

Résumé

**Les innovations et les enjeux
en matière de prestation de la formation
continue aux infirmières praticiennes
des communautés rurales et du Nord**

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Ce document traite de la nécessité de fournir aux infirmières praticiennes des régions rurales la formation à distance considérée comme essentielle pour mettre à jour leurs qualifications professionnelles acquises. La méthode de prestation des cours est un élément crucial de leur succès. Les auteurs présentent et décrivent la méthode de prestation novatrice du Programme ontarien de formation des infirmières praticiennes en milieu rural, depuis l'évaluation initiale des besoins jusqu'à la mise en œuvre du programme et l'étude d'évaluation. Chaque étude repose sur un modèle de recherche utilisant plusieurs méthodes d'analyse. Les personnes interrogées ont montré une préférence pour les modalités virtuelles perçues comme étant limitées par des obstacles. Ces obstacles ont par la suite été pris en compte dans le projet pilote. Les infirmières des régions rurales reconnaissaient les avantages offerts par les technologies de l'information. La mise en œuvre a été pondérée de façon efficace en fonction de multiples modes de prestation en ligne des cours et de l'utilisation de la pédagogie constructiviste. Les résultats de ces études montrent qu'il existe encore de nombreux défis à relever en ce qui concerne la prestation de la formation continue aux infirmières praticiennes des communautés rurales et du Nord.

Mots clés : infirmières praticiennes, formation à distance, régions rurales et éloignées.

Innovations and Issues in the Delivery of Continuing Education to Nurse Practitioners in Rural and Northern Communities

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This paper addresses the need to provide rural nurse practitioners (NPs) with the distance education that is considered vital to the upgrading of their professional skills. The method of delivering the courses is a critical aspect of their success. The authors trace and describe the innovative delivery of the Rural Ontario Nurse Practitioner Continuing Education Initiative, from the initial needs assessment study through to the implementation and evaluation study. In each study, a multi-method action research model was used. The respondents showed a preference for face-to-face modalities that were perceived to be constrained by barriers. These barriers were subsequently addressed by the pilot project. Those living in rural areas recognized the benefits of information technologies. Implementation was effectively weighted on multiple modes of online course delivery and the use of constructivist pedagogy. The findings suggest that the delivery of continuing education to rural and remote NPs is still wrought with challenges.

Keywords: nurse practitioners, distance education, learning modalities, rural and remote

Introduction

Several recent reports (e.g., Health Services Restructuring Commission, 1999; Nursing Task Force, 1999, 2001) have recommended greater use of nurse practitioners (NPs) in the health-care system of the province of Ontario, Canada. NPs play a particularly important role in rural, northern, and remote communities because of chronic shortages of physicians and inadequate access to primary health care. In response to service needs, from 1998 to 2002 approximately 400 new NP positions were created with funding from the Ontario Ministry of Health and Long-Term Care (MOHLTC). Many of these positions were in northern Ontario and other rural areas (Government of Ontario, 1998, 2000a, 2000b). This response followed the 1994 launch of an NP initiative (Ontario Ministry of Health and Long-Term Care, 1994) that addressed both the education and employment needs of NPs in Ontario. In 1995 the Council of Ontario University Programs in Nursing (COUPN)

began offering the Primary Health Care Nurse Practitioner Education Program via distance education.

Continuing education is an important issue for NPs working in rural, northern, and remote communities. The need for NPs to maintain or enhance their skills and knowledge is particularly critical in smaller or more remote communities where NPs tend to work fairly independently and see patients with diverse health problems. Continuing education programs may also help in the recruitment and retention of health-care providers, including NPs in rural and remote communities, by reducing the sense of isolation (Pong, Rowe, Ryan, & Mulloy, 1995). Continuing education for NPs in rural, northern, and remote practice settings requires special attention, for two reasons. First, their continuing education needs may differ from those of their urban counterparts because of their special practice environments. Second, different delivery approaches may have to be used to bring continuing education programs to NPs in non-urban settings. This paper reports on both aspects, and is based on findings from two separate studies of NP continuing education in rural and northern Ontario. The research findings reported here are from a needs assessment and an evaluation. We emphasize the innovative aspects of a continuing education pilot project, one of which is the melding of research with course development and modes of delivery.

The findings of previous studies suggest that continuing education has a positive impact on NP practice (Atkin, Hirst, Lunt, & Parker, 1994; Ferrel, 1988; Merservy & Manson, 1987; Peden, Rose, & Smith, 1990). However, little is known about the continuing education needs of rural NPs. Research from the United Kingdom (English National Board, 1991; Greenlaugh & Douglas, 1999; Shepherd, 1992) has identified general issues in the delivery of NP continuing education: needs analysis as an essential part of the development of programs, the need for program designers to ensure that education is pertinent and of high quality, and the need for staff development to encompass assessment of prior learning.

According to Sheperd (1995), the most suitable forms of continuing education are those that are flexible, encompass blocks of study, and are of short duration; practitioners state that these blocks of study should be scheduled well in advance, to allow for planning. Similarly, Andrusyszyn, Cragg, and Humbert (2001) and Andrusyszyn, van Soren, Spence, Goldenberg, and DiCenso (1999) found preferences for distance education methods to be related to learning styles, content, and individual learning goals; they also found convenience, self-direction, and timing to be important. Ontario NPs have identified print-based methods as the most favourable and audiotape as the least favourable (Andrusyszyn et al., 2001).

NPs in Ontario have expressed the greatest satisfaction, and the greatest familiarity, with face-to-face delivery approaches. However, dramatic increases in comfort level with computer usage and teleconference technologies — so long as technical support is available — have also been reported. Consideration should be given to using a mixture of methods, attending to specific content, learners' characteristics, and available technologies (Andrusyszyn et al., 2001; Wambach et al., 1999). Further recommendations for delivery include packaging courses into separate modules that are directly related to current practice situations (Atkin et al., 1994) and ensuring technical support and reliability before implementation (Jarrett, Wainright, & Lewis, 1997). In a recent Ontario study (IBM Business Consulting Services, 2003), NPs were asked to comment on what was included as part of their ongoing/continuing education in the preceding year. Almost all NPs (96%) indicated that lectures, conferences, and/or clinical presentations had been included; 86% indicated other education materials; 80% indicated clinical practice guidelines; and 67% indicated small-group learning, traineeships, and workshops. However, only 18% indicated distance courses or evening courses and 29% indicated chart audit with feedback on performance. Thus, fluency with mixed methods but lack of access to continuing education courses is apparent.

Further, Wambaugh et al. (1999) suggest an approach to NP instructional technology based on the concept of constructivism — a learning philosophy that focuses on the ways in which individuals come to understand course materials. This approach adheres to pedagogical principles such as learner-directed education and relevancy. The idea of networking to enhance and support rural education has also been documented. Hemman, McClendon, and Lightfoot (1995) report that collaboration and shared resources enhance distance education in rural areas. In the case of rural nurses in Australia, a preceptorship model of support has been found to enhance continuing education through empowerment and mentorship (Dusmohamed & Guscott, 1998). Also, a general system of infrastructure and technical support has been found to be useful to NPs in reaching disadvantaged consumers in rural and remote Australia (Hovenga, Hovel, Klotz, & Robbins, 1998). Similarly, Betty and Tiliczek (2002) report that a critical learner support system can emerge over the course of rural continuing education implementation that provides a range of technical support to learners. The literature clearly shows that delivery of continuing education should be tied to current practice contexts and that both referral patterns and the daily practice activities of NPs can help to determine needs (Way, Jones, Baskerville, & Busing, 2001).

A number of studies describe the nursing practice environments of northern and rural Ontario and suggest that rural communities face special challenges. There are rural–urban differences in health status, service utilization, and behaviour (Badgely, 1991; Mansfield, Wilson, Kobrinski, & Mitchell, 1999; Pampalon, 1991; Pitblado & Pong, 1995) — for example, a very high prevalence of heart disease in northeastern Ontario (Sahai et al., 2000), a high prevalence of certain types of cancer among farmers (Fair, 1992) and miners, high rates of diabetes and respiratory and infectious diseases in many Aboriginal communities, and short life expectancy and high infant mortality in rural and small communities (Wilkin, 1992).

In summary, the literature suggests that delivery of NP continuing education in non–urban areas should focus on the realities of the rural practice environment, and may require a mixture of delivery methods and constructivist pedagogies with an emphasis on relevant content areas, learner characteristics, and available technologies; it may also require the delivery of courses in the form of modules, within a technical support system.

The primary objective of this paper is to report on innovative aspects of a continuing education pilot project for rural, northern, and remote Ontario NPs. The focus is on the ways in which the pilot project melded the literature and research findings to develop and deliver continuing education courses. We will also report on an evaluation study that assessed the outcomes of the pilot project. Our focus will be the rural challenges of implementing and delivering courses, and the lessons learned in the process. Issues relating to course content and delivery will be addressed in a future research article.

Methods and Findings

We will now report on the design, method, and main findings of the needs assessment, the development of continuing education courses, and the evaluation of the pilot project. This section is intended as an overview of the research design and the multiple methods used by the investigative team. For detailed research methodologies, see Caty, Tilleczek, Pong, Michel, and Lemieux (2002) and Tilleczek, Caty, Russell, Pong, and Rukholm (2004).

There is no universally accepted definition of “rural” (Pong & Pitblado, 2001), but this study used the Statistics Canada definition: communities of fewer than 10,000 inhabitants located outside the commuting zones of Census Metropolitan Areas (with populations of 100,000 or more) and Census Agglomerations (with populations of 10,000–99,999). For the purposes of this study, “northern” refers to those regions that are

officially designated as “northern Ontario” by the provincial government. Although some northern Ontario communities, such as Sault Ste. Marie, Sudbury, and Thunder Bay, are small cities, they have been included in the study because they are fairly isolated geographically, have experienced shortages of physicians and other health-care resources, and may not have ready access to continuing education. For the purposes of the study, northern Ontario communities are designated as “rural” if they are outside the five main urban centres of North Bay, Sault Ste. Marie, Sudbury, Thunder Bay, and Timmins and are accessible by road. “Remote” refers to very small and isolated communities, most of which are located in northern Ontario areas inaccessible by road.

The term NP is used to cover three categories of RNs: those with a College of Nurses of Ontario Extended Class (EC) certificate of registration, those (without EC registration) working in an expanded role or under some medical directives in primary-care settings, and those (without EC registration) working as staff nurses in First Nations health centres funded by Health Canada. Nurses in the latter two categories, though not designated as NPs, often function in that capacity.

Needs Assessment

Design. In order to reach all RNs who met the operational definition of NP and were working in rural and northern regions of Ontario, a complex process was undertaken to construct a sampling frame. Five sources of names and addresses of RNs were used to generate a list of potential participants: the database of CRaNHR’s NP Multi-year Tracking Study ($n = 353$), the 2001 College of Nurses of Ontario database of RNs with EC registration ($n = 415$), the year 2000 membership list of the Nurse Practitioner Association of Ontario ($n = 691$), the Northeastern Ontario Medical Education Corporation list of RNs working in nursing stations funded by the MOHLTC ($n = 34$), and the Health Canada First Nations and Inuit Health Programs (FNIHP) ($n = 115$). The final number of potential participants in the survey was 472, after duplicated names had been eliminated.

A questionnaire was developed by CRaNHR researchers in consultation with COUPN NP coordinators. A pilot test of the draft instrument was conducted with three practising NPs for content validity and readability. The final questionnaire comprised 28 questions, both close-ended and open-ended. It was mailed to individuals and the FNIHP contact persons for distribution. Approval was secured from Laurentian University’s Research Ethics Board.

There are some limitations to the study that may affect the generalizability of the findings. First, the research team did not have access to the actual names and addresses of the RNs working in FNHIP-funded agen-

cies and relied upon third-party willingness to distribute the questionnaire. Only half of the FNIHP agencies responded to the request to help distribute it, and questionnaires were not received from all the agencies that did agree to help. Therefore, it is possible that not all RNs working in remote areas had an opportunity to participate in the study.

Second, the definition of rural southern Ontario was rather restrictive and therefore excluded the participation of those from communities with a population of more than 10,000 but still living far from an urban centre. As the analysis of filtered-out respondents has shown, these NPs were also interested in continuing education.

Findings. Nearly one half ($n = 227$) of the questionnaires were returned. If only those with known addresses are considered, the return rate was 54% ($n = 192$). The return rate for participants with a known southern Ontario address was 55% ($n = 117$) and with a known northern Ontario address 52% ($n = 75$). For questionnaires distributed through the FNIHP contact persons, the rate of return was 30% ($n = 35$). Questionnaires were received from 11 of 17 FNIHP-funded agencies that had agreed to take part in the survey.

Of the 227 questionnaires that were returned, 146 (64%) were suitable for analysis; 72 were from respondents in northern Ontario with a known address, 38 were from southern Ontario respondents with a known address, and 36 were from RNs in FNIHP-funded agencies.

Seventy-five percent ($n = 109$) of the respondents resided in northern Ontario, with 46% practising in rural communities, 27% in urban communities, and 27% in remote communities. Twenty-five percent ($n = 36$) of the respondents practised in a rural southern Ontario community. Eighty-five (59%) of the respondents practised as RNs (ECs), 32 (22%) as RNs in FNIHP-funded health agencies, and 27 (19%) as RNs in an expanded role or under medical directives.

Within these regions, 80% of the southern Ontario respondents resided in communities with a population of 50,000 or less. Ninety-five percent were practising at the time of the survey and 61% were RNs with EC designation. Because the Statistics Canada definition of "rural" has been adopted in this project, input from RNs who were practising in these southern Ontario communities had to be forfeited. Some of the respondents stated that they wished they could have participated in the survey, as continuing education was not available to them.

Respondents were also asked to report on continuing education activities in which they had participated in the previous 2 years and their preferences in relation to delivery modalities. The most frequently mentioned modalities (86%, $n = 502$) were face-to-face approaches such as workshops, conferences, seminars, and lectures. Other modalities (14%, $n = 84$) included teleconferences, print-based courses, Internet courses,

CD-ROM-based activities, videoconferences, and audiotapes. Ninety-five percent ($n = 138$) of respondents stated that continuing education was either “very important” or “extremely important” to them. The mean rating on a scale from 1 to 5 (5 = extremely important) was 4.79 ($SD = 0.5$). However, access to continuing education was rated as less than optimal. Respondents rated the frequency with which they encountered each of 14 main barriers to access. Four of the barriers were identified by more than three quarters of the respondents, with the two most important being “distance to travel” and “expense of travel.” It is worth noting that most respondents had access to computers (91%) and the Internet (71%), which suggests the feasibility of offering online courses.

There were statistically significant differences between regions with respect to issues concerning delivery of continuing education. For example, for those in northern Ontario, 89% ($n = 97$) stated that distance to travel was a significant barrier to access; in southern Ontario, the proportion was 78% ($n = 28$). Table 1 shows regional differences for six issues. It is worth noting that the respondents who had no computer access were all located in remote areas in the north.

Table 1 *Barriers to Accessing Continuing Education by Region**

Barrier to Access	Rural	
	Northern Ontario % Yes (n)	Southern Ontario % Yes (n)
Distance to travel	89 (97)	78 (28)
Expense of registration/tuition	73 (80)	83 (30)
Lack of employer-designated funds	66 (72)	78 (28)
Lack of knowledge of continuing education opportunities	66 (72)	53 (19)
Lack of access to a computer	12 (13)	0 (0)
Lack of access to Internet	22 (24)	8 (3)

* Statistically significant at $p < .05$.

Participants were asked to rate, on a scale from 1 to 5, the potential helpfulness of specific continuing education delivery modalities (5 = extremely helpful). Table 2 reports the percentages of respondents who rated each of the 11 modalities as “very helpful” and/or “extremely helpful,” as well as the mean score for each modality.

The respondents most frequently reported face-to-face continuing education methods such as seminars, workshops, and conferences as helpful to them. While most respondents had access to computers and the Internet, they reported that live modalities were more helpful. There

were no statistically significant differences between regions with respect to helpfulness for each modality. However, there were statistically significant differences between locations in northern Ontario (see Table 3). While face-to-face modalities (e.g., lectures, conferences, seminars, and workshops) had higher mean “helpfulness” scores in rural and urban areas of northern Ontario, respondents residing in remote areas rated CD-ROM technology and teleconferencing as more helpful.

Table 2 *Helpfulness of Modalities for Accessing Continuing Education Activities*

Barrier to Access	% Saying Helpful^a	Mean Score^b (SD)
Workshops	86	4.0 (0.9)
Seminars	85	3.6 (0.9)
Professional conferences (e.g., NPAO)	76	3.2 (0.9)
Print-based course material	76	3.1 (0.9)
Face-to-face lectures	75	3.4 (1.0)
Web-based Internet courses	62	3.6 (1.7)
CD-ROM	59	3.5 (1.7)
Videoconferencing	54	3.5 (1.3)
Networking (listserv, e-mail, meetings)	46	3.2 (1.5)
Computer conferencing	45	3.3 (1.5)
Teleconferencing	41	3.3 (1.0)

^a Sum of “very” or “extremely” helpful.
^b Rating scale from 1 (“not at all helpful”) to 5 (“extremely helpful”).

Table 3 *Significant Mean Differences in “Helpfulness” Scores by Northern Ontario Location*

Modality	Mean Helpfulness Score^{a*}		
	Rural	Urban	Remote
Face-to-face lectures	4.2*	4.0	3.5*
Professional conferences	4.1	4.5*	3.6*
CD-ROMs	3.0*	3.4	4.2*
Seminars	4.2*	4.3*	3.8*
Workshops	4.4*	4.4*	3.8*
Teleconferencing	3.4*	2.9*	3.6*

^a Rating scale from 1 (“not at all helpful”) to 5 (“extremely helpful”).
*Significant at $p < .05$.

Program Development

Based on the results of the needs assessment, five NP continuing education courses were developed: Fundamentals of Primary Health Care, Persistent Illness, Issues in Mental Health, Pharmacotherapeutics, and Emergency Health Care in Rural Settings. Each of the 8-week courses consisted of eight separate modules, with the exception of the Emergency Health Care in Rural Settings course, which had nine modules. Each module contained a set of expectations and outcomes, a list of assigned readings, and a case-based scenario followed by a set of questions. The courses were designed to be delivered as Web-based courses, through a main access portal supported by the COUPN team. The courses were augmented by an online discussion area for students and instructors (and, in the case of the Fundamentals course, by a weekly teleconference). Quizzes and tests were taken online.

Evaluation

Design. A design using both qualitative (focus groups and open-ended responses) and quantitative (registration forms and module evaluations) data was employed to answer the following research questions: Are students learning what they want and need? Is the method of delivery helping or hindering? What other continuing education activities could be developed?

The use of action research encouraged shared responsibility for the project and input from the NPs, in order to inform the development of the continuing education courses. For example, the Fundamentals course was evaluated before the other courses were delivered, so that the perspectives of the NPs could be brought back to the development team as the project unfolded. Ongoing discussions were held with the COUPN implementation team and CRaNHR researchers, particularly with regard to the research process. Procedures incorporated shared research responsibility. Three strategies were used with regard to data collection: demographic data collected on registration forms, learning assessment data collected throughout the course via an online form transmitted electronically to the researchers, and one focus group per course conducted via teleconference to address the strengths and weaknesses of the course.

Multiple responses were calculated for some variables. This involved the creation of a pooled variable by combining the responses to various questions across all learners and modules. A number of the questions included in the online evaluation questionnaire concerned similar issues. For instance, respondents were asked to rate several items on the helpfulness of the module delivery format in supporting their overall learning,

such as (a) cited references, (b) case studies, (c) interactive quizzes, (d) Web sites, (e) end-of-module quiz, and (f) assigned readings. Overall helpfulness was summarized by combining the ratings on related questions over all modules.

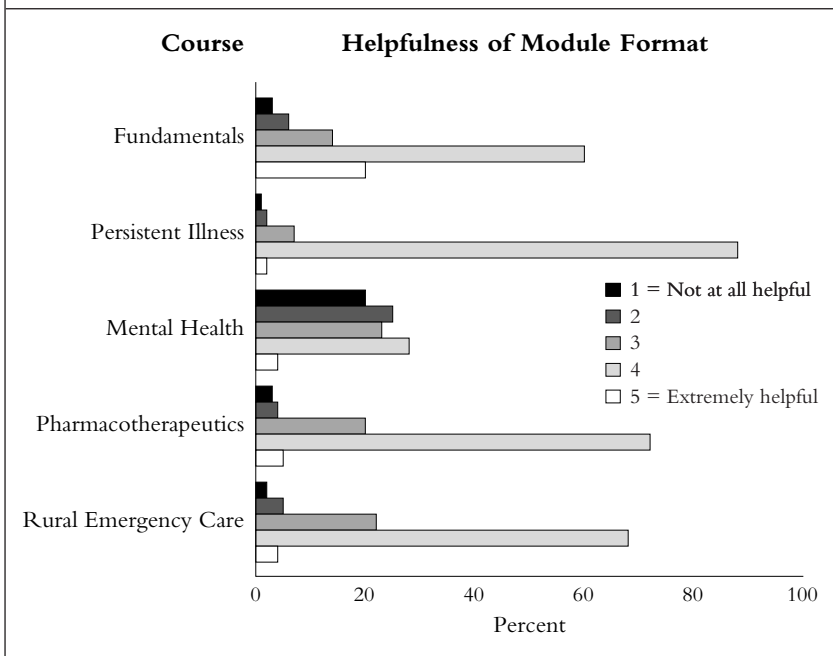
Given the small sample size and the need to protect participant confidentiality, regional comparisons were not made on a course-by-course basis. A further limitation was imposed by some missing learning-assessment data. For Fundamentals of Primary Health Care, for example, only four learners completed all of the module evaluations. Also, in each course there were learners with missing data on the evaluation forms and, because of a glitch in the online environment, learners who submitted duplicate evaluations for some modules, since they could not download the module content without completing the online evaluation. The duplication was handled by the CRaNHR team through the deletion of duplicate data. Data were carefully cleaned and cross-checked before analysis. Given these limitations and the fact that the evaluation has been designed to follow the progress of these specific courses, caution should be taken in generalizing the results.

Findings. Thirty-nine participants officially registered for at least one of the five courses and 28 registrants completed individual courses, for an overall completion rate of 73%. The learners were mostly highly experienced RNs who were relatively new to their NP positions and who therefore appreciated the depth and breadth of the course material. These participants reported that the greatest strength of the course was that it increased their knowledge and skills. The majority of learners held the view that the course(s) met their personal learning objectives. Also, the majority of learners passed the courses with an average score of 70% or higher, which was considered to render the courses successful.

The respondents reported that they were able to transfer the knowledge they gained to their practice. For example, although there were differences between courses, the majority of learners rated the course material as applicable to their daily practice. They commented that the experience extended their vision of and confidence in daily practice. They also commented on both the immediate and future significance of the course material to their work.

Learners suggested that the online aspects of the course were excellent, including the interface, design, and technical support. Mixed delivery methods and delivery that was fully supported were important aspects of this project. Learners were also pleased with the melding of online delivery and teleconferencing (in the case of Fundamentals in Primary Health Care) or news groups. Figure 1 illustrates the extent to which learners rated the delivery modes as helpful.

Figure 1 *Ratings of Module Helpfulness by Course*



Although there is variability in the ratings across courses, the majority of learners found the module design helpful to their learning. While it is important to consider the sometimes limited computing capacity in rural environments prior to delivery, this evaluation has shown that learners prefer the flexibility provided by online distance learning relative to traditional learning formats. However, learners in rural and remote areas expressed the need for access to reliable telecommunications and the Internet.

Discussion

The primary objective of this paper was to report on the innovative aspects of a rural NP continuing education pilot project related to delivery modalities. One such aspect has been the melding of course design and delivery with research. The development and implementation of the project were informed by both the needs assessment of rural and northern Ontario NPs and the evaluation. The broad definition of NP used in the studies assisted in providing an inclusive picture of the needs of NPs practising in Ontario. However, far fewer NPs have as yet accessed the

continuing education courses than responded to the needs assessment, indicating that the evaluation represents fewer voices than does the needs assessment.

A significant finding is that continuing education is important to NPs in rural and remote communities for maintaining competency, but that access is hampered by a variety of barriers such as travel, cost, and work and family obligations. These issues are also reported in the literature (Rasch & Cogdill, 1999; Sheperd, 1995). Another key finding is that while most respondents had access to computers and the Internet, and while they saw distance education as one means of accessing continuing education, they also valued face-to-face learning and networking. The interest in face-to-face modalities appeared to be constrained by barriers of distance, cost, and personal and work obligations. This paradox has been noted in other studies (Andrusyszyn et al., 1999; Andrusyszyn et al., 2001) and suggests that a range of approaches is needed to ensure accessibility for NPs working in rural and remote areas. Face-to-face encounters were not provided in the pilot project, but weekly teleconferences were seen as a useful substitute. Respondents practising in remote areas of northern Ontario recognized the benefits of information and communication technologies such as CD-ROM and videoconferencing. The use of multiple methods of delivery in the pilot project is a noteworthy innovation, and is consistent with findings from other studies (e.g., Chang et al., 2002; Chapman, 2000; Cole & Ramirez, 1999; Hewitt-Taylor, 2003). A further issue for design and research consideration is the extent to which courses can be provided in variable ways (Andrusyszyn et al., 1999; Andrusyszyn et al., 2001).

A further innovative feature of implementation was the use of the guiding principles of constructivism and learner-directed education, as suggested by other studies (e.g., Wambaugh et al., 1999). Moreover, as suggested by Chapman (2000), the delivery modes used in the project were relevant to rural practice settings and allowed for transference of learning to the rural communities in which the NPs work. Relevant content and delivery were achieved in the pilot project, enhancing the "deep learning" that takes place in a supportive work environment (Delva, Kirby, Knapper, & Birtwhistle, 2002). A challenge for rural communities is to find ways to encourage learners to proactively integrate their practice networks into a support system for learning. This could include suggesting mentors in the practice setting or encouraging connections with other health professionals who are expert in the course content (Betty & Tilleczek, 2002). A sense of being overwhelmed in one's practice setting has been found to be associated with a superficial approach to learning and the perception of barriers to continuing education (Delva et al.).

While rural and remote communities need technology to help overcome distance barriers (Sheppard & Mackintosh, 1998), they often lack the needed technological infrastructure. A critical but understudied issue is the importance of matching delivery modalities to the technical and Internet capabilities of each student and community (Farmer & Richardson, 1997; Hewitt-Taylor, 2003). Students enrolled in a given course may come from many different communities, each with unique access and support capabilities. Therefore, capability should be assessed and secured before delivery is designed or implemented. Technological capability that has been shown to be necessary for success should be part of the prior learning assessments (English National Board, 1991; Greenlaugh & Douglas, 1999; Sheperd, 1992).

In conclusion, the success of the pilot project may be related to the care taken to ensure that course content was of high quality, relevant to learners and to their client groups, and delivered through a supportive online environment. These qualities have also been shown to be linked to successful delivery of continuing education in the literature (e.g., Greenhalgh & Douglas, 1999; Sheperd, 1992) and reflect the kinds of needs reported by rural and northern Ontario NPs. The evaluation of the pilot project further suggests that rural and remote realities and issues should continue to play a role in the design and implementation of continuing education for rural NPs.

References

- Andrusyszyn, M. A., Cragg, B., & Humbert, J. (2001). Nurse practitioner preferences for distance education methods related to learning style, course content and achievement. *Journal of Nursing Education, 40*, 163–170.
- Andrusyszyn, M. A., van Soren, M., Spence, H., Goldenberg, D., & DiCenso, A. (1999). Evaluation of distance education delivery methods for a primary care nurse practitioner program. *Journal of Distance Education, 14*, 14–33.
- Atkin, K., Hirst, M., Lunt, N., & Parker, G. (1994). The role of self-perceived needs of nurses employed in general practice: Observations from a national census of practice nurses in England and Wales. *Journal of Advanced Nursing, 20*, 46–52.
- Badgely, R. F. (1991). Social and economic disparities under Canadian health care. *International Journal of Health Services, 21*, 659–671.
- Betty, D., & Tilleczek, K. (2002, January). *Using literacy programs in rural northern communities not serviced by literacy and basic skills agencies*. Report to Ontario Ministry of Training, Colleges and Universities and National Literacy Secretariat of Human Resources Development Canada. Sudbury, ON: Contact North.
- Caty, S., Tilleczek, K., Pong, R., Michel, I., & Lemieux, S. (2002). *Assessing continuing education needs of nurse practitioners in northern and rural southern Ontario*.

- Sudbury, ON: Centre for Rural and Northern Health Research. Available online: www.cranhr.ca
- Chang, E., Daly, J., Bell, P., Brown, T., Allan, J., & Hancock, K. (2002). A continuing educational initiative to develop nurses' mental health knowledge and skills in rural and remote areas. *Nurse Education Today*, 22, 542-551.
- Chapman, L. (2000). Distance learning for post-registered nursing: The facts. *Nursing Standard*, 14(18), 33-36.
- Cole, F. L., & Ramirez, E. (1999). Evaluating an emergency nurse practitioner educational program for its relevance to the role. *Journal of Emergency Nursing*, 25(6), 547-550.
- Delva, M. D., Kirby, J. R., Knapper, C. K., & Birtwhistle, R. V. (2002). Postal survey of approaches to learning among Ontario physicians: Implications for continuing medical education. *British Medical Journal*, 325(23), 1218-1223.
- Dusmohamed, H., & Guscott, A. (1998). Preceptorship: A model to empower nurses in rural health settings. *Journal of Continuing Education in Nursing*, 29, 154-160.
- English National Board. (1991). *Framework for continuing professional education for nurses, midwives and health visitors: Guide to implementation*. London: Author.
- Fair, M. (1992). Health and the rural population: Occupational mortality patterns. In R. Mendelson & R. D. Bollman (Eds.), *Rural and small town Canada*. Toronto: Thompson Educational.
- Farmer, J., & Richardson, A. (1997). Information for trained nurses in remote areas: Do electronically networked resources provide an answer? *Health Libraries Review*, 14, 97-103.
- Ferrel, M. J. (1988). The relationship of continuing education offering to self-reported change in behaviour. *Journal of Continuing Education in Nursing*, 19, 21-24.
- Government of Ontario. (1998, November 24). *Health agencies to receive enhanced community health funding for nurse practitioners*. Press release. Toronto: Ontario Ministry of Health and Long-Term Care.
- Government of Ontario. (2000a, February 23). *Nurse practitioners will provide expanded access to health service in rural and northern communities*. Press release. Toronto: Ontario Ministry of Health and Long-Term Care.
- Government of Ontario. (2000b, June 15). *Ontario invests \$4.7 million to fight cervical cancer*. Press release. Toronto: Ontario Ministry of Health and Long-Term Care.
- Greenhalgh, T., & Douglas, H.-R. (1999). Experiences of general practitioners and practice nurses of training courses in evidence-based health care: A qualitative study. *British Journal of General Practice*, 49, 536-540.
- Health Services Restructuring Commission. (1999). *Primary health care strategy: Advice and recommendations to the Honourable Elizabeth Witmer, Minister of Health*. Toronto: Author.
- Hemman, E., McClendon, B., & Lightfoot, S. (1995). Networking for educational resources in a rural community. *Journal of Continuing Education in Nursing*, 26, 170-173.
- Hewitt-Taylor, J. (2003). Facilitating distance learning in nurse education. *Nurse Education in Practice*, 3(1), 23-29.

- Hovenga, E., Hovel, J., Klotz, J., & Robbins, P. (1998). Infrastructure for reaching disadvantaged consumers: Telecommunications in rural and remote nursing in Australia. *Journal of American Medical Informatics Association*, 5, 269–275.
- IBM Business Consulting Services. (2003, June 30). *Report on the integration of primary health care nurse practitioners into the Province of Ontario. Final Report*. Toronto: Author.
- Jarrett, P., Wainright, P., & Lewis, L. (1997). Education and training practices of nurses. *Journal of Telemedicine and Telecare*, 3, 40–42.
- Mansfield, C. J., Wilson, E. J., Kobrinski, E. J., & Mitchell, J. (1999). Premature mortality in the United States: The roles of geographic area, socioeconomic status, household type and availability of medical care. *American Journal of Public Health*, 89, 893–898.
- Merservy, D., & Monson, A. (1987). Impact of continuing education in nursing practice on quality of patient care. *Journal of Continuing Education in Nursing*, 18, 214–220.
- Nursing Task Force. (1999). *Good nursing, good health: An investment for the 21st century. Report of the Nursing Task Force*. Toronto: Queen's Printer.
- Nursing Task Force. (2001). *Progress report: Good nursing, good health: An investment for the 21st century*. Toronto: Queen's Printer.
- Ontario Ministry of Health and Long-Term Care. (1994). *Nurse practitioners in Ontario: A plan for their education and employment*. Toronto: Author.
- Pampalon, R. (1991). Health discrepancies in rural areas in Quebec. *Social Science and Medicine*, 33, 335–360.
- Peden, A. R., Rose, H., & Smith, M. S. (1990). Transfer of continuing education to practice: Testing an evaluation model. *Journal of Continuing Education in Nursing*, 21, 68–72.
- Pitblado, R., & Pong, R. W. (1995). Comparisons of regional variations in the utilization of medical and dental services in Ontario: A test of several hypotheses. In D. J. McCready and W. R. Swan (Eds.), *Change and resistance: Proceedings of the 6th Canadian conference on health economics*. Kingston, ON: Canadian Health Economic Research Association.
- Pong, R. W., & Pitblado, R. (2001). Don't take geography for granted! Some methodological issues measuring geographic distribution of physicians. *Canadian Journal of Rural Medicine*, 6, 103–112.
- Pong, R. W., Rowe, B. H., Ryan, D. T., & Mulloy, J. V. (1995). Perceived roles of continuing medical education in physician recruitment and retention in northern Ontario. In A. I. Rothman & R. Cohen (Eds.), *Proceedings: The Sixth Ottawa Conference on Medical Education*. Toronto: University of Toronto Bookstore.
- Rasch, R., & Cogdill, K. (1999). Nurse practitioner information needs and information seeking: Implications for practice and education. *Holistic Nursing Practice*, 13, 90–97.
- Sahai, V., Barnett, R. C., Roy, C. R., Stalker, S. A., Chettur, V. N., & Alidina, S. (2000). A profile of cardiovascular disease in northern Ontario: Public health planning implications. *Canadian Journal of Public Health*, 91, 435–440.

- Sheperd, J. C. (1992). Analysis of training needs of nurse practitioners. *British Journal of Nursing*, 1, 310–313.
- Sheperd, J. C. (1995). Findings of a training needs analysis for qualified nurse practitioners. *Journal of Advanced Nursing*, 22, 66–71.
- Sheppard, L., & Mackintosh, S. (1998). Technology in education: What is appropriate for rural and remote allied health professionals? *Australian Journal of Rural Health*, 6, 189–193.
- Tilleczek, K., Caty, S., Russell, N., Pong, R., & Rukholm, E. (2004). *An evaluation of the Nurse Practitioner Continuing Education Implementation Project*. Sudbury, ON: Centre for Rural and Northern Health Research, Laurentian University. Available online: www.cranhr.ca
- Wambaugh, K., Boyle, D., Hagemaster, J., Teel, C., Langner, B., Fazzino, P., et al. (1999). Beyond correspondence, video conferencing and voice mail: Internet-based master's degree courses in nursing. *Journal of Nursing Education*, 28, 267–271.
- Way, D., Jones, L., Baskerville, B., & Busing, N. (2001). Primary health care services provided by nurse practitioners and family physicians in shared practice. *Canadian Medical Association Journal*, 195, 1210–1214.
- Wilkin, R. (1992). Health of the rural population: Selected indicators. In R. Mendelson & R. D. Bollman (Eds.), *Rural and small town Canada*. Toronto: Thompson Educational.

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