ICT and Health and Wellness in Remote and Rural First Nations Communities: A Social Determinants of Health Perspective

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Abstract

The topic of information and communication technologies (ICT) for health is generally framed as telehealth and other technology processes that enable delivery of mainstream health services. However First Nation communities are also using ICT for community development activities that contribute to improved health and wellness. Based on the preliminary results of a literature review on how ICT is being used in remote and rural First Nations, this paper uses a social determinants of health perspective to begin to create a broader understanding of how ICT can contribute to community health and wellness in remote and rural First Nations.

Introduction

Health care delivery in rural and remote First Nations communities is often characterized by isolation, poor or inconsistent access to health care, diversity of language and culture, holistic quality of care and community-based decision making (FNIHB, 2008). Information and communication technologies (ICT) have the potential to improve and support delivery of health care in these communities. First Nations are using ICT not only for health care delivery but also many community development activities that contribute to improved health and wellness.

In this paper we present the preliminary findings of a comprehensive review of literature on how First Nation communities and their public and private sector partners are using ICT in many ways that can contribute to improved health and wellness outcomes. Telehealth is the use of technical application tools and processes for the delivery of health care (Allec, 2005). While telehealth is a popular use of ICT in rural and remote First Nation communities, the communities are also using ICT in many other ways that can also improve social determinants of health.

Encompassing more than physical health and the role of health services, the concept of social determinants of health recognizes that other factors play an important role in determining health status. These include economic factors such as education, employment and income levels, social factors like social support within the family and the community and the physical environment which includes housing conditions and access to clean drinking water (Raphael, 2003). Additionally the mental, physical, spiritual and emotional health of both the individual and the community need to be taken

into consideration for a social determinants of health model for rural and remote First Nations peoples (Stewart et al., 2008). A social determinants of health perspective specific to First Nations creates a new understanding of how ICT can contribute to health and wellness within First Nation communities.

Description of the study

A search was conducted for recent and current research focusing on culturally-appropriate ICT for health and wellness services and activities in rural and remote First Nations communities. The search concentrated on Canadian sources; however relevant articles on First Nation and Aboriginal communities from the United States and Australia in particular were also included. The search was performed by NRC-CISTI, Canada's primary institute for scientific and technical information. Databases searched included Scopus, Web of Science, Medline, CINAHL, ACM Portal, INSPEC, Compendex and IEEE Xplore. Grey literature such as program evaluation reports were also included. Search terms included terms concerning the population, including but not limited to aboriginal, First Nation, Native and Indigenous. References to computer based technologies such as EHR, PHR, e-health, ICT and internet were included. Aspects of health and community wellness such as healing, illness, medicine, balance and wellness were also searched. Of the hundreds of articles and reports found in the search, more than 200 were selected for review and analysis in the larger report to be published by the National Research Council (Molyneaux et al., forthcoming in 2010). This paper contextualizes published research about the use of ICT in First Nation communities using a social determinants of health perspective.

Themes arising from the literature review

Social determinants of health from a First Nations perspective

In Canada, the term "social determinants of health" dates back to 1974 and the Lalonde report, *A New Perspective on the Health of Canadians*, which challenged the biomedical health care system by introducing the framework for social determinants of health theory. The report established that not only health services but also lifestyle, environment and human biology determines health status. The theory recognizes the limitations of the contributions of medicine and mainstream health care; instead health care is only one of many factors that determine health status (Lalonde, 1974; Allec, 2005).

The original framework for the social determinants of health has since evolved. Currently there are various definitions of the "social determinants of health." For the World Health Organization, the social determinants of health are based on economic factors and social support, such as social class, work, unemployment, food and transport, addiction, stress, early life social exclusion and social support. In the "Ottawa Charter for Health Promotion" the prerequisites for health include economic, environmental and social factors including education, income, shelter, food, a stable ecosystem, sustainable resources, peace, social justice and equity. Health Canada discusses these issues as determinants of health as well as personal health practices and coping skills, health child

development and child services and biology and genetic endowment. At a conference at York University the social determinants specifically relevant to Canada were discussed. These determinants included "early life, education, employment and working conditions, food security, health care services, housing, income and its distribution, the social safety net, social exclusion, and unemployment and employment security (Raphael, 2003)."

When applied to First Nations communities the social determinants of health perspective needs to take into account First Nation people's views on health and wellness. In many Indigenous communities, health has great cultural significance and refers specifically to the balance of the mental, physical, spiritual and emotional aspects of a person's nature. This balance is traditionally established and maintained through everyday life activities like hunting and participating in community gatherings. Illness occurs when one or more of the four elements become unbalanced (Stewart et al., 2008). The World Health Organization recognizes that health is not just the absence of disease or infirmity, but also a state of mental, physical and social well being (Yurkovich & Lattergrass, 2008). A First Nations perspective of health also includes spiritual and emotional aspects and connects the health of the individual to that of the community as a whole.

This theory of health and wellness encompasses more than individual health, but also involves the community as a whole. Community wellness is a concept which is closely related to the social determinants of health. Community wellness involves community-based program planning, encourages a community-wide support system and directly empowers the community to become involved in their own wellness (Jenkins, 1991).

At the 2007 symposium on the Social Determinants of Health, Indigenous representatives from the Americas, Asia, Australia, New Zealand and the Philippines listed colonization as one of the most fundamental and underlying determinants of health (King et al. 2009). Jacklin (2008) explains how Health Canada has used the social determinant of 'culture' to describe what should instead be labeled as "colonialism, acculturative stress, assimilation or even racism." In her studies on health variation among the villages of the Wikwemikong Unceded Indian Reserve in Ontario, Jacklin used the degree of residential school exposure as one measure of community health. Her results illustrate the importance of identifying culturally and community specific health determinants by showing a direct relationship between the individual colonial experiences of communities and the variance in their respective health statuses.

ICT in First Nation communities for mainstream health services

Broadly defined, telehealth encompasses technical applications, tools and processes. More narrowly the term refers to the use of information and communication technologies (ICT) for health care delivery, and the delivery of education and information over distance (Allec, 2005). ICT in First Nation communities are used for various telehealth applications including remote diagnostics and routine consultations, tele-wound care, telediabetes, telerehabilitation, telemental health and teleaddictions, telepaediatrics, telecardiology, teleoncology and other telehealth services, such as telepharmacies.

However, success in telemedicine relies on more than just the delivery of health services. Telemedicine programs must also engage and benefit the community.

In a 2009 presentation, Carpenter and Rowlandson describe the results of a project to bring telemedicine to some of the most underserved First Nation communities in Ontario: James Bay Coast (pop. 11,500), Attawapiskat (pop. 1,300), Fort Albany (pop. 1,000) and Kashechewan (pop. 1,200). The communities have a high number of referrals. To date the project has had positive results, with engaged leadership and good acceptance and adoption rates. Lessons learned include the need to demonstrate the value of telemedicine to clinicians and their patients, to establish long term capacity to implement solutions, and to recognize that First Nations organizations and communities have a unique body of knowledge and relationships to support positive outcomes. (Carpenter and Rowlandson, 2009).

In terms of clinical use, ICT has already been established in many communities as a means for "virtual visits" with specialists. This enables people to stay within their community (and family circle) for preliminary or follow-up visits. As Heaton notes, these trips from rural areas of Nunavut cost $2,000 on average. The cost of the trip and time away from their family can be very stressful to the individual and may in themselves take a toll on their health (Heaton, 2006).

A number of ICT projects support ICT use in First Nations communities. The Kuh-ke-nah Network (K-Net) is an example of a First Nations network success story. K-Net, a division of the Keewaytinook Okimakanak (KO) tribal council, is a not-for-profit provider of network services based on social equality. K-net services residents, community organizations and social groups in many remote northern Ontario communities, supports content management and web services, and includes satellite communications (Fisher & Clement, 2009). One reason for K-Net's success could be that they are based on models that support traditional Aboriginal beliefs – the holistic view of health which posits that all aspects of life are interconnected and contribute to individual and community well being (Gildeon, 2006). K-Net also supports the KO Telemedicine (KOTM) service (Carpenter, 2009).

Keewaytinook Okimakanak Telemedicine (KOTM) is the only Canadian telehealth network managed and operated by Aboriginal people. KOTM provides telehealth services to First Nations communities in northwestern Ontario. KOTM began providing remote access service in 2000 and now serves over two dozen First Nation communities. KOTM services include "clinical consultations involving specialists, family physicians and other health care providers; educational and training events that cater to a variety of community-based health care providers including nurses, social workers and mental health workers; and administrative meetings involving band chiefs, councilors, elders and other community members." The technologies used includes "telemedicine workstations equipped with patient cameras, stethoscopes and otoscopes… delivered over a wireless ground and satellite telecommunications network provided by K-Net (Hogenbirk, 2008)."

The goal of KOTM is to improve access to services, enhance quality of service and reduce isolation (both social and professional) for community workers and community members. KOTM meets its goals by providing a means to conduct health consultations, administrative meetings and training and educational sessions within First Nations communities (Hogenbirk, 2008). Some researchers see KO telehealth as model for future development (Muttitt, Vigneault & Loewen, 2004).

ICT in First Nation communities for community, social and economic development

ICT can support community wellness through various telehealth applications. However, ICT can also be used in various ways for community, social and economic development. For more than a decade, researchers have argued that ICT could be used by First Nations to work toward their community development goals (O'Donnell and Delgado, 1995). However there has been very little research in this area, compared to the considerable volume of research on ICT use for health and education.

The backbone of ICT for development in First Nations communities is the First Nations SchoolNet program, funded by the federal government and implemented by a network of six Regional Management Organizations (RMOs) in the different regions across Canada. The network supports not only educational applications but also telehealth, justice and economic development applications. The RMO presence extends to: strengthening local community ICT capacity, participation in a national Aboriginal broadband network, national and regional Aboriginal videoconferencing, innovative schools projects, collaborative programs with other departments, and economic development (Whiteduck, 2009b).

ICT originally meant for Western health care delivery systems are being used in alternative ways, and may even be adapted for traditional First Nation healing. In Fort Chipewyan, for example, videoconference technology is being used to connect family and friends to those who are hospitalized. Videoconferencing is also being used to connect elders for regular social visits. Currently the staff in Fort Chipewyan is exploring the use of videoconferencing as a medium for traditional healthcare delivery, a method they call 'telespirituality (Gildeon, 2006).'

Some of the many other uses of ICT in remote and rural First Nations include: training and education of health care workers, training and education of community members on wellness topics, schooling and school activities related to health and wellness, various ICT applications to support essential community services (water treatment plant operators, policing, etc.), and videoconferencing and other applications to support the activities of community businesses and organizations, justice services, community connections – such as elders communicating via videoconference – as well as programs and activities for youth, language and cultural activities, community economic development, community governance, and environmental and land sustainability.

First Nations are using videoconferencing in many ways for community, economic and social development. A recent paper from a SSHRC-funded study of First Nations

organizations that are supporting the use of video communications explores why visual communication is important for First Nations, the prevalence and purposes of videoconferencing in non-institutional settings, and the challenges the communities experience using this technology. The central theme of the paper is that videoconferencing is a vital tool for remote and rural First Nations and in order for it to become widely used, the technology has to be a part of everyday life in communities and not just restricted to telehealth and distance education. Further, if ways can be found to increase the use of videoconferencing in non-institutional settings by everyone in First Nations communities, the technology will be used more often for institutional applications. Thus, increasing the non-institutional, everyday use of videoconferencing will have a positive impact on its use for telehealth and distance education. (O'Donnell, Walmark and Hancock, 2009).

As one example of a community-led use of videoconferencing, the Keewaytinook Okimakanak (KO) tribal council in northern Ontario has developed and is implementing a highly innovative approach to the community delivery of water treatment services in remote northern communities. The approach includes the use of two-way videoconferencing for mentoring and continuing education, and support and remote monitoring and electronic servicing of community water treatment plants (Strachan, 2008).

Emerging theme: ICT for health literacy

Researchers have noted that some populations learn not through written media but through watching and listening (Hunter et al., 2007). Therefore video communication, through videoconferencing or recorded video may be vital tools for both health and community development in First Nation communities.

Hunter and colleagues argue that rights and social justice form the first two divides for Aboriginal peoples, but that health literacy constitutes the triple divide. Their paper discusses a program in North Queensland, Australia that addresses health issues through audio-visual media, using touch screens to access health information that is culturally appropriate. In this project, a team member worked closely with community members, elders and health workers to develop content, and community members were hired as paid actors, assistants, script writers, and so on. The researchers found that Aboriginal participants responded positively to the narrative multimedia sessions as well as the content that was activity-orientated or geared towards problem solving. Also, high levels of community involvement lead to greater interest in the subject matter (Hunter, et al., 2007).

Exploring the idea of First Nations health literacy, Stewart and colleagues describe a collaborative video research project concerning health undertaken by community members, university researchers, Canadian Indigenous youth and their teachers. Video was chosen for the project as it could be seen as culturally appropriate because it relies on traditional oral communication. Several themes emerged, including the importance of community (accessing community knowledge, having the support of the community);

culture (access to cultural resources, following culture protocols like circle sharing time, etc); confidence (students gain confidence as a result of the project, and as they gain skills); and control (control over self, ownership/control over the project, ability to make changes). The authors call for a "conception of culturally based health literacy" and holistic models of health literacy (Stewart et al., 2008).

Conclusions

This paper is a preliminary attempt to argue that ICT can contribute to improved health and wellness outcomes in remote and rural First Nations communities in ways far greater than telehealth. Conceptually, we used a social determinants of health perspective to link on one hand, potentially improved community health and on the other hand, ICT used by First Nations for a wide range of activities in their communities.

Following that line of argument, we believe ICT for health and wellness in First Nations should be conceived as using technologies to support a wide range of community activities. This view has significant implications for policies for health and wellness in these communities.

From a health policy perspective, the social determinants of health are not easily addressed. The myriad of elements that contribute to community and individual health in remote and rural First Nations – from good housing and clean water to use of secure use of traditional hunting and fishing resources – fall within a wide range of different policy and program silos. In addition, effective policy development requires consultation with individual communities and culturally appropriate programs and education – always a challenge when policy-makers are based in urban locations far removed from the communities involved.

From the perspective of policy for broadband networks and ICT diffusion, a similar challenge is that currently there are no comprehensive policies or plans in place to support the widespread use of ICT and networks by First Nation communities for different purposes. Further, policies for First Nation telehealth are not linked to emerging policies for ICT and networks for other community needs.

From the perspective of First Nations, their leaders have in recent years increased their demands to address the information and communication technology (ICT) gap or the "digital divide" in and among First Nation communities. First Nation leaders have recognized that this divide is a significant barrier to possibly reducing or overcoming many economic, social and educational challenges that hinder First Nation people and their communities from reaching a greater potential, and to creating more opportunities for First Nations (Perley and O'Donnnell, 2006).

The Assembly of First Nations (AFN), the organization representing the leadership of more than 600 First Nations across Canada, has outlined a strategy for an equipped First Nations broadband network. It is part of a broader plan for economic, social and cultural change based on a comprehensive economic strategy based on knowledge and

information. Since 2002, the AFN has passed five resolutions at their AGMs related to broadband connectivity and e-communities. Since 2008, the AFN has also been working with a team of ICT experts (AFN IT Experts Think Tank) to develop the strategic plan. The AFN's "e-Community ICT model" builds upon a common network model employed by Canadian institutions and corporations. The Think Tank has outlined policy recommendations along five themes: First Nation capacity development, First Nation connectivity, human resources development, information management, and service delivery and partners (Whiteduck, 2009a).

Conducting the literature review discussed in this paper has given us the opportunity to take a high-level view from which we see the need to link these various research and policy perspectives and activities from both government and First Nation community leaders. A more holistic research and policy agenda to improve health and wellness in remote and rural First Nation will consider and focus on many different activities that use ICT in First Nation communities. A social determinants of health perspective allows researchers and policy makers to recognize that health and wellness is a very broad concept, and that ICT can be used in many ways by First Nation communities to improve community health and wellness.

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