

Evaluation of The Electronic Rural Medicine Strategy (TERMS)

Final Report

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- University of Ottawa, Faculty of Medicine, Continuing Medical Education
- Memorial University of Newfoundland, Faculty of Medicine, Continuing Medical Education

Partners

- Alberta Rural Physician Action Plan
- Department of Health and Community Services, Government of Newfoundland and Labrador
- Federation of Canadian Municipalities
- Newfoundland and Labrador Federation of Municipalities
- Newfoundland and Labrador Medical Association
- Newfoundland Medical Board
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Introduction

The Rationale: The Need for Web-based CME

The provision of an equitable and sustainable level of health care in rural communities has been a challenge to the Canadian health care system for some time (Tepper & Rourke, 1999; Rourke, 1997; Hutten-Czapski, 1998). Rural communities have suffered from a shortage of primary care physicians for many years and have felt the chronic shortage longer and more severely than urban areas (Ramsey, Coombs, Hunt, Marshall & Wenrich, 2001). It has been argued that one of the main challenges to a sustainable rural health care system is the ongoing maldistribution of physicians (Rourke, 1997). Some rural hospitals have been at risk of closing because of a lack of physicians, while others have experienced a drastic decrease in the level of health care they can provide (Rourke 1998; Rourke & Rourke, 1998).

In Canada, there is an unbalanced distribution of physicians between urban and rural communities. While 30.3% of Canada's population lives in communities of under 10,000, only 16.5% of Canada's family physicians practice in these rural communities (Rourke, 1996). According to Hutten-Czapski (1998), there has been as much as a fourfold difference in physician-to-patient ratios between urban (1:193) and rural centres (1:797) in Canada. Unless current trends change, it has been estimated that by 2021 there will be 18.0% fewer rural doctors for the rural population than there are now (Rourke & Strasser, 1996). This apparent "underservicing" has prompted many initiatives to improve the education, recruitment, and retention of rural physicians and has become a priority of rural communities, medical schools, medical associations and governments.

There are many obstacles with regard to recruiting and sustaining an adequate supply of rural health care practitioners. Common deterrents include lack of time for family and leisure, lack of work and educational opportunities for family members, professional isolation, lack of professional development opportunities, low salaries, poor locum support, underfunded hospital services and over-scheduling (Rourke, 1993; Rourke, 1994). Each rural setting has its own special challenges. In the smallest, most remote communities, help is a long time and distance away. This places immense strain on limited local resources and on the physician, particularly when emergencies occur. In larger rural communities with a small hospital there are different stresses. The rural doctor usually has a practice that includes house calls, nursing home visits and even extensive hospital-based medicine in addition to regular office practice. This means extra work including emergency medicine shifts, direct care of in-hospital patients, obstetric deliveries and sometimes general practice anesthesia.

Rural family medicine is a demanding and challenging form of medical practice. The rural physician frequently practices in an isolated environment with inadequate resources and limited or distant specialist back-up resources. This isolation necessitates a level of clinical competence beyond that of urban family physicians. As well, the rural physician is often expected to perform a generalist role in every aspect of clinical practice. Because of this, she must develop and maintain a special base of knowledge and technical skill in a variety of clinical areas, particularly those related to rural medicine, including: emergency medicine, obstetrics and anesthesia (Rourke, 1988; Woolf, 1991; Kamien and Buttfeld, 1990; Gill and Game, 1994). Several studies have confirmed the existence of these unique and varied continuing medical education (CME) needs among rural physicians (Rourke, 1988; Woolf, 1991; Kamien and Buttfeld, 1990; Gill and Game, 1994). Some studies have also investigated the differences

between the rural and urban physician's continuing education needs (Lott, 1995; Rosenthal and Miller, 1982; Woolf, 1991). These studies indicate significant differences in the CME needs of rural and urban medical practitioners. A majority of these studies also suggest that these differences are influenced by the nature of medical practice and, in some instances, by the distance of a rural medical practice from major urban areas. The further a rural physician is from an urban area and large urban health care resources, the more knowledgeable and competent he must be in a greater number of clinical areas.

Hays et al. (1994) working in Queensland, Australia, developed a "sampling framework" for rural and remote doctors and surveyed 311 of these doctors to compare their training and practice profiles with those of 142 urban doctors. They found that doctors who were more than 80 km (or one hour's travel time) from the nearest hospital and support services were more likely to practice a wide range of clinical and procedural skills. In a similar study, Bitt et al. (1993) surveyed 231 full-time Australian general practitioners. They found that rural physicians were more likely to be sole practitioners whose access to medical specialists and other support services was found to decrease relative to population.

It is no coincidence that rural physicians experience great difficulty participating in, and accessing, continuing medical education. The very factors which characterize rural medicine also present significant barriers for participating in CME activities. Geographic distance contributes to the cost of attending selected CME activities and increases the time required to be away from family and practice. Arranging the necessary locum coverage for their practice and hospital responsibilities also makes "getting away" difficult for rural physicians. These obstacles are of great concern for the rural physician who must maintain his skills in an ever-changing and developing field of medical practice.

The primary aim of CME is to keep clinicians abreast of new developments in the medical field in order to enhance their skills and ultimately to improve patient care (Mamary & Charles, 2000). According to Lott (1996) physicians recognize the need to maintain and enhance professional skills and knowledge, and those who live in isolated geographic areas also realize that they have many obstacles between them and their continuing education goals. These obstacles include distance between themselves and educational resources, time away from practice, and patient coverage concerns. Most rural physicians have less backup and coverage support than their urban counterparts, thus making it more difficult to use their time for continuing professional education (Lott, 1996).

A number of authors have suggested that rural physicians perceive their opportunities for participation in traditional CME activity as inadequate (Lott, 1995; Gill and Game, 1994; Rosenthal and Miller, 1982; Woolf, 1991; Rubenstein et al., 1975). As well, Bhatara et al. (1996) have suggested that rural physicians' sense of professional isolation, because of a lack of continuing education opportunities, influences feelings of job dissatisfaction with rural practice. The result of this gap in access to, and participation in, CME is a lack of peer interaction and educational resources afforded by a large hospital staff and medical school, and an over-dependency on journal review and reading as the main method for addressing many CME needs (Lott, 1995; Rourke, 1988; Woolf, 1991; Gill and Game, 1994).

According to Godin et al. (1999) the information needs of physicians are complex and ever increasing in a world of rapidly expanding medical knowledge and a practice environment where physicians are required to know and do more with shrinking resources. The doubling time of medical information has been estimated to be about 19 years with medical knowledge increasing four-fold during a professional's lifetime. It has also been estimated that 1.4 questions per patient arise on a daily basis in in-patient settings, while one question is generated for every 15 patients seen in primary care practice (Anderson et al., 1999).

Peterson et al. (1999) argue that traditional CME has not been effective at altering the behaviours of physicians. One reason for this failure of traditional CME programs may be their inflexibility. In traditional CME, the clinician does not choose the topic, the pace of the program, or the place of learning, and the CME material cannot be easily delivered to the point of care where the clinician needs the information. These current strategies for providing CME have also failed because they have not provided timely, easy access to information that is current, integrated with other information and the physician's workflow, and relevant to specific questions that occur during the patient encounter (Godin, 1999). As a result, many of the questions which are generated from clinical practice go unanswered.

The tremendous growth in medical knowledge has resulted in numerous complaints from physicians concerning the increasing difficulty they experience in finding the right information to satisfy the questions arising from practice (Barnes, 1998). Clinicians could potentially spend many hours reading journals, consulting with specialists, and/or using the Internet to seek information for each patient. According to Godin et al. (1999) a new model for CME is required in which users initiate learning by answering questions that occur during patient care. This new model would entail an application of a 'just-in-time' information delivery model, where education occurs in the context of a real patient problem. This just-in-time learning differs from traditional scheduled learning in that it causes minimal interruption or loss in efficiency during work and can be practised when and as often as necessary (Bergeron, 1998). Such a model has been called a 'practice-learning approach' in which learning occurs when an information need is identified by the learner and a clinical decision must be made. Learning is more efficient, patient care is improved, and the learner is motivated by having important questions answered with minimal effort.

Increasingly, information and communication technology is being applied to the delivery of educational and clinical support to health and medical professionals (Walker et al., 1998). Historically, audio conferencing, video conferencing, slow scan imaging, and videotape programs have been used to deliver CME at a distance (Black and Dunikowski, 1985; Dunn et al., 1980; Lindsay et al., 1987; McDowell et al., 1987; Oeffinger et al., 1992; Moore and Hartman, 1992). In recent years, it has become recognized that Internet-based CME has great potential to deliver information that can be linked to patient care issues in a timely and interactive fashion (Peterson et al., 1999).

Technology is revolutionizing education. Global networks, powerful personal computers, and user friendly, graphically oriented software are creating a new infrastructure that promotes rapid, efficient access to information. Images, text, audio and video can be integrated into interactive multimedia presentations, providing a hierarchy of knowledge that can be navigated by a click of

a mouse (McEnery, 1995). The use of Internet technologies and the increased capacities of information and communication technologies are contributing to a movement away from traditional CME (Moore et al., 1994). Physicians who have installed computers in their offices can access a variety of distant databases. In some areas, electronic consultation networks have developed using e-mail technology and medical information systems which provide the rural physician with rapid access to assisted literature searches and other information sources. According to Moore and colleagues (1994):

We believe that the forces that are currently changing health care.....will shortly provide opportunities to create a new CME, one that will be more accessible, more convenient, and more relevant. This will be the new paradigm for CME. (Moore et al., 1994, p.11)

According to Sikorski & Peters (1998) providing high-quality, on-line professional learning opportunities could give physicians new options for accessing the best educational programs medicine has to offer. It could also present new opportunities to interact with expert faculty, integrate newly published or peer-reviewed scientific information and clinical developments, and improve the process of taking courses and tracking credits. CME should be highly self-directed, with content, learning methods, and learning resources selected specifically to maintain or improve the knowledge, skills and attitudes needed in clinical practice (Manning & Debakey, 2001). If Web-based education meets its purpose, greater opportunities for quality education at point-of-care will become available (Manning & Debakey, 2001).

Physicians' Internet Usage Patterns

According to Anderson et al. (1999) the Internet has increasingly become an important source of information for practicing physicians. This was evident in a study by Casebeer et al. (2002) who surveyed 2,200 primary care physicians to examine physician medical information-seeking behaviors and its relevance to CME providers. Nearly all physicians had access to the Internet, knew how to use it, and used it for locating medical information. A particular patient problem was the most common reason for seeking information (Casebeer et al., 2002) and physicians reported that their major impetus for Internet use was to identify information about something that came up in the course of patient care.

Kripilani et al. (1997) surveyed 350 physicians randomly selected from the primary care population in Texas. Physicians with prior computer experience, access to computers and on-line services, and previous experience with computer-assisted continuing medical education (CACME) gave significant higher ratings to CACME than their counterparts with no prior computer use. Physicians who used computer-based CME were generally satisfied with the experience and tended to prefer this method of delivery over other formats of self-directed CME (Kripilani et al., 1997).

The results from annual surveys of a random sample of 1,000 US physicians by the American Medical Association (AMA) demonstrated that 10% of physicians surveyed in 1997, 37% in 1999, and 70% in 2000 were WWW users. Physicians reported that their most frequent use of the Web was for electronic mail, medical information sources, product information, and professional association communication. The Canadian Medical Association (CMA) also conducted a similar survey of Canadian physicians in 1999 and found that 63% used e-mail, 60% used the Web, 53% searched literature on the Internet, and 41% used CME sites.

Models of Web-based CME

An interesting aspect of the Web-based CME literature which has been reported is the diverse nature of the subject matter and delivery formats that have been described. At the University of Tennessee Medical Center, physicians can complete certifying examinations in fluoroscopy procedures placed on the World Wide Web WWW (Thompson et al., 1996). At Marshall University's School of Medicine, a CME Web-based course has been developed to improve physicians' clinical and history taking skills, and is accredited for one hour of CME credit (Hayes and Lehman, 1996). The system simulates an actual patient encounter, with the learner playing the part of examining physician and the program acting as patient. Pictures of the patient serve as image maps to which the user can point and click, and inspect more closely. Lab and radiologic studies can be requested and the learner can submit a diagnostic and treatment for evaluation and CME credit.

Ryan and Waterson (2000) have developed an online CME course for enhancing physicians' knowledge and skill in the management of dementia and end-of-life care. Learning is facilitated by means of small-group, case-based and self-directed learning activities. Steps to reduce learner isolation include the use of email and chat discussion, and providing access to an ongoing dementia network and the responses of other learners (Ryan and Waterson, 2000). Turchin & Lehmann (2000) have also developed an educational WWW site called the Active Learning Centre (ALC). The ALC is designed to support: searchable databases dedicated to separate educational topics; automated customizable feedback tests for users; and remote WWW-based database authoring (enabling input for outside experts).

The University of Iowa College of Medicine has developed an online "Virtual Hospital" (Galvin et al., 1994). This WWW program includes multimedia teaching files, current diagnostic and therapeutic algorithms, patient simulations, historical information, patient instructional data, and on-line CME materials (Galvin et al., 1994). McEnery & Grossman (1997) describe a CME project which utilized e-mail delivery of HTML documents to facilitate participant access to case material. HTML e-mail was displayed directly within the e-mail reader of a Web browser. The HTML pages included medical images and clinical history of unknown diagnosis and the user submitted a diagnosis through an online submission form. This program was based on a 'push model' of content delivery.

Internet streaming is an exciting new technology that allows multimedia content to be stored and sent over the Internet (Rosser et al., 2001). Baylor College of Medicine, Houston, Texas has integrated Internet streaming into its curriculum and has offered a number of courses for CME credit. Each course consists of a Power Point slide show with the course instructor narrating the slides. At the end of a course, a 10 question test is given, which is submitted to the physician conducting the cybercourse (Rosser et al., 2001). Internet teleconferencing software can also be used to hold 'virtual meetings' during which participants around the world can share ideas. Ruskin et al. (1998) describe their experiences in using CUSeeMe and Microsoft NetMeeting software for facilitating live Internet teleconferences of the Society for Advanced Telecommunications in Anaesthesia (SATA). This software allows sound and moving images to be transmitted over a dial-up Internet connection.

Palmer et al. (1997) also describe a project in which live video and sound from the 11th World Congress of Anaesthesiology in Sydney, Australia was broadcast over the Internet using CUSeeMe software. Over 200 anaesthesiologists from around the world were able to 'attend' the plenary sessions via the Internet. Video reception was less successful for those receiving the broadcast via a modem-based Internet connection. The limiting factor for large-scale broadcasts at the time was bandwidth. Simultaneous reception of video and audio signals required a minimum bandwidth which was not always available to domestic Internet users who were connected by a modem via a conventional telephone line (Palmer et al., 1997).

Tello et al. (2000) delivered live and recorded lectures from a CME course over the Internet using streaming audio. A series of 18 hrs of lectures dealing with topics in vascular imaging, CT angiography, MR angiography, and conventional angiography were coordinated and organized at a remote site over a 3-day period. Lecture material consisted of slides and text outlines. The delivery of the lecture was evaluated over a 56K modem. Evaluators graded the audio playback as satisfactory, with the commentary easily understood in the context of the accompanying images.

Medical Information Systems

Health sciences libraries and continuing medical education offices have also performed outreach functions using computer networks in attempts to address the information needs of rural physicians (Moore and Hartman, 1992; Pivalo, 1994; Jennet et al, 1990; Rankin, 1992; Dorsh and Lindwirth, 1993; Leist and Kristofco, 1990; Manning, 1990; Craig et al, 1992). In these studies, health sciences libraries and CME offices have provided journal request and delivery services, electronic access to information, electronic communication devices for peer consultation, and continuing education opportunities. Several pilot "management information systems" programs have also been reported in the literature, and interactive information and telecommunication technologies appear to be playing a larger role in bridging the information gaps that exist for rural physicians.

At Stanford University, the Stanford Health Information Network for Education (SHINE) has been developed to address both immediate (decision support) and long-term (CME) information needs (Godin et al., 1999). SHINE makes available a core collection of medical content that includes textbooks, pharmaceutical databases, a bibliographic database, consensus statements and guidelines, full text online journals, a differential diagnosis expert system, reviews of clinical topics, and streaming video through a single, unified, web-based, intuitive interface and search capability (Godin et al., 1999). The functionality of SHINE includes the ability to query multiple content collections and view the results in a common interface. SHINE also provides a Java-based electronic notebook for saving, annotating, organizing, and archiving query results from any location.

Researchers at the University of Iowa have developed an integrated academic information management (IAIMS) for use on the WWW (D'Alessandro et al., 1996). The focus of this particular project was on the integration of CME into the clinicians' daily work by providing access to a computer-based patient record, multimedia educational information, and traditional library services. CME is integrated into the daily practices of physicians by tying CME credit to the acquisition of educational information during daily use of the computer-based patient record. The computer-based patient record is scanned for the occurrence of variants of key terms, and

the key terms which are detected trigger the insertion of hyperlinks into that record which point to relevant multimedia educational information. The system delivers relevant multimedia educational information to the point of care, where critical medical decisions are made. For health care providers, this multimedia information includes multimedia textbooks, decision support tools, teaching files, patient simulations, clinical practice guidelines, diagnostic algorithms, handbooks, journals, newsletters, and CME lectures (D'Alessandro et al., 1996).

Penn State's College of Medicine has collaborated with the Pennsylvania Department of Health in the design of a system of educational resources to be used with desktop conferencing (Lott, 1996). Desktop conferencing units were placed in the offices of several rural physicians and the physicians were provided with access to the Internet and WWW, and to medical, Penn State, and Department of Health databases (Lott, 1996). Web links allowed physicians to download learning activities and to search databases for medical information. Additionally, they were able to review medical Journal abstracts, participate in live and delayed broadcasts of medical conferences and educational activities, and engage in professional discussions with colleagues on secure chat lines. The Texas Tech MEDNET project (Moore and Hartman, 1992); the University of Illinois Library of Health Sciences medial information system project (Pivalo, 1994); the Faculty of Medicine, University of Calgary Medical Information System (MIS) pilot project (Jennett et al., 1990); and, the Georgia Interactive Network for Medical Information (GaIN) (Rankin, 1992) have also reported initiatives to address the information needs of the rural and remote physician. The projects vary in their use and application of technology, yet encompass similar processes for improving access to quality medical information for rural physicians.

Outcomes of Web-based CME

An emerging theme in the medical education field in recent years has been the idea of "evidence-based medical education." Evidence-based medical education refers to the critical review and use of evaluation data and information in guiding and informing decisions concerning the design and delivery of medical education. Abrahamson (1984) has suggested that the criteria by which CME has been evaluated has undergone an evolutionary process. According to Abrahamson the earliest reported measures of the success of CME programs were attendance records and the level of satisfaction expressed by participants about a given course. The criteria by which CME has been evaluated has since advanced to include such measures as cognitive, attitudinal, or psychomotor skills gain; transfer of learning to clinical practice and resultant performance change; and positive and meaningful changes in patient health outcomes. In this section of the report, the outcomes from a number of Web-based CME evaluation studies are reviewed and summarized based on Abrahamson's evaluation criteria.

Abrahamson's CME Evaluation Criteria

1. Attendance
2. Happiness
3. Knowledge
4. Competence
5. Performance
6. Patient outcomes

Tanner et al. (2001) developed an Internet-based CME course to enhance primary care physicians' knowledge of the diagnosis and management of major depression. An evaluation of the course indicated that participants had enhanced their knowledge and were very satisfied with the program. Of the 48% of users who failed the knowledge pretest (<70%, the usual standard), 67% passed the knowledge posttest after participating in the course. After taking the course, 94% of participants were interested in taking more Internet based CME and 92% were interested in more mental health oriented CME. Kronz et al. (2000) developed a Web-based education program on the Gleason grading of images of prostate carcinoma tissue specimens. The evaluation consisted of a 20-item pretutorial and posttutorial quiz of prostate carcinoma images. A total of 916 participants completed the course and there was significantly improved grading in 15 of 20 images, thereby improving the accuracy of Gleason grading of practising pathologists.

Anderson et al. (1999) evaluated Medcast, a commercial medical information service that uses intelligent pull technology to deliver medical information to practicing physicians. Medical news, CME and other information are transferred by modem on a nightly basis to physicians' computers. A survey to determine user acceptance of the Medcast system and its benefits was faxed to 195 users; 73 (39%) responded. Prior to the Medcast system, almost 40% of respondents did not use computers for professional activities because of time constraints, costs and computer literacy. After implementation of Medcast, almost 70% of respondents used the system two or more hours per week.

Harris et al. (2002) conducted a study to evaluate the effectiveness of an online domestic violence (DV) education program in enhancing physicians' confidence and attitudes. The program was developed around a series of interactive case-based scenarios which emphasized clinical aspects of DV as it might appear in a family practice office. Sixty-five physicians completed a pretest/posttest, 28 of whom were assigned to receive the online DV program. They found a + 17.8% mean change in confidence (self- efficacy) for physicians who took the DV program versus a -.6% change for physicians who did not take the program.

Marshall et al. (2001) conducted an evaluation of the Family Medicine Education and Research Network (FERN) which had been established to support on-line discussion among family physicians in southwestern Ontario. The program was based on a series of moderated, case-based, e-mail discussions. Thirty-four physicians participated in an evaluation study and were e-mailed a case every 2 weeks. Evaluation was conducted using preintervention and postintervention mailed surveys combined with an e-mail questionnaire and a modified focus group. A higher percentage of the FERN group scored higher on 7 of 8 knowledge items and reported they were more aware of new techniques and had made changes in their practice than a

comparison group. Participants also reported the method to be convenient, family practice oriented, and enjoyed the case-based approach to learning (Marshall et al., 2001).

Chan et al. (1999) conducted a study to evaluate the feasibility and effectiveness of a CME problem-based small-group learning (PBSGL) intervention conducted via the Internet. The investigators designed a randomized controlled trial in which 23 family physicians from across Canada were randomly assigned to a study group (n=11) and a control group (n=12). Participants were randomly assigned either to using the Internet to access learning resources and engage in e-mail-based discussion or just having Internet access to the resources and no discussion. The study group spent 2 months discussing the topic of depression in the elderly with the help of a facilitator and specialists. Outcome measures included qualitative feedback from the learners as well as a multiple-choice question (MCQ) test before and after the study. The authors found no significant difference in scores on a MCQ knowledge test between the groups (Chan et al., 1999).

Dickmann et al. (2000) report the results from an evaluation of a German CME Website. Fifty-nine GPs worked with the Website during a 4-month period and their online activity was evaluated by Web server log file analysis and online questionnaires on demographics, technical equipment, and aspects of the learning environment. The GPs mainly learned at home after work, and 46% of the GPs visited the Website at least once per month. Self-study and information seeking accounted for 58% of the activities, while communication and interaction were used infrequently. Dickmann et al. (2000) also surveyed the participants concerning the role of the Internet in their CME activity. Eighty-six percent (86%) reported that the Internet may play a role in supplementing traditional information sources, 29% reported that WWW-based CME may increase the GPs workload, 43% believed that it may result in new technical dependencies, 43% reported that it may lead to information overload, and 29% felt that it may decrease personal contacts in CME (Dickmann et al., 2000). Dickmann et al. (2000) concluded that the use of WWW-based CME systems depends largely on the quality and accessibility of its contents and on the physician's own need to learn independently.

Harris et al. (2001) evaluated the effectiveness of an Internet-based CME program in improving physicians' confidence, knowledge and clinical skills in managing pigmented skin lesions. The program contained four educational modules dealing with early recognition of melanoma, management of skin cancer risk factors, skin cancer prevention strategies, and recognition of benign pigmented lesions. The program was based on an interactive, problem-based teaching approach in which participants were introduced to an algorithm and then asked to apply the algorithm to nine clinical situations. Users had to complete a test before and after the program, and complete a voluntary on-line satisfaction survey. Three hundred and fifty four (N = 354) users completed the entire program and posttest. Use of the CME program was associated with significant improvements in physician confidence and knowledge (P<.001).

Peterson et al. (1999) developed and delivered three online pulmonary CME programs on the Virtual Hospital, the University of Iowa's digital health sciences library. The investigators measured the frequency with which the Internet-delivered CME was accessed by monitoring page accessions and by using a log file analysis program. In addition, they collected all evaluation forms submitted by registered users. The frequency with which the courses were

accessed had increased gradually over time and was doubling every 6 months (Peterson et al., 1999). Users rated the format and quality of material highly. They felt that the online CME was

relatively easy to use and enhanced their professional activity.

Purpose of The Electronic Rural Medicine Strategy (TERMS)

The purpose of *The Electronic Rural Medicine Strategy (TERMS)* project is to develop, evaluate, and sustain an electronic distributed learning strategy as a means for addressing the professional development needs of rural and remote physicians in Canada. The overall goal for this project is:

to enhance efforts in retaining physicians in rural and remote communities of Canada by providing greater access to distributed learning programming for addressing rural physicians' professional development needs.

In achieving this goal, it is believed that *TERMS* will improve rural physicians' access to CME, contribute to the enhancement of the knowledge and abilities of rural practitioners, and increase rural physicians' satisfaction with opportunities for professional development. The main component of *TERMS* is the *RuralMDcme* Web portal. This distributed learning Web site was designed and developed in collaboration with a number of university-based CME departments from across Canada. The vision for the project is that the distributed learning Web site will eventually become the main clearinghouse of on-line university-based CME for rural physicians in the country.

The *RuralMDcme* Web portal serves as the home of a number of MainPro M1 and C accredited Web-based CME courseware programs. The CME programs, electronic features and resources of the Web portal were designed in consultation with a number of rural medicine stakeholders to ensure the information and learning needs of rural physicians were being addressed. The *RuralMDcme* Web portal enables rural and remote physicians to access continuing education opportunities at times and places convenient to them. Participants are able to enhance and maintain their clinical competencies by learning from some of the most highly regarded university-based medical expertise in Canada. The stakeholder groups who have the most to gain from this project include rural physicians and the rural communities they practice in. By creating more effective and greater opportunities for participation in electronic distributed learning, it is believed that this strategy will contribute in a positive way to ongoing efforts to retain physicians in rural and remote practice.

It has been recognized that there is a need to concentrate the collective efforts of university-based CME offices in the identification of the professional development needs of rural and remote physicians. It is also believed that a collective effort is the best means for developing an effective distributed learning strategy and devising instructional design standards and criteria by which quality CME can be facilitated and implemented in a distributed learning program format. *RuralMDcme* will allow medical schools to reach a larger rural and remote physician audience and will improve and foster greater collaboration among medical schools in designing and delivering CME, thus resulting in reduced overlap and redundancy in the new media programming area.

Overview of the *RuralMDcme.ca* Web Portal

RuralMDcme.ca is the Web portal of The Electronic Rural Medicine Strategy (TERMS). The

TERMS project includes the research, development, delivery and evaluation of accredited, online CME courseware programs, as well as the development and implementation of a variety of professional development and practice management tools hosted on the *RuralMDcme.ca* Web portal. The purpose of this project is to address the professional development needs of family physicians across Canada through the provision of credible, accessible, and flexible online CME programs and information resources. Portal access is free with general information and links also available to the public. Online courses and practice management tools are restricted to physicians and require a username and password. The features of the *RuralMDcme.ca* portal are described below.

Homepage

The home page for *RuralMDcme.ca* presents the user with a variety of links and icons for accessing and navigating its CME and information resources content. The right side of the home page presents a menu for linking to the various sections of the site. These links include: “Physicians Only”, “About Us”, “CME”, “Clinical Practice”, “Medical Library”, “Tools and Technology”, “Rural Links”, “Email Notices”, “Contact”, and “Home”.

Other features included on the home page include a search engine which allows a user to search for specific items contained within the *RuralMDcme.ca* Web portal; an online survey that physicians can use to provide their opinions about the *RuralMDcme.ca* Web portal; and a direct link to the e-CME courses hosted by *RuralMDcme.ca*.



Homepage

Physicians Only

The “Physicians Only” hyperlink brings the visitor to the “Physicians Only” section where a username and password are required to gain access. New users wishing to sign up for a username and password can do so through the “new account” hyperlink. Once the username and password is entered the physician is brought to the “Colleague to Colleague” discussion board page. Here the physician can interact with colleagues in rural communities across Canada to discuss generalities of difficult cases; recommend solutions to problems; share local news in rural medicine; or provide updates in CME. A “Discussion Protocol” hyperlink opens a new page containing information for physicians who are unfamiliar with discussion board activities.



Physicians Only

Physicians can also create their own Web page for their practice through a hyperlink titled “Create Your Open Web Page” found in the menu on the right side of the page. Physicians are brought to a “Website Creation Tool”, opened in a new browser window, where they can customize a personal web page for their practice.

About Us

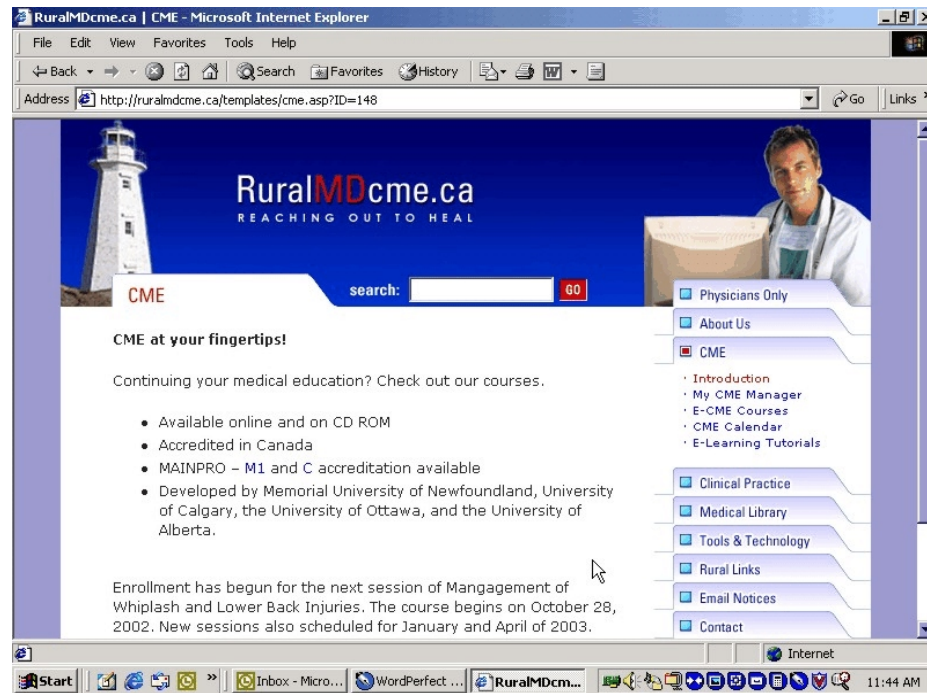
This section provides a brief description of the Office of Professional Development. A “Partners” hyperlink, found on the right navigation bar, brings the physician to a page listing the *RuralMDcme.ca* partners. A hyperlink to each partners’ homepage is provided, if one exists.

CME

The CME link brings the physician to the CME section of the site. A listing of the CME subsections is found on the menu bar under the “CME” section title. The subsections are described below and include “Introduction”, “My CME Manager”, “E-CME Courses”, “CME Calendar” and “E-Learning Tutorials”.

Introduction

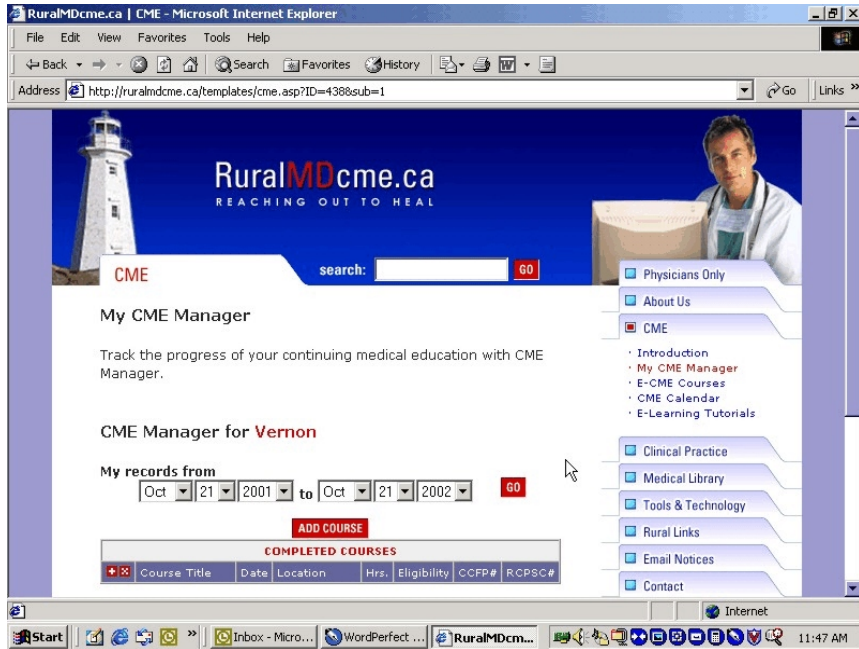
The “Introduction” subsection (default) provides basic information about the online courses and provides hyperlinks to pages describing MAINPRO M1 and C accreditation criteria.



CME Page

My CME Manager

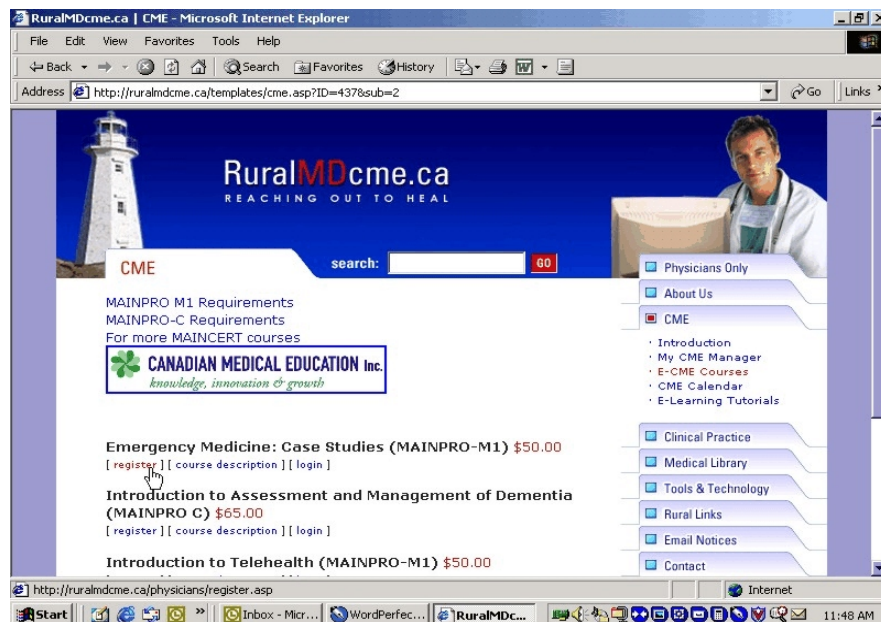
The “My CME Manager” subsection is restricted to physicians, who are required to enter their username and password to gain access to the section. Once the username and password have been entered correctly, the physician is brought to his/her personal CME manager. Here the physician can keep track of CME events completed or planned for any date after January 2001 (*RuralMDcme.ca*’s launch date). The physician is able to add courses through the “add course” hyperlink which opens a new window, titled “CME Calendar” where the physician can fill in course information. Physicians can also print or email records posted on the calendar.



My CME Manager

E-CME Courses

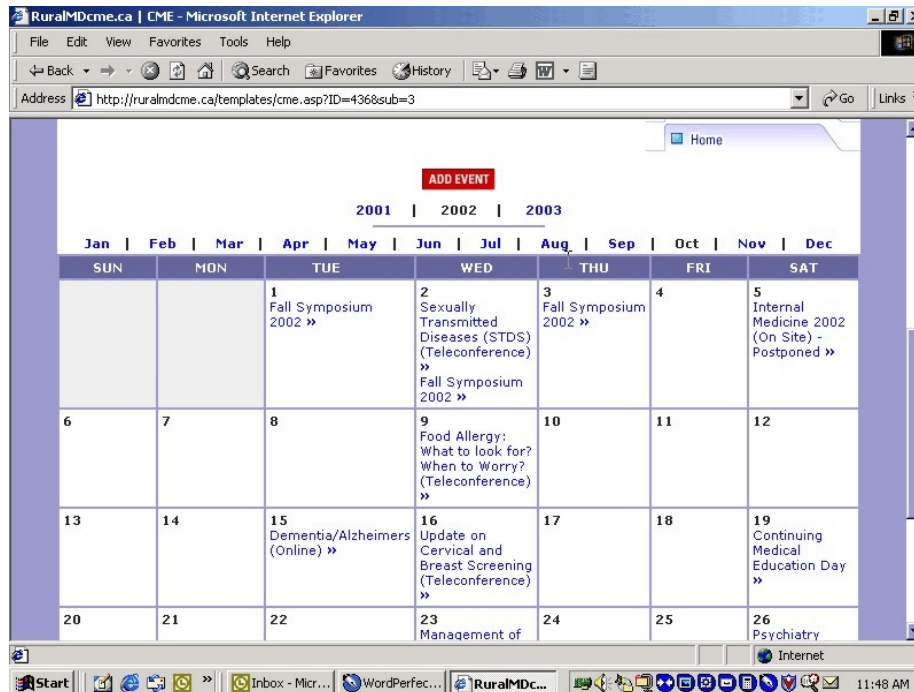
The “E-CME Courses” subsection provides hyperlinks to the online CME courses being offered by *RuralMDcme.ca*. Each course listing has hyperlinks to “register”, to view a “course description” and to “login”, each opening in a new browser window. Hyperlinks are also provided to pages which describe MAINPRO C/M1, and MAINCERT accreditation eligibility.



E-CME Courses

CME Calendar

The “CME Calendar” subsection provides physicians with a detailed calendar of events in continuing education for two years. Physicians may review event details through hyperlinks provided on the calendar. Physicians can also submit an event that may benefit other Canadian physicians. *RuralMDcme.ca* staff review the submitted material and publish it on the site if acceptable.



CME Calendar

E-Learning Tutorials

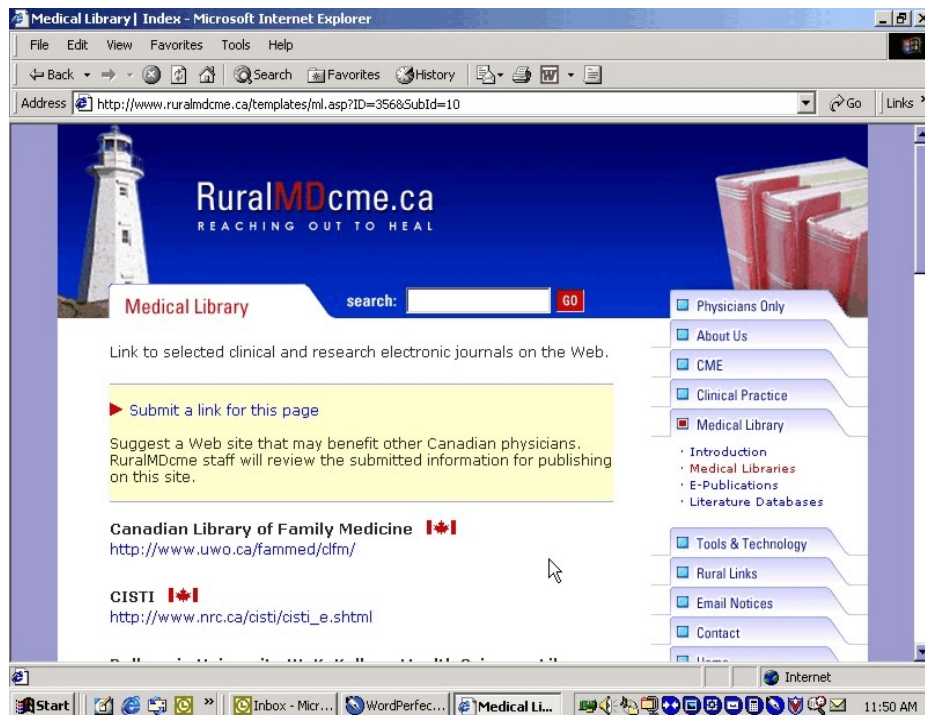
The “E-Learning Tutorials” subsection provides links to tutorials for exploring personal and professional interests. Physicians can also submit a link that may benefit other Canadian physicians. *RuralMDcme.ca* staff will review the submitted material and publish it on the site if approved.

Clinical Practice

The Clinical Practice section provides links to health and clinical information for both physicians and the general public. A variety of links are provided in the following subsections: 1.) “Clinical Practice Guidelines”; 2.) “Clinical Resources”; 3.) “Office Tips”; 4.) “Resources for Patients”; 5.) “Alternative Medicine”; 6.) “Drug Info Databases”. Links are sourced by a Health Science Librarian. Users can also submit a link to be reviewed by *RuralMDcme.ca* staff and posted through an administration module.

Medical Library

The “Medical Library” section provides links to selected clinical and research electronic journals and literature on the Web. Subsections include “Medical Libraries”, ” “E-Publications”, and “Literature Databases.” Physicians can also submit a link that may be of benefit to other Canadian physicians. *RuralMDcme.ca* staff will review the submitted material and publish it on the site through an administration module.



Medical Library Page

Tools and Technology

The “Tools and Technology” section is publicly available and provides links to health and medical information and tutorials under the subsections: “Personal Digital Assistants”, “Online Computer Resources”, and “Search Engines”. Users can also submit a link to be reviewed by *RuralMDcme.ca* staff and posted through an administration module.

Rural Links

The “Rural Links” section is publicly available and provides links to resources, supports, and organizations directly related to rural health care. Users can also submit a link to be reviewed by *RuralMDcme.ca* staff and posted through an administration module

Email Notices

In the “Email Notices” section, users can sign up to receive *RuralMDcme.ca* email newsletters of new information regarding the site. Users are asked to provide first and last names along with an email address.

Contact

Users with questions or comments can contact the *RuralMDcme.ca* or Professional Development staff using the feedback form provided in this section. The feedback form requires users to submit their name, email address, and a short message.

Overview of *RuralMDcme* Courseware Programs

Management of Whiplash and Back Injuries

The purpose of the Management of Whiplash and Back Injuries program is to enhance participants’ knowledge of the recognition, management and treatment of whiplash and back injuries. Five units comprise the instructional program:

Management of Back Injuries

The goal of this section is to enhance physicians' awareness of strategies for the effective diagnosis and management of patients with lower back injuries.

Management of Whiplash Injuries

This section is intended to enhance physicians' knowledge of strategies for diagnosing and managing patients with whiplash injuries.

Preparation of Medical-Legal Reports

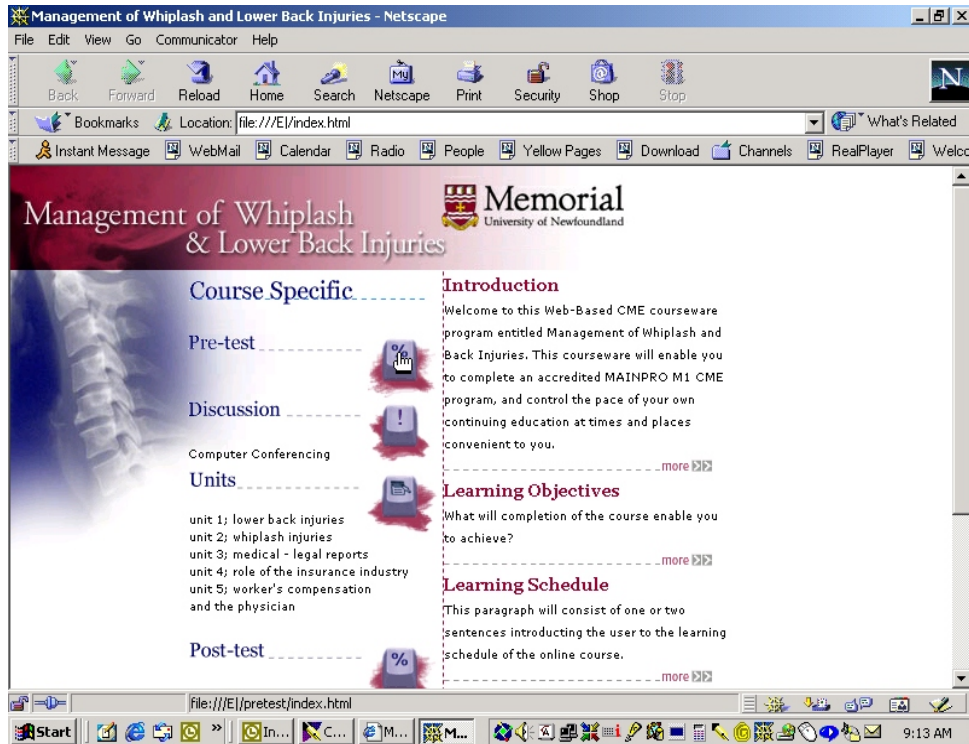
This section introduces physicians to the format and style for medical-legal reports.

Workers' Compensation and the Physician

Provides an overview of the Workers' Compensation System.

Role of the Insurance Industry

The goal of this section is to enhance physicians' awareness of the increase in claims related to back and whiplash injuries and the ramifications for the Canadian public.



Cases in Emergency Medicine

Emergency room physicians do not like 'lists' - at least not lists of a patient's problems. Generally, in a busy ER, ER physicians face only one problem, solve it expeditiously and move on usually to a completely different type of patient complaint. The learning in this program is guided by a number of cases. There are 30 cases in total; 10 cases are covered during each week of the course. In each case an attempt has been made to replicate a typical 'Day in Emergency'. There is no order to the cases, just as there is no order to a typical ER day. There are a number of parts to each case:

Self Assessment: A self assessment item is presented for each case. This item is not graded nor recorded. It is intended to focus attention on a learning issue to be covered in the case.

Case Presentation: The important aspects of the patient and the presenting problem are identified for consideration.

Case Discussion Questions: These questions are linked to a Bulletin Board discussion area within the WebCT e-learning software program.

Suggested Management: A suggested approach for diagnosing, treating or managing the problem presented in the case.

Web Resources: Links to supplementary resources on the Web.

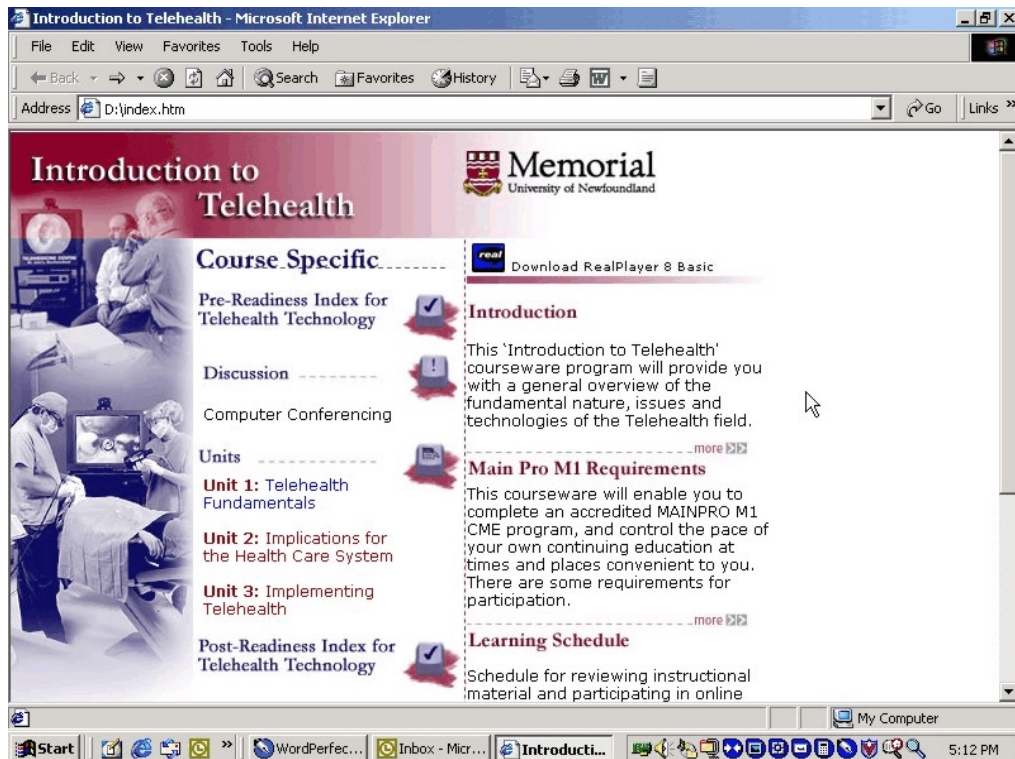
The screenshot shows a Microsoft Internet Explorer browser window titled "Emergency Medicine: Case Studies - Microsoft Internet Explorer". The address bar displays "D:\index.htm". The website content includes a header with the Memorial University of Newfoundland logo and the title "Emergency Medicine: Case Studies". A left-hand navigation menu lists "Course Specific", "Discussion", "Weeks", "Survey", and "Commitment to change". The main content area features an "Introduction" section with a welcome message, a "Main Pro M1 Requirements" section, and a "Learning Schedule" section. The browser's taskbar at the bottom shows the Start button, several application icons, and the system clock indicating 5:01 PM.

Introduction to Telehealth

The purpose of this program is to introduce participants to the telehealth field and the use of telehealth applications in health care delivery. Participants are introduced to a number of fundamental telehealth concepts and issues including:

- Telehealth Applications;
- Telehealth Challenges;
- Policy Issues;
- Sources for Advice/Support;
- Basic Steps to Start Up.

The courseware consists of a number of self-paced learning tutorials which present an overview of the principles governing the use and application of telehealth in the Canadian health care system. The information presented in these tutorials are enhanced by video and audio material, as well as links to readings and other resources on the WWW. The tutorials are also supplemented with interactive, online discussion activities using a bulletin board discussion system.



Introduction to Assessment and Management of Dementia

"Introduction to Assessment and Management of Dementia" is based on Module 1 of the MAINPRO-C course "Alzheimer's and Other Dementias". The course was originally developed at the University of Calgary in 1998 and has been delivered in a workshop format across Canada. The content of the course provides a comprehensive approach to Alzheimer's disease based on the consensus statements of the Canadian Consensus Conference on Dementia. It incorporates recent publications dealing with the diagnosis and management of dementia.

This online course addresses the following topics related to assessment of dementia and basic management of the patient with Alzheimer's disease:

- History, functional assessment and the physical examination;
- Evaluation of mental status and neuropsychological screening;
- The Mini Mental Status Examination;
- Differential diagnosis of Alzheimer's disease;
- Laboratory tests and CT scans;
- Introduction to the principles of the management of Alzheimer's disease and other dementias;
- Role of Cholinesterase Inhibitors for Treatment.

The screenshot shows a Microsoft Internet Explorer browser window. The title bar reads "Course Information - Microsoft Internet Explorer". The address bar shows "D:\courseinfo\index.html". The main content area features the University of Calgary logo and the course title "Introduction to Assessment and Management of Dementia". Below the title is a navigation bar with "Previous", "Home", and "Next" links. The "Course Information" section is active, displaying a "Course Overview" with the following text: "Introduction to Assessment and Management of Dementia" is based on Module 1 of the MAINPRO-C course "Alzheimer's and Other Dementias". The course was originally developed at the University of Calgary in 1998 and has been delivered in a workshop format across Canada. The content of the course provides a comprehensive approach to Alzheimer's disease based on the consensus statements of the Canadian Consensus Conference on Dementia. It incorporates recent publications dealing with the diagnosis and management of dementia. Below this text, it states: "This online course will address the following topics related to assessment of dementia and basic management of the patient with Alzheimer's disease :". A list of topics follows: 1. History, functional assessment and the physical examination; 2. Evaluation of mental status and neuropsychological screening; 3. The Mini Mental Status Examination; 4. Differential diagnosis of Alzheimer's disease; 5. Laboratory tests and CT scans; 6. Introduction to the principles of the management of Alzheimer's disease and other dementias; 7. Role of Cholinesterase Inhibitors for Treatment. The browser's taskbar at the bottom shows the Start button, several open applications (WordPerfect, Inbox - Micro..., Course Inf...), and the system tray with the time 5:20 PM.

Methodology

Evaluation Questions

A summative program evaluation was conducted for assessing the effectiveness of the *RuralMDcme.ca* Web portal and the various Web-based CME courseware programs which were delivered through the *TERMS* project. The evaluation research questions included:

- 1. How effective was *The Electronic Rural Medicine Strategy (TERMS)* in providing increased access to electronic professional development opportunities for rural and remote physicians?**

Evaluation Criteria

- ▶ track and assess usage of electronic information resources and learning materials (time of access, duration of access, pages and materials navigated and accessed);
- ▶ assess characteristics of online learners (demographic characteristics, computer usage and computer experience characteristics, computer hardware capabilities [modem speed, ISP connection type], and practice profile characteristics);
- ▶ assess registration and participation rates (online registration, return registrations, attrition rates and underlying reasons for attrition);
- ▶ assess learners' satisfaction or dissatisfaction with Web portal and online CME (download times, connection difficulties, technical errors, and compare with Internet connectivity and PC hardware and software configurations).

- 2. How effective were the *RuralMDcme* courseware programs in addressing participants' needs and providing a meaningful and useful learning experience?**

Evaluation Criteria

- ▶ assess strengths and weaknesses of online CME from a learner's perspective and assess learner's satisfaction with educational experience, quality of online CME instructional materials, quality of instruction, use of computer mediated communications for interaction, and other self-directed learning tools or functions;
- ▶ assess quality of instructional transactions.

- 3. How satisfied were stakeholders' and partners with *The Electronic Rural Medicine Strategy (TERMS)*?**

Evaluation Criteria

- ▶ assess stakeholders' and partners' satisfaction with a National Advisory Committee process for developing electronic information resources and distributed learning modules for rural and remote physicians;
- ▶ assess stakeholders' and partners' satisfaction with opportunity for providing input and advising on the direction of *TERMS*;
- ▶ assess extent to which original concerns and issues have been addressed.

Description of Evaluation Methods

This section of the evaluation report summarizes the methodology and instruments which were used to evaluate the effectiveness of the Web portal and the courseware programs. Summative evaluation can be described as evaluation that occurs after an instructional program or system has been developed and delivered to the learner. It is meant to collect information that enables decision-makers to judge the impact or effectiveness of a program or product in terms of a variety of outcomes. These outcomes could include the amount of learning which has been affected, the influences of instruction on an individual's performance, the reaction or satisfaction of learners with instruction, the effect of a training program on the organization, or a cost-benefit analysis (Dick and Carey, 1985).

The summative evaluation methods for this project were qualitative and quantitative in nature, and focussed on the collection of information surrounding: participation and usage rates; stakeholder and users' satisfaction with the various information and educational elements of the *RuralMDcme.ca* Web portal and the Web-based CME programs; attitudes towards computer-mediated learning; and the effectiveness of the system in facilitating greater peer collaboration. A prevalent theme found in the literature on evaluation methodology is that quantitative methods have traditionally dominated research and evaluation studies in the past. However, the current consensus among many authors is that quantitative and qualitative methodologies should be combined to provide a more comprehensive view of the effectiveness and impact of educational programs. Several authors (Guba and Lincoln, 1985; Willis, 1994; Thorpe, 1993) suggest that evaluation studies should be designed in a way that combines the two approaches, rather than relying solely on one approach or the other. Patton (1980) notes that "on many occasions -- indeed for most evaluation problems -- a variety of data collection techniques and design approaches should be used" (p. 18).

Willis (1994) states that educational program evaluation has undergone "a number of refinements since it was proposed as a discipline in the 1950s, from an emphasis upon tests and measurements, to behavioral objectives, to supplying information to decision-makers, to an emphasis upon judgment and values" (p. 100). Willis notes that a current consensus favors a more balanced view of the use of qualitative and quantitative forms of inquiry.

recognizing that reality is not exclusively numerical or categorical, current consensus thinking stresses a more balanced approach, emphasizing that both are important and that both should be incorporated in some way to provide an adequate description of reality...both qualitative and quantitative techniques can be incorporated into a single model for use in evaluating distance education (p. 100).

Several quantitative and qualitative methods and instruments were used in the evaluation of the *RuralMDcme.ca* Web portal and the various Web-based CME courses which were delivered over the duration of the TERMS project. These methods included: Website Registration/Participation Statistics; Website Usage Statistics; Website User Satisfaction data; Course Registration/Participation Statistics; a Content Analysis of Discussion Transcripts; Course Evaluation Surveys; Participant Interviews; and a Stakeholder Focus Group.

Website Registration/Participation Statistics

The log files of the activity on the server hosting the *RuralMDcme.ca* Web portal were analyzed using WebTrends' Log Analyzer 5.0. The purpose of this log file analysis was to determine the level of usage and the nature in which the *RuralMDcme.ca* Web portal was used. Log analysis makes it possible to determine what resources or web pages participants accessed most often, as well as identify which web pages participants did not access or accessed the least. We were also able to collect specific information on the geographic location of users who registered for access to the Physicians' Only section of the Web portal. The Physicians Only section provided users with access to a computer conferencing forum and to a feature for creating their own practice Web page. In order to access this section, users were required to register for an account and password. The registration information for each registrant included their name and location of practice. This information was saved in a directory for future access and was also forwarded to the site manager.

Website User Satisfaction data

An online user satisfaction survey was developed and posted to the main homepage of the *RuralMDcme.ca* Web portal. The purpose of this survey was to collect feedback and satisfaction information from users of the portal. The survey included a combination of closed and open-ended question types. The questions were organized around the following themes: Content & Information; Navigation and Operation; Page Design and Graphics; and Overall Impressions. A number of Likert scale items were included to measure user satisfaction within each of the thematic areas. Respondents were asked to rate their level of agreement or disagreement using a 5-point Likert scale (5 = Strongly Agree to 1 = Strongly Disagree). Open-ended questions were also presented to allow users to provide more detailed explanations of their satisfaction or dissatisfaction with the particular aspects of the *RuralMDcme.ca* portal.

Course Registration/Participation Statistics

Data concerning the extent of course registration, participation and completion were also collected and examined as a component of the evaluation. For each specific course, the level of participation in the discussion activities was examined. WebCT provides a record of items read and posted to the bulletin board. A record of online activity in the WebCT program is presented in the results section of this evaluation report. Given the nature of the hybrid systems which were used for the courses, we were unable to track or record participants' use of the CD courseware itself. The CD courseware was accessed on a participant's individual computer rather than a server, therefore we were unable to track 'hits'.

Content Analysis of Discussion Transcripts

The increasing use of computer mediated communications (CMC) has enhanced academic interest in its impact on social processes and outcomes (Fahy, 2002). The power of CMC tools, such as asynchronous computer conferencing systems, as constructivist learning tools and environments lies in their capabilities to support conversation and collaboration. It is believed that knowledge construction occurs when learners explore issues, take positions, discuss those positions in an argumentative format, and reflect on or re-evaluate their positions. The text-based nature of asynchronous computer conferencing provides an opportunity for analyzing the communicative patterns which are facilitated in an online CME course. This analysis can provide a further understanding of the quality of interactions taking place, as well as examine the negotiation of meaning and co-construction of knowledge which can transpire in a collaborative learning environment facilitated by computer conferencing.

In order to facilitate this understanding of the nature and types of questions or comments being posted by participants in the *RuralMDcme* courseware programs, a *Transcript Analysis Tool*

developed by researchers at Athabasca University was used (Fahy et al., 2000). This analysis tool allowed us to characterize the nature of participants' questions or comments and place them into one of five classification categories (Fahy et al., 2000). The results allow for an interpretation of the quality of collaboration and meaning construction which occurred in each of the courseware programs.

Course Evaluation Surveys

An important aspect of the evaluation was to assess learners' satisfaction or dissatisfaction with the online CME courses. Participants in the courseware programs were asked to complete an evaluation survey. This evaluation survey was accessible through the main home page of each courseware program. A hyperlink from the main home page of the program brought participants to the online version of the evaluation survey which was developed using the WebCT quiz tool functions. The quizzing feature of WebCT allowed the creation of survey items, construction of the survey instrument, provision of the survey online for participant completion and submission, and the recording and tracking of responses.

The purpose of the survey was to evaluate respondents' satisfaction with their participation in the courseware programs. Respondents were asked to rate their level of agreement or disagreement with a number of different statements using a 5-point Likert scale (5 = Strongly Agree to 1 = Strongly Disagree). Several sections were presented on the survey including: content and instruction; operation; graphics and media; bulletin board discussion; overall impressions; and demographic information.

The 'content and instruction' section included items related to the subject matter, the presentation strategies and media which were used, and the relevance of the content to participants' learning needs. The 'operation' section included items which pertained to the use of the courseware program and participants' satisfaction with the instructions which were provided for using the program. 'Graphics and media' presented evaluative items which were concerned with the attractiveness of the screens, the quality of media, and the navigation features of the courseware program. Items related to the computer conferencing discussion were presented in the 'bulletin board discussion' section. Respondents were asked to rate their satisfaction with a number of aspects of the discussion board and activities.

The 'overall impressions' section allowed participants to rate a number of general aspects of the courseware and their participation in the online learning program. Several open-ended questions were also provided to enable respondents to elaborate on any perceptions related to the strengths of the program and their recommendations for improvements. The 'demographic information' section collected information on gender, type of physician, years of experience, practice location and practice type.

Participant Interviews

According to Willis (1993) "quantitative evaluation relies on a breadth of responses and is patterned after experimental research which focuses on the collection and statistical manipulation of relatively large quantities of data" (p. 63). Quantitative methods require the use of predetermined categories so that the experiences of all subjects are limited to certain responses. Evaluative conclusions emerge from the resulting statistical analysis. However, the preordinate nature of quantitative research methods can be an obstacle to evaluation studies when more in-depth information from the learner's perspective is required. Quantitative approaches, by

definition and design, offer respondents a limited number of possible response options, particularly when forced choice surveys are used. As well, statistical analysis often results in an illusion of precision that may be far from reality (Thorpe, 1993). In contrast, qualitative evaluation focuses on depth of response, highlighted by the gathering of detailed descriptions of situations, events, interactions and anecdotal data from typically a smaller group of respondents. The focus in qualitative methods is on the quality of the response and the study of particular issues in greater depth and detail.

Semi-structured telephone interviews were conducted with a stratified sample of participants from each of the CME courseware programs. The sample was selected by reviewing the online participation records. The sample was intended to include individuals who had accessed the online program extensively to those who had minimal online participation. We were interested in learning more about the experiences and perceptions of the learners who participated in the program. What were their opinions of the courseware and online learning? What did they gain from participating in the program? What did they like or dislike?

Stakeholder Focus Group

A focus group was conducted with stakeholders from the TERMS National Advisory Committee. The purpose of the focus group was to evaluate the level of stakeholder and partner satisfaction with the *RuralMDcme.ca* portal and the process which was followed for developing and implementing the TERMS project. The focus group allowed stakeholders and partners to voice their satisfaction with the opportunities they were given for providing input and advising on the direction for the TERMS project and the *RuralMDcme.ca* Web portal. The focus group was also helpful in assessing the extent to which the original concerns and issues of stakeholders and partners had been addressed through the TERMS project.

Results

RuralMDcme.ca Web Portal Registration Statistics

The “Physicians Only” section of the *RuralMDcme.ca* Web portal required a username and password to gain access. New users wishing to sign up for a username and password were required to submit some basic information on their location. A total of 309 physicians registered for the Physicians Only section and received usernames and passwords for *RuralMDcme.ca*. The province or country of origin could be identified for 307 physicians. The results listed in the table below represent the number of physicians from each province in Canada or other countries who received usernames and passwords for *RuralMDcme.ca*. The majority of registrants were from the Provinces of Ontario, Alberta, Newfoundland and Labrador and British Columbia.

Table 1 **Summary of Web Portal Registration Statistics (Canadian)**
Data reported in this section covers the period of January 1, 2002 to October 10, 2002.

Canada	# of Physicians/ Percentage of Total
Ontario	71 (23%)
Alberta	67 (22%)
Newfoundland and Labrador	49 (16%)
British Columbia	37 (12%)
Quebec	24 (8%)
New Brunswick	12 (4%)
Nova Scotia	12 (4%)
Manitoba	10 (3%)
Saskatchewan	8 (3%)
Prince Edward Island	3 (1%)
Yukon	3 (1%)
Nunavut	1 (0.3%)
Northwest Territories	0 (0%)

Table 1a Summary of Web Portal Registration Statistics (International)

Other Countries	# of Physicians/ Percentage of Total
United States	5 (2%)
Indonesia	1 (0.3%)
Germany	1 (0.3%)
Poland	1 (0.3%)
Philippines	1 (0.3%)
India	1 (0.3%)

RuralMDcme.ca Web Portal Usage Statistics

When a user clicks on a link, or types in a Universal Resource Locator (URL) in the address line

in their browser, they are actually sending a request to a server to send specific information, contained on a page. Part of this request is the IP address (or return address) of the user's computer, so the server knows where to send the page. The page may contain various elements, or files, such as HTML text, graphic images, such as .gif, .jpg, .bmp, audio or video files, etc. As the server responds to this request, it writes a summary of the action into a log file. The log files of the activity on the server hosting the *RuralMDcme.ca* Web portal were analyzed using WebTrends' Log Analyzer 5.0. The purpose of this log file analysis was to determine the level of usage and the nature in which the *RuralMDcme.ca* Web portal was used. Log analysis makes it possible to determine what resources or web pages participants accessed most often, as well as to identify which web pages participants did not access or accessed the least. The log analyzer software produces statistics on the most active day and hour that participants used the Web portal. All times reported are referenced to the time zone of *RuralMDcme*'s server. The data reported in this section covers the period of January 1, 2002 to October 10, 2002.

As helpful as Web server log file analysis can be for getting an overall picture of the activity at a Web site, there are many potential sources of error when carrying out this kind of analysis. Therefore, the statistics cited in the following sections should be regarded as only estimates of activity. One source of error is due to caching. Caching by an Internet Service Provider's or a participant's own browser means that the server will have no record of that Web page being viewed. When a Web browser sends a request for a Web page, it may first ask the server if there is a newer version of the page on the server. If the latest version of the file is already in the browser's cache, this saves the server actually sending the file. So cached hits are those where the page was found in the cache of the browser, so the server did not need to transfer the file.

Unfortunately, most browsers are set by default to ask the Web server for a newer version of a file only once per session, so there is still the potential for many pages to be loaded from a cache without the server log knowing. Also, comparing individual user statistics is difficult if users have changed their browser cache preferences so that not all users are loading cached files to the same extent. Caching also affects "Most Requested Pages" because the first file logged could very well be in the middle of the user's visit.

Secondly, there is really no way to tell precisely how many visitor sessions the site has because one user can appear to connect from multiple hosts if the user's Internet Service Provider (ISP) uses a proxy server or firewall. For example, one user can appear to be coming from one IP address for the text on a web page, and from a second IP address when an image is loaded. Log Analyzer will count this as two sessions even though it is the same individual. Another source of error is that many users can appear to connect from one host. If the user's ISP is using a proxy server, for example, many users might appear to be coming from the same IP address, and therefore they're counted as one user session.

Furthermore, log analysis can't accurately tell how many visits there are to a site because a visitor session is defined as a visit from one host over a 30-minute period. It cannot be assumed that a host or IP number corresponds to one individual, nor that the individual would not pause or go to another site for longer than 30 minutes. In sum, what is defined as a "visitor session" is at best an estimate.

Methods for Measuring Web Site Activity

The three most common measurements of Web site activity are hits, page views and user

sessions. Total Hits is the total number of files that are requested from the server. This includes all graphics, audio/video files, and other supporting files, as well as the actual html page itself. Page Views, or Page Impressions is the number of pages viewed. Pages are files with extensions such as .htm, .html, .asp (and a few others). Impressions, therefore, are a count of the number of pages viewed and do not include the supporting graphic files. Thus, by definition, you should have more total hits than page views. User Sessions is the number of unique users who visited a web site during a certain time period. The user session statistic can be seen as equivalent to "Unique Visits," which, unless every visitor only sees one page, will be less than the number of page views/impressions. User Sessions do provide a good idea of how many people are visiting the site and are the only successful way to track individual visits using current technology. Before proceeding to review the sections, readers unfamiliar with Web server terminology may wish to consult the Definition of Terms table for definitions of terms used.

Definition of Terms	
Server	A computer that hosts information available to anyone accessing the Internet.
IP address	Internet Protocol address identifies a computer connected to the Internet.
Browser	A program used to locate and view HTML documents (for example, Netscape, or Microsoft Internet Explorer.)
Hits	A count of successful hits for the document not including the supporting graphic files on the page. Files considered web pages are those with the following extensions: .htm, .html, .asp, and a few others. These are defined by the File Types tab in the Options window.
The total number of hits	A count of all successful hits including HTML pages, pictures, forms, scripts, and downloaded files.
Hits: Average Per Day	Number of Successful Hits divided by the total number of days in the log.
Hits: Home Page	Number of times the home page was visited. This statistic is derived from the Home Page settings in the profile.
Visitor Sessions: Total	A count of the visitor sessions to your site.
Average Number of Visitor Sessions Per Day	Number of visitor sessions divided by the total number of days in the log.

Visitors	A count of unique IPs for the period of the report, whether or not they were authenticated using domain names or cookies.
Visitors: Unique Visitors	Unique visitors are counted using the visitor's IP address, domain name, or cookie.
Visitors: Visitors Who Visited Once	A count of visitor sessions that occurred only once throughout the log file.
Visitors: Visitors Who Visited More Than Once	The count of visitor sessions that appeared more than once in the log file. By default a visitor session is 30 minutes.

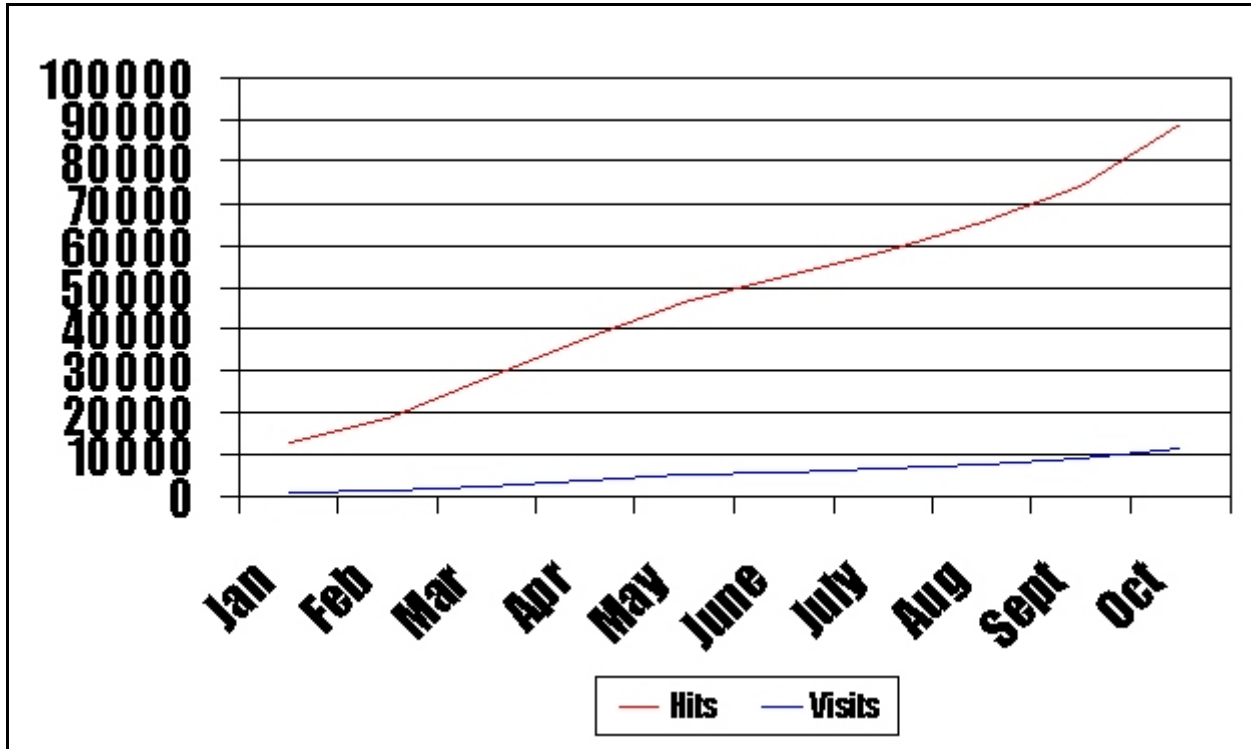
General Statistics

The General Statistics table includes statistics for hits, page views, visitor sessions, and visitors for the server during the designated time frame of January 1, 2002 to October 10, 2002. The log file analysis indicates that the *RuralMDcme* Web portal experienced 3,634 unique visitors over the reporting period. Of these visitors 2,709 visited the site once and 925 were return visitors. As mentioned, unique visitors are counted using the visitor's IP address, domain name, or cookie.

Table 2 General Statistics		
Hits	Entire Site (Successful)	89201
	Average Per Day	340
	Home Page	85
Visitor Sessions	Visitor Sessions	11350
	Average Per Day	35
	Average Visitor Session Length	4 minutes, 26 seconds
Visitors	Unique Visitors	3634
	Visitors Who Visited Once	2709
	Visitors Who Visited More Than Once	925

Visitors by Number of Visits During Report Period

This section shows the distribution of visitors based on how many times each visitor visited the Web portal. This covers visits made during the reporting period only. The data indicates that 74.54% of visitors only visited the site once, whereas over 25% of visitors returned to the site for 2 or more visits.



Level of Activity During Report Period

Table 3 Visitors by Number of Visits During Report Period		
Number of Visits	Number of Visitors	% of Total Unique Visitors
1 visit	2709	74.54%
2 visits	401	11.03%
3 visits	167	4.59%
4 visits	85	2.33%
5 visits	63	1.73%
6 visits	38	1.04%
7 visits	26	0.71%
8 visits	25	0.68%
9 visits	14	0.38%
10 or more visits	106	2.91%

Summary of Activity for Report Period

This section outlines general server activity, comparing the level of activity on weekdays and weekends. The Average Number of Visitors and Hits on Weekdays are the averages for each individual week day. The Average Number of Visitors and Hits for Weekends groups Saturday and Sunday together. The analysis showed that Saturday was the least active day in the week. There was little difference between weekend and weekday activity. There was an average of 41 visitor sessions on weekdays compared to 44 visitor sessions on weekends.

Table 4 Summary of Activity for Report Period	
Average Number of Visitor Sessions per day on Weekdays	41
Average Number of Hits per day on Weekdays	412
Average Number of Visitor Sessions for the entire Weekend	44
Average Number of Hits for the entire Weekend	317
Most Active Day of the Week	Thu
Least Active Day of the Week	Sat
Most Active Hour of the Day	13:00 - 13:59
Least Active Hour of the Day	06:00-06:59

RuralMDcme.ca Web Portal User Satisfaction Survey

A list of potential respondents was compiled from those individuals who had registered for the “Physicians Only” section of the *RuralMDcme.ca* Web portal, as well as those who had registered for at least one online *RuralMDcme* course. A total of 316 potential respondents were contacted to complete the *RuralMDcme.ca* User Satisfaction Survey; a total of 19 registrants completed and returned the survey (response rate of 6.1%). The data presented in Table 5, 5a and 5b is summarized below.

Content and Instruction

The majority of respondents either agreed or strongly agreed that all aspects of *RuralMDcme.ca*’s content and instruction were adequate. Eighty five percent (85%) agreed or strongly agreed that the information accessible through the website was useful, reliable, and applicable to their practice. Ninety percent (90%) agreed or strongly agreed that it was easy to find the information they were looking for.

Navigation and Operation

The majority of respondents either agreed or strongly agreed that *RuralMDcme.ca* was easy to navigate (95%), all of the links and navigation buttons were clearly labelled and purposeful (84%), and any instructional information for using the Website was clear (95%). When asked if pages and images from the Web site took a long time to load on their computers, 27% felt the pages and images took a long time to load on their computers while 48% felt they did not.

Page Design and Graphics

The respondents' comments regarding Web page design and graphics were extremely positive. Eighty-four percent (84%) felt the Web pages were attractive and 90% felt the design and layout of pages were well-organized for ease of use.

Overall Impressions

Seventy-four percent (74%) either agreed or strongly agreed that they would recommend RuralMDcme.ca to others. With regards to the information and features accessed through the Web portal, 69% of respondents either agreed or strongly agreed that they were useful. When asked if they received adequate help with technical problems, 22% agreed or strongly agreed while majority (47%) reported that this item was not applicable suggesting that respondents did not require assistance of this nature.

Internet Connection and Browser

The majority of respondents (75%) connected to the Internet from home; 45% of these individuals used a network connection, 25% used a 56k modem, and 5% used a 28.8 modem. The remaining 25% of respondents connected to the Internet from work; 20% of these individuals used a network connection, while 5% used a modem connection. Eighty three percent (83%) of respondents used Internet Explorer as their browser of choice.

Table 5 Summary of RuralMDcme.ca User Satisfaction Survey Results

Content and Instruction	SD	D	N	A	SA	N/A
The information which was accessible through this Web site was applicable to my practice.		1 (5%)		6 (32%)	10 (53%)	2 (11%)
It was easy to find the information I was looking for.		1 (5%)	1 (5%)	10 (53%)	7 (37%)	
The links which are provided on this Web site are reliable and useful sources of clinical and professional development information.			2 (11%)	10 (53%)	6 (32%)	1 (5%)
Navigation and Operation	SD	D	N	A	SA	N/A
It was easy to navigate, find my way around, and use the Web site.			1 (5%)	10 (53%)	8 (42%)	
All links and navigation buttons were clearly labelled and served an easily identified purpose.		1 (5%)	2 (11%)	7 (37%)	9 (47%)	
Any instructional/directional information for using the Web site was clear and easily understood.			1 (5%)	11 (58%)	7 (37%)	
It takes a long time for pages and images from the Web site to load on my computer.	2 (11%)	7 (37%)	5 (26%)	3 (16%)	2 (11%)	
Page Design and Graphics	SD	D	N	A	SA	N/A
The Web pages were attractive.			3 (16%)	11 (58%)	5 (26%)	
The design and layouts of pages on the Web site were clear, uncluttered, and well-organized for ease of use.			2 (11%)	10 (53%)	7 (37%)	
Overall Impressions	SD	D	N	A	SA	N/A
I would recommend this Web site to my colleagues.		1 (5%)	2 (11%)	8 (42%)	6 (32%)	2 (11%)
I received adequate help with technical problems.			6 (32%)	2 (11%)	2 (11%)	9 (47%)

Overall, the information and features I accessed and used through this Web site were useful.		1 (5%)	3 (16%)	6 (32%)	7 (37%)	2 (11%)
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SD = Strongly Agree; A = Agree; N = Neither Agree or Disagree; D = Disagree; SD = Strongly Disagree; N/A = Not Applicable

Table 5a Summary of RuralMDcme Registrants' Choice of Internet Connection

28.8 Modem From Home	56k Modem From Home	Network Connection From Home	Network Connection From Work	Modem Connection From Work	Not Sure
1 (5%)	5 (25%)	9 (45%)	4 (20%)	1* (5%)	0 (0%)

* One registrant used both a network connection from home and a modem connection from work.

Table 5b Summary of RuralMDcme Registrants' Choice of Internet Browser

Internet Explorer	Netscape Navigator	Both
15 (83%)	2 (11%)	1 (5%)

*One person did not respond to this question.

Table 5c Summary of Comments Received About Specific Aspects of RuralMDcme.ca

Content or Information
<ul style="list-style-type: none"> • Excellent • Found nothing particularly useful on this site • Online CME is very useful • Second course on spinal cord injuries was too long with too much repetition. Key points could have been made much more concise. I literally spent hours on the course. • Very informative • Easily accessible
Navigation and Operational Features
<ul style="list-style-type: none"> • Have a poor rural phone line (which meant it took a long time for pages and images to load) • Very user-friendly web page • Only one problem when site was changed - corrected easy • Good • Some “button” did not work - were two screens leading nowhere
Page Design and Graphical Aspects
<ul style="list-style-type: none"> • Good overall (catchy!) • X-rays were often difficult to see clearly on webpage • Attractive
Strengths
<ul style="list-style-type: none"> • Easy to use/ simple and access • Easy to find information • Relevant, useful information/content • Attractive web pages • Applicable and relevant to rural medicine • Ability to learn at personal convenience/when you want • Free • Access to CME activity (highly available) • No need to use a proxy server • Great way of knowing what others are doing and great way of interacting with others. There’s always someone to answer questions. • Online for credit CME • CME from home - no travel • Pick your topics of interest • Instructor
Advice
<ul style="list-style-type: none"> • Improve x-ray pictures • It has been working well thus far. Do not change. • Ask specialists to prepare pages that can be used in rural practice.

Course Registration/Participation Statistics

Information concerning the extent of course registration, participation and completion were collected and examined as a component of the evaluation study. For each specific course, the level of participation in the discussion activities was examined. WebCT provides a record of items read and posted to the bulletin board. A record of online activity in the WebCT program is presented in the results section of this evaluation report. Given the nature of the hybrid systems which were used for the courses, we were unable to track or record participants' use of the CD courseware itself. The CD courseware was accessed on a participant's individual computer rather than a server, therefore we were unable to track 'hits'.

We calculated a 'registration to participation ratio' for each course offering and a total ratio for each course. The registration to participation ratio calculation involved dividing the total number of participants by the total number of registrants. This ratio provides an indication of the attrition level which was experienced. It should be noted that there was no participation or registration fee for the courses which were evaluated in this study. The Introduction to Assessment and Management of Dementia had the highest registration to participation ratio (0.6) of all four courses, while Cases in Emergency in Medicine had the lowest (0.4).

Management of Whiplash and Back Injuries

The first two sessions of this course had a registration to participation ratio of 0.4 and 0.3. This meant that approximately 40% and 30% of registrants went on to participate in the first two sessions respectively. However, session three had a registration to participation ratio of 0.6, meaning that approximately 60% of registrants participated in the third offering of the course.

Cases in Emergency Medicine

The first two sessions of this course had a registration to participation ratio of 0.4. This meant that approximately 40% of registrants went on to participate in the first two sessions of the course. Session three had a registration to participation ratio of 0.8, meaning that approximately 80% of registrants participated in the third session (although it must be noted there were fewer registrants for this session).

Introduction to Telehealth

This course had a low number of registrants and participation was low in session one. The registration to participation ratio was 0.1; only 1 out of 7 registrants went on to participate in the course. However, sessions two and three had registration to participation ratios of 1.0 which meant that 100% of registrants went on to participate in the course (although it must be noted there were fewer registrants for this session).

Introduction to Assessment and Management of Dementia

The total registration to participation ratio was higher than other courses (0.6). The first two sessions of this course had a registration to participation ratio of 0.7. Session three had a registration to participation ratio of 0.5.

Table 6 Summary of Registrants and Participants in *RuralMDcme.ca* Courseware Programs

Course	Session	Number of Registrants	Number of Participants*	Registration to Participation Ratio
Management of Whiplash and Back Injuries	Session One: February 25-March 17, 2002	10	4	$4/10 = 0.4$
	Session Two: April 15-May 5, 2002	6	2	$2/6 = 0.3$
	Session Three: September 9 - 29, 2002	8	5	$5/8 = 0.6$
				Total Ratio = 0.5
Cases in Emergency Medicine	Session One: February 11-March 3, 2002	17	6	$6/17 = 0.4$
	Session Two: April 8-28, 2002	12	5	$5/12 = 0.4$
	Session Three: May 20-June 9, 2002	5	4	$4/5 = 0.8$
				Total Ratio = 0.4
Introduction to Telehealth	Session One: March 4-24, 2002	7	1	$1/7 = 0.1$
	Session Two: June 3-23, 2002	3	3	$3/3 = 1$
	Session Three: September 9-29, 2002	2	2	$2/2 = 1$
				Total Ratio = 0.5

Introduction to Assessment and Management of Dementia	Session One: March 11-April 7, 2002	16	11	$11/16 = 0.7$
	Session Two: June 3-30, 2002	6	4	$4/6 = 0.7$
	Session Three: September 2-October 6, 2002	6	3	$3/6 = 0.5$
				Total Ratio = 0.6

* Participants were defined as individuals who were actively involved in viewing and reviewing course materials and who participated in discussions by reading and/or posting discussion items.

Characteristics of Course Participants

The Course Evaluation Survey included a 'demographic information' section which asked participants to provide information concerning their gender, years of experience, practice location and practice type. The results which are presented only represent the responses which were received from those participants who completed the survey.

Management of Whiplash and Back Injuries

The majority of respondents who participated in the course were female (67%), family physicians/GPs (83%) with at least 21-30 years of practice experience (50%).

Cases in Emergency Medicine

Forty-three percent (43%) of the respondents who participated were female, while 57% were male. The majority of participants were family physicians/GPs (93%) who practiced in rural areas (71%). Thirty-six percent (36%) of participants had 11-20 years of practice experience.

Introduction to Telehealth

The majority of respondents were male (67%) and all were rural family physician/GPs (100%). The majority (67%) reported 21-30 years of practice experience.

Introduction to Assessment and Management of Dementia

There were an equal number of male and female respondents (50% respectively) who participated in the course over three sessions. The majority were family physician/GPs (79%) and practiced in urban areas (67%). Thirty-six percent (36%) of participants had 0-5 years experience (36%), 29% reported 6-10 years experience, and 21% indicated 11-20 years experience.

As part of completing the course evaluation survey participants were also asked how they connected to the Internet in order to participate in the course. The results indicate that the majority of respondents in all courses (Whiplash, 67%; Emergency Medicine, 93%; Telehealth, 66%; Dementia, 88%) used connections at home to access the Internet. The majority of these respondents, with the exception of respondents to the Telehealth course (33%), used network connections (Whiplash, 50%; Emergency Medicine, 64%; Dementia, 63%). Others connected using a 56k modem (Whiplash, 17%; Emergency Medicine, 29%; Telehealth, 33%; Dementia, 25%).

Table 7 Summary of RuralMDcme Participant Characteristics

Courses		Management of Whiplash and Back Injuries	Cases in Emergency Medicine	Introduction to Telehealth	Introduction to Assessment and Management of Dementia
Gender	Female	4 (67%)	6 (43%)	1 (33%)	7 (50%)
	Male	2 (33%)	8 (57%)	2 (67%)	7 (50%)
Designation	Family Physician/GP	5 (83%)	13 (93%)	3 (100%)	11 (79%)
	Specialist	1 (17%)	1 (7%)		2 (14%)
	Other				1 (7%)
Years of Experiences	0-5 years		2 (14%)		5 (36%)
	6-10 years	1 (17%)	3(21%)		4 (29%)
	11-20 years	1 (17%)	5 (36%)		3 (21%)
	21-30 years	3 (50%)	3 (21%)	2 (67%)	1 (7%)
	30 years or more	1 (17%)	1 (7%)	1 (33%)	1 (7%)
Location of Practice	Urban	4 (67%)	4 (29%)		8 (67%)
	Rural	2 (33%)	10 (71%)	3 (100%)	4 (33%)

Table 8 Summary of RuralMDcme Participants' Internet Connections

Course	28.8 Modem From Home	Modem Connection From Work	56k Modem From Home	Network Connection From Work	Network Connection From Home
Management of Whiplash and Back Injuries	0 (0%)	0 (0%)	1(17%)	2 (33%)	3 (50%)
Cases in Emergency Medicine	0 (0%)	0 (0%)	4 (29%)	1 (7%)	9 (64%)
Introduction to Telehealth	0 (0%)	1 (33%)	1 (33%)	0 (0%)	1 (33%)
*Introduction to Assessment and Management of Dementia	0 (0%)	0 (0%)	4 (25%)	2 (13%)	10 (63%)

* Two participants provided more than one response.

Participation Statistics

As part of the online learning experiences provided through the *RuralMDcme* courses, participants had the opportunity to interact with the instructor and other participants through an asynchronous computer conferencing component of the WebCT learning management system. The computer conferencing component enabled learners to review, post and respond to text-based messages. For each specific course, the level of participation in the discussion activities was examined. WebCT provides a record of items read and posted to the bulletin board (computer conferencing) for each individual learner. The results listed below represent the average number of discussion postings which were accessed by participants and the average number of text-based message postings made by individual participants. All participants were expected to actively view and review all postings, however they were not required to author and actually post messages.

Management of Whiplash and Back Injuries

There was an average of 6.5 items read over three sessions and an average of 1.4 items posted.

Emergency Medicine

There was an average of 72.1 items read and 12.2 items posted over three sessions.

Introduction to Telehealth

There was an average of 18.2 items read and 5.3 items posted.

Introduction to Assessment and Management of Dementia

Over three sessions there was an average of 69.4 items read and 8.4 items posted.

Table 9 Summary of Participation Statistics

Courses (All sessions)	Average # of Items Read	Average # of Items Posted
Management of Whiplash and Back Injuries	6.5	1.4
Cases in Emergency Medicine	72.1	12.2
Introduction to Telehealth	18.2	5.3
Introduction to Assessment and Management of Dementia	69.4	8.4

Content Analysis of Discussion Transcripts

The discussion postings of one session (individual course offering) of each of the *RuralMDcme* courses were downloaded from WebCT for analysis. These discussion postings were saved as .txt (text) file transcripts and were copied to Ethnograph 5.0 for analysis. Ethnograph is a software program for analysing text-based, qualitative information. The purpose of this analysis was to examine the nature of the messages and comments which had been posted by participants to the various courses in *RuralMDcme*. The analysis considered only those messages posted by participants, not instructors. A *Transcript Analysis Tool*, developed by researchers at Athabasca University (Fahy et al., 2000), was used as part of the analysis process. The *Transcript Analysis Tool* uses a typology to classify computer-mediated messages. The classification categories include:

Fahy et al.'s (2000) Transcript Analysis Tool

Classification Category	Definition
Vertical Questioning	The emphasis is on the acquisition of data or information and the question is addressed to only one person (the person viewed as the most likely to possess the correct answer).
Horizontal Questioning	The purpose is to initiate or invite dialogue which anticipates discussion or collaboration. No "correct" answer is assumed to exist.
Statements	Usually does not invite dialogue. Information is provided to the audience. A "correct" answer is implied and the speaker believes he or she possesses it.
Reflections	Speaker reveals his or her conflicts, values, beliefs, reasoning processes, misgivings, doubts and provides other insights into his or her thinking processes. The speaker assumes listeners are interested in these personal revelations and will respond with acceptance and support. Responses are welcome.
Scaffolding	The speaker invites others to comment by referring to their views or addressing shared group experiences.

Examples of Messages Posted (from all courses):

Vertical Questioning

Vertical questions are most likely addressed to the instructor. One example is as follows:

Great tip about the alpha blocker. How long would you keep him on that? Just until he gets to see a urologist?

Horizontal Questioning

Some examples of questions posted are as follows:

Does anyone know what type of increased risk this would put someone with hemorrhagic stroke at?

The whole online world is theoretically available for consultation - should we go for the best specialist wherever he/she is? How would that person be paid? What happens if the advice results in harm to the patient?

In an Alzheimer's patient with history of heart disease or strokes, no other vascular risk factors other than hyperlipidemia, how aggressive are you in treating the hyperlipidemia?

Statements

Many of the statements posted by participants were often in the form of introductions or they relayed what participants would do in certain situations. They did not make any personal revelations or discuss why they would take a certain course of action. They did not invite dialogue from other participants. Some examples are as follows:

The difference between a chart review and viewing a video is that the observer in the latter case can draw their own independent conclusions based on what they see the patient doing. With the benefit of hindsight it may be easier to criticize the provider and his/her interaction.

The Alzheimer's Society is an excellent resource for families with a loved one with Alzheimers. Some communities would also have respite care and day programs for Alzheimers patients.

I think it is important to set some specific goals or expectations for the patient and the family with respect to medication outcome.

Reflections

In many cases, examples of reflections involved participants reflecting on their past experiences, personal feelings, and revealing why they responded in the way that they did in certain situations. In many cases they were responding to questions or cases posed by the instructor. Some examples were as follows:

If she is silly enough to drink that much [referring to a diabetic who is wondering how to adjust her insulin intake under such circumstances] she is likely not to take her insulin even though she has been told many times to take it. Some diabetics are incorrigible!

Again this is a very typical case and I have discovered over many years in practice that the length of time that a patient experiences significant symptoms is coincidentally the same length of time that it takes for the insurance companies to settle the case financially. After this occurs, I will rarely see the patient in follow-up.

For me, I have only seen cases of Alzheimer's and Vascular dementia..... Mixed dementia is more common. But I am not sure how to confidently make a diagnosis of a mixed dementia.

Scaffolding

Scaffolding questions or comments build on those stated by previous participants. Such questions or comments also might invite others to comment and share their views. Some examples were as follows:

I agree with [participant's name]. In addition, we can also make use of tools such as Functional Assessment Staging Test or Functional Activities Questionnaire.

I agree with you [refers to another participant by name]. There has been discussion in our forum re using lab to decide on enzymes.

It's good to hear your experience [referring to an experience recounted by another participant]. I would definitely have been hesitant to close it and would have irrigated it with the time consuming syringe/iv catheter!

Management of Whiplash and Back Injuries

Thirty-three percent (33%) of the items which were posted involved *Horizontal Questioning* and 50% of the items posted involved *Reflections*.

Cases in Emergency Medicine

While there was some interaction among participants, as indicated by the 21 (18%) and 13 (11%) messages categorized as *Reflections* and *Scaffolding* respectively, the majority of messages posted by participants (64%) were *Statements*.

Introduction to Telehealth

It was difficult to assess the types of questions or comments posted as there was only one participant in this course session. However, this participant was quite active in his/her questioning of and discussion with the two instructors. He/she mainly provided *Statements*; six of the eight items which were posted (75%) were categorized as such.

Introduction to Assessment and Management of Dementia

While fifty-nine (59%) of messages were *Statements*, 32% could be categorized as *Scaffolding*. These participants attempted to build on the comments and postings of others.

Table 10 Summary of Categories of Computer-Mediated Messages

Course	Vertical Questioning	Horizontal Questioning	Statements	Reflections	Scaffolding
Management of Whiplash and Back Injuries (Session One)	0 (0%)	2 (33%)	1(17%)	3 (50%)	0 (0%)
Cases in Emergency Medicine (Session Two)	2 (2%)	7 (6%)	76 (64%)	21 (18%)	13 (11%)
Introduction to Telehealth (Session One)	0 (0%)	2 (25%)	6 (75%)	0 (0%)	0 (0%)
Introduction to Assessment & Management of Dementia (Session Three)	0 (0%)	2 (5%)	22 (59%)	1 (3%)	12 (32%)

Course Evaluation Survey Results

At the end of each course session, participants were asked to complete an evaluation survey. The purpose of the survey was to evaluate respondents' satisfaction with their participation in the courseware program. This evaluation survey was accessible through the main home page of the courseware program. Paper copies of this survey were also faxed to those participants who did not complete the online version.

Management of Whiplash and Back Injuries

A total of six participants (N = 6) completed the course evaluation survey for all three sessions of the Management of Whiplash and Back Injuries program. Overall, participants' responses to the program were positive. All participants agreed or strongly agreed (100%) that they would participate in another course of this type. Eighty-three percent (83%) of participants agreed or strongly agreed that they would recommend this course to others. Eighty-three percent (83%) of participants also agreed or strongly agreed that aspects of the content, instruction, and operations of the courseware were adequate. Fifty percent (50%) of participants neither agreed nor disagreed that all the information presented to them was necessary.

With regards to graphics and media, all participants (100%) agreed that the screen design was well-organized for ease of use and the use of different media helped to present the subject matter effectively. However, some participants felt the site was not easy to navigate (17% disagreed; 17% strongly disagreed) and as a result, had difficulty using the resources which were accessible to them. As for the bulletin board discussion, the course evaluation results suggest that several participants may have experienced difficulty. Fifty percent (50%) of participants did not find it easy to post, respond, and reply to messages. A majority of respondents were also ambivalent about many aspects of this part of the courseware program. Eighty-three percent (83%) of participants (50% neither agreed nor disagreed; 33% checked not applicable) had no opinion concerning whether participation in such discussions enhanced their understanding of the subject area. Eighty-three percent (83%) of participants (50% neither agreed nor disagreed; 33% checked not applicable) also indicated no opinion concerning the benefits of such discussions in enhancing communication between the facilitator, their colleagues, and themselves.

Participants were also invited to make open-ended comments in three areas: (1) the three greatest barriers to their successful participation in the program; (2) the three greatest strengths of the courseware program; and (3) the overall design and content of the courseware. Common barriers were related to difficulties with the discussion board or technical problems with the program. Some participants had difficulty with or were unable to access the discussion board. Other participants found their computers were outdated (which caused many technical problems) or they experienced problems in having to link to an external Web site to download plug-in applications to view instructional material in the courseware. Other barriers which participants commented about included:

Availability of course unknown to many. This sometimes meant fewer participants and no discussion;

Finding time.

Many participants felt that a main strength of the courseware program was that it was convenient, flexible, and provided them with an opportunity to work at their own pace. The course was well-organized and it gave participants the time they needed to review topics until they were comfortable with their understanding. Other strengths listed by participants included:

The potential ability to discuss cases with colleagues throughout the country;

Can ask questions of consultant in the area.

Table 11 Summary of Course Evaluation Survey - Management of Whiplash and Back Injury

Content & Instruction	SD	D	N	A	SA	N/A
The instruction provided through this courseware addressed my learning needs				3 (50%)	3 (50%)	
Course objectives were clear and comprehensive				3 (50%)	3 (50%)	
The information that was provided was complete, thorough, and applicable to my practice			1 (17%)	2 (33%)	3 (50%)	
All information was necessary (there was little/no superfluous information)			3 (50%)	1 (17%)	2 (33%)	
Operation	SD	D	N	A	SA	N/A
My participation in this program has enhanced my knowledge and skills in this area			1 (17%)	2 (33%)	3 (50%)	
The courseware was easy to load			1 (17%)	2 (33%)	3 (50%)	
The courseware was well organized for ease of use		1 (17%)		3 (50%)	2 (33%)	
The instructional/directional information supplied for this courseware was effective and clearly worded			1 (17%)	5 (83%)		
Graphics & Media	SD	D	N	A	SA	N/A
The Web pages were attractive			1 (17%)	4 (67%)	1 (17%)	
The screen design and layouts were clear, uncluttered and well organized for ease of use				4 (67%)	2 (33%)	
The use of different media components (text, images, photos) presented the subject matter effectively				2 (33%)	4 (67%)	

It was easy to navigate and find my way around, so I could concentrate on learning the material rather than learning how to use the courseware	1 (17%)	1 (17%)		4 (67%)		
All links and navigation buttons were clearly labelled and served an easily identified purpose			1 (17%)	2 (33%)	3 (50%)	
Bulletin Board Discussion	SD	D	N	A	SA	N/A
Participating in discussions enhanced my understanding of the subject areas	1 (17%)		3 (50%)			2 (33%)
I found it informative and beneficial to be able to communicate with the facilitators(s)			3 (50%)	1 (17%)		2 (33%)
I found it informative and beneficial to be able to communicate with my colleagues			3 (50%)			3 (50%)
I was more comfortable participating in discussions in this courseware program than I am in face-to-face courses		2 (33%)	1 (17%)	1 (17%)		2 (33%)
I found it easy to post, respond, and reply to messages in the bulletin board	1 (17%)	2 (33%)	1 (17%)	1 (17%)		1 (17%)
The facilitator(s) responded promptly to my questions	1 (17%)		3 (50%)	1 (17%)		1 (17%)
Overall Impressions	SD	D	N	A	SA	N/A
I would participate in another CME course offering of this type				3 (50%)	3 (50%)	
I would recommend this course to others			1 (17%)	3 (50%)	2 (33%)	
I received adequate help with technical problems			3 (50%)	2 (33%)	1 (17%)	
Overall, the content was clear and easy to understand				3 (50%)	3 (50%)	
Overall, the instruction I received through this courseware program was appealing, interesting and motivating				4 (67%)	2 (33%)	
Because this was an online course:	SD	D	N	A	SA	N/A

I spent too much time trying to gain access to a computer or computer terminal	3 (50%)	2 (33%)			1 (17%)	
I used the WWW resource links to locate information for inquiries that went about and beyond that required for this course (eg. for certain patient problems)				5 (83%)	1 (17%)	
I was able to learn at my own pace				1 (17%)	5 (83%)	
I was at a disadvantage because I do not possess adequate computer skills	2 (33%)	2 (33%)	1 (17%)	1 (17%)		
I spent more time studying				4 (67%)	2 (33%)	
I put more thought into my comments		1 (17%)	2 (33%)	2 (33%)		1 (17%)
I was better able to juggle my learning time with my work and/or home responsibilities				1 (17%)	5 (83%)	

SD = Strongly Agree; A = Agree; N = Neither Agree or Disagree; D = Disagree; SD = Strongly Disagree; N/A = Not Applicable

Table 11a Summary of Participants’ Perceived Barriers, Strengths, and Advice - Management of Whiplash and Back Injury

Barriers
<ul style="list-style-type: none"> • Unable to access the discussion board • Unable to access site until received CD-ROM • Availability of course unknown to many. This sometimes meant fewer participants and no discussion. • Outdated computer • Needed instruction from outside the courseware to download applications, eg. RealOne finding time
Strengths
<ul style="list-style-type: none"> • Well-organized with clear and segmented portions • WWW links provided • Ability to study at your own pace • The potential ability to discuss cases with colleagues throughout the country • Able to review topic over and over until you learn it • Can ask questions of consultant in the area • Humour in videos • Flexible with regards to time and needs
Advice
<ul style="list-style-type: none"> • The later videos were somewhat slow • Site and discussion boards need to be easier to access. • Try to fix “glitches” in program. One participant commented that he/she had trouble accessing all information. Two topics would not open. Once scrolling cursor did not appear and she could not read all the text.

Cases in Emergency Medicine

A total of fourteen participants (N = 14) completed the course evaluation survey for all three sessions of the Cases in Emergency Medicine program. Ninety three percent (93%) of these participants strongly agreed that they would participate in another course of this type, while 86% strongly agreed they would recommend it to others. A majority of participants either agreed or strongly agreed (93%) that aspects of the content and instruction of the courseware were adequate. Seventy-two percent (72%) of participants either agreed or strongly agreed that aspects of the courseware's operations were adequate, and 64% of participants felt that the courseware was well-organized for ease of use. With regards to graphics and media, the majority of participants either agreed or strongly agreed (86%) that the web pages were attractive, the screen design and layout was clear and well-organized (83%), and the use of different media presented the subject matter effectively (79%). However, as with the *Management of Whiplash and Back Injuries*, some participants had difficulty navigating the site. Twenty-one percent (21%) either disagreed or strongly disagreed that the site was easy to navigate, while 43% were ambivalent (they neither agreed nor disagreed) and held no opinion about this. As for the bulletin board discussion, the responses were positive. Seventy-two percent (72%) of participants either agreed or strongly agreed that participating in the discussions enhanced their understanding of the subject matter. The majority of participants (64%) thought it was beneficial to be able to communicate with the facilitator and other colleagues. Fifty-seven percent (57%) of participants either agreed or strongly agreed that it was easy to post, respond, and reply to messages in the bulletin board.

The most common barriers to using the courseware were related to difficulties in participating in the discussions and technical problems. Some participants had difficulty accessing the discussion and posting messages and replies, while others had problems with the web site (the site was down or their password would not work). Several participants experienced difficulties with viewing the ECG's/EKG's which were provided. Other barriers which participants commented about included:

Could be time consuming;

Lack of direct physical communication;

Inadequate number of participants.

One of the main strengths of the program was its convenience. A number of participants also noted that the course content was relevant and the course itself was interactive and made learning fun. Other participant comments included:

Relevant to practice;

Abstracts on various topics very useful in providing new information on treating a variety of ER problems;

Discussion between participants and facilitator very informative and interesting.

Regarding advice, participants felt it was important to address the technical problems and improve features of the discussion board. One participant wondered if there was any way of connecting directly from each case to the appropriate discussion without having to go through all the screens. Other suggestions received from participants included:

Improve EKG graphics;

Save some discussion comments from previous course participants;

Review the links being referred to or add some that may be easier to find things in.

Table 12 Summary of Course Evaluation Survey - Cases in Emergency Medicine

Content & Instruction	SD	D	N	A	SA	N/A
The instruction provided through this courseware addressed my learning needs			1 (7%)	6 (43%)	7 (50%)	
Course objectives were clear and comprehensive				7 (50%)	7 (50%)	
The information that was provided was complete, thorough, and applicable to my practice			1(7%)	5 (36%)	8 (57%)	
All information was necessary (there was little/no superfluous information)			1 (7%)	6 (43%)	7 (50%)	
Operation	SD	D	N	A	SA	N/A
My participation in this program has enhanced my knowledge and skills in this area				6 (43%)	8 (57%)	
The courseware was easy to load		2 (14%)	2 (14%)	6 (43%)	4 (29%)	
The courseware was well organized for ease of use		1 (7%)	4 (29%)	3 (21%)	6 (43%)	
The instructional/directional information supplied for this courseware was effective and clearly worded		1 (7%)	1 (7%)	6 (43%)	6 (43%)	
Graphics & Media	SD	D	N	A	SA	N/A
The Web pages were attractive			2 (14%)	6 (43%)	6 (43%)	
The screen design and layouts were clear, uncluttered and well organized for ease of use			1 (7%)	7 (50%)	6 (43%)	
The use of different media components (text, images, photos) presented the subject matter effectively			3 (21%)	6 (43%)	5 (36%)	

It was easy to navigate and find my way around, so I could concentrate on learning the material rather than learning how to use the courseware	1 (7%)	2 (14%)	6 (43%)	3 (21%)	2 (14%)	
All links and navigation buttons were clearly labelled and served an easily identified purpose		1 (7%)	4 (29%)	5 (36%)	4 (29%)	
Bulletin Board Discussion	SD	D	N	A	SA	N/A
Participating in discussions enhanced my understanding of the subject areas			2 (14%)	6 (43%)	4 (29%)	2 (14%)
I found it informative and beneficial to be able to communicate with the facilitators(s)			1 (7%)	5 (36%)	4 (29%)	4 (29%)
I found it informative and beneficial to be able to communicate with my colleagues			3 (21%)	6 (43%)	3 (21%)	2 (14%)
I was more comfortable participating in discussions in this courseware program than I am in face-to-face courses		3 (21%)	6 (43%)	3 (21%)		2 (14%)
I found it easy to post, respond, and reply to messages in the bulletin board	2 (14%)	1 (7%)	2 (14%)	5 (36%)	3 (21%)	1 (7%)
The facilitator(s) responded promptly to my questions			2 (14%)	5 (36%)	3 (21%)	4 (29%)
Overall Impressions	SD	D	N	A	SA	N/A
I would participate in another CME course offering of this type				1 (7%)	13 (93%)	
I would recommend this course to others				2 (14%)	12 (86%)	
I received adequate help with technical problems			5 (36%)	1 (7%)	3 (21%)	5 (36%)
Overall, the content was clear and easy to understand				5 (36%)	9 (64%)	

Overall, the instruction I received through this courseware program was appealing, interesting and motivating			1 (7%)	5 (36%)	8 (57%)	
Because this was an online course:	SD	D	N	A	SA	N/A
I spent too much time trying to gain access to a computer or computer terminal	5 (36%)	6 (43%)	1 (7%)	1 (7%)	1 (7%)	
I used the WWW resource links to locate information for inquiries that went about and beyond that required for this course (eg. for certain patient problems)	1 (7%)	1 (7%)	1 (7%)	9 (64%)	2 (14%)	
I was able to learn at my own pace	1 (7%)			3 (21%)	10 (71%)	
I was at a disadvantage because I do not possess adequate computer skills	4 (29%)	7 (50%)	1 (7%)	2 (14%)		
I spent more time studying		3 (21%)	1 (7%)	9 (64%)	1 (7%)	
I put more thought into my comments		2 (14%)	5 (36%)	6 (43%)		1 (7%)
I was better able to juggle my learning time with my work and/or home responsibilities				3 (21%)	11 (79%)	

SD = Strongly Agree; A = Agree; N = Neither Agree or Disagree; D = Disagree; SD = Strongly Disagree; N/A = Not Applicable

Table 12a Summary of Participants' Perceived Barriers, Strengths, and Advice - Cases in Emergency Medicine

Barriers
<ul style="list-style-type: none"> • Problems with internet connection • Difficulties accessing discussion or posting replies • Problems with the website, ie. site down or difficulty getting ID to work • Could be time consuming • Lack of direct physical communication • ECG's/EKG's enlarged poorly • Some of the websites were not very helpful or difficult to navigate • Inadequate number of participants
Strengths
<ul style="list-style-type: none"> • Convenient, flexible, accessible • Excellent course - cases very practical • Inexpensive/no cost • Relevant to practice • Interactive • Abstracts on various topics very useful in providing new information on treating a variety of ER problems • Links to resource readings were easy, with excellent articles • Made learning fun as it combined reading with review of x-rays, EKG's and photos • Discussion between participants and facilitator very informative and interesting • Prompt and adequate response by facilitator
Advice
<ul style="list-style-type: none"> • It would be nice to know how many others taking the course. Participants thought there was only one other person taking part in discussions. Maybe course should be postponed until minimum number of participants sign up. • Improve EKG graphics • Save some discussion comments from previous course participants • Fix technical problems • Better advertisement • Any way of connecting directly from each case to the appropriate discussion without having to go through all the screens? • Review the links be referred to or add some that may be easier to find things in.

Introduction to Telehealth

A total of three participants (N = 3) completed the course evaluation survey for all three sessions. Two participants were ambivalent about recommending the program to others (neither agreeing or disagreeing), while one participant disagreed (he/she would not recommend the course). Overall, participants either agreed or strongly agreed (66%) that most aspects of the content and instruction were adequate. However, only one participant agreed (33%) that the instruction provided through the courseware addressed his/her learning needs (one participant disagreed while the other neither agreed nor disagreed). All participants (100%) either agreed or strongly agreed that most operations of the courseware were adequate. One participant (33%) neither agreed nor disagreed that participation in the program enhanced his/her knowledge and skills in the area of telehealth. All participants either agreed or strongly agreed (100%) that the screen design was well-organized for ease of use, the use of different media presented the subject matter effectively (100%), and agreed or strongly agreed that the site was easy to navigate (100%). As for the bulletin board discussion, although participants' impressions were mainly positive, all stated they were uncomfortable participating in such discussions as compared to face-to-face courses.

Common barriers included technical difficulties. One participant commented that he/she was unable to do the post-test or commitment to change activity due to such difficulties. Another participant felt the course was very basic and did not have much depth. Participants did believe that the links which were made available to them, the courseware's ease of use, and a responsive facilitator were some of the courseware's strengths. One participant commented:

Multimedia interesting.

With regards to advice, they suggested adding more Canadian content to the course to make it relevant and encouraged the recruitment of more participants for future courses. Suggestions for course content included:

Are there any guidelines for conducting a tele-interview (who is developing them, what is written)?

Table 13 Summary of Course Evaluation Survey - Introduction to Telehealth

Content & Instruction	SD	D	N	A	SA	N/A
The instruction provided through this courseware addressed my learning needs		1 (33%)	1 (33%)	1 (33%)		
Course objectives were clear and comprehensive			1 (33%)	2 (67%)		
The information that was provided was complete, thorough, and applicable to my practice				2 (67%)		1 (33%)
All information was necessary (there was little/no superfluous information)			1 (33%)	1 (33%)	1 (33%)	
Operation	SD	D	N	A	SA	N/A
My participation in this program has enhanced my knowledge and skills in this area			1 (33%)	2 (67%)		
The courseware was easy to load				1 (33%)	2 (67%)	
The courseware was well organized for ease of use				2 (67%)	1 (33%)	
The instructional/directional information supplied for this courseware was effective and clearly worded				2 (67%)	1 (33%)	
Graphics & Media	SD	D	N	A	SA	N/A
The Web pages were attractive				1 (33%)	2 (67%)	
The screen design and layouts were clear, uncluttered and well organized for ease of use				1 (33%)	2 (67%)	
The use of different media components (text, images, photos) presented the subject matter effectively				2 (67%)	1 (33%)	

It was easy to navigate and find my way around, so I could concentrate on learning the material rather than learning how to use the courseware				2 (67%)	1 (33%)	
All links and navigation buttons were clearly labelled and served an easily identified purpose				2 (67%)	1 (33%)	
Bulletin Board Discussion	SD	D	N	A	SA	N/A
Participating in discussions enhanced my understanding of the subject areas			2 (67%)		1 (33%)	
I found it informative and beneficial to be able to communicate with the facilitators(s)			2 (67%)	1 (33%)		
I found it informative and beneficial to be able to communicate with my colleagues				1 (33%)		2 (67%)
I was more comfortable participating in discussions in this courseware program than I am in face-to-face courses	1 (33%)	2 (67%)				
I found it easy to post, respond, and reply to messages in the bulletin board				2 (67%)	1 (33%)	
The facilitator(s) responded promptly to my questions					*1 (50%)	*1 (50%)
Overall Impressions	SD	D	N	A	SA	N/A
I would participate in another CME course offering of this type				3 (100%)		
I would recommend this course to others		1 (33%)	2 (67%)			
I received adequate help with technical problems			1 (33%)			2 (67%)
Overall, the content was clear and easy to understand					3 (100%)	

Overall, the instruction I received through this courseware program was appealing, interesting and motivating			1 (33%)	2 (67%)		
Because this was an online course:	SD	D	N	A	SA	N/A
I spent too much time trying to gain access to a computer or computer terminal	1 (33%)	1 (33%)	1 (33%)			
I used the WWW resource links to locate information for inquiries that went about and beyond that required for this course (eg. for certain patient problems)				2 (67%)		1 (33%)
I was able to learn at my own pace				1 (33%)	2 (67%)	
I was at a disadvantage because I do not possess adequate computer skills	2 (67%)	1 (33%)				
I spent more time studying		3 (100%)				
I put more thought into my comments		1 (33%)	1 (33%)	1 (33%)		
I was better able to juggle my learning time with my work and/or home responsibilities			1 (33%)	1 (33%)	1 (33%)	

**Only two participants responded to this question.*

SD = Strongly Agree; A = Agree; N = Neither Agree or Disagree; D = Disagree; SD = Strongly Disagree; N/A = Not Applicable

Table 13a Summary of Participants' Perceived Barriers, Strengths, and Advice - Introduction to Telehealth

Barriers
<ul style="list-style-type: none"> • Could not do post-test or commitment to change due to technical difficulties • Lack of other participants • Course was very basic and did not have much depth
Strengths
<ul style="list-style-type: none"> • Easy to understand • Multimedia interesting • Large number of references and sites to explore • Responsive facilitator
Advice
<ul style="list-style-type: none"> • I think a good deal of effort was put into this course by its developers, but it really isn't relevant to my practice situation. I am a rural GP and was more interested in how a PC could enhance my practice. • More Canadian content (who are current leaders and what are they doing) • Are there any guidelines for conducting a tele-interview (who is developing them, what is written) • Find ways to get more participation

Introduction to Assessment and Management of Dementia

Pre Self-Assessment

The participants in the Introduction to Assessment and Management of Dementia courseware program were asked to complete a self-assessment survey prior to their participation. Eighteen (18) individuals participated in the course over three sessions; a total of 17 participants completed the self-assessment survey. This survey included a number of questions pertaining to the participants' practice characteristics and experiences with patients who have Alzheimer's disease or dementia.

All of the participants had some experience and/or knowledge of Alzheimer's disease and dementia, and reported experience working with patients experiencing such symptoms. Participants reported an average of 12.8 patients in their practices who had been firmly or tentatively diagnosed with Alzheimer's disease; and an average of 5.5 patients in their practices who had been firmly or tentatively diagnosed with dementia. Eight participants (47%) had personally conducted 1 - 5 Mini Mental Status Exams (MMSE) in the last six months, three (18%) reported they had conducted 6-10 exams, three (18%) had conducted more than 10 exams, and three (18%) had not conducted any. The majority of participants reported feeling 'somewhat comfortable' with taking a history around cognitive decline (76%) and 59% reported feeling 'somewhat comfortable' about deciding when to treat patients with cognitive enhancers. Forty-one percent (41%) of participants refer their patients to other physicians for treatment, but still provide them with ongoing care.

Table 14 Summary of Self-Assessment Survey - Introduction to Assessment and Management of Dementia

Questions	Responses	
Approximately how many patients do you currently have in your practice for whom you have a firm or tentative diagnosis of Alzheimer's Disease?	12.8 patients	
Approximately how many patients do you currently have in your practice for whom you have a firm or tentative diagnosis of other types of dementia?	5.5 patients	
How many Mini Mental Status Exams (MMSE) have you personally done in the last six months?	None	3 (18%)
	1-5 exams	8 (47%)
	6-10 exams	3 (18%)
	> 10 exams	3 (18%)
How comfortable are you with taking a history around cognitive decline?	Somewhat	13 (76%)
	Very	4 (24%)

How comfortable are you with using the MMSE?	Somewhat	10 (59%)
	Very	7 (41%)
How comfortable are you with deciding when to treat with cognitive enhancers?	Not At All	4 (24%)
	Somewhat	10 (59%)
	Very	3 (18%)
My usual involvement with my patients with dementia is:	Refer with minimum history	2 (12%)
	Refer for diagnosis confirmation, treatment and ongoing care	1 (6%)
	Refer but provide ongoing care	7 (41%)
	Complete care of uncomplicated	4 (24%)
	Complete care of uncomplicated and complicated	3 (18%)

Commitment to Change & Reflective Exercise

At the end of each session participants were asked to complete a “Commitment to Change” form. This form offered participants the opportunity to reflect on the subject matter presented during the course and to identify how the information could enhance or change their clinical practice. These comments do not represent commitments from all participants, but only those who completed this form. Participants were asked, “*As result of this workshop, identify five concrete measurable changes you will employ in your practice.*” Participants will be asked at a later date to review their comments to determine if, in fact, these changes did occur. The commitments received from participants in the first two sessions of the course include:

- *Will use the SMMSE handbook.*
- *Will use SMMSE on an ongoing basis to evaluate patient response to anticholinesterase RX rather than just at initial assessment. Will also use SMMSE with a staging instrument to more accurately characterize disease stage in Alzheimer's patients.*
- *Be more aware of the other types of dementia.*
- *Clearly document MMSE score on chart for use by the patients primary care giver.*
- *Feel more comfortable performing an MMSE, but recognize limitations.*
- *Will do a complete screening of any patient with memory loss with the MMSE and score it and take a complete dementia questionnaire.*
- *Will order CT head on dementia patients that meet criteria not all patients as I did before.*
- *Will periodically question relatives of dementia patients to conquer burnout.*

- *Will refer patients early to AD resources.*
- *Assess new resident's for criteria for dementia on admission to long term care.*
- *Assess patients with dementia for cause and adjust treatment as required.*
- *Counsel families as to diagnosis and expected course and provide access to resources/counselling. Ensure families get more written info on the disease and support groups is in the website given in the course. Discussion with family about advance directives, wills, driving, safety and contact with alzheimer's society early in first few visits.*
- *Discuss diagnosis and educate nursing staff in LTC as to difference in symptoms, signs, behaviours and course.*
- *Advocate for improved atmosphere mileau for dementia patient in ad out of institutions.*
- *Use the MMSE form regularly to follow patients with suspected known dementia (i.e. 3-6 months).*
- *Utilize other tests in patients with suspected dementia .*
- *Ensure all other possibilities are ruled out when diagnosing dementia.*
- *Use cholinesterase inhibitors earlier and frequently assess how they are working.*

Three months after completing the course, participants were sent post-assessment instruments and were asked to reflect on their experiences since the course and to respond to the following questions: 1. *What impact did the Dementia workshop have on your practice?* 2. *Considering the course and your current management of dementia, what learning needs remain? How will you address these?* The responses received to date included the following:

- *I feel more confident evaluating people with dementia - decreased number of referrals. More comfortable with diagnosing mild-moderate stages of dementia than I initially was. I am also more comfortable with what follow-up should be instituted if only the patient complains of deficits but the MMSE is normal. I'm regularly receiving my patients with Alzheimer's disease now.*
- *I feel more comfortable writing them up, treating, and following them.*
- *Dealing with patients and families given time constraints of family members. I'll do more questionnaires. Use RN's for some things.*
- *Better handle on managing behavioural issues that can arise and help families come up with plans for their loved one's future. Hoping/need to take more CME courses on dementia because as I age, so will my population of patients.*

Course Evaluation Survey

A total of fourteen participants (N = 14) completed the course evaluation survey for all three sessions of the *Introduction to Assessment and Management of Dementia* courseware program. Ninety-three percent (93%) of participants either agreed or strongly agreed that they would participate in another CME course of this type and recommend it to others. A majority of participants agreed (85%) that aspects of the content and instruction were adequate, but comments regarding the operation of the course, graphics and media varied. Fifty seven percent (57%) of participants either agreed or strongly agreed that the courseware was easy to load, and 50% felt it was well-organized and effective. However, a majority of participants (57%) disagreed or strongly disagreed that the site was easy to navigate, while 21% neither agreed nor disagreed with this aspect. Overall, participants' comments about the bulletin board discussion were positive. Seventy-nine percent (79%) either agreed or strongly agreed that their participation in the discussions enhanced their understanding of the subject matter. Seventy-two percent (72%) of participants either agreed or strongly agreed that the discussions were beneficial for communicating with the facilitator and their colleagues. Sixty-five percent (65%) found it easy to post, respond, and reply to messages. Although participants' responses were positive, 50% disagreed that they were more comfortable participating in online discussions and would prefer face-to-face discussion.

Common barriers, as with other courses, included technical difficulties, problems navigating the site, and understanding the use of the bulletin board discussions. Technical difficulties ranged from problems with passwords or accessing the Internet, to being completely shut out of the program. Other barriers which participants commented on included:

Lack of computer knowledge;

Delay in receiving course binder;

Interaction is severely limited as opposed to face-to-face discussion.

Participants' comments regarding the strengths of the courseware were positive. Many felt the course was well-organized and the facilitator and the resources which were provided were excellent. They felt the course was clinically relevant for their practices. Others commented on the convenience of using such a courseware program for CME. Participants' comments included:

Ability to get facilitator comments;

Easy to use once you get use to it;

Table 15 Summary of Course Evaluation Survey - Introduction to Assessment and Management of Dementia

Content & Instruction	SD	D	N	A	SA	N/A
The instruction provided through this courseware addressed my learning needs			1 (7%)	6 (43%)	7 (50%)	
Course objectives were clear and comprehensive			1 (7%)	4 (29%)	9 (64%)	
The information that was provided was complete, thorough, and applicable to my practice				9 (64%)	5 (36%)	
All information was necessary (there was little/no superfluous information)			1 (7%)	4 (29%)	9 (64%)	
The resource binder was useful part of the course				2 (14%)	12 (86%)	
My participation in this program has enhanced my knowledge and skills in this area				6 (43%)	8 (57%)	
The information presentation strategies (multimedia tutorial, case study self-assessments, x-ray self-assessment) were interactive and instructive			1 (7%)	9 (64%)	3 (21%)	1 (7%)
Operation	SD	D	N	A	SA	N/A
The courseware was easy to load	1 (7%)	1 (7%)	1 (7%)	5 (36%)	3 (21%)	3 (21%)
The courseware was well organized for ease of use	1 (7%)	2 (14%)	3 (21%)	3 (21%)	4 (29%)	1 (7%)
The instructional/directional information supplied for this courseware was effective and clearly worded		1 (7%)	2 (14%)	4 (29%)	6 (43%)	1 (7%)
Graphics & Media	SD	D	N	A	SA	N/A
The Web pages were attractive			3 (21%)	6 (43%)	5 (36%)	

The screen design and layouts were clear, uncluttered and well organized for ease of use	2 (14%)	1 (7%)	2 (14%)	3 (21%)	6 (43%)	
The use of different media components (text, images, photos) presented the subject matter effectively		1 (7%)	4 (29%)	4 (29%)	3 (21%)	2 (14%)
It was easy to navigate and find my way around, so I could concentrate on learning the material rather than learning how to use the courseware	3 (21%)	5 (36%)	3 (21%)	2 (14%)	1 (7%)	
All links and navigation buttons were clearly labelled and served an easily identified purpose	1 (7%)	4 (29%)	1 (7%)	5 (36%)	3 (21%)	
Bulletin Board Discussion	SD	D	N	A	SA	N/A
Participating in discussions enhanced my understanding of the subject areas			1 (7%)	6 (43%)	5 (36%)	2 (14%)
I found it informative and beneficial to be able to communicate with the facilitators(s)			1 (7%)	3 (21%)	8 (57%)	2 (14%)
I found it informative and beneficial to be able to communicate with my colleagues			2 (14%)	5 (36%)	5 (36%)	2 (14%)
I was more comfortable participating in discussions in this courseware program than I am in face-to-face courses		7 (50%)	1 (7%)	5 (36%)		1 (7%)
I found it easy to post, respond, and reply to messages in the bulletin board	1 (7%)	2 (14%)		4 (29%)	5 (36%)	2 (14%)
The facilitator(s) responded promptly to my questions		1 (7%)	1 (7%)	3 (21%)	7 (50%)	2 (14%)
Overall Impressions	SD	D	N	A	SA	N/A
I would participate in another CME course offering of this type		1 (7%)		2 (14%)	11 (79%)	
I would recommend this course to others		1 (7%)		2 (14%)	11 (79%)	

I received adequate help with technical problems		2 (14%)	2 (14%)	4 (29%)	4 (29%)	2 (14%)
Overall, the content was clear and easy to understand				6 (43%)	8 (57%)	
Overall, the instruction I received through this courseware program was appealing, interesting and motivating			2 (14%)	5 (36%)	7 (50%)	
Because this was an online course:	SD	D	N	A	SA	N/A
I spent too much time trying to gain access to a computer or computer terminal	4 (29%)	2 (14%)	5 (36%)		2 (14%)	1 (7%)
I used the WWW resource links to locate information for inquiries that went about and beyond that required for this course (eg. for certain patient problems)		3 (21%)	1 (7%)	5 (36%)	2 (14%)	3 (21%)
I was able to learn at my own pace				7 (50%)	7 (50%)	
I was at a disadvantage because I do not possess adequate computer skills	7 (50%)	2 (14%)	3 (21%)		1 (7%)	1 (7%)
I spent more time studying		2 (14%)	3 (21%)	6 (43%)	3 (21%)	
I put more thought into my comments			5 (36%)	4 (29%)	4 (29%)	1 (7%)
I was better able to juggle my learning time with my work and/or home responsibilities		2 (14%)		5 (36%)	7 (50%)	

SD = Strongly Agree; A = Agree; N = Neither Agree or Disagree; D = Disagree; SD = Strongly Disagree; N/A = Not Applicable

Table 15a Summary of Participants' Perceived Barriers, Strengths, and Advice - Introduction to Assessment and Management of Dementia

Barriers
<ul style="list-style-type: none"> • Computer program not accepting password • Lack of computer knowledge • Getting used to discussion forum/finding it • Navigating the site • Finding time for course work • Bit repetitive • Constantly struggled with the courseware and never did get it to work properly • Delay in receiving course resource binder • Typing skills • Unable to access Internet due to computer trouble • At times suddenly shut out of the program and had difficulty getting back on (for at least half an hour) • Interaction is severely limited as opposed to face to face discussion
Strengths
<ul style="list-style-type: none"> • Ability to get facilitator comments • Convenience • Excellent reading material/ resource binder • More efficient than traveling to CME courses • Group discussion • Easy to use once you get used to it • Interesting • Greater number of participants than in other courses • Clearly laid out • Designed for ease of use • Links provided • Clinically relevant • Interactive
Advice
<ul style="list-style-type: none"> • Check out other online courses for suggestions • Somewhat surprised at how much material was not online (3 booklets and video). Nevertheless that did not detract from course, actually, enhanced it for me. • Perhaps the discussion board could be accessible directly from the mainpage of the course rather than through the course resources • Suggest automization (online, e-mail) of password retrieval.

Participant Interview Results

Semi-structured interviews were conducted with a sample of 15 physicians who had registered for the *RuralMDcme* online courses. Twelve of these respondents had completed their courses (participants); two had registered but did not follow through on the course (non-participants); another person had experiences as both a participant and a non-participant. Nine males and six females were interviewed. One-third of the respondents had 11 years of work experience or less; the remaining two-thirds had 20 or more years of experience. The two non-participants were older males. Thirteen of the informants were family practitioners, two of whom had practices with extended areas of responsibility. One person was a specialist; another was an administrator. All family physicians worked in group practices. Four respondents worked in urban settings, while eleven were in rural areas.

About half of the respondents connected to the course Website exclusively from their home computers. Several people used both home and office computers and a small minority used only an office computer. All respondents had home computers connected to the Internet. Five of the fifteen lacked office access to a computer suitable for online study.

The interview transcripts were coded using Ethnograph 5.0, and themes describing the physicians' perceptions and experiences with online courses were identified and classified. Physician perceptions will be discussed under the following themes: attractions and advantages of online courses, disadvantages of online courses, experience with specific courses, influence of online courses on CME, and suggestions for increasing the appeal of online CME.

When asked what attracted them to the *RuralMDcme* courses for which they had registered, physicians gave answers in three major categories: they were enticed by the promotional materials, they found the online format appealing for its convenience, or the topic of the course was the deciding factor. Various respondents learned of the courses through a journal article, a brochure or via listserv announcements. They responded out of curiosity, "*Well, I am interested in on-line learning, so it was a novelty I guess.*" This was the first online course for most of these physicians, and their descriptions of what they saw as the advantages of this format suggested a receptive audience.

. . . time saving, cost saving and very convenient. I don't have to book off time from the clinic to do CME, and I can do it when I have free time.

The convenience, the fact that you can log on whenever you want. The fact that it is just not a one day thing; it's usually on the go over several weeks. You get time to let the material gel.

In particular, these rural physicians were pleased that they did not have to travel to do the course.

Table 16 Summary of Interview Themes and Categories

Themes	Categories	#	Examples/Quotes
Attractions and advantages of online courses	Response to promotion	10	<i>I am interested in on-line education, both CME and others. They did a pretty good job of sending e-mails to interested people and the website was attractive.</i>
	Convenience, including cost	32	<i>The ease of access. I can participate from my own home, my own community and also the ability to log in and log at will. There were no time constraints.</i>
	Relevance of topic	11	<i>I practice in a rural area. I thought any course coming out of RuralMDcme.ca might have content applicable to my situation.</i>
Disadvantages of online courses	Reduced interaction	11	<i>When you are in face-to-face you have a lot more interaction and dialogue back and forth.</i>
	Time management	9	<i>You tend to think you will to do it tomorrow night and it is always tomorrow night.</i>
	Bulletin boards	16	<i>I had trouble getting on to the bulletin board and I really didn't see anyone else's comments. I could barely get on to leave my own bewildered comments.</i>
Experience with specific courses	<i>Positive aspects</i>		
	Content	32	<i>I gained a lot of knowledge which I have actually put to significant use already.</i>
	Design or layout	15	<i>I realize that I got more out of this course, than I would have done through any other medium.</i>
	Discussion, feedback	10	<i>That was the best part of the course. I think all the learning happens when they discuss cases and put their opinions on the line.</i>

Themes	Categories	#	Examples/Quotes
Influence of online courses on CME	Links, online references, resource materials	12	<i>They had a very nice page of links . . . which I just uploaded into my computer and I will use that again.</i>
			<i>I think that the little binders that came with . . . written materials . . . were really useful.</i>
	Familiarization with online learning	3	<i>Well I certainly gained a little bit more confidence with computers - I wouldn't feel intimidated by doing it again.</i>
	<i>Negative aspects</i>		
	Problems of a technological nature	34	<i>I had very severe problems with linking to the course. In fact spent one night, I think 3 hours trying to sort out online and I really felt I missed out on some aspects of the course and not for lack of trying.</i>
			<i>It is hard in this particular course to gain direct access [to someone who could help], I tried on 2 occasions and was not successful.</i>
	Course content or design	20	<i>One of the pre-questions was "What are the rules in your province?" - never did get the answer to that.</i>
	Intend to use again, important learning option	16	<i>I think I will continue to do the online CME for sure.</i>

Themes	Categories	#	Examples/Quotes
	Concerns re: confidentiality	5	<i>I don't think people will be as frank [when comments are posted] . . . and the other is they may leave themselves open to criticism.</i>
Increasing the appeal of online CME	Make more interactive	12	<i>If you make it interactive, people will retain it.</i>
	Have accredited; promote more	8	<i>Well, you have a good start with getting it recognized by the College of Family Physicians.</i>
	Time flexibility	4	<i>I think if there were perhaps a few shorter topics or something like that you could do in 1 - 2 hours, that would be fine. You could do it in just one sitting.</i>
	Design suggestions	17	1) <i>I think problem-based learning.</i> 2) <i>Video would be a nice thing to add and it is feasible.</i>

Being out in a smaller town with a family it is hard to find the time to go in and do CME activities, especially when it takes you away from the clinic or from your family for a day or two.

Closely related to convenience for several respondents was the issue of cost. They acknowledged both the fact that they were offered a free, accredited course, and that they also saved money in not having to travel or be away from their practice.

We are pretty rural and it obviously costs us a lot of money to go to big courses and if it can be this way in future, I think it's very exciting.

Some physicians cited the course topic as an attraction.

Those were two areas where I felt there was a deficiency in my knowledge and they are both common problems in general practice.

Online courses are also seen as having some disadvantages, including reduced interaction with others, problems with time management, and difficulties related to the course bulletin boards. Diminished interaction between learner and facilitator and among learners taking the same course was frequently cited as a drawback of online learning. This comment encompasses many of the constraints on interaction experienced with online learning.

It is asocial, you don't get that schmoozing and chit chat that you normally get when you go to traditional CME which is always a nice part of it. I think the verbal feedback that you get when people ask questions is delayed in the online courses. Somebody asks a question and there may not be an answer to it for a day or two. It is nice to communicate with people online and it is certainly less intimidating if somebody is shy or doesn't deal well or doesn't have good social skills, but most doctors tend to have pretty good social skills and like the sociability of the traditional face-to-face CME.

One physician pointed out that the time-related advantages of online learning can also be seen as disadvantages. Unlike live courses, where one is away from home and other time demands eliminated, online courses lack “protected time” and participation may suffer as a result.

When you go away for a course you set aside that time and you don't get any interruptions and calls. You are away from your home site and all of the other normal things that go on. I have done two on-line courses now and I have found it difficult, you think “oh yeah, this will be no problem I'll do a half hour a night”, but you do it at times when you get interrupted by other things and it gets more and more difficult to get the course work done.

Many respondents rated the requirement to participate in bulletin boards or discussion groups as an impediment of online courses. Several of them experienced a great deal of difficulty in figuring out how the bulletin boards worked, including how to locate and read messages from other learners, how to post their own comments. They were frustrated by having to wait a day or two for responses. Since some of the courses in question had only one or two participants,

sometimes the bulletin board was only a two-way conversation between learner and facilitator. Some participants appeared uncomfortable with submitting their comments.

I didn't get a chance to use the bulletin board discussion all that much. It seemed like there wasn't a lot of discussion going on, so I guess I am just not used to participating in that sort of thing.

Moving to the specific courses, participants identified what they had liked and disliked. Positive aspects included the course content, design or layout, discussion and feedback, course materials and references, and the opportunity to develop familiarity with online learning. The participants chose courses whose topics were of interest to them, and were usually satisfied with what was presented in the course.

I think I learned a lot about the basics of diagnosing dementia, and management guidelines and appropriate ordering of cat scans.

The most relevant were the clinical practice guidelines.

[The facilitator] dealt in very straightforward fashion with two complex topics which is essentially chronic cervical and chronic low back pain. . . I thought they had a positive outlook and tried to teach us to have a positive outlook.

I have been in practice a long time and there were lots of things that I didn't realize or I learnt on this course. I thought it was very worthwhile.

Course design was also positively received. Not only were the courses and the web layout found to be attractive; participants emphasized that these features assisted learning.

It was a fun course because it was not just boring - you could answer your question, you would read something, you might look at a EKG or an X-ray.

. . . the one on Whiplash and Back Injuries. As I said, I was really impressed. There was no way that this course could have been done in other medium than through on-line.

Participants appreciated the opportunity for discussion of the materials covered, and they wanted feedback on their mastery of the content.

That was super - that was the best part of the course. I think all the learning happens when they discuss cases and put their opinions on the line. The moderator was good - it challenged us. We had to support our statements with evidence and it was nice to hear the experiences of the other doctors.

Both online links and references, and hard copy resource materials were appreciated.

The references to other web sites were really good. I sort of bookmarked that for more information for more patients.

Written materials that came with it were really useful.

A final positive result cited from taking an online course for the first time was that the individual had become more familiar with web-based learning, and had overcome the hurdle of trying something new.

Well, I guess it is a nice introduction to that type of learning.

Course-specific negative experiences were in two main categories. The majority related to technical difficulties in accessing WebCT and/or the bulletin boards, with a smaller number concerning reservations about course content. Some participants had problems getting on to the course, and consumed a great deal of time discovering how to get into WebCT.

Somehow I kept getting into the wrong screen. I was half way through the course before I figured out how to get into the right one.

A few people had computers which could not handle all course features, such as video clips, or a network connection too slow for ease of use.

That is to say that one unfortunate thing is download time for the video clips because it takes a while, but if that somehow could be fixed or I guess if I wasn't so cheap and had a high-speed modem perhaps then it wouldn't take all that long to work through.

There were individuals who, even after mastering their access problems, could not bring themselves to post to the bulletin boards. They felt uncomfortable in posting their thoughts in what they believed to be a public space.

The only message there is mine. You feel a little exposed, if nobody else is out there.

Concerns about using discussion groups deserve special mention as they arose again and again, both specific to the course taken, and with respect to how people felt about web-based courses in general. No other single aspect of the online courses received as much comment, or was the subject of such ambivalence. Physicians wanted courses where they could receive feedback from the facilitator and have the opportunity to communicate with their peers. At the same time, there were barriers to overcome in using online bulletin boards: inexperience, lack of success at first attempts, small number of discussants, and a sense of discomfort with the very concept of bulletin boards.

I did find the bulletin boards awkward in that I guess I was not using them properly, so my inexperience with using a bulletin board, it didn't feel like I was hearing any ones comments or getting questions answered.

Where it was more difficult was trying to get through to the discussion board. There may have been a short cut but I didn't find it. So I would have to go back through the various weeks to find the little link into the discussion board but I couldn't find a direct link to the discussion which would have been handy at the very beginning.

It had a chat room feel about it which I'm not really fond of chat rooms.

I guess I am just not used to participating in that sort of thing. I would hope that next time I take a course like that I will feel more comfortable doing that.

Course content or design critiques tended to be based on the participant's individual needs. What one person regarded as superfluous was hailed as the course highlight by another. Comments need to be monitored by developers of particular courses to see whether trends in preferences develop as more physicians complete each course and submit evaluations.

Participants and non-participants were asked how they envisioned online courses influencing CME. Responses were generally enthusiastic. Many indicated they intended to use online courses again, and anticipated that it would be the "wave of the future for rural doctors".

I find it really fun to go through these cases and then to be able to talk back and forth to physicians across the country and this is what I would do and get advice from them on other ways of approaching things.

One or two individuals were concerned about confidentiality, that once a remark has been posted on a bulletin board it is there for all to see, and that it could in some way reflect badly on them.

There is always the confidentiality thing. When you are having a discussion in a room of other physicians and you go home, somebody might say to someone else, "You know what I heard Smith say?" that's not the same as Smith's words being there. Written down, saved by God knows who for who knows how long.

Physicians were asked for suggestions about increasing the appeal of online CME. On top of this list was a desire to make courses more interactive, either by promoting communication between the learner and facilitator or fellow learners, or by requiring participatory learning.

The interaction is key -- to be able to interact with the facilitator but also with the other people in the group, which makes it fun. You are able to find out how other practices are run and how the people manage common problems through other ways of approaching things.

Physicians commented on the importance of having courses accredited, and of advertising their availability through a variety of means.

Have demonstration booths at doctors' meetings and packages and that sort of stuff.

There were also two recommendations regarding time allocations. There was a desire to have more time flexibility with respect to course start and finish dates. Sometimes they had not been able to devote the time needed to the course during the weeks designated by course organizers, but felt they might have been able to complete it in another week or two. Another suggestion was that courses be chopped up into “*bite-size pieces*” – short lessons or activities which could be accomplished in an hour or so. They believed that being able to complete short sections at a single sitting would provide a sense of accomplishment which would increase satisfaction with the learning.

Structure it so that the modules are completed in a single session, and so if you think that the average person is going to log on and use the internet for maybe an hour or thirty minutes, the ability to complete a defined module and evaluate yourself within that time frame I think is an important part for physicians.

Course design suggestions were extremely varied in nature. A minority wanted to supplement web-based learning with more conventional forms of distance education – conference calls, telephone access to the facilitator, more printed materials. Others wanted everything online, since they had experienced delays in receiving materials sent by post. Problem-based learning and evidence-based medicine were specified by some respondents as preferred formats.

I think as long as it remains in the practice-based model where you are trying to simulate real life cases, I think that is always the most beneficial for general practitioners.

Stakeholder Focus Group Responses

A focus group was facilitated with nine (9) stakeholders from the *TERMS* National Advisory Committee. The purpose of this focus group was to evaluate the stakeholders’ perceptions and satisfaction with the *TERMS* project and the *RuralMDcme* Web portal. The focus group was transcribed and the coding and analysis was completed using Ethnograph v5.0. The questions which guided the focus group discussion included:

- *What is your general perception of the success of The Electronic Rural Medicine Strategy (TERMS)?*
- *Have the goal(s) of this project been met? Why or why not?*
- *How successful was the TERMS project in consulting and involving various stakeholder groups in the design, development and growth of the RuralMDcme Web portal?*
- *Do you have any suggestions or recommendations on how the stakeholder consultation process could have been organized or conducted differently?*
- *What recommendations might you have for enhancing the stakeholder consultation process in the future?*

- *What suggestions or recommendations would you have for the future development and growth of the RuralMDcme Web portal?*
- *Do you have any comments about your involvement and/or the effectiveness of the TERMS project?*

Advantages of TERMS

Generally, the stakeholders had very positive opinions on the project and its success. They agreed that it was “*a great project*” which had a number of advantages and great potential. Several stakeholders stated that they felt “*proud*” to promote the project and the *RuralMDcme* Web portal. All of the participants in the focus group appeared to have a great deal of confidence in the future success and sustainability of the project.

I think you really have something you can be proud of there and we can go forward with.

There were a number of benefits which *TERMS* and *RuralMDcme* offered to rural physicians in terms of their professional development and continuing education. The stakeholders believed that the focus on “*rural physicians*” was necessary and the site appeared to have met its goal of increasing opportunities for professional development for rural physicians. Some of the stakeholders felt that the delivery of accredited CME courses was the most attractive and beneficial aspect of the *RuralMDcme* Web portal.

I think it's really good when you offer continuing professional education for rural physicians.

The stakeholders participating in the focus group also believed that the CME courseware programs which were offered through the *RuralMDcme* Web portal were well designed. The focus group participants also appeared to be very satisfied with the way the courses were administered and delivered: “*It's been very well received*”. One of the stakeholder participants had actually participated in a course through the *RuralMDcme* Web portal and was very impressed with the learning experience.

System Use

The stakeholder participants expressed concerns about the level of system usage and the nature of the statistical reports they were receiving concerning usage of the Web portal. The stakeholders felt that they needed more precise information about whether the rural physician target audience was interested in this product. They also felt it was important to have a better understanding of who was using the portal. This information was believed to be important because it would provide a ‘*picture*’ of user interests which would be helpful for further development and promotion. The stakeholders felt it was important to have regular reports available on the usage of the portal, as well as the interests and needs of users.

Achievements in meeting the goals of TERMS

The majority of stakeholders felt that the goals of the project had been successfully achieved. One of the goals of the project was to “*provide greater access to distributed learning program*” and to contribute to the retention of “*physicians in rural and remote communities of Canada.*”

The stakeholders felt that this goal had been achieved as a result of the development of the *RuralMDcme* Web portal.

I think the website as a portal for doing that has been and is successful at an early stage in its development life.

The stakeholders believed that a number of rural physicians had been reached as a result of the project and these individuals appeared to be pleased with their *RuralMDcme* experiences. There were a number of positive comments made by the stakeholders concerning the *RuralMDcme* Web portal. The stakeholders felt that the web site was easy to “scan”, “user-friendly” and “easy to get around.” There was also a general perception that the portal had a great deal of potential to become a clearinghouse of online CME.

I can tell you that this particular web portal is seen as the cutting edge as far as online learning is concerned when it comes to physicians and so there is a lot of promise that it holds.

Successful consultation

The focus group participants felt that the *TERMS* project was successful in involving them in the design, development and growth of the *RuralMDcme* web portal. The stakeholders participating in the focus group were also pleased with their participation in the *TERMS* consultation process.

I think you have done a wonderful job of developing a site, taking the initiative, and getting funding for the subsequent integration. I take my hat off to you for doing all this work and we're just lucky to be part of it, and to have been involved in providing input.

Many of the participants enjoyed the partnership which had been formed with a variety of groups and expressed their satisfaction with this collaborative process. As an example, one stakeholder commented that from the beginning of the project, they were consulted through “focus groups” and as a result “had a lot of input”. A number of stakeholders had also been invited to review and test the web site by “going through and assessing how easy the site was to use for beginners.” These individuals were then able to make suggestions for enhancing the portal based on their own experiences. The level of collaboration which the *TERMS* project facilitated was believed to be a valuable outcome of the project. One stakeholder felt that this collaboration contributed to the success of the project:

...we are going to have a strong synergy in our partnership in that one of the things industry can bring to the table is the ability to market a product....if you think of the portal as a product and our field sales force as a marketing force then there can be good synergy there.

The stakeholders also stressed the importance of involving La fédération des médecins omnipraticiens du Québec (FMOQ) in future Web portal and course developments. Involvement of the FMOQ was essential for the course materials to be implemented in Quebec. Thus, the stakeholders were aware that they would need to collaborate with the FMOQ in the future.

Project Improvements

There were several areas in which the stakeholders believed more work with TERMS and the RuralMDcme Web portal could occur. First, there was discussion concerning the application of TERMS to health professionals other than rural physicians, such as pharmacists and nurse practitioners in rural areas. It was suggested that portal sections for each individual group could be added. One stakeholder did raise a concern that careful consideration would need to be given to the different learning needs of these professional groups, as well as the cost of undertaking such an initiative.

Another area for improvement was in promotion and marketing. Despite the efforts to promote the site, the stakeholders felt that more work could be done to promote the portal to rural physicians, to increase their participation, and to expand the portal to other provider groups and users. The stakeholders were concerned about the marketing issue. They did accept the fact that marketing and promotion was challenging and it was something which could evolve over time. They recognized that a great deal of work had been done with such things as site “tours” as well as repeated mail-outs and e-mailings.

...but we can do a better job of informing them about the site and what's available.

One of the stakeholders questioned the meaning of the market defined by the goal of the project - rural and remote communities of Canada. This individual felt that the needs of specialists who were in rural communities were not being addressed and ways to address their professional development and CME needs were required.

I'm sure it is the same with other specialties around Canada, that they need to be involved and brought into this and certainly they need to be part of it's development...because they are so busy they often come to the table to say yes we need X, Y and Z and how do we develop it or I don't have time to develop it so maybe the specialty contingent needs to be looked at as well.

The stakeholders discussed ways to promote the Web portal and a number of suggestions were offered.

send an e-card through a database of physicians across the country;

place advertisements in the Canadian Journal of Rural Medicine which is distributed to all rural physicians in Canada and many residents;

the Chairs of family medicine across Canada should be contacted and asked to forward information to their rural preceptors, students and residents.

The Provincial chapters of the College of Family Physicians of Canada was identified as another route for promotion. Another suggestion was to conduct a survey to identify the best means for promotion.

to check off how they learned about the site when they entered it, just curiosity more than anything, just to see what is effective in terms of drawing people to the site.

In addition, the stakeholders questioned how continuing education needs pertaining to aboriginal groups might be addressed through RuralMDcme in the future.

There were a number of areas in which the stakeholders felt that the RuralMDcme Web portal could be enhanced. The participants in the focus group believed that the search engine capability was in need of enhancement. They felt that the search engine feature would be far more convenient if it could scan and search “through the different libraries” and web sites linked from the Web portal to identify information for the user. There was also a suggestion about how to make the web site more attractive to users. One stakeholder suggested the addition of free online tutorials. This individual felt that such a product would draw users to the courses being offered through the site which have a registration cost.

Project Development

Discussion on the further development of TERMS focused on the possibility of using TERMS to assist with the training and education of international medical graduates (IMGs) in assisting them to prepare for “licensing to practice”. However, the stakeholders did feel that this would be a long-term goal for the project. The stakeholders did believe that as the project continued, it would be important that the rationale for the project remain the same:

we need to stay focused to the original objectives and if we do move from that we need to keep the rationale.

The stakeholders did stress that “ongoing evaluation” was a very important element of the development process. Despite the favorable comments and enthusiasm about online products of this sort, the effectiveness of the project needed to be examined and re-examined on an ongoing basis for the benefit of its further improvement. According to one stakeholder:

it's through evaluation that you can optimize the resource and make it better over time so I would encourage all levels of evaluation as we move forward.

Discussion and Recommendations

According to Barnes (1998) CME in the 21st century must move beyond the parallel and ineffectively linked systems for education and clinical care in order to develop a fully integrated practice-learning environment. A variety of educational resources must be made available to accommodate individual information needs, learning styles, motivation and commitment to change practice behaviours (Barnes, 1998). CME will have to develop innovative tools that allow practitioners to identify opportunities for improving practice performance, to access appropriate information resources, and to incorporate new knowledge into practice. The development of the practice-learning environment requires that we use information technology, not to enhance the old model of CME, but to implement a new model of seamless practice and learning (Barnes, 1998). A ‘just-in-time’ approach advocates that information be accessible during the process of patient care, allowing physicians’ questions to be answered immediately and permitting scientific evidence to be incorporated at the time decisions are made (Barnes, 1998).

Advantages of Web-based CME

The Internet is an excellent location for medical reference material as information is universally available, easily updated and quickly obtained (Huntley, 1998). The Internet and computer networks also provide an exciting new technology for delivering distance learning and CME to practicing physicians. Using the Internet, CME can easily be delivered to the site of clinical activity (Peterson et al., 1999). Internet-based CME is also advantageous because it allows the user to select the content, pace, and place of learning. It allows physicians to obtain CME from regional, national, and international experts without the need to travel.

The main benefits of Internet-based CME include easy access, low expense, interactive multimedia format, and an ability to create interactive clinical cases (Tanner et al., 2001; Richardson & Norris, 1997). The flexibility of HTML, the language in which Web pages are written, allows for high-quality video and audio to be presented (Allen, 2001). Electronic publishing can present ideas that would be impossible in printed text, using multimedia components such as sound and movies (Ruskin et al., 1996). Many Web-based materials can easily be stored on a CD-ROM and used locally within a PC with access speeds far higher than those achievable with most on-line courses. According to Turchin & Lehmann (2000) the WWW provides opportunities for the development of new educational tools and facilitates learning through interactivity and self-paced study. Publication on the Internet offers the added advantages that information can be distributed worldwide and can be easily and rapidly updated to reflect the state of the art.

Online CME is associated with a marked decrease in cost (Allen, 2001) and provides practising health professionals with convenient and cost-effective tools for continuing education (Richardson & Norris, 1997; Ryan and Waterson, 2000; Mamary & Charles, 2000). It provides new opportunities for distributed learning, accessible wherever and whenever it is needed, and it supports new approaches such as resource-based learning, electronically networked learning communities and 'just-in-time' learning. Computer-based methods, as opposed to traditional in-person conferences, offer participants the advantages of continually updated information, reduced time away from the workplace, and a format that allows learning to occur at the individual's pace (Mamary & Charles, 2000).

According to Casebeer et al. (2002) the ability to scan a wide range of options and the enormous number of possibilities on the Internet make it a unique support for a self-directed curriculum. Learners develop and manage their own self-directed curriculum by drawing on different kinds of resources at different times. As a self-directed curriculum, the Internet allows a wide range of learning styles, searching styles and ways to combine resources (Mamary & Charles, 2000).

Barriers to Web-based CME

CME providers attempting to engage their audiences with Internet-based CME curricula have several hurdles: ensuring that their learners have the skill and hardware to access the Internet, attracting learners to their Website, and developing curricula that are not only valid in content but also captivating to the audience (Beasley et al., 2001). Peterson et al. (1999) have identified a number of obstacles to Web-based CME use including issues regarding a lack of skill in using the Internet and a general reluctance of physicians to participate in online commerce. Another important obstacle to Internet-based CME use is that we have not designed a form of CME that can be easily incorporated into the workflow of a busy clinician (Peterson et al., 1999).

According to Casebeer et al. (2002) barriers to use can also center around too much information to scan and too little specific information to respond to a defined question. Richardson & Norris (1997) reported that a main disadvantage to online CME was the lack of a significant base of current on-line offerings, and the problem of slow network speeds for downloading materials. Sargeant et al. (2000) have recommend that educational software needs to be easy to use for those physicians who lack computer proficiency and have little time for learning how to use new computer technology. ‘Not knowing how’ is a frequently reported reason for not using the Internet for computer-based training. A lack of adequate computer skill has been identified as a primary factor which discourages physicians from the use of computer-based methods rather than a lack of preference for the new technologies (Mamary & Charles, 2000).

If clinicians are to be convinced to take advantage of computer-based modes of receiving CME, it will be necessary to identify their current use patterns, evaluate their intent to begin using computer-based instruction, and identify the barriers that inhibit use of new technology (Mamary & Charles, 2000). Mamary and Charles (2000) conducted a survey to assess the preferences and barriers to use of CME delivery methods among physicians, nurse practitioners and physician assistants in Nevada. The investigators found that respondents with more years of clinical practice experience were less likely to have access to or use computer-based technologies. They recommend that CME providers should consider training in new technologies during on-site conferences, provide CD-ROMs as take-home instructional materials, or promote technology awareness (Mamary & Charles, 2000).

Rural MDcme Web Portal Usage Issues

The log file analysis indicates that the RuralMDcme Web portal experienced 3,634 unique visitors over the reporting period. Of these visitors 74.54% only visited the site once, whereas over 25% of visitors returned to the site for 2 or more visits. This data suggests that there are a large number of visitors to the portal who are not returning, either because the information and resources of the site are not appropriate or applicable to their needs. The stakeholders expressed concerns about the level of system usage and felt that there was a need to learn more about whether the rural physician target audience was interested in this product. They also felt it was important to have a better understanding of who was using the portal and what their needs were. This information was believed to be important because it would provide a ‘picture’ of user interests which would be helpful for further development and promotion.

Recommendation

Conduct a systematic market analysis to identify the users of the site, potential market segments for the site, the characteristics of market segments, and the needs of the market segments.

Marketing and Promotion Issues

The stakeholders also believed that an area for improvement existed in the area of marketing and promotion. Despite the efforts to promote the site, the stakeholders felt that more work could be

done to promote the portal to rural physicians, to increase their participation, and to expand the portal to other provider groups and users.

Recommendations

Develop a Strategic Marketing and Promotion Plan for the RuralMDcme Web portal in consultation with representatives of the National Advisory Committee.

Participant Characteristics and Attrition Issues

Generally, there was an equal number of female and male participants in the courseware programs. The majority of participants were family physicians/GPs and had practice experience of 11 years or greater. The majority of participants were also rural physicians which might explain the degree of practice experience which the participants brought to the courses. It is well recognized that the majority of rural physicians are experienced practitioners. The exception was the Introduction to Assessment and Management of Dementia course, as the majority of participants in this course were urban physicians.

It should be noted that there was no participation or registration fee for the courses which were evaluated in this study. As a result, the high attrition rates which were experienced may be a result of the lack of commitment which existed among the registrants because there was no financial stake in the courses. The Introduction to Assessment and Management of Dementia course had the highest registration to participation ratio (0.6) of all four courses, while Cases in Emergency in Medicine had the lowest (0.4).

Computer Access and Technology Issues

The advances which are occurring in the communications and information technologies are proceeding at an enormous rate. This is no exaggeration, particularly when we speak of computer processing speeds and memory capacities. These rapid developments and changes are a primary concern for health care professionals who use computers in their offices or from their homes. The systems which they may like or intend to use are not always compatible with the educational courseware being supplied to them. Technical and communication system limitations (old computers, slow phone lines, modems, etc.) are considered to be a main disadvantage of programs which are offered over the Internet (Pankaskie & Sullivan, 1998; Veldenz & Dennis, 1998). In many instances, health care professionals who are planning to participate in computer-mediated learning are required to have an up-to-date computer with the latest capabilities (Lancaster & Willis, 1994). A number of technical barriers were experienced by both participants and presenters attempting to use the Web-based learning system and some of these were related to the user's computer and/or Internet connection.

Recommendation

Identify and promote minimum computer and Internet connectivity requirements for accessing the Web-based learning system. Develop courseware which is within the technological limitations of these system requirements and not beyond.

Ensure downloadable plug-in software files, where applicable, are accessible as executable (.exe) files from the RuralMDcme server or appropriate CD-ROM courseware, rather than from the plug-in site.

Online Discussion Issues

The literature suggests that computers allow physicians to carry on synchronous and asynchronous discussions with physician colleagues (LaRocque, 1998) and foster the development of communication and support networks between learners and educators (Ward, 1997). It enables physicians to interact with their peers and engage in discussion concerning important aspects of their clinical practices. There were mixed perceptions on the usefulness of computer conferencing, as well as individual participants' satisfaction with the experience of participating in online discussions. These experiences varied, depending on the course and the individual. The majority of physicians described the computer conferencing as being important for interacting with their peers and the instructors. The interview findings also indicate that participants in the computer conference found it allowed them a greater amount of time to reflect on the discussion and the comments they would like to post, which they believed enhanced the quality of the dialogue which occurred. They felt that this aspect of computer conferencing was a significant advantage.

Other respondents rated the requirement to participate in bulletin boards or discussion groups as an impediment of online courses. Several of them experienced a great deal of difficulty in figuring out how the bulletin boards worked, including how to locate and read messages from other learners, how to post their own comments. They were frustrated by having to wait a day or two for responses. Since some of the courses in question had only one or two participants, sometimes the bulletin board was only a two-way conversation between learner and facilitator. Some participants appeared uncomfortable with submitting their comments. The results from the Course Evaluation Surveys and participation levels in the online discussions were:

Management of Whiplash and Back Injuries

Fifty percent (50%) of participants did not find it easy to post, respond, and reply to messages. Eighty-three percent (83%) of participants (50% neither agreed nor disagreed; 33% checked not applicable) had no opinion concerning whether participation in such discussions enhanced their understanding of the subject area. There was an average of 6.5 items read over three sessions, and an average of 1.4 items posted. Thirty-three percent (33%) of the items which were posted involved Horizontal Questioning and 50% of the items posted involved Reflections.

Cases in Emergency Medicine

Seventy-two percent (72%) of participants either agreed or strongly agreed that participating in the discussions enhanced their understanding of the subject matter. The majority of participants (64%) thought it was beneficial to be able to communicate with the facilitator and other colleagues. Fifty-seven percent (57%) of participants either agreed or strongly agreed that it was

easy to post, respond, and reply to messages in the bulletin board. There was an average of 72.1 items read, and 12.2 items posted over three sessions. While there was some interaction among participants, as indicated by the 21 (18%) and 13 (11%) messages categorized as Reflections and Scaffolding respectively, the majority of messages posted by participants (64%) were Statements.

Introduction to Telehealth

There was an average of 18.2 items read, and 5.3 items posted. It was difficult to assess the types of questions or comments posted as there was only one participant in this course session. However, this participant was quite active in their questioning of and discussion with the two instructors. This individual mainly provided *Statements*; six of the eight items which were posted (75%) were categorized as such.

Introduction to Assessment and Management of Dementia

Seventy-two percent (72%) of participants either agreed or strongly agreed that the discussions were beneficial for communicating with the facilitator and their colleagues. Sixty-five percent (65%) found it easy to post, respond, and reply to messages. Over three sessions there was an average of 69.4 items read and 8.4 items posted. While fifty-nine (59%) of messages were *Statements*, 32% could be categorized as *Scaffolding*. These participants attempted to build on the comments and postings of others.

The asynchronous mode of computer conferencing supports self-paced learning, reflection and idea formation. Several authors have suggested that this leads to purposeful response construction and formulation processes which may very well enhance the quality of the discussion (Ross et al, 1995; Rowntree, 1995; Harasim, 1986; Burge, 1994). The text-based, collaborative nature of computer conferencing discourse deepens student processing and requires an enhanced articulation to others, which furthers the development and refinement of understanding, and heightens learner reflectiveness (Ross et al., 1995). The initial, internal articulation or rehearsal of a point of view refines the expression of one's ideas more so than in a face-to-face discourse.

Several authors have reported that students often report feelings of confusion and annoyance, and a lack of conceptual understanding of how conferencing systems and threading works with computer conferencing software (Ruberg et al., 1996; Burge, 1994; Seaton, 1993; Tagg and Dickinson, 1995). The findings of this study support these reports. A number of respondents commented on difficulties they experienced in understanding the 'threaded' nature of the discussions which occurred in the conferencing area. Ruberg et al. (1996) found that students were uncomfortable with the interface of computer conferencing software, often becoming confused with what seemed like a lot of jumbled thoughts. Ruberg et al. contribute this anxiety and uncomfortableness to the extensive text-based interchanges occurring in computer conferencing, which participants often find difficult to adapt to.

The successful implementation of computer-mediated learning calls for a change in the roles for both learners and educators. Both parties must become computer literate (Hekelman, Niles & Brennan, 1994) and, in addition, instructors must also learn skills for becoming managers of instruction (Billings, 1986). Educators who have traditionally enjoyed teaching in the face-to-face setting are not required to perform in the same manner in online learning environments. Adult learners, as well, must become more responsible for their own learning, which includes learning how to use information technology in order to participate effectively in a course.

Recommendations

Provide ongoing faculty development sessions to orient facilitators to the use of the courseware programs and to train them in techniques for facilitating and encouraging effective online CME discussion.

Provide an online orientation module and/or print manual to participants which describes how to use the WebCT bulletin board discussion area. This manual or module should also describe other aspects of the WebCT software program which participants are required to use for their online learning experiences and activities (i.e. Quizzing features). The instructions should provide clear steps on how to use and operate the WebCT components (i.e. reviewing messages, posting messages, replying to messages, completing online quizzes).

Promote the availability of a 1-800 help desk and e-mail service for physicians participating in the Web-based learning system. The purpose of this service would be to support and assist physicians in accessing and using online learning programming.

Physicians' also reported that the "asynchronous" nature - the time delay in messaging, and the irrelevancy of the discussion were disadvantages. These perceptions and experiences support the findings of several other studies reported in the literature. In a qualitative study of learners' perceptions of computer conferencing, Tagg and Dickinson (1995) found that the asynchronous nature of computer conferencing resulted in feelings of "communication anxiety," attributable to the varying delays learners experienced between messages being sent and received. As well, learners expressed certain difficulties in assessing how one's contribution had been received in a medium where immediate feedback by way of facial expression, verbal response, or physical reaction was entirely absent (Tagg and Dickinson, 1995). Rowntree (1995) and Harasim (1986) suggest that because computer conferencing lacks the visual and auditory cues on which we usually rely for interpreting other people's meanings, it is initially an impersonal social world for many participants. Burge (1994) also reported that graduate level students participating in an online education course indicated perceptions of "irrelevancy" of discussion topics and feelings of being out of sync with the discussion.

Recommendation

Encourage participants in online learning to follow appropriate netiquette which includes reviewing and responding to computer conferencing messages in a timely manner. Online conferencing can also be a lesson in patience. Participants need to be aware that "asynchronicity" does not mean immediacy and that there will some delays in communications with asynchronous computer conferencing.

Courseware Design Features

Many participants felt that a main strength of the courseware programs of *RuralMDcme* were that they were convenient, flexible, and provided them with an opportunity to work at their own

pace. Diminished interaction between learner and facilitator and among learners taking the same course was frequently cited as a drawback of online learning. One physician pointed out that the time-related advantages of online learning can also be seen as disadvantages. Unlike live courses, where one is away from home and other time demands eliminated, online courses lack “*protected time*” and participation may suffer as a result. A number of participants reported difficulty navigating the courseware programs which could be the result of lack of understanding of how to use the WebCT learning management system, lack of computer experience or skill, or a problem with the instructional design of the courseware itself.

Management of Whiplash and Back Injury

A number of participants experienced difficulty in navigating the site (17% disagreed; 17% strongly disagreed) and as a result, had difficulty using the resources which were accessible to them.

Cases in Emergency Medicine

Twenty-one percent (21%) either disagreed or strongly disagreed that the site was easy to navigate, while 43% were ambivalent (they neither agreed nor disagreed) and held no opinion about this. Several participants experienced difficulties with viewing the ECG’s/EKG’s which were provided.

Introduction to Assessment and Management of Dementia

A majority of participants (57%) disagreed or strongly disagreed that the site was easy to navigate, while 21% neither agreed nor disagreed with this aspect.

Navigation and user-friendly software interface features are an important part of effective instructional courseware design. The navigation features and interface of instructional courseware should be intuitive, meaning learners spend little time learning how to navigate through the courseware, thereby focusing more attention to the content. Screen layouts are an important feature as well. Screens should be designed to facilitate use and learning, rather than impose further learning, particularly in how to navigate and use instructional courseware.

Recommendation

Conduct an instructional design review of the courseware programs with special attention of screen layout and design and navigation features of the courses. Introduce enhancements where deemed necessary.

Concerns about using discussion groups deserve special mention as they arose again and again, both specific to the course taken, and with respect to how people felt about web-based courses in general. No other single aspect of the online courses received as much comment, or was the subject of such ambivalence. Physicians wanted courses where they could receive feedback from the facilitator and have the opportunity to communicate with their peers. At the same time, there were barriers to overcome in using online bulletin boards: inexperience, lack of success at first attempts, small number of discussants, and a sense of discomfort with the very concept of bulletin boards.

Findings related to participants' satisfaction and perceptions of the effectiveness of the subject matter of the courseware suggest that the content was relevant to their clinical practices, practical, and presented in an effective and interesting way.

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