Health Canada
First Nations and Inuit Health Branch

# *National Information Sharing & Feedback Session on the Potential Future of Telehealth in First Nations and Inuit Communities*

# FINAL REPORT


***Sponsored By:***

**First Nations and Inuit Health Branch, Health Canada**

***In conjunction with:***

**Assembly of First Nations**
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# Background

The ***National Information-Sharing and Feedback Session on the Potential Future of Telehealth in First Nations and Inuit Communities*** was held on October 5th and 6th 2000 in Montreal. The Session was coordinated jointly by the First Nations and Inuit Health Branch of Health Canada, the Assembly of First Nations and the Inuit Tapirisat of Canada. Approximately 60 First Nations and Inuit representatives attended the session traveling from most provinces/territories. The session was intended to give participants the opportunity to acquire a general understanding of telehealth and its implications for First Nations and Inuit communities. Participants were also invited to discuss the need for telehealth and the general components of a Blueprint to guide its potential future development. Finally, participants were called upon to identify the next steps required to move forward the telehealth agenda.

This ***Final Report*** includes a review of the four main themes presented at the Session: *Introducing Telehealth, Sharing Lessons Learned, Creating a Blueprint* and *Identifying Next Steps*. Summaries of the break-out group discussion and of the Next Steps plenary discussion are provided. Some session materials and presentations of invited speakers are also appended.

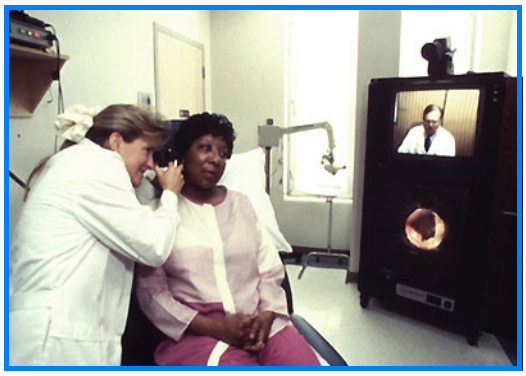
***Evaluation forms*** were completed by 18 session participants (30% response rate). All participants who completed the form indicated that they enjoyed the session. All participants except one indicated that they learned about one or more of the following topics: telehealth, experience of First Nations and Inuit with telehealth and the future of telehealth in First Nations and Inuit communities. Participants made suggestions for areas where more information is needed. The Final Report is intended partly to fill these information gaps. Each additional information item suggested by participants is incorporated under the most appropriate session theme.

According to the evaluation forms, all participants found the break-out group discussions useful although five participants wished that more time had been made available. General criticisms of the session by participants are stated below.

- The level of Inuit representation was not equitable to the level of First Nations representation.
- The agenda was too overwhelming; too many ideas were presented.
- No simultaneous translation services were made available to Francophone participants.
- More time would have been needed to give feedback.
- Foods were high in carbohydrates and no fruit was offered.
- The room was too small.

# Introducing Telehealth

## What is Telehealth?



***Telehealth is a tool for communities to access health expertise from nurses, physicians, specialists and other health practitioners.*** Patients are not the only ones who want to access health expertise. Nurses working in isolated communities often want to consult with physicians about a patient. They have been doing this for years using the telephone. Now, they can send images of the patient (like the image of his ear or of his skin) to the physician or they can arrange for patients to speak to the physician directly over the audio-video link to help the physician to give a more informed opinion.

Physicians working in rural areas also want to obtain second opinions from specialists to reinforce their diagnoses. And even specialists want to discuss difficult cases amongst themselves to learn from the experience of others. With telehealth, even though health experts may be separated from each other by several miles, they can still consult with one another and share patient information.

***Telehealth is a tool for professionals and community members to access health education.*** Health professionals working in rural and remote areas do not have access to learning materials and courses necessary for them to keep up-to-date on new practices or even to refresh their current skills. Telehealth allows these professionals to access learning materials from universities/libraries, professional associations or health care facilities. Health professionals can also learn from sharing experiences with each other. Telehealth allows them to do this through audio-video links or Internet chat rooms.

***Telehealth is a tool for people to access information related to health.*** Community members can access information about health in general: how to care for their diabetes, whether their mother should get a flu shot etc. Health providers can access information about their patients. Health managers can access information about how services are used and money is spent. Whatever type of health information, whoever is looking for it, telehealth can help to access it. In doing so, it also makes sure that personal health information is protected from wrongful

disclosure.

## What Main Opportunities Does Teleheath Offer to Your Community?

Telehealth has a great deal of potential to improve access to health care, health education and health information of First Nations and Inuit communities especially since over 1/3 (252) of these communities are located more than 90 km from physician services. Having to travel over long distances and in bad weather to access health care places patients and health providers at risk. It also makes even more difficult the recruitment and retention of local health providers.

Telehealth can potentially benefit all community members by improving access, reducing unnecessary travel, improving their overall health status, increasing their level of comfort and security and giving them opportunities to increase their knowledge of health and their capacity to deliver health care at the community level.

Community health providers often feel alone and overwhelmed. Telehealth can help them to access support and it can also help them to better manage their workload. They can save time spent traveling with patients. They can learn new techniques to deliver services. They can save time looking for patient files. They can save time by doing several home care visits using audio-video link directly from the clinic.

*This question was posed during the Break-Out Group Discussions. A summary of responses received from all the groups is provided below.*

**INCREASE ACCESS** of patients and health care providers to varied applications and services:
Diagnosis, Prescriptions, Treatment, Grand rounds, Continuing Care/Follow-up, Televisitation, Specialist Care, Home Care, Professional Education/Training, Telespirituality

**PROVIDE SUPPORT** to patients, health care providers and communities:
- Awareness-building, Patient Education, Patient Choice/Decision-Making
- Traditional Healers, Holistic Patient Care, Culture/Language Development
- Provider Education, Peer/Professional Support
- Health System Renewal (supporting changing health care roles), Capacity-building (health careers, training, advocacy)
- Community Development, Economic Development, Employment, Research and Innovation

**FACILITATE LINKAGES** among individuals and groups, places and knowledges:
- Networking (elders, communities, organizations, partnerships, experts, help desks), Educational Connections, Information Sharing (Best Practices), Internet access/webpages
- Links for Family Support in Homes/Communities (Monitoring, Supervision, Education)
- Links among Programs (e.g. Treatment Centres, FNIHIS Systems)

**CONTRIBUTE TO EFFECTIVE ADMINISTRATION/MANAGEMENT** of health-related programs and resources:

- Upgrade Infrastructure/Infostructure (e.g. Access to Adequate Telephone Lines)
- Longitudinal Electronic Health Records
- Discharge Planning
- Process Evaluation
- Staff Retention and Recruitment

## How Does Telehealth Work?

It uses computers, video screens, speakers/microphones and cameras. It links two or more of these computers by using telephone lines, microwave, satellite, cable. Computers can be linked over short distances (across the street, from community to community) or large distances (across a province or a country). Once computers are linked, they can send information in two ways:

By ***Store-and-Forward*** which means that images/text/voice can be sent through the Internet or even on a regular e-mail account. For example, the nurse takes a picture of an ear,"stores" that picture in the computer and "forwards" the picture by e-mail to an ear specialist that works in the city. The specialist looks at the picture from his computer and sends his diagnosis also by e-mail to the nurse in the remote community.

By ***Interactive Television or Videoconferencing*** which allows live, two-way interaction. Using the same example, a nurse takes a picture of an ear just like in store-and-forward. But, this time, the specialist can see her doing it and give her directions that improves the quality of the picture. He can examine the picture live and give the nurse and the patient his diagnosis immediately. The patient hears the diagnosis from the specialist directly.

So why doesn't everyone use videoconferencing? Videoconferencing requires a telecommunications connection at higher speed (called high bandwidth). Many rural and remote communities do not currently have access to the bandwidth required to conduct videoconferencing.

## What Is Telehealth Used For?

Telehealth offers many different types of services.

***Medical Consultations*** Consultations in most specialties can be provided using telehealth. Telecardiology, teleophthalmology, tele-ENT, teledermatology, telepsychiatry, teleradiology, telepathology, tele-oncology, telenephrology, tele-trauma, tele-emergency

***Education*** Health care providers can access health information on the Internet (such as educational materials and medical journals) or even participate in group events at a distance (such as seminars, conferences, courses and on-the-job training). This can help them to feel less isolated and increase the support they receive from colleagues.

Community members can access information about their health concerns on their own using the Internet or computer databases. They can also participate in live information sessions and workshops using videoconferencing, such as pre-natal classes. Telehealth encourages a more holistic approach to health by giving community members the information they need to prevent disease and promote their personal health, as well as the health of their families and communities. A greater variety of information, that includes Western medicine but also traditional medicine and alternative therapies, is available to them.

***Home Care*** Home care services include nursing, physiotherapy, occupational therapy, home maker services and meal programs. Delivering home care is labor intensive; it requires a lot of time from health care providers. This is an especially important concern in rural and remote communities where there is already a shortage of nurses, aides and home care workers.

Telehealth allows health care providers to save time by offering home care services directly from the nursing station or health centre. For example, 20 home video visits can be conducted by one health provider per day compared to only 4-6 on-site visits. Tele-home care also allows the continuity of care to be improved.

***Call Centres*** Call centres are 1-800 lines or local telephone numbers that community members can call to obtain advice and information from nurses. There are services like these offered in Alberta, New Brunswick, Ontario, Quebec and Manitoba.

| | |
|---|---|
| ***Health Information Networks*** | These networks link all computers of major health care facilities and often universities and research centres in an area. That area can be as large as a province or small as a city.<br><br>An example of a health information network is the First Nations and Inuit Health Information System. Its goal is to develop, with First Nations and Inuit communities, the basic infrastructure and capacity to track and manage health issues on a par with other jurisdictions. Its target is to create a network of 566 sites by 2002. |
| ***Administration*** | Videoconferencing can be used to conduct meetings from various locations saving precious travel time to community members. |

A more complete inventory of telehealth applications, as well as there minimal communication requirements (bandwidth), is offered in Appendix B.

## What Is the Extent of Current Telehealth Activity in Canada?

There are many telehealth projects and networks actively operating in Canada, approximately 178. There are about 300 Canadian telehealth companies. Organizations currently sponsoring telehealth initiatives include: 275 rural and remote communities; 20 Aboriginal communities; 98 professional associations, health care facilities, research organizations and universities; 19 government agencies.

A history of the development of Canadian telehealth is outlined in Appendix C and an overview of Canadian telehealth activity is provided in Appendix D.

## What is the Extent of Current First Nations and Inuit Telehealth Activity?

We can currently count 20 First Nations and Inuit communities involved in telehealth initiatives in Canada.

- The I-SITE Project screens members of the Tallcree Band for diabetic retinopathy by linking Fort Vermillion to Edmonton.
- The North-East Health District Network links Nipawin to Cumberland House.
- The Norway House Indian Hospital is participating in the Telemedicine R&D Project in Manitoba.
- Keewaytinook Okimakanak Health Services has begun a telepsychiatry pilot project. It has conducted initial teleconsultations using sites in Red Lake, Fort Severn and Sioux Lookout. The tribal council is also planning more telehealth activities including a call center.
- OUTREACH, a telepsychiatry project in London, operates a telehealth centre in Muncey, the Chippewas of the Thames community.

- Memorial University has installed Telecentres for Education and Community Health (or TEACH) in two Labrador communities (Nain and Goose Bay).
- The Baffin Health Network links Pond Inlet, Kimmirut and Iqaluit.
- IIU Network links Pond Inlet and Cape Dorset.
- WESTNET links Inuvik and Fort Smith to the Stanton Regional Hospital in Yellowknife.
- The Eskasoni First Nation was recently linked into the Nova Scotia Telehealth Network.
- The National First Nations Telehealth Research project established telehealth systems in five First Nations communities: Ulkatcho First Nation, the Montagnais of Unamen Shipu, the Peter Ballantyne Cree Nation, the Nunee Health Authority, the Berens River First Nation.

These projects have implemented a wide range of applications: tele-ultrasound, tele-emergency, teleradiology, tele-education, telerehabilitation, telecardiology, home telemonitoring, teledermatology, tele-ENT, tele-ophthalmology, telenephrology, telepsychiatry, tele-administration.

# Sharing Lessons Learned

## What are the Main Lessons Learned from the National First Nations Telehealth Research Project?

### Background Information

The National First Nations Telehealth Research Project was proposed by, what was then, Medical Services Branch, on behalf of First Nations, to the Health Transition Fund Steering Committee. The Health Transition Fund, announced in the federal budget of 1997, was intended to explore new models of health care delivery and to evaluate health care reform initiatives that were already in place. The National Telehealth Project was announced by the Health Minister in September 1998. It selected five First Nations communities located in La Romaine (QC), Berens River (MB), Southend (SK), Fort Chipewyan (AL), and Anahim Lake (BC). The participating communities are all situated in isolated locations.

The goal of the National Telehealth Project was to test telehealth to see whether it can make positive contributions in First Nations communities. The Project went through 8 main steps of implementation: (1) a needs analysis; (2) selection of 3 telehealth applications according to the needs identified; (3) access to the required telecommunications infrastructure (equipment and communication time); (4) launch of a Request For Proposals to identify interested equipment vendors; (5) vendor selection; (6) negotiation of an agreement with provincial health and educational centres that would provide services to communities through telehealth; (7) installation and training; (8) evaluation. The evaluation will be completed on March 31, 2001. An independent evaluation team was hired. Team members visited each community to tailor the evaluation tools (i.e. forms to collect the information) to the workflow of the community's health facility. Problems arising during the planning and implementation phases were dealt with jointly

by Health Canada and the community project teams.

Each community received approximately $200,000 to fund the telehealth project. Health Canada and the communities are working together to sustain the projects until 2002.

**Lessons Learned from the National Telehealth Project**

From the lessons learned during the planning and the implementation of the National Telehealth Project, we can identify a series of critical success factors for potential future implementation. First, the main lessons learned pertaining to different project areas are reviewed. Second, corresponding critical success factors are pinpointed.

**In the area of Project Management, lessons learned were:**

- High expectations should be managed by communicating that telehealth is not a solution to all problems.

- If technology companies come knocking on the door, it is important to be informed of all the steps and considerations involved in telehealth implementation, many of which are not related to technology. Most people with telehealth knowledge and experience agree that it is not the technology, but rather the human side of telehealth that is most difficult to negotiate. Technology is often the last piece of the implementation puzzle.

- There are many unanticipated costs of telehealth. Sources of sustained funding should be identified. Start-up and annual operating costs should be distinguished.

**In the area of human resources, lessons learned were:**

- Project management expertise is needed.

- Adequate and continuous (or periodical) training and guidelines for use of the equipment are important to ensure rapid adaptation and high usage of the equipment.

- A sufficient testing and demonstration period is required to familiarize staff with the equipment.

- Local health providers must be involved at the outset of the project to ensure their long-term participation and use of the equipment.

- A telehealth coordinator is a key resource to promote and operate the telehealth system. A coordinator schedules all uses of the equipment (ideally assisted by an electronic scheduler). He/She receives all of the training necessary to operate the

equipment and maybe even some basic maintenance training. The coordinator can also train new staff members to use the equipment. This is critical since most communities face frequent staff turnover. Events can be organized by the coordinator to inform and encourage community members to use the equipment. Communities can choose to train a nurse, a Community Health Representative (CHR) or someone else as coordinator depending on who is available and interested in the position.

- The human infrastructure that supports telehealth must be developed. This development, however, is hindered by the lack and instability of human resources available in remote First Nations and Inuit communities. In the context of the National Telehealth Project, not one of the five communities was immune to this problem. They experienced the loss of project champions (including telehealth coordinators) and staff turnover. Human resources impact planning, training, community buy-in, technical maintenance, the recording of evaluation data...that is, every step in the implementation process. The development of the human infrastructure will rely principally on training and establishing protocols/guidelines that respond to the impact of telehealth on scope of practice, liability and time management. Centennial College has created a Telehealth Nursing Program. As well, Canada's Health Informatics Association's Nursing Interest Group has launched a National Nursing Informatics Project to develop standards in nursing informatics education.

- It is preferable for project administration and scheduling to be handled outside nursing so as not to add to nurses' workload.

**In the area of investments, lessons learned were:**

- Adequate space is needed to house the equipment. The room where videoconferencing equipment is housed must be painted blue, sound-proofed, equipped with enough power outlets, lighting, back-up generator etc.

- Telehealth technology includes computer hardware and software, peripherals (otoscopes, dermascopes, digital cameras, ECGs, etc.) and networking technologies (modems).

- Telecommunications infrastructure was the most expensive item in two of the five communities, mainly because they had to use satellite communication. Another community had to change from interactive video to store-and-forward mode because access to the provincial telemedicine telecommunications network cost $10,000 per month. Faced with such a prohibitive cost, the community settled on using POTS to send medical images and electrocardiograms through e-mail. In summary, it is important to know what telecommunications infrastructure is available in the community before planning a budget and selecting telehealth applications. Some

applications require higher-speed connections (see Appendix B) to be effective.

- Other items in which a project must invest are: technical support and maintenance, project management and technical expertise, furniture and office supplies, administration and secretarial services, training and human resources (telehealth coordinator and health care providers), and service contracts with provincial health care and educational institutions. Average funding allocations for each major cost item per telehealth site are estimated at:

| | |
|---|---|
| Project management/Administration | $50,000 |
| Evaluation (research) | $10,000 |
| Community Site Coordinator | $30,000 |
| Technical Expertise/Support/Maintenance | $20,000 |
| Training | $10,000 |
| Service contracts with provincial health and educational facilities | $20,000 |
| Office supplies | $5,000 |
| Insurance | ? |
| Telecommunications (equipment and usage charges) | $40,000-$100,000 |
| Telehealth equipment | $60,000 |

Telecommunications costs will increase proportionately to the community's distance from the referral/educational centre and to the level of remoteness of the community (i.e. from road access to air only).

**In the area of practitioner participation, lessons learned were:**

- Telehealth reimbursement policies are only in place in Alberta, Saskatchewan, Manitoba and Nova Scotia. This means that in all other provinces, the fee-for-service practitioners must be in the same room as the patient to be reimbursed for the service he/she provides to that patient. In some cases, provisional measures have been approved by provincial governments to reimburse practitioners for some services provided through telehealth. Typically, this is done on an application by application basis or on a project by project basis. It is notable that Nunavut has stipulated in its contracts with health care practitioners that they must use telehealth to deliver services where appropriate. General reluctance to reimburse telehealth on the part of provincial governments is founded on uncertainty regarding the financial implications

of telehealth, the impact of telehealth on medical practice and the means of integrating telehealth in the health system.

- Clinical guidelines and protocols have been developed for telenursing by the College of Nurses of Ontario, Manitoba, Newfoundland and Alberta. The Canadian Nurses Association's Nursing Telepractice Working Group is working toward establishing standards of practice and core competencies. Professional nurses associations agree that nurses are accountable for services provided through telehealth. The Canadian Nurses Protective Association advises nurses not to give advice on the telephone without appropriate protocols in place. Clinical protocols and guidelines for other uses of telehealth and for other health care providers are needed.

- Cross-border licensing is, licensing health practitioners in more than one province is an issue raised by telehealth. If a physician works in Manitoba but provides a service using telehealth to a patient living in Ontario, does that mean the physician has to be licensed in Manitoba ***and*** Ontario? The Federation of Medical Licensing Authorities of Canada (FMLAC) – an organization of provincial medical licensing authorities with no statutory power that seeks to develop national protocols and accords – established a special committee to study interprovincial practice by telemedicine. The Committee recommended to all provincial authorities that:
  - Every province and territory determine what licensure, registration or other requirements it has of doctors from other jurisdictions who wish to practice telemedicine from elsewhere into their province or territory;
  - Every province or territory pass a rule binding its own members to the proposition that none of them may practice by telemedicine into any other province or territory without first satisfying whatever requirement(s) that province or territory may have established.

  All provinces except Nova Scotia, Quebec and BC approved and moved to implement these recommendations. Meanwhile, the FMLAC will continue to work on a Canadian accord for interprovincial telemedicine credentialing and standards.

- Time management is a concern for practitioners using telehealth since conducting teleconsultations often require more time than a face-to-face consultation. In Nova Scotia, specialists are compensated at a higher rate for teleconsultations than regular, face-to-face consultations for this reason.

- The type of technology used can determine the type of service that is feasible to do because the technology must be clinically validated by medical practitioners. Clinical validation determines that the text/image/audio transmitted is of sufficient quality to complete the teleconsultation.

**In the area of technology, lessons learned were:**

- Technologies must be easy to use.

- Access to technical expertise from persons other than the equipment vendors bidding for the contract is important because it allows community members to evaluate the best bid in terms of cost and feasibility.

- Proprietary telehealth equipment manufactured by various vendors is not always interoperable. Simply put, if a community wants to connect to a regional hospital and that hospital already has telehealth equipment, the equipment purchased by the community must be able to connect with the equipment at the regional hospital; both sets of equipment must be interoperable. The need for interoperability can impose restrictions on communities in terms of the equipment to be purchased (they must deal with a certain vendor etc.).

- It is important to access the required telecommunications infrastructure.

**In the area of partnership negotiation with provincial health systems, lessons learned were:**

- Building partnerships with provincial health care institutions is crucial to ensure that services will be provided at the other end of the connection.

- Equipment purchased at both ends of the connection must be interoperable. If provincial health and educational facilities already have equipment in place, it is important to purchase compatible equipment at the community facility.

- Memoranda of Understanding, or other forms of written agreement, must be negotiated with provincial facilities in order for infrastructure and resources to be shared with communities. Both parties have to agree to an acceptable level of service that will respond to the needs identified by the community and that is also manageable by the staff at the referral site.

## What Could Be Some of the Challenges of Implementing Telehealth in Your Community?

*This question was posed to the Break-Out Discussion Groups. Their responses summarized below mirror many of the lessons learned noted above.*

- CHALLENGES SPECIFIC TO THE ABORIGINAL COMMUNITY: governance, Aboriginal-driven process, communication, language, the protection of community-level information, literacy; institutional racism

- ROLE CLARIFICATION: jurisdiction, roles of government, policy gaps/inconsistencies

- RESOURCE ALLOCATION: spending money on basic needs vs. new technology, living with a low standard of care but high-end technologies, funding telehealth as an up-front investment, staffing issues and issue of access to specialist care, the need for technical/equipment resources and operation/maintenance resources

- CHANGE MANAGEMENT: time management, pace of change, adaptation to change (fear, depersonalization)

- RISK MANAGEMENT: privacy and confidentiality, liability

## What are the Critical Success Factors that can be extracted from the Lessons Learned?

| *Project Area* | *Critical Success Factor* |
|---|---|
| Community | • attainable expectations<br>• informed<br>• readiness<br>• stable governance and nursing services |
| Funding | • comprehensive<br>• sustained |
| Management | • decentralized<br>• needs-based<br>• local champion<br>• evaluation criteria considered at outset<br>• targeted performance goals (preferably quantified)<br>• effective change management<br>• effective time management<br>• effective project management at the community level<br>• communications strategy<br>• access to technical expertise<br>• training/capacity building |
| Health Care/ Educational Practice | • comprehensive provincial reimbursement of telehealth services provided by fee-for-service practitioners<br>• formal agreements (MOUs) with referral and educational centers<br>• resolution of liability, licensing, accountability and insurance issues<br>• standardized practice protocols and clinical guidelines<br>• compliance with academic standards/curricula and accreditation<br>• interprovincial licensing agreements<br>• evaluations of clinical and educational efficacy<br>• legal and technical provisions for privacy and confidentiality<br>• training for telehealth users |
| Technology | • user-friendliness<br>• ongoing, technical support<br>• security mechanisms<br>• interoperable, plug-and-play solutions<br>• access to the required bandwidth<br>• telecommunications planning at the outset<br>• substantial/sufficient testing and demonstration period |
| Policy | • flexibility/choice in referral patterns<br>• harmonization of F/P/T initiatives<br>• positive evaluations of telehealth |

## What Other Lessons Were Shared by First Nations and Inuit Community Members?

Bernice Downey, Executive Director of the Aboriginal Nurses Association of Canada, presented the main findings of a discussion paper entitled "The Impact of Technology on Aboriginal Health Nursing" to be recently released by the Association.

Orpah McKenzie, Health Director of Keewaytinook Okimakanak Health Services, shared lessons learned during their telepsychiatry project.

Peter Stevens, Director of the Eskasoni Community Health Centre, related his community's experience as the newest member of the Nova Scotia Telehealth Network.

Live demonstrations established links with Pond Inlet (Nunavut) and Fort Chipewyan (Alberta). Heather Taylor, Nurse-in-Charge of the Pond Inlet Health Centre, Jaopie Killiktee, Community Telehealth Facilitator, Sipporah Peterloosie, Community Telehealth Coordinator, and Tina McKinnon, Nunavut Telehealth Coordinator, discussed their experiences with telehealth and answered questions from the audience. They also showed participants in Montreal the weather on Baffin Island by focusing the general examination camera on the view seen outside the window.

Mary (Cookie) Simpson and Tammy Buchanen delivered their presentation using a document camera called Elmo. Tammy demonstrated zooming and focusing on the print-out of the presentation using the camera.

Presentations of Bernice Downey, Orpah McKenzie, Peter Stevens, Cookie Simpson and Tammy Buchanen are available in Appendix F.

## How Is Telehealth Evaluated?

There is no standardized evaluation framework for telehealth. Some researchers, such as Marilyn Field[1], are known for their development of telehealth-specific evaluation methodologies. There are two general approaches used to evaluate telehealth: program evaluation and health technology assessment. Program evaluation assesses the effectiveness of a service delivery program.. It can include several sub-components such as needs analysis, economic analysis

[1]Marilyn J. Field, Telemedicine: A Guide to Assessing Telecommunications in Health Care (Washington, D.C.: National Academy P, 1996).

(cost-benefit, cost-effectiveness or cost-consequence analyses), formative (process-oriented) or summative (outcomes-oriented) evaluations. Health technology assessment relates to the safety and performance of the technology, as well as to the costs of the technology.

The National Telehealth Project hired independent project evaluators to create a framework and tools, in consultation with community project teams and provincial health care and educational facilities. The project evaluation will assess the extent to which telehealth: 1) improves patient and community access to care, including timeliness of access; 2) renders service delivery in remote communities more cost-effective; and 3) improves linkages between remote health care centres and secondary, tertiary and educational facilities in each province.

Completion of the project evaluation will require the following information-gathering activities: monitoring of telehealth system usage; assessment of patient satisfaction; qualitative interviews with key informants; and a cost assessment. The Code of Research Ethics developed by the National Steering Committee of the First Nations and Inuit Regional Health Survey in 1997 is adhered to by the National Telehealth Project.

## What Have Been the Results of Telehealth Evaluations?

Telehealth evaluations vary according to whether they address the health impact (its response to health needs), organizational impact (improvements to service management and delivery) or economic impact (cost-benefits, cost-effectiveness and cost-consequences) of telehealth.

### Health Impact

In terms of health impact, the evaluation team of the National Telehealth Project completed a literature review of evaluations of selected telehealth applications in rural settings.[2] From this review, it is possible to conclude that the clinical efficacy of telehealth varies according to the application and the technological capability of the system. For instance, in teledermatology, if low-cost videoconferencing or store-and-forward technology is used for the transfer of images, the accuracy of diagnoses is lower than when images are transferred using higher-speed connections. Similar observations have been made in cases of tele-ENT, telepsychiatry and tele-ultrasound. As well, technical problems are reported to hinder efficacy (primarily due to audio-visual quality, lighting and camera operation).

Overall, studies reveal adequate levels of consensus regarding diagnoses among medical practitioners conducting telehealth consultations and those conducting face-to-face consultations with the same patients. These studies provide relatively strong evidence that telehealth maintains

[2]Applications consisted of cardiology, continuing medical education, dermatology, diabetes management, ENT, mental health/counselling, ophthalmology, neo/post-natal and pediatric assessment, rehabilitation, respiratory problems, trauma and emergency medicine.

current levels of quality of care. Notwithstanding, most studies have not considered whether telehealth improves the quality and accessibility of care beyond their current levels, and whether it maintains or improves the continuity and comprehensiveness of care. However, there are exceptions. For instance, a study found that the use of an electronic information system to remotely control blood glucose levels reduced three-fold the prevalence of diabetes-related crises (hyper/hypoglycemia).

Most studies also note that reactions to telehealth among local health providers (most often, general practitioners) and patients are positive. Telehealth appears to offer opportunities for learning to both groups.

**Organizational Impact**

Some evaluations of telehealth projects have discovered that health care providers (especially general practitioners) obtain educational benefits from being in contact with other colleagues. For instance, in Australia, general practitioners training in a rural practice were found to benefit from educational support given remotely by an experienced rural physician. Equivalent to standard advanced GP training, this training was better adapted to the context of the rural trainees' future professional setting. Another evaluation determined that health care providers participating in a home telerehabilitation program understood and appreciated even more patients' challenges after having seen their home environment. Other benefits of telehealth for health care providers documented in evaluations are: decreased stress; decreased travel time; ability to improve services for patients; potential to decrease workload through better health outcomes and less inappropriate referrals.

Patients are also reported in telehealth evaluations to benefit from better service delivery. They are said to be empowered by their access to second opinions and to more service options, by their ability to leave consultations at will (e.g. in tele-psychiatry) and to practice self-care in familiar surroundings (e.g. tele-home care). They also save on lost time and travel-related stress and expenses.

**Economic Impact**

Results of economic analyses of telehealth vary from positive, ambiguous and negative. Positive results are obtained from reduced travel time of the practitioner, reduced utilization rates of health care services (hospitalizations, length of hospital stays and home care visits), and savings on infrastructure (human and capital resources) and on transportation (practitioner or patient transfers). However, the evaluators of the National Project caution that few studies are comprehensive and those that are do not guarantee cost-effectiveness. A relatively longer amortization period is required to arrive at sound, reliable findings of cost savings. While some patient transfers may be avoided, this is not always the case. Improved access to services and expertise, including access to new services (e.g. tele-home care), may raise the number of patients diagnosed with ailments and, consequently, the number of patients who receive care (e.g.

follow-ups). As well, savings will depend on organizational efficiency in managing and delivering telehealth services.

# Creating a Blueprint

## Why is a Blueprint for Potential Future Implementation of Telehealth in First Nations and Inuit Communities Needed?

***Reason 1*** Many First Nations and Inuit communities want to launch telehealth initiatives. We have seen this trend with the number of funding proposals submitted to the Smart Communities Program and the Canadian Health Infostructure Partnerships Program (CHIPP). First Nations and Inuit organizations and communities that have submitted proposals that are not selected will be looking for other funding sources. Those whose proposals are approved will be looking for sources of sustained funding. A Blueprint will be a critical tool to acquiring additional funding for First Nations and Inuit telehealth initiatives.

***Reason 2*** Many activities[3] are being launched across the country that are determining how telehealth will be implemented. National and provincial/territorial initiatives can affect where telecommunications infrastructure is made available, what policies are put in place to guarantee practitioner participation (reimbursement, liability, ...) and to protect personal health information . In other words, they influence how telehealth will be rolled out to First Nations and Inuit. Consequently, it is important for First Nations and Inuit to be part of these discussions and initiatives. It also important for the interests and concerns of First Nations and Inuit regarding telehealth to be communicated in an accurate and consistent manner. A Blueprint is instrumental to ensuring the appropriateness and effectiveness of this communication. It can do so by acting as a vehicle for gathering the lessons learned and outcomes from First Nations and

[3]The Advisory Committee on Health Infostructure's Telehealth Working Group, created in 1999, is developing a tactical plan that addresses major policy issues with the hopes of facilitating the implementation of telehealth on a national scale. Members of the Group represent various provinces and territories across Canada. Health Canada's Office of Rural Health launched the Rural and Remote Health Innovations Initiative in 1999 to explore new mechanisms for service delivery like telehealth in rural and remote communities. In September 2000, the First Ministers of Health announced the creation of a new independent corporation to develop and ensure the use of common, pan-Canadian information standards and compatible communications technologies. There are other important national initiatives launched by CANARIE, Industry Canada, the Canadian Society of Telehealth etc. that have a tremendous influence on the development of telehealth in Canada.

Inuit telehealth projects.

***Reason 3*** Not only should the interests and concerns of First Nations and Inuit be taken into account in national initiatives, but First Nations and Inuit should be able to actively engage in the increasing level of telehealth activity initiated by provincial and territorial governments and by regional health, educational and research organizations, such as telehealth networks, provincial/territorial consortia and partnerships.

***Reason 4*** Telehealth is a core component of the Aboriginal Health Infostructure (AHI), whose vision was outlined by the Advisory Council on Health Infostructure. Its main principles are: self-determination; knowledge is power and inequities in human resource capacity and institutional development. A Blueprint for telehealth is a necessary sub-component of the larger AHI that will contribute to its partial realization.

***Reason 5*** A Blueprint is essential to outline and begin to address the critical policy issues raised by telehealth, related to clinical practice, partnerships and non-insured health benefits.

***Reason 6*** Telehealth is a tool for health system renewal. The Blueprint is a means to identifying the benefits of telehealth and incorporating telehealth applications into new programs such as the Aboriginal Diabetes Initiative and First Nations and Inuit Home and Community Care Program, and in existing programs such as NNADAP and professional education/training. Telehealth offers a new way of delivering these programs, all the while potentially expanding their scope and their reach.

## What Could Be the Main Components of the Blueprint?

*This question was posed to Break-Out Group Discussions. A summary of the responses received from all groups is provided below.*

1. **VISION STATEMENT**

- That recognizes health issues unique to First Nations and Inuit;
- That emphasizes telehealth's potential for "Breaking the Isolation" by improving the comprehensiveness of care, reducing gaps in access to health services, building support to communities and establishing links among communities;
- That emphasizes telehealth's direction toward the value-added components of health care (improved communication, best practices, community networking, information sharing);
- That takes into account the Aboriginal Health Infostructure recommendations of the Advisory Council.

2. **COMMUNICATION PLAN**

- That has a community and youth focus;
- That clarifies the benefits of telehealth;
- That encompasses the lessons learned and experiences of many communities;
- That lays out clearly all of the application options available;
- That targets high stakeholder involvement at all levels;
- That enables ongoing, direct involvement of stakeholders at the onset (including in the possible drafting of a Treasury Board submission).

3. **BUSINESS CASE**

- That includes demographic information and health status statistics specific to First Nations and Inuit;
- That takes into account the evaluations of various technologies and options;
- That takes into account intangible benefits, such as better utilization of services during times of staff shortage.

4. **TACTICAL PLAN*, with three major sub-components:***
   ***a) Accountability Framework (principles, objectives, roles and responsibilities)***
   ***b) Policy Development Strategy***
   ***c) Implementation Strategy***

- That considers the option of consistency among projects and applications;
- That allows the sharing of resources amongst all parties (within a region such as provincial/territorial centres and communities; or within a community);

- That elaborates principles such as Aboriginal-driven, Ongoing Direct Involvement, Canada Health Act principles, Ownership/Control/Access, Self-Determination;
- That provides for parallel and interconnected strategies (First Nation-specific, Inuit-specific, universal) fostering greater opportunities for all Aboriginal peoples including business mentorships, technical training, partnerships with national Aboriginal organizations, educational programs, youth programs;
- That examines the use of telehealth to promote traditional medicine/holistic care;
- That supports a universal and equitable process to access funding and other resources for telehealth implementation;
- That includes a funded capacity-building strategy;
- That includes partnership and risk management strategies;
- That allows for the flexible implementation of telehealth to account for and protect different identities/cultures;
- That addresses intellectual property issues;
- That adheres to needs-based funding vs. per capita funding (the latter disadvantages small Inuit populations with greater infrastructure needs);
- That promotes a concerted effort toward the building of infrastructure;
- That is sensitive to political issues at the community level.

## What Are the Next Steps to Develop the Blueprint?

A plenary session was held to brainstorm on Next Steps. The following were suggested:

- The ANAC could lead the development of an educational strategy for health care providers that would contribute to capacity-building.
- A connection between FNIHIS and telehealth should be established that fosters the coordination of both initiatives. Both initiatives should be geared toward capacity-building and tackle jointly infrastructure development. Telehealth should, nevertheless, not be funded under the umbrella of FNIHIS but rather as a separate initiative.
- Infrastructure development could be undertaken by multiple federal departments, such as INAC, HRDC, Justice and Health Canada. The roles of these other departments in promoting and implementing telehealth beyond infrastructure development should also be considered and clarified. A concerted approach to exploiting resources that allows the leveraging of multi-departmental investments is beneficial to communities; many different areas, such as health, justice, education, economic development, can take advantage of new technologies. Within this framework, telehealth is an important component of a wider capacity-building strategy.
- A broad Vision Statement is required to reflect the need to bring together the First Nations and Inuit community at large. The following Vision Statement was proposed for consideration:

  *In every community where telehealth can be demonstrated to improve health, the Government of Canada should support it.*
- More Inuit should be included in national consultation and implementation strategies. An

Inuit-specific process should ultimately be adopted including, but not limited to, an Inuit Working Group.

- Projects other than the National Telehealth Project should be included in the Business Case.
- Aboriginal organizations should be involved at the front-end of the Blueprint development process.
- Consultations regarding the Blueprint should be conducted at the community-level. Do communities really want this? The national, political mandate should originate from the grassroots.
- Other local, regional and national organizations that deal with other program areas, such as Head Start, should be consulted.
- The Working Group should be composed of champions/allies, community representatives and political/government representatives. Community representatives are critical to ensuring that the implementation process is adapted to each community. A physician should participate in the Working Group, as well as an elder and a youth (perhaps a member of the Aboriginal Youth Information Network).
- The Blueprint should recognize different levels of community readiness. Some communities lack the very basic infrastructure to assess whether they could make telehealth a reality. These communities should be granted support to deploy telecommunications infrastructure and increase their readiness.
- Regional leadership must be consulted and make resolutions helping to secure the national, political mandate.
- The term "telehealth" should be rethought. A term with greater emphasis on the community dimension of health should be used. A suggestion for "tele-holistic health" was made.
- The Assembly of First Nations should be granted support for its First Nations Health Conference to be held from February 25 to February 28 since telehealth will be a prominent theme at this conference.
- A list of community telehealth coordinators should be distributed to communities for information-sharing.

Volunteers were sought for the Ad Hoc Working Group on First Nations and Inuit Telehealth. The following names were submitted:

Leona Cochrane -- MB
Bernice Downey -- Aboriginal Nurses Association
Nadine Gros-Louis -- QC
John Graham -- Labrador
Jean Wood -- AL
Peter Stevens -- NS
Rhonda Kootenay -- AL
Jane Gray -- AFN
Janet Brewster -- ITC
Orpah MacKenzie -- ON
Chief Allan Claxton -- BC
Tina McKinnon -- Nunavut

This group will be meeting on November 23 and 24 to discuss the national consultation process, review this Final Report and draft a Vision Statement.

# Appendix A: List of Participants

# Appendix B: Inventory of Telehealth Applications and their Communication Requirements

Please refer to the glossary (Appendix E) for clarification of terms employed. Table A identifies the various telecommunications services available and the speed of the connection it provides. Three speed levels are suggested:

- ***Low bandwidth*** capability with limited medical imagery support and lower-resolution videoconferencing. This telephone line-based link would be suitable for many Internet access and data transfer activities and for applications operating in store and forward mode (as opposed to interactive mode). Services using standard Internet connections or dial-up modems (transmission speeds up to 56 kbps) could satisfy many basic telehealth applications.
- ***Medium bandwidth*** capability with single channel ISDN (transmission speeds up to 128 kbps) videoconferencing and limited medical imagery, possibly including transfer of radiology images. This technology would offer limited interactive capability as well as viable store and forward capability.
- ***High bandwidth*** comprehensive capability with full range of medical imagery, possibly including, for example, 3D ultrasound images, endoscopy, dermascopy, face-to-face teleconsultations and/or lecturer-student interviews, seminars, or grand rounds. The bandwidth demands would likely be from 256 or 384 kbps and up to the low megabit rate (1.544 Mbps) or greater.

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| POTS | Plain Old Telephone System | 14.4 kbps modem<br>28.8 kbps modem | low bandwidth |
| Switched-56 | Packet switched, data lines, leased lines or dial-up | 56 kbps (up to 1.544 Mbps by multiplexing) | low to high bandwidth |
| ISDN | Integrated Services Data Network | 2 channels at 64 kbps each (up to T1 when multiplexed) | medium to high bandwidth |
| T1 | Digital service, time-division multiplexed | 1.544 Mbps | high bandwidth |
| T3 | Digital service, time-division multiplexed | 45 Mbps | high bandwidth |
| 10BaseT | Ethernet - 10 Mbps baseband twisted copper pairs | 10 Mbps | high bandwidth |
| FDDI | Fibre Distributed Data Interface | 100 Mbps | high bandwidth |
| Ku/C Band | Satellite | 45 Mbps (per digital channel) | high bandwidth |
| ATM | Asynchronous Transfer Mode | 155-622 Mbps | high bandwidth |

Table B lists the main telehealth applications, their communication requirement (low, medium or high bandwidth) and provides a general description of each application.

| *Application* | *Communication Requirement* | *General Description* |
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| E-health  | low (data transfer) to high bandwidth (clinical consultations) | E-health is generally defined as Internet-based activities in health. The distinction between telehealth and e-health is, therefore, grounded on the technology used. This distinction, however, is gradually being erased as more and more telehealth activities are migrating to an Internet platform (that is, they are integrated into the Internet). E-health applications include: consumer health information, provider health information, e-business (advertising, dietary and drug product transactions), education and training, telemonitoring, tele-home care, self-management tools, store-and-forward diagnostic imaging using e-mail, web-based personal health information, clinical consultations. Some experts define e-health as an all-encompassing term uniting all applications related to health and medical informatics and including telehealth, and emphasizing its integration into mainstream health systems. |
| Health information networks/systems | low (POTS) to high bandwidth (cable modem xDSL) | Health information management and health surveillance research are greatly facilitated by electronic data collection, storage and transfer. Health information networks/systems can include the transfer of electronic health records and medical images (such as digitized radiology images). Security is an important component of a health information system. Various technologies and standards have been developed to address network security concerns: encryption systems, firewalls, biometric technologies (finger print/retinal scans), digital keys, certificates and public key infrastructures, Virtual Private Network. |
| Home Telehealth  | low to medium bandwidth | A rapidly growing area of telemedicine. For interactive clinical encounters, it involves the use of regular telephone services to deliver care and supervise patient activities at home. Most home telehealth is delivered using videophones (telephones with a video image). Most telephones in urban and rural areas in Canada support this technology. While the quality of the video is low, it is enough to verify medication and conduct virtual nurse visits. This application is referred to as telehospice when it is used to deliver long-term and palliative care to patients, at times, allowing patients to die at home in a more comforting environment. |

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| Home Telemonitoring<br>  | low to medium bandwidth | The electronic monitoring of parameters, such as blood pressure, glucose (sugar), weight, oxygen levels, coupled with interactive video improves continuity of care. The possibility for patients to connect directly to their physician's office is emerging in areas such as cancer therapy, cardiology, asthma, and high-risk pregnancies. |
| Specialty teleconsultation<br>  <br>  | low (store-and-forward) to high bandwidth (interactive video consults -- minimum requirement of 384 kbps) | Main focus in development of telemedicine networks. In 1998, the Association of Telemedicine Service Providers identified 157 telemedicine programs with a total of 49,556 consults (excluding teleradiology) which translates to an average of 370 teleconsultations per program per year. Most telemedicine programs surveyed (71%) were created by academic medical centers or large hospitals. 17 surveyed programs were prison-based. 8 programs delivered care to nursing homes. Telepsychiatry was the most common specialty application.<br><br>While most teleconsultations use real-time interactive video, store-and-forward technology is used to transmit higher quality images over lower speed connections when an immediate response is not required. Store-and-forward is most popular in ophthalmology (for retinal images), cardiology (for ultrasounds), dermatology (for still images of skin lesions), and orthopedics (for X-ray images). |
| Tele-administration (or tele-meeting)<br>  | medium bandwidth | This application can allow other sectors to use the equipment, depending on where it is located, such as education, justice, social work, economic development etc. |
| Tele-education<br>  | low (Internet/data access) to medium bandwidth (interactive video) | Tele-education can include professional education and training at the undergraduate and graduate levels, as well as continuing education. It can be undertaken by accessing educational materials on the Internet or databases such as university library catalogues or MEDLINE (POTS), or by listening to/viewing material on broadcast media (radio, television), or by participating in seminars, courses or supervised on-the-job training through videoconferencing. Tele-education for patients is referred to as self-care or telecare, or more recently e-health, and involves the same technologies. |

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| Telenursing (Call Centers or Teletriage)<br>  | low bandwidth | Telenursing is generally defined as the practice of nursing by telecommunications. Telenursing is often understood solely in terms of tele-triage/call centers. Guidelines for this type of telenursing (i.e. nurses who practice tele-triage/who work in call centers) have been developed by the Ontario College of Nurses. Call centers do not necessarily only involve the telephone. Interactive video can be added, especially in cases where call centers target seniors or patients receiving home telehealth and/or home telemonitoring. If video is added, than videophones or Internet videoconferencing can be used, as well as more elaborate videoconferencing systems (although this is rare). Typically, low-speed connections are used since these are more practical. |
| Teleradiology<br>  | low to high bandwidth (for transmission in emergency situations) | Most widely used application in telemedicine. It involves a new way of managing medical images. Diagnostic images such as X-rays, CTs, ultrasounds and MRIs are shared over a network (Internet or private network). X-ray films are scanned and transmitted in secure e-mail packets. CTs and MRIs generate digital files that are readily transmitted and stored on any network. The American College of Radiology established standards for capture and transmission of X-ray images to ensure image quality. These standards (i.e. DICOM) are widely adopted internationally. |
| Urgent/Emergent Telehealth (tele-emergency/tele-trauma | medium (videophones) to high bandwidth | New and emerging application with many unknowns. Tele-emergency systems seek to run emergency departments in rural health centres using “physician extenders”, that is, seeking physician expertise through telehealth. They are often extensions of teleradiology and telecardiology systems. In some cases, tele-emergency units are staffed on a 24-hour basis by paramedics. Paramedics take the initial call from the rural center and direct it to the appropriate physician/specialist. |

# Appendix C: Major National Events in the History of Telehealth in Canada

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| 1956 | teleneurology | Dr. Feindel, a neurosurgeon from Saskatoon, Saskatchewan, transmitted live electrocorticography tracings through a closed-circuit television system. |
| 1959 | teleradiology | In Montreal, Dr. Jutras transmitted X-rays by coaxial cable and performed remote control fluoroscopy (the examination of objects by observing their x-ray shadow on a fluorescent screen to study patient physiology, such as pulse and breathing). Also, the Jean-Talon Hospital in Montreal launched a teleradiology program during the 1950's. |
| 1975 | general | First Canadian Telemedicine Symposium was held. |
| 1976-1982 | general | The Federal Department of Communications supported several projects using the Hermes and Anik B satellites. The Ontario Ministry of Health studied the feasibility of using VHF radio and satellite to monitor vital signs of a patient being evacuated from a remote community. The University of Western Ontario linked London's University Hospital, the Moose Factory General Hospital and the Kashechewan Nursing Station on James Bay to provide medical consultations and some continuing education. Finally, Memorial University, under the leadership of Dr. Max House, directed a televised health education program from St-John's, Newfoundland, to hospitals in Stephenville, St-Anthony, Labrador City and Goose Bay. Since then, Memorial University has participated in over 30 telemedicine projects, many of which are on-going. |
| 1991-1996 | National Health Information Network (NHIN) | The National Task Force on Health Information outlined a broad framework for the development of a national health information infrastructure. The Government of Canada's Science and Technology Strategy recognized the role of science and technology in improving health and well-being. It proposed to launch an NHIN in part to improve health service delivery and access to medical expertise in remote communities. Health Canada's Science and Technology Action Plan set out objectives to provide practical guidance and to develop applications to improve the dissemination and utilization of health knowledge. The Government of Canada's Information Highway Action Plan announced the development of a national strategy for an integrated NHIN. |
| 1993-1999 | Provincial and Territorial Health Information Networks | As early as 1993 with the planning of PEI's Island Health Information System, provincial and territorial departments of health have instigated strategic plans for the deployment of large scale health information networks: Alberta *Well*net thanks to a $14M anonymous donation in 1995, HealthNet/BC in 1995, the Manitoba Health Information Network in 1995, New Brunswick's Wellnet and Care Network developed from 1995 to 1997, the Newfoundland and Labrador Centre for Health Information in 1996, the Northwest Territories' Westnet in 1997, the Nova Scotia Telehealth Network in 1997, Ontario's Smart System in 1997, Quebec's Inforoute Santé and its Inter-regional Telemedicine Network in 1996 and Saskatchewan's Health Information Network in 1997. Several provinces also enacted more extensive privacy legislation to protect personal health information, including Alberta |

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| | | (1997), Manitoba (1997), and Saskatchewan (1999). |
| 1995-1998 | Health Iway | CANARIE established a Health Information Infrastructure Advisory Committee to elaborate strategies relating to the advancement of a Canadian health information highway. CANARIE advocated a national strategy and framework to create a Canadian Health Iway that would incorporate provincial initiatives and would act as a virtual "information centre" that is created and used by communities and individuals across Canada. CANARIE organized a set of workshops inviting various stakeholders to discuss the issues of privacy and confidentiality (October 1997), marketing telehealth (February 1998), regionalization (May 1998), interoperability (May 1998), distance learning (November 1998) etc. |
| 1996 | Partnerships for Health Informatics/ Telematics | The Canadian Institute for Health Information (CIHI) launched its Partnership for Health Informatics/Telematics initiative in March of 1996. The initiative comprises of several working groups dealing with the domains of the (1) Health Information Model, (2) Privacy, Confidentiality, Data Integrity and Security, (3) Data Content and (4) Interoperability. Its intention is to advance standards development in health informatics and telematics. |
| 1996-1998 | Health Transition | The National Forum on Health's Evidence-Based Decision-Making Working Group, in its Final Report, supported the concept of a national health information system. The 1997 Federal Budget dedicated funds to implementing the National Forum's recommendations. Included in the Budget was a Health Transition Fund allocated to the provinces on a per capita basis to initiate a total of 141 pilot projects evaluating health care reform initiatives and exploring new models of care in four focus areas: primary care, home care, pharma care and integrated services delivery (including telehealth). Health Canada's Medical Services Branch submitted a proposal for a National First Nations Telehealth Research Project involving 5 First Nations communities across Canada. The Project will be completed in 2001. |
| 1998 | Canadian Society for Telehealth | The Canadian Society for Telehealth, a non-profit health association dedicated to the promotion of telehealth, was established at the TExpo 98 Conference in Fredericton, New Brunswick. It has 153 founding members from academic, individual, and corporate sectors. |
| 1997-today | Canadian Health Infostructure | Health Canada's Office of Health and the Information Highway was established with funding allocated during the 1997 Federal Budget and was designed to promote a Canadian Health Infostructure with three main components: the National Health Surveillance Infostructure, the Canadian Health Network and the First Nations Health Information System. In 1998, it founded the Federal/Provincial/Territorial Chief Information Officers Forum to act on critical issues such as Y2K, standards and privacy. Also in 1998, the Health Infostructure Support Program was launched to fund pilot projects on a shared-cost contribution basis in the areas of public health, health surveillance, pharmacare, First Nations health, home care and telehealth. Thirty-six projects were undertaken by 33 non-profit NGOs. In 1999, the Advisory Council on Health Infostructure was created to advise the Health Minister on components of the Canadian Health Infoway, including an Aboriginal Health Infostructure. Following the Council's recommendations, the Advisory Committee on Health Infostructure was founded in 2000. It has |

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| | | since set up a Telehealth Working Group to advance the national telehealth agenda. It is composed of national and provincial/territorial representatives. |
| 1998-2001 | Health Information Roadmap | In October 1998, the Advisory Council on Health Infostructure's Working Group on Health Information for the General Public organized a workshop with key informants. The Council, along with CIHI and Statistics Canada, participated in identifying health information needs by consulting approximately 500 stakeholders. These interviews produced a Health Information Roadmap released by CIHI in December 1998. Part of the Roadmap's action plan are: stakeholder consultations; standards development; collection of data on health services, outcomes, and health determinants; the Canadian Population Health Initiative; and, public reporting and special studies. On February 16, 1999, the federal government agreed to fund three to four years of the Roadmap program.. |
| 1998-2001 | First Nations and Inuit Telehealth | Several proposals for telehealth and electronic health record projects were submitted to the Smart Communities Program and Canadian Health Infostructure Partnerships Program (CHIPP). Smart Labrador and the Keewaytinook Okimakanak Kuh-Ke-Nah projects were successful in obtaining funding from the Smart Communities Program. Successful CHIPP proposals will be announced March 2001. Health Canada's First Nations and Inuit Health Branch is developing a Strategic Vision for future telehealth implementation in First Nations and Inuit communities, in partnership with these communities. A first National Information-Sharing and Feedback Session is being held on Oct. 5-6 2000 in Montreal to discuss how to create this Strategic Vision. |

# Appendix D Overview of Telehealth Activity in Canada

| Region | Networks/Programs | Practice/Legal Issues | Expertise |
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| **Canada** | ■ National Project: to fund and evaluate 5 telehealth pilot projects in remote First Nations communities.<br>■ Canadian Health Infostructure: 3 components:<br>■ First Nations Health Information System: to provide a case management and surveillance tool to standardize data collection in 500-600 communities across Canada;<br>■ National Health Surveillance Infostructure: to fund pilot projects to develop Internet-based tools and capacity to support national surveillance for health protection/promotion, including: Canadian Integrated Public Health Systems, Global Public Health Intelligence Network, LoPHID, SPHINX, ProdNet, Public Health Intelligence Database and E-standards;<br>■ Canada Health Network: to provide public access to health information (promotion, prevention, treatment options, system performance) through Internet, toll-free telephone line, interactive voice response and fax-back capability;<br>■ Health Infostructure Support Program: to fund pilot projects on a shared-cost contribution basis in public health, health surveillance, pharmacare, First Nation health, home care and telehealth. 36 projects have been undertaken by 33 non-profit NGOs.<br>■ Canadian Health Infostructure Partnerships Program: a shared-cost incentive program to support innovative applications of ICT in health care delivery.<br>■ Canadian Year 2000 Clearing House for Health<br>■ Canadian Women's Health Network: to share information and consolidate advocacy efforts through a website, health information toll-free telephone line, clearinghouse and electronic magazine.<br>■ Community Access Program (CAP): to implement community teleservice centres in 5000 rural and remote communities by March 2001.<br>■ Smart Communities Demonstration Project: involving a phased competitive process to fund 20 communities across Canada. It also includes a Resource Exchange, Facilitation Tool Kit and Skill Development Program, and a Benchmarking and Recognition Program. | ■ Bill C-54: establishes the right to privacy for personal information collected, used and disclosed by private organizations for the purpose of commercial activity.<br>■ College of Family Physicians of Canada's Computer and Health Information Programs Committee: studies issues related to privacy and confidentiality, develops standards and guidelines regarding the development of Clinical Patient Records and educational software/Internet websites.<br>■ Canada's Health Informatics Association (COACH): organizes 4 interests groups on nursing, physician, science and research and special interests. It released security and privacy guidelines for | ■ Canadian Medical Association Online and "Doctors on the Net" Training Program<br>■ Canadian College of Health Service Executives/INSIGHT Interactive Distance Initiative<br>■ Canadian Society of Telehealth<br>■ Canadian Institute for Health Information: developing the Health Information Roadmap<br>■ CANARIE Inc. provides funding and strategic direction through its Health Information Advisory Committee.<br>■ Communications Research Centre: partners on various telehealth projects especially those involving remote and rural regions and has participated in live, international telemedicine demonstrations.<br>■ The Centres of Excellence for Women's Health Program: collaborates with the Canadian Women's Health Network and includes centres in BC, in the Montreal University consortium, a Maritime centre, a Prairie centre and a National Network on Environments and Women's Health.<br>■ Canadian Telework Association |

| Region | Networks/Programs | Practice/Legal Issues | Expertise |
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| | ■ Canadian Wellness Network (sponsored by CAP): links to non-profit health organizations on its web-site, including ParentNet (a pilot project that hosts on-line discussion groups among parents and provides parenting information).<br>■ Canadian Public Health Association's National AIDS Clearinghouse<br>■ Canadian Medical Association Infobase: a free, online database of about 750 full-text Canadian Clinical Practice Guidelines (CPGs). Nearly 40 CPG developers are represented, including the Canadian Paediatric Society, Cancer Care Ontario and the Canadian Task Force on Preventive Health Care.<br>■ Clinical Practice Management Network Project: a research project sponsored by the College of Family Physicians of Canada to develop computerized patient record systems, to validate and disseminate CPGs, and to collect family medicine research data through the establishment of a national network of family physicians.<br>■ G7 Global Healthcare Applications: participation of Health Canada to develop a global health information infrastructure.<br>■ Health Evidence Application and Linkage Network (HEALNet): links 16 universities to develop health care evidence-based decision making (EBDM) tools. | health information systems and undertakes a National Nursing Informatics Project to develop standards in nursing informatics education in partnership with the Canadian Association of University Schools of Nursing, the Canadian Nurses Association, the Registered Nurses Association of British Columbia and the Academy of Canadian Executive Nurses.<br>■ Both the American and the Canadian Nurses Association have formed working groups to develop recommendations for standards of practice and core competencies in nursing telepractice.<br>■ Teleradiology professionals are encouraged to adopt the DICOM standard by the American College of Radiology and the Canadian Institute for Health Information among others. | |

| Region | Networks/Programs | Practice/Legal Issues | Expertise |
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| **Alberta** | ■ Alberta *Well*net: Health Information Network (HIN) for evidence-based decision-making, administration and research, including a pharmanet, integrated cancer care network, a Spatial Public Health Information Exchange, a triage call centre, a Senior Drug Profile, a Newborn Metabolic Screening and Breast Cancer Screening projects, and 55 sites providing telepsychiatry, CME, telelearning and teleradiology services. 130-140 locations will be connected in 2002. 20 teleultrasound sites with live video planned in 2000 in addition to 20 videoconferencing sites. .Alberta Health is the main health agency of the network ($25M over 4 years). It is expected that, in the long term, the network will be converted into an IP environment using the government network AGNPac.<br>■ Community Health Immunization Information System (CHIIS): Calgary Health Services, 16 community based offices and Alberta Health have access to 9 CHIIS databases distributed through a Wide Area Network (WAN).<br>■ Health Knowledge Network (HKN): sponsored by the Alberta Heritage Foundation for Medical Research and the College of Physicians and Surgeons of Alberta, the libraries of the University of Alberta and of Calgary have collaborated to provide public access to health-related databases to teaching hospitals in Alberta and the territories, and to the larger public through the Internet.<br>■ Lupus Healthnet: to provide teleconsultations for the treatment and management of lupus.<br>■ Keeweetinok Regional Health Authority (RHA) Network: provides satellite links between 3 remote communities, 3 Rural Health Centres, the University of Alberta's Telerehabilitation Centre, the EFW Radiology Clinic in Calgary and Nipawin in Saskatchewan.<br>■ Treaty 7 Aboriginal Community Health Representative AIDS Committee: provides an interactive, community-based sexuality website for teens.<br>■ Telephone call centre for health information (8483 calls per month in 1997) and a centre for STD information (30,000 calls per month in 1997). Early planning stage for a province-wide teletriage service. | ■ *Health Information Protection Act* under further revision. | ■ University of Calgary's Health Telematics Unit: working with Capital Health, Keeweetinok Lakes Regional Health Authority and the Alberta Mental Health Board in a pilot program to evaluate the effectiveness of telehealth.<br>■ University of Alberta's telehealth network managed by the Telehealth Technology Research Institute links 4 health science faculties with other telehealth sites. The network's Telerehabilitation Centre is linked to the Keeweetinok Lakes RHA Network.<br>■ Alberta Research Council's Department of Health Informatics: operates an Interoperability Laboratory.<br>■ Alberta Heritage Foundation for Medical Research: sponsored HKN.<br>■ Raytheon Systems of Canada are a partner in the Keeweetinok Lakes RHA Network.<br>■ AGRA Whitman Benn Ltd.: project management.<br>■ BDL Management Consultants: project management of health information.<br>■ systems (HIS).<br>■ Clinicare Corporation: software solutions.<br>■ HSI Healthservice International: project management.<br>■ Gemini Learning Systems Inc.: distance learning solutions.<br>■ HSI Healthservice International: project management.<br>■ Hughes Aircraft Corporation and AGT Ltd designed the Remote Consultative Network in 1993.<br>■ Raytheon Systems Canada Ltd.: set up (planning to maintenance) of telehealth networks.<br>■ Tandberg Inc.: telehealth and education |

| Region | Networks/Programs | Practice/Legal Issues | Expertise |
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| | | | videoconferencing systems.<br>■ Telehealth Resource Group Inc.: consulting, training and implementation services. |
| **BC** | ■ HealthNet/BC: open data network and information sharing facility with restricted access that includes the Connections Project (links between acute care hospitals, government offices, Regional Health Boards and Community Heath Councils for access to communications services and PharmaNet access for hospitals), a Client Registry, PharmaNet, Teleplan (e-submission of physicians' claims) and Health Data Warehouse. The BC Ministry of Health is the main health agency of the network.<br>■ Information Resource Management Plan of BC Ministry of Health composed of: an integrated patient record of health services; a common information repository for health planning, evaluation and research; common computer communications network (extending the model of the Continuing Care Data Warehouse Network currently operating).<br>■ St Paul's Hospital, the Vancouver General Hospital and the University of BC Hospital are piloting telehealth applications such as the Northwest Teleradiology Project in the Skeena region involving St. Paul's and 11 northern sites. The St Paul's Hospital is also testing a Computerized Patient Education and Support System (CHESS) for patients with cardiac disease in partnership with the BC Heart & Stroke Foundation, Hewlett-Packard Canada, and the Vancouver Foundation. Other projects are pathology image delivery, shared cardiac imaging and shared electrodiagnostic database and storage.<br>■ Entreprise Medical Image Management Server – Large Scale Medical Image Archiving System: establishment of a test bed simulation system using the provincial high speed communications network (RNet) linking BC Women's and Children's Health Centre, and Vancouver Hospital (main site and University site) to develop an automated medical image archive server to provide long term storage management of medical images.<br>■ Capital Health Region's Regional PACS and Teleradiology Project: to implement a PACS that will enable all sites to be virtually film-less over the next 5 years (since 1997) including nuclear medicine, fluoroscopy, | | ■ InterMinistry Telehealth Committee<br>■ British Columbia Institute for Technology: involved in telehealth pilot projects.<br>■ BC Cancer Agency: involved in telehealth software development.<br>■ 3C Systems Inc.: technical supplier specializing in the needs of community care providers.<br>■ Acquired Intelligence Inc.: expert systems.<br>■ ALI Technologies Inc.: diagnostic image and clinical report management systems.<br>■ Canasia Businessworld Inc.: application software and Eletronic Patient Records (EPRs).<br>■ CardioComm Solutions Inc.: software and hardware to detect and manage cardiac disease.<br>■ Telehealth Innovations Group (part of ChilCana Consulting (ON): project management.<br>■ HealthVision Corporation: Health information system.<br>■ Hewlett-Packard Canada Ltd.: partner of the St Paul's Hospital computerized patient education support system.<br>■ M.H. Nusbaum and Associates Ltd.: management consulting services.<br>■ Praxis Technical Group Inc.: web-based performance support and training systems.<br>■ Service-Growth Consultants Inc.: marketing and management services.<br>■ Starvision Multimedia Corporation: provides hardware and software for ATM-based StarMed telemedicine applications. |

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| | ultrasound, CT (computer tomography), MRI (magnetic resognance imaging) and general radiography. Sites are Victoria General Hospital, Royal Jubilee Hospital, Fairfield Health Centre, Saanich Peninsula Hospital and Lady Minto Hospital on Salt Spring Island.<br>■ University of British Columbia Brain Imaging Laboratory: an ATM network with high performance SGI Octane workstations will link all major scanners at UBC, Vancouver Hospital (UBC and VH sites), and BC Children's Hospital to create a brain imaging consortium composed of all research groups in the Brain and Spinal Cord Research Centre involved in the development of advanced imaging techniques.<br>■ 3D Analysis and Operative Planning for Spinal and Neurosurgery: a 3D shared workspace environment and multi-point collaboration between BC Children's Hospital and the MAGIC (Media and Graphics Interdisciplinary Centre) lab at UBC that allows images of a child's brain or spine to be reconstructed into a 3D model prior to surgery.<br>■ Real time Telemedicine Using Shared Three Dimensional Workspaces over ATM: a high speed ATM network developed at UBC that provides a campus testbed, a local testbed to the hospitals, and a National testbed with the BADLAB in Ottawa. The testbed has been developed to combine a commercial shared audio/video/whiteboard environment coupled with a shared interactive 3-dimensional solid model whose uses range from forensic reconstruction from partial remains to pre-maxillofacial surgery.<br>■ Craniofacial Reconstruction: a protocol testbed on ATM (CAnetII) that can demonstrate the simulation of a maxillofacial reconstruction procedure (currently undertaken between the MAGIC lab at UBC, Vancouver Hospital and Halifax).<br>■ Children's and Women's Health Centre: regional telehealth consultation and education link (teleradiology, health promotion, administration and teleconsultations). Links to the Centre provided to Prince George Regional Hospital, the Central Okanagan Child Development Association, Victoria, Williams Lake, Kamloops, Trail, Nelson, Courtenay, Terrace and Quesnel.<br>■ Paramedic Training Link: a pilot project between the Justice Institute and Paramedic Academy (New Westminster) in the Kelowna Training Region was completed in March 1998. Eventually, paramedic assessment and | | ■ Wellington Medical Systems Ltd.: electronic information management solutions for medical clinics (e.g. EPRs). |

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| | training will be conducted using the PTN at 15 regional centres and over 190 ambulance stations throughout the province.<br>■ Partnerships for Better Health: A Self-care Pilot Project: established a call centre and the distribution of the Healthwise Handbook to 11,700 households in the Capital Health Region.<br>■ BC Transplant Society Organ Donor Registry: link to the Ministry's Client Registry, creating a provincial demographic database accessible via HL7 transactions via HealthNet/BC, provided to all major transplant hospitals in BC and, ultimately, to all BC hospitals.<br>■ St Paul's Hospital Electronic Laboratory Handbook: a comprehensive source of laboratory test information that is on-line and able to be updated in real time accessible to all laboratory divisions of the St Paul's Hospital.<br>■ Simon Fraser Health Region Web-Based Clinical Manuals: 300 Word documents that form all the Nursing Standards, procedures and protocols used in the nursing departments within the Simon Fraser Health Region accessible online. | | |
| **MA** | ■ Manitoba Health Information Network: includes the Drug Programs Information Network to manage prescription records, process claims, provide drug histories/warning notifications, and provide real-time adjudication of Pharmacare reimbursement to patients and pharmacies (also provides medication dispensing information in emergency rooms); a Decision Support System; a Diagnostic Services Information Network to link laboratories; a Community Health component (not yet specified); a Physician/Primary Care Provider component (not yet specified). The Network is being developed by the Health Information Services of Manitoba Steering Corporation whose sole shareholder is the Minister of Finance of Manitoba. The Department of Health acts as the main health agency.<br>■ Continuing Care Management Information System: a decision support tool for workers. The Screening Assessment Care Planning Automated Tool (SACPAT) is used by health care workers to conduct interviews through a Local Area Network (LAN) and the use of laptops.<br>■ POPULIS: Population-based Health Information System for the statistical analysis of population data for health system monitoring, research and policy | ■ *Personal Health Information Act*. | ■ Smart Health: develops the MHIN and other integrated health information systems.<br>■ Manitoba Centre for Health Policy and Evaluation: develops POPULIS.<br>■ Careware Software Systems Inc.: software products for rehabilitation services.<br>■ Infotech Inc.: software tools for health care applications (e.g. consumer health assessments)<br>■ MBTelMed: project management.<br>■ Manitoba Innovation Network organizes the Manitoba Health Telematics Advisory Panel to disseminate information about health telematics, provide a forum for discussion and act as a liaison and facilitator.<br>■ Momentum Health Information Systems Inc.: software (clinical and financial) applications.<br>■ Health Sciences Centre Foundation: supports health |

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| | analyses. Its five major databases are Hospital Discharge Claims, Physician Claims, Manitoba Centre for Health Policy and Evaluation Research Registry, Vital Statistics, and Personal Care Home Claims. Other databases concern home care, drug use and finances. The system is led by the University of Manitoba, the St. Boniface General Hospital and the Manitoba Health Services Commission.<br>■ Integrated Information Systems: The Community Data Group, formed by community health service providers in Winnipeg, seeks to improve the automated acquisition of population health data, clinic or agency management data, and practitioner data for daily service delivery.<br>■ Telemedicine Research and Development Pilot Project: links tertiary care facilities in Winnipeg to 3 Northern communities (Norway House, Churchill and Thompson) to conduct teleradiology and teleultrasound. The project also supports a distance education program (Bachelor of Nursing of the University of Manitoba, CME, CNE) offered to the Norway House Indian Hospital.<br>■ Pediatric Teleradiology Project: links Winnipeg Children's Hospital to the Thompson General Hospital (in 1998/99, 888 pediatric X-rays were transmitted). Funded by Burntwood RHA and Manitoba Health.<br>■ Filmless Radiology Research Project: links Winnipeg to Portage, La Prairie (hospital and some radiologists' homes).<br>■ Telepsychiatry: link between Winnipeg Health Sciences Centre and The Pas Hospital since January 1998, funded by Norman RHA.<br>■ A Model for Integrated Health Care Delivery for Children with Disabilities: a project funded by the Health Transition Fund (Health Canada) that provides a website, children's record system and two-way videoconferencing link between Brandon and Thompson. | | telematics research.<br>■ Online Business Systems: healthcare software solutions.<br>■ Rise Healthware: information systems for health and social service agencies. |
| **NB** | ■ Wellness Network: an e-commerce infrastructure accessible to 51 hospital facilities, the Red Cross, the Worker's Compensation Board, physicians (currently 15%) and allied health care workers. Applications are not pre-determined by a lead health agency or partner committee, but rather by the system's users on an incremental basis. The Network includes the Regional Addictions Services System, the Extra-Mural Program Patient Unit Information System, the Medicare Administration and Technical Services | ■ A recommended guide published by the provincial government for telehealth remuneration listing of high-priority service which will be reimbursed. | ■ $30,000 grant received from Health Canada to set up a committee to produce a standard evaluation framework for telehealth.<br>■ Clinidata: operates the Telecare Network.<br>■ Applied Courseware Technologies Inc.: instructional design productivity tools. |

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| | System, the Prescription Drug Program System, the Atlantic Health Sciences Corporation Imaging Network (teleradiology), Telecare (24/7 nurse triage network), the VITAL-NB Health Centre (telecardiology for early discharge cardiac patients that includes telehomecare; budget from CANARIE, ACOA), the Maritime Children's Telehealth Network (telepediatrics), the NOR'EAST Health Network (undertaken with the South-East Health Care Corporation to deliver neuro-rehabilitation teleconsultations) and the National Nephrology Community Care Telehealth Project (Health Transition Fund; involves 3 remote dialysis facilities and 5 patients at home; led by the Beausejour Hospital). It is led by a forum of Chief Information Officers from a health corporation that is chaired by the Department of Health.<br>■ Neuroscience Telemedicine Program of the Regional Hospital Centre in Bathurst: conducts teleconsultations with Moncton facility. Telerehabilitation services are also provided.<br>■ TeleEducation NB: videoconferencing network linking over 100 sites including 3 Regional Health Councils used to deliver ambulance training, university courses, CME (from Quebec and Nova Scotia) and administrative meetings. Audiographic tele-education sites have also been installed in the Extra-Mural Hospital's program offices.<br>■ Early planning stage for the region-wide deployment of a PACS/Teleradiology infrastructure led by the Atlantic Health Sciences Corporation. | ■ Telehealth liability coverage in the provincial insurance plan and a ruling from the Canadian Medical Protective Association (CMPA) and the Association of Medical Colleges determining the extent of physician liability coverage. | |
| **NL** | ■ Newfoundland and Labrador Centre for Health Information (NLCHI): a comprehensive system for health and social services that will distribute health records to individual health institutions and to authenticated providers. In addition, a central database system will register demographic information with reference to the individual's EPR. Applications also include a Human Resource Management Information System, a Client and Referral Management System, Physician Practice Pattern Profiling, Personal Medication Regimen, Diagnostic Service Requester Decision Support and telehealth. The lead health agencies of the project are the Department of Health and Social Services, the Health Care Corporation of St. John's and Memorial University's Centre for Health Research. | ■ Payment schedules for teleradiology and telepsychiatry were instituted in the context of pilot projects. An extensive remuneration policy has been drafted for consideration by the provincial Medicare Commission.<br>■ NLCHI has drafted a | ■ Memorial University's TETRA/Telemedicine Centre |

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| | ■ Memorial University's TETRA/Telemedicine Centre: operates a teleconference network divided into 11 teleconferencing circuits with over 200 sites in approximately 150 communities throughout Newfoundland. The network has an audioconferencing capability, telewriter workstations in over 140 communities (remote blackboarding function) and 8 videoconferencing sites. The network provides distance education for emergency medical attendants, distance CME and teleconsultations in several specialty areas (tele-EEG, tele-ultrasound), at times funded by Regional Health Boards, including a teleconsultation system between the Hibernia Offshore Oil Platform and the St. John's Health Sciences Centre, and an e-mail link to a remote nursing station in Black Tickle (Labrador) and the Melville Hospital in Happy Valley-Goose Bay. It is also involved in SatelLife's HealthNet.<br>■ Audio Teleconferencing Breast Cancer Social Support Program: sponsored by the Newfoundland and Labrador Division of the Canadian Cancer Society, provides bi-weekly consultations to rural sites across the province. Conducted by Memorial University's Telemedicine Centre, it links 200 sites in 150 communities. Evaluation of the network by Memorial U received funding support from the Maritime Centre for Excellence in Women's Health. | privacy policy. | |
| **NWT** | ■ Network 99: a health and social services computer network, including WellCom (a record-keeping and electronic data transfer system for CHC management), the Child Welfare Information System (record-keeping) and Westnet linking all communities since April 1999.<br>■ Westnet connects the Yellowknife General Hospital with three health care centres to conduct teleconsultations in orthopaedics, internal medicine, telepsychiatry, teledermatology, telegeriatrics and distance trauma consultations. | | |
| **NS** | ■ Nova Scotia Telehealth Network: a computer-based telemedicine network connecting all hospitals, spanning 42 sites (total of 53 videoconferencing systems including 36 teleradiology sending stations and 11 reading stations). Funded by the Department of Health and managed by TecKnowledge Health Care systems Inc. and MT&T, it involves the exchange of | ■ Revised fee schedules to accommodate telehealth service delivery. Radiologists and general practitioners receive same | ■ TecKnowledge Health Care Systems Inc. offers real-time telehealth systems and project management expertise.<br>■ The Community Health and Epidemiology Department of Dalhousie University conducts bi- |

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| | administrative/financial information but the priority remains clinical and emergency ward applications (telepsychiatry, teledermatology, tele-radiology, CME program of Dalhousie University, transmission of laboratory results). Part of the network is connected to St. Kitts in the Carribean to provide teleradiology and tele-ophthalmology services. In 1999/2000, there occurred over the 12 month period 410 clinical consultations, 15 991 teleradiology cases, 1029 education sessions, 332 administrative meetings and 32 clinical case conferences.<br>■ Nova Scotia Home Care Information System involves the use of SACPAT (mobile computing) by health care coordinators for case and program management.<br>■ Maritime Children's Telehealth Network: connects 7 regional health centres in the Maritimes (NS, PEI and NB) to the IWK Grace Health Centre for Children, Women and Families. Applications are pediatric oncology, cardiology and radiology.<br>■ Western Health Information Project: consumer health information service linking the Yarmouth Community Network to a regional hospital, public library and School of Nursing.<br>■ At an early stage of development are plans to develop a provincial "Ask the Nurse" health information and help line. | amount of compensation but specialists are paid a supplemental detention fee.<br>■ The government received a letter from the CMPA confirming physician liability protection in teleconsultations. | annual performance measurement of the network. Dalhousie University also operates a distance CME program.<br>■ Caduceus Health Care Ltd.: telemonitoring and telehomecare solutions.<br>■ Digital Image FX Inc.: web-based applications, virtual reality technology and project management through its parent company Digital Telehealth Inc. |
| **NT** | ■ Baffin Health Network: links Pond Inlet, Kimmirut, Iqaluit and 3 tertiary care centres in Ottawa to conduct teleconsultations in mental health, family medicine and Ear, Nose and Throat (ENT) and to provide professional support to nurses working in isolated areas.<br>■ IIU Network: links Baffin, Pond Inlet and Cape Dorset to provide medical consultations and support remote nursing stations. Cost is $500K and plans to expand the network to 26 communities. | ■ The Nunavut government has stipulated in all contracts with health service providers that they must use telehealth to deliver health care where appropriate. | |
| **Ontario** | ■ Health Information Partnerships (HIPs) between District Health Councils (DHCs), Public Health Units and academic science centres in regions: to support community needs assessment, program design and evaluation, skills transfer and to provide population health data and health intelligence. For instance, the Central West Health Planning Information Network is managed | ■ In June 1996, the Ontario Ministry of Health distributed a consultation paper regarding the development of a legal | ■ Telehealth Association of Ontario (TAO)<br>■ Carleton University's Medical IDEAS Research Group: develops an Intelligent Decision Aid System for Intensive Care Units.<br>■ McMaster University's Health Sciences Centre: |

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| | by a Steering Committee made up of representatives from public health units and DHCs in Central West Ontario and the Faculty of Health Sciences of McMaster University. Other partnerships are: the Southwest Region HIP, the Central East HIP, the HIP of the Eastern Ontario Region and the Northern HIP.<br>■ Rural and Northern Health Care Framework: to build networks for 24-hour access to emergency and specialized care in remote communities. Smaller rural hospitals will be linked to at least one larger hospital with a fully staffed emergency department. Rural and northern hospitals located within 40 km of each other will be connected to form regional networks for consolidation of administrative and support services. They will also be linked to DHCs and other providers/agencies.<br>■ HealthLink: a clinical data network that connects 7 Toronto hospitals, 6 Community Care Access Centres (CCACs) and 3 private sector partners. The network includes a health records transfer capability for perinatology and oncology, e-mail, Ontario Health Card validation, telemedicine and remote home care, and medical research databases. The network is also used for CME. The Network is governed by an independent corporation and funding is received partly from an Ontario government infrastructure program, partly from shareholders and users.<br>■ Smart System: linking all hospitals and CCACs to share models and infrastructure and integrate computers and information databases via a telecommunications network by adopting standards, developing policy/regulations, optimizing technical infrastructure and conducting research through 'breakthrough' projects such as hospital on-line registration for newborns, a drug health network, and a laboratory results transfer capability. Other applications of the network are telemedicine and health system management information (to support planning and client services). The first phase of the system created Primary Care Networks including a Clinical Management System.<br>■ Community Care Access Centre Information System: patient information database.<br>■ Community Health Council Information System: for management purposes, supports the integrated team approach, for education and research purposes, | framework for health information. The legal framework responding to public feedback is still under development.<br>■ Ontario Telehealth Task Force<br>■ The College of Nurses of Ontario has established standards for telephone nursing practice.<br>■ Ontario Hospital Association's Hospital CARE Strategy: seeks to improve coordination of health networks.<br>■ Centennial College's Telehealth Nursing Program<br>■ NovaTech Computer Careers: Tele-Health Technician Certificate program. | operates HEALNet.<br>■ University of Toronto's Department of Public Health Sciences: sponsors TeenNet.<br>■ University of Ottawa's Community Health Research Unit: organized a workshop on best practices for Internet use in public/community health (funded by the Office of Learning Technologies of Human Resources and Development Canada).<br>■ Laurentian University's Centre for Rural and Northern Health Research: conducts evaluations of telehealth projects (tele-triage and HEARRT demonstration project) and studies policy issues.<br>■ Communication and Information Technology Ontario (CITO): centre of excellence to build partnerships between universities and industries that co-sponsored 2 telehealth workshops with TAO, Bell Canada and University of Toronto.<br>■ Gowling, Strathy and Henderson: legal expertise in health and information technology.<br>■ Institute of Clinical and Evaluative Sciences, tied to Toronto teaching hospitals, conducts research on health service delivery and utilization.<br>■ Centre for Rural and Northern Health Research: conducts evaluations of telehealth pilot projects and studies policy issues.<br>■ Canadian Coordinating Office for Health Technology Assessment: collaborating with the Alberta Heritage Foundation for Medical Research and the Conseil d'Evaluation des technologies de la santé du Québec (CETS) to study 4 main aspects of telehealth: state of the science; assessment of specific technologies; broad national issues; and identification of further work.<br>■ Ottawa Life Sciences Council: sponsors national |

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| | to streamline administrative processes, to support fund-raising.<br>■ LARG*net: regional network in the City of London, linking academic and health care institutions for sharing information and expertise.<br>■ CLOVR: a teleadministration/telelearning network that grew out of LARG*net and operates from the London Health Sciences Centre. It reaches out to other hospitals in Southwest Ontario and includes 13 systems. The applications are reported to be 50% administration, 40% education and 10% clinical. London Health Sciences Centre also provides teleradiology services to 3 other hospitals in SW Ontario.<br>■ Electronic Child Health Network (eCHN) of the Greater Toronto Area: provides a public information web-site, a Professional Online Forum and a Health Data Network (centralized database for child health records).<br>■ Toronto Hospital for Sick Children Telehealth Program: provides real-time videoconferencing links to sites across Ontario for remote consultations and tele-education (7 participating programs). The Sick Kids network has also established an International Telehealth Link with countries such as Israel, Argentina, Japan, India and the US.<br>■ NORTH Network: Sunnybrook Health Sciences Centre in Toronto is linked to regional hospitals (Cochrane, Kirkland Lake, Timmins, Sudbury) to deliver consultations in orthopedics, dermatology, neurosurgery, pediatrics and speech pathology, rheumatology, neurology, psychiatry and gerontology. CME sessions are also undertaken.<br>■ TeenNet (sponsored by the University of Toronto's Department of Public Health Sciences): to use IT to engage teens in health promotion activities.<br>■ Southwestern Ontario Regional Academic Health Science Network: (AHSN) sponsored by the University of Western Ontario to promote the Internet for continuous learning among community hospital members of the AHSN.<br>■ OUTREACH -- London-St Thomas Psychiatric Hospital Network: operates 6 community telehealth centres (including a First Nation reserve community) to implement mental health reform and health restructuring initiatives and provide telepsychiatric consultations in rural and northern communities.<br>■ Orillia Soldiers' Memorial Hospital Teledialysis Network: monitors home dialysis treatments provided in satellite units located a minimum of 100 km from the Hospital. Opened in 1997 in Alliston (first satellite unit) and now | | conferences that deal with health technology and organizes a working group on the Ottawa Community Health Information Partnership. The goal of the partnership is to deliver an Integrated Health Information System for Ottawa-Carleton.<br>■ Clinidata: technical supplier that operates a health management call centre. It participated with Quebec's RAMQ (Health Insurance Board) and USAGE (Québec Research Group on Medication Use in the Elderly) to develop decision making tools for family physicians (e.g. electronic drug advisor).<br>■ A & L Computer Software<br>■ Aetna Health's Informed Health Line provides access to toll-free 24-hour nursing triage and information services.<br>■ JetForm Corporation: develops an Integrated Clinical Information Systems in partnership with Newbridge Networks, Starvision Multimedia Corporation, Oracle Corporation and PARJplus Software Corporation. ICIS is being used and evaluated by the Ottawa Hospital-Civic Campus' new Women's Breast Health Centre.<br>■ IBM Canada Ltd.: developed eCHN.<br>■ Peridata: provides antenatal home care (the telemonitoring of women with high risk pregnancies at home).<br>■ ChilCana Consulting Canada: project management, associated to the Telehealth Innovations Group located in BC.<br>■ CME Telemetrix Inc.: medical diagnostic and monitoring devices.<br>■ Code Red Production Ltd.: R&D in CPR training kit.<br>■ De Janos and Associates Consultants: project management. |

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| | expanded to three other hospitals. Orillia Soldiers' Memorial Hospital also refers pediatric patients to the Telemedicine Centre at the Toronto Hospital for Sick Children since 1996. Also conducts teleconsultations in mental health and diabetes with the Women's College Hospital since 1997.<br>■ Northeastern Regional Cancer Centre in Sudbury is linked with 19 community oncology clinics by Bell Canada.<br>■ Telephone Health Education/Triage Service: province-wide service recommended by the Telehealth Task Force in October 1999 and 2000 Ontario Budget provides $45M for the expansion. Currently operational in Northern Ontario as DirectHealth (serves 400,000). Service to be soon implemented in the Greater Toronto Metropolitan Area.<br>■ Healthcare and Education Access for Remote Residents by Telecommunications or HEARRT: telehealth project of the University of Ottawa Heart Institute operating since 1997 and funded by the Ontario Ministry of Energy, Science and Technology. Provides clinical consultations, CME and prevention programs to 5 remote locations in Ottawa and in the North. | | ■ Elcombe Systems Ltd.: remote emergency response solutions.<br>■ Entrust Technologies: encryption (Public Key Infrastructure infrastructures).<br>■ FONEMED Canada Inc.: 24-hour, 7 day nurse triage centre and health information library accessed in Canada, the US and Columbia.<br>■ ForeComm Consulting: research and consulting.<br>■ GE Medical Systems: diagnostic imaging equipment including telemedicine solutions.<br>■ HBO and Company Canada Ltd.: data management software and infrastructure applications for HIS.<br>■ Healthlink Communications Inc.: software and hardware.<br>■ Interhealth Canada Ltd.: project management and systems development.<br>■ International Neural Machines Inc.: artificial intelligence software for decision support systems and entreprise resource planning.<br>■ MAINSOURCE Software Corporation: web-based information management products such as the Virtual Multi-media Electronic Health Record (VMEHR).<br>■ Mediconsult.com: information website.<br>■ MNI Systems Corporation: develops the MediNet System (a shareable Electronic Patient Record).<br>■ Mytec Technologies Inc.: encryption.<br>■ P&P Data Systems: healthcare software solutions.<br>■ Rivera Heartling Systems Ltd.: smart cards for EPRs.<br>■ SHL Systemhouse Inc.: systems integration, business process management, decision support etc.<br>■ Siemens: medical products and services (consulting, training and financial planning) such as Integrated Hospital Solutions. |

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| | | | ■ Sierra Systems Consultants Inc.: IT-based business solutions.<br>■ Spacelabs Medical Products Ltd.: electronic patient monitoring systems.<br>■ World Access Canada Inc.: provides emergency medical assistance and telehealth/teletriage services. |
| **PEI** | ■ Island Health Information System: to support service delivery by linking care providers, to provide patient information, to provide planning and evaluation information and to provide research information. Currently, the IHIS runs the following applications: an Electronic Client/Patient Record, Admitting/Discharge/Transfer System, Pharmaceutical Information Program, Physician Billing System, Medicare System, Vital Statistics System, Integrated Services Management. *Future directions*: case management, patient care system, laboratory information system, radiology information system and a clinical information system.<br>■ Health Information Resource Centre: province-wide service (a Community Access Program initiative) managed by a volunteer committee representing consumers, community organizations and professional service providers. The Centre provides a telephone and drop-in referral and information service in Charlottetown.<br>■ West Prince Health Telehospice Pilot Project: Western Hospital linked to 12 telehospice units, funded by Health Infostructure Support Program. | | |
| **Quebec** | ■ Integrated action plan (Inforoute Santé) for a provincial health and social services information network, consumer health (EPRs) and telehealth (telemedicine, telediagnosis, teleservice). Its objectives are to collect and analyze population-based information; increase patient autonomy and improve patient decision making; to promote information networking for improved access to, and management of, services, security mechanisms (smart cards) and remote access to medical services. The backbone of the network is the Réseau de télécommunications socio-sanitaire (RTSS) that currently links 600 health care facilities in a closed ATM network. The lead agency is the Health and Social Services Ministry. | ■ Comprehensive legislative protection of personal privacy that grants legal protection to the doctor-patient privilege almost equivalent to that of the solicitor-client privilege. | ■ Globalmedic's Self Care Solutions and Health Care Manager.<br>■ Medisolution: software solutions.<br>■ Cifra Medical Inc.: real-time telemedicine systems. It is the main technology supplier for Quebec's integrated telehealth network.<br>■ Télématiques: systems integration and development and operator of a health management remote clinic.<br>■ InfoTelmed Communications Inc.: research and consulting. |

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| | ■ Quebec Inter-regional Telemedicine Network: links the Hotel-Dieu Pavilion of the Montreal University Hospital, St-Mary's Hospital located in Three-Rivers and hospitals in Joliette and Rouyn-Noranda, funded by the Information Highway Fund, to conduct teleconsultations in radiology, anaesthetics, dermatology, psychiatry and cardiology, as well as CME.<br>■ East Quebec Network: funded by CANARIE and the Information Highway Fund, connects the Laval University Pavilion of the Quebec Universities Hospital and 12 regional hospitals to conduct teleconsultations in cardiology, pediatrics and radiology.<br>■ Provincial Mother-Child Network: operated by the St-Justine Hospital in Montreal and funded by HTF, offers to the Laval, Valleyfield and St-Jerome regions teleconsultations in infectious diseases, obstetrics, gynaecology, intensive care medicine, and may expand to include telepsychiatry, teleradiology and EMR exchange.<br>■ Quebec Pediatric Telemedicine Service, funded by the Ministry of Health and Social Services, connects 4 tertiary care centres, 28 other health care centres and 2 northern health centres to conduct pediatric cardiology consultations. The service will be expanded to over 70 sites.<br>■ Lévis-Chamy Network: links the Lévis Hotel-Dieu Hospital and the Health Complex and CLSC (local community health centre) in Charny for teleradiology.<br>■ Quebec North Shore and Lower North Shore Telepresence Network: link 2 regional hospitals (Baie-Comeau and Seven Islands), 3 health centres (Les Escoumins, Forestville, Havre-St-Pierre), the Centre for Protection and Rehabilitation and the Regional Health and Social Services Board of the North Shore for videoconferencing, emergency services, teleradiology, cardiology and pediatric cardiology.<br>■ Tele-Speech Therapy Project: links the St-Justine Hospital in Montreal to the CLSC in Matane and the regional hospital in Rimouski.<br>■ Madeleine Islands Project: pilot project funded by the Health Transition Fund that links the Madeleine Islands Hospital, the Laval University and Hotel-Dieu Pavilions of the Quebec University Hospitals (Quebec City), the Enfant Jésus Hospital in Montreal, and the regional hospital in Rimouski to conduct tele-orthopedics, tele-emergency, tele-cardiology and tele-pediatric | | ■ McGill University Molson Informatics Project: adapts medical undergraduate curriculum to the Internet.<br>■ CEFRIO: evaluates telemedicine projects in Quebec.<br>■ Montreal University Hospital: participates in telehealth trials with France.<br>■ Absolu Technologies Inc.: Webpayphone network design.<br>■ Canvas Visual Communications: videoconferencing systems.<br>■ CEV Inc.: videoconferencing systems. It was involved in a telesurgery pilot with Montreal's Maisonneuve Hospital and the Delanaudiere Hospital in Joliette.<br>■ DRM Group Inc.: Information and Communications Technology systems (e.g. for Quebec's Worker Health and Security Commission).<br>■ Innovitech Inc.: project management.<br>■ Isogroup: research and consulting.<br>■ Multidev JDL Communications Inc.: videoconferencing and data communications especially for scientific, military and industrial R&D projects.<br>■ SSB Multimedia: multimedia and interactive publisher specializing in health for medical education. |

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| | cardiology, teleradiology, tele-trauma care and telepsychiatry.<br>■ Infosanté: 24/7 nurses tele-triage/health information telephone line. Answered 2.8M calls at a cost of $33.3M in 1998/99, representing 323 calls per 1000 population. | | |
| **SK** | ■ Saskatchewan Health Information Network: information management system including: a service event management system liked to a personal registry system; development of Electronic Patient Records; links among health district providers and district health facilities (hospitals, District Health Boardss, Community Health Councils, long-term care facilities) for ordering, recording and monitoring health services; telehealth pilot projects in the areas of teleconsultations, EPRs, public and professional education. Some specific applications are the Southwest Network Pilot, CT Scan Transmission, Mother/Infant Care Pilot Project, Triplicate Prescription Program and Expanded Services to Physicians. The network is operated by a Crown corporation, governed by a Board of Directors, implemented by Science Applications International Corporation (SAIC).<br>■ Provincial Immunization Record System: connecting 30 districts and First Nation health delivery agencies to a secure immunization database through the Internet.<br>■ Newborn Registration System.<br>■ Northern Telehealth Network, partly funded by Health Infostructure Support Program: real-time videoconferencing network connecting 3 northern hospitals, 2 regional hospitals, 2 tertiary care facilities and 2 nursing stations (total of 9 sites) to conduct teleconsultations in child psychiatry, dermatology, ultrasound, teleradiology, CME and patient education.<br>■ Interprovincial telehealth network: provides real-time audio-video links between the North-East Health District in SK and the Keeweetinok Lakes Regional Health Authority in Alberta to link rural and remote communities for community development, shared education, training and expertise (e.g. an Aboriginal diabetes educator.<br>■ North-East Health District network: links Cumberland House (an isolated First Nation and Metis community) to Nipawin for administrative purposes, education, training and teleconsultations. | ■ Fee schedules were revised to accommodate teleconsultations, supplementing time-related payments.<br>■ Draft legislation extending privacy protection to the private sector was presented to Parliament in the Spring of 1999. | ■ Computing Devices Canada Inc. is the main technology supplier for the Northern Telehealth Network.<br>■ SAIC is implementing the SHIN.<br>■ NSI Nursing Systems Inc.: nursing information systems. |

| Region | Networks/Programs | Practice/Legal Issues | Expertise |
|---|---|---|---|
| | ■ Southwest Rural Physician Network: connects 34 workstations for the exchange of EPRs. | | |
| **Yukon** | ■ Whitehorse General Hospital Network: linked to the Vancouver General Hospital and an Alberta health care facility to conduct teleradiology and teleultrasound.<br>■ A pilot project funded by CANARIE, NorthwesTel and the Yukon Government links the Whitehorse General Hospital with rural communities to conduct teleconsultations in dermatology, rehabilitation, occupational therapy and physiotherapy. | ■ A two-year contract specifies liability, payment and jurisdictional arrangements for the Whitehorse General Hospital Network.<br>■ The government is revising fee schedules to supplement time-related payments.<br>■ Liability issues are resolved in the pilot project with rural communities with a Consent of Treatment and Diagnosis Form signed by each patient prior to receiving a teleconsultation. | ■ Medical Information Plan produced by the Department of Health and Social Services and the Yukon Medical Association addressing issues relating to electronic billing and potential telemedicine connections. |

# Appendix E Glossary of Terms

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| **ADSL (Asymmetric Digital Subscriber Line)** | A telecommunications delivery platform that allows for videoconferencing. |
| **Analogue** | Information (electronic or otherwise) that is created and transmitted in a continuous stream. Compared to digital information transmitted by computers. Standard photographs and X-rays for example are analogue. Modems are used to convert digital computer information into analogue form to transmit it over standard telephone lines. |
| **Application (as in telehealth application)** | Type of telehealth activity or service (like teleconsultation, tele-education, tele-administration, tele-home care, tele-triage etc.) |
| **Asynchronous Communication** | Store-and-forward communication that takes place during different time frames according to the users' convenience (such as in electronic mail). Compared to synchronous or real-time communication. |
| **ATM (Asynchronous Transfer Mode)** | A type of store-and-forward, two-way telecommunications service that breaks up the transmission into small packets of 56 bps capacity over telecommunications media such as fibre optic and coaxial cable along with microwave transmissions. ATM networks are fast and flexible enough to handle large bandwidth requirements of telehealth. |
| **Bandwidth** | The capacity at which information can be carried over a communications channel per unit of time, usually measured in kbps (kilobits per second). The higher the bandwidth, the more information can be transmitted. |
| **Bit** | Binary digit, that basic 0-1 unit of information used by computers to enter information, store it and transmit it. The rate of information that can be transmitted over telecommunications is usually expressed in bits per second, i.e. bps. |
| **bps, kbps or Mbps (bits/kilobits/megabits per second)** | The bandwidth of the communications channel (see "bit"). |
| **Bridging** | The process of establishing a video/voice/data link between three or more sites. It requires a Multipoint Control Unit (MCU) or "data bridge". |
| **Broadband** | Communications systems, such as television or microwave broadcasts, that are capable of providing a wide range of data channels over a single communication medium using frequency division multiplexing. Generally refers to bandwidth that can support real-time full motion video and videoconferencing. |
| **Call Center** | see Triage |
| **Chat Room** | An electronic address, usually on the Internet, that people can access in order to exchange text messages with others. |
| **Clinical Validation** | Health professionals agree that the quality of video, voice or data is good enough to make a diagnosis. |

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| **CME or CNE (Continuing Medical or Nursing Education)** | Education accessed by physicians or nurses who are already practicing their profession. This form of education enables professionals to stay in touch with new developments (research and technology) in their field and to update/refresh their skills and knowledge. |
| **Coaxial Cable** | A metal cable consisting of a conductor in the form of a tube that can carry broadband signals by guiding high frequency electromagnetic signals. It is used to transmit voice, video and data. |
| **Codec** | A term used for a coder/decoder electronic device that converts an analogue signal into a digital form in order to transmit information (especially video). |
| **Connectivity** | The ability of computer networks and systems to interact on a local, regional, national or international scale. |
| **Convergence** | The merging of communications and information technologies and information. The coming together of telecommunications, computers and information. |
| **Cost-benefit Analysis** | A method used in telehealth evaluations that focusses on studying the economic impact of telehealth. Although conducted similarly to the cost-effectiveness analysis, it expresses costs and intangible social aspects and health impacts (i.e. benefits) in monetary terms. It can be used to determine which project applications, technical equipment, telecommunications link etc., has greater monetary value. |
| **Cost-effectiveness Analysis** | A method used in telehealth evaluations that focusses on studying the economic impact of telehealth. It compares costs and health impacts (such as years of life gained or cases of disease prevented) of a minimum of two alternatives (such as a telehealth consultation and a face-to-face consultation). |
| **Cost-consequence Analysis** | A method used in telehealth evaluations that focusses on studying the economic impact of telehealth. It allows for a more qualitative analysis than the cost-benefit and cost-effectiveness models by considering the intangible consequences of two or more alternatives (such as a telehealth consultation and a face-to-face consultation). That is, it compares the impact on costs of health and *non-health* consequences of each alternative. |
| **Data** | Information that is collected, aggregated and analyzed for research, administrative or other purposes. |
| **Database** | An electronic system that collects information, cross-references and analyzes it for easy referral, storage and study. |
| **Desktop Videoconferencing** | Dial up systems, including camera, microphone, software and codec, that are added to a personal computer to deliver videoconferencing. |
| **DICOM (Digital Imaging and Communications in Medicine)** | A collection of industry standards for connection of, and communication among, medical imaging devices. |
| **Digital** | Information coded in discrete numerical values (“0" and “1" see bits). Digital data streams are less vulnerable to interference than analogue data streams. Also, because they are made up of zeros and ones (bits), they can be easily manipulated and integrated with other data streams (voice/video/text). |

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| **Digital camera** | Captures images (still or motion) digitally and, therefore, does not require analogue to digital conversion before the image can be transmitted or stored in a computer. Conversion causes some degradation in the quality of the image and time delay in transmission. |
| **Download** | To retrieve a file from another computer. |
| **EDI (Electronic Data Interchange)** | A general term describing the need for common standards in the form and content of data messages exchanged during health care practice. |
| **Electronic Health/Patient/ Medical Record** | A patient record captured, stored and transmitted by computers. |
| **Electronic Mail or E-mail** | Messages are sent and received using electronic personal mailboxes in a computer network (like the Internet or an Intranet). |
| **Encryption** | A mathematical scrambling of a computer file or data stream so that it cannot be deciphered at the receiving end without the proper key. Encryption is a security mechanism that ensures that only those authorized to participate in a videoconference of information exchange can do so. |
| **Extranet** | A network, apart from the Internet, that uses Internet technologies and protocols to securely exchange data among Intranets. |
| **Firewall** | A security barrier erected between a public computer network like the Internet and a local private computer network. |
| **Frame rate** | The number of images displayed per second in a video stream. 24 frames per second is considered to be full motion video. |
| **Frame Relay or X..25** | A technology for transmitting packets of data in high speed bursts across a digital network contained in a transmission unit called a frame. It requires a dedicated connection and is similar to ATM although it uses less expensive technology and is not as well suited to video or voice (since it is generally slower). |
| **Health Information Networks** | An electronic communications network that links health care, educational, research and government facilities to share health and patient information/databases and to provide teleconsultations. |
| **"Hub" Site** | Referral center (typically a tertiary care center). |
| **Informatics** | The application of computer and information to the management and processing of data, information and knowledge. |
| **Information Highway** | The information and communications technology infrastructure through which information is transmitted. |
| **Infostructure** | The communications and knowledge infrastructure through which and according to which information is collected, stored, transmitted, analyzed etc. |
| **Interactive Television** | see "videoconferencing". |
| **Internet** | An international computer network that is the largest and fastest-growing in the world. |
| **Interoperability** | The capacity of different systems to work and link together smoothly and predictably. |

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| **Intranet** | A private computer network that uses TCP/IP protocols over the Internet and is accessible only to a select group of authorized users. |
| **IP (Internet Protocol)** | The main protocol used by computer networks that make up the Internet. |
| **ISDN (Integrated Services Digital Network)** | A low-to-medium speed technology that uses digital instead of analogue telephone lines. Because it uses digital lines and it uses multiples of 64kbps (more than twice as high as ordinary telephone lines), it allows for the integrated transmission of voice, video and data. |
| **LAN (Local Area Network)** | A data communication network that is limited geographically to, for instance, a single building. |
| **Modem** | Modulator/Demodulator that enables the transmission of digital data (by transforming it to and from analogue format) over standard analogue telephone lines and cable video systems. |
| **Narrowband** | The opposite of broadband; it is a communications medium that can use only a small frequency range of signals. |
| **Network** | Interconnected communications equipment used to transmit voice, video or data. Examples include LANs and WANs. |
| **PACS (Picture Archival and Communications Systems)** | Systems generally associated to the digitization of radiology departments. PACS consist of various components/modules that are integrated to form a coherent digital image management system: image acquisition, digital networks, image archives, image display workshops. In other words, PACS structures the management of digital X-ray and other medical images. |
| **Peripheral Devices** | Devices/Equipment attached to videoconferencing units or computers to capture images, voice, video or text in a digital form. They include medical and non-medical peripheral devices. Medical peripheral devices include digital cameras (document camera, dermascope, otoscope, ophthalmoscope, general examination etc.), electronic stethoscope, scanners, or more conventional medical equipment like ECG, vital signs monitor, electronic glucometer etc. that are adapted for telehealth applications using network devices (i.e. modems). Non-medical peripheral devices include: computers, printers, VCR, slide projector, fax machine, document/graphics camera etc. |
| **Platforms** | Telecommunications technologies include cable-based platforms (ISDN, Coaxial cable, ADSL, POTS, fibre optic and frame relay) and wireless-based platforms (terrestrial broadcasting, satellite, microwave and cellular mobile systems) to deliver information. |
| **POTS (Plain Old Telephone Service)** | The everyday telephone system we all know. Transmission of data is done over this service using modems at both ends of the telephone line to transform the data into sound and then back into data. |
| **Scanner** | Converts texts or drawings or pictures into computer-recognizable data by using a form of optical recognition. Optical recognition systems use a light beam to scan data and convert it into electrical signals that are then sent to the computer to be processed. |
| **Server** | A computer on a network that stores commonly used resources such as data or programs and makes these available on demand to clients on the network. |

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| **Set-top Videoconferencing** | Dial up systems that sit atop or beside a standard television set. Voice and video are routed through the television set to save the cost of a monitor (screen) and speakers. |
| **"Spoke" Site** | Referring site (typically rural or remote communities). |
| **Standard** | A requirement or technical specification established by a recognized organization such as the Canadian Standards Association or the International Organization for Standardization. Standards provide rules, guidelines or characteristics of activities to achieve the best performance in a given context. They are based on consolidated results of science, technology and experience. |
| **Store-and-forward** | An asynchronous communication where voice, video and/or data is "stored" in a computer and than "forwarded" to a computer in another location. |
| **Synchronous communication** | Real-time communication |
| **T1** | A dedicated connection composed of 24 digital signals level "0" that has a total capacity of 1.544 Mbps. This is currently the most popular way to connect large computer networks. |
| **TCP (Transmission Control Protocol)** | A protocol on which the Internet is based. It is often combined with IP. |
| **Telecentres** | Facilities managed by communities where people can access computers and other technologies for educational, professional or entertainment purposes on a cost recovery basis. |
| **Telecommunications** | A system of communication that is different from broadcast communication by the fact that it typically supports private rather than public airways. Present-day telecommunications technology offers five standard media over which to transmit information: copper wire, fibre optic cable, co-axial cable, satellite and microwave. |
| **Teleconsultation** | A medical consultation held over distance using communications and information technology. |
| **Telehealth** | The use of communications and information technology to deliver health care, health information and health education over large and small distances. |
| **Tele-home care** | The delivery of home care services at a distance through telephone lines or other telecommunications. |
| **Tele-imaging** | The transmission of images from one location to the other through an electronic communications system. |
| **Tele-education or Telelearning** | The delivery of educational material at a distance through videoconferencing, the Internet or another form of communications technology. |
| **Telematics** | The use of communications technology to deliver expert advice and/or patient information at a distance to deliver health care or health education. |
| **Telemedicine** | The delivery of medical services and expertise at a distance using communications and information technology. |
| **Tele-training** | The delivery of training material at a distance through videoconferencing, the Internet or another form of communications technology. |

| | |
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| **Tele-triage** | The intervention of a trained health professional who delivers expert advice over a telephone help line. The location of the trained health professional is often referred to as a call center. |
| **Televisitation** | Visiting hospitalized family members from a distant location using videoconferencing or another form of communications technology (like electronic mail transmitted over the Internet). |
| **Transmission Speed** | The speed at which a message is transmitted over communications technology. |
| **Ultrasound** | An investigative technology that uses sound waves to study anatomical structures or organs and measures their size, location and shape. This technique is used to evaluate and diagnose disease. |
| **Videoconferencing or Interactive TV** | A communications technology that delivers two-way, real-time transmission of video and audio images between two (point-to-point) or more (multi-point) locations. |
| **Videophone** | A small, stand-alone video appliance with a small camera and monitor (screen), speaker and microphone that allows for interactive voice-video communication over POTS or ISDN. They are not dependent on a computer or a larger videoconferencing system. |
| **Virtual Reality** | A simulated experience created by using virtual technologies and products such as three-dimensional and stereoscopic simulation, Total Sensory Presence, interactivity and virtual environments. |
| **WAN (Wide Area Network)** | A data communication network that is not limited geographically. |
| **Whiteboard** | A document-conferencing service that allows several individuals in different locations to simultaneously view and comment on a document with pens, highlighters and drawing tools. |
| **World Wide Web (WWW)** | An Internet tool for retrieving and distributing information which uses a system of linking pages (websites) of related information together (data in hypertext). It acts as a global publishing system. |

# Appendix F Invited Speakers' Presentations

## 1 Orpah McKenzie, "KEEWAYTINOOK OKIMAKANAK: Telepsychiatry Pilot Project", POPLAR HILL FIRST NATION.

**History of KO and Telehealth Initiatives**

- 1991 - Keewaytinook Okimakanak (Northern Chiefs Council) is incorporated and mandated by the Chiefs of six First Nations in Northwestern Ontario to provide advisory services to the First Nations of Deer Lake, Fort Severn, Keewaywin, McDowell Lake, North Spirit Lake and Poplar Hill. The table below give a brief overview of health facilities and staffing levels as well as existing telecommunications infrastructure. As in most First Nations there are support staff and resource workers that provide other essential services in the community.

| Community | Population | Health Facility | Staffing-CHNs | Telecommunications Infrastructure |
|---|---|---|---|---|
| Deer Lake | 1000 | Nursing Station | 4 | telephone, internet |
| Fort Severn | 500+ | Nursing Station | 2 | telephone, internet, working on videoconferencing capability via satellite |
| Keewaywin | 500 | Health Station | from Sandy Lake NS | internet, 2 telephone lines |
| McDowell Lake | 50 | NONE | NONE | NONE |
| North Spirit Lake | 360+ | Health Station | from Deer Lake | telephone, internet, videoconferencing |
| Poplar Hill | 370+ | Health Clinic | from Pikangikum | telephone, internet |

- 1993 - KO established a Health Office with the objective of improving health services in the communities starting with the development of community-based Mental Health programs with funding from Brighter Futures and Building Healthy communities in 1995

- 1994 - KO established a computer Bulletin Board System utilizing donated computers from business organizations.

- 1996 - KO initiated discussions with Red Lake Margaret Cochenour Memorial Hospital to relocate services from the Sioux Lookout Zone Hospital as part of the mandate to improve health services in the communities. KO communities have historical ties and links with the Red Lake area and as such see accessing services through Red Lake as more convenient and "closer to home".

- 1997 - KO approached various government departments (Industry Canada, FedNor, Ministry of Health, Health Canada) to fund on-going activities in the development of information technologies to all member First Nations. Applications for the technology included education of community-based staff in the area of education and health.

- 1998 - KO Chiefs and staff visited the Ottawa Heart Institute to view the Cardiac program which links remote sites in the NWT to deliver services to cardiac patients. This visit affirmed the desire of the First Nations to continue their efforts in the development of telecommunication technology as a way of accessing services available in the urban centers.

**Present Projects**

**TELEPSYCHIATRY PILOT PROJECT**

*Goals of the project:*

1. To maximize access to professional services for isolated communities through the use of videoconferencing
2. To minimize the disruption to clients
3. To utilize and enhance the capabilities and skills of community support persons in terms of overall care of clients
4. To determine whether this method of mental health intervention is less expensive than the traditional face-to-face process

The Keewaytinook Okimakanak Tele-Psychiatry Pilot Project was intended to be implemented in each member First Nation. However, the telecommunications infrastructure improvement project north of Red Lake did not proceed as planned. Consequently tele-psychiatry was not an option for each of our First Nations. The focus of the pilot changed and Poplar Hill was chosen to pilot the project using the video-conferencing equipment in Red Lake. Poplar Hill is an ideal community due to their close proximity to Red Lake, and the people's hesitancy to leave their community to seek counselling outside the community. Poplar Hill is also ideal because of the existing support structure developed through years of having a visiting professional mental health counsellor who is hired by the community.

Mental health problems are the second most common health care issue in the Sioux Lookout Zone of Northwestern Ontario. Mental health counselling at this time involves appointments with counsellors at the Nodin office in Sioux Lookout. People sometimes wait months before a counsellor is available for an appointment. The purpose of the Keewaytinook Okimakanak Tele-Psychiatry project is to address this need. The project will test the efficacy of video conferencing in the assessment, treatment and follow-up of clients with mental health difficulties who live in the remote community of Poplar Hill.

The Tele-Psychiatry Project has involved a lot of planning between chief and council and staff in Poplar Hill, staff at Keewaytinook Okimakanak, the project coordinator, and psychiatrists. The following is a brief list of the activities that have occurred:

- community orientation,
- community education and awareness,
- determining effective structures, procedures and protocols,
- screening clients for appropriateness of the tele-psychiatric consult medium,
- organizing and implementing the video consultations.
- evaluation of acceptance by the clients.

The effectiveness of the video conferencing process and the cost-effectiveness will be evaluated at the completion of the project in March 2001

**Project Personnel**

*Mental Health Worker*

The active participation of the Poplar Hill Mental Health Worker is essential to the Tele-psychiatry Pilot Project. The role of the Poplar Hill Mental Health Worker is to conduct:

- referrals,
- counselling,
- follow-up,
- case management,
- community programming
- translation,
- escort clients to the Red Lake video-conferencing site
- accompany clients during the video-consultation.
- maintain records
- participate in project evaluation.

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*Tele-Psychiatry Project Coordinator*

The Project Coordinator was hired collaboratively between Poplar Hill First Nation and Keewaytinook Okimakanak. The Project Coordinator will conduct once monthly in-community consults. The role of the Project Coordinator is to participate in:

- the referral process and determine the appropriateness of video-conferencing for clients
- counselling more difficult cases
- follow-up
- case management and liase between all service providers
- maintaining records
- available to accompany clients during the video-consultation
- pilot project reporting
- organization of video-conference consults
- implementation of pilot project
- keep all project partners informed on pilot program progress

- evaluation of pilot project

*Contract Psychiatrist*
A Winnipeg psychiatrist with six years experience working with remote northwestern Ontario First Nation people was hired on contract. The psychiatrist provides consultation services through the use of video-conference equipment which Keewaytinook Okimakanak installed in her Winnipeg office. The equipment was loaned to the contract psychiatrist for use in this project. The role of the psychiatrist is to:

- conduct psychiatric assessments on referred clients
- consult in difficult case management matters
- provide treatment
- provide follow-up services
- provide medication reviews
- provide consultation notes
- provide education and training for staff
- participate in tele-psychiatry video role-play
- conduct a two-day in-community visit
- participate in project evaluation.

It is important to note that other contract psychiatrists may be called upon to consult with specialized cases.

*Video Technician*
The Keewaytinook Okimakanak Video Technician is located in the Balmertown office. Until the technology is available at the community level, all video-consults occur at the Balmertown office. The role of the video technician is to:

- ensure the video-conference equipment is operational
- establish tele-linkages for video-conference consults as per notification from Project Coordinator
- monitor video-conference calls to ensure clarity
- maintain client confidentiality.

*Keewaytinook Okimakanak Health Services*

- It is the role of the Health Services team to:
- supervise the pilot project
- review and submit financial and statistical reports
- participate in the project evaluation
- liaise with First Nations and Inuit Health Branch
- liaise with KNET to ensure the functioning of the video-conference equipment

**Pilot program productions/activities**

*Brochure*
A brochure was created to provide illustrations and explanations of the Tele-Psychiatry Project. All staff participated in its development. Two versions were produced. One version is in Eastern Ojibway syllabics and the other in English. The Poplar Hill Mental Health Worker determined the families who would benefit from the English version and those who would prefer the syllabics brochure. The brochures were placed in the local mailboxes. A copy of the two versions are enclosed.

*Video*
A video role-play between a patient and a psychiatrist was attempted. The "interview" scenario was created by the Tele-Psychiatry Project Coordinator and distributed to the actors and the psychiatrist. The role-play was rehearsed by all involved, unfortunately, the actual recording was not successful due to some unanticipated technical difficulties. This was disappointing since the role-play had gone smoothly, without problems. A second attempt to record the interview video is scheduled. The video will be used as a tool for community education and awareness.

*Community Visit*
A two-day in-community visit took place on April 27 and 28, 2000. The visit focused on meeting community members and providing education and awareness on the pilot project and mental health issues. A meeting with chief and council as well as a radio-broadcast occurred. The psychiatrist and mental health professional made home visits to explain the process and gave out brochures to those people who were potential clients for the project. Keewaytinook Okimakanak Health Services also participated in this event. During the community visit three potential clients for the project were engaged in counselling sessions.

*Consultations*
The first tele-video interview was established in May 2000. This was a case management and family matter that did not require the services of the psychiatrist on contract. The patient, at the Lakehead Psychiatric Hospital, has a serious mental illness. The patient, care givers and family were in need of case planning and a family visit. The family members had not seen their husband and father for nine months due to the distance and expense from Poplar Hill to Thunder Bay. The tele-video conference was organized between the patient, his doctor, two nurses, two social workers, the patient's wife and daughter at the Thunder Bay site and the patient's six sons, the technician and the mental health trainee at the Balmertown site. The family was able to meet and have a much needed social visit with their father and to hear about his condition from the doctor, nurses and social workers. Case planning and placement needs were discussed. The session duration was two hours. Verbal evaluations from the care givers were positive as per the report from the LPH social worker. Responses from the patient's sons were also good. However, the family members reported that it was a very emotional visit as they hadn't realized the extent of their father's deteriorating condition.

The following 5 video-consults were two hour consultations involving the psychiatrist, client, Mental Health Worker, Project Coordinator, and the technician at the Balmertown site. It was a successful process. Each client was oriented to the equipment. In each case, clients seemed very relaxed and open with the psychiatrist and comfortable in the video-conference setting. No clients were dissatisfied with the process.

Further statistics on numbers of clients accessing services for remainder of the first phase of the pilot project have not been analyzed yet. These will be forthcoming by end of October 2000.

**Conclusion**

The videoconference process so far has been found to be creative, exciting and less complicated to organize, arrange and undertake than the face to face procedure used in traditional psychiatry. The actual time taken in client/psychiatrist contact is longer and more comprehensive. With client consent, other mental health care givers are involved with the process or immediately following the client interview. A financial analysis will be undertaken in March 2001 to compare the costs of traditional client/psychiatric interviews against the video-conference method.

**SMART COMMUNITIES**

- KO entered the national SMART Communities competition and has been awarded the Aboriginal site. The project will require raising 50% of costs. Main applications include: health, education, economic development, language retention.

**UMED ELECTRONIC MEDICAL RECORD**

- proposing a partnership with UMED to deliver personal health record services to KO First Nations

**CHIPP**

- In partnership with NORTH Network, carried out an intensive telehealth information and education program with member First Nations. The report on this activity is still in draft and has not been reviewed by the First Nations. The final product is to be submitted to the Canada Health Infostructure Partnership Program (CHIPP).

## POTENTIAL OPPORTUNITY FOR TELEHEALTH SERVICES IN KO COMMUNITIES

(Telehealth and Keewaytinook Okimakanak First Nations Community Consultation Report, 2000)

- improved patient care
- reduce the experience of professional isolation
- client satisfaction
- improved First Nation capacity to manage health services
- improved access to medical and health professionals
- improved continuity of care
- improved access to education
- reduction in disruption and discomfort caused by extensive patient travel

## CONCERNS EXPRESSED FROM COMMUNITY MEMBERS

(Telehealth and Keewaytinook Okimakanak First Nations Community Consultation Report, 2000)

The overall reaction to local telehealth access was positive but common concerns were expressed during the consultation:

- concerns about the physical location of the telemedicine suite and how the service will be integrated with existing services
- concerns about the introduction of telemedicine services such as what level of service will be available when
- concerns about the level of privacy and security that the system would offer and how user confidentiality would be respected
- concerns that distributed access to health care would mean fewer CHNs and/or physicians in the communities
- concerns about the effect of telehealth on local health transportation services
- concerns about local coordination for telehealth. For instance, how new duties associated with telehealth would be distributed and how training would be delivered and upgraded over time
- concerns about the length of the pilot project and who would pay for the telemedicine delivery after the 18 month project ended.

## LESSONS LEARNED

- Telehealth takes TIME!
- Telehealth takes money! But costs should never be the sole factor in determining whether a community receives services.
- Telehealth is a CHANGE of mode of delivery of services
- Providers of technology do not dance to your tune!
- Support from other professionals will take time.
- The community has to have a sense of control over their program
- Telehealth cannot be used to replace, but to enhance existing services!

## STATISTICS-PHASE 1

These statistics reflect only the numbers of clients that accessed services through the first phase of the project. The second phase begins in October.

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|---|---|
| January 00 | 48 client contacts conducted by Tele-psychiatry Project Coordinator (PC) and the Poplar Hill Mental Health Worker |
| February 00 | 28 client contacts conducted by Tele-psychiatry PC and the Poplar Hill Mental Health Worker |
| March 00 | Due to staff turnover, 1 client contact conducted by the Tele-psychiatry PC |
| April 00 | 21 client contacts conducted by the Tele-psychiatry PC and the Poplar Hill Mental Health Worker. 3 client assessments and 2 community presentations by the psychiatrist during her in-community visit. |
| May 00 | 31 client contacts conducted by the Tele-psychiatry PC and the Poplar Hill Mental Health Worker. One client, 8 family members, 4 health care providers (2 nurses, 1 doctor, and 2 social workers) and 2 technicians (one at each site) participated in a televisitation/case management session. |
| June 00 | 16 client contacts conducted by the Tele-psychiatry PC and the Poplar Hill Mental Health Worker. One client participated in a tele-psychiatry video-conference session. |
| July/August 00 | 26 client contacts conducted by the Tele-psychiatry PC and the Poplar Hill Mental Health Worker. 3 clients participated in tele-psychiatry video-conference sessions. |
| September 00 | 9 client contacts conducted by the Tele-psychiatry PC and 127 charts reviewed. No Community Mental Health Worker. 1 tele-psychiatry video-conference consult. |

**2. Bernice Downey, "The Impact of Technology on Aboriginal Health Nursing", Aboriginal Nurses Association of Canada.**

**3. Mary (Cookie) Simpson and Tammy Buchanan, "TeleRehabilitation in Fort Chipewyan and the Lessons Learned," Nunee Health Authority.**

## 4. Peter Stevens, Eskasoni First Nation.