund raise to make the project sustainable.
- Re-evaluate the merits of having a project web site.

CME Programming Impact

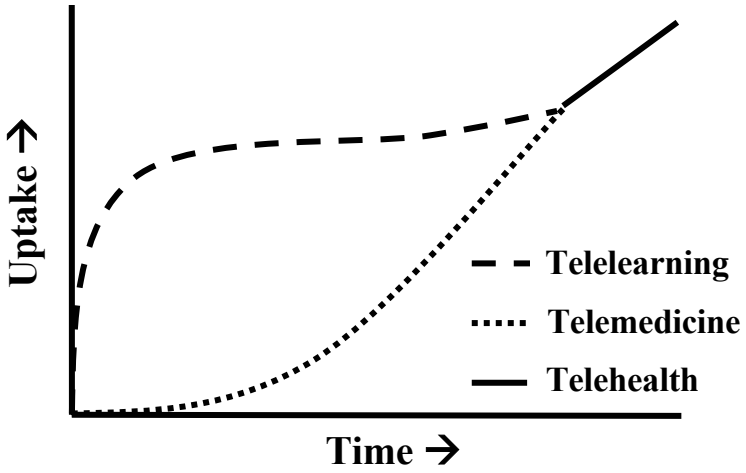
"How effective was the series of CME programming in influencing clinical practices?" is the research question central to evaluating this project component.

Conclusions. The literature review reveals little evidence that conventional CME experiences (e.g. medical conferences) are effective in helping physicians incorporate new knowledge into practice. According to Kirkpatrick (1998), behavioural change is the least controllable of the four levels (reaction, learning, behaviour, and results). The encouraging learning environment Vanderhoof physicians experience reduces the importance of a reward system, offering participants the professional freedom to choose their desire and degree of mastery of content as the determining factors in their changing their clinical practice. However, the RHVNL did offer CME credits to participants for attending CME rounds and filling out feedback forms. Project data show that a majority of participants used a new skill or knowledge set, learned during CME videoconferences, and had a moderate level of comfort with the new skill or problem. Physicians ranked the interactive and engaging Diabetes and Depression rounds high for degree of impact on clinical service delivery. Participation levels averaged 77%, which is high when factoring in the network time restrictions and physician workload. Additional incentives for attending would have minimal impact at best. The ultimate advantage of the videoconference delivery system is bringing high quality, needs-based CME experiences that rural physicians would not normally be able to receive.

The literature review describes a transition to a virtual externship (Figure 1, p.20) where a physicians' education during his/her life shifts from traditional delivery to workplace delivery. This project demonstrates that videoconference technology can shift the education focus from just professional development to using CME as a strategy to integrate telemedicine into physicians' regular routine. The area of telelearning in the workplace can become seamless

with clinical service delivery due to the nature of the videoconference medium (Figure 8). Participants accepted telelearning quickly, whereas incorporating telemedicine into their daily routine was slow. With enough time (i.e. 2 years), the "blending" of two areas can lead into a true telehealth environment where working and learning become one accomplishing the overarching goal of improving patient care. Results of the project evaluation survey suggest there was improvement to patient care because of one or more of the CME rounds; however, the final focus group discussion (Appendix D) failed to support or refute the survey findings. The pilot project timeline was too short to establish a true telehealth environment.

Figure 8. Telehealth Uptake Model



Recommendations. Based on the above conclusions and the results presented in Chapter 4, the following recommendations are to:

- Undertake a more comprehensive literature review of the effectiveness of conventional continuing medical education conferences.
- Secure funding for a sustainable CME link to Vanderhoof.

- Utilize the Telehealth Uptake Model where CME rounds gradually introduce or blend clinical services delivery applications.
- Expand project evaluation to include patient interviews to determine telehealth effects on patient care.
- Expand the use of the videoconference medium for CME delivery to other rural communities.

Network Reliability

"How reliable was the provincial electronic infrastructure (SPANBC/PLNet) as an IP protocol videoconferencing venue for delivering CME?" is the research question central to evaluating this project component.

Conclusions. The network has a high degree of reliability outside the hours of 0900 – 1500. However, physicians want a more flexible CME delivery schedule (e.g. over lunch). Renting additional bandwidth from Telus, between Prince George and Vanderhoof, would provide flexible delivery times.

Recommendations. Based on the above conclusions and the results presented in Chapter 4, the following recommendations are to:

- Encourage the provincial government to increase network bandwidth between Prince George and Vanderhoof to allow videoconferencing during the regular workday.
- Identify other network providers to increase competition and possibly decrease bandwidth costs.

Delivery Medium Cost Effectiveness

"How cost effective was the provincial electronic infrastructure (SPANBC/PLNet) as an IP protocol videoconferencing venue for delivering CME?" is the research question central to evaluating this project component.

Conclusions. Delineation of the cost effectiveness (approximately $700 per physician per CME round) of the CME component when compared to alternate CME delivery strategies is not easy. Group-directed and organized CME experiences reduce CME expenses to zero, however the physicians have to work together on agreeing to attend the rounds, settle on the topics, and elect someone to take the lead in organizing the sessions. The cost of print-based CME can be as low as several hundred dollars per physician per module or journal subscription. Advantages include learner control over time, place, and pace. Unfortunately low physician preference for receiving print-based materials for CME and a desire to experience CME with their peers are obvious disadvantages. Travelling to conferences in major centres costs about half ($333 per conference hour) as much as a 1-hour videoconference CME round. However, as the network has unlimited monthly access (unlike IDSN), providing more CME experiences will decrease the cost per round. However, the purpose of medical conference and the needs-based, high quality nature of a CME round require close consideration.

The end-users (e.g. physicians) will need to pay for the link in order to make videoconference CME sustainable. Other groups in the community can also use the link and share network costs. For example, the lab technicians are interested in receiving CE delivery via videoconference. However, as the literature recommends, a full time coordinator is required

to facilitate use and comes with significant cost implications unless several communities share one between them.

Recommendations. Based on the above conclusions and the results presented in Chapter 4, the following recommendations are to:

- Identify other community groups that may benefit from the videoconference system (e.g. lab technicians, physiotherapists, schools, and local government) to share bandwidth costs.
- Provide multi-point VC sessions to reduce cost per participant.
- Hire a full-time project manager to increase ICT system use for more than one community.

Discussion

Specialist presenters arrived at the videoconferences very well prepared to deliver their topic to the audience. Most, however, had never experienced presenting with the videoconference medium and its unique pedagogical requirements. They reported becoming more at ease with the technology as the session progressed. Instructional methods include PowerPoint, case-based, and open discussion. Some instructors emailed their notes/slides to the participants prior to the presentation. After the videoconferences, some specialists thought they would like to modify their delivery strategies to match the high interactivity needs of the medium. A common response to the experience was "Videoconferencing is 'different' than presenting to an audience in the same room." Some also liked having the local and remote cameras on while setting up as it gave the "feel" of a face-to-face presentation. A closer match

of instructional strategies to the unique nature of the videoconference medium requires more communication between presenters and the project manager.

The concept of videoconference delivered CME acting as a catalyst for videoconference clinical service delivery (Telehealth Uptake Model) deserves careful consideration given the nature of being a rural physician. The Vanderhoof physicians are a very cohesive group of professionals with strong leadership and a clear vision of what works best for delivering health care to their community. Recruitment and retention challenges, faced by other rural communities, appear to be less of an issue in Vanderhoof. The group has procedures in place that limit physician isolation, educational isolation, and peer support isolation; the causes of professional dissatisfaction. Consequently, they do not want anything that might disrupt their homeostatic environment. They are not interested in any initiative that will demand more of their time, cost the community money, or prevent difficult cases from transferring to Prince George (thereby adding nursing pressure to an already overworked nursing staff).

Participants became familiar with the videoconference medium through experiencing CME events under a no cost, high benefit scenario. These needs-based medical rounds created a pressure-free atmosphere conducive to thinking about direct patient application and seeing other potential uses for the system. For example, one of the participants organized a teledermatology session where patients, physician, and a specialist met through a videoconference link. In this situation, CME blended with clinical service delivery, positively influencing patient health and physician knowledge/skill base. Even the specialist reported a

number of benefits, including realizing the potential of the system for reaching into remote areas to improve patient health.

Lab technicians, community-based users, and telehealth delivery to schools address the issue of having to reduce videoconference costs in order to offer the town a sustainable link. The lab technicians work in St. John hospital with the physicians and nurses. After hearing about the videoconference link, this group voiced a great desire to access the medium to receive CE from specialist lab technicians in Vancouver. Even though free access to the videoconference system existed, the lab technician group needed guidance in identifying Vancouver lab specialists and the procedure for coordinating a session. Unfortunately, the necessary assistance was not available. Community-based organizations represent a fourth potential user of the system. For example, the co-investigator in Vanderhoof arranged a smoking cessation videoconference session, inviting members of the community of Stoney Creek and an expert in Vancouver. Effective instructional strategies included a few PowerPoint slides showing smoking-related statistics, a brief video of the physiology of the effects of smoking, and the majority of time for open discussion. Telehealth delivery to schools is a fifth use for the videoconference link. Linking up students and school nurses with specialists in Vancouver could deal with adolescent health issues (e.g. drug abuse, pregnancy, depression) (Appendix N).

Summary of Recommendations

The following ranked recommendations fall under project-related, design- and delivery-related, and videoconference medium-related groups:

1. Identify a willing, local "champion" to keep a telehealth project moving forward.
2. Do not pursue further pilot projects unless they involve a minimum two year funding plan. The first year offers the project team an opportunity to demonstrate "proof-of-concept" and use Year 2 to maintain the program and actively fund raise to make the project sustainable.
3. Expand the use of the videoconference medium for CME delivery to other rural communities.
4. Encourage the provincial government to increase network bandwidth between Prince George and Vanderhoof to allow videoconferencing during the regular workday.
5. Identify other network providers to increase competition and possibly decrease bandwidth costs.
6. Hire a full-time project manager to increase ICT system use for more than one community.
7. Identify other community groups that may benefit from the videoconference system (e.g. lab technicians, physiotherapists, and local government) to share bandwidth costs.
8. Provide multi-point VC sessions to reduce cost per participant.
9. Continue Division of CME efforts and address the "digital divide" (i.e. low bandwidth) issue to improve computer and Internet literacy. Each physician would need to have a computer and high-speed Internet access at home and in the office. The literature documents both issues well requiring minimal assessment at each community.
10. Continue to match CME content with physician needs through the needs assessment-focus group approach.
11. Seek out specialist presenters with an understanding/awareness of the rural health perspective.

12. Design videoconferences with highly interactive instructional strategies, low program structure, and high learner autonomy.
13. Conventional PowerPoint presentations have little pedagogical merit for videoconference delivery of continuing medical education and, therefore, should either be avoided or re-designed to make them more interactive and engaging.
14. Invite potential specialist presenters to attend a videoconference "Best Practices" workshop to understand the uniqueness of the medium and better prepare themselves as videoconference presenters.
15. Have presenters fill out surveys on their experience with the videoconference medium
16. Investigate "eye-to-eye" videoconferencing techniques (Rose & Clarke, 1995).
17. Re-evaluate the merits of having a project web site.
18. Undertake a more comprehensive literature review of the effectiveness of conventional continuing medical education conferences.
19. Secure funding for a sustainable CME link to Vanderhoof.
20. Utilize the Telehealth Uptake Model where CME rounds gradually introduce or blend clinical services delivery applications.
21. Expand project evaluation to include patient interviews to determine telehealth effects on patient care.
22. Continue providing CME experiences through the videoconference medium.
23. Encourage physicians to become more familiar with the videoconference medium by offering more flexible delivery times, more CME round topics (by linking UBC grand rounds to the network), and more training (e.g. scheduled lunch hour sessions).

Recommendations for Future Study

Videoconference delivery of CME to Vanderhoof physicians was effective; however, there is neither a need nor participant desire for another pilot project or an extension of the current one. The only way this group of physicians will welcome the technology again is in the form of a sustainable (i.e. 3 to 5 years) initiative with guaranteed funding and 24-hour, highly reliable access. Uncertainty and trust, as discussed in Chapter II, are themes that played a role in this project and will play important roles in subsequent telehealth initiatives. In addition, low computer literacy, physician preference for group CME and the need for local project coordinators should guide all telehealth initiatives. Therefore, future telehealth delivery into other rural communities should follow the Telehealth Uptake Strategy (Figure 7) with an up front funding guarantee for a 3 to 5 year sustainable initiative, including the provision of a coordinator and identification and cooperation of a local "champion" with local administrative support. This three-pronged approach will ensure maximum use of the videoconference system and facilitate the identification and coordination of multiple user groups to maximize utilization. One aspect of the RHVNL project left unresolved is whether patient care improved. Analysis of the final project data suggests it was; however, the question requires more research.

Desktop videoconferencing (DTVC) is an alternative CME delivery technology. There are a number of vendors of free software, most notably, CU-SeeMe. Physicians in Vanderhoof have computers with fast enough processing speeds; however, bandwidth remains limited to 28.8 kbps or 56 kbps at the medical clinic and at all except 3 participant residences. Whether physicians prefer CME at their computers or in a small group of peers requires further research after resolving the "digital divide" issue. However, preliminary data on computer literacy from

the needs assessment and the corresponding low web site use, suggests that physicians (especially the older ones) will continue ignoring DTVC. A longitudinal study of rural physician attitudes and learning would be very interesting. However, the aversion to filling out surveys, low interest for participating in additional focus groups, and seeing little benefit of another research initiative to their community would make the delivery of this type of study difficult.

Although CNE evaluation was not part of this study, data collection did take place. Nurses in Vanderhoof have fewer opportunities to experience continuing education then physicians. Long hours, understaffing, and a lack of CNE funding are barriers to participating in CNE events. A rich collection of data is available for analysis by contacting the Division of CME, Faculty of Medicine, at the University of British Columbia (Attention: Associate Dean).

The British Columbian government should study the feasibility of a separate department (e.g. Centre of Telehealth) responsible for monitoring publicly-funded and privately-funded telehealth initiatives, approving telehealth projects, evaluating the programs (including impact on patient care), assuring sustainable funding for successful projects, and publicizing project successes. This would avoid duplication of studies and increase implementation of proof-of-concept initiatives.

The purpose of this master's project was to perform an evaluation of the RHVNL pilot project with a particular focus on the CME component. Videoconference delivery of CME rounds can be effective in addressing the learning needs of physicians in a cost-effective way

that may lead to physicians incorporating videoconferencing in their day-to-day practice. The challenge for medical educators using the videoconference medium is to minimize transactional distance by implementing pedagogical strategies, including higher mental process questioning, that encourage high interactivity, low program structure, and high learner autonomy.

BIBLIOGRAPHY

Anderson, T. D. & Garrison, D. R. (1995). Transactional issues in distance education: The impact of design in audio conferencing. *American Journal of Distance Education, 9*, 2, pp. 27-45.

ANZ Telehealth Committee (2000). *A methodology for telehealth evaluation in Australia*. Author. [On-line]. Retrieved October 23, 2001, from the World Wide Web: http://www.telehealth.org.au/.

AuYeung, D., Ho, K., Landolt, M., Brussoni, M., Huckell, V., & Woollard, R. (2000). *Medical informatics dissected: A survey of B.C. physicians' professional use of the Internet*. Unpublished manuscript.

Best, J. W. & Kahn, J. V. (1998). *Research in Education (8th Edition).* Boston, MA: Allyn and Bacon.

Bhatara, V. S., Fuller, W. C., O'Connor-Davis, L., & Misra, L. K. (1996). Improving job satisfaction of rural South Dakota mental health providers through education: A pilot study. *South Dakota Journal of Medicine*, pp. 93-96.

Black, D. P. & Dunikowski, L. (1985). Videotapes as continuing medical education for physicians in isolated communities. *Canadian Family Physician, 31*, pp. 1161-1163.

Blignault, I. (1999). *Review of the literature on evaluation in telehealth*. Australian New Zealand Telehealth Committee. KMPG Consulting. [On-line]. Retrieved October 23, 2001 from the World Wide Web: http://www.telehealth.org.au.

Blignault, I. (2000). *Telehealth facility definitions*. Australian New Zealand Telehealth Committee. [On-line]. Retrieved October 23, 2001, from the World Wide Web: http://www.telehealth.org.au/discussion_papers/datadef/definitions.htm.

Bloom, B. S. (Ed.) (1956) *Taxonomy of educational objectives: The classification of educational goals: Handbook I, cognitive domain*. New York ; Toronto: Longmans, Green.

Bruce, B. (1999). Challenges for the evaluation of new information and communication technologies. *Journal of Adolescent and Adult Literacy, 42*, 6, pp. 450-455.

Burns, P. (1999). Telehealth or telehype? Some observations and thoughts on the current status and future of telehealth. *Journal of Healthcare Information Management, 13*, 4, pp. 5-15.

Chen, Y. -J., & Willits, F. (1998). A path analysis of the concepts in Moore's Theory of Transactional Distance in a videoconferencing learning environment. *Journal of Distance Education/Revue de l'enseignement à distance, 13* 2. Retrieved March 27, 2001, from the World Wide Web: http://cade.icaap.org/vol13.2/chen.html.

College of Family Physicians of Canada (1998). *The CFPC National Family Physician Survey: Regional Report - British Columbia. The Janus Project*. College of Family Physicians of Canada. [On-line]. Retrieved October 23, 2001, from the World Wide Web: http://www.cfpc.ca/research/janus/janusregbc.asp.

Cornish, M. & Monahan, B. (1996, March/April). A network primer for educators. *Educational Technology*, pp. 55-57.

Creswell, J. W. (1994). *Research Design: Qualitative and Quantitative Approaches*. Thousand Oaks, California: SAGE Publishers, Inc.

Curran, V., Hatcher, L. & Kirby, F. (1997). *Professional development needs assessment: What are your learning needs?* Unpublished questionnaire. Memorial University of Newfoundland, St. John's.

Curran, V., Hatcher, L., & Kirby, F. (2000). CME needs of rural physicians: How do we compare to our urban colleagues. *Canadian Journal of Rural Medicine, 5*, 3, pp. 31-8.

Davis, D. A., Haynes, R. B., Chambers, L., Neufield, V. R., McKibbon, A., & Tugwell, P. (1984). The impact of CME: A methodological review of the continuing medical education literature. *Evaluation and the Health Professions, 7*, 3, pp. 251-283.

Davis, D. A., Thomson, M. A., Oxman, A. D., & Haynes, R. B. (1992). Evidence for the effectiveness of CME: A review of 50 randomized controlled trials. *The Journal of the American Medical Association, 268*(9), pp. 1111-1117.

Davis, D. A., Thomson, M. A., Oxman, A. D., & Haynes, R. B. (1995). Changing physician performance: A systematic review of the effect of continuing medical education strategies. *The Journal of the American Medical Association, 274*(9), pp. 700-706.

Doolan, T. & Nichols, A. (1994, July). Training for rural practice: The way ahead. In *Issues Affecting Rural Communities*. Proceedings of an International Conference Held by the Rural Education Research and Development Centre, Townsville, Queensland, Australia.

Dunn, E. V., Acton, H., Conrath, D., Higgins, C., & Bain, H. (1980). The use of slow scan video for CME in a remote area. *Journal of Medical Education, 55*, pp. 493-95.

Edworthy, S. M. (2001). Telemedicine in developing countries. *British Medical Journal, 323* (7312), pp. 524-525.

Fitzpatrick, G. (1998). *TARDIS evaluation*. Distributed Systems Technology Centre Pty. Ltd. University of Queensland, Australia. [On-line]. Retrieved October 23, 2001, from the World Wide Web: http://www.dstc.edu.au/Research/Projects/EWP/Papers/TARDISpaper_Whiting%20doc.pdf.

Fortune, J. (1997). *Block II - A Systems Approach to Failures, Systems Paradigms, Studying Systems Failures*. The Open University. Norwich, United Kingdom: Page Bros.

Gagné, G. P., Grzybowski, S., Iglesias, S., Klein, M., & Lalonde, A. (1998). Joint position paper on rural maternity care. *Journal of the Society of Obstetrics and Gynaecology of Canada, 20*, 4, pp. 293-398.

Garrison, D. R. (1989). *Understanding distance education: A framework for the future*. New York: Routledge.

Gill, D. & Game, D. (1994). Continuing medical education needs of rural GPs in South Australia. *Australian Family Physician, 23*, 4, pp. 663-667.

Gunawardena, C. N. (1999, October). The challenge of designing and evaluating "interaction" in web-based distance education. In *WebNet 99 World Conference on*

the WWW and Internet. Proceedings of an International Conference Held in Honolulu, Hawaii.

Gunawardena, C. N., Lowe, C. A., & Carabajal, K. (2000, February). Evaluating online learning: Models and methods. In *Society for Information Technology & Teacher Education*. Proceedings of an International Conference Held by SITE 2000, San Diego, California.

Hailey, D., Roine, R., Ohinmaa, A., (2001). Assessing telemedicine: A systematic review of the literature. *Canadian Medical Association Journal, 165*, 6, 765-771. [On-line]. Retrieved on June 6, 2001, from the World Wide Web: http://www.cmaj.ca/cgi/reprint/165/6/765.pdf.

Hoyal, D. (1994, July). How to catch and keep a rural doctor. In *Issues Affecting Rural Communities*. Proceedings of an International Conference Held by the Rural Education Research and Development Centre. Townsville, Queensland, Australia.

Hutten-Czapski, P. (2002). President's message: Growth in rural doctor numbers in Canada. *Canadian Journal of Rural Medicine, 7*, 1, p. 7.

Jennett, P. A., Hunter, B. J., & Husack, J. P. (1998). Telelearning in health: A Canadian perspective. *Telemedicine Journal: The Official Journal of the American Telemedicine Association, 4*, 3, pp. 237-247.

Jennett, P. A., Nijssen-Jordan, C., Wiggs, B., Gao, M., Person, V., Andruchuk, K., & Johnston, R. (2001). Telelearning in a partnership between a university faculty and a

regional health authority: Benefits, challenges and strategies. *Journal of Telemedicine and Telecare, 6*, 2, pp. S32-S35

Johnson, A., Gorman, M., Lewis, C., & Baker, F. (2001). Interactive videoconferencing improves nutrition intervention in a rural population. *Journal of the American Dietetic Association, 101*, 2, pp. 173-174.

Jong, M. K. K. & Beach, D. A. (1997). NorFaM -- training residents for rural practice. *Canadian Journal of Rural Medicine, 2*, 3. [On-line]. Retrieved October 23, 2001, from the World Wide Web: http://collection.nlcbnc.ca/100/201/300/cdn_medical_association/cjrm/vol-2/issue-3/0120.htm

Kennedy, M. F. & Kettle, B. W. (1995). Using a transactionist model in evaluating distance education programs. *Canadian Journal of Educational Communication, 24*, 2, pp. 159-170.

Kirkpatrick, D. L. (1998). *Evaluating Training Programs: The Four Levels (2nd Edition)*. San Francisco: Berrett-Koehler Publishers, Inc.

Kralj, B. (2000). Measuring "rurality" for purposes of healthcare planning: An empirical measure for Ontario. [Online]. Retrieved February 9, 2002, from the World Wide Web: http://www.oma.org/oma_comm/omr/oct/00rurality.htm.

Leduc, E. (1997). Defining rurality: A general practice rurality index for Canada. *The Canadian Journal of Rural Medicine, 2*, 3. [Online]. Retrieved on February 9, 2002, from the World Wide Web:

http://www.cma.ca/cma/common/displayPage.do?pageId=/staticContent/HTML/N0/l2/cjrm/vol-2/issue-3/0125.htm.

Lehoux, P., Sicotte, C., & Lacroix, A. (1999). Theory of use behind telehealth applications. *Studies in Health Technology and Informatics, 64*, pp. 29-38.

Lindsay, E. A., Davis, D. A., Fallis, F., Willison, D. B., & Biggar, J. (1987). Continuing education through telemedicine for Ontario. *Canadian Medical Association Journal, 137*, pp. 503-506.

Lott, D. R. (1996). Can distance education solve rural physicians' professional isolation problems? *Journal of Continuing Higher Education, 44*, 3, pp. 25-28.

Lott, D. R. (1995). Obstacles to self-paced learning. *Journal of Continuing Education in the Health Profession, 15*, pp. 203-208.

Maloney, P. & Kane, J. W. (1995). An innovative solution to assessing staff learning needs. *The Journal of Continuing Education in Nursing, 26*, 2, pp. 67-72.

Manca, D. ("n.d."). Rural Physician Training. Alberta Family Practice Research Network [On-line]. Retrieved October 23, 2001 from the World Wide Web: http://www.ruralnet.ab.ca/afprn/training.html.

Mann, K. V. & Chaytor, K. M (1992). Help! Is anyone listening? An assessment of learning needs of practicing physicians. *Academic Medicine, 67*, pp. 54-56.

Mann, K. V. (1998). Not another survey! Using questionnaires effectively in needs assessment. *Journal of Continuing Education in the Health Professions, 18*, 3, pp. 142-149.

Martin, S. (1999). "Is everyone as tired as I am?" The CMA's physician survey results, 1999. *Canadian Medical Association Journal, 161*, 8. [On-line]. Retrieved October 23, 2001, from the World Wide Web: http://www.cmaj.ca/cgi/content/full/161/8/1020#FU140.

Masys, D. R. (1997). Telehealth: The need for evaluation. *Journal of the American Medical Informatics Association, 4*, 1, pp. 69-70.

McKibbon, K. A. (1998). Evidence based practice. *Bulletin of the Medical Library Association, 86*, 3, pp. 396-401.

McMahon, F. (2001). *Telehealth projects: A practical guide*. The Information Management Group, Corporate Shared Services, Ministry of Health Planning, and Ministry of Health services, Victoria, British Columbia. National Library of Canada.

Mitchell, J. (2000). Increasing the cost-effectiveness of telemedicine by embracing e-health. *Journal of Telemedicine and Telecare, 6*, 1, pp. S16-19.

Moore, M. G. (1993). Theory of transactional distance. In D. Keegan (Ed.) *Theoretical Principles of Distance Education*. New York: Routledge. pp. 22-38.

Noorani, H. & Picot, J. (2001). *Assessment of videoconferencing in telehealth in Canada*. (Canadian Coordinating Office for Health Technology Assessment Technology report no. 14). Ottawa: National Library of Canada.

Oeffinger, J. C., Hiebeler, L., Sherman, T., Gaskill, M., Portante, T., Polasek, J., & Litterer, K. (1992). Innovative desktop learning tool: Implications for rural hospitals and physicians. *Annals of the New York Academy of Sciences, 670*, 1, pp. 76-90.

Patton, M. Q. (1982). Evaluation issues in practical perspective. In M.Q. Patton (Ed.), *Practical evaluation* (pp. 32-54), Sage Publications, Inc.

Pavan, L. A. & Makin, M. (2000). Review of cesarean sections at a rural British Columbia hospital: Is there room for improvement? *Canadian Journal of Rural Medicine, 5*, 4, pp. 201-207.

Phi Delta Kappa National Study Committee on Evaluation (1971). *Educational evaluation and decision making*. Itasca, Indiana: F. E. Peacock Publishers, Inc.

Picot, J. (1999). Towards a methodology for developing and implementing best practices in telehealth and telemedicine. *Studies in Health Technology and Informatics, 64*, pp. 23-28.

Picot, J., & Cradduck, T. (2000). *The telehealth industry in Canada: Industry profile and capability analysis*. The Keston Group and Infotelmed Communications Inc. [On-line]. Retrieved October 23, 2001 from the World Wide Web: http://www.keston.com/ICreportsumry.pdf.

Pitblado, R. & Pong, R. (1999). What is "rural?" From *Geographic distribution of physicians in Canada*. Sudbury, Ontario: Centre for Rural and Northern Health Research, Laurentian University.

Pong, R. W. & Pitblado, J. R. (2002). Beyond counting heads: Some methodological issues in measuring geographic distribution of physicians. *Canadian Journal of Rural Medicine, 7*, 1, pp. 12-20.

Premier's Technology Council First Quarterly Report, November 2001. [On-line]. Retrieved February 20, 2002 from the World Wide Web: http://www.gov.bc.ca/prem/down/the_ptc_report_q1.pdf.

Premier's Technology Council Second Quarterly Report, April 2002. [On-line]. Retrieved October 8, 2002 from the World Wide Web: http://www.gov.bc.ca/prem/down/quarterly_rpt_2.pdf.

Premier's Technology Council Third Quarterly Report, November 2002. [On-line]. Retrieved October 8, 2002 from the World Wide Web: http://www.gov.bc.ca/prem/down/the_ptc_reportq3.pdf.

PriceWaterhouseCoopers (1999). *HealthCast 2010: Smaller World, Bigger Expectations*. Retrieved October 23, 2001, from the World Wide Web: http://www.pwchealth.com/cgi-local/hcregister.cgi?link=pdf/hc2010.pdf.

PriceWaterhouseCoopers (2000). *Telehealth Victoria: Survey on the use of videoconferencing and related technologies in health care*. [On-line] Retrieved October 23, 2001 from the World Wide Web:

http://www.telehealth.org.au/discussion_papers/TeleHealthVictoriaSurveyReport-Nov2000.PDF.

Raman, S. (1998). *Assessing benefits of videophone technology in internal medicine*. Unpublished master's thesis, Oregon Health Sciences University.

Rosenthal, T. C. (Ed.) (1989, November). *Training physicians for rural health careers in New York State*. Proceedings of a Symposium held in Buffalo, New York.

Rourke, J. (1988). Rural family practice part II: Preferences in continuing medical education. *Canadian Journal of Family Physician, 34*, pp. 1035-1038.

Rourke, J. (1997). In search of a definition of "rural". *Canadian Journal of Rural Medicine, 2*, 3. [On-line]. Retrieved February 9, 2000, from the World Wide Web: http://www.cma.ca/cma/common/displayPage.do?pageId=/staticContent/HTML/N0/l2/cjrm/vol-2/issue-3/0113.htm.

Siden, H. B. (1998). A qualitative approach to community and provider needs assessment in a telehealth project. *Telemedicine Journal, 4*, 3, pp. 225-235.

Soles, T. L. (2001). Physician numbers in rural British Columbia. *Canadian Journal of Rural Medicine, 6*, 1, pp. 24-30.

Taylor, P. (1998). A survey of research in telemedicine 2: Telemedicine services. *Journal of Telemedicine and Telecare, 4*, pp. 63-71.

TIP Series (1990). Athabasca (Centre). In Coldeway, Spencer, Cookson, & Moisey, *MDDE603: Systems Design in Distance Education (Study Guide)*. Athabasca University, Canada

Wallace, G. (2001). Information technology and telemedicine. *Canadian Medical Association Journal, 165*, 6. [On-line]. Retrieved February 18, 2002 from the World Wide Web: http://www.cmaj.ca/cgi/reprint/165/6/777.pdf.

Ward, J. (1988). Continuing medical education: Part 2. Needs assessment in continuing medical education. *The Medical Journal of Australia, 148*, pp. 77-80.

Watanabe, M. (1998). Telehealth in Canada. *Telemedicine Journal: The Official Journal of the American Telemedicine Association, 4*, 3, pp. 197-198.

Watanabe, M. (Ed.) (2000). A Telehealth Report. *The 5th International Conference on the Medical Aspects of Telemedicine* (Industry Canada Contract No. U4300-0-0018). Montreal: Canadian Society of Telehealth.

Wen, C. (1975). Training a million barefoot doctors. *Prospects, 5*, 4, pp. 501-503.

Wiggs, B. R. (1999). Telehealth in British Columbia: From design to delivery. *Studies in Health Technology and Informatics, 64*, pp. 58-60.

Wise, A. L., Hays, R. B., Adkins, P. B., Craig, M. L., Mahoney, M. D., Sheehan, M., Siskind, V., & Nichols, A. (1994). Training for rural general practice. *The Medical Journal of Australia, 161*, pp. 314-318.

Woolf, C. R. (1990). Personal continuing education (PECE) plan: Stage 2. A model to supply physicians perceived needs. *The Journal of Continuing Education in Health Professions, 10*, pp. 321-328.

Woolf, C. R. (1991). Comparison of the perceived CME needs of semi-rural and urban physicians. *Journal of Continuing Education in the Health Professions, 11*, 4, pp. 295-299.

Woolf, C.R. (1993). Continuing health professional education: Principles for global application. *Journal of Continuing Education in the Health Professions, 13*, 3, pp. 229-34.

APPENDIX A – CONSENT FORM

The University of British Columbia
Division of Continuing Medical Education
Faculty of Medicine
105-2194 Health Sciences Mall, Vancouver, BC V6T 1Z3
Phone: (604) 822-2927 Fax: (604) 822-4835

Consent Form

British Columbia Rural Health Video Network Link Project

Principal Investigator: *Dr. Kendall Ho*, M.D., F.R.C.P.C., Associate Dean and Director of Continuing Medical Education, Faculty of Medicine, University of BC (604) 822-2927.

Co-Investigator: *Mr. Jeff A. May*, B.Sc., Masters' Candidate, Centre for Distance Education, Athabasca University, AB (604) 420-1966.

Introduction:

Thank you very much for considering to participate in this telelearning in health project, a collaboration between the physicians and nurses in Vanderhoof and the Division of CME, UBC Faculty of Medicine.

Purpose:

The goal of this project is to first assess professional needs and then to measure the efficacy of information and communication technologies (ICTs) in facilitating clinical services, specialty consultation, and professional education for the rural communities of Vanderhoof and Stoney Creek.

The reason you were selected is because you may experience the challenges that are typical for physicians and nurses working and living in rural areas. The issues include:

- Lack of rural access to peer support and specialty consultations
- Barriers to attend CME/CNE events
- Challenges surrounding health care delivery to First Nation's communities

Study Procedures:

You are one of an estimated total of 40 health care professionals (10 physicians and 30 nurses) in the project. By choosing to participate you will be invited to i) complete a needs assessment questionnaire, ii) participate in an introductory telehealth workshop, iii) take part in a follow up focus group videoconference, iv) be involved in four CME/CNE rounds via videoconferencing, and v) complete an opinion/feedback survey.

The total time commitment over the six-month implementation phase is estimated at 10 hours.

Confidentiality:

Any information resulting from this research study will be kept strictly confidential. All surveys will be identified only by code number and kept in a locked filing cabinet. Participants will not be identified by name in any reports of the completed study. If the data records are kept on a computer hard disk, a firewall and password will protect them.

Remuneration/Compensation:

There is no remuneration or compensation to participants.

Contact:

If I have any questions or desire further information with respect to this study, I may contact Dr. Kendall Ho or one of his associates at (604) 822-2927.

If I have any concerns about my treatment or rights as a research subject I may contact the Director of Research Services at the University of British Columbia at (604) 822-8598.

Consent:

I understand that my participation in this study is entirely voluntary and that I may refuse to participate or withdraw from the study at any time without prejudice.

I have received a copy of this consent form for my own records.

I consent to participate in this study.

_____

Subject Signature Date

_____

Signature of a Witness Date

APPENDIX B – CME NEEDS ASSESSMENT

The University of British Columbia
Division of Continuing Medical Education
Faculty of Medicine
105-2194 Health Sciences Mall, Vancouver, BC V6T 1Z3
Phone: (604) 822-2927 Fax: (604) 822-4835

CONTINUING MEDICAL EDUCATION NEEDS ASSESSMENT
QUESTIONNAIRE – **Physician Survey**

British Columbia Rural Health Video Network Link (RHVNL) Project

Principal Investigator: *Dr. Kendall Ho*, M.D., F.R.C.P.C., Associate Dean and Director of Continuing Medical Education, Faculty of Medicine, University of BC (604) 822-2927.

Co-Investigator: *Mr. Jeff A. May*, B.Sc., Masters' Candidate, Centre for Distance Education, Athabasca University, AB (604) 420-1966.

Introduction

Thank you very much for participating in this telelearning in health project, a collaboration between the physicians and nurses in Vanderhoof, the British Columbia Medical Association, British Columbia Ministry Of Health, British Columbia Ministry Of Management Services, and the Division of Continuing Medical Education at the University of British Columbia Faculty of Medicine.

Purpose

The goal of this project is to first assess the professional needs of health professionals and then to measure the efficacy of information and communication technologies (ICTs) in facilitating clinical services, specialty consultation, and professional education for the rural communities of Vanderhoof and Stoney Creek.

The reason you were selected is because you may experience the challenges that are typical for physicians working and living in rural areas. The issues include:
Lack of rural access to peer support and specialty consultations
Barriers to attend CME events
Challenges surrounding health care delivery to First Nation's communities

You are one of an estimated total of 40 health care professionals who are being asked to participate in the study. By choosing to participate, you are invited to complete this needs assessment questionnaire.

Results of the survey will be used to refine CME topics for the four videoconference rounds delivered early next year.

Right of Refusal

You have the right to refuse to participate or withdraw at any time without prejudice. If you choose to participate, the completed survey is taken as your consent.

Time Required

The survey should take approximately 10 to 15 minutes to complete.

Survey Return and Feedback

When you are finished this survey, please place it in the envelope provided and return it to Dr. Stuart Johnston. Results of the survey will be posted on the project's password-protected web site in January 2002.

Confidentiality

The information resulting from this questionnaire will be kept strictly confidential. This document will be identified only by code number and kept in a locked filing cabinet. Participants will not be identified by name in any reports of the completed study.

All returned surveys will be sealed in an envelope by Dr. Stuart Johnston and taken back to Vancouver for data analysis by Mr. Jeff May.

Thank you for taking time out of your busy schedule to complete this questionnaire.

Sincerely,

Dr. Kendall Ho
Principal Investigator

CONTINUING MEDICAL EDUCATION NEEDS ASSESSMENT–

Physician Survey (Code #:_____)

Please indicate your multiple choice answers by placing an "X" in the appropriate box; for your short answers, please write inside the text box. This questionnaire[1] will take approximately 10 to 15 minutes to complete. Thank you for your participation.

PART I – INDIVIDUAL PROFILE

This section is designed to gather information about you and your practice.

1. Sex: (1)☐ Female (2)☐ Male

2. Age: ☐

3. Your Medical School: ☐

4. Medical School graduation year: ☐

5. Are you a:
(1)☐ Family Physician (CCFP certified)
(2)☐ Family Physician (not CCFP certified)
(3)☐ Specialist (please specify): ☐

PART II – TECHNOLOGY PROFILE

This subsection is designed to gather information about your current general learning needs in the area of computer and information technology.

1. Do you have access to a computer?
(1)☐ Yes (please specify location): ☐
(2)☐ No

2. Do you have access to any of the following (please check all that apply)?
(1)☐ Internet (2)☐ E-mail (3)☐ CD-ROM (4)☐ DVD (5)☐ Compressed Digital Video

3. Please indicate your level of need for continuing education in the following computer and information technology areas:

		NEED			
	N/A	No	Low	Med.	High
(1)Basic computer skills (i.e. Word processing)	☐	☐	☐	☐	☐
(2)Computer assisted diagnosis	☐	☐	☐	☐	☐
(3)Computerized billing systems	☐	☐	☐	☐	☐
(4)Computerized patient record systems	☐	☐	☐	☐	☐

[1] Adapted, with permission, from *CME Needs of Rural Physicians: How do we compare to our Urban Colleagues?* (Curran 2000)

	NEED (cont'd)				
	N/A	No	Low	Med.	High
(5)Computerized drug interaction information programs	☐	☐	☐	☐	☐
(6)Library searching skills	☐	☐	☐	☐	☐
(7)Internet searching techniques	☐	☐	☐	☐	☐
(8)Understanding the purpose and use of Internet News Groups	☐	☐	☐	☐	☐
(9)Awareness of issues related to use of information on the Internet (e.g., Security, quality of information)	☐	☐	☐	☐	☐

4. From the previous list, please choose the **top three** areas of computer and information technology in which you presently require continuing education:

1. ☐
2. ☐
3. ☐

PART III – YOUR PRESENT CME LEARNING PATTERNS

This section is designed to gather information about your general CME learning patterns.

1. Approximately how many hours a week do you spend in non-credit CME activities?

(1)☐ < 1 hr (2)☐ 1 - 5 hrs (3)☐ 6 - 10 hrs (4)☐ 11 - 15 hrs (5)☐ > 15 hrs

2. To what extent do you use the following continuing education resources to meet your learning needs?

	USE				
	N/A	No	Low	Med.	High
(1)**Computer-Based** (e.g. CD ROM)	☐	☐	☐	☐	☐
(2)**Course-Based**	☐	☐	☐	☐	☐
(3)**Print-Based** (e.g. books, peer-reviewed journals)	☐	☐	☐	☐	☐
(4)**Web-Based** (i.e. Internet)	☐	☐	☐	☐	☐
(5)**Work-Based** (e.g. clinical traineeship, Colleague consultations, learning from medical students/residents, self-assessment programs)	☐	☐	☐	☐	☐
(6)**Audio/Video** (e.g. audio tapes, video tapes, audioconference, videoconference)	☐	☐	☐	☐	☐
(7)**Conference/Workshops/Seminars** (e.g. Medical Conferences, onsite CME activities delivered by a specialist or peer)	☐	☐	☐	☐	☐

PART IV – YOUR PRESENT CME PARTICIPATION LEVEL

This section is designed to measure your level of involvement in continuing education.

1. Approximately how many CME programs have you attended 'in person' in the past 12 months?

(1) ☐ None (2) ☐ 1 - 3 (3) ☐ 4 - 6 (4) ☐ 7 - 9 (5) ☐ > 10

2. Approximately how many CME programs have you attended via the Internet in the past 12 months?

(1) ☐ None (2) ☐ 1 - 3 (3) ☐ 4 - 6 (4) ☐ 7 - 9 (5) ☐ > 10

3. Approximately how many of these CME programs were offered by pharmaceutical companies?

(1) ☐ None (2) ☐ 1 - 3 (3) ☐ 4 - 6 (4) ☐ 7 - 9 (5) ☐ > 10

4. Approximately how many of these CME programs were offered locally (i.e. within 100 km)?

(1) ☐ None (2) ☐ 1 - 3 (3) ☐ 4 - 6 (4) ☐ 7 - 9 (5) ☐ > 10

5. Approximately how many of these CME programs were not offered locally (i.e. more than 100 km)?

(1) ☐ None (2) ☐ 1 - 3 (3) ☐ 4 - 6 (4) ☐ 7 - 9 (5) ☐ > 10

6. Do you feel that you currently spend enough time on CME to keep yourself up-to-date?

(1) ☐ Yes (2) ☐ No

7. How important are the CCFP credits to your professional development and practice?

Not Important *Very Important*

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4

PART V – YOUR CURRENT CME LEARNING NEEDS

A. General.

This section is designed to gather information about your current general learning needs.

1. Please indicate your need for continuing education in the following general education areas.

		NEED			
	N/A	No	Low	Med.	High
(1)Generally keep up with medical advances	☐	☐	☐	☐	☐
(2)Improve teaching skills	☐	☐	☐	☐	☐
(3)Maintain standards of practice	☐	☐	☐	☐	☐
(4)Update clinical skills	☐	☐	☐	☐	☐

B. Clinical Skills.

This subsection is designed to gather information about your current general learning needs in the area of clinical skills..

2. Please indicate your level of need for CME in the following clinical skills areas:

		NEED			
	N/A	No	Low	Med.	High
(1)Addictions	☐	☐	☐	☐	☐
(2)Adolescent health	☐	☐	☐	☐	☐
(3)Cardiovascular Diseases	☐	☐	☐	☐	☐
(4)Clinical Immunology & Allergy	☐	☐	☐	☐	☐
(5)Critical Appraisal Skills	☐	☐	☐	☐	☐
(6)Dermatology	☐	☐	☐	☐	☐
(7)Emergency Medicine	☐	☐	☐	☐	☐
(8)Epidemiology	☐	☐	☐	☐	☐
(9)Gastroenterology	☐	☐	☐	☐	☐
(10)Geriatrics	☐	☐	☐	☐	☐
(11)Gynaecology	☐	☐	☐	☐	☐
(12)Haematology	☐	☐	☐	☐	☐
(13)Infectious Disease	☐	☐	☐	☐	☐
(14)Laboratory Medicine	☐	☐	☐	☐	☐
(15)Nephrology	☐	☐	☐	☐	☐
(16)Neurology	☐	☐	☐	☐	☐
(17)Nutrition	☐	☐	☐	☐	☐
(18)Obstetrics	☐	☐	☐	☐	☐
(19)Oncology	☐	☐	☐	☐	☐
(20)Ophthalmology	☐	☐	☐	☐	☐
(21)Orthopaedics	☐	☐	☐	☐	☐
(22)Otolaryngology	☐	☐	☐	☐	☐
(23)Pathology	☐	☐	☐	☐	☐
(24)Paediatrics	☐	☐	☐	☐	☐
(25)Pharmacology & Therapeutics	☐	☐	☐	☐	☐
(26)Physical Medicine & Rehabilitation	☐	☐	☐	☐	☐
(27)Psychiatry	☐	☐	☐	☐	☐
(28)Radiology	☐	☐	☐	☐	☐
(29)Respiratory Medicine	☐	☐	☐	☐	☐
(30)Rheumatology	☐	☐	☐	☐	☐

	NEED(cont'd)				
	N/A	No	Low	Med.	High
(31)Surgical Skills	☐	☐	☐	☐	☐
(32)Urology	☐	☐	☐	☐	☐

3. From the previous list, please choose the **top three** areas of clinical skills in which you presently require continuing education.

1. ☐
2. ☐
3. ☐

PART VI – AVAILABILITY OF CONTINUING EDUCATION PROGRAMS

This section is designed to gather information about how we can maximize the availability of continuing education programs.

1. Please rate the following as factors that have an impact on your access to continuing education:

	IMPACT				
	N/A	No	Low	Med.	High
(1)Advertisement of courses & programs	☐	☐	☐	☐	☐
(2)Effective distance education programs & support services	☐	☐	☐	☐	☐
(3)Offer credit for self-directed learning	☐	☐	☐	☐	☐
(4)Onsite child care	☐	☐	☐	☐	☐

2. What time of the week is convenient for you to attend CME programs?

	CONVENIENCE				
	N/A	No	Low	Med.	High
WORK DAY					
(1)Morning	☐	☐	☐	☐	☐
(2)Afternoon	☐	☐	☐	☐	☐
(3)Evening	☐	☐	☐	☐	☐
DAY OFF					
(4)Morning	☐	☐	☐	☐	☐
(5)Afternoon	☐	☐	☐	☐	☐
(6)Evening	☐	☐	☐	☐	☐

3. Is there a particular day of the week that works best for you to attend CME programs?

(1) ☐ Monday (2) ☐ Tuesday (3) ☐ Wednesday (4) ☐ Thursday (5) ☐ Friday (6) ☐ Saturday (7) ☐ Sunday

PART VII – METHODS OF DELIVERING CONTINUING EDUCATION PROGRAMS

This section is designed to gather information about your preferences for different methods of receiving education programs.

1. Please indicate your preference for the following methods of delivering CME:

	PREFERENCE				
	N/A	No	Low	Med.	High
(1)**Computer-Based** (e.g. CD ROM)	☐	☐	☐	☐	☐
(2)**Course-Based**	☐	☐	☐	☐	☐
(3)**Print-Based** (e.g. books, peer-reviewed journals)	☐	☐	☐	☐	☐
(4)**Web-Based** (i.e. Internet)	☐	☐	☐	☐	☐
(5)**Work-Based** (e.g. clinical traineeship, Colleague consultations, learning from medical students/residents, self-assessment programs)	☐	☐	☐	☐	☐
(6)**Audio/Video** (e.g. audio tapes, video tapes, audioconference, videoconference)	☐	☐	☐	☐	☐
(7)**Conference/Workshops/Seminars** (e.g. Medical Conferences, onsite CME activities delivered by a specialist or peer)	☐	☐	☐	☐	☐

PART VIII–ROLE(S) OF CONTINUING MEDICAL EDUCATION DEPARTMENTS

This section is designed to gather information about your expectations of CME departments.

1. Please indicate your level of agreement with the following statements about the role of CME departments:

	LEVEL OF AGREEMENT				
	N/A	No	Low	Med.	High
The role of the CME department is to:					
• (1)provide continuing education programs & services.	☐	☐	☐	☐	☐
• (2)focus its activities on curriculum development only, not delivery of education programs.	☐	☐	☐	☐	☐
• (3)lobby other education providers to develop programs that meet education needs of physicians.	☐	☐	☐	☐	☐
• (4)develop a resource centre to provide information & support materials upon request.	☐	☐	☐	☐	☐
• (5)provide medical education.	☐	☐	☐	☐	☐

PART IX – TELEHEALTH

This section is designed to gather information about your awareness and opinions on the field of telehealth.

1. Please indicate your level of agreement with the following statements about the field of telehealth:

	LEVEL OF AGREEMENT				
	N/A	No	Low	Med.	High
(1)I am aware of the clinical applications of telehealth?	☐	☐	☐	☐	☐
(2)I will use telehealth in my practice	☐	☐	☐	☐	☐
(3)Telehealth will impact consultations	☐	☐	☐	☐	☐
(4)Telehealth will "de-humanize" health care	☐	☐	☐	☐	☐
(5)Telehealth will affect my role or practice (i.e. referral patterns, scheduling, etc.)	☐	☐	☐	☐	☐
(6)I am concerned about the issues of privacy and confidentiality surrounding telehealth	☐	☐	☐	☐	☐
(7)I believe patients will feel good about using telehealth	☐	☐	☐	☐	☐

PART X – GENERAL COMMENTS

This section is designed to gather additional information about your continuing education needs and your evaluation of this questionnaire.

1. Do you have other comments on your continuing education needs that you would like to add?

2. Do you have other comments on the questionnaire itself that you would like to make?

THANK YOU FOR YOUR INPUT!

APPENDIX C – PHYSICIAN NEEDS ASSESSMENT RESULTS

Table 11. Gender Composition, Medical Training, and Certification for Participants

Characteristic	Number Of Participants
Gender	
Female	3
Male	5
Training	
Canadian	2
Foreign	6
Certification	
CCFP	4
non-CCFP	4

Table 12. Physician Age and Graduation Year

Characteristic	Mean	Mode	Range	S.D.
Age	42.9	45.5	33 - 49	6.1
Year of Graduation	1984.1	1983	1977 - 1993	6.6

Figure 9. Access to Information and Communications Technology

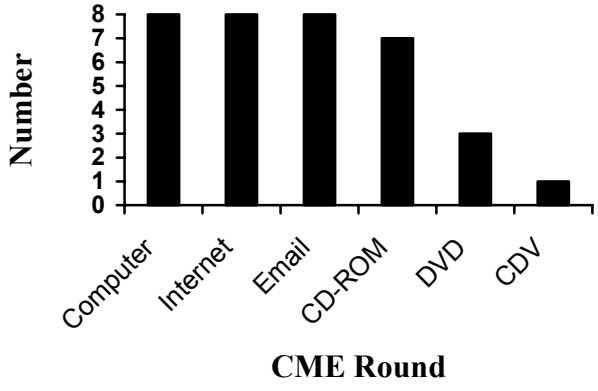


Table 13. Continuing Education Needs in ICTs

Top 5 ICT Needs	Mean (Out of 4)	SD
Computerized patient record systems	3.4	0.9
Computerized billing systems	3.2	1.3
Basic computer skills (i.e. Word processing)	3.1	1.0
Computer assisted diagnosis	3.1	0.8
Computerized drug interaction information programs	3.1	1.1
Bottom 4 ICT Needs	**Mean (Out of 4)**	**SD**
Awareness of issues related to use of information on the Internet (e.g., security, quality of information)	2.9	0.9
Library searching skills	2.6	0.5
Internet searching techniques	2.6	0.7
Understanding the purpose and use of Internet News Groups	2.3	1.1

Table 14. Time Spent on Non-credit CME Activities

Hours Per Week, n					
<1	**1 – 5**	**6 – 10**	**11 – 15**	**>15**	**Total**
0	7	1	0	0	8

Table 15. Continuing Education Resource Use

Top 4 Resources	Mean (Out of 4)	SD
Print-Based (e.g. books, peer-reviewed journals)	3.3	0.5
Work-based (e.g. clinical traineeship, Colleague consultations, learning from medical students/residents, self-assessment programs)	3.1	0.6
Conference/Workshops/Seminars (e.g. Medical Conferences, onsite CME activities delivered by a specialist or peer)	2.8	0.5
Audio/Video (e.g. audio tapes, video tapes, audioconference, videoconference)	2.6	1.0
Bottom 3 Resources	**Mean (Out of 4)**	**SD**
Course-based	2.3	0.5
Web-Based (i.e. Internet)	2.3	0.5
Computer-Based (e.g. CD ROM)	1.0	0.6

Table 16. Level of Involvement in CME Activities

Mode of Participation	CME Participation Level, n					
	<1	1 – 3	4 – 6	7 – 9	>10	Total
Number of "In-Person" CME Programs Attended during Last 12 Months	0	4	1	1	2	8
Number of CME Programs Attended via the Internet in the Last 12 Months	6	2	0	0	0	8
Number of Pharmaceutical Company Sponsored CME Programs	4	4	0	0	0	8
Number of Locally Sponsored CME Programs	3	2	1	2	0	8
Number of Attended CME Programs Not Offered Locally	1	5	1	0	0	7

Table 17. CCFP Importance

Question	Mean (Out of 5)	SD
How important are the CCFP credits to your professional development and practice?	4.1	0.8

Table 18. Ranked General Education Needs

General Education Need	Mean (Out of 4)	SD
Generally keep up with medical advances	3.1	0.6
Maintain standards of practice	3.1	0.6
Update clinical skills	3.1	0.6
Improve teaching skills	2.4	0.8

Table 19. Factors that have Impact on Continuing Education Access

Question	Mean (Out of 5)	SD
What Impact Does Advertisement of Courses & Programs Have on You Accessing Continuing Education	2.9	0.6
What Impact Does Effective Distance Education Programs & Support Services Have on You Accessing Continuing Education	3.3	1.1
What Impact Does Receiving Credit for Self-Directed Learning Have on You Accessing Continuing Education	2.9	0.9
What Impact Does Receiving Onsite Childcare Have on You Accessing Continuing Education	2.5	0.8

Table 20. Preferred Times of the Day for Attending CME Programs

Top 3 Times of the Week	Mean (Out of 4)	SD
WORKDAY Evening	3.0	0.9
DAY OFF Morning	3.0	1.1
DAY OFF Afternoon	2.9	1.0
Bottom 3 Times of the Week	**Mean (Out of 4)**	**SD**
WORKDAY Evening	2.7	0.8
DAY OFF Morning	2.4	1.3
DAY OFF Afternoon	2.0	0.6

Figure 10. Most Convenient Day of the Week for Attending CME Events

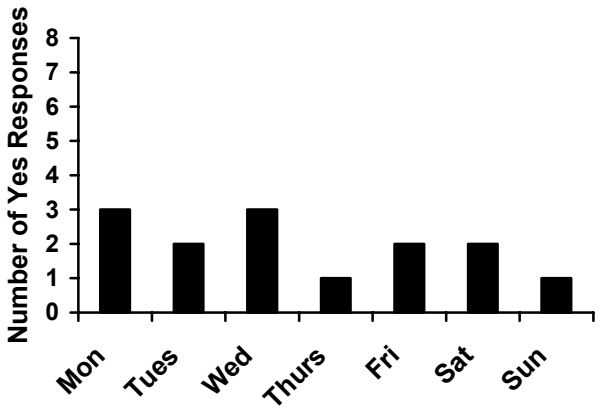


Table 21. Preferences for CME Delivery

Top 4 Delivery Preferences	Mean (Out of 4)	SD
Conference/Workshops/Seminars (e.g. Medical Conferences, onsite CME activities delivered by a specialist or peer)	3.4	0.5
Course-Based CME delivery method	3.1	0.7
Work-Based (e.g. clinical traineeship, Colleague consultations, learning from medical students/residents, self-assessment programs)	3.1	0.8
Audio/Video (e.g. audio tapes, video tapes, audioconference, **videoconference**)	3.0	0.8
Bottom 3 Delivery Preferences	**Mean (Out of 4)**	**SD**
Print-Based (e.g. books, peer-reviewed journals)	2.6	0.5
Web-Based (i.e. Internet)	2.4	0.5
Computer-Based (e.g. CD ROM)	2.3	0.7

Table 22. Role(s) of Continuing Medical Education Departments

Role of CME Department	Mean (Out of 4)	SD
Provide continuing education programs and services.	3.6	0.5
Provide medical education.	3.4	0.5
Lobby other education providers to develop programs that meet education needs of physicians.	3.1	0.4
Develop a resource centre to provide information & support materials upon request.	2.9	0.8
Focus its activities on curriculum development only, not delivery of education programs.	1.6	0.5

Table 23. Level of Agreement with the Following Statements about Telehealth

Statement	Mean (Out of 4)	SD
I am aware of the clinical applications of telehealth.	2.6	0.7
I will use telehealth in my practice	2.5	1.2
Telehealth will impact consultations	2.8	0.5
Telehealth will "de-humanize" health care	1.9	1.3
Telehealth will affect my role or practice (i.e. referral patterns, scheduling, etc.)	2.6	1.0
I am concerned about the issues of privacy and confidentiality surrounding telehealth	2.5	1.1
I believe patients will feel good about using telehealth	2.8	0.5

Written Comments

The following presents responses to the open-ended portion of the needs assessment questionnaire:

- "Difficulty with child care especially when breast feeding in the first year has really limited my ability to attend conferences and it is difficult to find out about online/videoconferencing CME events which would be much easier to do"

APPENDIX D – PHYSICIAN FOCUS GROUP TRANSCRIPTS

Vanderhoof Site Visit 12-17-2001 - Physicians' Focus Group (one facilitator, eight participants, one non-participant physician)

1. **Please describe your current clinical service delivery experience in Vanderhoof.**
   - Broad variety of clinical activities.
   - The physician group in Vanderhoof provides specialty coverage including endoscopy, laparoscopy, tendon repair, carpal tunnel, hernia, hemorrhoids, hysterectomy, C section, etc.
   - Have visiting specialists to provide specialty coverage, e.g. geriatrician every 3 months
   - Enough MDs in the community to cross cover each other so that each have time for holidays and rest
   - Not enough nursing staff for critical case management, e.g. one on one nursing for syntocinon or nitroglycerin drips
   - Not enough nursing staff leading to bed closure (drop from 21 to 15 acute beds)
   - Recent loss of visiting psychiatrist
   - Would benefit from having more specialty access, including psychiatry, geriatrics, Internal medicine, plastics, orthopedics.

2. **Regarding the network and videoconferencing equipment, in the area of clinical service delivery, what would you most like to use it for?**
   - Having Vancouver specialists providing consultation services to their patients, with Internal Medicine and dermatology as first two areas to try

- Having "hallway conference" so that Vanderhoof MDs can meet with consultants without their patients and go over cases. This would be more efficient than having the patients in the room.
- Could the current system provide acute care coverage down the road, e.g. emergency? Would be potentially useful
- Having "in patient rounds," with MDs bringing admitted patients to the VC room to consult specialists from Vancouver
- Have local person (e.g. Sue Mannering) organize consults (patient case submission)
- MDs to provide monthly consultation to Stoney Creek
- Retinal screening of patients from Stoney Creek or Vanderhoof would be very useful

3. Please describe your experiences with CME while in Vanderhoof

- Usually have CME rounds on Tuesday at noon, organized by [one of the local physicians]. These rounds may be presentations, or may be a group session to mutually share clinical cases
- MDs do teach medical residents from UBC and provide mentorship to them
- Providing patient and community oriented education (especially in these types of diseases with poor patient compliance in seeing their doctors) with the nurse (Stoney Creek):
    - Hypertension
    - Diabetes
    - Pregnant patients
    - Long term care

4. **Which CME topics are of greatest interest to you as a group?**

   - Case based, interactive discussion format the best
   - Ideal if MDs can bring their own patients into CME round to ask questions
   - Ideal to have expert speakers that know or appreciate rural perspectives
   - Potential topics:
     - Review of common radiological pitfalls
     - Atrial fibrillation: management controversies
     - What's new in ACLS
     - Management of difficult or refractory depression
     - Cardiology "free-for-all" where the audience brings in questions for the expert facilitator
   - Monday, 8:00 to 9:00 am each month from February to May, 2002

5. **Additional thoughts**

   - Be careful that specialty service consultations do not lead to the local retention of higher acuity patients and the corresponding increasing workload
   - The telehealth system has to be helpful to physicians in decreasing their workload or increasing their work pleasure/gain. Otherwise, this system will not be used.
   - Pay specialists sessional fees (e.g. $300 per 2 hour session).
   - Pay MDs for attending the consultation session (e.g. $27 consultation fee).

Vanderhoof Site Visit 09-30-2002 - Physicians' Focus Group (one facilitator, one presenter, five participants, fourteen invited guests)

1. **Regarding the network and videoconference equipment, in the area of clinical service delivery, how will you use it in the future?**

   ⇒ Must be easy to use, accessible, and some guarantee that it will be sustainable

   ⇒ Does it make our job easier? No loss of money to the community?

   ⇒ Will any cost savings go back to the community?

   ⇒ Clinical service delivery (e.g. teledermatology, teleradiology)

2. **Please describe your experiences with CME (CNE) delivered via videoconference during the project.**

   ⇒ Nice to experience CME together as a group

3. **Which CME topics delivered to you during the project were of greatest interest to you as a group?**

   ⇒ Liked the procedural nature of the shoulder injection round *(immediate response)*

   ⇒ Liked the case-based nature of some of the rounds

   - Diabetes: peer to peer discussions
   - Depression: case discussion, not didactic

   ⇒ Liked the specialist perspective and interpretation of changes at the ACLS round

4. **Do you want this link to continue? Why or why not?**

   ⇒ More CME is good

   ⇒ Would like to use a Takla Landing link

5. **What changes would you like to see if the service is preserved?**

   ⇒ Link to the grand rounds from UBC as they have a good range of choices

   ⇒ Had scheduling problems and would like a more flexible delivery time

APPENDIX E – CME FEEDBACK SURVEY

The University of British Columbia
Division of Continuing Medical Education
Faculty of Medicine

Feedback Form
Clinical Service Delivery

Session Title: _____

Presenter(s): _____

Date: _____

Part One: Feedback on the Presentation

Please rate the following criteria:

Criteria	Poor	Fair	Good	Excel.	N/A
1. Stated objectives clearly	1	2	3	4	5
2. Related presentation material to a clinical case or clinical problem	1	2	3	4	5
3. Presented current clinical and/or basic research results	1	2	3	4	5
4. Highlighted key points or "take home" message	1	2	3	4	5
5. Stimulated questions, responses and discussion	1	2	3	4	5
6. Use of audiovisual aids	1	2	3	4	5
7. Speaking and presentation skills	1	2	3	4	5
8. Overall, how would you rate this presentation?	1	2	3	4	5

9. Please write your comments and suggestions for improvement or other feedback in the space provided:

Please complete the other side

The University of British Columbia
Division of Continuing Medical Education
Faculty of Medicine

Part Two: Feedback on your Learning

Please rate the following statements by circling the appropriate answer:

	Disagree strongly				**Agree strongly**
1. I learned *new* information on the topic.	**1**	**2**	**3**	**4**	**5**
2. I was already familiar with most of the content presented.	**1**	**2**	**3**	**4**	**5**
3. Interaction and discussion facilitated my learning.	**1**	**2**	**3**	**4**	**5**
4. The presenter's feedback on scenarios was helpful.	**1**	**2**	**3**	**4**	**5**
5. I am confident that I will be able to change my behaviour as a result of this session.	**1**	**2**	**3**	**4**	**5**
6. I will be able to use what I have learned in my day-to-day life.	**1**	**2**	**3**	**4**	**5**
7. The videoconferencing technology provided the *best* way of delivering the material.	**1**	**2**	**3**	**4**	**5**

8. Please describe any barriers to applying what you have learned to your day-to-day living.

9. What did you like *and* what did you dislike about the use of videoconferencing to deliver this topic?

Likes	***Dislikes***

Additional Comments:

Thank you for your responses.

APPENDIX F – CME FEEDBACK SURVEY RESULTS

Table 24. Feedback on the Presentations

Item	Mean (Out of 4)	SD	Mean Score Range
1. Stated Objectives Clearly	3.8	0.1	3.6 – 4.0
2. Related Presentation Material to a Clinical Case or Clinical Problem	3.8	0.3	3.3 – 4.0
3. Presented Current Clinical and/or Basic Research Results	3.7	0.4	3.4 – 4.0
4. Highlighted Key Points or "Take Home" Message	3.7	0.3	3.3 – 4.0
5. Simulated Questions, Responses and Discussion	3.7	0.1	3.5 – 3.8
6. Use of Audiovisual Aids	3.6	0.6	2.7 – 4.0
7. Speaking and Presentation Skills	4.0	0.1	3.7 – 4.0
8. Overall, How Would Your Rate this Presentation?	3.9	0.2	3.7 – 4.0

Physician Comments

Presentation Comments:

Round Number (# of returned forms)	Comment
1 (*n=3*)	A1.Very helpful talk/ A2.More interactive discussion/time for discussion would be helpful/ A3.Very useful
2 (*n=6*)	B1.Excellent talk! Follow up talks on more advanced applications as they develop would be great!/ B2.Good presentation/ B3.Thanks/ B5.Enjoyable; fascinating! Had little idea of how much can be done on these magic machines!
3 (*n=6*)	C3.Excellent talk!/ C4.Need to add discussion/presentation on: - drug dosage; - electrical conversion/ C5.Because I use this knowledge infrequently and am a little cautious with regards to _____cardiac dysrythmias, I would like to have had a slightly more specific discussion about maximum doses of drugs that can be used./ C6.Always find Dr. _____ excellent to listen to

4	(*n=6*)	D1.Very practical & useful session/ D2.Would be helpful to know ahead of time that it is a question/answer session rather than a lecture./D5.Very useful format/ D6.More useful because it allowed for the GPs to ask questions regarding actual patient care that have caused us difficulty.
5	(*n=5*)	E2.Excellent & very practical. Thank you./ E3.Very useful talk./ E4.Very good.
6	(*n=5*)	F1.Excellent talk/ F3.Enjoyable and interesting presentation. Many thanks./ F5.Very useful topic; good handout

Table 25. Feedback on Learning from the Presentations

Item	Mean (Out of 5)	SD	Mean Score Range
1. I Learned a New Way of Approaching a Task or Problem	3.7	0.3	3.3 – 4.0
2. I was Already Familiar with most of the Content Presented	2.6	0.6	1.7 – 3.4
3. Interaction and Discussion Facilitated my Learning	3.9	0.3	3.5 – 4.3
4. The Presenter's Feedback on Scenarios was Helpful	3.9	0.2	3.7 – 4.2
5. I am confident that I will be able to perform the skills when needed	3.4	0.4	3.0 – 3.8
6. I will be able to apply what I have learned in my own practice or context.	3.7	0.3	3.3 – 4.2
7. The videoconferencing technology provided the best way of delivering the material.	3.9	0.3	3.6 – 4.4

Physician Comments

Barriers to Applying What You've Learned:

Round Number (# of returned forms)	Comment
1 (*n=3*)	A3.The lack of constant exposure to these problems will always be the main problem

2	(*n=6*)	B1.Finding time to experiment with features of Palm Pilot/ B2.Would have to be quite speedy with the handheld in order to use it with confidence in the presence of the patient/ B5.Need to get more familiar with operating the PP. / B6.Not enough time
3	(*n=6*)	C3.We don't see a fib. often in emergency
4	(*n=6*)	*no responses*
5	(*n=5*)	E1.No C-T available/ E5.Lack of local resources
6	(*n=5*)	F1.Numbers of patients in my practice with resistant depression not high; therefore experience more limited/ F2.n/a

Likes About The Use Of Videoconferencing To Receive CME Round:

Round Number (# of returned forms)		Comment
1	(*n=3*)	A1.Very good presenter/ A2.Good presentation/ A3.Useful
2	(*n=6*)	B1.Easy, cost & time saving/ B2.Good practical demonstration/ B3.Interactive, personable, convenient/ B5.Interaction; holds ones attention better than teleconferencing/ B6.Didn't have to leave my community
3	(*n=6*)	C3.Convenience; good interaction/ C5.Being able to enjoy an excellent CME with Dr. Huckell, then 15 minutes later be getting on with my usual work day.
4	(*n=6*)	D1.convenient; interactive/ D6.Was feeding my child at 0715; V-conferencing with a specialist in Vancouver at 0815; and doing rounds of my in-patients in Vanderhoof at 0915 --- Great!!
5	(*n=5*)	E1.Quick, minimal disruption of work day/ E3.Interactive
6	(*n=5*)	F1.convenience; ability to have input on topics; better discussion than at big conferences/ F2.Real-time interaction/ F4.Interactive/ F5.Interactive

Dislikes About The Use Of Videoconferencing To Receive CME Round:

Round Number (# of returned forms)		Comment
1	(*n=3*)	A3.no real dislikes
2	(*n=6*)	B5.Clarity of picture/sound not always perfect
3	(*n=6*)	C4.Poor focus on the screen at this end, therefore couldn't read the text
4	(*n=6*)	*no response*
5	(*n=5*)	*no response*
6	(*n=5*)	E5.Occasional distortion of sound & picture.

Additional Comments:

Round Number (# of returned forms)		Comment
1	(*n=3*)	A3. none
2	(*n=6*)	B3.Excellent
3	(*n=6*)	C6.The _____ algorithums were not readable on the computer generated screen. Fine detail doesn't transmit well from the laptop. The overhead _____ is significantly better.
4	(*n=6*)	*no response*
5	(*n=5*)	E5.Excellent talk
6	(*n=5*)	*no response*

APPENDIX G – CME POST-FEEDBACK SURVEY

The University of British Columbia
Division of Continuing Medical Education
Faculty of Medicine

Your Name: _____ **e-mail:** _____
(PLEASE PRINT)

Post-feedback Form
CME Rounds (RHVNL Project)

Rounds Title: *CME Credits = 1*
Presenter(s):
Date of Presentation:

Feedback on your Learning

Please rate the following statements by circling the appropriate answer:

	N/A	Disagree strongly				Agree strongly
1. I was already familiar with most of the content presented.	0	1	2	3	4	5
2a. I learned a *new* way of approaching _____. **(1=no; 5=yes)**		1				5
2b. I've had the opportunity to perform this new skill. **(1=no; 5=yes)**		1				5
2c. I was able to successfully perform this skill. **(1=no; 5=yes)**		1				5
2d. My level of comfort in performing this skill is high.	0	1	2	3	4	5
3. My attitude towards _____ has changed.	0	1	2	3	4	5
4. Interaction and discussion facilitated my learning.	0	1	2	3	4	5
5. Dr. _____ was an *effective* instructor.	0	1	2	3	4	5
6. The videoconferencing technology was an *effective* way of delivering the material.	0	1	2	3	4	5

7. If applicable, please describe any barriers to applying what you have learned in your own practice/context.

8. What did you like *and* what did you dislike about the use of videoconferencing to deliver the CME round?

Likes	***Dislikes***

9. Additional Comments:

Thank you for your responses.

APPENDIX H – CME POST-FEEDBACK SURVEY RESULTS

Table 26. Post-Feedback on Learning from the Presentations

Item	Yes	No	NR
1. I learned a New Way of Approaching a Task or Problem.	11	0	5
2. I've had the opportunity to use this knowledge/skill.	6	5	5
3. This knowledge assisted me in managing the problem.	7	4	5

Table 27. Post-Feedback on Learning from the Presentations

Item	Mean (Out of 5)	SD	Mean Score Range
1. I was Already Familiar with most of the Content Presented	2.7	0.5	2.0 – 3.3
2. My level of comfort with the content or in performing the skill is high	3.1	0.7	2.3 – 4.0
3. My attitude towards the medical condition management or new skill has changed.	3.5	0.4	3.0 – 4.0
4. Interaction and Discussion Facilitated my Learning	4.1	0.3	3.5 – 4.3
5. The presenter was an effective instructor	4.3	0.2	4.0 – 4.7
6. The videoconferencing technology was an effective way of delivering the material.	4.0	0.4	3.3 – 4.3

Physician Comments

Barriers to Applying What You've Learned:

Round Number (# of returned forms)		Comment
1	(*n=3*)	A2. Low number of ACLS protocols ___ in the local ER
2	(*n=6*)	B3. Need more guidance in use for anything but the basics. (must be a slow learner!)./B4. Lack of expertise in configuring the desktop PC.
3	(*n=6*)	C4. I haven't seen anyone wit Afib recently.
4	(*n=6*)	*no response*
5	(*n=5*)	*no response*
6	(*n=5*)	*no response*

Likes About The Use Of Videoconferencing To Receive CME Round:

Round Number (# of returned forms)		Comment
1	(*n=3*)	A1. PowerPoint slides very useful./A2. Convenient
2	(*n=6*)	B1. Convenience./B2. Direct interaction./B4. Not having to leave Vanderhoof.
3	(*n=6*)	C4. Ease; interactive.
4	(*n=6*)	D1.Very interactive session - useful in terms of clarifying issues quickly./D3.ease/timing; interactive
5	(*n=5*)	*no response*
6	(*n=5*)	F1. Allowed for interactive discussions that directly related to problems experienced in my rural practice.

Dislikes About The Use Of Videoconferencing To Receive CME Round:

Round Number (# of returned forms)	Comment
1 (*n=3*)	*no response*
2 (*n=6*)	*no response*
3 (*n=6*)	*no response*
4 (*n=6*)	D3.Difficult sometimes to remember key points.
5 (*n=5*)	E1. some difficulty seeing the X-rays well./E2. poor XR image transmission.
6 (*n=5*)	*no response*

Additional Comments:

Round Number (# of returned forms)	Comment
All	*no response*

APPENDIX I – PROJECT EVALUATION

The University of British Columbia
Division of Continuing Medical Education
Faculty of Medicine

Project Evaluation Survey – CME Component

Part One: General

Please rate the following statements by circling the appropriate answer:

Statement	N/A	Disagree strongly	Disagree	Neutral	Agree	Agree strongly
1. The subject matter of the six CME sessions reflected my educational needs.	0	1	2	3	4	5
2. I became more relaxed with the videoconference technology during the project.	0	1	2	3	4	5
3. I have changed my perceptions of the videoconference technology during the project.	0	1	2	3	4	5
4. Patient care improved because of this project.	0	1	2	3	4	5
5. The network used to deliver the six CME videoconferences was reliable.	0	1	2	3	4	5
6. I would like to continue attending CME rounds using the videoconference medium.	0	1	2	3	4	5

Part Two: Clinical Practice Impact

Please rate the following statements by circling the appropriate response:

Statement	N/A	Disagree strongly	Disagree	Neutral	Agree	Agree strongly
7. I have changed my workplace practice because of one or more CME Rounds delivered via videoconference.	0	1	2	3	4	5
8. I've noticed a change in my **colleagues'** clinical practice as a result of the videoconferences	0	1	2	3	4	5
9. Of the six CME rounds, what level of impact did the ***What's New in ACLS?*** session have in changing my workplace practice.	0	1	2	3	4	5
10. Of the six CME rounds, what level of impact did the ***PalmPilot Applications in Medicine*** session have in changing my workplace practice?	0	1	2	3	4	5
11. Of the six CME rounds, what level of impact did the ***Atrial Fibrillation: Management Controversies*** session have in changing my workplace practice?	0	1	2	3	4	5

****Please complete the next page → → →*

cont'd

Statement	N/A	Disagree strongly	Disagree	Neutral	Agree	Agree strongly
12. Of the six CME rounds, what level of impact did the ***Diabetes: An Informal Discussion of Northern Issues*** session have in changing my workplace practice?	**0**	**1**	**2**	**3**	**4**	**5**
13. Of the six CME rounds, what level of impact did the ***C-Spine Imaging For Emergency Physicians*** session have in changing my workplace practice?	**0**	**1**	**2**	**3**	**4**	**5**
14. Of the six CME rounds, what level of impact did the ***Resistant and Chronic Depression Management: A Case-Based Round*** session have in changing my workplace practice?	**0**	**1**	**2**	**3**	**4**	**5**

Part Three: CME Delivery Preferences

Please indicate your preference for the following methods of delivering CME

Method	N/A	No	Low	Med.	High
15. **Computer-Based** (e.g. CD ROM)	0	1	2	3	4
16. **Course-Based**	0	1	2	3	4
17. **Print-Based** (e.g. books, peer-reviewed journals)	0	1	2	3	4
18. **Web-Based** (i.e. Internet)	0	1	2	3	4
19. **Work-Based** (e.g. clinical traineeship, Colleague consultations, learning from medical students/residents, self-assessment programs)	0	1	2	3	4
20. **Audio/Video** (e.g. audio tapes, video tapes, audioconference, videoconference)	0	1	2	3	4
21. **Conference/Workshops/Seminars** (e.g. Medical Conferences, onsite CME activities delivered by a specialist or peer)	0	1	2	3	4

Part Four: Telehealth

Please indicate your level of agreement with the following statements about the field of telehealth

Statement	N/A	No	Low	Med.	High
22. I am aware of the clinical applications of telehealth?	0	1	2	3	4
23. I will use telehealth in my practice	0	1	2	3	4

****Please complete the next page → → →*

cont'd

Statement	N/A	No	Low	Med.	High
24. Telehealth will impact consultations	0	1	2	3	4
25. Telehealth will "de-humanize" health care	0	1	2	3	4
26. Telehealth will affect my role or practice (i.e. referral patterns, scheduling, etc.)	0	1	2	3	4
27. I am concerned about the issues of privacy and confidentiality surrounding telehealth	0	1	2	3	4
28. I believe patients will feel good about using telehealth	0	1	2	3	4

Part Five: Optimal Use of Videoconferencing

Please list learning situations where the following instructional strategies would be appropriate for the **videoconference medium**:

INSTRUCTIONAL STRATEGY	LEARNING SITUATION (use back of sheet if needed)
29. PowerPoint Presentation (Didactic)	
30. Case-based	
31. Unstructured free-for-all	
32. BYOC (Bring your own case)	
33. Consultation	
34. BYOP (Bring your own patient)	

Please list appropriate instructional strategies for the **videoconference medium** in the following learning scenarios:

INSTRUCTIONAL STRATEGY	LEARNING SITUATION
35.	• Latest treatment modalities in heart attack
36.	• A new drug that you just become aware that has good literature evidence of reduction in morbidity and mortality
37.	• Hospital introducing this new drug to your hospital, recommends that you use it
38.	• You have used the drug once or twice with patients and have questions about it

39. Please write additional comments and/or suggestions in the box below:

Thank you for participating in the project!

APPENDIX J – PROJECT EVALUATION RESULTS

Table 28. General Project Impressions

Item	Mean (Out of 5)	SD
1. The subject matter of the six CME sessions reflected my educational needs.	4.4	0.5
2. I became more relaxed with the videoconference technology during the project.	4.4	0.9
3. I have changed my perceptions of the videoconference technology during the project.	4.0	0.7
4. Patient care improved because of this project.	4.2	0.8
5. The network used to deliver the six CME videoconferences was reliable.	3.8	0.8
6. I would like to continue attending CME rounds using the videoconference medium.	4.0	0.7
7. I have changed my workplace practice because of one or more CME Rounds delivered via videoconference.	4.2	0.4
8. I have noticed a change in my colleagues' clinical practice as a result of the videoconferences	3.6	0.9

Table 29. CME Round Impact on Clinical Services Delivery

Question	Mean (Out of 5)	SD
Impact level of the "Diabetes: An Informal Discussion of Northern Issues" session on changing workplace practice?	4.3	0.5
Impact level of the "Resistant and Chronic Depression Management: A Case-Based Round" session on changing workplace practice?	4.2	0.4
Impact level of the "Atrial Fibrillation: Management Controversies" session have on changing workplace practice?	4.0	0.0
Impact level of the "C-Spine Imaging For Emergency Physicians" session have on changing workplace practice?	4.0	0.0
Impact level of the "Palm Pilot: Applications in Medicine" session have on changing workplace practice?	4.0	1.2
Impact level of the "What's New in ACLS?" session have on changing workplace practice.	3.7	0.6

Physician Comments

Comments
G1.This system needs to be supported in the long term to be used. i.e. needs to be reliable

APPENDIX K – PROJECT WEBSITE

Figure 11. Project Website.

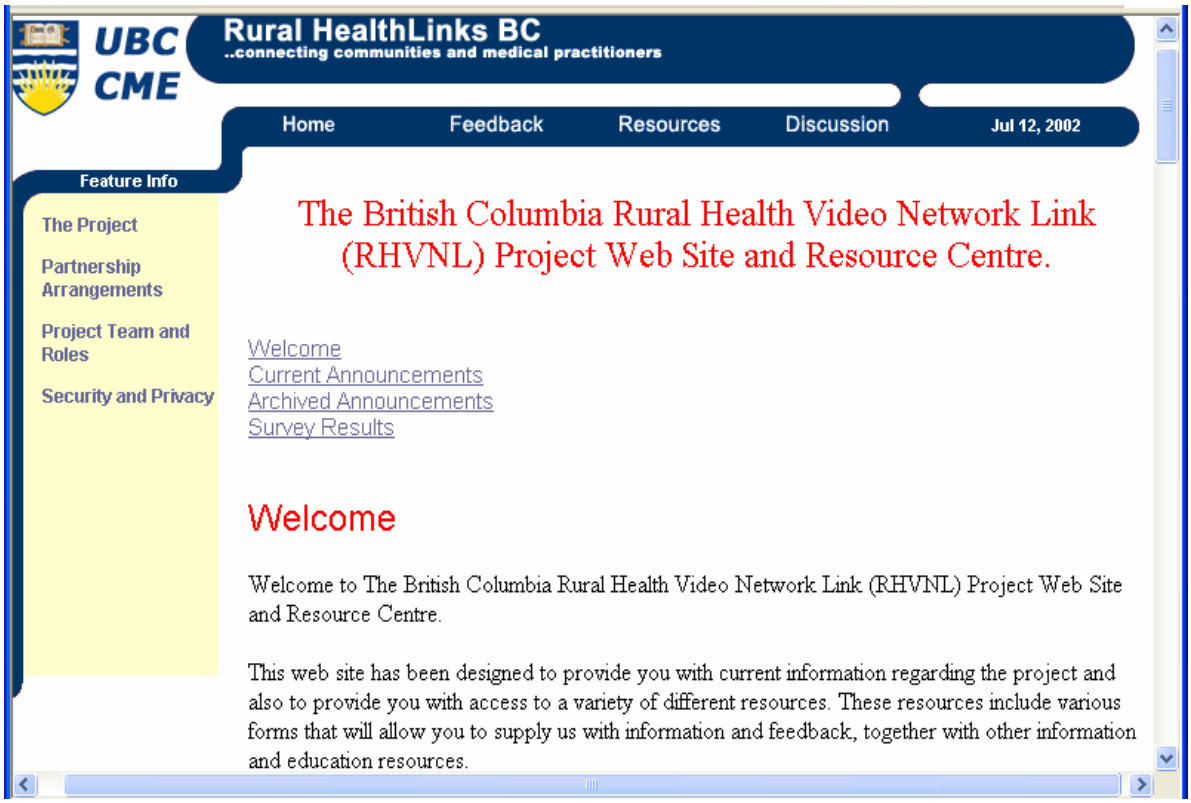
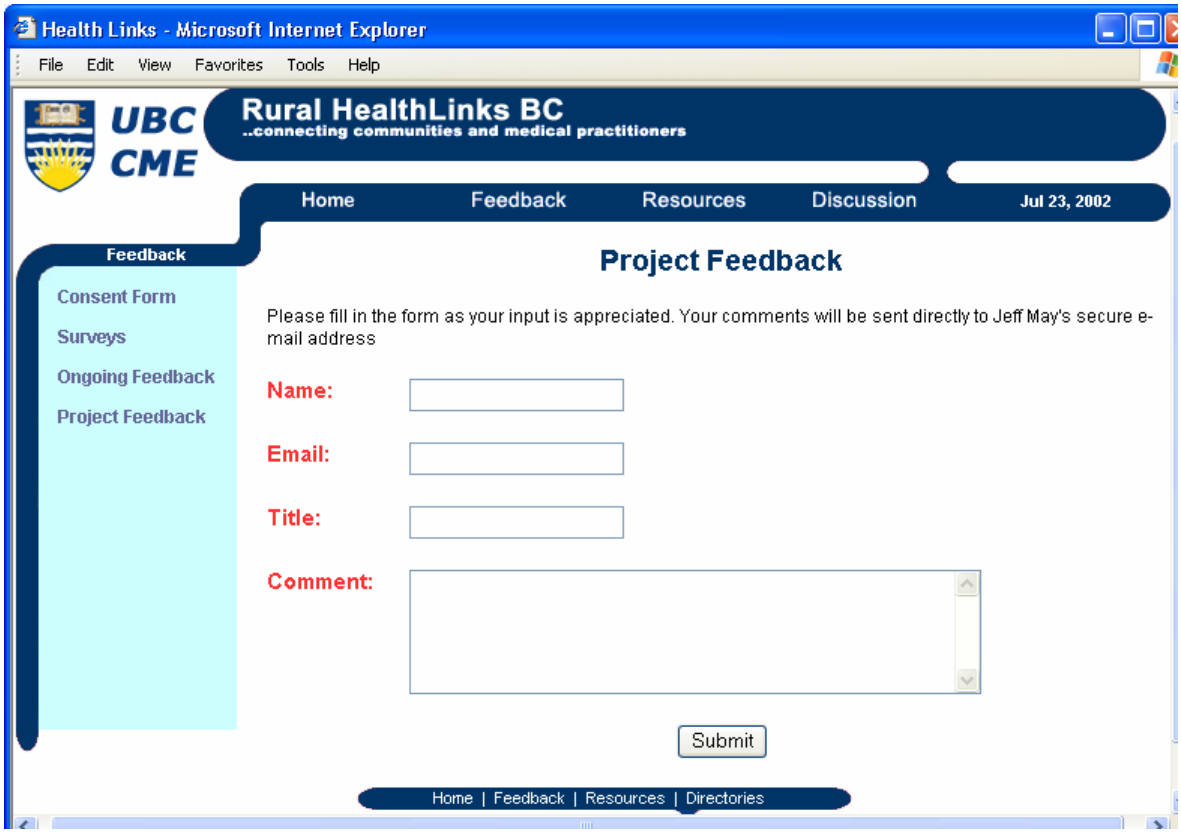


Figure 12. Online feedback.



APPENDIX L – "BEST PRACTICES" IN VC CME DELIVERY

The following may help medical educators plan, deliver, and evaluate effective videoconference sessions.

1. PRE-SESSION ACTIVITIES

A. Facilitator (local site)

⇒ Advertise videoconference round

⇒ Book videoconference room

⇒ Arrive 30 minutes early

⇒ Bring refreshments for presenter(s)

⇒ Have phone numbers for local videoconference room, remote videoconference room, videoconference equipment technician

⇒ Call if running late

⇒ Ensure camera presets are correct

⇒ Prepare a document with the session title, date, and "Please MUTE your audio"

⇒ Check audio/visual equipment for power, focus, and cueing up

⇒ Put the system into a "loop" call so you can see what the participants will see

⇒ Decide, in advance, who will initiate the call

⇒ Dial in 5 to 10 minutes early and touch base with your co-facilitator

⇒ Mute the microphone

⇒ Have the main camera focus on the presenter and any other guests setting up to give the audience a chance to connect with the local site before the conference begins

B. Co-Facilitator (remote site(s))

⇒ Advertise videoconference round

⇒ Book videoconference room

⇒ Arrive 15 – 30 minutes early

⇒ Have a seating plan arranged prior to round and fax it to the specialist presenter

⇒ Distribute any handouts to the participants before the session

⇒ Prepare questionnaires for distribution immediately following the session

⇒ Bring refreshments for participants

⇒ Place the microphone near the most people

C. Presenter

⇒ Contact facilitator to find out specifics about the participants (e.g. age, gender, number, medical background on the topic, degree of interest) and videoconference location

⇒ Follow instructional design principles specifically related to the videoconference medium

⇒ Remember that it takes approximately 10% longer to deliver content via videoconference compared to a face-to-face presentation

⇒ Design half the session for formal presentation and half for unstructured questions and discussion, as this will increase interactivity. Remember, a one-way presentation is cheaper to videotape than deliver via videoconference

⇒ A case-based round that the participants have some experience with is the most requested by rural physicians

⇒ If you have overheads for use on the document camera make sure you produce them with the following in mind:

- ✓ **Bold** type face with greater than **30 pt Arial** and no italics
- ✓ Headings in 60 pt Arial
- ✓ landscape page orientation
- ✓ at least a 5 cm border
- ✓ pastel coloured paper (transmits a clearer picture)
- ✓ malt paper only (no glossy paper)
- ✓ paper NOT transparencies

⇒ PC Presentations (e.g. PowerPoint):

- ✓ ask yourself these questions: "Do I really need that many PowerPoint slides?"; "Can I avoid using PowerPoint altogether?"
- ✓ use very few slides or none at all
- ✓ you could print out the slides in black-and-white view and use the document camera. This works better (i.e. increases interactivity) than transmitting the PowerPoint.

If you must use the PowerPoint Presentation, remember:

- ✓ black text on a white background or white text on a blue background work best (stay away from red)
- ✓ keep it simple (no more than five bullets per slide)
- ✓ avoid fly-ons, fades, etc.
- ✓ use document camera for charts

⇒ When planning, provide time throughout the session for learner involvement (e.g. read, write, discuss, undertake, report)

⇒ Remember to send up enough copies of your handouts prior to the presentation)

⇒ Rehearse your presentation in the videoconference room with the test configuration on

⇒ Dress:

- ✓ in a medium – dark colour
- ✓ choose solid over pattern, not white
- ✓ wear non-reflective jewelry

⇒ Arrive 15 minutes early

D. <u>Participant</u>

⇒ Read any handouts prior to event

⇒ Prepare to participate by thinking of relevant cases and any specific challenges they present

⇒ Arrive 5 – 10 minutes early

2. SESSION DELIVERY

A. Facilitator (local site)

⇒ Introductions

- ✓ introduce yourself
- ✓ check to see if the volume is good
- ✓ welcome participants
- ✓ ask permission to videotape the session for your library
- ✓ establish meeting etiquette
- ✓ set session time and agenda
- ✓ initiate "round table" introductions (zoom in on each participant as they introduce themselves {e.g. name, department, job, comfort level with the topic, etc.})
- ✓ introduce specialist/speakers
- ✓ guide meeting

⇒ Remind participants to minimize eating, drinking, paper shuffling noise

⇒ Ensure the session finishes on time

B. Co-Facilitator (remote site(s))

⇒ Handle the remote control

⇒ facilitate "round table" introductions (zoom in on each participant as they introduce themselves {e.g. name, department, job, comfort level with the topic, etc.})

⇒ Intervene as necessary to give a local perspective

⇒ Let presenter know if he/she cannot be heard or if a slide is unreadable

⇒ Tell the onsite facilitator if the audio or video is breaking up

⇒ Facilitate break-out sessions and exercises

C. Presenter

⇒ Use thick pen if handwriting

⇒ Use main camera when changing overheads on document camera

⇒ Use highlighter pen during presentations to add emphasis

⇒ Avoid too much arm movement

⇒ Use videotape no more than 2 to 3 minutes followed by discussion

⇒ Minimize Transactional Distance (i.e. increase dialogue; increase learner autonomy by having an open, free-flowing discussion with NO prepared material – participants ask questions based on their experience and the specialist answers)

⇒ Maximize interactivity (e.g. higher order thinking questions, group work, etc.)

⇒ Look at the camera while speaking, not at the other people in your room

⇒ Say what you are going to say; say it; then say what you said

⇒ Invite participants to talk as soon as possible

⇒ Prepare, suggest, prompt, and invite questions

⇒ Direct questions to one participant

⇒ Allow time for thought and response

⇒ If long pause, rephrase or redirect

⇒ Encourage disagreement

⇒ Remember to have a longer pause after asking questions

⇒ Variety:

- ✓ mix PowerPoint presentations with document camera, presenter-on-camera, audience view, etc.
- ✓ alter tone of voice
- ✓ ask higher order thinking questions (HOT) (e.g. "Here is the situation, how would you proceed?")
- ✓ let participants work in small groups on a problem for a few minutes

⇒ Troubleshooting:

- ✓ If you hear an echo of your own voice ~ a half a second after speaking, ask remote site to turn down their audio
- ✓ Be aware of the ¼ second delay and limit "over talking" each other
- ✓ Speak clearly

D. Participant

⇒ Participate, participate, and participate!

3. POST-SESSION ACTIVITIES

A. Facilitator (local site)

⇒ Thank all speakers, participants, co-facilitator(s), and local audience (if any)

⇒ Encourage participants to complete evaluation forms

B. Co-Facilitator (remote site(s))

⇒ Thanks the presenter for the session

⇒ Distributes the evaluation surveys to participants

⇒ Collects the forms as participants leave

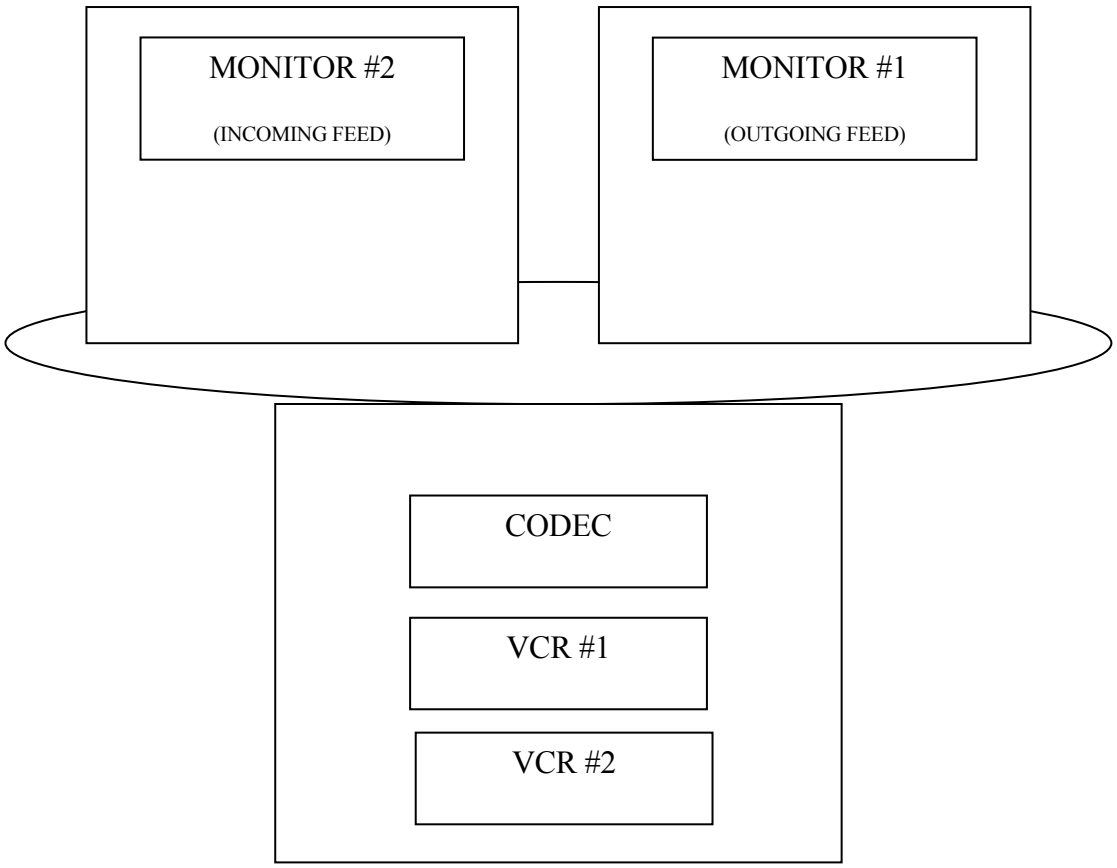
C. Presenter

⇒ Fills out presenter survey

D. Participants

⇒ Complete and return session evaluation forms before leaving

4. VIDEOCONFERENCE EQUIPMENT CONFIGURATION



VCR #1 tapes Monitor #1 (Outgoing Feed)

VCR #2 tapes Monitor #2 (Incoming Feed)

APPENDIX M – ETHICS APPROVAL

The University of British Columbia
Office of Research Services and Administration
Behavioural Research Ethics Board

Certificate of Approval

PRINCIPAL INVESTIGATOR	DEPARTMENT	NUMBER
Ho, K.	Surgery	**B01-0387**

INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT
UBC Campus ,

CO-INVESTIGATORS:
May, Jeffrey,

SPONSORING AGENCIES

TITLE:
BC Rural Health Video Network Link

APPROVAL DATE	TERM (YEARS)	DOCUMENTS INCLUDED IN THIS APPROVAL:
DEC 2 0 2001	1	29 November 2001, consent form

CERTIFICATION:

The protocol describing the above-named project has been reviewed by the Committee and the experimental procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval of the Behavioural Research Ethics Board by one of:
Dr. Paul Hewitt, Chair
Dr. K.D. Srivastava, Director Pro Tem, Research Services

This Certificate of Approval is valid for the above term provided there is no change in the experimental procedures

APPENDIX N – TELEHEALTH TO SCHOOLS

C.S. JOHNSTON INC.

Dr. C.S. Johnston Inc.
Omineca Clinic, RR#2
Vanderhoof
BC, V0J 3A0
Canada
09.07.01

Mabel Louie
Director
Carrier Sekani Health Services
Matzhold Building
Vanderhoof

Dear Mabel,

RE : VIDEO-CONFERENCE LINK TO STONEY CREEK – PREVENTATIVE HEALTH CARE

Thank you for the discussion on the 21st June about the above issue.
As discussed, there is a need to support the primary aim of the Carrier Sekani health services to provide preventative health care education and information to the communities under its care.

It is felt that the long-term improvement of the measures of good health in these communities is more likely to result from this approach than the simple provision of acute medical care.

The focus of this education can be broadly split into two groups, the adult population and the school-going children.

Programs that would be useful at the adult level would be:

- FAS/FAE
- Early childhood intervention
- Healthy lifestyles (exercise, diet and weight control)
- Diabetes
- Cardiovascular risk factors
- Smoking cessation

Programs that would be useful at the Schools would be:

- HIV
- FAS
- Nutrition
- Alcoholism
- Smoking
- Pregnancy

You suggested that I should approach Jan to find out what the Nurses within the communities see as useful programs, and also to ask the Band for their input. In addition I understand that Jan has a 'Nurse Review' which covers important health issues identified in the communities.

We also discussed the fact that Takla Landing would benefit more from this Video-link proposal than any of the other communities by virtue of it's very remote location. As mentioned, Dr. Kendall Ho has submitted a proposal to the Federal government for funding to look at ways of linking Takla into the project if possible. I will ask Dr. Ho to fax you a copy of this proposal

Regards,

Dr. C. Stuart Johnston