Executive Summary

The NORTH Network is a telemedicine program which has been providing patient consultations and continuing professional education to northern and rural communities in Ontario via two-way television, electronic medical devices and other advanced technologies since 1998.

The CHIPP program (April 1, 2001 through March 31, 2003) enabled NORTH Network and its partner, Keewaytinook Okimakanak Telehealth (in collaboration with over 75 member and funder organizations) to expand telehealth services from 14 to 78 sites, to deploy advanced technologies, to further develop and refine the service framework and to build significant capacity to deliver services.

The NORTH Network evaluation reviewed the implementation of the CHIPP funded program and its specific tasks and collected information through a number of means. Data collection sources included a survey of all patients; a survey specific to movement disorder (neurology) patients; focus groups with rural patients, First Nations community members, Telehealth Coordinators, allied health professionals and physicians; review and analysis of administrative data; a survey of continuing professional development session attendees; key informant interviews and; two research projects. The evaluation also identified an approach for future evaluation.

Overall, the implementation was entirely successful, completing all tasks and milestones set out in the CHIPP statement of work. The further objectives of the evaluation of the NORTH Network project were to assess the following: improvements to health services (i.e. quality, access, utilization); integration of health services; health and health care system-outcomes; cost-effectiveness; technology performance (i.e. effectiveness, ease of use, training, maintenance and support); privacy; lessons learned and priorities for further development. A summary of these is provided below.

Improvements to Health Services

Quality

- 96% of survey respondents were satisfied with their telemedicine consultation.
- 97% of survey respondents were comfortable talking with their telemedicine specialist.
- 97% of individuals who participated in a movement disorder telemedicine consultation felt that the experience was at least the same or better than an in-person appointment.

---

1 The acronym NORTH in NORTH Network refers to Northern Ontario Remote Telecommunication Health Network

NORTH Network Phase II Evaluation
Access

- The NORTH Network provided telemedicine consultations in 48 specialties during the CHIPP project.
- Patients reported that significantly less time is required to attend a telemedicine consultation versus an in-person appointment.
- Survey respondents indicated that they saw a specialist within a significantly shorter timeframe for a telemedicine consultation than they would have for in-person appointment. Forty-nine per cent of respondents who completed the patient survey had their telemedicine appointment within 3 weeks of referral.
- Focus groups with patients from First Nations and other communities, physicians and allied health professionals strongly endorsed and accepted telemedicine for improving access to health care.
- 88% of respondents to the movement disorder survey felt that telemedicine provided the same or better access to the specialist’s multidisciplinary team as face-to-face.
- Individuals in the four patient focus groups commented on their concerns about delays in access or lack of access to specialty consultation in the absence of a telemedicine program.
- Participants in the patient focus groups in the First Nation’s communities were very satisfied with their telemedicine experience and felt that it was increasing access to other health care specialties (e.g. mental health counseling) and was more convenient with respect to time and cost-savings. They valued the program and wanted it to continue. This sentiment was reflected in the comment of one participant who stated “please don’t take away the telemedicine program”.
- Physicians identified the following benefits of the NORTH Network project related to access:
  - Improved communication and relationships with health care professionals and specialists
  - Broader access to patients
  - Broader access to other specialists
  - Easier to bring in other health care professionals and specialists for case consultation
  - Improved opportunities for professional education
  - Likely to help with the retention of physicians and specialists in Northern Ontario, since telemedicine helps to decrease “professional isolation”
- 100% of stakeholders who responded to the online preliminary stakeholder survey felt that the NORTH Network had met its objective to improve access to medical specialty care for residents of remote and rural communities.
Utilization

- NORTH Network membership grew from 14 to 54 hospital corporations (286%) during the CHIPP funding period.

- 3,935 patient consultations were conducted by the NORTH Network during Phase II (April 2001-March 2003).

- NORTH Network’s monthly volume of patient consultations increased 527% during the CHIPP funding period from 64 per month in the first month (April 2001) to 401 per month in the last month (March, 2003.)

- The sites with the highest overall volume of patient consultations during this two-year time period were Kirkland Lake (587), Timmins (499), Cochrane (325), Marathon (268) and Sudbury (202).

- The number of physicians utilizing the NORTH Network for patient referrals and consultations increased 192% during the 2-year CHIPP period (April 1, 2001 – March 31, 2003) from 218 to 637.

- The number of Allied Health Care Professionals utilizing the NORTH Network for patient consultations increased 264% during the 2-year CHIPP period (April 1, 2001 – March 31, 2003) from 14 to 51.

- The highest number of consultations by specialty were: dermatology (806), psychiatry (616), pediatrics (433), movement disorder (289) and pain management (187).

- There were 210 administrative events conducted using the NORTH Network technology during the CHIPP funding period. These increased from 4 in April, 2001 to 28 in March, 2003 (600% increase).

- Continuing professional development events increased from approximately 7 to 30 per month (328% increase). A total of 318 continuing professional education events were conducted with the NORTH Network’s telemedicine technology during the CHIPP funding period.

- The Central Scheduling Office was automated to accommodate the significant increase (400%) in-patient or clinical consultation volume during the CHIPP funding period.
Integration of Health Services

- A total of 2,392 individuals participated in 67 NORTH Network-accredited Continuing Professional Development (CPD) events from October, 2001 to April, 2003. Overall, participants were very satisfied with these CPD events. (These sessions represent 21% of the 318 educational events scheduled on the NORTH Network).

- The NORTH Network has used the same set of technologies and service framework to provide telemedicine consultations in 48 specialties. The consultants include a broad variety of physician specialists and allied health care professionals.

- The NORTH Network uses technologies that are standards-based, including the ubiquitous internet protocol (IP) to ensure that telemedicine is accessible securely across all networks.

- A collaboration between the NORTH Network, the Southwestern Ontario Telehealth Network (SWOT-N) and the Eastern Ontario Telehealth Network (EOTN) is underway to create a provincial telemedicine initiative that retains its regional representation. All three networks have aligned with the province’s Smart Systems for Health initiative, which provides bandwidth to hospitals, enabling the telemedicine networks to reallocate funding to service delivery.

- The CHIPP project purchased bandwidth from K-Net to provide telehealth services for First Nations communities in Northwestern Ontario, supporting the Community-based Network infrastructure.

- The NORTH Network actively participates and provides leadership for research and special projects which provides opportunities to expand the scope of services available through telehealth (e.g., emergency services, diabetes management, tele-psychiatry, tele-stroke and tele-radiology). NORTH Network actively participates as a partner to support health delivery programs to use telehealth to meet their program objectives.

- Participants in the patient, physician, allied health professional and Telehealth Coordinator focus groups identified potential barriers to accessing the telemedicine program. The main barriers included:
  - Confusion between NORTH Network telemedicine and the Telehealth Ontario program (Registered Nurse-telephone advice service)
  - Need for more promotion of the telemedicine program to family physicians, specialists and the community
  - Constraints on availability of Telehealth Coordinators (part-time resource)
  - Uncertainty of future funding

- Focus group participants identified the need for sustainable program funding to ensure access to specialty services in Northern Ontario.
Health and Health Care System Outcomes

- At this point in the implementation of the NORTH Network Program it is too early to identify clear links between technology and health-related outcomes, with the exception of two research sub-projects in telestroke and tele-ophthalmology. However, one of the next steps for the NORTH Network program with the assistance of the Evaluation Committee, is to help stimulate researchers to look at finding appropriate health outcome measures and strategies for measurement.

Cost-effectiveness

- Patients report significant out-of-pocket cost savings in having a telemedicine consultation versus an in-person appointment (average $362.00, median $200.00).
- Based on NORTH Network administrative data it is estimated that the NORTH Network saved the Northern Health Travel Grant program $1.26 million over the 2 year CHIPP period (April 1, 2001 – March 31, 2003). At current volumes/activity, the estimated savings to the Northern Health Travel Grants program are $100,000 per month.

Technology Performance

Effectiveness

- The NORTH Network has automated its centralized scheduling and referral processes. Movement is underway towards an automated de-centralized (end-user) scheduling system.
- 100% of stakeholders responding to the preliminary online stakeholder survey reported that the NORTH Network has met its objective to build a high quality, reliable, scaleable, cost-effective, and sustainable network capable of supporting the delivery of medical care and education.
- Patients, physicians and allied health professionals reported that the technology had provided an effective mechanism for conducting patient consultations.

Ease of use

- Turnkey technology, network management and program organization facilitates local implementation.
- Patients, physicians and allied health professionals all reported a high degree of satisfaction and acceptance of the technology and the telemedicine consultation process.
Training, Maintenance and Support

- All 123 Telehealth Coordinators and 32 Medical Directors participated in clinical and technical training programs in the spring, 2002.

- Training programs are customized to meet local needs and resources and offered on a continuing basis.

- NORTH Network has implemented a 24/7 Help Desk, receiving approximately 300 calls per month, of which 95% are resolved without escalation to second level technical support or vendors.

Privacy

- Most focus group participants expressed very little concern about privacy issues. They described the telemedicine consultation as being very similar to an in-person appointment.

- The NORTH Network has developed a state-of-the-art secure technology, including closed user group and a virtual private network architecture.

- Patients engaging in video-conferencing are fully informed and are required to read, understand and sign a consent form at each and every visit.

- All paper and electronic patient data are handled according to the confidentiality policies of each host hospital.

- The NORTH Network has commissioned an external consultant to conduct a Privacy Impact Assessment and to help develop appropriate policies and procedures regarding privacy, security and confidentiality. The assessment report is expected at the end of June 2003.

Lessons Learned

Service Framework Lessons Learned

- To facilitate adoption, implementation and endorsement, telemedicine programs must be driven by the needs identified by the communities themselves.

- Telemedicine is much more than the introduction of new technology. It requires efficient and effective change management strategies that are sensitive to local needs, cultures and resources.

- Scheduling a telemedicine appointment for the referring health professional must be as easy as scheduling a face-to-face consultation – otherwise it will not be used.
➢ The referral process must be automated to be efficient for scheduling and for monitoring program performance.

➢ To facilitate the integration of telemedicine into every-day practice, the technology must be accessible and available to the end-user.

➢ Technical support must be available 24/7 to be responsive and proactively anticipate and resolve problems.

➢ Locally-based resources need to be identified and supported in order to promote and facilitate telemedicine utilization.

➢ Full-time Telehealth Coordinators are required at the local level in response to increased consultation volumes and organizational demands.

➢ Physicians must be appropriately reimbursed.

➢ Physicians must be credentialed by appropriate licensing bodies to deliver telemedicine services.

➢ A flexible membership model provides an opportunity for broad representation, increased participation and ongoing sustainability.

➢ Multiple communication strategies and mechanisms are required, both internally and externally, to facilitate decision-making, information-sharing, promotion and accountability.

➢ Coordinated, customized training must be provided on an ongoing basis to facilitate the implementation of new technologies and processes, and to maintain and enhance staff skills.

➢ Need to establish a methodology to facilitate roll-outs of new sites that accounts for the needs and resources of local communities and incorporates lessons learned and change management strategies.

**Health Care Delivery Lessons Learned:**

➢ Telemedicine can be broadly applied, regardless of specialty.

➢ Telemedicine must respect existing referral patterns.

➢ Integration through partnerships with other telemedicine service providers, provincially, nationally and internationally, is essential to ensure broad access to health care services.

➢ Need for more promotion of the telemedicine program to family physicians, specialists and the community.
Telemedicine programs can actively participate in research and special projects to identify opportunities to expand the scope of services provided (e.g., emergency services).

Continuing Professional Development Lessons Learned:

- Telemedicine can be used effectively to deliver a broad range of continuing professional education activities.
- Program evaluation is essential to continuous quality improvement and accountability to funders and stakeholders.
- Regional leadership on the development of content for continuing professional development activities is essential to ensure that it is relevant to and meets the needs of local health care professionals.

Next Steps

- An analysis of the costs avoided through use of the network for educational and administrative purposes is required.
- Development and implementation of focused, timely, short evaluation data collection strategies to answer evaluation questions quickly and facilitate continuous quality improvement decision-making.
- Building upon the background work completed in 2002, the NORTH Network will further support the design and implementation of a balanced scorecard approach for program evaluation that will commence in July, 2003 and is expected to be completed by 2006. The balanced scorecard approach will help contribute to the identification of core evaluation indicators and measurement strategies which will be used to standardize the evaluation of telehealth initiatives and serve as the basis for future accountability frameworks. In addition, the NORTH Network will collaborate with national groups to develop the appropriate indicators.
- Partner with national telemedicine organizations on the creation of a consensus approach to the identification and definition of outcome indicators for the evaluation of telehealth.
- Develop capacity to stimulate researchers to address outcomes questions that NORTH Network is unable to answer on its own, such as impact of telehealth on health services (through looking at large databases like OHIP, CIHI, Northern Travel Grants) and impact of telehealth on health outcomes (by studying disease-specific condition hypotheses).
# Table of Contents

1.0 NORTH Network Program
   1.1 History
   1.2 Program Overview
      1.2.1 Service Framework
      1.2.2 Health Care Delivery
      1.2.3 Continuing Professional Development

2.0 NORTH Network Innovations
   2.1 Business Improvement
   2.2 Change Management Approach
   2.3 Clinical Service Innovations

3.0 Overview of Evaluation Strategy
   3.1 Evaluation Objectives
   3.2 Evaluation Resources
   3.3 Evaluation Issues
   3.4 Indicators and Sources of Information
   3.5 Methodologies for Data Collection Activities

4.0 Findings
   4.1 Service Framework
      4.1.1 Central Scheduling Office
      4.1.2 Training
      4.1.3 Help Desk
      4.1.4 Membership Model
      4.1.5 Communications
      4.1.6 Special Projects
   4.2 Health Care Delivery
      4.2.1 Accessibility
         Utilization
         Patient Satisfaction and Wait Times
         Physician Professional Satisfaction
         Stakeholder satisfaction
         Acceptability
      4.2.2 Cost Savings of Telemedicine
   4.3 Continuing Professional Development

5.0 Discussion

6.0 Lessons Learned

7.0 Next Steps

8.0 Conclusions

9.0 References
Appendices

Appendix A  NN Map
Appendix B  NN Telemedicine Sites
Appendix C  Report on the First Nations Telehealth Workshop
Appendix D  Referral Patterns
Appendix E  List of NN Members/Funders
Appendix F  Out-of-Province Tele-Consultations Policy
Appendix G  Phase II Evaluation Framework
Appendix H  Focus Group Materials
Appendix I  Ethics Package for Focus Groups
Appendix J  Patient Satisfaction Questionnaire
Appendix K  Referral Form
Appendix L  Movement Disorder Survey
Appendix M  List of Stakeholders Interviewed
Appendix N  Evaluation of the NN Telehealth Coordinator Training Program
Appendix O  Diabetic Retinal Screening Project (reading images, etc.)
Appendix P  Total Patient Consultations March 1998 – April 2003
Appendix Q  Using the Balanced Scorecard for Evaluating Telemedicine
Appendix R  Online Stakeholder Survey
Appendix S  Northern Health Travel Grant Savings
Appendix T  Continuing Professional Development Participant Feedback Form
Appendix U  Keewaytinook Okimakanak Telehealth: Project Management Transition Summary
Appendix V  Evaluation of the Keewaytinook Okimakanak Telepsychiatry Pilot Project
Appendix W  NORTH Network Presentations by Executive Director
Appendix X  Governance Committees

List of Exhibits

Exhibit 1  Canada Health Infostructure Partnerships Program Guidelines for Evaluation Report
Exhibit 2  Tasks Outlined in the CHIPP Agreement
Exhibit 3  NORTH Network Logic Model
Exhibit 4  Number and Location of Focus Group Discussions
Exhibit 5  Number of Help Desk Calls Per Month (Apr./02–Mar./03)
Exhibit 6  NORTH Network Website Hits (Nov./02–Apr./03)
Exhibit 7  NORTH Network Website Visits (Nov./02-Apr./03)
Exhibit 8  Summary of Tele-Ophthalmology Screening Consultations Sandy Lake
Exhibit 9  Summary of Tele-Ophthalmology Screening Consultations Fort Severn
Exhibit 10  Movement Disorder Clinic Questionnaire Summary of Responses
Exhibit 11  Number of Patient Consultations Monthly Apr./01–Mar./03
Exhibit 12  NORTH Network Sites with 100 or More Patient Consultations
Exhibit 13  Specialist Consultation Volume (Sites with Over 100 Consultations)
Exhibit 14  Specialty Consultations Provided by the NORTH Network
Exhibit 15  Specialties with Over 100 NORTH Network Patient Consultations
Exhibit 16  Age of Survey Respondents and NORTH Network Consults by Region
Exhibit 17  Gender of Survey Participants and NORTH Network Consults by Region
Exhibit 18  Distribution of Completed Patient Surveys by NORTH Network Site
Exhibit 19  Employment Status/Occupation
Exhibit 20  How Long Do You Think You Would Wait For An Appointment To See The Specialist?
Exhibit 21  Travel Time Required for a Face-to-Face Specialist Consultation
Exhibit 22  How Well Do You Believe Each Objective Is Being Achieved?
Exhibit 23  Average Expenses by Region: Telemedicine Versus In-person Consultation
Exhibit 24  Potential Northern Health Travel Grant Program Potential Savings for April 01, 2001 to March 31, 2003
Exhibit 25  Potential Northern Health Travel Grant Program Savings
Exhibit 26  Type and Volume of Northern Health Travel Grants
Exhibit 27  NORTH Network Continuing Professional Development Events
Exhibit 28  Participants at Accredited Continuing Professional Development Events
Exhibit 29  Feedback on Accredited Continuing Professional Development Events
Exhibit 30  Feedback on Videoconference Continuing Professional Development Events
Exhibit 31  Attendance at Accredited Continuing Professional Development Events
Exhibit 32  Balanced Scorecard Structure

Acknowledgements

Thank you to the following individuals for their contributions to the evaluation process and final report:

- Fred Ashbury PhD, PICEPS Consultants, Inc., Whitby, Ontario
- Donna Bain, Workers’ Safety and Insurance Board, Toronto, Ontario
- Cathy Cameron, MHSc, Cathy M. Cameron & Associates, Inc., Toronto, Ontario
- Carol Fenton, Clinical Services Manager & Regional Telehealth Coordinator, Timmins, Ontario,
- John Hogenbirk, Senior Researcher, Laurentian University, Sudbury, Ontario
- Patrice Lindsay, PhD, University of Toronto, Toronto, Ontario
- Tina Sahay, MHSc, Health Promotion Consultants Group, Toronto, Ontario
- Evaluation Committee Members:
  - Carole Dunphy, Regional Telehealth Coordinator, Barrie
  - Dr. Vivek Goel, Deputy Provost, University of Toronto, Toronto, Ontario (Evaluation Committee Chair)
  - Dr. Tony Hanley, Staff Scientist, Mount Sinai Hospital, Toronto, Ontario
  - Dr. Ray Pong, PhD, Research Director, Laurentian University, Sudbury, Ontario
  - Dr. Rob Williams, NORTH Network Clinical Director, Timmins, Ontario
Report Structure

The Office of Health and Information Highway, Canada Health Infrastructure Partnerships Program (CHIPP), provided guidelines for preparation of the evaluation report, including structure and key questions to be addressed. The NORTH Network contracted three arms-length evaluators to implement and report on an evaluation strategy that focused on its three core components: service framework, healthcare delivery and continuing professional development. (see Exhibit 1).

Exhibit 1
CHIPP Guidelines for Evaluation Report

<table>
<thead>
<tr>
<th>Evaluation Question</th>
<th>Report Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Rationale</td>
<td></td>
</tr>
<tr>
<td>1.1 Why was this project considered a good idea? Is this an idea that should be pursued further? Why?</td>
<td>8.0</td>
</tr>
<tr>
<td>1.2 What proved to be the most innovative aspects of this project?</td>
<td>2.0</td>
</tr>
<tr>
<td>2.0 Improvements to Health Services</td>
<td></td>
</tr>
<tr>
<td>2.1 From the perspective of patients and providers, how does this project affect the quality of services/care provided?</td>
<td>4.1, 4.2, 4.3, 5.0</td>
</tr>
<tr>
<td>2.2 How does this project affect access to, or utilization of, health services?</td>
<td>4.2.1, 5.0</td>
</tr>
<tr>
<td>3.0 Integration of Health Services</td>
<td></td>
</tr>
<tr>
<td>3.1 In what ways does this project foster integration, coordination and/or collaboration of health services across the continuum of care?</td>
<td>2.3</td>
</tr>
<tr>
<td>4.0 Health and Related Impacts/Effects</td>
<td></td>
</tr>
<tr>
<td>4.1 What kinds of health and related impacts have occurred as a result of your project, and on what basis did you draw these conclusions?</td>
<td>4.2</td>
</tr>
<tr>
<td>5.0 Cost-effectiveness</td>
<td></td>
</tr>
<tr>
<td>5.1 Does the project contribute to a more cost-effective service than what is currently being provided?</td>
<td>4.2.2</td>
</tr>
<tr>
<td>5.2 How does the project contribute to a more cost-effective service than what is currently being provided?</td>
<td>4.2.2</td>
</tr>
<tr>
<td>6.0 Lessons Learned</td>
<td></td>
</tr>
<tr>
<td>6.1 What lessons have you learned in developing and implementing this project, that might be useful to other jurisdictions/regions/setsings, and to other programs?</td>
<td>6.0</td>
</tr>
<tr>
<td>6.2 Specify the positive and negative effects or results experiences during the life of your project. What were the consequences of these results, and, where appropriate, how were they dealt with?</td>
<td>4.0, 5.0, 6.0</td>
</tr>
<tr>
<td>7.0 Technology Performance</td>
<td></td>
</tr>
<tr>
<td>7.1 How well has the technology met project requirements?</td>
<td>1.2, 4.1, 5.0</td>
</tr>
<tr>
<td>8.0 Electronic Health Records: Privacy</td>
<td></td>
</tr>
<tr>
<td>8.1 In what ways have the means for collecting, using and disclosing personal health information been improved to ensure privacy?</td>
<td>2.3.2</td>
</tr>
<tr>
<td>8.2 In what ways have the means for health systems security been improved?</td>
<td>1.2.1</td>
</tr>
</tbody>
</table>

NORTH Network Phase II Evaluation
1.0 NORTH Network Program

1.1 History

The NORTH Network is a telemedicine project which has been providing medical consultations and continuing professional development via two-way television and electronic medical instruments to rural and remote communities in Northern Ontario since March 1998. The NORTH Network grew out of an extensive feasibility study, sponsored by the Ontario Medical Association, which looked at how telemedicine could improve access to health care for citizens of rural and remote communities of Ontario. An important mandate of the feasibility study included the provision of a framework to create an efficient telemedicine network that could expand across the province.

As a result of the feasibility study, a demonstration project (Phase I: March 1998 to December 1999) was undertaken to provide specialist consultations, continuing professional development and patient education via two-way television to communities in Northern Ontario. At the end of the demonstration period, a detailed evaluation showed high satisfaction among health care professionals and patients and the number of expected telemedicine consultations was exceeded. NORTH Network patients indicated that the telemedicine consultations meant a dramatic improvement in access to specialty care. Overall, the evaluation supported the premise that telemedicine is a viable and feasible means of providing care to citizens of Northern Ontario.

The project continued uninterrupted between January 2000 and March 2001, growing to a total of 14 hospital members with additional funding from Ministry of Health and Long Term Care. In parallel, First Nations Northern Chiefs initiated a tele-psychiatry project which provided the basis for expansion of tele-psychiatry.

In 2001, Keewaytinook Okimakanak (KO) was funded by the SMART Program of Industry Canada to demonstrate how information technology can improve services and business opportunities in remote First Nations. Telehealth is one of the services that utilize the SMART broadband network. KO Health Services partnered with Ontario’s NORTH Network in April 2001 to develop the Keewaytinook Okimakanak Telehealth Initiative. The goal of this project was to develop a working model for Telehealth service delivery in remote First Nations.
As a result of the successful demonstration project in addition to broad support and partnership with Keewaytinook Okimakanak, the NORTH Network received funding from Health Canada’s CHIPP program in April 2001 to undertake a second phase of the project. The expansion was to enable the delivery of telemedicine services to an additional 46 sites, including five First Nations communities as well as collaboration with MBTelehealth (Manitoba Telehealth Program) for referrals originating in the far northwest regions of the province. This expansion would result in 62 NORTH Network sites in 47 communities throughout the province. In fact, during the CHIPP funding period, the NORTH Network expanded from 14 sites in April 2001 to a total of 78 sites in April, 2003. The expansion involved the adaptation and development of new technology to improve service. The activities and evaluation of this expansion (Phase II – April 2001 to March 2003) are discussed in this report.

1.2 Program Overview

The NORTH Network is committed to increasing access to health care for Ontarians in rural and remote communities. The Network continues to search for new ways to deliver emergency care and other health services and to pursue efforts to support recruitment and retention of health professionals in rural and remote Ontario. The philosophy of the NORTH Network is ‘Bringing health care closer to home’.

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To improve access to medical specialty care for residents of remote and rural communities.</td>
</tr>
<tr>
<td>2. To reduce costs associated with long distance travel.</td>
</tr>
<tr>
<td>3. To support medical specialists currently practicing in remote and rural communities by respecting existing referral patterns.</td>
</tr>
<tr>
<td>4. To reduce professional isolation through increased access to continuing professional development and peer support.</td>
</tr>
<tr>
<td>5. To build a high quality, reliable, scaleable, cost-effective, and sustainable IP Wide Area Network (WAN) capable of supporting the delivery of medical care and education, and the transmission of large data files such as digital x-ray images.</td>
</tr>
</tbody>
</table>
Current Structure

The NORTH Network currently operates a telemedicine program that has studio facilities in 78 sites across the province including 54 hospital corporations (some with multiple studios), three clinics, ten First Nations communities, five physician’s homes and two educational sites, plus multiple units providing administrative and technical support (see Appendix B for a list of NORTH Network hospital/clinic/program sites). The program has dedicated staff at Sunnybrook and Women’s College Health Sciences Centre, Royal Victoria Hospital in Barrie, Sudbury Regional Hospital, Timmins & District Hospital and Thunder Bay Regional Hospital. As well, our partner organization Keewaytinook Okimakanak, has dedicated staff located in Balmertown, Ontario.

The NORTH Network is organized into five functional regions based on existing referral patterns (Northeast, Northwest, Keewaytinook Okimakanak, Central, Greater Toronto Area). This structure supports existing health care providers and multidisciplinary health care teams, and provides a framework for regional leadership.

Keewaytinook Okimakanak, or ‘Northern Chiefs’ in Oji-Cree, is a non-political administrative council serving six First Nations communities in Northwestern Ontario. These communities, which range in population from 250 to 900 and, together, form a population of about 2,800 people, have pooled their resources in Keewaytinook Okimakanak (KO) to finance, co-ordinate and administer a series of comprehensive programs and services, including health care.

Health Canada provided the Thunder Bay Regional Hospital with $200,000 for community consultations that were conducted through a partnership with the NORTH Network and KO. This process facilitated the development of a larger partnership between the NORTH Network and Keewaytinook Okimakanak and enabled the completion of the CHIPP Business Plan. Keewaytinook Okimakanak were also successful in receiving a SMART Communities Grant that enabled them to build the infrastructure required for the next phase of the project.

For evaluation purposes, the core components of the NORTH Network program are service framework, health care delivery and continuing professional development. The service framework includes the structures and processes that have been developed and are in place to facilitate the delivery of the NORTH Network project. Health care delivery refers to the activities that ensure patient access to care including scheduling, referral management and consultations. Continuing professional development refers to educational activities supported by the NORTH Network for physicians, nurses and allied health professionals.
1.2.1 Service Framework

The following section describes the tasks completed during the CHIPP funding period (April, 2001 – March 2003) based on the 14 tasks (see Exhibit 2) outlined in the CHIPP agreement:

Exhibit 2

<table>
<thead>
<tr>
<th>CHIPP Tasks</th>
<th>% Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Install and operate network</td>
<td>100%</td>
</tr>
<tr>
<td>2. Procure, install and manage telemedicine workstations and technologies</td>
<td>100%</td>
</tr>
<tr>
<td>3. Install and operate tele-radiology and image archiving</td>
<td>90% *</td>
</tr>
<tr>
<td>4. Project Management</td>
<td>100%</td>
</tr>
<tr>
<td>5. Recruit clinical staff and train users</td>
<td>100%</td>
</tr>
<tr>
<td>6. Security management</td>
<td>100%</td>
</tr>
<tr>
<td>7. Telemedicine health care services delivery</td>
<td>100%</td>
</tr>
<tr>
<td>8. Operate health professional and student education</td>
<td>100%</td>
</tr>
<tr>
<td>9. Manage user requests and scheduling</td>
<td>100%</td>
</tr>
<tr>
<td>10. Initiate governance committees and Telehealth Professional Advisory Committee (TPAC)</td>
<td>100%</td>
</tr>
<tr>
<td>11. Develop plans and implement communications, promotion and telemedicine education</td>
<td>100%</td>
</tr>
<tr>
<td>12. Implement program evaluation and research activities</td>
<td>100%</td>
</tr>
<tr>
<td>13. Plan and implement strategy to assist other First Nations communities to build telemedicine capacity</td>
<td>100%</td>
</tr>
<tr>
<td>14. Maintenance and development of staff skills</td>
<td>100%</td>
</tr>
</tbody>
</table>

* The Tele-radiology Project Deployment was 100% completed June 17, 2003

The service framework is subdivided into three key components: clinical, technical and administrative services. Each of these components and their associated tasks are described below. The presentation of tasks is integrated into each of these key components.
Clinical Services Framework

The NORTH Network Clinical Services Framework was already operational prior to the beginning of the CHIPP project. The CHIPP project involved primarily scaling up the existing service to accommodate the many new sites, users and applications to be launched during the project. The components of the framework include:

1) Site Telehealth Coordinators and site Medical Directors to manage the local program and ensure grassroots buy-in
2) Communications strategies
3) Physician remuneration
4) Training
5) Turnkey technology
6) End to end referral management and scheduling
7) Maintenance and augmentation of existing referral patterns

Description of each of these program elements, which we have called the Change Management Program, are available in this report in Section 2. Within this section, we will describe how the elements of the program were rolled out and scaled up to accommodate new sites.

Recruit clinical staff and train users (Task 5)
At the onset of the CHIPP project, the CEOs from every hospital were asked to assign a Medical Director and Telehealth Coordinator for their site. Each hospital was asked to provide a 0.5 FTE Telehealth Coordinator, usually a nurse, for their site. This was usually one person, but several sites identified backup individuals for the lead Telehealth Coordinator or shared the position among several staff.

The Site Medical Director received an honorarium from NORTH Network and signed a letter of agreement outlining the responsibilities of the position. A kick-off meeting was held in Thunder Bay, and a second meeting in Sudbury in October and November 2001 where all Site Medical Directors and Telehealth Coordinators from the Northwest and Northeast regions met for a one-day session to learn about the project, meet their peers and to share the needs of their communities.

Training on the equipment occurred when the vendors installed the equipment through February and March 2002, and was followed up by further detailed training by NORTH Network regional coordinators and/or a NORTH Network trainer for each site. Every site received NORTH Network’s training manual, the ABCs of Telehealth, Version 1 (an updated Version 2 was provided in the winter of 2003). Overall, more than 150 individuals were trained in telemedicine prior to the launch of these sites.
Keewaytinook Okimakanak (KO) hired Community Telehealth Coordinators in each of its communities. The NORTH Network training manual was rewritten and adapted to accommodate the specific needs of the First Nations communities. As well, since Community Telehealth Coordinators were often laypeople, they received supplemental training in the clinical skills required to assist in a telemedicine examination. Each of the Community Telehealth Coordinators was awarded a certificate upon completion of the training program.

Clinical staff at each hospital and KO site continue to be engaged through regular meetings as noted below in Task 10.

**Telemedicine Health Care Services Delivery (Task 7)**
At the onset of the CHIPP project, NORTH Network was facilitating approximately 60 live interactive patient consultations per month. By the end of the project there were more than 400 consultations per month and the numbers are still rising. The consultations began over the new IP network in late April, early May 2002. The goal of exceeding 300 patient encounters was reached in November 2002.

The network achieved its goal of delivering comprehensive services providing access to 48 different medical specialties during the CHIPP project. Several special sub-projects were also delivered including diabetic retina screening, tele-stroke, tele-radiology, and tele-psychiatry. The underlying process of supporting this delivery included referral and scheduling management, a 24/7 Help Desk and communication and promotional activities. These activities are described in detail later in the report.

**Operate Health Professional and Student Education (Task 8)**
NORTH Network supported health professional and student education by facilitating the delivery of these events for its partners as well as by operating a NORTH Network continuing professional development series (referred to as “Virtual Hospital Rounds”).

The Northwestern Ontario Medical Program (NOMP) and Northeastern Ontario Medical Education Corporation (NOMEC) are programs set up to train and mentor health professionals in rural areas of the province. In collaboration with McMaster and Ottawa respectively, they provide training opportunities for medical residents in the North. NOMP has been very active in developing continuing professional development events for Northwestern Ontario.

The NORTH Network developed educational events for Central Ontario and Northeastern Ontario, alternating weekly between Sunnybrook & Women’s College Health Science Centre and The Hospital for Sick Children. In addition, The University Health Network and the Central Ontario group each scheduled regular events in response to needs identified in their region.
The use of the network for educational events went from approximately 4-6 events per month at the onset of the CHIPP project to approximately 30 events per month. Each of these events involved on average approximately 10 sites. The largest event was on April 8, 2003, involving 46 hospitals with simultaneous web casting to over 420 viewers over the Internet.

Services required at NORTH Network to support this activity included the scheduling desk, administrative, staff events manager and the Help Desk with bridging services.

Technical Service Framework

Project Startup

The NORTH Network CHIPP Project required the development of an entirely new technical infrastructure developed essentially from scratch. Once CHIPP funding was confirmed, steps were taken to kick-start further planning and roll-out of the technology under a tight timeframe. This process, while not formalized, went roughly like this:

1. Determine the overall definition of what the ultimate technical infrastructure would look like and then drill down to understand the core requirements and components of the infrastructure.

2. Clearly understand and prioritize these components in a rational way so that various dependencies would be understood. For example, it would be a mistake to rollout telemedicine videoconferencing platforms before the network was in place.

3. Identify funding requirements iteratively through this process to ensure that available funding would match the requirements. Early in the project this turned out to be shifting sand as the CHIPP funding amount was somewhat short of the total requested. However, this shortage of funding was mitigated through the successful acquisition of additional funding from Industry Canada through the FedNor program and ultimately also through the use of bandwidth provided by Smart Systems for Health. The latter resource enabled NORTH Network to work strategically within the framework provided by government to allocate resources more effectively and in a fashion which complements the government’s investments.

4. Once the components of the infrastructure were determined, each of those components required a unique strategy. This included decisions around whether to hire human resources to do it internally, whether to outsource or whether to use consultants. It required informed decisions around whether to purchase sets of products or to negotiate for solutions and each component required a rational approach for procurement - whether it was through formal public tender, invited competitive proposals or single source.

Over the two-year CHIPP project, NORTH Network’s technical team grew from one individual at outset to 13 full-time equivalents and its list of active vendors has grown from a handful to several dozen.
The following sections summarize the implementation story for each of the major technical tasks within the CHIPP proposal. A short summary is provided for each task, highlighting major challenges and issues.

**Network Development**

Prior to CHIPP funding, NORTH Network operated telemedicine services over a dial-up network. The commitment for the CHIPP project was to develop an IP-based network linking all member sites. While IP networks are commonplace and form the base protocol supporting the public Internet, video traffic over these networks was really just beginning to emerge in 2001. Several challenges existed, including effectiveness of the available bandwidth, quality of service (QoS), gatekeeper design, MCU choice and security. The availability and cost of appropriate bandwidth in rural areas was also a significant concern. Hence, careful planning, design and testing was required.

The first step in this process was finding an integrator whose role was to architect the network, test that architecture, assist in procurement of bandwidth and deploy all network devices and supporting infrastructure required to manage the network. NORTH Network defined the task and approached four large companies with a request for a fixed price for turnkey solution to include network design, testing, procurement and deployment components. The successful bidder was GE Capital IT Solutions, who were successful primarily because of the availability and breadth of human resources to complete this task as well as their experience in similar undertakings. A parallel task undertaken by NORTH Network and a consultant was to thoroughly understand the availability of bandwidth throughout Northern Ontario. This required research into the availability of community-based networks as well as private companies, telecom carriers and other non-traditional telecommunications providers to determine what the possibilities were.

Ultimately, a formal tender to acquire the required bandwidth was prepared and executed and two companies responded. NORTH Network did a formal evaluation of the vendor responses and just as the contract was about to be awarded, the Smart Systems for Health (SSH) group of Ontario’s Ministry of Health and Long-Term Care informed us that they would provide the bandwidth for the project. Hence, the tender was annulled.

The network chosen for Smart Systems for Health was Bell’s MPLS network, a new network architecture for Bell. Eventually, an MPLS circuit was sourced and we were able to redo our laboratory testing on that circuit to ensure that this would be adequate for our purposes. The network architecture was then revisited to accommodate the new environment and a new set of network equipment was chosen. In addition, Smart Systems for Health stated that they would be able to offer a secure environment, enabling NORTH to reduce the cost of network equipment.
The availability of SSH bandwidth provided a tremendous asset in terms of reducing the overall cost of network and enabling NORTH to strategically reallocate some funding. However, SSH’s entry also generated several issues. While the NORTH Network was on the verge of deploying bandwidth as a result of the tender in August of 2001, ultimately the Smart Systems for Health network did not roll out until January 2002, delaying the project by five months. As well, Bell Canada was never able to provide appropriate security services for NORTH Network’s application across the network. Hence NORTH Network was provided with its own closed user group, separate from SSH’s network. This left NORTH with a legacy problem in terms of being able to have all hospitals across the province communicate effectively.

Ultimately, all network gear was configured and a province-wide rollout continued into early 2002 deploying switches and/or routers at all sites. Supporting infrastructure, including core routers, gatekeepers, MCU, gateway and VPN concentrators were deployed, as well as a set of servers to support network-monitoring applications, videoconferencing device management applications, a certificate server, Microsoft Exchange and a SAN storage unit.

In activities parallel to SSH deployment, the bandwidth required for First Nation’s communities was made available through K-Net and a network architecture strategy was developed to inter-network with K-Net’s existing community-based network in a secure fashion. A low cost VPN hardware device was placed in each nursing station and existing bandwidth available through K-Net was linked into a VPN concentrator in Toronto allowing encrypted communication across the First Nations communities in the Sioux Lookout Zone. As part of the process, K-Net required bandwidth uplift and the purchase of quality of service (QoS) in order to accommodate the telehealth applications.

K-Net’s integrated community-based network was already in place prior to the beginning of the CHIPP Project. The community network strategy requires many partners to share in funding to be able to deliver services to small communities and has proven to be effective in promoting community use of the network and ensuring long-term sustainability. This model relies on each public sector group paying its way on the network.

Unfortunately, Smart Systems for Health was unable to purchase bandwidth from K-Net to support this model. Through the CHIPP funding model, the CHIPP project arranged to pay its share of the bandwidth costs. It was recognized that following the CHIPP funding, a more sustainable model will be required, where those providing health services to the communities pay a fair share of the bandwidth costs to support health applications. It should also be noted that other uses of the community-based network also support the general health of the community, including education and economic applications.
Thus, NORTH Network became the first application to use the Smart Systems for Health’s new network. Being first created several challenges as noted above. One additional challenge, was that SSH had not provided any standard or requirements for how hospitals should connect into its network infrastructure. Without this standard, hospitals run the risk of not being able to communicate and of degrading their real-time services such as video traffic. Hence, NORTH Network developed a standard, called the “point of presence proposal” (POP Proposal) which defined requirements and architecture for hospitals linking into SSH. This architecture is now in use in many hospitals across the province and enables secure connectivity among participating organizations while enabling voice, video and data traffic to use the same network infrastructure. This standard has been driven through the Ontario Hospital Association (OHA) network working group and is expected to soon be sent by the OHA to the Ontario Health Information Standards Committee for consideration as a provincial standard.

The network and the videoconferencing infrastructure deployed by NORTH Network has proven to be reliable, scaleable and effective. We have been able to reliably deliver telehealth services and have been able to add numerous sites and applications within the Smart Systems for Health cloud as well as the First Nations K-Net network cloud.

**Telemedicine Workstation**

NORTH Network has a history of working with telemedicine workstation vendors to provide them with feedback and improvement to their equipment and is quite familiar with the available technology. Hence, in contrast to the network development task, for which NORTH Network hired an integrating company, it was felt that internal resources were capable of managing the selection and rollout of telemedicine workstations.

The decision was made to tender procurement for telemedicine workstations and an RFP was created and issued. Seven vendors responded and four were short listed for presentations and demonstrations. A test network was set up between Sunnybrook in Toronto and the Meno-Yah-Win Hospital (previously known as the Sioux Lookout Zone Hospital.) A set of clinical and technical people was assembled at each site, making up the evaluation committee. After tabulating results of the four demonstrations, a decision was made to support a multi-vendor environment and two vendors were selected as the vendors of record. Contracts were negotiated to ensure best pricing and documentation of associated services for the duration of the CHIPP project. Several different models of videoconferencing and telemedicine platform were included in the contract, including room-based and portable solutions. Warranty costs were negotiated downwards because of NORTH’s intent to take over first-line support for the units from our Help Desk. Special attention was paid to one of the carts, which was a new design. Risk was mitigated through contractual assurances by the vendor to aggressively repair any flaws discovered in the field at their expense. The NW region chose Polycom equipment (Adcom) and the NE region Tandberg equipment. The medical cameras, including patient exam camera and endoscopic light source, were single sourced from AMD (American Medical Devices) and were ultimately deployed along with the workstations.
Once the network was deployed, rollout of telemedicine workstations began and continued through February and March 2002. Management tools for the two platforms were installed as well as the Global Address Book. The new network and sites eventually went live for delivery of telehealth services at the end of April 2002.

This was a large scale project which required a great deal of project management, including coordination of Telehealth Coordinators, IT resources, vendors and others to ensure a successful roll-out. There were many details essential to success including room preparation, power supply, security, cabling, jacks and numerous survey tools and communications. The process went quite smoothly but required significant human resources.

A key part of delivering new technology is training. While each of the videoconferencing and medical device vendors provided training to the users, NORTH Network found that this was inadequate in most cases and did not meet the project’s purposes. NORTH Network’s training coordinator re-wrote most of the materials provided by the vendors and created information specific to NORTH Network. All vendor training was then followed up with supplemental NORTH Network training and written materials.

Some minor interoperability issues between vendor videoconferencing platforms (Tandberg and Polycom) were discovered and were escalated to the manufacturers’ head offices. These issues required some adjustment and downgrade of software versions and close tracking of all software versions across the network to avoid incompatibilities. This issue also resulted in initiation of change management protocols at NORTH Network to ensure that no changes were made (such as a software upgrade) without thorough testing and review by relevant members of the technical team.

**IP Stethoscope and PC Roll-out**

At the onset of this project, there were no IP stethoscopes commercially available for clinical use; however a company in Toronto called e-Records had just developed and was testing one. NORTH Network followed the progress of this stethoscope and ultimately performed a clinical trial involving cardiologists in Sudbury and Thunder Bay which was remarkably successful. In fact, the cardiologists in Sudbury preferred the new IP stethoscope to the previous analogue model they had been using.

Roll-out of the new stethoscopes required PC’s at each and every workstation. Testing determined that the stethoscope operation (and future applications requiring capture cards) would operate optimally with a PC-based system rather than a notebook style computer. This had been planned in the design of the telemedicine workstations and most models were ready for deployment of this device, although some post-manufacture modifications were required in the field for one type of telemedicine cart.
The configuration of the PC required planning and lab testing to determine what other applications were compatible and could also be made available on the local PCs. The decision was made to lock down the PC to stethoscope and remote management applications only initially. Then, as new applications were added, each would be considered to be a new rollout project with testing to ensure compatibility and ability to install the software remotely. In addition, at initial deployment, software was installed in each PC to allow remote reset of the PC back to baseline software configuration to ensure that the stethoscope could always be made to work even in the event that users put on new software or other issues developed.

Ultimately, in the seventh and eighth quarter of the project over 60 PC and stethoscope combinations were configured and deployed at every site across central and northern Ontario.

**Bridging**

Based on the number of sites at NORTH Network and projected activity, it was determined to be advantageous to NORTH to buy its own bridge and develop in-house IP bridge management capacity rather than outsource this activity. To assist in the decision regarding which bridge to purchase, an external consultant was found to analyze requirements and recommend a solution.

While the bridge initially purchased was adequate, it was not highly manageable. It lacked some desired features and most significantly, it had some incompatibilities in the field. Over the course of 4 or 5 months, the bridge had crashed approximately 5 times during large events. While this represented a failure rate of about 2%, it was still unacceptable and a decision was made to return it and a new bridge was purchased and installed. The new bridge is the Accord – the gold standard in bridging devices. This latter choice has been working near flawlessly since its inception.

NORTH Network has acquired significant expertise in bridging, including 2 experienced bridge managers, one of whom had previous experience installing and managing the bridges and a third individual with extensive experience in configuring and managing the Accord bridge.

**Help Desk**

NORTH Network considers the Help Desk a critical part of supporting a telehealth infrastructure. There are very few, if any, scaleable call centres dedicated to supporting telehealth in Canada.

NORTH’s Help Desk, called the Telehealth Service and Support Centre (TSSC), is a resource for all end-users problems and questions, accessed through toll-free line. It is also a proactive monitoring centre which identifies and fixes technical problems in network, video and other devices and ensures the system is always telehealth ready and reliable. In addition, the Help Desk manages all bridged events, linking up the conferences and providing “Meet and Greet” services and conference monitoring.
In order to build this Help Desk, NORTH Network looked for consulting assistance. Competitive proposals were generated from two companies. A proposal from GE Capital was deemed superior. This involved hiring a business analyst to determine Help Desk requirements and an information technology individual to install a software tool. The tool chosen was the Remedy ticketing and asset management system which tracks all problems to completion. As well an integrated environment has been created, known as the “NORTH Network Switchboard” which provides access to all of the network device and telehealth technology management tools.

The Help Desk went live in April 2002 with one staff member and quickly grew into a total of three. These individuals are highly trained and able to manage most problems immediately during the phone call and will escalate to second line support or to vendors when required.

K-Net provided support for all First Nations communities, with NORTH Help Desk providing backup. A Service Level Agreement (SLA) was developed and approved to define the service commitments between the two organizations. NORTH and K-Net began using the Remedy ticketing software as a common tool to track all service calls.

With the introduction of NORTH Network’s first emergency initiative, (the Telestroke project), the Help Desk went live for 24/7 availability in July 2002. This required the extension of the support function out through VPN connections to the homes of Help Desk staff.

**Teleradiology**

The teleradiology initiative successfully developed integrated digital imaging services across Northeastern Ontario, including 14 hospitals and 2 First Nation’s nursing stations covering an area the size of France. The project took longer than expected because of non-technical reasons (i.e. expansion of scope and governance issues).

The project began with one major impediment which was of a non-technical nature — the development of a partnership across the region and a functioning user group to ensure that requirements were defined. At onset of the CHIPP project, it was expected that Thunder Bay Regional Hospital (TBRH) would tender for the technology and manage this process. However, it quickly became clear that the resources were not available at TBRH to do this and hence NORTH Network assumed ownership of the project. A working group representing the region was then put together to oversee the development and issuance of a RFP for teleradiology services. While initially reluctant, the group came together successfully and took ownership of the process. This group oversaw the work of a consultant who did a thorough needs assessment of all of the hospitals and First Nations communities across the region to understand current activity levels and intended uses for teleradiology. An RFP was then issued for a technical solution which was ultimately answered by seven companies. Four of these companies were short listed for site visits and demonstrations and the selection was then narrowed down to two vendors who were brought in for a marathon negotiating session with the user group. Philips was the successful vendor, ultimately selected because of the radiologists’ appreciation of the quality of their hardware.
A project manager and a project coordinator were hired in Thunder Bay to oversee the rollout of the project. They worked closely with the Philips project team and created a regional user group including representatives from every site. Regular meetings and frequent communications with site representatives were initiated.

Several challenges arose regarding the network component of the project. These included a requirement for Smart Systems for Health to provide bandwidth uplift for sites involved in teleradiology. As such, NORTH Network was required to produce a business case for the minimum bandwidth uplift required at each site to support teleradiology which was eventually approved by the Ministry of Health. Secondly, there was integration work required in many hospitals to ensure the digital images could be accessed across the hospital LAN’s. This was accomplished through an integration architecture which required device deployment and integration at each participating site.

Over the course of two years, there was also a significant increase in the scope of this project. While initially the project had been planned to deliver film digitizers and allow for emergency and urgent transfers of films across the network (accounting for approximately 15% of all imaging activity), over half of the hospitals and all of the First Nations communities took advantage of the offer to upgrade the digitizer to a CR device, which enables filmless imaging. This means that over half the centres in the region will be going filmless as result of the project. This will significantly increase the number of images that will be transmitted and archived and will thus put strain on the size of the archive which may require expansion over the next year.

Another key component of teleradiology is the mating of the digital imaging system with a radiology information system (RIS.) The RIS enables patient demographics and radiologist reports to be linked to the image and makes this information available as a component of the electronic patient record. Initially, a solution was available to include RIS to the project – however this solution seemed to be in jeopardy for several months. Ultimately, Thunder Bay Regional Hospital came to the plate and provided the Meditech RIS component which will provide RIS services for participating hospitals.

Another challenge related to current referral patterns for X-ray reporting in Northwest Ontario. Radiologists in Burlington Ontario currently read films for 6 hospitals in the NW. Hence there was a requirement for the radiologist office in southern Ontario to be outfitted to be able to read x-rays. While initially it was expected that a dedicated circuit could be purchased for the radiologists’ office, the expense of the circuit proved to be prohibitive. Instead, a 3 Meg business DSL circuit from Bell Canada was sourced and tested and will be used for this project at a far lower cost. Encryption devices were deployed at the radiologists’ office by NORTH Network.
At the time of this writing, the rollout of this project has just been completed. The final challenge of this project was the development of a regional governance group to oversee management of the network, promote future development of the network and to create a structure for sharing the ongoing costs of the teleradiology network. NORTH Network took the leadership role in devising a governance structure which was accepted by CEO’s and other stakeholders across the region. This structure included a formula which was developed to fairly share expenses according to resource use. NORTH Network assisted in hiring a PACs administrator and PACs technician to support the region and will continue to be involved in managing these employees and remain part of the governance group.

**Telestroke**

The Telestroke initiative provides urgent telemedicine assessment of patients experiencing an acute stroke in northern emergency departments to determine if they are candidates for emergency administration of clot-busting drugs, which can reduce morbidity and mortality. This project required several new technical components to be deployed. These included:

- a. Portable videoconferencing platforms to be placed in the emergency department.
- b. The ability to transmit CT scan images from northern sites to Toronto sites.
- c. Reliable, scaleable, secure network which is available to the neurologists 24/7.

To accomplish these requirements, hospital LAN integration architecture was designed and deployed in Sudbury and North Bay. Highly portable Tandberg Intern videoconferencing platforms with patient exam cameras were acquired and placed in the emergency departments. E-film was selected as software to acquire the CT images from the local CT scanner machine and transmit them to the end-user for viewing. Redundant sets of e-film servers were positioned at each site to ensure that there was not a single point of failure for transmission of these images in an emergency situation. A “pull” system for just-in-time access to these films was deployed, as the physicians involved in the project were uncomfortable with a centralized storage approach which would have involved keeping patient information in a central data base.

In order to enable 24x7 on-call services, Smart Systems for Health circuits were deployed in the homes of several neurologists as well as PCs equipped with desktop videoconferencing and eFilm viewing software. Finally, the Help Desk technologies were deployed as noted above to ensure 24x7 support services availability.

There were several challenges identified during this process. The first challenge was acquiring the images from various manufacturers’ CT scan machines and overcoming legacy local network environments. The second challenge was negotiating appropriate service level agreements for the e-film technology. The third and very time-consuming challenge involved deploying and supporting the technology in the neurologists’ homes. This required many visits to the homes and flexibility in terms of timing of the visits. One neurologist’s home could not be set up due to contractual and liability concerns.

---

**NORTH Network Phase II Evaluation**
A number of follow-up visits relating to software problems at the end-user’s site were required, usually as a result of end-user activities, such as loading unauthorized software onto the PC. Finally, during the course of this process, several software bugs and incompatibilities were identified in the desktop videoconferencing application which have resulted in escalation to the manufacturer and in implementation of careful change control processes to prevent these issues.

**Scheduling Software**

The core principle of NORTH Network was to develop a scaleable solution that would be ready to bring telehealth into the next level of mainstream utilization. It has been recognized that one of the key challenges in doing this is developing a system for efficient scheduling of physicians, other health professionals, telehealth coordinators, videoconferencing studios and equipment.

The initial plan was to source the best available scheduling software and possibly modify it to meet the requirements of telehealth. As part of GE Capital’s contract, a consultant was engaged to source out software solutions. Five suitable products were discovered and analyzed. A contract was negotiated to provide the selected software as well as a collaborative agreement to work together to enhance the software for telemedicine purposes.

Subsequently in quarter four and five of the CHIPP plan, a business analyst worked with the NORTH Network scheduling personnel to develop a detailed map of the business processes required for referral management and scheduling. This work resulted in a very complex document published in June 2002 which highlighted several areas of inefficiency which could be immediately addressed. In addition it provided the roadmap for requirements for the software package. Following many weeks of discussion with the vendor, it was finally determined that the software could not meet all of the data collection and workflow process requirements of the scheduling office and would not allow future growth. This meant, that while the product is still useful to schedule the technology and interact with the hardware, it would not be useful as the front end for the scheduling workflow processes nor as the platform for future development of self-serve scheduling by end users.

A decision was then made to develop software in-house and a team of developers were assembled to do so. An early beta was released in October 2002 and after intensive efforts, the production software was released in February 2003. The software, called Telehealth Service Manager, is a reliable, highly secure, scaleable piece of software built on industry standards, which is believed to be unique. It is functioning well within the scheduling office environment and future plans include driving out the interface for end user scheduling and calendar maintenance through secure internet portal.
Administrative Service Framework

*Project Management (Task 4)*

Within the duration of the CHIPP project, NORTH Network staff expanded from approximately 3.5 FTE to over 30 FTEs. This rapid growth resulted in a great deal of internal change within the organization and required a fluid approach to management. To support growth and change of this size, a number of structures and processes had to be developed.

At its onset, with just a few staff, the NORTH Network was a relatively flat organization. As its size began to increase, a formal organizational structure with a layer of management was required. The project started out with an Executive Director, Chief Medical Director, and a Regional Telehealth Coordinator, and was quickly expanded to have senior individuals in Regional Medical Director and Telehealth Coordinator roles for each of the regions. A senior project manager with experience in Telehealth was recruited as well. At the end of the project, the organization was defined by a senior management team which includes the Executive Director, the Clinical Director, the Director of Technical Services and the Director of Programs and Operations. The second tier of management includes Clinical Services Manager, Manager of Technical Operations, Manager of Network Engineering, Manager of Training and Service Development, and Manager of Special Projects.

With the rapid growth in the project, individual’s roles and responsibilities were quite fluid. It was difficult for some individuals to maintain the flexibility required in such a dynamic environment, but with tremendous commitment and hard work, the team delivered on all of its project tasks effectively and with a sense of camaraderie and humour. Many of the original uncertainties around organizational structures and roles and responsibilities receded as the project stabilized towards its completion, although much work is still required in this area.

A second major challenge includes the management of staff from a distance. NORTH Network staff are located in Toronto, Timmins, Thunder Bay, Sudbury, and Barrie. In addition, NORTH Network worked closely with Keewaytinook Okimakanak Health Services and K-Net located in Balmertown and Sioux Lookout, respectively. These relationships turned out to be very strong, mutually supportive and durable. The partnership created an open dialogue which worked remarkably well.

Finally, with the scope of this expansion, many of the management processes required formalization. This included regular management meetings, and detailed project plans for any significant project undertaking. It also required some fluid timelines, as operational responsibilities often competed with project responsibilities.

*NORTH Network Phase II Evaluation* 30
Initiate Governance Committees and Telehealth Professional Advisory Committees (Task 10)

As noted elsewhere in this report, Telehealth Professional Advisory Committees were set up within each region to enable all of the Medical Site Directors and Telehealth Coordinators to meet on a regular basis. Further, a Clinical Operations Committee was formed which consisted of all Regional Medical Directors and Telehealth Coordinators as well as NORTH Network senior management and technical resources, to ensure that all concerns of the regions were brought back to senior management. The Clinical Operations Committee also served as a conduit for information to each of the sites and managed many of the clinical decisions to be made regarding telemedicine services.

A Policy and Procedure Committee was also formed to review draft policies and procedures and/or determine the need for others to be developed. With broad representation from across the regions, this Committee will be a clearing house for all policies and procedures prior to forwarding them to NORTH Network Senior Management team for final approval.

Three governance committees were formed and supported including the Northwest Implementation Committee, (which is now transformed into the Northwest Ontario Operations Committee,) the Central Ontario Steering Committee, and the Provincial Steering Committee. These committees function as stakeholder advisory panels.

Develop Plans and Implement Communications, Promotion, Telemedicine Education (Task 11)

Over the course of the CHIPP project, a comprehensive communication strategy was deployed. This was undertaken through the hiring of a Communications Officer and a consultant who assisted in rebranding the NORTH Network as well as development of some of the communication materials. These activities are described in more detail later in the report.

Plan and Implement Strategy to Assist Other First Nation Communities to Build Capacity for Telehealth (Task 13)

Over the course of the CHIPP project, many meetings and discussions were held with all of the tribal councils across the Sioux Lookout Zone region and other areas of Ontario. This culminated in a Northwestern Ontario region-wide workshop in the Fall of 2002, which included Health Directors from all of the Sioux Lookout Zone (NAN) communities. The report on this activity is included in Appendix C. This work ultimately led to a proposal for deploying Telehealth services across the entire Sioux Lookout Zone region to approximately 28 communities that has been submitted to the Federal Government’s Primary Health Care Transition Fund, aboriginal envelope. For a summary of the Keewaytinook Okimakanak Telehealth Program see Appendix U.

Maintenance and Development of Staff Skills (Task 14)

Over the course of the CHIPP grant, NORTH Network technical staff have taken a number of courses to upgrade their skills, including courses in e-film tele-radiology, management of remedy ticketing system, Cisco Certified Network Administrator courses and VC Wizard training. In addition, NORTH Network staff reviewed and augmented this training for internal training of Telehealth Coordinators.

NORTH Network Phase II Evaluation
Many of NORTH Network’s clinical staff participated in the Canadian Society of Telehealth meetings in Toronto, 2001, and Vancouver, 2002 and have submitted 15 abstracts for the CST meeting in the Fall, 2003. Other conferences were attended over the two years, including the American Telemedicine Association conference and eHealth conference. NORTH Network senior management presented at dozens of conferences and meetings. Finally, a two-day NORTH Network strategic planning workshop was held in the Fall of 2002 that included approximately 40 of NORTH Network’s core staff. A follow-up meeting was conducted “virtually” in April 2003 with all participants from the Fall meeting invited to attend.

Security Management (Task 6)
NORTH Network has consistently included security, privacy and confidentiality as requirements in all of its projects. This has resulted in the development of state-of-the-art secure technology including closed user group and a virtual private network architecture. Patients engaging in videoconferencing are fully informed and are required to read, understand and sign a consent form. All paper and electronic patient data is handled with confidentiality in mind and in keeping with the policies of each of the host hospitals. Finally, at the time of writing this report, Mr. David Flaherty, the ex-Privacy Commissioner for the Province of British Columbia, was conducting a privacy impact assessment and creating detailed privacy policies for the NORTH Network program.

This work is to culminate in a completed Privacy Impact Assessment report due the end of June 2003.

1.2.2 Health Care Delivery

All requests for patients to see a specialist through the NORTH Network are sent to the Central Scheduling Office (CSO) in Timmins. The goal of the CSO is to provide ‘one stop shopping’ for patient consultation requests; to make referrals to specialists via televideo as easy as a referral for a face-to-face consultation; to collect pertinent diagnostic reports, x-rays and previous consultation reports; and, to ensure that both the patient and specialist will experience a positive encounter and quality consultation.

Currently, the majority of requests for referrals are received via fax. Each request is reviewed for its appropriateness to televideo. Specialist availability, based on existing referral patterns, is determined. The Telehealth Coordinator’s availability at both the virtual (patient site) and actual (specialist site) site is matched and then the patient and telemedicine studios (including any additional technology required) are scheduled. A pamphlet containing information about the appointment and televideo consultations is mailed to the patient.

The patient referrals are for real time patient consultations by physicians or other health care professionals using two-way video and medical instruments such as an electronic stethoscope and patient exam cameras. Medical peripherals at referring sites include: a patient camera, an endoscopic light source with otoscope, and digital stethoscopes. In addition, tele-radiology units are now available at some sites to transmit digitized x-ray images to a remote computer.
Emphasis has been placed on preserving existing referral patterns (see Appendix D). Patients are referred to specialists in their usual referral center, for example Timmins or Sudbury for referrals from Northeastern Ontario. Only when an appropriate specialist cannot be located in these centres, are referrals forwarded to other sites (e.g. Sunnybrook & Women’s College Health Sciences Centre, The Hospital for Sick Children). Specialists who would otherwise bill OHIP, are currently reimbursed by the NORTH Network (the Ontario Ministry of Health is currently considering incorporating telemedicine consultations into the OHIP fee schedule).

1.2.3 Continuing Professional Development

The NORTH Network has developed and regularly broadcasts a continuing professional development (CPD) program for physicians, nurses and allied health professionals called “Virtual Hospital Rounds”. These accredited Continuing Professional Development (CPD) events receive MAINPRO-M1 credits by the Canadian College of Family Physicians and are an accredited group learning activity as defined by the Maintenance of Certification Program of the Royal College of Physicians and Surgeons of Canada.

While NORTH Network CPD programming continues, increasingly the network is used to broadcast many other educational and ad hoc events across the province with content developed and coordinated by the regional programs. The Network provides the technology, locations, local contacts and promotional abilities to support members who wish to reach their target audience. Through the ongoing development of relationships with NOMEC, NOMS, NOMP and with other regional entities, additional educational opportunities continue to be identified and explored.

Mentorship

There are currently four residents in three areas of speciality (surgery, internal medicine, and paediatrics) in their first of four years of medical training practicing in the north and they are being mentored through telecommunication connections with both McMaster University and Ottawa University. In addition, NOMP and NOMEC have started utilizing time on the NORTH Network to support family practice residents. Tele-mentoring has great potential for supporting numerous healthcare professionals in their professional and clinical development across great distance.
2.0 NORTH Network Innovations

The NORTH Network began the CHIPP expansion with the unique advantage of having a detailed feasibility study on which to base its activities, a completed two-year demonstration project and evaluation, a recent series of community consultations to assess the needs of new communities who joined the network, as well as direct consultation with patient care programs and educational programs to understand their requirements. The NORTH Network has identified some challenges from the expansion, and has used its resources to address them through innovation. These innovations address four key areas of health care including improving access, maintaining quality, patient satisfaction and change management. The following list identifies the areas of innovation:

2.1 Business Improvement
   - Funders and Partners
   - Membership Model
   - Regional Leadership Structure
   - Sustainability
   - Scaleability

2.2 Change Management Approach
   - Local Leadership at Every Site
   - Enhanced Regional Communication
   - Adaptation to First Nations Communities
   - Maintenance of Existing Referral Patterns
   - Communication and Promotion
   - Payment of Fee-for-Service Practitioners
   - Training
   - Turnkey Technology

2.3 Clinical Service Innovations
   - Comprehensive Services
   - Innovative Projects and Peripheral Equipment

The following section provides a summary of these key innovations.
2.1 Business Improvement

<table>
<thead>
<tr>
<th>Business Improvement Innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Funders and Partners</td>
</tr>
<tr>
<td>➢ Membership Model</td>
</tr>
<tr>
<td>➢ Regional Leadership Structure</td>
</tr>
<tr>
<td>➢ Sustainability</td>
</tr>
<tr>
<td>➢ Scaleability</td>
</tr>
</tbody>
</table>

The NORTH Network is unique in that it took a business approach to ensure future sustainability by utilizing the CHIPP funding to create a scaleable, comprehensive infrastructure. This business approach included identifying sources of in-kind support, creating opportunities for business process improvement and exploring avenues for leveraging funding.

2.1.1 Funders and Partners

The NORTH Network has optimized its support from Health Canada by identifying a broad range of partners and funders including both provincial (Ministry of Health and Long-Term Care, Northern Development and Mines, Public Security and Safety) and federal governments (Health Canada, FedNor), corporate partners (Cisco Systems Canada, Hydro One, Placer Dome, Weyerhauser, Workers Safety Insurance Board, Cancer Care Ontario, Provincial Air Ambulance program), education partners (NOMEC, NOMP, NOMS) and Research Programs (Canadian Stroke Network, HEALnet). We also consider our numerous hospital members as an integral part of our partnership model. An expanded partnership base improves the projects’ capacity to develop and expand its services. It is noteworthy that the partnership comprises multiple levels of government, private industry and community-based organizations all with a key stake in the success of the project.

The NORTH Network is also collaborating with other provincial telemedicine projects (SWOT-N and EOTN) to create a ‘network of networks’ and to jointly explore further initiatives for telemedicine. The NORTH Network also continues to work closely and collaboratively with the MBTelehealth Program in Manitoba.

In addition, the NORTH Network is working in partnership with Keewaytinook Okimakanak (KO) to improve access to integrated health services for First Nations in the Sioux Lookout Health Zone.
NORTH Network began working with Keewaytinook Okimakanak in July 2000. Since then, KO Telehealth has worked closely with our staff, sharing many of our administrative protocols and service models. Similarly, NORTH has taken lessons learned from KO and applied them to its operations and management. These experiences have strengthened our partnership. Moreover, KO has demonstrated its capacity to achieve clearly defined goals, influence and manage systemic changes to the regional health system and foster unprecedented regional support for First Nations access to telehealth services.

The KO Telehealth/NORTH Network partnership stems from our successful submission to the Canadian Health Infrastructure Partnership Program. Between April 2001 and March 2003, KO Telehealth successfully modeled and migrated an integrated and scalable telehealth service for the Sioux Lookout Zone. Similarly, the Kuh-ke-nah Network of SMART First Nations (K-Net) managed the network delivery and technology support services for the five KO First Nations, the Balmertown Telehealth Hub and the Menoyawin Health Centre in Sioux Lookout.

In April 2003, the Ontario region of Health Canada’s First Nation Inuit Health Branch recognized the value of KO Telehealth’s contribution by continuing to fund the First Nations project after CHIPP pilot funding had expired. Similarly, NORTH Network continues to support KO Telehealth by:

1. Supporting referral management and scheduling of patient consultations and educational sessions for the First Nation’s communities
2. Paying fee-for-service physicians for their consultations
3. Providing sessional fees for psychiatrists
4. Providing “train-the-trainer” and training documentation support for telehealth coordinators
5. Working with K-Net to support and build capacity for Help Desk services for the region
6. Supporting procurement, network architecture and network management activities
7. Providing bridging and gateway services
8. Working closely with KO Health Services on several projects to roll out new telehealth services to the communities
9. Supporting physicians involved in delivering telehealth care in the Sioux Lookout Zone through inclusion in regional meetings and in the Provincial Clinical Operations Committee
10. Incorporating KO representatives into the governance structure, including the NW Ontario Operations Committee and the Provincial Steering Committee
2.1.2 Membership Model

The NORTH Network developed a membership model that has three key elements:

- Members guide and validate NORTH Network initiatives;
- Members are invited and encouraged to contribute; and,
- NORTH Network is responsive to members’ needs and expectations.

The number and variety of members provides an environment within which common objectives are identified and advanced. Original members continue to support the NORTH Network. In addition, membership has grown substantially during the CHIPP funding period and continues to grow. The membership fee structure has been revised to provide different levels of membership for hospitals (academic, regional, community and rural) and others. The benefits of the membership model include a broader stakeholder and funding base (see Appendix E for a full list of members).

2.1.3 Regional Leadership Structure

The NORTH Network promotes delivery of health services across regions, including across the Manitoba border, within a practical framework. The NORTH Network aims to provide this framework by creating linkages and open channels of communication among health providers within a regional leadership structure.

The NORTH Network facilitates the utilization of its services by having Regional Medical Directors and Regional Telehealth Coordinators. These positions are paid by the Network to act as a resource to Telehealth Coordinators at each site. In addition, the Regional Medical Directors provide the lead for regional program development and act as the liaison between the region and the NORTH Network management team.

2.1.4 Sustainability

The NORTH Network has built a solid infrastructure and network of funders and partners to ensure ongoing sustainability. At the end of the CHIPP funding the Network has renewed commitments from existing members, the addition of new members and has been advised that the Ontario Ministry of Health and Long-Term Care will provide base funding. This approach has significantly leveraged the resources provided by CHIPP and has enhanced the continuity and long-term viability of the NORTH Network.

Furthermore in collaboration with the other provincial telemedicine projects (SWOT-N, EOTN), work is underway to develop provincial interoperability, interconnectivity and a ‘network of networks’. This collaboration will ensure that telemedicine matures into a provincial initiative while retaining the key success factor of regional representation and implementation.
2.1.5 Scaleability

The CHIPP funding enabled the NORTH Network to create an infrastructure that supports scaleability and sustainability. A business approach to the delivery of telemedicine ensured that the Network would be able to respond to ever increasing volume, activity and demand for service. To this end, the Network automated its scheduling and referral management processes and created a formal Help Desk with expanded functionality and capacity.

With clinical consultations and educational events continuing to rise, the automated scheduling system provides the Central Scheduling Office (CSO) with the functionality to meet the growing demand. The aim is to continue the transition from a centralized model of scheduling to a decentralized model. Over time and with support, Telehealth Coordinators and eventually providers themselves will be able to independently schedule consultations directly from their desktop.

2.2 Change Management Approach

The NORTH Network Program emphasizes the integration of telemedicine into everyday practice by making the technology easy to use, providing telemedicine and telemedicine technology expertise for all of its partners, interfacing with government and regulatory bodies and increasing awareness among health providers and the public of the benefits of telemedicine. In recognition that telemedicine is more than the introduction of technology, the NORTH Network has invested significant resources to facilitate and support change management. Key features of the change management strategy to encourage physicians and other health professionals to adopt telemedicine in their practices include:

<table>
<thead>
<tr>
<th>Change Management Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Local Leadership at every Site</td>
</tr>
<tr>
<td>➢ Enhanced Regional Communication</td>
</tr>
<tr>
<td>➢ Adaptation to First Nations Communities</td>
</tr>
<tr>
<td>➢ Maintenance of Existing Referral Patterns</td>
</tr>
<tr>
<td>➢ Communication and Promotion</td>
</tr>
<tr>
<td>➢ Payment for Fee-for-service Practitioners</td>
</tr>
<tr>
<td>➢ Training</td>
</tr>
<tr>
<td>➢ Turnkey Technology</td>
</tr>
</tbody>
</table>
2.2.1 Local Leadership at Every Site

For implementation of telemedicine activities to take place, three key elements are required: a local physician champion, in-kind resources and broad support. Each site appoints a local physician as a NORTH Network Medical Director and appoints a 0.5 FTE Telehealth Coordinator. The Medical Director’s role is to act as a catalyst to encourage the use of telemedicine among local health care professionals, to take a leadership role through patient referrals to telemedicine as appropriate, to attend continuing professional development sessions and participate on the Professional Advisory Committee (PAC). Medical Directors receive a stipend from the NORTH Network (approximately $4,000 to $6,000 per annum).

One of the biggest challenges of telemedicine is underutilization. This has not been an issue for the NORTH Network as usage grew dramatically over the CHIPP period and continues to grow. The local identification and paying of honoraria to Medical Directors at every site to be local champions and agents of change has facilitated the utilization of the NORTH Network at both local and regional levels.

Telehealth Coordinators at each site facilitate clinical consultations and educational sessions. The Telehealth Coordinators assist in consultations, promote telemedicine activities within their institution and link to allied health professional groups to determine local educational needs.

The role of Telehealth Coordinators in First Nation’s communities differs somewhat from hospital-based sites. Coordinators in these communities are typically not nurses and are not supported by a hospital infrastructure. A customized training approach has been essential to support First Nation’s Telehealth Coordinators. Another benefit of the identification, training and support of local non-health professionals as Telehealth Coordinators is that it is seen as supporting and enhancing local capacity.

2.2.2 Enhanced Regional Communication

It was recognized that a mechanism was needed to facilitate communication among service staff at the regional level. Regional Professional Advisory Committees (PACs) were developed and implemented to meet this need. The PAC is the structure that enables each regional referral hospital and its regional satellite hospitals to work together to ensure that the medical resources needed by rural patients are available and timely.

The meetings provide a forum for feedback and for the identification and development of new regional applications of telemedicine. The Network’s past experience is that these discussions contribute towards the integration of health services across a region. They often extend beyond telemedicine and have led to overall improved service delivery for a region.
In addition, the Clinical Operations Committee was formed to address ongoing clinical issues and to provide a communication channel between all of the regional Telehealth PACs and senior management. The Clinical Operations Committee includes broad regional representation from technical, operational and clinical staff.

Planning is underway for a strategic initiative to be launched in the Fall, 2003 with academic health sciences centres to identify further opportunities for collaboration and future development and to formalize a regional, representative group in the Greater Toronto Area.

2.2.3 Adaptation to First Nations Communities

The Keewaytinook Okimakanak (KO) has developed a successful framework for building capacity in the First Nations through appropriate modifications to support adoption and integration. The project aims to provide comprehensive telemedicine services for five remote First Nations communities to improve their health care and empower the community in a way that is culturally specific and relevant.

The KO Project Manager considered the project a success based on the following outcomes: scheduled monthly consults at all sites, the securement of a Help Desk service level agreement with NORTH Network, endorsement of a regional migration strategy that has been short listed by the Primary Health Care Transition Fund, and the receipt of bridge funding from Health Canada.

Keewaytinook Okimakanak Telemedicine has successfully implemented a working telemedicine model in the KO Region of the NORTH Network – Deer Lake, Fort Severn, Keewaywin, North Spirit Lake and Poplar Hill First Nations, the Balmtown Health Centre and the Menoyawin Health Centre in Sioux Lookout. A comprehensive training manual for First Nations Community Telehealth Coordinators has been distributed in addition to continuous improvement training sessions.

Expansion of the telemedicine model has been supported by First Nations Health Directors in the Sioux Lookout Health Zone. A Telemedicine Sustainability Working Group has developed an implementation strategy for extending services to an additional 23 First Nations sites. In addition, the project plans to implement a strategy to assist other First Nations groups across the country to build capacity for telemedicine in their communities when they are ready.

The NORTH Network presents an innovative opportunity to allow First Nations to have increased control over health issues by moving beyond historical jurisdictional barriers. As part of the NORTH Network program, the care for First Nations’ patients will be seamless regardless of where the care is received (on or off reserve) or what referral centre they receive their care from (Ontario or Manitoba). To ensure integration with the larger telemedicine network, the Medical Director for the First Nations communities sits on the regional Telehealth Professional Advisory Committee. This is seen to enhance the potential for continuity of care for the communities of the region.
2.2.4 Maintenance of Existing Referral Patterns

One of the principle underpinnings of the NORTH Network has been its philosophy of maintaining existing “referral patterns”. Referral patterns indicate how patients in rural and remote communities travel to receive specialized health care. While theoretically telemedicine will provide patients with the ability to access medical care anywhere in the country, or for that matter, anywhere in the world, this is not considered an appropriate approach towards integration of telemedicine into the health care system. Existing referral patterns for patient care are maintained to ensure continuity of care and to support the practice of local specialists that facilitate the support of Northern medical practitioners. As an example, if a patient in Atikokan requires a cardiology assessment via telemedicine, the NORTH Network would seek a cardiologist in Thunder Bay to be the consultant. If the patient required a cardiac surgery assessment, they would likely be referred to another centre, such as Winnipeg, Toronto or Sudbury, since there is no cardiac surgery program in Thunder Bay. NORTH Network continues to actively promote the maintenance of existing referral patterns for telemedicine consultations. This approach is critical to the preservation of the integrity of the local health care system.

Respecting existing referral patterns includes those referrals that occur between Ontario and Manitoba. To maintain these referral patterns, it was necessary to address licensing issues. Currently, licensed health care providers can practice only on patients they see in the province/territory/state in which they have a professional license. This position is documented in provincial regulations that were enacted before telemedicine and ‘virtual’ consultations were possible.

In this regard the CPSO granted an exception (September 12, 2000) for specialists in Manitoba to provide telemedicine consults to Ontario patients that they would normally see in person. The CPSO suggests that a Manitoba physician does not need licensure in Ontario when the physician is providing advice or consultation to a patient by telemedicine on a referral from an Ontario primary care provider or following up with a patient after procedures have been done in Manitoba. In order to facilitate out-of-province telemedicine, the NORTH Network has developed this interim position statement until the relevant licensing bodies and FMLAC develop their processes (see Appendix F for Out-of-Province Tele-Consultations policy 2.0.1.5). To facilitate these out-of-province consultations, a MBTelehealth Medical Director working in Winnipeg has responsibility for organizing services for Ontario patients at the Winnipeg Health Sciences Centre and St. Boniface Hospitals. In addition, a Manitoba telemedicine representative sits on the telemedicine advisory committee in Northwest Ontario.
2.2.5 Communication and Promotion

Communication is an essential component of any change management initiative. The following activities and mechanisms were utilized to support and promote the NORTH Network and telemedicine: the recruitment of local champions, regional roll-out meetings (Sault Ste. Marie, Sudbury, Thunder Bay), the hiring of a Communications Officer, the development and dissemination of the ABC Training Manual, the development of a health professional brochure and press kit, multiple media and community launches and showcasing the NORTH Network to a number of Ministry representatives, strategic planning sessions, Quarterly e-Newsletter, biweekly “News in a Nutshell”, and the publication “Report to Our Communities”. In addition, posters are currently in production and scheduled for distribution in July, 2003.

A website was developed in November, 2002 (www.northnetwork.ca). The website includes a “members only” section and new security measures. An innovative feature of the website is a password-protected, Tele-Stroke on-call schedule for neurologists. This functionality has broader applicability as the Network continues to expand its services. In addition, enhancements have been made to the Continuing Professional Development areas of the website as well as increased access for NORTH Network members to information (e.g., new or changed policies and manuals, newsletters and events).

Currently the NORTH Network is providing leadership on a joint web portal project with the SWOT-N and EOTN to enable communication and collaboration within this newly formed ‘Telemedicine Networks of Ontario’.

2.2.6 Payment of Fee-for-Service Practitioners

Since there is currently no fee schedule for physician telemedicine professional consultations in Ontario, the Network pays fee-for-service physicians and other fee-for-service practitioners for telemedicine services. This commitment will continue until such time as the province develops a fee schedule. Manitoba’s fee-for-service physicians who provide services for Ontario patients are reimbursed by Manitoba’s Provincial Ministry of Health.

The Ontario Medical Association (OMA) Board recently endorsed the inclusion of services on their fee schedule. Currently, the OMA is negotiating with the Ministry regarding inclusion of telemedicine on the OHIP fee schedule.
2.2.7 Training

The NORTH Network collaborates with technology vendors to ensure training and information is tailored to the needs of our network and that content is delivered at the appropriate level for the audience. Recent revisions made by NORTH Network staff to the vendor training manual have been adopted by the vendor with the manual being widely distributed.

The NORTH Network provides both clinical and operational training for all telemedicine staff (e.g. Telehealth Coordinators, Medical Directors), at each member site. The program provides guidance for incorporating telemedicine into professional practice and opportunities to build skills in operating the technology. Clinical and process content is delivered in person or via videoconference by regional Telehealth Coordinators, the Training Manager and the Regional Medical Directors.

Version 2.0 of the NORTH Network Training Manual (‘The ABCs of Telehealth: A User Guide to Start up and Success in the NORTH Network’) has been completed, distributed and is scheduled to be posted on the NORTH Network website for easy access by all members. This version contains the most recent guidelines for scheduling procedures and clinical protocols for patient care.

Training continues as new equipment is installed at each site or as new telemedicine applications arise. Refresher training, or re-training, is provided as required and helps to ensure consistency in user skill level. Customized training materials and sessions are also developed and conducted on an as needed basis for the implementation of special projects (e.g. electronic stethoscope, store and forward project, tele-ophthalmology project).

A specific customized training approach was developed by the First Nation’s communities for their Community Telehealth Coordinators (CTC) in recognition that they do not have clinical backgrounds. The in-depth training program included topics such as computer skills, health care skills, basic first aid and vital signs, physical assessment, medical terminology and technical and equipment training. A minimum of 40 hours of training is augmented with customized training and support as required.

2.2.8 Turnkey Technology

The Network simplifies the entry of new sites into the telemedicine network by providing turnkey technology, network management and program organization for each new site. The Network provides the infrastructure of training, a 24/7 Help Desk (including monitoring, incident management, connection services, service level management, new studio set up and configuration, asset management and parts depot, site certification and call routing) and a comprehensive warranty service.
Presently, highly qualified information technology (IT) professionals who specialize in videoconferencing systems, network engineering and support services, staff the NORTH Network Technical Team. A detailed site survey is undertaken to assess the existing technology, environmental space, network architecture and clinical and integration requirements. Once the implementation phase is completed the Help Desk certifies the site and the clinical training can be completed. The site is then launched and the NORTH Network team supports the site technically and helps the site implement existing and new applications on a turnkey basis.

2.3 Clinical Service Innovations

<table>
<thead>
<tr>
<th>Clinical Service Innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Comprehensive Services</td>
</tr>
<tr>
<td>➢ Innovative Projects and Peripheral Equipment</td>
</tr>
</tbody>
</table>

2.3.1 Comprehensive Services

Without proper planning, as telemedicine networks continue to develop, there is the potential for duplication of efforts, waste of resources, and interconnectivity problems. Small regional telemedicine networks and networks which deliver only one specialty service will create incomplete access to medical services as well as limited success and sustainability.

A primary objective of the NORTH Network has always been to address these issues by developing a comprehensive and efficient framework for a telemedicine system that can be used for all telemedicine applications across related regions. The same infrastructure can be used to provide consultations and services in many different specialties and for many different applications (including meetings, education, emergency services).

In order to ensure a sustainable and integrated telemedicine network, the NORTH Network has invited all potential users of telemedicine services in the regions served to become partners and share the resources of the network. Hence, the project has developed an aggregated model for funding telemedicine through partnership, shared infrastructure and shared costs that will enable its sustainability over the next five years.

Finally, the project uses technologies that are standards-based, including the ubiquitous internet protocol (IP). The network choice greatly expands the connectivity of all of the diverse users by enabling communication beyond the traditional telemedicine “studio” sites (i.e., desktop videoconferencing in the community). By adding capacity for more health service delivery, the network increases its efficiency and sustainability.
2.3.2 Innovative Projects and Peripheral Equipment

A number of innovative projects were launched during the CHIPP funding period including tele-ophthalmology, tele-radiology, emergency applications (e.g. electrical burns, tele-stroke) and a pilot project with the Ministry of Public Safety and Security. These projects are briefly described below.

**Tele-ophthalmology**

The Tele-ophthalmology program is a collaborative effort of the Northern Ontario Diabetes Research Project, Northern Diabetes Health Network, the NORTH Network and Keewaytinook Okimakanak (Northern Chiefs) Telemedicine Project. It utilizes new technology to help identify and enable early treatment of eye disease for residents of remote First Nations communities in Northwestern Ontario. The tele-ophthalmology program was a pilot project using a high resolution, non-mydriatic digital retina camera and reading station to screen patients in the First Nations communities for diabetic retinopathy. The examinations were done by visiting diabetes educators from the Northern Diabetes Health Network and the photos were transmitted to an ophthalmologist at Thunder Bay Regional Hospital, who agreed to read the images and arrange appropriate follow-up. The ophthalmologist used the photos to determine if there was any damage to a person’s eyes, particularly from diabetes, that may require corrective surgery. A recent study determined that tele-ophthalmology and the transmission of digital retinal images to ophthalmologists, was effective at detecting and grading diabetic retinopathy (Gomez-Ulla et al., 2002).

**Tele-Radiology**

Tele-radiology services have been developed for 14 Northwestern Ontario hospitals and two remote First Nations communities providing service for an area the size of France. This is the largest geographic area covered by such an initiative in the world. This service enables the digitization and transmission of plain X-rays from all equipped centres. Ultrasound and CT studies are also transmitted from centres that are equipped to acquire these images. Both elective and emergency professional interpretation of images are supported. Equipment roll-out began in December 2002 and continued through to May 2003 (due to SARS-related delays). This included the installation of the main archive and web servers in Thunder Bay; diagnostic review stations at three reading sites in Kenora, Sioux Lookout and Thunder Bay; and a clinical review station at the Northwestern Ontario Regional Cancer Centre. Other equipment, such as film digitizers and CR systems, were also installed during this period.
The images are stored and transmitted using the DICOM-3 standard and are viewable using any standards-based technology. Hence the images may also be transmitted to other referral centres with appropriate technology and network access, such as Winnipeg Health Sciences Centre and Northeastern and Southern Ontario referral hospitals. In addition, the digital images and reports will be made available over the Internet to authorized health professionals with appropriate desktop PC access. This will enable the secure review of imaging studies with a quality appropriate for a preliminary or urgent reading from any location.

**Emergency Applications**

Prior to Phase II the Network was used primarily for elective (scheduled) consultations and education. In Phase II, the Network developed technologies that could be applied to emergency applications. The first emergency application is acute stroke care. The framework that was designed and implemented for tele-stroke will provide us with the template for use in other emergency applications. For example, emergency trauma, cardiology, neurosurgery and other specialty applications will be deployed according to medical user requirements. In collaboration with Hydro One, an emergency application for electrical burn patients is scheduled for implementation in June, 2003.

**Tele-stroke**

Tele-stroke was implemented through a joint funding arrangement with the Canadian Stroke Network, the Ontario Ministry of Health and Long-Term Care as well as the NORTH Network. This innovative care model provides residents of northern communities who present to Emergency Departments with signs and symptoms of stroke, access to assessment and treatment advice of a neurologist in Toronto. Through the use of the NORTH Network’s virtual private network, five neurologists based out of Sunnybrook and Women’s College Health Sciences Centre and the University Health Network have access to home and hospital-based telecommunication equipment which, in combination with compact, mobile videoconferencing equipment sited in the Emergency Departments in the northern sites, allows them to view the patients’ CT scan and initiate a two-way videoconference to assess the patient and provide treatment advice on an emergent basis, twenty-four hour per day, seven days per week. In addition to the telecommunications infrastructure, clinical protocols were harmonized amongst the participating hospitals. This service is currently available in two northern communities through the Emergency Departments at North Bay General Hospital and Sudbury Regional Hospital.

A formal evaluation of the tele-stroke initiative is being planned and will be supported through a post-doctoral fellow who will begin work with the NORTH Network in July, 2003. This evaluation will be facilitated by the data that is currently being collected through the Registry of the Canadian Stroke Network. Data transmitted weekly to the Institute of Clinical Evaluative Sciences is aggregated with data from other Registry centers. This database will provide a rich resource for evaluation of the tele-stroke program. While the evaluation framework has not been finalized, several key areas will be included in the evaluation such as patient and provider satisfaction, an analysis of the Registry data, an analysis of related data elements from existing databases (i.e. NACRS, DAD) as well as the development of a set of indicators for future evaluation of tele-stroke as a model of care.
Electrical Burn Program
Hydro One Networks have partnered with the Ross Tilley Burn Centre at Sunnybrook and Women’s Health Sciences Centre and the NORTH Network to develop an electrical burn telemedicine program. This program will provide northern health care providers with emergent access to surgeons with expertise in the assessment and treatment of electrical burns. A telemedicine studio has been set up in the Ross Tilley Burn Centre so that a two-way videoconference can be established on an urgent basis when a patient presents with a burn at a NORTH Network hospital site (if they are not a candidate for immediate transfer).

The Electrical Burn Telemedicine Program will be evaluated through the use of data entered into a burn registry at the Ross Tilley Burn Centre as well as through the development and implementation of a number of tools to solicit patient and provider satisfaction.

Tele-psychiatry
This project was implemented prior to the CHIPP funding period and provided valuable feedback to facilitate the design and implementation of the current tele-psychiatry initiative. The Keewaytinook Okimakanak First Nations Tribal Council from Northern Ontario undertook the pilot project to provide tele-psychiatry services to two of its six communities. The purpose of the pilot project and its evaluation was to assess the long-term viability of tele-psychiatry as an ongoing program for First Nations communities.

The recent increase in the demand for mental health care among remote northern First Nation’s communities has overwhelmed existing services to the extent that long waiting periods must be endured before counseling can be provided. A tele-psychiatry program was conceived as a means to overcome the economic and geographic barriers to accessing mental health care imposed upon rural and remote First Nations communities. Its purpose was to supplement existing mental health services and thereby reduce the long periods spent awaiting care. The pilot project was undertaken to test the viability of such a program.

Video, telecommunication and digital information technologies were combined to create real-time, audio-visual links between First Nations clientele within their home communities to a psychiatrist in Winnipeg, Manitoba and a psychiatrist in Toronto, Ontario. During 1½-hour videoconferencing sessions, the psychiatrist provided assessment, treatment and consultation services.
Telemedicine Pilot for the Ministry of Public Safety and Security
The Ministry of Public Safety and Security (MPSS) has implemented a successful video remand program within correctional complexes that has been found to provide cost savings in the transportation of inmates between correctional facilities and provincial courthouses. As a result of this success, the MPSS has retained the NORTH Network to provide project management and system infrastructure to support the pilot of a telemedicine studio in the Monteith Correctional Complex and the Central East Correction Centre for the purposes of elective clinical consultation and continuing professional development. Monteith Correctional Complex is planning to become the first correctional facility in Ontario to offer inmates health care via teleconference June, 2003. The Central East Correctional Facility will begin seeing patients in their telemedicine studio in mid-September, 2003. This project, which has an evaluative component, will assist the MPSS to determine whether telemedicine can play a role in health care delivery in other correctional facilities across the province.

Breast Screening Program
The Physics Group, Ontario Breast Screening Program initiated a series of tests to demonstrate whether the very large (greater than 40 megabyte) digital mammography files could be successfully transmitted over the network without adversely affecting other network applications. Files have been successfully transmitted over the network with no deterioration and no interruptions to the network. Testing continues and is expected to be completed in the Fall, 2003. Based on these data, the Ontario Breast Screening Program will consider purchasing a digital mammography unit for its travelling bus, which currently visits most towns in Northwestern Ontario. This new technology will enable the images to be read while the patient is still in the bus, so that results will be available immediately, and appropriate follow-up or referrals can be made. This may relieve patient anxiety related to having to wait and/or travel for test results.

Privacy, Security and Confidentiality
The NORTH Network participated in the CHIPP sponsored PrivaC self-assessment tool during the months of June and July, 2002. The report from this tool has been circulated to the members of the Senior Management Team and a number of initiatives are underway to continue our work in this area. Specifically, an educational day was conducted for members of the Management Committee, March 2003. Presentations were delivered by private consultants and by a hospital Chief Privacy Officer. Subsequent to the educational session, a consultant was retained to conduct a thorough Privacy Impact Assessment and develop data protection policies for the NORTH Network. A structure to facilitate the implementation of recommendations from the Impact Analysis will be designed on submission of the report, which is expected at the end of June, 2003. Preliminary findings presented by the consultant are very positive regarding how the NORTH Network manages privacy, security and confidentiality.
3.0 Overview of Evaluation Strategy

The evaluation was designed to assess the implementation of the NORTH Network following its expansion during the period April 1, 2001 through March 31, 2003, and to identify lessons learned to facilitate future program enhancements.

3.1 Evaluation Objectives

Specifically, the evaluation was designed to:

- Assess the program against the program objectives approved by Health Canada, with a specific emphasis on the objectives outlined in the CHIPP proposal:
  - Cost-effectiveness
  - Improvements to health services
  - Health-related outcomes
  - Integration of health services
- Establish baseline data against which future performance can be assessed
- Identify lessons learned to facilitate program expansion

The Phase II evaluation plan builds on the experience and results of the NORTH Network’s Phase I evaluation (March 1998-December 1999) which relied on data collected from a series of self-report questionnaires administered to patients, referring physicians and specialists to assess patient/provider satisfaction, telemedicine costs, waiting times to “see” a medical specialist, and alternate treatment choices had telemedicine not been available.

The self-report questionnaire methodology used in the Phase I evaluation plan can be limited (i.e., low patient/physician response rates, validity of self-report data, respondent fatigue and the desire to explore issues in-depth). This led us to design an enhanced Phase II evaluation which utilized multiple data collection methods including program administrative data, a patient satisfaction survey, focus groups with patients and providers and key informant interviews, in an effort to capture more in-depth and valid feedback from respondents and to reduce reporting bias due to low questionnaire response rates.

To determine if project objectives were being met, a series of data collection procedures were implemented to collect information from patients, their referring physicians, specialists and key informants associated with the NORTH Network (Medical Directors, regional and site coordinators, technical staff) and NORTH Network partners. In addition, an evaluation component was built into each sub-project within the NORTH Network. Some, like the tele-stroke initiative, developed their own approach to address their specific goals. Other initiatives, like tele-ophthalmology, worked with the evaluation team to develop appropriate measures of the process.
In order to evaluate the NORTH Network Program’s phase two expansion, this second evaluation was built on a framework that examined processes and implementation activities. Process evaluation was undertaken for each of the three program components (service delivery, health care delivery and continuing professional development) to assess the functioning of the NORTH Network system. Process indicators included: satisfaction with consultations on the part of patients, referring physicians and consultants; quality of images; and, time required for scheduling. Some measures (e.g., timeliness) were generated from the system’s existing data, others required special data collection. For example, satisfaction was assessed through ongoing surveys and focus groups. Implementation was assessed for each of the three components of the NORTH Network Program. Most of this information was collected as part of project management. Some data, however, were collected through focus groups and interviews with program participants, program deliverers, and stakeholders.

### 3.2 Evaluation Resources

In order to implement the phase II evaluation plan, the NORTH Network contracted external evaluation consultants, developed and implemented an evaluation steering committee, and committed internal resources. Three experienced program evaluators were contracted, and were responsible for various elements of the evaluation, including: development of focus group and interview tools, and informed consent documents; analysis of patient survey data; review of program documentation and administrative data; and assisting with the coordination, preparation and reporting from a workshop held with members of the evaluation steering committee, program staff, partners and Health Canada. These consultants also helped to pull together the various pieces of the documentation to facilitate the preparation of the evaluation report.

In order to oversee and give advice and direction to the program evaluation, the NORTH Network established a program evaluation committee, comprising external and internal experts in telemedicine, health services delivery research and program evaluation. The committee members are:

- Dr. Vivek Goel (Chair) – University of Toronto, Toronto, Ontario
- Dr. Tony Hanley – Mount Sinai Hospital, Toronto, Ontario
- Dr. Ray Pong – Center for Rural and Northern Health Research, Sudbury, Ontario
- Dr. Rob Williams – Timmins and District Hospital, Timmins, Ontario (NORTH Network, Clinical Director)
- Ms. Carole Dunphy – Royal Victoria Hospital, Barrie, Ontario (Regional Telehealth Coordinator)

The evaluation steering committee met in Toronto on May 5, 2003, to review the status of the Phase II evaluation, to make recommendations on reporting the results of this evaluation and to identify possible future directions for program evaluation. Members of the evaluation steering committee were also asked to review and provide comment on a draft of this evaluation report. Key results and recommendations from this meeting are presented in the section of this report entitled, “Next Steps”.

---

**NORTH Network Phase II Evaluation**

50
The NORTH Network Program assigned senior staff to assist with the evaluation of the program. This was done to ensure the evaluation consultants could have complete access to reports and data to facilitate the evaluation, as well as to help build the program’s capacity to conduct program evaluation. These senior staff co-facilitated focus groups and interviews, helped to collect other pertinent data on program activities (e.g., utilization reports, website data, special project reports and sub-program data and reports, and contributed to the coordination and content of the report).

3.3 Evaluation Issues

One challenge in the evaluation of the NORTH Network program is to identify appropriate performance indicators (e.g., for cost effectiveness and health care access), data sources and baseline information against which to measure change. In some cases, appropriate indicators were not readily available and proxy measures were needed (e.g., in an absence of hard economic data on patients’ expenditures for out-of-town health care consultations, we have had to rely on patients’ self-reported data). In addition, because telemedicine is relatively new, there is no consensus on a “gold standard” and many different approaches to measurement have been used (e.g., cost measures) making comparisons between studies difficult. Finally, there is a paucity of evaluation data from other programs to use for benchmarking. This measurement challenge has been identified as a priority in telemedicine programs across Canada. In June 2003, there will be a national consensus workshop in Calgary, Alberta, to develop performance indicators for telemedicine. The NORTH Network program will participate in this workshop.

The burgeoning interest in and implementation of telemedicine during the past decade has escalated due to many factors, including improved and less costly technology (Gilmour et al., 1998; Currell et al., 2002; Lim, Egerton & Shumack, 2000; Mair et al., 2000; Mair & Whitten, 2000). Telemedicine research and evaluation of telemedicine programs during this period has focussed on the following: adequacy of the technology; outcome measurement including cost effectiveness, patient satisfaction, and quality of care; and incentives and barriers to use. Unfortunately, many of the reported studies have been criticized for a lack of scientific rigor, including inadequate sample sizes and inappropriate study designs (Currell et al., 2000; Mair et al., 2000; Roine, Ohinmaa, Hailey, 2001). Conclusions with respect to cost analysis are also problematic in research design and methods, despite the existence of more than 500 relevant citations (Currell et al., 2000 Mair et al., 2000; Roine, Ohinmaa, Hailey, 2001; Whitten, Kingsley, Grigsby, 2000). This highlights the need for well-designed cost analysis studies. It has been stated that the issue of cost is the most salient issue for the integration of telemedicine into health care delivery (Bashshur, Reardon & Shannon, 2000).
An additional limitation is that the focus group and survey results are based on self-reported data. Another important challenge is to show a link between technologies to facilitate patient care and outcomes in patient care. Many of the questions raised in the CHIPP evaluation guide are related to the impact of the NORTH Network Program on health services and outcomes. These are important questions that must be answered for any new health technology. However, at this point in the implementation of the NORTH Network Program it is too early to identify a clear link between the technology and health and health services outcomes. Therefore, it was decided that an important exercise for this second phase of the program would be to develop a logic model to identify the links between program activities, outputs and outcomes. The logic model is presented in Exhibit 3.

### Exhibit 3 – NORTH Network Logic Model

<table>
<thead>
<tr>
<th>Components</th>
<th>Activities</th>
<th>Target Groups</th>
<th>Outputs</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. VPN &amp; roll out of technologies &amp; supporting infrastructure</td>
<td>All system users</td>
<td>• Province-wide scheduling system, on-line referral, global address book, help desk established</td>
<td>• Coordinator needs identified</td>
</tr>
<tr>
<td></td>
<td>b. Implementation of initiatives to facilitate technology use</td>
<td></td>
<td>• # of workstations delivered &amp; installed</td>
<td>• Increased awareness of availability and potential of telemedicine</td>
</tr>
<tr>
<td></td>
<td>c. Development and implementation of policies and procedures</td>
<td>Telehealth Coordinators and Medical Directors</td>
<td>• P&amp;P manual developed and distributed to all sites</td>
<td>• Increased telemedicine use</td>
</tr>
<tr>
<td></td>
<td>d. Coordination of services</td>
<td>Patients and Providers</td>
<td>• ABC manual developed &amp; available on website</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e. Disseminate/promote telemedicine</td>
<td></td>
<td>• Training manual developed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Training and support system established</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• # of coordinators trained</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• # of promotional material distributed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• # of information sessions delivered</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• # of champions trained</td>
<td></td>
</tr>
</tbody>
</table>

*CHEM*
## II. HEALTH CARE DELIVERY

### Components

**Activities**

| A. Provide telemedicine consultations |
| B. Archive teleimages |

**Target Groups**

- Patients and providers

**Outputs**

- 
  - # of consultations per month, multiple specialties, duration
  - Change over time
  - Images available to authorized users
  - Support for and timely access to data interpretation

**Indicators**

**Health:**

- Patient/provider satisfaction
- Utilization data
- Meeting of identified community needs
- Response rate to referral requests

**Costs:**

- Decreased travel costs
- Reduced health professional travel
- Impact on travel grants
- Reduced work-time lost
- Reduced patient out-of-pocket expenses

**Integration of Health Services:**

- Maintenance of existing referral patterns
- Increased access to equitable/timely, multi-specialty care
- Reduced professional isolation, increased MD back-up
- Improved province-wide strategies (stroke care, diabetes education)
- Decreased unnecessary transfers/tests
- Multidisciplinary teams
- Mentoring of local health care professionals for continuity of care
### III. CONTINUING PROFESSIONAL DEVELOPMENT

#### Activities

**A. Continuing Professional Development (CPD)**

- # hours/month CPD delivered
- Types of activities

**B. Support training of rural students/medical residents**

- Above includes establishment of mentorship program
- 25% airtime during business hours
- # of mentors trained
- # of students attending teaching rounds/case presentations
- # of mentor-mentee pairs established

#### Target Groups

**Physicians, Nurses & Allied Health Professionals Providers**

**Medical students/residents**

#### Outputs

- Satisfaction
- Reduced travel costs for training/education
- Improved recruitment/retention of MDs
- Reduced professional isolation
- Improved rural student programs
- Improved access to educational events
- Accreditation by the Royal College of Physicians & Surgeons of the northern specialty training programs

#### Indicators

- # hours/month CPD delivered
- Types of activities

---

### 3.4 Indicators and Sources of Information

The evaluation relied on multiple sources of information – administrative data, internal status reports, interviews with key personnel, summaries of policy decisions, focus groups with patients and providers, patient questionnaires and data supplied from sub-projects where these data exist (see Appendix G for an outline of the evaluation framework).

Software used to schedule consultations provided an additional data source wherein information on specialty service, location of specialists and participating communities has recently become available electronically. Additional data sources were identified to provide baseline measures of medical service delivery and costs in new communities. The intent is that this information will be collected at intervals to determine the impact of telemedicine in these communities over time.
3.5 Methodologies for Data Collection Activities

This evaluation included both qualitative and quantitative data collection. Qualitative data were gathered using key informant interviews and focus groups. Quantitative data were obtained from program administrative sources and surveys.

Administrative Data

Utilization data from April, 2001 to March, 2003, was captured based on scheduled events (consultations, education and administrative) through the Central Scheduling Office (CSO). This data was captured manually prior to the implementation of the automated scheduling and referral system in November, 2002.

In order to estimate the potential cost savings for the Northern Health Travel Grants Program (NHTG), administrative data was used to calculate the number of kilometers that would qualify for reimbursement (‘qualifying kilometers’) had the individual traveled for the consultation (distance between the location of the patient and the location of the specialist). A companion has also been included for those individuals who were under 16 years of age as per the guidelines of the NHTG Program. The potential savings to the NHTG Program were calculated based on their formula (round trip minus 100 kilometers x $.3425). The consultations included in this analysis took place between April, 2001 and March, 2003 in the areas covered by the NHTG Program (Algoma, Cochrane, Kenora, Manitoulin, Muskoka, Parry Sound, Rainy River, Sudbury, Temiskaming and Thunder Bay). The Northern Health Travel Grants Program only covers areas North of the Central Ontario Region. The KO region is covered by the Non-insured Health Benefits Program under Health Canada that reimburses for travel and related costs for medical appointments. Therefore, our calculations significantly underestimate the potential for provincial travel savings.

To determine the impact on the NHTG program for patients seen via telemedicine certain assumptions were made:
- The patient would see the same specialist that they saw via telemedicine.
- The patient would travel in a personal vehicle (not shared with another patient) or take commercial transportation.
- All patients under 16 years of age would have a companion.
- The distance between two locations was based on an Ontario map and was used to calculate the kilometers patients would travel to see the same specialist.

Administrative data was received from the NHTG program on total number of patient and companion grants, the number of grants by type of appointment (i.e., consultation, surgery, follow-up, procedure) and the amount of grants dispersed in 2002/03. In consultation with an NHTG program consultant, it was determined that consultation and follow-up appointments represented approximately 62% of the total grant disbursements for the NHTG program. Using this calculation we were able to determine potential savings to the NHTG program based on the NORTH Network’s current volume and activity.
Key Informant Interviews
Key informants are persons identified for interviews because they are considered to be highly knowledgeable regarding the topic of interest and are able to articulate their opinions. The NORTH Network project identified key informants who could comment on the background, structures, process and implementation activities of the NORTH Network project. The NORTH Network hired an external consulting group to conduct interviews with these stakeholders. All key informants received a notification in advance of their interview that outlined the objectives and process of the interview. A total of 34 interviews were conducted in April, 2003.

Focus Groups
Focus group interviews were developed to gather in-depth, rich data on knowledge of, experiences and satisfaction with the NORTH Network project, as well as recommendations to improve the program. They were conducted in different locations within the geographical territory covered by the NORTH Network Program to get regional representation and with representatives of different stakeholder communities (patients, physicians, allied health professionals, and Telehealth Coordinators) to obtain different perspectives on the program.

Participants were recruited by NORTH Network Telehealth Coordinators, who were encouraged to recruit people with a range of experiences with the telemedicine program. For patient groups, coordinators identified and invited potential participants who were 18 years of age and older and who had participated in at least one telemedicine consultation (this could include a family member of a patient). For allied health professionals and physicians, coordinators identified and invited individuals who had participated in at least one telemedicine consultation.

An invitation to attend a focus group, description of the focus group process, a copy of the interview questions and informed consent documentation were all developed by the NORTH Network and distributed to the Telehealth Coordinators to facilitate the recruitment of focus group participants (see Appendix H). This package of materials was given by the Telehealth Coordinators to focus group participants in advance to help them prepare for the focus group. Signed informed consent forms were collected prior to the start of the groups. All participants received a small honorarium to offset any expenses incurred in participating in the group discussion. (see Appendix I).

Eight focus groups were conducted between March 18 and April 29, 2003 (see Exhibit 4 for a list of focus group locations). There were four patient focus groups (two of which were in First Nation’s communities), two focus groups with physicians (e.g. pediatrician, surgeons, family physician, internist, dermatologist, pathologist), one focus group with allied health professionals (e.g., social worker, dietician, physical therapist, nurse educator) and one focus group with Telehealth Coordinators. The patient and physician focus groups were conducted in-person, and the allied health professional and Telehealth Coordinator focus groups were each conducted by video-conference, using the telemedicine technology.
Exhibit 4 – Number and Location of Focus Group Discussions

<table>
<thead>
<tr>
<th>Group</th>
<th>Location(s)</th>
<th># of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>Fort Severn &lt;br&gt;Keewaywin &lt;br&gt;Marathon &lt;br&gt;Kirkland Lake</td>
<td>30</td>
</tr>
<tr>
<td>Coordinators</td>
<td>Central ON Region via videoconference</td>
<td>5</td>
</tr>
<tr>
<td>Physicians</td>
<td>Thunder Bay &lt;br&gt;North Bay</td>
<td>11</td>
</tr>
<tr>
<td>Allied Health Professionals</td>
<td>Via videoconference (Orillia, Toronto, Barrie, Huntsville)</td>
<td>8</td>
</tr>
</tbody>
</table>

Focus group participants were told that the group would last from 60 to 90 minutes, and that they were free to participate in a manner that best suited them personally. They were encouraged to ask questions and told they could respond or not to any of the questions, as participation was voluntary. Where possible and with participants’ permission, the focus group session was tape-recorded to facilitate note taking. Two trained facilitators moderated each group and took notes to supplement the data collection process. The moderators independently reviewed their notes and interpreted the data from the focus groups. The moderators then came together to discuss their interpretations of the focus group data and through a consensus process developed the themes as findings from the focus groups.

**Patient Satisfaction Survey**

The NORTH Network Project developed a survey to measure the responses of patients that were referred for a telemedicine consultation (see Appendix J). The survey was designed to capture patients' experiences and satisfaction with the consultation, patient demographic data, and data on experiences with out-of-town health care consultations (including travel and expenses) including any costs incurred by the patient for participation in a telemedicine consultation.

The survey was sent to Telehealth Coordinators in all NORTH Network sites throughout Ontario to distribute to each patient referred for a consultation between June 1, 2002 and March 31, 2003. A total of 2,014 consultations were conducted during this period, representing the potential survey respondent pool. All adult patients who participated in a telemedicine consultation were offered the opportunity to complete the survey on a voluntary basis. The patients were informed that there would not be any impact on the health care services they received, whether or not the patient chose to complete the survey.
Completed surveys were returned to the NORTH Network Project office in Toronto, Ontario in bundles sent each month by the coordinators. The NORTH Network Project also received data from referral forms for all completed consultations (i.e., referral form data for all 2,014 telemedicine participants). A copy of the referral form is included as Appendix K. The referral form includes patient demographic data, and as such, it was possible to compare the demographic profile of survey respondents with those patients who had a consultation but chose not to complete the survey.

Each completed survey was screened for completeness. All returned surveys were judged to be sufficiently complete to warrant inclusion in the analysis. Data entry accuracy was confirmed through supervision of the data entry process.

Analysis of the survey involved three steps. First, responses to each question were tabulated. Secondly, for selected demographic questions, comparisons to referral data were calculated; in addition, a regional breakdown was conducted for selected questions pertaining to experiences with the Telemedicine project.

Movement Disorder Clinic Survey
A Telemedicine Movement Disorder Clinic survey (see Appendix L) was completed by 73 out of 89 patients between January and March, 2003 (82% response rate). These patients are movement disorder clinic patients, including those with Parkinson disease, who are being seen for follow-up visits via telemedicine. The purpose of the questionnaire was to determine whether these patients feel they are receiving adequate care via telemedicine as compared to their face-to-face visits. The questionnaires were mailed to all patients who had participated in a telemedicine visit through the movement disorder clinic since March 2002. Participants were asked to sign a consent form and return their questionnaire confidentially in a postage-paid envelope to the Toronto NORTH Network office.

Tele-psychiatry
The evaluation for the tele-psychiatry program assessed the costs of providing the service to each of the primary stakeholders, as well as its effects on access to mental health care, the clinical process of care, health outcomes, and user satisfaction. Data collection included interviews with the psychiatrist and community care providers, the evaluation of the clinical service through a chart audit and a survey of clients following their session and a 6-month follow-up.

Stakeholder Consultations
In March, 2003, a web-based survey was sent to 37 CEOs of NORTH Network’s member hospitals exploring satisfaction with NORTH Network partnerships and sustainability issues. Respondents were also invited to offer any additional comments about the NORTH Network, based on their experiences with or observations of the project. The online survey was developed by the evaluation consultants, Director of Programs and Operations and NORTH Network’s Executive Director. This was considered a preliminary survey of key informants prior to more in-depth interviews that followed. A total of 17 completed surveys were submitted (46% response rate).
With the support of the Ministry of Health and Long-Term Care, the NORTH Network contracted with an independent professional services firm to develop a joint plan with the other two Ontario telemedicine initiatives (SWOT-N and EOTN). To this end, extensive consultations were conducted with 35 telemedicine stakeholders including the leadership of the three provincial programs (NORTH Network, EOTN, SWOT-N), partners, providers, clients, funders and experts. These interviews were held in April and May, 2003 (see Appendix M for a list of individuals and organizations who participated).

**Telehealth Coordinator Training Survey**

A one-page evaluation tool was distributed to all Telehealth Coordinators following their participation in a clinical and technical training program. The questions focused on the training content including what was most helpful, least helpful and what could be improved for future training. A total of 88 out of 123 participants completed the questionnaire (71% response rate).

**Tele-ophthalmology**

Approximately 250 individuals in the Sandy Lake community had been diagnosed with diabetes as of the Fall of 2002. Seventy-six per cent of these individuals participated in the complications research project funded by the Canadian Institutes of Health Research (CIHR). A total of 136 patients (72%) were screened under the Tele-ophthalmology Pilot Project over a five week period. A brief questionnaire was completed by the consulting physician following the tele-consultation which asked questions about image clarity/readability, anomalies noted and recommendations for patient follow-up. Twenty-eight patients were also screened under the Tele-Ophthalmology Pilot Project in Fort Severn.

**Continuing Professional Development**

Continuing professional development (CPD) has been an integral part of the NORTH Network since its inception. It is important to note that accredited continuing professional development (CPD) events organized by the NORTH Network represent only one component of the overall educational activities offered through the network. Many other programs and partners use the NORTH Network infrastructure to deliver their educational events. The data presented in this report only captures attendance and feedback of accredited CPD sessions (called “Virtual Hospital Rounds”) and thereby represents only a small percentage of overall CPD programming on the Network.

The NORTH Network accredited CPD sessions are broadcast between multiple sites weekly, to address a range of topics suggested by northern practitioners. At the end of each presentation, participants are asked to complete a participant satisfaction form that measures satisfaction with both the program content and format. Evaluation forms were completed by 1,600 of the 2,392 individuals (67% response rate) who participated in a total of 67 accredited CPD events between October, 2001 and April, 2003.
4.0 Findings

In this section of the report, we present the results based on the three core components of the NORTH Network Project: the service framework; health care delivery; and, continuing professional development. The service framework includes the structures and processes that have been developed and are in place to facilitate the delivery of the NORTH Network project. Health care delivery refers to the activities that ensure patient access to care including scheduling, referral management and consultations. Continuing professional development refers to educational activities supported by the NORTH Network for physicians, nurses and allied health professionals. We integrated the results of data collected from multiple sources within each of the three components listed above.

4.1 Service Framework

4.1.1 Central Scheduling Office (CSO)

At the beginning of the CHIPP funding phase there were 14 sites in the NORTH Network providing 60-80 consultations per month. The CSO office had one full-time employee and one part-time RN. As the new sites (50 in May 2002) received their equipment and were trained, consultation volumes increased steadily. By the end of the CHIPP funding period, there were approximately 400 consultations a month. This represents a 400% increase. To accommodate this increase, the CSO hired a second full-time clerk and another part-time RN. By February 2003 a third full-time clerk was hired.

In addition to the increase in patient consultations there were increased requests for multi-point managed calls (sessions where more than two sites are involved). The volume of these sessions went from 6-10 to 50-60 per month (500% increase). The increased volume resulted in instances of scheduling conflicts between clinical and non-clinical (education/administrative) events. Automation of the Telehealth Service Manager (TSM) has significantly reduced these conflicts as issues are identified at the time of booking.

*Central scheduling office has been automated to accommodate the significant increase (400%) in consultation volume during the CHIPP funding period*
4.1.2 Training

To support the May 2002 simultaneous ‘go live’ of 50 sites, an extensive training program was conducted. All 123 individuals designated as Telehealth Coordinators at that time and all 32 Medical Directors participated in this clinical and technical training program. This represents the initial training program and does not reflect additional participation in ongoing training activities.

A one-page evaluation tool was distributed to the Telehealth Coordinators following this initial training (See Appendix N). The questions, which were open-ended, focused on the training content including what was most helpful, least helpful and suggestions for areas for improvement. A total of 88 participants completed the questionnaire (72% response rate). Overall, the coordinators valued the opportunity to have ‘hands-on’ experience using the technology and to conduct mock consults. Respondents reported high satisfaction with the training program and the ABC training manual. A number of participants expressed a desire to have had more hands-on time during the training session. Thus, arrangements were made for additional training sessions to be provided by the vendor to increase user skill level and comfort with medical peripherals. These sessions were very well attended and well received by the participants.

4.1.3 Help Desk

Technical support was initially provided by the Manager of Technical Services who was paged as required to provide assistance. As volume and activity increased and with a desire to continually deliver quality customer service it was determined that a dedicated Help Desk would be developed. The Help Desk was initiated in February, 2002 and fully functional in April, 2002. The objectives of the Help Desk are to manage and resolve incidents, collect and trend data and continuously improve service delivery. They manage and implement service level agreements with all vendors. In addition, they proactively identify and resolve potential problems before these problems impact users. Current technology enables the Help Desk to remotely assess end-user equipment over the network using protocols such as Simple Network Management Protocol (SNMP). Additional benefits include the capability to assess network integrity on an ongoing basis. A significant enhancement to the Help Desk service was the expansion to 24/7 coverage effective July 15, 2002. This was implemented to support the tele-stroke emergency application.

K-Net provided support for all First Nations communities, with NORTH Help Desk providing backup. A Service Level Agreement (SLA) was developed and approved to define the service commitments between the two organizations. NORTH and K-Net used the Remedy ticketing software as a common tool to track all service calls.
Exhibit 5 - Number of Help Desk Calls Per Month (April 2002 - March 2003)

* Note: 50 sites went “Live” May, 2002

On average, the Help Desk currently receives approximately 300 calls per month with some seasonal variability, lower in July, August and December (see Exhibit 5). It is important to note that there may be more than one call per incident. The calls are broken down as follows:

- 35% come from the Central Scheduling Office requesting management of bridge/gateway events.
- 25% come from Smart Systems for Health (the NORTH’s network provider)
- 40% come from NORTH’s member sites requesting technical assistance and or requesting technical troubleshooting.

Typically, the Help Desk receives a call and records it as a ‘ticket’ (1st level support); they then diagnose, troubleshoot and resolve the problem (2nd level support). If these steps are unsuccessful, the ‘ticket’ goes to the technical team (3rd level support) for further analysis and investigation. The top three types of problems reported are: Network/ telecommunications (64%), telemedicine workstations (10%), software (5%). On average, the Help Desk resolves more than 95% of issues at the first and second level, with less than 5% requiring escalation to 3rd level support staff.
4.1.4 Membership model

New members continue to join the NORTH Network. Overall hospital membership has increased approximately 300% from 14 to 54 during the CHIPP funding period.

NORTH Network membership grew 300% during the CHIPP funding period

4.1.5 Communications

The NORTH Network has embraced a comprehensive communication strategy using a number of interactive, multimedia approaches to facilitate communication with members, stakeholders and patients, and to maximize promotional opportunities and improve overall accessibility.

NORTH Network Website

During the CHIPP funding period, a website was developed as an important mechanism for the NORTH Network to use to communicate with members, staff and the general public. Website statistics including the number of hits and visits to the NORTH Network website were collected between November, 2002 and April, 2003. A hit means that a person opened a website page on the NORTH Network site. Visits are a subset of hits and indicate that an individual opened a website page and stayed for a defined period of time (e.g. 9 seconds). The number of hits per month to the NORTH Network website increased 800% from 4,005 to 36,083 in the six months from November, 2002 and April 2003 (see Exhibit 6). Website visits increased 664% from 192 per month to 1,467 per month during that same time period (see Exhibit 7).

Number of hits and visits to the NORTH Network website increased 800% and 600% respectively in the six months from November, 2002 and April, 2003
Presentations
Representatives of the NORTH Network have made numerous presentations at a variety of venues including the Canadian Society for Telehealth Conferences, American Telemedicine Association and to a multitude of audiences, including Provincial and Federal Ministries. See Appendix W for a list of presentations conducted during the CHIPP Project by the NORTH Network Executive Director.
Publications
Patient brochures were produced (7,000) and to date, 4,000 have been distributed to NORTH Network sites. These brochures are mailed to patients prior to their consultation. Health professional brochures were also developed and produced (2,500). To-date approximately 1,000 have been sent to physicians. In addition, posters are currently being produced for use in health professional offices across the province.

An electronic media and community launch package was developed and disseminated to Telehealth Coordinators in the summer of 2002. In addition, a NORTH Network Annual Report entitled ‘Report to Our Communities’ was developed during the CHIPP funding period and 5,000 copies have been produced and are being widely distributed.

Media Launches
A media kit was developed and distributed to all communities prior to their implementation. The media kits included a sample invitation to local MPPs, sample thank you note, a template news release for local media and a planning guide for organizing the community launch. Media launches were planned and conducted during the CHIPP funding period in the following communities:
- Parry Sound
- Dryden
- Kenora
- Marathon
- Englehart
- Smooth Rock Falls
- North Bay
- Huntsville
- Sturgeon Falls
- Balmertown
- Geraldton
- Hearst
- Sault Ste. Marie
- Red Lake
- Matheson
- Orillia
- Wawa
- Fort Frances
- Temiskaming
4.1.6 Special Projects

Diabetic Retinopathy in Native Canadians
A total of 136 patients were screened under the Tele-ophthalmology pilot project in the Sandy Lake Community. An earlier study by Harris et al (1997) demonstrated an overall crude prevalence rate of 17.1% for Type 2 diabetes in this community. This prevalence rate continues to be among the highest reported to date globally in studies which have used similar gold standard diagnostic methodologies. Approximately 250 individuals in this community had been diagnosed with diabetes as of the Fall of 2002. Seventy-six percent of these individuals participated in the CIHR-funded complications research project.

A brief questionnaire (see Appendix O) was completed by the consulting physician following the teleconsultation which asked questions about image clarity/readability, anomalies noted and recommendations for patient follow-up. The consultant was able to read the image clearly in 87.5% of patients and in 27% of these patients an anomaly was noted. For those 12.5% (n=17) whose image was unreadable, the physician recommended repeat photography or a clinical exam. It is important to note in this context that all photographs were taken without pharmacologic dilation.

Exhibit 8 - Summary of Tele-Ophthalmology Screening Consultations Sandy Lake (n=136)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were you able to read this image? (n=136)</td>
<td>119 (87.5%)</td>
<td>17 (12.5%)</td>
<td>0</td>
</tr>
<tr>
<td>Was there an anomaly noted? (n=119)</td>
<td>32 (27%)</td>
<td>83 (70%)</td>
<td>4 (3%)</td>
</tr>
<tr>
<td>Is follow-up in person required? (n=136)</td>
<td>20 (15%)</td>
<td>68 (50%)</td>
<td>48 (35%)</td>
</tr>
</tbody>
</table>

Recommendations:
Yearly screening: 67
Clinical exam: 18
Repeat photography: 17
No recommendations noted: 31

A total of 28 patients were also screened under the Tele-Ophthalmology Pilot Project in Fort Severn. The consultant was able to read the image clearly in 53% of patients and in 14% of these patients an anomaly was noted. An in-person clinical exam or repeat photography was recommended for 50% of the patients.

Exhibit 9- Summary of Tele-Ophthalmology Screening Consultations Fort Severn (n=28)

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Were you able to read this image?</td>
<td>15 (53%)</td>
<td>7 (25%)</td>
<td>Incomplete: 6 (21%)</td>
</tr>
<tr>
<td>2. Was there an anomaly noted?</td>
<td>4 (14%)</td>
<td>15 (54%)</td>
<td>NA: 9 (32%)</td>
</tr>
<tr>
<td>3. Follow-up in person required?</td>
<td>1 (4%)</td>
<td>14 (50%)</td>
<td>Either follow-up or repeat photography: 13 (46%)</td>
</tr>
</tbody>
</table>
| 4. Recommendations | Yearly Screening: 14 (50%)
Clinical exam: 1 (4%)
Repeat photography: 13 (46%) |
Informal feedback was also obtained from program staff. They indicated that the size of the camera and case made it difficult to transport between locations and that extra help was required to transport and load and unload the equipment. In addition, they identified having technical difficulties saving the images onto disk. They recommended that if the program was to be fully implemented, that a dedicated person be hired and that roles and responsibilities of staff be clarified.

**Tele-Dermatology Quality Assurance Activity**

A high degree of skill and comfort is required to effectively utilize the handheld patient camera that is used during tele-dermatology consultations. As a result of feedback of the dermatologist regarding the quality of the images and presentation of the site during the clinical examination, a review was conducted to identify the contributing factors (e.g. lighting, technology and user skill). It was determined that the principal contributing factor to poor images was variation in user skill. Therefore, a one-hour training session with all Telehealth Coordinators and their alternates was conducted in November, 2002. To evaluate the effectiveness of this training, the Sunnybrook and Women’s College Health Sciences Centre Telehealth Coordinator observed and documented any less than optimal clinical consultations utilizing the handheld patient camera during weekly Tele-Dermatology clinics between January and March, 2003. No adverse events were noted during this time period and there was increased satisfaction for both the dermatologist and the Telehealth Coordinators.

**Movement Disorders Clinics**

Movement disorder patients are followed at intervals in-person at the Movement Disorder Clinic located at Markham-Stouffville Hospital. Movement disorder includes Parkinson’s Disease and Huntington’s Disease, primarily chronic degenerative neurological disorders which require frequent expert follow-up and medication adjustments. Travel is particularly difficult for this patient population. Therefore, following an initial in-person consultation, out-of-town patients are offered the opportunity for follow-up appointments to be conducted via telemedicine.

A brief questionnaire was completed by 73 out of 89 patients (82%) who had attended a movement disorder telemedicine consultation since March, 2002. The surveys were completed between February and March, 2003.

Overall the respondents to the movement disorder survey felt that their telemedicine consultation was at least the same or better than an in-person visit when asked to comment on different aspects of the consultation (e.g. time, cost, access, quality of care, communication) (see Exhibit 10). In particular, they felt that the telemedicine visit was better or much better than a face-to-face visit with respect to the length (54%) and quality (48%) of time they had with the specialist. The remainder of respondents felt that it was the same as an in-person visit.

*Patients who traveled to a telemedicine visit overwhelmingly (94%) described this experience as better or much better than traveling for a face-to-face consultation*
Almost all respondents felt that the process of arranging the appointment was the same or better than a face-to-face visit (93%). Forty per cent of respondents felt that the waiting time between telemedicine appointments was better or much better than for an office visit. As well, respondents felt that the process to schedule the telemedicine appointment (52%), the check-in process at the telemedicine site (44%) and the waiting time in the telemedicine clinic (65%) were better or much better than an in person appointment. Patients who traveled to a telemedicine visit overwhelmingly (94%) described this experience as better or much better than traveling for a face-to-face consultation.

The responses were more varied around the issue of communication. Although the majority felt that the telemedicine visits were the same or better than an in-person appointment, with respect to communication issues, a small percentage thought that the telemedicine visit was worse with respect to their ability to discuss confidential problems (16%), to talk to the specialist (12%), to ask questions (11%) and that they were less comfortable talking about any problem (11%).

The majority of respondents felt that the quality of the health care they received was the same or better than an in-person consultation. In particular, they felt that the specialist was able to manage their Parkinson’s motor symptoms (97%), other symptoms (93%), other medical problems (90%) and that they had the same or better access to the specialist’s multidisciplinary team (88%).

Eighty-eight percent of respondents indicated that they had the same or better access to the movement disorder’s multidisciplinary team

The large majority of respondents stated that being closer to home and reduced travel time and traveling risks (e.g. winter driving) were huge advantages. Other advantages of the telemedicine program included the responsiveness and warmth of the staff, no waiting time spent in the physician’s office, the participation of caregivers in the appointment and the overall convenience and efficiency of the process.

When asked what they liked least about the telemedicine appointment, some respondents felt that videoconferencing was less personal than a face-to-face visit and that it might be more difficult communicating sensitive problems in this setting. A few respondents also mentioned that the individuals in the room with the physician were not familiar to them and that this led to some discomfort. They recognized that any initial discomfort they felt with their first telemedicine consultation would likely diminish with time.
Eleven individuals indicated that they received Northern Health Travel Grant Assistance to travel to the physician’s office for a total $1,601. The amount of individual assistance ranged from $80.00 to $290.00 (average $160.10). Three of these eleven individuals also indicated that they received Northern Health Travel Grant Assistance to travel to the telemedicine appointment (total $211.65, mean $70.75). Therefore, there was a minor incremental cost to the NHTG program for these telemedicine consultations. The majority of the respondents (94.5%) indicated that they saved out-of-pocket costs by using telemedicine for their appointment versus an office visit (average $85.10, range $10.00 – $800.00, total $4,425.00). In addition, almost all respondents (96%) indicated that they saved travel time with the telemedicine visit compared to an office visit (range 0.5 to 40 hours, average 5.2 hours).

Participants in the movement disorder telemedicine program indicated they saved both out-of-pocket costs (average $85.10) and travel time (average 5.2 hours) compared to an in-person visit.
### Exhibit 10 - Movement Disorder Clinic Questionnaire Summary of Responses

<table>
<thead>
<tr>
<th>Using telemedicine compared to traveling to Dr. Guttman’s office:</th>
<th>Much Better n (%)</th>
<th>Better n (%)</th>
<th>Same n (%)</th>
<th>Worse n (%)</th>
<th>Much Worse n (%)</th>
<th>Missing n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I felt Dr. Guttman was able to manage my Parkinson’s motor symptoms.</td>
<td>11 (15)</td>
<td>8 (11)</td>
<td>52 (71)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>2. I felt Dr. Guttman was able to manage my other symptoms relating to Parkinson’s (e.g. sleep problems, depression, other psychiatric problems etc...).</td>
<td>3 (4)</td>
<td>12 (16)</td>
<td>53 (73)</td>
<td>3 (4)</td>
<td>0 (0)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>3. I felt Dr. Guttman was able to manage my other medical problems.</td>
<td>2 (3)</td>
<td>13 (18)</td>
<td>50 (69)</td>
<td>5 (7)</td>
<td>0 (0)</td>
<td>3 (4)</td>
</tr>
<tr>
<td>4. How do you rate the length of time spent with Dr. Guttman?</td>
<td>13 (18)</td>
<td>26 (36)</td>
<td>30 (41)</td>
<td>2 (3)</td>
<td>0 (0)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>5. How do you rate the quality of time spent with Dr. Guttman?</td>
<td>13 (18)</td>
<td>22 (30)</td>
<td>37 (51)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>6. How do you compare your understanding of any treatment changes Dr. Guttman recommended?</td>
<td>6 (8)</td>
<td>11 (15)</td>
<td>51 (70)</td>
<td>5 (7)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>7. How do you compare your ability to talk to Dr. Guttman?</td>
<td>7 (10)</td>
<td>17 (23)</td>
<td>40 (55)</td>
<td>9 (12)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>8. How do you compare your ability to ask Dr. Guttman questions?</td>
<td>5 (7)</td>
<td>14 (19)</td>
<td>45 (62)</td>
<td>8 (11)</td>
<td>0 (0)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>9. Did you feel comfortable talking about any problem?</td>
<td>3 (4)</td>
<td>12 (16)</td>
<td>50 (69)</td>
<td>8 (11)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>10. Did you feel you could discuss confidential problems?</td>
<td>3 (4)</td>
<td>8 (11)</td>
<td>47 (64)</td>
<td>12 (16)</td>
<td>1 (1)</td>
<td>2 (3)</td>
</tr>
<tr>
<td>11. Do you feel you have the same access to Dr. Guttman’s nurses and social worker?</td>
<td>3 (4)</td>
<td>10 (14)</td>
<td>51 (70)</td>
<td>5 (7)</td>
<td>1 (1)</td>
<td>3 (4)</td>
</tr>
<tr>
<td>12. How was your overall experience with telemedicine compared to the office visits?</td>
<td>7 (10)</td>
<td>31 (43)</td>
<td>32 (44)</td>
<td>3 (4)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>13. How was your caregiver’s experience with telemedicine compared to the office visits?</td>
<td>12 (16)</td>
<td>20 (27)</td>
<td>33 (45)</td>
<td>4 (6)</td>
<td>0 (0)</td>
<td>4 (6)</td>
</tr>
<tr>
<td>14. How does the length of time between telemedicine appointments compare with the office visits?</td>
<td>9 (12)</td>
<td>13 (18)</td>
<td>49 (67)</td>
<td>2 (3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>15. How would you rate the process used to schedule and confirm your telemedicine appointment?</td>
<td>13 (18)</td>
<td>25 (34)</td>
<td>30 (41)</td>
<td>5 (7)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>16. How would you rate the check-in and registration process at your local telemedicine site?</td>
<td>10 (14)</td>
<td>22 (30)</td>
<td>40 (55)</td>
<td>1 (1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>17. How does the waiting time in the telemedicine clinic compare to waiting times in Dr. Guttman’s office?</td>
<td>12 (16)</td>
<td>36 (49)</td>
<td>25 (34)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>18. How would you describe your travel experience to the telemedicine clinic?</td>
<td>45 (62)</td>
<td>23 (32)</td>
<td>2 (3)</td>
<td>3 (4)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>
Tele-psychiatry for First Nations Communities

Mental health services to Northern First Nations communities can be provided in two ways: persons requiring mental health services can travel to where these services are available for in-person consultations; and/or, persons requiring mental health services can access these services through telemedicine in their community. These two methods of delivering mental health services understandably have different cost components as discussed below.

Providing mental health care services to remote First Nations communities without tele-psychiatry:

- Currently, to receive psychiatric care, clients and their escorts must use local air transportation to travel an average 300 km from their isolated communities to the Nodin Counselling Centre in Sioux Lookout.
- A time commitment of at least 36 hours on the part of both the client and an escort is required for the client to receive a 1-hour psychiatric counselling session.
- The total cost of this care is estimated to average $2,716 per client-session, which includes the cost of the referral assessment, travel and accommodation, the service itself, and those costs borne by the client’s home community.
- This does not take into account any additional costs incurred by the client or escort, such as foregone wages or the cost of alternative care for dependants left at home.

Using tele-psychiatry to bring mental health care services to remote First Nations communities:

- A 1½-hour tele-psychiatry session, conducted within a client’s home community, would require a time commitment of no more than 2 hours from the client. And there would likely be a reduced need for an escort.
- It is estimated that the total cost would average about $710 per client-session. This would include the cost of the referral assessment, the psychiatrist’s professional fees, the depreciation of the videoconferencing equipment at both sites, and an appropriate share of the telecom line charges.

Using the above calculations, the tele-psychiatry program potentially represents an average savings of $2006.00 per client-session. While clearly there are cost-savings with the tele-psychiatry project, there will be some transfer of costs to both the local community (from $170 to between $305 and $580) and to the Sioux Lookout First Nations Health Authority (SLFNHA) Client Services ($7).

In total, 25 clients met with the psychiatrist via videoconferencing, for a total of 40 sessions. The most common presenting problems were suicidal ideation, complicated grief, substance abuse, depression and anxiety. The service responded to significant mental health problems in the community, and was used by people in need who would otherwise have had little or no access to specialized mental health assessment and treatment. Please see the complete Evaluation Report on The Tele-psychiatry Pilot Project in Appendix V.

NORTH Network Phase II Evaluation
The distance created by not being face-to-face with the psychiatrist appears to have helped clients feel comfortable with the psychiatrist.

Clients demonstrated perfect attendance and expressed consistently positive perceptions of the confidentiality and benefits of the service that were maintained over time. The distance created by not being face-to-face with the psychiatrist appears to have helped clients feel comfortable with the psychiatrist. While many clients (60%) indicated they felt nervous during their session, the majority (80%) said they felt comfortable with the psychiatrist asking personal questions of them. Almost all the clients indicated that the psychiatrist had helped them with their emotional problems, and that they would recommend the service to people they care about who have emotional problems.

Both clients and health care providers liked the increased availability of mental health services in the community, without a requirement for travel. Both clients and local health care providers liked the service and wanted more of it.

Health care professionals and paraprofessionals reported increased continuity and coordination of care for clients and increased flexibility in their work. Front-line workers in the communities reported reduced isolation and increased support in their work. Extensive community orientation to the service (e.g., mass distribution of information brochures, community radio information programs and a community visit by the consultant) contributed to the successful introduction of the service. The opportunity to meet the consultant in the community helped clients become comfortable with the service.

The pilot project was successful, in part, because its organization and delivery responded to local needs and used a personal approach. In this, the skill and experience of staff contributed significantly to the success of the project. Service providers pointed to the potential for tele-psychiatry to increase continuity and follow-up in service; to deliver more specialized services (e.g., for children and adolescents); to foster more networking among community health workers and professionals; and to allow for more flexibility in the local management of services.
Stakeholder Feedback on NORTH Network’s Service Framework

The stakeholder consultation process identified the following key success indicators for the future of telemedicine:

- Consistent funding
- The ability to coordinate services across jurisdictions
- Clear legislation and policies
- A common vision for widespread expansion and adoption of services across the province and country

The NORTH Network is seen to have a strong management and employee team, a healthcare focus and a scaleable operation. Additional strengths cited are NORTH’s regional focus and the strong relationships that it has developed with partners and members. However, resources are currently seen to be inadequate to appropriately address the issues required for growth and expansion.

The stakeholders identified a consistent vision for the future of telemedicine that included the following:

- Interoperability (provincially, nationally and internationally)
- Regionally centric
- Centralized approach to planning and standardization
- Enhanced patient access
- Appropriate incentive based funding
- Convergence of electronic health records and telemedicine
- Resolution of legal issues
- One central funding point for telemedicine
- Clear accountability and reporting of activity
- Coordination between programs
- Extension to other services (e.g. homecare, clinics, social services)
- Increased system usage
- Improved efficiencies
- Government support
- Sustainability and growth of services
4.2 Health Care Delivery

The evaluation examined four aspects of improved health care: accessibility (including acceptability), quality, efficiency, and health care delivery integration. Much of the data on health care delivery were obtained through patient surveys and focus groups. The results of the analyses of these data are incorporated into the relevant sections below.

4.2.1 Accessibility

Indicators of improved access to health care include:
   a. Utilization
   b. Patient satisfaction and wait times
   c. Physician and allied health professional satisfaction
   d. Stakeholder satisfaction
   e. Acceptability

Utilization
Utilization data (i.e., number of consults per month, number of consults by specialty and by location) was collected using the existing paper-based system of recording completed consultations and/or through the on-line scheduling utility. The unit of measurement was each completed consultation.

A total of 3,935 patients were referred for telemedicine consultations during Phase II (April 2001-March 2003). The number of consultations per month rose from 64 in April 2001 to 401 in March, 2003 (less than anticipated due to SARS-related cancellations) (see Exhibit 11). The sites with the highest overall volume of patient consultations are Kirkland Lake (587), Timmins (499), Cochrane (325), Marathon (268) and Sudbury (202) (see Exhibit 12). During this 2 year time period (April 1, 2001 – March 31, 2003), 637 physicians either referred patients to or provided consultation through the NORTH Network and 51 Allied Health Professionals participated in patient consultations via the NORTH Network.

NORTH Network’s monthly volume of patient consultations increased by more than 500% during the CHIPP funding period (from 64 per month in April 2001 to 401 per month in March, 2003)

The sites with the highest volume of specialist consultations were Toronto (703), Sudbury (671), Thunder Bay (610) and North Bay (353) (see Exhibit 13). Existing referral patterns continue to be observed. In April, 2003, 90% of the telemedicine referrals from the Northwest region were handled by specialists in Thunder Bay. Only 10% of referrals required a consultation from a specialist outside the region.
Specialties with highest consultation volumes: dermatology, psychiatry, pediatrics, movement disorder, pain management

To date, the NORTH Network has provided consultations in 48 specialties (see Exhibit 14). The highest number of consultations by specialty are: dermatology (806), psychiatry (616), pediatrics (433), movement disorder (289) and pain management (187) (Exhibit 15).

Exhibit 11 - Number of Patient Consultations Monthly April 2001 - March 2003

NORTH Network Phase II Evaluation
Exhibit 12 - NORTH Network Sites with 100 or More Patient Consultations by April 2003
Exhibit 13 - Specialist Consultation Volume (NORTH Network Sites with Over 100 Consultations)

- Winnipeg Lakehead - TB
- NEORCC * Timmins - TB
- NEHMC ** St. Joes - TB
- McKellar - North Bay - TB
- Sick Kids - Sudbury
- Sunnybrook Memorial

* Northeastern Ontario Regional Cancer Centre - Sudbury
** Northeastern Ontario Mental Health Centre - Sudbury
### Exhibit 14 - Specialty Consultations Provided by the NORTH Network

<table>
<thead>
<tr>
<th>Current Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy</td>
</tr>
<tr>
<td>Amputee Clinic</td>
</tr>
<tr>
<td>Burn Management</td>
</tr>
<tr>
<td>Cardiology</td>
</tr>
<tr>
<td>Cardiovascular</td>
</tr>
<tr>
<td>Dermatology</td>
</tr>
<tr>
<td>Diabetic Education</td>
</tr>
<tr>
<td>Dietician</td>
</tr>
<tr>
<td>ENT</td>
</tr>
<tr>
<td>Eating Disorders</td>
</tr>
<tr>
<td>Endocrinology</td>
</tr>
<tr>
<td>Facial Retraining Physiotherapy</td>
</tr>
<tr>
<td>Family Visitation</td>
</tr>
<tr>
<td>Gastroenterology</td>
</tr>
<tr>
<td>General Surgery</td>
</tr>
<tr>
<td>Genetic Counselling</td>
</tr>
<tr>
<td>Geriatrics</td>
</tr>
<tr>
<td>Hepatology</td>
</tr>
<tr>
<td>Haematology</td>
</tr>
<tr>
<td>Immunology</td>
</tr>
<tr>
<td>Infectious Diseases</td>
</tr>
<tr>
<td>Internal Medicine</td>
</tr>
<tr>
<td>Movement Disorder</td>
</tr>
<tr>
<td>Nephrology</td>
</tr>
<tr>
<td>Neurology</td>
</tr>
<tr>
<td>Neurosurgery</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
In Cochrane and Kirkland Lake - two of the Network’s original sites pre-dating CHIPP - telemedicine has evolved to become a mainstream method of health care delivery. In the first phase of the NORTH Network project, approximately 5% of the populations of these towns had a telemedicine consult based on 1996 census data.

Patient Demographics
Data on patient demographics were obtained from the NORTH Network’s referral forms. Data were selected for the period June 1, 2002 through March 31, 2003, to correspond to the timeframe of the patient satisfaction survey. During this period, there were 2,014 individual telemedicine consultations. Of these patients, 825 completed a survey, representing a 41% survey participation rate. Patient demographics for survey respondents were compared to all other individuals (1,189) who had a telemedicine consultation during the same time period. There were no significant differences between these two groups which gives us confidence that survey respondents are representative of the other telemedicine participants. Over half (50.7%) of the survey respondents were located in the North East region, 31.8% were in the North West region, and the remainder were from “other” areas.

Patient Age
Of the patients who completed a survey, the average age was 42.8 years and the median age was 41 years (all other telemedicine participants were 41.5 years of age on average, and the median was 40 years). Therefore, it is reasonable to conclude that the survey participants were representative, in terms of age, of the total patient population who participated in a telemedicine consultation during the period of the survey. The chart below (Exhibit 16) breaks down the age of respondents by their region.
Exhibit 16 – Age of Survey Respondents and NORTH Network Consults by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Telemedicine Survey Respondents (years) (n=825)</th>
<th>Other Telemedicine Participants (years) (n=1,189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>42.8</td>
<td>41.5</td>
</tr>
<tr>
<td>North East</td>
<td>41.4</td>
<td>42.2</td>
</tr>
<tr>
<td>North West</td>
<td>38.5</td>
<td>40.3</td>
</tr>
<tr>
<td>All Other</td>
<td>54.3</td>
<td>40.5</td>
</tr>
</tbody>
</table>

Breakdown by Age Range (%)

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Telemedicine Survey Respondents (%) (n=825)</th>
<th>Other Telemedicine Participants (%) (n=1,189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>5.0</td>
<td>5.9</td>
</tr>
<tr>
<td>25-34</td>
<td>9.2</td>
<td>10.9</td>
</tr>
<tr>
<td>35-44</td>
<td>21.0</td>
<td>19.9</td>
</tr>
<tr>
<td>45-54</td>
<td>18.1</td>
<td>21.3</td>
</tr>
<tr>
<td>55-64</td>
<td>19.3</td>
<td>15.7</td>
</tr>
<tr>
<td>65+</td>
<td>27.4</td>
<td>26.3</td>
</tr>
</tbody>
</table>

Patient Gender

Nearly half (49.3%) of those who completed the patient satisfaction survey were female, which closely approximates the proportion of patients who participated in a telemedicine consultation, but did not complete a survey (52.6%). Thus, the survey sample is representative of the patient population in terms of gender. The chart below (Exhibit 17) breaks down the gender of respondents by their region:

Exhibit 17 – Gender of Survey Participants and NORTH Network Consults by Region (% Female)

<table>
<thead>
<tr>
<th>Region</th>
<th>Telemedicine Survey Respondents (%) (n=825)</th>
<th>Other Telemedicine Participants (%) (n=1,189)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>49.3</td>
<td>52.6</td>
</tr>
<tr>
<td>North East</td>
<td>49.8</td>
<td>52.9</td>
</tr>
<tr>
<td>North West</td>
<td>51.2</td>
<td>52.8</td>
</tr>
<tr>
<td>All Other</td>
<td>44.8</td>
<td>51.1</td>
</tr>
</tbody>
</table>

NORTH Network Locations

Exhibit 18 illustrates the distribution of completed surveys according to sites participating in the NORTH Network project. Survey respondents closely represented the distribution of patient consultations by site during that same period (June/02 to March/03). Kirkland Lake and Timmins accounted for about 10 per cent of the completed surveys each.
Exhibit 18 – Distribution of Completed Patient Surveys by NORTH Network Site

<table>
<thead>
<tr>
<th>Location</th>
<th>Distribution of Completed Surveys by Site (%)</th>
<th>Distribution of Patient Consultations by Site (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kirkland Lake</td>
<td>9.9</td>
<td>9.2</td>
</tr>
<tr>
<td>Timmins</td>
<td>9.9</td>
<td>11.9</td>
</tr>
<tr>
<td>Marathon</td>
<td>7.7</td>
<td>9.7</td>
</tr>
<tr>
<td>Cochrane</td>
<td>5.0</td>
<td>4.6</td>
</tr>
<tr>
<td>Sault Ste. Marie</td>
<td>4.8</td>
<td>4.3</td>
</tr>
<tr>
<td>New Liskeard</td>
<td>4.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Dryden</td>
<td>4.5</td>
<td>5.8</td>
</tr>
</tbody>
</table>

**Patient Occupational Status**

The chart below (Exhibit 19) illustrates the employment status of the 825 participants who completed the patient satisfaction survey. About one-third of the respondents were working full-time or part-time, 28.3% were retired, approximately 15% were on some type of disability insurance, another 12% reported they were students, just under 7% said they were homemakers, and 4.4% were not employed at the time of the survey.
**Patient Income**

The patient satisfaction survey also asked respondents to self-report their annual income. This optional question was answered by 391 participants (47.4%) of the overall 825 who completed the survey. Of the 391 respondents, just over one-third of the participants (34.5%) reported that they earned less than $15,000 in a year. Another one-quarter (25.3%) earned at least $15,000 a year but less than $30,000. The remaining 40% of the survey respondents reported they earned at least $30,000 in a year. However, it is not clear if this is an individual or a household income that the respondent is self-reporting. This is due to ambiguity in the question wording. Respondents were asked to check off the box that corresponded to the statement, “My annual income is:” (boxes of different annual income ranges were presented).

**Time Period to Telemedicine Consultation**

The patient satisfaction survey asked respondents to indicate the amount of time that lapsed from the point a family doctor made the referral to a telemedicine specialist to the time the telemedicine consultation occurred. Survey respondents were offered three options: less than one week, one to three weeks, and more than three weeks. Just over half (51.1%) of the patients surveyed reported that it took more than three weeks to have a telemedicine consultation from the time it was recommended by their family physician, 36% said it took between one and three weeks and about 13% said it took less than one week to have the consultation.

*49% of survey respondents had their telemedicine appointment within 3 weeks of referral*

The ability to access a telemedicine consultation in a timely manner after the physicians’ recommendation was identified as a key benefit of the NORTH Network project by participants in the two patient focus groups. Patients in these two focus groups commented on their concerns about delays in access or lack of access to specialty consultation in the absence of a telemedicine initiative.

**Potential barriers/challenges to access**

Participants in the patient, physician, allied health professional and Telehealth Coordinator focus groups identified potential barriers to access the telemedicine program. The main barriers included:

- Confusion between NORTH Network telemedicine and the Telehealth Ontario program (Registered Nurse telephone advice service)
- Need for more promotion of the telemedicine program to family physicians, specialists and the community
- Part-time availability of Telehealth Coordinators at each site (competing demands on time of part-time Telehealth Coordinators)
- Lack of sustainable funding
Focus group participants felt that the telemedicine program needs to establish a brand name that separates it from the province’s 1-800 telehealth service. The NORTH Network project acknowledges this confusion. While used by the project, the term “telemedicine” does not fully embrace the NORTH Network project philosophy, as the project promotes more than medicine, to include health education, health promotion, and multi-disciplinary care. Nevertheless, the NORTH Network is cognizant that confusion remains between the two initiatives. The Ministry of Health has requested that the three provincial telemedicine initiatives not use the term Telehealth so as to avoid confusion with the Telehealth Ontario program. Consequently, SWOT-N, EOTN and the NORTH Network have named their collaborative initiative ‘Telemedicine Networks of Ontario’ (TNO).

Telehealth Coordinators have developed and implemented a number of strategies to facilitate telemedicine promotion. These strategies included (but were not limited to): advertisements in local newspapers and newsletters, participation in local community events, delivering rounds, and establishing a local advisory committee. Local coordinators report spending valuable time on promotion and request additional corporate promotional materials and assistance with local issues. A combination of program-based and locally relevant promotion seems ideal.

At present, the position of Telehealth Coordinator is part-time. People are assigned to this work by their local hospitals, as a portion of their FTE. However, participants in the coordinators focus group stated that, as the number of referrals has increased substantially (this number is anticipated to continue to grow), the current approach to resource this position should be changed to a full-time resource and/or secure administrative assistance at busy sites to manage educational and administrative activities.

**Full-time Telehealth Coordinators are needed in response to increased utilization**

Funders and stakeholders have invested time, effort and money to support, facilitate or develop the infrastructure and technology of the NORTH Network project. Focus group participants were concerned whether this investment was at risk of being withdrawn and whether future funding was unavailable. As the patient satisfaction survey has shown, and comments from the focus groups reinforces, the NORTH Network project has generated enthusiasm and increased utilization, while contributing to patient and provider satisfaction. Focus group participants reinforced the need for sustainable program funding to ensure access to specialty services in the North.

**Focus group participants identified the need for sustainable program funding to ensure access to specialty services in Northern Ontario**

*NORTH Network Phase II Evaluation*
Similar feedback was also obtained from the NORTH Network project stakeholders through the preliminary online stakeholder survey conducted in April, 2003. Seventeen of 37 stakeholders responded to this online survey (46% response rate). The stakeholders were asked, “How concerned would you be if the NORTH Network Program were to be discontinued?” Of the 17 respondents, 15 (88.2%) said they would be “very concerned” if the program were discontinued (See Appendix R).

**Patient Satisfaction and Wait Times**

Patients were asked if they were comfortable with their telemedicine consultation, to report their overall satisfaction with the telemedicine consultation, and if they would participate in a future telemedicine consultation if their family doctor recommended it. Nearly all of the patients who completed the survey (97%) reported they were comfortable with their telemedicine consultation. Moreover, nearly everyone (96%) agreed or strongly agreed with the statement that the telemedicine consultation was satisfactory. Nine out of 10 people would be pleased or very pleased to have another telemedicine consultation if it were recommended by their family physician. The NORTH Network project, therefore, is highly regarded by the patients who completed the survey.

| 96% of survey respondents were satisfied with their telemedicine consultation and 90% would be pleased or very pleased to have another consultation if recommended by their family physician |

Participants in the four patient focus groups reported a very high degree of satisfaction with the telemedicine program. They articulated a number of key benefits of the program that have contributed to their satisfaction, including:

- More convenient for patients due to less traveling and less disruption to family and daily living
- More cost-effective for the patient, with less out-of-pocket costs and lost wages through time off work to travel to out-of-town specialists
- They do not have to apply for Northern Travel Grants, which many described was a stressful and disruptive process
- Broader access to a wide range of specialist services
- Potential to receive patient education through the telemedicine technology

**Alternate Treatment Options**

Following the telemedicine consultation, the patient satisfaction survey asked respondents what treatment option they would have chosen if telemedicine had not been available. Of patients who responded, 86.5% indicated that they would travel to see an out-of-town specialist. The remainder indicated that they would continue to see their family doctor for treatment (8.2%), or wait for a visiting specialist (5.3%).

*NORTH Network Phase II Evaluation*
For those who indicated they would travel to see a specialist, nearly one quarter (23.7%) indicated they would go to Toronto, and a similar proportion (23%) said they would likely go to Thunder Bay. Sudbury was their third choice (17.2%), followed by Markham (11.9%), North Bay (9%) and Winnipeg (6.8%).

The chart below illustrates survey respondents’ expectations for the length of time they would need to wait before they would be able to have an in-person specialist consultation (see Exhibit 20). The options were: less than two weeks, two to four weeks, one to three months, and more than three months. These timeframes are not comparable to those offered to survey respondents when asked how long it took to have a telemedicine consultation from the time it was recommended to them by their family physicians. However, the responses presented in the Exhibit 19 clearly show that patients expect in-person specialist visits to take considerably longer than a telemedicine consultation. Nearly three-quarters of the survey respondents (71.1%) reported they expected to wait at least one month for a specialist visit (about 38% said more than three months) from the time it was recommended by their physician (in contrast to about 50% who said it took less than three weeks to have a telemedicine consultation).

Survey respondents indicated that they would see a specialist within a shorter timeframe for a telemedicine consultation versus an in-person appointment.
31.8% of patient survey respondents anticipated that it would take at least 4 months from the time of referral to get an in-person appointment with a specialist.

The patient satisfaction survey also asked how much time they would expect to have to travel to have an in-person health consultation (see Exhibit 21). More than one-third of the respondents (37.8%) expected they would be able to travel to and from their in-person specialist visit in the same day. Just over one-quarter of the survey respondents (27.3%) reported they would expect to travel overnight, and 34.9 percent expected it would take at least two or more days of their schedule to participate in an in-person specialist consultation. As stated earlier, patients in the focus groups commented negatively on the disruption, costs and inconvenience imposed on them and of family members or other companions who would be traveling with them to attend an out-of-town consultation.

62% of patient survey respondents reported that a face-to-face consultation would require at least one overnight stay away from home.
Physician Professional Satisfaction

Focus groups were conducted with physicians in Thunder Bay and North Bay to assess their knowledge of, needs, expectations and satisfaction with the NORTH Network project. A total of 11 physicians representing different disciplines participated in the two groups. Some of the participants had participated in several telemedicine consultations while others had much less experience with the project.

The physician participants agreed that telemedicine has improved access to specialty services in the north. They identified a number of benefits to patients and to themselves resulting from telemedicine, including:

Patient Benefits:
- More convenient and less disruptive to patients due to less traveling
- Equalization of services between cities and outlying communities
- Cost savings for the patients and for the travel grants program
- Perceive patients to be satisfied with the telemedicine consultation

Physician Benefits:
- Improves communication and relationships with health care professionals and specialists
- Broader access to patients
- Broader access to other specialists
- Easier to bring in other health care professionals and specialists for case consultation
- Improves opportunities for professional education
- Likely to help with the retention of physicians and specialists in the NORTH, since telemedicine helps to decrease “professional isolation”
**Stakeholder Satisfaction**

A preliminary online survey of 37 CEO’s of NORTH Network’s member hospitals was conducted prior to more in-depth key informant interviews. A total of 17 completed surveys were submitted (46% response rate). More than two-thirds (68.8%) of the respondents to the stakeholder survey reported that the NORTH Network met their expectations ‘very well’. The majority of the respondents felt that most of the objectives of the project are very appropriate (82 – 100%). However, they were less comfortable with the objective ‘to support medical specialists currently practicing in rural and Northern communities by respecting existing referral patterns’ with 59% rating this ‘very appropriate’ and 41% ‘somewhat appropriate’. The majority of the respondents indicated that the objectives were being achieved (see Exhibit 22). For the objectives, 53% to 76% indicated that the objectives were ‘very well’ achieved.

**Exhibit 22 – How Well Do You Believe Each Objective is Being Achieved?**

<table>
<thead>
<tr>
<th>Objective</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very Well</td>
</tr>
<tr>
<td>1) To improve access to medical specialty care for residents of remote and rural communities</td>
<td>71% (12)</td>
</tr>
<tr>
<td>2) To reduce costs associated with long distance travel</td>
<td>76% (13)</td>
</tr>
<tr>
<td>3) To support medical specialists currently practicing in remote and rural communities by respecting existing referral patterns</td>
<td>62% (10)</td>
</tr>
<tr>
<td>4) To reduce professional isolation through increased access to continuing professional development and peer support</td>
<td>47% (8)</td>
</tr>
<tr>
<td>5) To build a high quality, reliable, scaleable, cost-effective, and sustainable network capable of supporting the delivery of medical care and education</td>
<td>53% (9)</td>
</tr>
</tbody>
</table>

**Acceptability**

Participants in the focus groups (patients, physicians, allied health professionals) all expressed a high degree of satisfaction with the telemedicine consultation and reported a high degree of acceptance with the process, including the use of technology and communication with members of the health care team. Most patient participants expressed a certain amount of “surprise” at the quality of the technology, describing it as “…just like sitting in the doctor’s office” and in some instances better with respect to the appointment being on time and having more focused attention of the physician. One participant felt that they had “100% of the doctor’s attention for 100% of the time they were there”. Equally, physicians and health care professionals expressed a high degree of satisfaction with the telemedicine consultations including the quality of the image and clarity of the voice transmission.
Most participants did not express any concern about privacy. They described the telemedicine consultation as not being much different than an in-person appointment. They felt that the consultation was being conducted in the same confidential manner as would be the case with an in-person visit. Health care providers felt the consultations were coordinated and managed professionally by telemedicine staff, and that patients were made to feel as comfortable as possible with the consultation.

Some patient focus group participants expressed an interest in ensuring there was an “option” to visit the specialist in-person. Physicians and allied health professional focus group participants also wanted the option of in-person visits, particularly for specific types of care.

Patients thought that some types of consultation would not be appropriate using telemedicine. For example, some patients would not participate in a consultation where the physical exam involved a more invasive procedure (e.g., gynecological examinations). Some other patients felt that situations where the specialist would be imparting “bad news, such as telling you that you have a terminal disease” should not be done through a telemedicine consultation.

Overall, most patients felt they were well prepared about what to expect to happen in the telemedicine consultation. However, a few patients felt they were less well prepared or not prepared. For example, patients and physicians in the focus groups wanted more clarification on the role of the telemedicine staff member. Patients were not sure if they could ask the telemedicine staff member to leave the consultation if the patient wanted to talk privately with the specialist or with their companions. Further, several of the patients did not realize that there would be two television screens, one that projected the image of the specialist, and one that projected the patient’s image during the consultation. Some patients felt they would like to be able to turn off the second television that projected their image, because, as one individual described, “it was very distracting. I kept looking from one screen to the other screen....checking what I looked like, looking back at the doctor...I didn’t like seeing myself.”

Some physicians thought full acceptance of the technology among some health care professionals will take time to achieve, due to the current lack of portability of some video equipment and the impact on the specialists time. At the moment, most physicians have to travel to a designated location to use the technology to participate in the consultation. In addition to this impact on physician time, the telemedicine consultation is not fully integrated into routine practice. Physicians stated that once the technology can be incorporated directly into the physicians’ offices and clinics, it should become a routine part of practice and lead to increased acceptance and utilization of the telemedicine consultation. As one individual stated, “the closer it [the technology] gets, the more accessible it is to everyone”.

NORTH Network Phase II Evaluation
Physicians also thought that the technology did not allow for “spontaneity” during the consultation. They thought that the technology resulted in a more “artificial communication between the patient and the doctor”. In contrast, however, the majority of the patients did not feel the same way. Apart from the presence of the equipment, most felt they were able to talk and ask questions in much the same fashion as they would if they were in an in-person consultation.

In summary, there was a high degree of satisfaction with and acceptance of the telemedicine consultation by both patients and health care providers. Several focus group participants in the different groups commented on how this “popularity” will likely result in higher utilization of the telemedicine program. Some wondered, however, if increased access would cause problems for scheduling patient consultations.

Patients, physicians and allied health professionals reported a high degree of satisfaction and acceptance of the technology and the telemedicine consultation process

### 4.2.2 Cost Savings of Telemedicine

As previously stated, the methodologies to measure the cost implications and cost-effectiveness of telemedicine consultation are varied and inconsistently applied. The patient satisfaction survey was designed to elicit information from patients on the cost of telemedicine consultations and in-person specialist visits.

The methodology and methodological issues for the cost measurement approach was presented in Section 3.0 of this report. In brief, a number of measures of cost were included in the survey: time to attend a telemedicine consult, self-reported out-of-pocket expenses, and anticipated reimbursement and proportion of expense reimbursement from the Northern Health Travel Grants program to attend an in-person specialist visit.

**Patients Time and Expenses**

Patients were asked to estimate the amount of time they took to attend a telemedicine consultation, including travel time to the clinic, waiting for the appointment, seeing the specialist and returning home. On average, patients reported that slightly more than two hours of time was taken from start to finish of the consultation, including travel time to and from the telemedicine clinic (median was one hour, standard deviation of 7.43 hours).

Patients report that significantly less time is required to attend a telemedicine consultation versus an in-person appointment
Patients also estimated their expenses for a telemedicine consultation. The average cost of expenses to travel to and participate in a telemedicine consultation was just under twenty dollars (median of $0, standard deviation of $146.37). Exhibit 23 presents these expenses by region. As the chart illustrates, the time required for participation in a telemedicine consult is higher in the North West region, compared to other regions, and higher than the overall average. In addition, the average cost of expenses to attend a telemedicine consultation in the North West region are nearly twice that of the overall average, and more than two-and-a-half times the average cost of expenses of the other regions.

**Exhibit 23 – Average Expenses by Region: Telemedicine Versus In-person Consultation**

<table>
<thead>
<tr>
<th>Expenses (Dollars)</th>
<th>Telemedicine</th>
<th>In-person Consultation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>$19.91</td>
<td>$361.97</td>
</tr>
<tr>
<td>North East</td>
<td>$13.61</td>
<td>$298.40</td>
</tr>
<tr>
<td>North West</td>
<td>$34.20</td>
<td>$569.83</td>
</tr>
<tr>
<td>All Other</td>
<td>$11.30</td>
<td>$73.68</td>
</tr>
</tbody>
</table>

Interestingly, about one-in-five patients (22%) reported they took time off work to attend the telemedicine appointment. Of these, 60% took an unpaid day, 28% reported they took a sick leave day, and 12% reported they took a vacation day. Patients were not asked to indicate the amount of income they lost from missing work.

Half of the survey respondents (50.1%) reported they were accompanied to the telemedicine appointment by a family member, 42.2% said they went alone, and 7.8% were accompanied by a friend or other individual (e.g., health care worker). Of the participants accompanied by a family member, about 20 per cent said the family member lost time from work, 8.7% of friends lost time from work, and 8.1% of other companions lost time from work. Participants were not asked if the individuals who came with them to the appointment who lost time from work also lost income.

**Patient’s Self-Reported Out-of-Pocket Costs**

Participants were asked about the anticipated personal time and cost impacts if they have to travel to an out-of-town specialist for a health consultation. First, the data show clearly that out-of-town consultations have a significantly greater impact on personal time. We described earlier how patients would, on average, lose more than one day to attend an out-of-town consultation, compared to a few hours to attend a telemedicine consultation. The time commitment is exacerbated for companions accompanying the patients to an out-of-town consultation.
Survey respondents also reported the anticipated cost of expenses to attend an out-of-town specialist consultation. On average, patients reported they expected to pay about $362.00 (median of $200.00, standard deviation of $577.08) to attend an out-of-town specialist health consultation (about 25% of participants estimated the cost to be approximately $80.00). Exhibit 23 also presents a breakdown of the anticipated costs of an out-of-town consultation by region. It is not surprising that the average cost to see an out-of-town specialist for patients in the North West planning region is substantially higher than the expected cost for other regions due to the greater distances to be travelled and the fewer options available for travel (for example, fewer roads).

Patients report significant out-of-pocket cost savings in having a telemedicine consultation versus an in-person appointment

Northern Health Travel Grants Program
The NORTH Network’s administrative data were used to calculate the number of kilometers that would qualify a patient for reimbursement (‘qualifying kilometers’) had the individual traveled for the consultation. For the purposes of this calculation, ‘qualifying kilometers’ are the distance patients would have traveled to see the same specialist. A companion has also been included for those individuals who were under 16 as per the guidelines of the Northern Health Travel Grant Program (NHTG). The potential savings to the NHTG Program were calculated based on their formula (round trip minus 100 kilometers x $.3425). The consultations included in this analysis took place between April, 2001 and March, 2003 in the areas covered by the NHTG Program (Algoma, Cochrane, Kenora, Manitoulin, Muskoka, Parry Sound, Rainy River, Sudbury, Temiskaming and Thunder Bay). The calculations are based on the assumption that the individual would have traveled for the consultation if the telemedicine program had not been available. These calculations did not account for the possibility that more than one patient could have traveled together to the same destination. Based on these calculations, there was potential savings of $1.26 million for the NHTG program (see Exhibit 24). The Northern Health Travel Grants Program only covers areas North of the Central Ontario Region. The KO Region is covered by the Non-insured Health Benefits Program under Health Canada which reimburses for travel and related costs for medical appointments. Therefore, our calculations will underestimate the potential for provincial travel savings.
<table>
<thead>
<tr>
<th>Location</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Q7</th>
<th>Q8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atikoken</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 191.80</td>
<td>$ 191.80</td>
<td>$ 5,315.60</td>
<td>$ 287.70</td>
<td>$ 5,986.90</td>
</tr>
<tr>
<td>Chapleau</td>
<td>$ 9,822.90</td>
<td>$ 2,027.60</td>
<td>$ 10,076.35</td>
<td>$ 22,057.00</td>
<td>$ 11,672.40</td>
<td>$ 4,870.35</td>
<td>$ 6,873.98</td>
<td>$ 8,990.63</td>
<td>$ 76,391.21</td>
</tr>
<tr>
<td>Cochrane</td>
<td>$ 8,425.50</td>
<td>$14,891.90</td>
<td>$ 17,844.25</td>
<td>$ 17,857.95</td>
<td>$ 16,248.20</td>
<td>$ 11,802.55</td>
<td>$ 15,679.65</td>
<td>$ 15,364.55</td>
<td>$ 118,114.55</td>
</tr>
<tr>
<td>Dryden</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 794.60</td>
<td>$ 8,802.25</td>
<td>$ 15,552.93</td>
<td>$ 22,368.68</td>
<td>$ 47,518.46</td>
</tr>
<tr>
<td>Elliot Lake</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 822.00</td>
<td>$ 369.90</td>
<td>$ 554.85</td>
<td>$ 575.40</td>
<td>$ 2,322.15</td>
</tr>
<tr>
<td>Englehart</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 726.79</td>
<td>$ 2,200.22</td>
<td>$ 2,217.35</td>
<td>$ 4,855.28</td>
<td>$ 9,999.64</td>
</tr>
<tr>
<td>Espanola</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 972.70</td>
<td>$ 972.70</td>
</tr>
<tr>
<td>Fort Frances</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 5,017.63</td>
<td>$ 10,514.35</td>
<td>$ 20,037.08</td>
<td>$ 21,858.35</td>
<td>$ 57,427.41</td>
</tr>
<tr>
<td>Geraldton</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 1,016.54</td>
<td>$ 6,074.58</td>
<td>$ 6,064.99</td>
<td>$ 17,303.10</td>
<td>$ 30,459.21</td>
</tr>
<tr>
<td>Gore Bay</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 2,399.56</td>
<td>$ 2,082.40</td>
<td>$ 4,243.58</td>
<td>$ 2,089.94</td>
<td>$ 10,815.48</td>
</tr>
<tr>
<td>Hearst</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 2,846.18</td>
<td>$ 3,305.81</td>
<td>$ 8,202.88</td>
<td>$ 8,733.75</td>
<td>$ 23,088.62</td>
</tr>
<tr>
<td>Huntsville</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 787.75</td>
<td>$ 1,318.63</td>
<td>$ 3,298.28</td>
<td>$ 4,267.55</td>
<td>$ 9,672.21</td>
</tr>
<tr>
<td>Iroquois Falls</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 2,519.43</td>
<td>$ 7,809.00</td>
<td>$ 3,452.40</td>
<td>$ 3,041.40</td>
<td>$ 16,822.23</td>
</tr>
<tr>
<td>Kapuskasing</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 2,589.20</td>
<td>$ 4,692.25</td>
<td>$ 6,096.50</td>
<td>$ 12,097.10</td>
<td>$ 25,475.05</td>
</tr>
<tr>
<td>Kenora</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 212.35</td>
<td>$ 2,414.63</td>
<td>$ 7,418.55</td>
<td>$ 7,898.05</td>
<td>$ 17,943.58</td>
</tr>
<tr>
<td>Kirkland Lake</td>
<td>$14,268.55</td>
<td>$20,338.34</td>
<td>$ 26,557.45</td>
<td>$ 22,167.29</td>
<td>$ 27,732.23</td>
<td>$ 21,430.23</td>
<td>$ 21,437.08</td>
<td>$ 17,399.00</td>
<td>$ 171,330.17</td>
</tr>
<tr>
<td>Little Current</td>
<td>$ 280.17</td>
<td>$ -</td>
<td>$ 2,515.32</td>
<td>$ 1,933.76</td>
<td>$ 3,609.95</td>
<td>$ 2,657.12</td>
<td>$ 723.36</td>
<td>$ 2,075.55</td>
<td>$ 13,795.23</td>
</tr>
<tr>
<td>Manitouwadge</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 431.55</td>
<td>$ 3,043.46</td>
<td>$ 6,632.17</td>
<td>$ 7,783.66</td>
<td>$ 17,890.84</td>
</tr>
<tr>
<td>Marathon</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 140.43</td>
<td>$ 6,072.53</td>
<td>$ 28,369.28</td>
<td>$ 21,676.83</td>
<td>$ 56,259.07</td>
</tr>
<tr>
<td>New Liskeard</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 1,852.93</td>
<td>$ 1,489.88</td>
<td>$ 8,517.98</td>
<td>$ 18,571.40</td>
<td>$ 30,432.19</td>
</tr>
<tr>
<td>Nipigon</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 825.70</td>
<td>$ 835.70</td>
<td>$ 1,876.90</td>
<td>$ 1,835.80</td>
<td>$ 1,452.20</td>
<td>$ 6,826.30</td>
</tr>
<tr>
<td>North Bay</td>
<td>$</td>
<td>$</td>
<td>$ 404.15</td>
<td>$ 808.30</td>
<td>$ 2,603.00</td>
<td>$ 2,534.50</td>
<td>$ 5,134.08</td>
<td>$ 3,459.25</td>
<td>$ 14,943.28</td>
</tr>
<tr>
<td>Parry Sound</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 222.63</td>
<td>$ 849.40</td>
<td>$ 1,061.75</td>
<td>$ 1,328.90</td>
<td>$ 3,462.68</td>
</tr>
<tr>
<td>Red Lake</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 1,578.93</td>
<td>$ 4,610.05</td>
<td>$ 4,928.58</td>
<td>$ 14,782.30</td>
<td>$ 25,899.86</td>
</tr>
<tr>
<td>Sault Ste. Marie</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 349.35</td>
<td>$ 9,456.43</td>
<td>$ 7,791.88</td>
<td>$ 16,073.53</td>
<td>$ 7,487.05</td>
<td>$ 41,158.24</td>
</tr>
<tr>
<td>Smooth Rock Falls</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 2,520.80</td>
<td>$ 736.38</td>
<td>$ 863.10</td>
<td>$ 2,308.45</td>
<td>$ 6,428.73</td>
</tr>
<tr>
<td>Sturgeon Falls</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 1,688.53</td>
<td>$ 3,120.18</td>
<td>$ 5,137.50</td>
<td>$ 9,946.21</td>
<td></td>
</tr>
<tr>
<td>Sudbury</td>
<td>$ 3,476.38</td>
<td>$ 6,521.20</td>
<td>$ 4,175.08</td>
<td>$ 6,288.30</td>
<td>$ 9,192.70</td>
<td>$ 5,394.38</td>
<td>$ 9,528.35</td>
<td>$ 8,997.48</td>
<td>$ 53,573.87</td>
</tr>
<tr>
<td>Terrace Bay</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 339.08</td>
<td>$ 1,243.28</td>
<td>$ 972.70</td>
<td>$ 2,990.03</td>
<td>$ 5,545.09</td>
</tr>
<tr>
<td>Timmins</td>
<td>$16,755.10</td>
<td>$12,816.35</td>
<td>$ 20,111.60</td>
<td>$ 15,563.20</td>
<td>$ 17,775.75</td>
<td>$ 23,755.80</td>
<td>$ 31,270.25</td>
<td>$ 13,124.60</td>
<td>$ 151,172.65</td>
</tr>
<tr>
<td>Thunder Bay</td>
<td>$ 2,722.88</td>
<td>$ -</td>
<td>$ 26,297.15</td>
<td>$ 22,063.85</td>
<td>$ 42,315.88</td>
<td>$ 32,177.88</td>
<td>$ 44,288.68</td>
<td>$ 17,868.23</td>
<td>$ 187,734.55</td>
</tr>
<tr>
<td>Wawa</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$ 2,507.10</td>
<td>$ 3,572.28</td>
<td>$ 2,990.25</td>
<td>$ 9,069.63</td>
<td>$ 1,258,477.99</td>
</tr>
</tbody>
</table>

**Total** $55,751.48 $56,595.39 $108,807.05 $109,089.00 $168,452.42 $186,308.02 $293,337.77 $280,136.86 $1,258,477.99

**NORTH Network Phase II Evaluation** 93
To help understand the potential savings to the NHTG program, a few examples have been developed. First, we looked at what the cost to the program would be for a person who resided in Timmins (Northeast Region) to travel to Toronto for an in-person visit. The distance from Timmins to Toronto is 1,360 kilometers. If the patient is eligible for a travel grant, 100 kilometers would be deducted from the total distance and the reimbursement calculation of $0.3425/qualifying kilometer would be applied. Thus, the individual from Timmins would be reimbursed $421.55 \((1360-100)\times 0.3425\). Similarly, a person from Atikoken (Northwest Region), which is located 380 kilometers from Thunder Bay Regional Hospital, would be reimbursed $95.90. The chart below (Exhibit 25) shows these examples to demonstrate the potential for significant cost savings to the NHTG program. A diagram depicting these savings is shown as Appendix S.

### Exhibit 25 – Potential Northern Health Travel Grant Program Savings

<table>
<thead>
<tr>
<th>Location</th>
<th>Destination</th>
<th>Total Distance (km)</th>
<th>Eligible NHTG Reimbursement ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timmins</td>
<td>Toronto</td>
<td>1360</td>
<td>421.55</td>
</tr>
<tr>
<td>Chapleau</td>
<td>Toronto</td>
<td>1580</td>
<td>506.90</td>
</tr>
<tr>
<td>Thunder Bay</td>
<td>Toronto</td>
<td>2750</td>
<td>807.62</td>
</tr>
<tr>
<td>Atikoken</td>
<td>Thunder Bay</td>
<td>380</td>
<td>95.90</td>
</tr>
</tbody>
</table>

In the movement disorder survey, three individuals indicated that they were reimbursed by the NHTG program for their telemedicine consultation. This reimbursement therefore would be an incremental cost to the NHTG program that is not reflected in our calculation.

Based on administrative data, it is estimated that the NORTH Network saved the NHTG program $1.26 million over a two-year period.

Another analysis was conducted using data provided by the Northern Health Travel Grants program (NHTG) on the number of patient and companion grants by specialty and by type of treatment. The total NHTG program in 2002/03 paid out approximately $19.2 million for a total of 134,291 grants (see Exhibit 26). Approximately 62% of these grants were for consultations and follow-up appointments, the two types of appointments that are best suited for telemedicine and comprise the bulk of NORTH Network’s activities. Based on the previous analysis at the current level of patient consultations/follow-up activity, the NORTH Network calculated a potential savings to the NHTG program of $100,000 per month. This represents a 10% savings ($1.2 million) to the consultation and follow-up appointment grants portion of the NHTG program ($11,808,000). These savings will increase as activity levels continue to rise.
Exhibit 26 – Type and Volume of Northern Health Travel Grants, 2002/03 (total cost $19.2 million)

<table>
<thead>
<tr>
<th>Type of Treatment</th>
<th>Number of Grants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation*</td>
<td>34,179</td>
<td>25.4</td>
</tr>
<tr>
<td>Surgery</td>
<td>12,021</td>
<td>9.0</td>
</tr>
<tr>
<td>Follow-up*</td>
<td>48,421</td>
<td>36.1</td>
</tr>
<tr>
<td>Procedure</td>
<td>39,670</td>
<td>29.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>134,291</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Amenable to telemedicine consultations (62%)

In summary, telemedicine consultations produce considerable cost savings for both patients and the Northern Health Travel Grants program.

4.3 Continuing Professional Development

In order to facilitate health professional development, the NORTH Network’s telemedicine technology is used to deliver educational events including accredited CPD programs. In the month of April, 2001, there were seven educational events using the NORTH Network’s technology. As the chart below illustrates, activity in this area has grown considerably during the past two years, especially since May, 2002 with the launch of 50 new telemedicine sites (see Exhibit 27). In March, 2003 there were 30 educational events. There were a total of 318 educational events over the two-year period.
The following section provides data on participation and satisfaction with NORTH Network organized accredited events from October, 2001 to April, 2003. It is important to note that accredited continuing professional development events organized by the NORTH Network represent only one component of the overall continuing professional development activities of the network.

The NORTH Network’s accredited CPD sessions, are broadcast between multiple sites weekly, to address topics requested by northern practitioners. At the end of each presentation, participants are asked to complete a one-page participant satisfaction form that measures satisfaction with both the program content and format (See Appendix T). Evaluation forms were completed by 1,600 of the 2,392 individuals (67% response rate) who participated in a total of 67 accredited CPD sessions from October, 2001 to April, 2003.

Approximately half of the participants in the accredited CPD sessions are other health professionals (non-MD) (53%) (see Exhibit 28). The remaining participants are physicians (19%), specialists (17%) and residents/medical students (7%).
The majority of the participants agreed or strongly agreed that the presentation time was adequate (95%), the discussion time was adequate (89%), the speaker conveyed the information clearly (96%), the program provided new information (89%) and that the program was relevant to their practice (82%). The participants also indicated that the involvement of multiple sites was valuable (76%) and that the NORTH Network improved access to continuing professional development. Overall, the majority of participants indicated that they were satisfied with the presentation (92%).

A substantial number of participants (40 – 47%) felt that the NORTH Network’s accredited CPDs (“Virtual Hospital Rounds”) were better or much better than traditional ‘live’ CPD presentations with respect to the ability to hear and see the speaker, see the slides, the level of interaction with the speaker and interaction with participants (see Exhibit 29).

**Exhibit 28– Participants at Accredited Continuing Professional Development Events**

<table>
<thead>
<tr>
<th>Type of Health Professional</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family Physician</td>
<td>298 (19)</td>
</tr>
<tr>
<td>Specialist</td>
<td>277 (17)</td>
</tr>
<tr>
<td>Other health professional (non-MD)</td>
<td>850 (53)</td>
</tr>
<tr>
<td>Resident, medical student</td>
<td>112 (7)</td>
</tr>
<tr>
<td>Missing</td>
<td>87 (5)</td>
</tr>
</tbody>
</table>

**Exhibit 29– Feedback on Continuing Professional Development Events**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree N(%)</th>
<th>Agree N(%)</th>
<th>Neutral N(%)</th>
<th>Disagree N(%)</th>
<th>Strongly Disagree N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation time was adequate</td>
<td>648 (41)</td>
<td>857 (54)</td>
<td>54 (3)</td>
<td>18 (1)</td>
<td>5 (0.3)</td>
</tr>
<tr>
<td>Discussion time was adequate</td>
<td>603 (38)</td>
<td>819 (51)</td>
<td>76 (5)</td>
<td>14 (1)</td>
<td>5 (0.3)</td>
</tr>
<tr>
<td>Speaker conveyed information clearly</td>
<td>825 (52)</td>
<td>700 (44)</td>
<td>45 (3)</td>
<td>6 (0.4)</td>
<td>5 (0.3)</td>
</tr>
<tr>
<td>Program provided new information</td>
<td>691 (43)</td>
<td>736 (46)</td>
<td>127 (8)</td>
<td>15 (1)</td>
<td>7 (0.4)</td>
</tr>
<tr>
<td>Program was relevant to my practice</td>
<td>625 (39)</td>
<td>684 (43)</td>
<td>206 (13)</td>
<td>20 (1)</td>
<td>12 (1)</td>
</tr>
<tr>
<td>I was very satisfied with the presentation</td>
<td>697 (44)</td>
<td>762 (48)</td>
<td>93 (6)</td>
<td>16 (1)</td>
<td>7 (0.4)</td>
</tr>
<tr>
<td>Involvement of multiple sites was valuable</td>
<td>487 (30)</td>
<td>739 (46)</td>
<td>245 (15)</td>
<td>8 (1)</td>
<td>8 (1)</td>
</tr>
<tr>
<td>NORTH improved access to CPD</td>
<td>647 (40)</td>
<td>558 (35)</td>
<td>111 (7)</td>
<td>0 (0)</td>
<td>4 (0.3)</td>
</tr>
</tbody>
</table>

* It is important to note that accredited continuing professional development (CPD) events represent only one component of the overall continuing professional development activities of the network. Exhibits 28 and 29 reflect the attendance and feedback from accredited sessions only.
Exhibit 30– Feedback on Videoconference Continuing Professional Development Events - How did this NORTH-CPD presentation compare to a traditional (‘live’) CPD presentation?

<table>
<thead>
<tr>
<th></th>
<th>Much Better N(%)</th>
<th>Better N(%)</th>
<th>Same N(%)</th>
<th>Worse N(%)</th>
<th>Much Worse N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to hear speaker</td>
<td>395 (25)</td>
<td>352 (22)</td>
<td>565 (35)</td>
<td>52 (3)</td>
<td>6 (0.4)</td>
</tr>
<tr>
<td>Ability to see speaker</td>
<td>395 (25)</td>
<td>349 (22)</td>
<td>486 (30)</td>
<td>121 (8)</td>
<td>8 (1)</td>
</tr>
<tr>
<td>Ability to see slides</td>
<td>333 (21)</td>
<td>354 (22)</td>
<td>444 (28)</td>
<td>177 (11)</td>
<td>25 (2)</td>
</tr>
<tr>
<td>Interaction with speaker</td>
<td>353 (22)</td>
<td>364 (23)</td>
<td>518 (32)</td>
<td>77 (5)</td>
<td>13 (1)</td>
</tr>
<tr>
<td>Interaction with participants</td>
<td>318 (20)</td>
<td>317 (20)</td>
<td>478 (30)</td>
<td>157 (10)</td>
<td>9 (0.6)</td>
</tr>
</tbody>
</table>

A number of the participants took the time to provide suggestions on how the CPD sessions could be improved. Suggestions included increasing the clarity of the slides used (e.g. increase font size, less busy, appropriate background colour) and improving the quality of the audio (e.g. clarity, time delay). A number of participants also mentioned that they would like to have handouts of the slides to refer to during the presentation. For some of the presentations, the participants indicated they would like to have had more discussion time and more opportunity to ask questions. There were a few comments about the level and focus of the presentation (medical vs. non-medical). This may be a reflection of the diverse backgrounds and roles of the participants (i.e., 53% of participants are other health professionals).

Participants provided several suggestions for future topics for CPD events. These included but are not limited to the following: dermatology, immunization, pediatric, toxicology, rehabilitation, psychiatry, diabetes, substance abuse, asthma, hormone replacement therapy and the West Nile virus.
Participation varies according to topic and the availability of the participants due to their clinical responsibilities. As Exhibit 31 demonstrates, documentation is available for sessions conducted from October 2001 through to the end of April 2003. During this period, 2,409 health care professionals participated in the accredited CPD events. Events conducted prior to October 2001, were scheduled through V-span and thus the data is unavailable. Only attendance at accredited CPD events is captured.
5.0 Discussion

The phase II evaluation of the NORTH Network Project was conducted to determine the extent to which the project’s objectives were being met:

1. To improve access to medical specialty care for residents of remote and rural communities.

2. To reduce costs associated with long distance travel.

3. To support medical specialists currently practicing in remote and rural communities by respecting existing referral patterns.

4. To reduce professional isolation through increased access to continuing professional development and peer support.

5. To build a high quality, reliable, scalable, cost-effective, and sustainable IP Wide Area Network (WAN) capable of supporting the delivery of medical care and education, and the transmission of large data files such as digital x-ray images.

The NORTH Network project has taken a business approach to ensure future sustainability. In response to increasing referrals for consultation and follow-up, CHIPP funding has been used to create a scaleable, comprehensive infrastructure and initiatives to generate in-kind support, opportunities for business process improvement and new sources of funding. Membership in the project has grown, new partners have been identified, existing referral patterns have been maintained, new projects in specialty areas are being piloted and evaluated, and local resources have been recruited, trained and supported to ensure efficient and effective delivery of telemedicine. The NORTH Network has established long-term linkages with First Nation’s communities through its partnership with Keewaytinook Okimakanak (KO), and adapted resources and services to build local capacity and ensure cultural appropriateness and sensitivity. Recognizing that telemedicine is much more than simply introducing new technology, the NORTH Network project emphasizes the integration of telemedicine into everyday practice by making the technology easy to use, providing telemedicine and telemedicine technology expertise for all its partners, interfacing with stakeholders, government and regulatory bodies, and promoting the benefits of the service to health care providers and the public.

Program evaluation has been undertaken to demonstrate the project’s accountability and desire to identify opportunities for continuing improvement. The evaluation focused on the three core components of the NORTH Network telemedicine project: service framework, health care delivery and continuing professional development. Key findings for each of these components are discussed below.
Service Framework

Since the beginning of the CHIPP funding period, the number of consultations has grown by approximately 300 per cent, to just over 400 consultations per month. Automated scheduling has dramatically improved the efficiency and effectiveness of all aspects of the office, including scheduling, data capture and reporting. Nevertheless, there are a number of challenges in scheduling telemedicine appointments. One challenge is that the Telehealth Coordinators are a shared resource (0.5 FTE) with multiple demands on their time. In addition, the studios themselves are multipurpose and are sometimes difficult to access at peak times. Some sites have identified the need for a second workstation, to optimize the flexibility and availability of studio time for both clinical consults and educational events.

Training of telehealth personnel and continuing education are key to maintaining appropriate service delivery and responding to increasing demand. All telehealth staff completed initial, comprehensive training and there are ongoing training initiatives to support existing and new projects and technology. Staff response to training is positive. Opportunities to enhance the training needs of staff have been identified and responded to, including more hands-on time with technologies. Training programs will continue to be developed in response to the NORTH Network’s ongoing activities to identify new technologies for service delivery and business process improvement.

Since its initiation in April 2002, the Help Desk has expanded to offer 24/7 availability and has the capacity to access end-user equipment remotely. Calls to the Help Desk have increased from under 200 per month to approximately 300, with 95 per cent of the issues resolved without referral to the technical services staff. The number of calls has increased by 50 per cent. This increase in calls to the Help Desk is, understandably, in response to the substantial increase in the number of new sites participating in the NORTH Network and the implementation of new technologies.

The NORTH Network now has one or more studios in 54 Ontario hospitals (up from 14), and its partners, SWOT-N and EOTN, are implemented in 33 and 19 hospitals, respectively. There are presently 157 hospital corporations in Ontario, many of which have more than one hospital site affiliated.

Interactive multi-media strategies have been implemented to facilitate communication with stakeholders, members, partners, health care providers and the public, to improve access, and promote awareness of telemedicine programs and services. For example, since the implementation of the NORTH Network website, visits (persons who remain on the website) have increased by about 600 per cent, from just under 200 in November, 2002, to almost 1,500 in April of this year. While the number of visits has increased substantially, there has been a small decrease during this period in the proportion of people who visit the site (i.e., remain) in relation to the number of hits to the website.
This presents an opportunity for the project to identify active strategies to promote awareness and use of this new website and to learn more about what content and changes to the website are required to meet the needs of its users, and thereby increase the proportion of visitors to the website. In addition, the NORTH Network uses a number of other methods to promote and communicate about telemedicine, including active participation in professional and academic conferences and workshops, presentations to stakeholder groups, government and non-government organizations, media launches, newsletters, publication of resource materials for patients, health care providers and the public, and a public relations kit for use at the local level. A recently published “Report to Our Communities” is being widely distributed and promoted.

The NORTH Network has undertaken or partnered on a number of pilot projects in several health service delivery areas, including, for example, tele-ophthalmology, tele-stroke, tele-psychiatry, and tele-radiology. These initiatives are at various stages in collecting and interpreting evaluation data, from which the NORTH Network expects to obtain valuable information and lessons learned to apply to future health care delivery service areas.

Health Care Delivery

A key issue in assessing the implementation of telemedicine services is the extent to which telemedicine improves access to health care services for persons living in remote and under-served areas. Research within many different specialties has shown that telemedicine can facilitate the delivery of health care (Loane et al., 2000; Sjorgen et al., 2001).

Measures of improved access to health care include: utilization, satisfaction (patient, provider, stakeholder), and acceptability (patient and provider). Data from administrative records, focus groups and surveys demonstrate increased utilization of telemedicine services, increased access to a broad range of health care specialties, a high degree of satisfaction among patients, providers and stakeholders, and widespread acceptance of the technology and telemedicine consultation process. Importantly, telemedicine consultations conducted through the NORTH Network Project reflect a broad demographic patient base, and 48 specialties have been accessed since the implementation of the project. Furthermore, the data demonstrate that, following a referral, patients are able to access specialists through telemedicine within significantly less time than they would expect to wait to access specialists for in-person consultations.
The evaluation also assessed potential cost savings for both patients and the Northern Health Travel Grants Program (NHTG). Data from patients, administrative records and from the NHTG were collected to estimate costs and potential cost savings. These data clearly demonstrate that the NORTH Network Project has produced substantial cost savings for patients, their companions, and the NHTG. Based on current NORTH Network consultation volumes, it is estimated that there is a cost-savings of $100,000.00 per month to the NHTG. It is important to acknowledge that cost has not been measured consistently in programs in other jurisdictions. Therefore, there are no benchmarks against which the NORTH Network performance can be compared.

The Evaluation Sub-Committee of the NORTH Network has been asked to help define appropriate criteria to benchmark and assess the project’s performance through its balanced score card initiative.

**Continuing Professional Development**

With funding support from the CHIPP program and in partnership with NOMP, NOMS and NOMEC, the NORTH Network has been able to facilitate the delivery of numerous continuing professional development sessions. Importantly, the content of these sessions is locally driven to ensure that it meets the needs of the health care professionals in the communities. This capacity has enabled physicians and allied health professionals to participate in a broad range of educational opportunities they otherwise would not be able to attend, or where attendance would have both personal and institutional schedule and cost implications. Attendance in these sessions has increased, and there is demonstrated need to expand continuing professional development services using this technology.

It is worth emphasizing that physicians who participate in telemedicine consultations with patients in remote areas have also reported an educational benefit. One Canadian study showed that the referring physician regarded the telemedicine consultation as a valuable continuing professional development experience, not only in terms of clinical skills but knowledge, attitude and judgment (Davis, Howard & Brockway, 2001). A comparison of face-to-face and tele-consultations with dermatologists in the United Kingdom showed that participating general practitioners reported that 75 per cent of tele-consultations were of educational benefit and rated the tele-consultation as a valuable experience (Gilmour et al., 1998). Referring physicians in an American military telemedicine program reported an improvement in their clinical knowledge (Pak, Welch & Poropatch, 1999).
6.0 Lessons Learned

One of the most pressing and perplexing issues affecting the health care system today is how to facilitate the appropriate, efficient and effective transfer of clinically-relevant information and technology from discovery and subsequent demonstration of its value to routine medical practice at the level of the individual physician (Oldenburg, Hardcastle & Kok, 1997). The time delay from discovery and demonstration to routine clinical application is often lengthy (Felch & Scanlon, 1997; Greco & Eisenberg, 1993).

Telemedicine research is now recognizing that as an innovation, telemedicine includes organizational and social dimensions (Bashsur, Reardon & Shannon, 2000). While much knowledge has been acquired with respect to the technology itself such as the effect of bandwidth, much less is known about the human dimensions that will enable telemedicine to impact the delivery of effective care (Mair & Whitten, 2000). Organizational and social system issues must be addressed for telemedicine to become integral to health care delivery (Linderoth, 2002). For example, the requirement for a physician to arrange a telemedicine service has been shown to be a disincentive for physician participation. Where regional physicians were provided direct access to a telemedicine coordinator who facilitated the referral, including the completion of any necessary diagnostic procedures prior to the telemedicine consultation, telemedicine referrals increased (Smith et al., 2001). Factors such as the establishment of a clinical need and the inclusion of local physicians at an early stage of telemedicine program development have been found to enhance utilization of telemedicine (Doolittle, 2001).

Due in large part to the fact that the NORTH Network incorporated many of these factors into the design and implementation phases, several successes have been realized. These successes include improvements in program service delivery, capacity and scaleability, increased partnerships and memberships, improved access to health care services, and greater support for continuing professional development. Patients and health care providers report high satisfaction with the quality of telemedicine and care delivered. Through this evaluation the NORTH Network Project has learned important lessons to ensure that it will grow and improve programs and services that meet the needs of patients, health care providers and the public. For each of the three components of the NORTH Network Project (service framework, health care delivery, and continuing professional development), the key lessons learned are:

Service Framework Lessons Learned

- To facilitate adoption, implementation and endorsement, telemedicine programs must be driven by the needs identified by the communities themselves.

- Telemedicine is much more than the introduction of new technology. It requires efficient and effective change management strategies that are sensitive to local needs, cultures and resources.
Scheduling a telemedicine appointment for the referring health professional must be as easy as scheduling a face-to-face consultation – otherwise it will not be used.

The referral process must be automated to be efficient for scheduling and for monitoring program performance.

To facilitate the integration of telemedicine into every-day practice, the technology must be accessible and available to the end-user.

Technical support must be available 24/7 to be responsive and proactively anticipate and resolve problems.

Locally-based resources need to be identified and supported in order to promote and facilitate telemedicine utilization.

Full-time Telehealth Coordinators are required at the local level in response to increased consultation volumes and organizational demands.

Physicians must be appropriately reimbursed.

Physicians must be credentialed by appropriate licensing bodies to deliver telemedicine services.

A flexible membership model provides an opportunity for broad representation, increased participation and ongoing sustainability.

Multiple communications strategies and mechanisms are required, both internally and externally, to facilitate decision-making, information-sharing, promotion and accountability.

Coordinated, customized training must be provided on an ongoing basis to facilitate the implementation of new technologies and processes, and to maintain and enhance staff skills.

Need to establish a methodology to facilitate roll-outs of new sites that accounts for the needs and resources of local communities and incorporates lessons learned and change management strategies.

Health Care Delivery Lessons Learned:

- Telemedicine can be broadly applied, regardless of specialty.
- Telemedicine must respect existing referral patterns.
- Integration through partnerships with other telemedicine service providers, provincially, nationally and internationally, is essential to ensure broad access to health care services.

NORTH Network Phase II Evaluation
Need for more promotion of the telemedicine program to family physicians, specialists and the community

Telemedicine programs can actively participate in research and special projects to identify opportunities to expand the scope of services provided (e.g., emergency services).

Continuing Professional Development Lessons Learned:

- Telemedicine can be used effectively to deliver a broad range of continuing professional development activities.
- Program evaluation is essential to continuous quality improvement and accountability to funders and stakeholders.
- Regional leadership on the development of content for continuing professional development activities is essential to ensure that it is relevant to and meets the needs of local health care professionals.

Keys to Sustainability

The success of the NORTH Network can be attributed to the strength of its technological capabilities and the strength of its partnerships - partnerships based not just on financial commitments, but on active participation in the project, shared vision and common goals. In the two-year CHIPP funding period, the NORTH Network has forged strong alliances with hospitals, physicians and other health professionals throughout Ontario and Manitoba and has developed working partnerships with First Nations communities to help achieve common goals.

CHIPP funding was leveraged to create a partnership strategy to build a funding model that will sustain the project after the federal grant period has expired. The funding model relies on several elements:

- Continued contributions from hospitals, patient care programs and education programs who will use the telemedicine network to meet their own objectives and pay reasonable fees to support it.
- More users of the network who will share in its costs.
- The use of Smart Systems for Health’s (SSH) bandwidth which has enabled NORTH Network to reallocate resources to support other activities and initiatives.
- Continued support of the telemedicine network by Ontario’s Ministry of Health and Long-Term Care as well as Health Canada.
- Support from rural communities, who are anticipated to ensure the sustainability of the network in their own community.
This shared funding model has the advantage of bringing diverse groups together to improve the delivery of health care and professional development across regions, as well as the potential for cost sharing. By sharing and integrating network resources, the project will reduce the waste and duplication that may occur with independent infrastructures. An aggregated service model also substantially reduces the risk to government for financial support.

There has been a significant investment made in the NORTH Network with a subsequent investment in capital and associated start-up costs. Now that the bulk of the equipment has been purchased and deployed, and the majority of sites are up and running, the potential for future cost-effectiveness and eventual savings is promising. Savings to programs like the Northern Health Travel Grant Program will likely be substantial.
7.0 Next Steps

The NORTH Network Project has continued to review opportunities for technological enhancements that will improve service delivery. Steps are underway to increase capacity and utilization through additional workstations, increased portability, integration into clinical practice (desktop video-conferencing), and additional administrative support within local telemedicine sites. The NORTH Network Project will continue to build upon its service framework strategies (partnerships, membership, technological scaleability, leveraged funding) to ensure long-term viability and sustainability. The project is actively working with provincial and national governments to develop policies, and to address licensing and reimbursement issues.

Some of the next steps identified include:

- An analysis of the costs avoided through use of the network for educational and administrative purposes is required.

- Development and implementation of focused, timely, short evaluation data collection strategies to answer evaluation questions quickly and facilitate continuous quality improvement decision-making.

- Partner with national telemedicine organizations on the creation of a consensus approach to the identification and definition of outcome indicators for the evaluation of telehealth.

- Develop capacity to stimulate researchers to address outcomes questions that NORTH Network is unable to answer on its own, such as impact of telehealth on health services (through looking at large databases like OHIP, CIHI, Northern Travel Grants) and impact of telehealth on health outcomes (by studying disease-specific condition hypotheses).

Moreover, it is recognized that telemedicine programs require assessment and the ongoing collection of relevant data for administrative, evaluation and monitoring purposes as they become integrated into the health care system. As a part of planning evaluation for the NORTH Network, several evaluation frameworks for telemedicine have been examined for their appropriateness and applicability to this program.

The evaluation frameworks reviewed provided different approaches to the evaluation of telemedicine. The studies suggested requirements for telemedicine evaluation and the identification of basic issues for evaluation. The evaluation frameworks that were reviewed ranged in comprehensiveness and in approach. Most frameworks provided a simple comparative analysis of the financial costs of telemedicine versus face-to-face consultations. As well, many evaluation frameworks focused specifically on patient or provider satisfaction with telemedicine. Some authors suggested specific stages for evaluation of telemedicine, while others looked at the different elements of telemedicine and focused on analyzing specific aspects of a telemedicine consultation.
The key messages from this comprehensive review of the telemedicine literature included:

i) Although different evaluation models used different terminology, the intended domains were similar: technology requirements, process measures of performance, diagnostic effectiveness; patient outcome measures, satisfaction, financial implications, operational and other considerations;

ii) A comprehensive approach to telemedicine evaluation requires a commitment to the systematic collection of data related to a core set of measurable performance indicators. A minimum dataset for these indicators could serve as a standard for the creation of telemedicine registries. Such a standard would ensure comparability of evaluation information across telemedicine programs.

iii) The literature often referred to the need for a comprehensive approach, yet the detailed measures within an individual framework tended to focus on narrow areas, such as patient satisfaction data or financial measures.

A literature review and our experience has led us to choose a balanced scorecard model (BSC) to provide the most comprehensive and holistic view of the NORTH Network with the development of complementary sets of measures that span a variety of dimensions relevant to the strategic direction of the organization (Baker & Pink, 1995; Hailey et al., 1999). The Balanced scorecard is an effective tool for integrating several aspects of a program into one comprehensive framework that may be used for ongoing monitoring, management, evaluation, and refinement of the telemedicine program.

The BSC is comprised of four quadrants: (1), patient/provider satisfaction; (2), clinical utilization and outcomes; (3), system integration and change; and (4), financial activities (see Exhibit 32). The intent of the BSC will be to translate the strategic goals and objectives of the North Network into a complimentary set of performance measures within each of these four quadrants. This approach will accomplish two objectives: i) provide an understanding of the inter-relationships among the different aspects of service delivery, and an appreciation of how changes within one area of telemedicine may affect other dimensions or quadrants; and, ii) provide evidence for the effectiveness, stability and sustainability of the Telemedicine program.

The NORTH Network is planning the implementation of a balanced score card project that will be conducted during the next three years. This work is a continuation of the work initiated by the NORTH Network in 2002 (see Appendix Q). A post-doctoral fellow with a special interest in program evaluation has been funded by the Canadian Institutes of Health Research. In collaboration with this fellow, the NORTH Network will commence work on the BSC initiative July, 2003.
The identification and selection of indicators for each quadrant will occur through a similar structured, multi-step process. The first steps will be to conduct an extensive review of the literature (including research and review articles in major journals, published clinical practice guidelines, electronic documents, and consensus papers) for previously validated indicators of performance along each of the four dimensions. Since the telemedicine care delivery model is relatively new, there are few published papers directly evaluating telemedicine care delivery using a comprehensive multi-dimensional framework. Many of the existing papers lack a systematic approach or large enough sample size to adopt their indicators without further refinement and validation work. The BSC project will build on existing research and evaluations of other telemedicine programs, as well as develop additional indicators to ensure a comprehensive evaluation.

The primary outcome of the literature review will be the generation of a list of all indicators found for each of the four dimensions of performance. These indicators will then undergo a process of refinement, revision, deletion and additions through the use of expert modified-Delphi panels, focus groups, which may include nominal group processes, and feasibility studies against currently available data sources. The expert panels and focus groups will be charged with the tasks of reviewing and rating specific indicators for their relevance to specific aspects of telemedicine performance and their sensitivity to care delivery activities within each quadrant.
The feasibility studies will be conducted in two stages. In the first stage, each potential indicator will be operationally defined. The indicator definition process will be supported through the literature review, expert panel, and additional input from individual experts appropriate for each dimension and each indicator (through personal interviews). In the second stage, a systematic methodology will be developed to critically analyze the accuracy, validity, and feasibility of performance measurement data available for each potential indicator. This may include statistical validation checks on secondary data (range tests, logic tests, outlier identification and analysis), and comparison of primary and secondary data sources, or multiple secondary data sources against each other for accuracy and completion of data abstraction and transcription. Additional steps at this stage may involve the development of linkages between key data sources to ensure optimal information. Finally, consultation through means such as a consensus conference is required to narrow the indicators in each quadrant to a core set. Ideally, there should not be more than ten indicators per quadrant.

The core set of indicators could then provide the basis for the identification of a minimum data set, based on the data that would be required to generate the indicators. This minimum data set would then be the basis for the development of registries for telemedicine programs. Such a registry would provide the ability to compare the performance of telemedicine programs as well as provide some insight into the sustainability and success of the program in the future. The use of the balanced scorecard would help in providing answers to questions of accessibility, satisfaction, cost-effectiveness, and sustainability of telemedicine. Once the BSC model has been developed for telemedicine in general, it will become a template and applied to several specific clinical services offered by telemedicine, such as tele-stroke, diabetes care, and care of persons with movement disorders. Appropriate adaptations will be made within each quadrant to reflect the specific nature of the different clinical programs.
Research and Evaluation

The Evaluation Sub-Committee, at its workshop on May 5, 2003, identified a number of key areas and activities for research and evaluation:

- Analysis of the factors that impact on physician acceptance and utilization of telemedicine (factors influencing adoption rates in different communities)
- Evaluation of the value-added benefits, if any, for family physicians, patients and specialists when the family physician attends a tele-consultation with a patient
- Examination of the impact of telemedicine on the health outcomes of participating patients
- Refine current tools for measuring patient and provider satisfaction
- More systematic approach to patient and provider satisfaction studies (including stratified sampling and recruitment strategies)
- Design and implementation of cost-effectiveness analyses
- Evaluate health outcomes by measuring telemedicine against usual care
- Study of individuals (patients and providers) who decline telemedicine consultation referrals
- Contribute to the body of telemedicine peer-reviewed literature through the publication of results of existing studies

In addition, the Evaluation Sub-Committee used the workshop to discuss its role to support the NORTH Network’s ongoing research and evaluation activities. The discussion broadly outlined an advisory role, in which members would counsel NORTH Network management with respect to research directions, partnerships, evaluation methods, and review and comment on research and evaluation and results. Since this was the inaugural meeting of the committee, it is anticipated that there will be further discussion and refinement of its role.
8.0 Conclusions

The Canada Health Act states that reasonable access to medically necessary hospital and physician services must be unimpeded by financial or other barriers.

Telemedicine is a great idea whose time has come. It is a vehicle by which Canadians have improved access to health care, regardless of the remoteness of their community. It provides the opportunity to integrate, collaborate and coordinate health services across the continuum of care.

The strength of the NORTH Network telemedicine program is its success, diversity, longevity and growth. This report presents the challenges, successes, and lessons learned over the course of the 2-year CHIPP period (April 1, 2001 to March 31, 2003). Realistic goals for the future development of the NORTH Network and telemedicine in the province are also represented.

The NORTH Network Phase II evaluation reviewed the implementation of the CHIPP funded program and its specific tasks; collected information in the domains of satisfaction, utilization, access and cost; and highlighted specific needs for future evaluation and research in telehealth.

Overall, the implementation was entirely successful, meeting or exceeding all targets and goals set out in the CHIPP statement of work, in time and on budget. Utilization levels have been remarkable by telehealth standards, user satisfaction is high, access was improved and preliminary data point to great potential for cost efficiencies for patients, public sector organizations and government.

However, there are still many gaps in our knowledge of telehealth’s value in specific areas, including a global understanding of what is the “right” level of access to health services; what are the health system-wide impacts of integration of telehealth into the system and ultimately; what is the impact on health outcomes.

For NORTH Network, answering these latter questions will require new ways of evaluating and even greater collaborative partnerships. The new evaluation approach will include the development of capacity to ask continually changing research questions and get the answers in a shortened time cycle. It will also include development of the capacity to stimulate researchers to address the big questions of health services impact (through looking at large databases) and health outcomes (by studying disease-specific condition hypotheses.)
NORTH Network will support the further development of a national “balanced scorecard” or equivalent tool which will be used to standardize the evaluation of telehealth initiatives and serve as the basis for future accountability frameworks. This national work has begun with the commitment to participate in the National Telehealth Outcome Indicator Project (NTOIP) and the collaborative work that will follow in the months and years to come. On a provincial basis, the work underway and in partnership with Southwestern Ontario Telehealth Network (SWOT-N) and the Eastern Ontario Telehealth Network (EOTN) provides the foundation for a provincial telemedicine initiative, while ensuring that the principles of regional representation and implementation remain integral.

While the evolution of evaluation strategy is essential, it has become equally clear that in order to fully understand the impact of telehealth on the health care system, we need to continue towards fully integrating telehealth into the healthcare system. Only when significant penetration into everyday health care is achieved, will telehealth truly come out of the “laboratory” and enable us to observe what the real “in-vivo” benefits are.

In conclusion, the next phase will continue to require innovation and change management skills as we seek to integrate lessons learned into all that we do and become more rigorous regarding evaluation. As we partner with other telemedicine programs across the province and country to reach consensus on working definitions and indicators, we will endeavor to adopt standardized measurement tools that enable comparisons and learnings across programs and provinces.
References


*NORTH Network Phase II Evaluation*


