

# Evaluating the Benefits

Newfoundland and Labrador Provincial Telehealth Program: Chronic Disease Management

January 2010

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This study was made possible through funding from Canada Health Infoway and the provincial government of Newfoundland and Labrador and through in-kind contributions by the Newfoundland and Labrador Centre for Health Information.

# **EXECUTIVE SUMMARY**

The Newfoundland and Labrador Telehealth Strategic Plan defines telehealth as the use of communications and information technology to deliver healthcare services over large and small distances, including remote and rural areas. In the literature, telehealth has been shown to be associated with increased satisfaction with healthcare services, improvements in patient empowerment, improved access to healthcare and continuity of care, and an increase in frequency of patient follow-up. An evaluation of the Chronic Disease Management Provincial Telehealth Program in Newfoundland and Labrador was carried out using a mixed-methods approach. Data sources included telehealth utilization data, provider and patient surveys, key informant interviews, and administrative data on oncology visits.

Over the study period, there was an increase in telehealth sessions and an expansion of telehealth to other sites, disease entities and provider types. This increase in utilization and sites suggests an increasing level of acceptability by both patients and providers, both of which demonstrated high levels of satisfaction with most aspects of telehealth services. Our study found that telehealth was associated with many benefits, the most notable of which was a reduction in travel time and costs. Clinical benefits included improved access to patient information, provider and management continuity, and an increase in frequency of patient follow-ups. There was an indication that telehealth may reduce wait times and hospitalizations, and facilitate earlier discharge from hospital, however quantitative data to confirm these benefits was deficient.

In spite of overwhelming success, the telehealth program in the province is not without its challenges. There is a desire from current providers of telehealth to expand to new sites and to increase services to more disease entities. There were also privacy concerns raised, as well as issues with space where the telehealth sessions take place. Providers expressed the need for increased human resources, new equipment, and improved access to patient information. Integrating telehealth into the current service delivery model and obtaining sustainable funding were seen as critical if telehealth is to continue to provide enhanced services to rural parts of the province.

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# **SECTION 1: INTRODUCTION**

Canada has a healthcare system that is respected worldwide as being responsive to the needs of Canadians, yet there remain obstacles in the delivery of equal and equitable healthcare services to the population (WHO, 2000). The geographic landscape of Canada represents one such obstacle for those living in rural and northern areas. In 2006, 14.9% of Ontario, 56.6% of Nunavut, 42.2% of Newfoundland and Labrador, and 19.8% of the total Canadian population was located rurally (Canadian Rural Information Service, 2008). In addition to distance, another reason for healthcare access problems is the difficulty these areas face in attracting and retaining an adequate supply of healthcare professionals. Telehealth has been shown to be an important healthcare delivery model in areas where traditional delivery approaches are hindered by distance or a lack of healthcare providers (Allan et al., 1995; Paul et al., 2006).

The Newfoundland and Labrador Telehealth Strategic Plan defines telehealth as the use of communications and information technology to deliver healthcare services over large and small distances, including remote and rural areas (Government of Newfoundland and Labrador, 2005).

In addition to problems with healthcare access, research has shown rural and northern areas to have a poorer health status compared to the rest of Canada (Romanow, 2002). People living in predominantly rural areas have lower life expectancy and physical activity rates than those in urban areas, as well as higher rates of smoking, obesity, disability, accidents, poisonings and violence; and higher rates of overall mortality from diabetes, injuries, suicide, circulatory and respiratory disease (Romanow, 2002; PHAC, 2006). This suggests that there is a need to take advantage of the opportunities that telehealth provides in addressing the healthcare needs of individuals living in rural/remote areas.

Telehealth provides many benefits, including improved access to primary healthcare and specialized health services, improved continuity of care, increased availability of patient information, and increased frequency of patient visits to healthcare specialists (Moehr et al., 2006). Telehealth has been shown to reduce unnecessary referrals, increase patient and provider satisfaction (Brown and Sarsfield, 2003; Aarnio et al., 2000), increase

patient empowerment (Doze et al., 1999; Brown and Sarsfield, 2003), and decrease travel and wait times and associated cost for both patients and providers (Doze et al., 1999; Brown and Sarsfield, 2003). There are also many benefits specific to providers that stem from telehealth implementation, in particular for physicians practicing in rural or remote areas. Rural practice can be an isolating aspect for an individual's quality of life (Gagnon et al., 2006) and rural physicians can use telehealth services to upgrade their education and stay connected to other areas of the healthcare system (Gagnon et al., 2006; Wysocki et al., 2005). Telehealth can also support the follow-up process through consultation and discussion of tests results, while simultaneously using other information technology enhancements such as picture archiving and communication systems (PACS) (Wysocki et al., 2005). Telehealth presents an opportunity for the multi-management of a patient's case file by having input from multiple specialists located at different sites (Moehr et al., 2006). This approach is also used internationally whereby videoconferencing connects specialists from different countries so they can simultaneously discuss patient cases (Davison et al., 2004; Atlas et al., 2000).

Telehealth has been used to deliver a variety of healthcare services including teleoncology, tele-psychiatry and tele-nephrology. Oncology service delivery has benefited immensely from telehealth usage as it makes possible the linkage between oncologists and their patients for both initial and follow-up sessions. Detecting cancer early on in the progression of the disease becomes very important to a person's survival. Tele-oncology facilitates information exchange on patient biopsies so that the diagnosis and treatment processes are streamlined (Marchevsky et al., 2002). The ultra rapid breast care process uses tele-radiology to reduce the time from diagnosis to obtaining a treatment plan from several weeks to as short as one day (Weinstein et al. 2007). Tele-oncology enhances the discussion and exchange of multidisciplinary medical knowledge of cancer cases, which can bring more insight and clarity to treatment formulation (Atlas et al., 2000). Videoconferencing has also been shown to enhance patient follow-up and psychosocial support in pediatric oncology (Bensink et al., 2007), and as well telepathology can be a viable option in healthcare facilities lacking full-time pathology coverage (Winokur et al., 2000).

Many benefits have also been seen with the use of telehealth in psychiatric services. Tele-psychiatry connects psychiatrists in larger centres to patients in smaller areas for follow-up sessions, as well as for monitoring compliance with medications. Telepsychiatry provides patient choice and control over treatment, improved quality of life, the potential for avoiding hospitalization (Doze et al., 1999), and the prevention of suicide (Godleski et al., 2008). Use of telehealth in the treatment of depression has been found to have comparable medication adherence, health outcomes and client satisfaction rates to that of conventional treatment (Ruskin et al., 2004).

The discipline of nephrology has also benefited from the advent of telehealth. Many patients receiving dialysis are living with advanced renal disease and are in need of ongoing dialysis treatment and monitoring. (Rumpsfeld et al., 2005). Tele-nephrology allows a nephrologist to monitor and treat renal patients in rural areas, thus allowing patients to receive dialysis in close proximity to their place of residence (Rumpsfeld et al., 2005). Nephrologists often monitor the treatment of rural patients from their own office, while onsite nurses (or assistants) operate the telehealth and dialysis equipment at the patient site. Tele-nephrology can support quicker diagnosis and treatment for serious cases and ultimately save lives, while at the same time reducing costs to the patient and the health system overall (Jian et al., 2002).

Although telehealth has been shown to have many benefits, challenges have also been identified. Confusion and delay in appointment scheduling and patient privacy and confidentially have been identified (Brown and Sarsfield, 2003). There have also been indications of resource gaps, including technical challenges with equipment, the need for more staff, better facilities, and more education and training for users (Hopp et al., 2006 and IOM, 1996). Other research suggests telehealth may lead to the depersonalization of the doctor-patient relationship and increase the psychological distance between the doctor and patient by affecting the perception of warmth or empathy given to the patient (Miller et al., 2003). Furthermore, some studies have found that users have a preference for face-to-face interaction with physicians over videoconferencing (Gómez-Martino et al., 2008).

Despite increased interest in telehealth services in Canada, policy development related to its use is still relatively new. As a result there still exist some challenges in integrating telehealth into the broader healthcare system (May et al., 2003). Proper implementation of telehealth requires the development of policy that connects telehealth at all levels with

appropriate infrastructure and integration into the existing healthcare system (May et al., 2003; Schmeida et al., 2007). When implementing a telehealth program, it is important to look at the information requirements, staffing levels, technology processes, objectives and values, and the management of systems (Bahaadini and Yogesan, 2008).

Telehealth has a long history in Newfoundland and Labrador, with the Telehealth and Educational Technology Resource Agency (TETRA) project originally established in 1977 as part of Memorial University of Newfoundland. TETRA had an advanced networking system and was internationally recognized as a Canadian leader in telehealth services (TETRA, 2003). In 2004, the provincial government began a consultation process that led to the development of the Newfoundland and Labrador Telehealth Strategic Plan (2005). This plan was predicated on the need to move away from the project-based funded telehealth program operated at Memorial University (i.e., TETRA), to that of a sustainable integrated provincial program operated through the Regional Health Authorities. Key stakeholders throughout the province were engaged and asked to provide input on which telehealth application(s) should be the starting points for a sustainable program, and which ones could provide the greatest benefit. Priorities subsequently identified through this consultation process included:

- 1) Selfcare/Telecare (HealthLine)
- 2) Chronic Disease Management (CDM)
- 3) Access to secondary and tertiary services and specialists
- 4) Home Care
- 5) Telehealth education and point of care learning

Chronic Disease Management (CDM) was chosen as the initial implementation focus for telehealth services. Chronic diseases are now the main cause of death, and the main contributor to healthcare utilization in Newfoundland and Labrador (NLCHI, 2004). During the consultation process, stakeholders discussed the prevalence of chronic diseases and the need to target these diseases to reduce the burden on the health system. Following the consultation, a two-and-a-half-year CDM Telehealth Implementation Plan emerged, which had as one of its primary objectives the transition of a wide range of telehealth-based services across several chronic disease areas, and

the intent that this approach become a standard mode of service delivery throughout the province.

This current evaluation focuses on the CDM component of the Provincial Telehealth Program. This program is being implemented across the province to support the management of specific chronic diseases through consultation between patients and healthcare specialists. It is expected that telehealth in chronic disease management should:

- improve access to care, support, education and information sharing by selecting appropriate telehealth applications, processes, and technology to fill gaps;
- provide cost benefits and cost avoidance to patients, providers, and the overall healthcare system;
- enable patients to remain at home or in their own community longer, thus preventing admissions to acute care facilities or delaying admission to long-term care institutions; and
- offer the potential for earlier discharge from acute care facilities.

Each Health Authority identified oncology as a priority, and the need to build upon the Newfoundland and Labrador Tele-Oncology Program that had its origin with TETRA. Most Authorities had some experience with tele-oncology through TETRA and were eager to see it expand to more communities and other applications. In 2004, the Tele-Oncology Program was initiated to enhance delivery of services for the Newfoundland Cancer Treatment and Research Foundation, now known as the Cancer Care Program and part of the Eastern Regional Health Authority. The Tele-Oncology Program utilized telehealth expertise at TETRA to begin delivering and supporting province-wide cancer treatment, management and educational services. The Tele-Oncology Program was developed to address service gaps that included the need for more consultation and education, better referral processes, clarity on guidelines, standards and policies, and enhanced access to other support services, particularly among rural healthcare providers delivering cancer services.

In July 2006, the Newfoundland and Labrador Centre for Health Information (the Centre) was given the mandate to implement telehealth services for the province. At this time the Tele-Oncology Program transitioned from a demonstration program at TETRA to what is now known as the Provincial Telehealth Program. The tele-oncology model is being replicated for other chronic disease areas including diabetes management, mental health, nephrology, and neurology. The CDM Telehealth Program, which is a component of the Provincial Telehealth Program, has resulted in the availability of videoconferencing technology in an increasing number of communities, increasing the treatments available and providing patients with more timely access to treatments closer to home. It has also provided more options for health providers in rural and remote areas, as they can increase their skill levels and become a more integrated part of a multi-disciplinary team. In the long-term, the addition of new equipment and the education of health providers will support future expansion of the Provincial Telehealth Program. Access to additional support may also assist in the recruitment and retention of health professionals in rural and remote areas (Dwyer, 2005). Currently, the CDM Telehealth Program in the province is moving beyond videoconferencing to encompass other technologies such as electronic peripheral devices (e.g., exam cameras and stethoscopes). The future of telehealth in Newfoundland and Labrador includes telehome care technology and linkages to the Newfoundland and Labrador Electronic Health Record (EHR), all of which will assist in the management of chronic diseases across the continuum of care.

### Purpose and Scope of Benefits Evaluation Project

The evaluation presented in this report was undertaken to provide information to the provincial government and the Regional Health Authorities (RHAs) on the impact that telehealth services have had on rural and remote communities in the province. The evaluation focused on the implementation of telehealth services in Newfoundland and Labrador, specifically on the range of CDM sites and services that included oncology, nephrology, neurology, diabetes, and mental health. The evaluation did not address telehealth's integration with the provincial Electronic Health Record (EHR), or other health information applications, as these were out of scope of the CDM Implementation Project.

The CDM Telehealth Evaluation Framework that was used for this current evaluation was based on the EHR evaluation framework developed by NLCHI and MUN (Neville D, Gates K, MacDonald D. et al., 2004) and the Infoway Benefits Evaluation Framework (Canada Health Infoway, 2006) shown below in Figure 1, which is a modification of the DeLone and MacLean IS Success Model (DeLone and McLean, 2003). The CDM Telehealth Evaluation Framework is organized around two research questions as indicated below, each with underlying indicator questions.



Figure 1: Infoway Benefits Evaluation Framework

Based on the Delone & McLean IS Success Model

### Research Question #1: Does telehealth support equitable access to services?

### **Indicator Questions:**

- 1) Is there adequate access to existing Telehealth services?
- 2) Is there a need for additional Telehealth services at sites?
- 3) Has Telehealth changed healthcare service levels?
- 4) Has Telehealth changed patient waiting time for access to services?
- 5) Has Telehealth changed travel time to access services?
- 6) Has Telehealth changed travel costs to access services?
- 7) Are patients/providers satisfied with Telehealth services?

# Research Question #2: Does Telehealth increase patient empowerment?

# **Indicator Questions:**

- 1) Have there been changes in patient participation in Telehealth? (focused on earlier stages of disease monitoring and follow-up)
- 2) Has Telehealth resulted in changes in continuity of care for individuals suffering from targeted chronic diseases, such as diabetes?
- 3) Has Telehealth resulted in earlier discharges from acute care facilities due to availability of appropriate community services (via telehealth)?
- 4) Has Telehealth resulted in prevention of unnecessary admissions to acute care facilities?

# **SECTION 2: METHODOLOGY**

The evaluation employed mixed methodologies and was lead by staff within the Research and Evaluation Department of the Newfoundland and Labrador Centre for Health Information. The Department has extensive capacity and experience in conducting evaluations of components of the EHR, including the provincial Client Registry, Picture Archiving and Communications System (PACS) and the Pharmacy Network.

### Introductory Evaluation Workshop

Key stakeholders of the Newfoundland and Labrador CDM Telehealth Program representing the four Regional Health Authorities, the Department of Health and Community Services, and the Newfoundland and Labrador Centre for Health Information participated in a workshop on November 19<sup>th</sup>, 2008. The primary purpose of the workshop was to validate and provide input into the proposed evaluation framework. At the start of the workshop participants were given an introduction to the Infoway and the Centre's evaluation frameworks, as well as the CDM Telehealth Evaluation Framework, all of which guided the evaluation. During the breakout sessions stakeholders were divided into the three groups, each with a facilitator and note-taker. Group members were provided the two research questions and associated indicators identified in the evaluation framework. Each group was asked to review, and if possible, validate the research and indicator questions. Participants were also instructed to suggest and/or refine possible measures for the indicators. Potential data sources to support the indicators were also discussed. Each group then reported back to all participants on the results of their breakout session. There was a large group discussion on the additional areas/indicators that were not included in the original evaluation framework and these additional areas were incorporated into the evaluation framework where practical. The workshop concluded with a discussion of the next steps that were to be taken in the evaluation process. A summary of the workshop discussion around research and indicator questions was subsequently provided to participants who then had the opportunity to provide feedback. Information obtained from the workshop was used to modify existing indicator questions, as well as assist in the development of study instruments (i.e. survey questionnaires and interviews scripts). The workshop summary is provided in Appendix A.

# **Utilization Analysis**

The utilization analysis used the Teleheath Utilization Database maintained at the Centre. The database consists of a spreadsheet which tracks information on all telehealth sessions in the CDM Telehealth Program. Utilization patterns are described over time by telehealth program/disease area, Regional Health Authority, telehealth site, type of user, and type of session (i.e. clinical vs. educational). Database fields used for the study included: date session held, discipline/organization requesting session, length of session, type of session (e.g. initial assessment, follow-up, educational, etc.), site location and type of participants involved in the session.

# Surveys

Patients and healthcare providers involved with telehealth were surveyed in order to obtain their views and opinions of the CDM Telehealth Program. Copies of the patient and provider surveys are provided in Appendices B and C, along with consent scripts and the cover letter for the provider survey. The provider survey included a question at the end asking if the responder would be interested in participating in a future interview to further explore their experience with telehealth services.

# Survey Pilots

Questionnaires were piloted on a small number of patients and providers in April 2009 in order to increase the validity and reliability of the instruments. Based on the pilot surveys, minor revisions were made to the questionnaires.

# Provider Survey

Provider surveys were administered to all healthcare providers (N = 84) involved in using telehealth services including physicians, nurses, and pharmacists. Each of the four regional telehealth coordinators provided the evaluation team with a list of all healthcare

providers using telehealth services within their health authority. Survey packages were mailed by the evaluation team to the coordinators during the last week of April, 2009. Coordinators then sent the survey packages to telehealth providers in their respective regions via internal mail. The survey packages included a personalized "invitation letter" signed by the study principal investigator (Appendix B) explaining the purpose and importance of the survey and inviting the provider to complete and return it in the pre-addressed, stamped envelope provided. In an effort to increase the response rate, providers were informed in advance by the coordinators via email to expect the survey package in the mail.

Providers were asked to provide their name and phone number on a separate sheet at the end of the survey if they were interested in being contacted for an interview. The survey included instructions for the form to be detached from the survey and mailed in a separate pre-addressed stamped envelope included with the survey package. A second survey reminder package was mailed to providers approximately two months after the initial mail-out (June 2009), which included a reminder letter asking the provider to complete the survey and stated that the provider should disregard the letter if he/she had already completed and sent in his/her survey. The total timeframe for administration of the provider survey was approximately four months, lasting from May to August, 2009.

### Patient Survey

Patient surveys for 39 telehealth sites plus five specialist sites in St. John's (as of July 2009) were mailed to telehealth coordinators who then arranged to have the surveys mailed to individual sites. It should also be noted that some surveys were sent to each of the specialist sites as patients sometimes attended sessions at these sites involving out-of-province specialists. A total of 1,360 copies of the surveys were mailed out to sites. The patient survey was conducted immediately after the telehealth session by the nurse or other on-site staff involved with the telehealth session. The nurse or other staff member invited each telehealth patient to participate in the survey by reading an "invitation script" (Appendix C). Attempts were made to recruit as many patients as possible in order to maximize the sample size. After completing the survey, patients were instructed to place the survey in the envelope provided and seal it before returning it to the nurse/staff member. Completed surveys were mailed to the evaluation team by

the sites on a regular basis. The patient survey was administered over a four-month period, between July 20<sup>th</sup> and October 16<sup>th</sup>, 2009.

### Survey Analysis

Responses for close-ended items were coded and entered into SPSS version 15 for analysis. Descriptive statistics and bi-variate comparisons (e.g., Fischer-Exact tests) were used to compare responses among sites and provider groups. Responses for open-ended questions were analyzed for emerging themes and categories.

### Interviews with Telehealth Staff

After a preliminary analysis of the provider surveys was completed, semi-structured telephone interviews were conducted between July 20<sup>th</sup> and October 29<sup>th</sup>, 2009 in an effort to gain more in-depth insight into the research questions, and where applicable to seek clarification on survey responses. Twenty interviews were conducted that included two provincial telehealth staff at the Centre, the four regional telehealth coordinators, and 14 healthcare providers who had previously agreed to be interviewed via the provider survey. The regional coordinators and providers were called by a member of the evaluation team and were read an "invitation script" (Appendix D), explaining the purpose of the study and again inviting the individual to participate in an interview. If the participant accepted an interview time was then scheduled. The interview guide is provided in Appendix D.

Interviews were recorded on a hand-held digital recorder and transcribed by an external transcription company. A thematic/content analysis with the aid of NVivo software was undertaken by the evaluation team to analyze interview transcripts. Transcripts were read to determine the overall content of each interview and codes were created based on similarities in responses. Transcripts were re-examined several times in order to identify the key categories and broader themes emerging from the data.

# Administrative Data

Administrative data on oncologist visits was obtained for the years 2005 to 2008 from the Oncology Patient Information System (OPIS) maintained at the Cancer Care Program (Eastern Health). This data was used as a means to examine the effects of telehealth on the following three outcomes:

wait time to initial oncologist visit (time between referral date and date of initial visit);
continuity of oncologist care (number of different oncologists seen per patient); and
frequency of oncologist follow-up (number of follow-up visits per patient).

Descriptive statistics and bi-variate comparisons (e.g., Mann-Whitney U Test) were used to investigate any change in outcome variables by type of cancer over the study period. Wait times were compared for telehealth verses in-person visits.

# **Ethics Review**

The evaluation protocol was approved by the Human Investigation Committee, Faculty of Medicine (Memorial University), the Secondary Uses Committee at the Centre, as well as by the individual research ethics committees within three of the four Regional Health Authorities in the province. (Appendix F). The Central Health Authority did not require separate ethics approval.

# **Dissemination of Results**

Findings of the evaluation are presented in this final report to Canada Health Infoway, the provincial Depertment of Health and Community Services, and the Regional Health Authorities. The final report will be posted on the Centre's website and be made available free of charge to interested stakeholders. Study results will be presented at academic scientific/health conferences and submitted to peer-reviewed journals for publication.

# **SECTION 3: RESULTS**

# A. Telehealth Utilization Analysis

Every time a telehealth session is scheduled a *Telehealth Booking Request Form* (Appendix E) is completed and sent to the Scheduling Coordinator at the Centre. When a session has been scheduled, the information on the form is entered into the Telehealth Utilization Database maintained at the Centre. The analysis included only those sessions where a patient and/or provider were actually present (i.e., active sessions). Cancelled sessions and no-shows were excluded (n = 409).

Figure A1 presents the number of telehealth sessions by fiscal quarter from the time of the first videoconference session (September 2004) until the end of June 2009. The number of telehealth sessions has increased consistently over time, with a sharp increase after the third quarter of 2008/09. The number of telehealth sessions per quarter increased from less than 10 at the start of the program to almost 1500 in quarter one of 2009/10. Given that detailed data was only available for telehealth sessions up to the end of the 2008 calendar year (i.e. Q3 of 2008/09), the remainder of this section will provide a detailed look at sessions up until that point.





# Telehealth Programs and Types of Sessions

The Provincial Telehealth CDM Program involves delivery of clinical videoconferencebased services to a number of programs including oncology, nephrology, adult psychiatry, pediatric psychiatry, neurology, and diabetes. As of December 31, 2008, the genetics and diabetes programs had not started, and the occupational therapy (i.e., neurology) program had only six sessions. Therefore, these three programs were excluded from the analysis.

Table A1 shows the date of the first telehealth session for each of the four major telehealth programs included in the analysis.

Telebealth CDM Program	Month of First
Teleficatin ODM Trogram	Telehealth Session
Tele-oncology	September 2004
Pediatric Tele-psychiatry	October 2007
Adult Tele-psychiatry	December 2007
Tele-nephrology	January 2008

Table A1Telehealth CDM Program by Start Dates

The first telehealth program in the province was tele-oncology which as noted previously had originally started as a research project at Memorial University under TETRA before transitioning into the Provincial Telehealth Program in July 2006. Pediatric tele-psychiatry started to deliver services via telehealth in October 2007, adult tele-psychiatry in December 2007, and tele-nephrology in January 2008.

# Telehealth Sessions

Figure A2 presents the total number of telehealth sessions by program. Tele-oncology, being the longest running program, had the most sessions with 2,198 (77.1% of total sessions) up until the end of 2008. Tele-nephrology was second with 545 (19.1%), while pediatric and adult psychiatry combined to make up the remaining 3.7%. When examining the number of patients involved in telehealth sessions the chart number was

used to identify a unique patient. For oncology, 1,017 patients were involved in telehealth sessions up to the end of 2008 (29 sessions with missing chart numbers), and 14 patients were involved in telehealth sessions in pediatric psychiatry (seven sessions with missing chart numbers). The number of patients participating in tele-nephrology and adult tele-psychiatry sessions is unknown due to unavailable chart numbers.



Figure A2 Total Number of Telehealth Active Sessions by Program, 2004-2008

Figure A3 shows the type of telehealth session by program. Clinical sessions are the most common and consist of either consults or follow-ups. A consult is a patient's initial visit to a specialist (e.g., oncologist) and involves an assessment lasting approximately 30-40 minutes. A follow-up session is a pre-booked session lasting about 10-15 minutes in which the specialist discusses the results of tests and/or patient progress. For tele-oncology the most common type of session was patient follow-up (1,595; 72.6%), followed by patient consult (326; 14.8%), which together make up the clinical sessions. A third category of sessions named 'other' includes educational or administrative sessions. Educational sessions are either case reviews involving providers or patient education/support. Case reviews are mostly medical tumor-board rounds where physicians discuss oncology patient cases, whereas as education sessions could be where a patient is taught how to administer his or her chemotherapy at home.

Administrative sessions occurred mostly when the tele-oncology program was first being implemented and involved system testing by teleheath staff.



Figure A3 Telehealth Sessions by Type of Session

Tele-oncology and tele-psychiatry sessions are normally one-on-one sessions that occur between a specialist (oncologist or psychiatrist) and a patient, although a nurse and a family member are usually also present at the session. The patient comes into the remote site, which is usually a healthcare facility, and has his or her telehealth session in a designated room where the videoconference equipment has been setup.

Tele-nephrology sessions involve patients with advanced kidney disease who receive renal dialysis every three to four days in a dialysis unit at a remote site. The patients have follow-up sessions with a nephrologist in St. John's via telehealth during their dialysis procedure, usually on a weekly basis. For these sessions the videoconference equipment is brought into the dialysis unit. Tele-nephrology follow-up sessions are generally shorter than the other telehealth programs, lasting only 3-6 minutes, provided there are no outstanding issues. Several patients in the dialysis unit are seen by a nephrologist via videoconference, one after the other, with each counted as a separate session. Tele-nephrology sessions are considered follow-up sessions as the nephrologist would already have seen the patients in-person before the patient returned home to start receiving tele-nephrology within their Health Authority.

For psychiatry there were only clinical sessions, with follow-up sessions being the most common. Here a consult refers to the patient's initial visit to the particular psychiatrist, which would generally be done through an in-person visit and rarely via videoconference. The duration of tele-psychiatry consults and follow-up sessions varied depending on the circumstances.

Figure A4 presents tele-oncology sessions by type of cancer. Prostate cancer was the most common cancer seen via telehealth with 783 sessions (40.6 %), followed by breast, colorectal and lung cancers. Four hundred and seventeen (417) sessions involved patients with cancer in a variety of other sites; there were 97 sessions for which the type of cancer was unavailable.



Figure A4 Tele-oncology Sessions by Type of Cancer

### **Telehealth Participants**

Figure A5 presents the percent participation by type of participant for the tele-oncology clinical sessions (i.e., consults and follow-ups). For all sessions, an oncologist was present at the specialist site and a patient at the remote site. Physicians, nurses and patients each made up approximately 27% of all participants involved in the 1,921 tele-oncology sessions. A small number of sessions involved more than one physician and/or nurse, who may have been present at a third site. Approximately 19% of all session participants came from the 'other participant' group, which consisted mainly of family members and guardians, but also of a small number of social workers and pharmacists.



Figure A5 Percent Participation in Tele-Oncology Clinical Sessions

Figure A6 presents the percent participation by those participants involved in the 277 tele-oncology educational/administrative sessions. Given that the majority of these sessions were medical tumor-board rounds involving multiple physicians, it is not surprising that physicians made up the majority (71.5%) of participants for these sessions. Educational/administrative sessions also included smaller percentages of

pharmacists, nurses, and other health professional groups, as well as "other participants", consisting mostly of family members.



For the 545 tele-nephrology sessions, the proportion of participant groups involved included 48.6% for each of nephrologists and patients, with a small percentage of involvement from pharmacists (2.8%) (data not shown). For the 31 adult tele-psychiatry sessions the distribution of participants was 47.7 % for each of psychiatrists and patients, and 4.6 % for social workers (data not shown). For the 75 pediatric psychiatry sessions the distribution was 31.0 % for each of psychiatrists and patients, 12.4% for social workers and 25.6 % for 'Other Participants', which consisted mostly of family members (data not shown).

### Telehealth Sessions by Regional Health Authority and Trends over Time

Each telehealth session involved at least two sites: 1) the site where the specialist is located, which is designated the specialist site, and 2) the site where the patient is located, designated as the remote site. As of December 2008 there were 3 specialist sites in St. John's and 28 remote sites, for a total of 31 telehealth sites. It should be

noted that in the Labrador-Grenfell Authority telehealth sessions take place between Goose Bay (proxy specialist site) and remote coastal sites whereby a nurse at a coastal nursing station consults with an emergency room physician in Goose Bay. These sessions are not part of the CDM Telehealth Program and therefore are not part of this evaluation.

Figures A7a - A7c present clinical sessions (i.e., consults and follow-ups) by Health Authority. In a small number of cases multiple remote sites were involved in a session, in which case the site where the patient was located was used in the analysis. Adult and pediatric psychiatry sessions were combined because of the small numbers of sessions for each. Figure A7a shows the number of tele-oncology sessions by Health Authority. The majority of sessions occurred in Central, followed by Labrador-Grenfell, Western and Eastern. Figure A7b shows tele-nephrology sessions by Health Authority. The majority of tele-nephrology sessions took place in Eastern, while no tele-nephrology sessions took place in Western. Figure A7c shows the number of tele-psychiatry sessions by Health Authority with Labrador-Grenfell having the most sessions.



Figure A7a Tele-Oncology Sessions by Regional Health Authority

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Figure A7b Tele-Nephrology Sessions by Regional Health Authority



Figure A7c Tele-Psychiatry Sessions by Regional Health Authority



Figure A8 presents the number of active tele-oncology sites having at least one telehealth session. There was almost a linear increase in the number of sites over the study period, starting at two sites in 2004 and increasing to 31 sites in 2008.



Figure A8 Number of Active Tele-Oncology Sites by Calendar Year

Figure A9 presents tele-oncology sessions by fiscal quarter for each Health Authority. All four Authorities experienced increases in tele-oncology sessions from the time of the first session (September 2004) until the end of the 2008 calendar year. Labrador-Grenfell was the first to adopt tele-oncology in Q3 of 2004/05, followed by Central and Western in Q1 of 05/06. Rural sites in Eastern adopted the technology in Q3 of 2005/06. Central Health experienced a sharp increase in tele-oncology sessions after Q1 of 2005/06 and continued to have, on average, 3 to 4 times as many sessions per quarter as Labrador-Grenfell, which had the second-most sessions. Central continued to show a greater increase in sessions than the other Health Authorities, except during Q4 of 2006/07 and Q1 of 2007/08, when there was a slight decrease in the number of sessions in that Authority. Western and Eastern showed greater increases in session numbers between Q2 and Q3 of 2008/09, and in Q3 of 2008/09 Western overtook Labrador-Grenfell as having the second most telehealth oncology sessions per quarter.

Figure A9 Tele-Oncology Clinical Sessions by Regional Health Authority of Remote Site and Fiscal Quarter



Given that tele-nephrology and tele-psychiatry sessions only started in late 2007 and early 2008, the numbers of sessions for these programs are low and therefore are not presented graphically. Tele-nephrology sessions in Eastern almost tripled over the study period, increasing from 53 in Q4 of 2007/08 to 150 in Q3 of 2008/09. Sessions in Labrador-Grenfell more than tripled, going from 14 in Q4 of 2007/08 to 46 in Q3 of 2008/09. Tele-nephrology sessions in Central did not start until Q3 of 2008/09, with 66 sessions being recorded in that quarter. As previously stated, there were no tele-nephrology sessions in Western during the study period. Given the small number of sessions in the two tele-psychiatry programs, the number of sessions took place in both programs was Q4 of 2007/08. Sessions in the adult tele-psychiatry program increased from six in this quarter to 14 in Q3 of 2008/09, while sessions in the pediatric program increased only slightly from 17 to 19 over the same time period.

### Telehealth Sessions by Site

### **Specialist Sites**

For the tele-oncology program over 99% of sessions used the H. Bliss Murphy Cancer Centre as the specialist site, whereas over 96% of tele-nephrology sessions used the Health Sciences Centre. For adult tele-psychiatry, 74% of sessions used the Health Sciences Centre as the specialist site, while the remaining 26% used the H. Bliss Murphy Cancer Centre. For pediatric tele-psychiatry, 65% of sessions used the Janeway Children's Hospital as the specialist site, 24% used the H. Bliss Murphy Cancer Centre, and 11 % used the Health Sciences Centre.

### **Remote Sites**

Figures A10 - A13 present the total number of tele-oncology sessions by Health Authority of the remote site. In Eastern there were three remote sites involved in tele-oncology, with the Burin site having the most sessions. In Central there were six sites involved with the two larger centers, Grand Falls and Gander, having the most sessions. Western had four sites involved with Corner Brook having the most sessions. The Labrador-Grenfell Health Authority had the most sites involved in tele-oncology with 12 sites. The three largest centers, Goose Bay, Labrador City and St. Anthony had the most sessions. Smaller sites, where less than five sessions took place during the study period, were combined in an 'other' category (total of eight sessions). These smaller sites included Port Hope Simpson, Mary's Harbor, Postville, Cartwright and Makkovic.

Figure A10 Number of Tele-Oncology Sessions by Site, Eastern



Figure A11 Number of Tele-Oncology Sessions by Site, Central





Figure A12 Number of Tele-Oncology Sessions by Site, Western

Figure A13 Number of Tele-Oncology Sessions by Site, Labrador-Grenfell



Figure A14 shows tele-nephrology sessions by remote site and Health Authority. Sessions involved two remote sites in the Eastern (Burin and Clarenville), one in Central (Gander), and two in Labrador/Grenfell (St. Anthony and Goose Bay), with the Burin site having the most sessions. There were no tele-nephrology sessions in Western during the study period.



Figure A14 Number of Tele-Nephrology Sessions by Site

The number of sessions for adult and pediatric tele-psychiatry were too small for analysis at the site level. Sites for these two programs are shown in Tables A2 and A3. The adult program involved six remote sites: one in each of Eastern, Central and Western, and three in Labrador-Grenfell. The pediatric program involved 14 sites: one in Eastern, three in Central, two in Western, and eight in Labrador-Grenfell. The Goose Bay site recorded the most sessions for both tele-psychiatry programs.
# Table A2: Remote Sites Involved in Adult Tele-Psychiatry Sessions

Eastern	Central	Western	Labrador-Grenfell
Burin	Twillingate	Corner Brook	Goose Bay Labrador City St. Anthony

# Table A3Remote Sites Involved in Pediatric Tele-Psychiatry Sessions

Eastern	Central	Western	Labrador-Grenfell
Burin	Grand Falls-Winsor	Corner Brook	Goose Bay
	Gander	Stephenville	Labrador City
	Brookfield		St. Anthony
			Roddickton
			Flower's Cove
			Nain
			Hopedale
			Natuashish

# B. Surveys

# 1) Provider Survey

A total of 61 of the 84 provider questionnaires were returned completed for a response rate of 72.6%. Of the 61 respondents, 46 (75.4%) were female and 12 (19.7%) were male; (three non-responses). The mean age of the respondents was 45.7 years; (ten non-responses). The majority of respondents (75.4%) had participated in five or fewer telehealth sessions in the past month; (four non-responses).

Figure B1 presents survey respondents by provider group. Over half of the respondents were nurses (54.1%); 26.2% were physicians; 9.9% occupational therapists; and 9.9% were categorized as 'Other'. The 'Other' category included administrators/managers, social workers, nurse practitioners and pharmacy staff.



Figure B1 Respondents by Healthcare Provider Group

Figure B2 presents respondents of the provider survey by telehealth program. The majority of respondents were involved with the tele-oncology program (55.9%), with a further 11.8% involved with psychiatry and 7.4% with nephrology. One quarter of respondents were involved with other telehealth programs and were categorized as 'Other'. Other programs included neurology, occupational therapy, endocrinology, family medicine/primary healthcare, palliative care, surgery and orthopedics. Given that some providers were involved in more than one program, the total number of programs reported is greater than the total number of respondents. Responses for two respondents were excluded because they did not specify a program.



Figure B2 Respondents by Telehealth Program

Figure B3 presents survey respondents by Health Authority of practice. Most respondents practiced within Western (34.4%) or Eastern (31.1%), with smaller numbers practicing within Labrador-Grenfell (18.0%) and Central (16.4%).



Figure B3 Respondents by Regional Health Authority

Respondents were asked to rate their agreement with each statement in the questionnaire using a five-point Likert Scale; all statements were positively-worded. "Don't know" and "Not Applicable" categories were also included. Percent agreement is the sum of the percentage of respondents indicating either "Agree" or "Strongly Agree", while for reporting purposes the percent agreement was rolled-up into five levels of agreement as shown in Table B1.

Level of	Percent				
Agreement	Agreement				
Strong	80-100%				
Moderate	60-79%				
Modest	50-59%				
Minimal	20-49%				
Little	0-19%				

Table B1Level of Agreement Categories

Table B2 presents the percent distribution of responses by providers across categories for each statement, as well as the level of agreement with each response. If there were missing responses for a particular statement, the number of respondents (x) providing a valid response for that statement was indicated by (n = x) immediately after the statement.

While there was strong agreement by providers with the statement "During my telehealth session the patient and specialist... are able to see and hear each other adequately", there was only moderate agreement with the majority of the statements (i.e., 9/13). For the remaining three statements the percent agreement was less than 50%: "Telehealth generally decreases wait time to the initial specialist visit"; "During a telehealth session, if needed, I am able to examine patients in an acceptable manner"; and "....telehealth has prevented my patient(s) from being hospitalized." A fair number of respondents indicated "Don't Know" (21.7%) for the statement "Telehealth generally decreases wait time to the initial specialist visit", and a large proportion of respondents indicated "Not Applicable" (23.7%) for the statement "During a telehealth session, if needed, I am able to examine patient". Several respondents indicated either "Don't Know" (21.3%) or "Not Applicable" (27.9%) for the statement "....telehealth has prevented my patient(s) from being no point statement".

 Table B2

 Percent Distribution of Likert Scale Responses - Provider Survey

Statement	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)	Don't Know n (%)	N/A n (%)	Level of Agreement
#1. Telehealth has made it easier for my patients to obtain an appointment with the specialist/other provider at the provider site	31 (50.8)	17 (27.9)	7 (11.5)	2 (3.3)		3 (4.9)	1 (1.6)	Moderate
#2. Telehealth generally decreases the wait time to the initial specialist visit for my patients (n=60)	15 (25.0)	12 (20.0)	9 (15.0)	6 (10.0)	1 (1.7)	13 (21.7)	4 (6.7)	Minimal
#3. The availability of telehealth generally allows patients to be seen more frequently by a specialist (or other healthcare provider) than if telehealth was not available	27 (44.3)	19 (31.1)	4 (6.6)	4 (6.6)		5 (8.2)	2 (3.3)	Moderate
#4. The facility space in which I attend telehealth session(s) is appropriate	26 (42.6)	16 (26.2)	7 (11.5)	8 (13.1)	2 (3.3)		2 (3.3)	Moderate
#5. The videoconference equipment was ready and working properly during telehealth session(s)	26 (42.6)	17 (27.9)	13 (21.3)	4 (6.6)		1 (1.6)		Moderate
#6. During my telehealth sessions the patient and the specialist (other healthcare provider at provider site) are able to see and hear each other adequately (n=59)	24 (40.7)	25 (42.4)	7 (11.9)	1 (1.7)		1 (1.7)	1 (1.7)	Strong
#7. I have no privacy or confidentiality concerns about my telehealth sessions (n=59)	24 (40.7)	20 (33.9)	6 (10.2)	5 (8.5)	2 (3.4)	1 (1.7)	1 (1.7)	Moderate

#8. During a telehealth session, if needed, I am able to examine patients in an acceptable manner (n=59)	10 (16.9)	15 (25.4)	11 (18.6)	6 (10.2)	2 (3.4)	1 (1.7)	14 (23.7)	Minimal
#9. Generally speaking, availability of telehealth makes it more likely for patients to see the same specialist (or other healthcare provider) for their health problem (n=60)	25 (41.7)	22 (36.7)	1 (1.7)	2 (3.3)	1 (1.7)	7 (11.7)	2 (3.3)	Moderate
#10. Telehealth generally improves communication/ information transfer among healthcare providers (n=60)	20 (33.3)	21 (35.0)	11 (18.3)	3 (5.0)		5 (8.3)		Moderate
#11. Availability of telehealth has prevented my patient(s) from being hospitalized (n=58)	3 (5.2)	8 (13.8)	10 (17.2)	2 (3.4)	5 (8.6)	13 (21.3)	12 (27.9)	Moderate
#12. Telehealth enhances the quality of care my patients receive (n=60)	19 (31.7)	25 (41.7)	10 (16.7)	2 (3.3)		3 (5.0)	1 (1.7)	Moderate
#13. I feel I have received adequate training on using telehealth system (n=60)	17 (28.3)	20 (33.3)	16 (26.7)	3 (5.0)	2 (3.3)	1 (1.7)	1 (1.7)	Moderate

Table B3 presents the percent agreement with statements in the provider survey by telehealth program. The table includes p-values of Fischer-Exact tests, the test used to determine if significant differences existed between programs.

There were no statistically significant differences in agreement between telehealth programs for any statement. However, percent agreement was lower for oncology and the 'Other' program group than for the nephrology and psychiatry programs for the following statements: #5 *"The videoconference equipment was ready and working properly during telehealth session(s)"*, and #13 *"I feel I have received adequate training on using telehealth system"*. Percent agreement was lower for nephrology for the statement #7 *"I have no privacy or confidentiality concerns about my telehealth sessions."* Percent agreement was lower for the 'Other' program group than for the statement #7 "*I have no privacy or confidentiality concerns about my telehealth sessions."* 

other three telehealth programs for the following statements: #1"*Telehealth has made it easier for my patients to obtain an appointment with the specialist/other provider at the provider site*", and #4 "*The facility space in which I attend telehealth session(s) is appropriate*". These results need to be viewed with caution given the small number of respondents (n = 5) for the nephrology and psychiatry programs.

Table B3
Percent Agreement by Telehealth Program - Provider Survey

Otatumant					
Statement	Oncology (n=38)	Nephrology (n=5)	Psychiatry (n=5)	Other (n=13)	p-value
#1. Telehealth has made it easier for my patients to obtain an appointment with the specialist/other provider at the provider site	86.8	80.0	80.0	53.8	0.08
#2. Telehealth generally decreases the wait time to the initial specialist visit for my patients (n=60)	55.3	20.0	40.0	23.1	0.15
#3. The availability of telehealth generally allows patients to be seen more frequently by a specialist (or other healthcare provider) than if telehealth was not available	78.9	100	60.0	61.5	0.26
#4. The facility space in which I attend telehealth session(s) is appropriate	71.1	80.0	100	46.2	0.15
#5. The videoconference equipment was ready and working properly during telehealth session(s)	60.5	100	100	76.9	0.13
#6. During my telehealth sessions the patient and the specialist (other healthcare provider at provider site) are able to see and hear each other adequately (n=59)	81.6	80.0	80.0	76.9	0.94
#7. I have no privacy or confidentiality concerns about my telehealth sessions (n=59)	76.3	20.0	80.0	76.9	0.08
#8. During a telehealth session, if needed, I am able to examine patients in an acceptable manner (n=59)	31.6	60.0	40.0	61.5	0.21

#9. Generally speaking, availability of telehealth makes it more likely for patients to see the same specialist (or other healthcare provider) for their health problem (n=60)	81.6	60.0	80.0	69.2	0.55
#10. Telehealth generally improves communication/information transfer among healthcare providers (n=60)	71.1	80.0	60.0	53.8	0.67
#11. Availability of telehealth has prevented my patient(s) from being hospitalized (n=58)	15.8	40.0	20.0	15.4	0.61
#12. Telehealth enhances the quality of care my patients receive (n=60)	68.4	80.0	100	69.2	0.62
#13. I feel I have received adequate training on using telehealth system (n=60)	50.6	100	80.0	61.5	0.18

Table B4 presents the percent agreement with statements in the provider survey by Health Authority. Agreement was lower for Eastern and Central for statement #9 "Generally speaking, availability of telehealth makes it more likely for patients to see the same specialist (or other healthcare provider) for their health problem"; agreement was higher in Labrador/Grenfell for statement #10 "Telehealth generally improves communication/information transfer among healthcare providers"; agreement ranged from a low of 4.8% in Western to a high of 45.5% in Labrador/Grenfell for statement #11 "Availability of telehealth has prevented my patients from being hospitalized"; agreement was lower in Central and Western for statement #12 " Telehealth enhances the quality of care my patients receive." While not statistically significant, agreement was found to be lower in Central for statements: #5 "The videoconference equipment was ready and working properly during telehealth session(s)." and #13 "I feel I have received adequate training on using the telehealth system"; and lower in Labrador-Grenfell for statement #8 "I have no privacy concerns about my telehealth session."

 Table B4

 Percent Agreement by Regional Health Authority - Provider Survey

Statement		n voluo			
Statement	Eastern (n=19)	Central (n=10)	Western (n=21)	Lab/Grenfell (n=11)	p-value
#1. Telehealth has made it easier for my patients to obtain an appointment with the specialist/other provider at the provider site	73.7	80.0	76.2	90.9	0.79
#2. Telehealth generally decreases the wait time to the initial specialist visit for my patients (n=60)	36.8	60.0	42.9	45.5	0.68
#3. The availability of telehealth generally allows patients to be seen more frequently by a specialist (or other healthcare provider) than if telehealth was not available	63.2	80.0	71.4	100	0.12
#4. The facility space in which I attend telehealth session(s) is appropriate	68.4	60.0	66.7	81.8	0.76
#5. The videoconference equipment was ready and working properly during telehealth session(s)	73.7	50.0	76.2	72.7	0.52
#6. During my telehealth sessions the patient and the specialist (other healthcare provider at provider site) are able to see and hear each other adequately (n=59)	68.4	80.0	85.7	90.9	0.47
#7. I have no privacy or confidentiality concerns about my telehealth sessions (n=59)	78.9	80.0	71.4	54.5	0.52
#8. During a telehealth session, if needed, I am able to examine patients in an acceptable manner (n=59)	31.6	20.0	47.6	36.4	0.17

#9. Generally speaking, availability of telehealth makes it more likely for patients to see the same specialist (or other healthcare provider) for their health problem (n=60)	68.4	50.0	85.7	100	0.02*
#10. Telehealth generally improves communication/information transfer among healthcare providers (n=60)	57.9	50.0	66.7	100	0.04*
#11. Availability of telehealth has prevented my patient(s) from being hospitalized (n=58)	21.1	10.0	4.8	45.5	0.04*
#12. Telehealth enhances the quality of care my patients receive (n=60)	89.5	60.0	47.6	100	0.002*
#13. I feel I have received adequate training on using telehealth system (n=60)	73.7	30.0	61.9	63.6	0.16

\* Statistically significant difference

Table B5 presents the percent agreement with statements in the provider survey by provider group. Agreement was lower for physicians and the 'Other' provider group than for nurses for statement #3 "The availability of telehealth generally allows patients to be seen more frequently by a specialist (or other healthcare provider) than if telehealth was not available." Agreement was lower for physicians for statement #6 "During my telehealth sessions the patient and the specialist (other healthcare provider at provider site) are able to see and hear each other adequately". Although not statistically significant, agreement was lower for physicians for statement #8 "During a telehealth session, if needed, I am able to examine patients in an acceptable manner.

Table B5Percent Agreement by Provider Group - Provider Survey

Statement	Pe	n valuo		
Statement	Physician (n=16)	Nurse (n=33)	Other (n=12)	p-value
#1. Telehealth has made it easier for my patients to obtain an appointment with the specialist/other provider at the provider site	68.8	87.9	66.7	0.13
#2. Telehealth generally decreases the wait time to the initial specialist visit for my patients (n=60)	37.5	51.5	33.3	0.45
#3. The availability of telehealth generally allows patients to be seen more frequently by a specialist (or other healthcare provider) than if telehealth was not available	62.5	87.9	58.3	0.04*
#4. The facility space in which I attend telehealth session(s) is appropriate	75.0	69.7	58.3	0.66
#5. The videoconference equipment was ready and working properly during telehealth session(s)	68.8	72.7	66.7	093
#6. During my telehealth sessions the patient and the specialist (other healthcare provider at provider site) are able to see and hear each other adequately (n=59)	56.3	90.9	83.3	0.02*
#7. I have no privacy or confidentiality concerns about my telehealth sessions (n=59)	68.8	69.7	83.3	0.74
#8. During a telehealth session, if needed, I am able to examine patients in an acceptable manner (n=59)	18.8	45.5	58.3	0.07

#9. Generally speaking, availability of telehealth makes it more likely for patients to see the same specialist (or other healthcare provider) for their health problem (n=60)	68.8	84.8	66.7	0.27
#10. Telehealth generally improves communication/information transfer among healthcare providers (n=60)	62.5	72.7	58.3	0.61
#11. Availability of telehealth has prevented my patient(s) from being hospitalized (n=58)	25.0	18.2	8.3	0.54
#12. Telehealth enhances the quality of care my patients receive (n=60)	81.3	66.7	75.0	0.60
#13. I feel I have received adequate training on using telehealth system (n=60)	62.5	57.6	66.7	0.94

\* Statistically significant difference

# Other Provider Survey Questions

In Question #14, providers were asked "*Do you think telehealth should be expanded to other healthcare services in your region?*". The majority of respondents (85.2%: n = 54) answered 'yes'. Those that answered "yes" were then asked what heath care services telehealth should be included in any expansion. Comments were grouped under three themes as shown in Table B6.

#### Table B6 Frequency of Reponses Indicating Desired Expansion of Telehealth by Theme

Theme	#
Expansion of telehealth based on specific disciplines	35
Expansion of telehealth based on specialties/geographic areas	18
Expansion of telehealth based on specific communities/areas	9

The most frequent response was that telehealth should be expanded to specific disciplines, with the most common discipline cited being psychiatry/mental health, followed by dermatology. Other disciplines suggested included hematology, emergency

medicine, internal medicine, physiotherapy, pediatrics, allied health, diabetes care, palliative care, endocrinology, rheumatology, and urology.

The second theme identified was the expansion of telehealth based on specialties/geographic areas. Suggestions were that telehealth should be expanded to rural/remote/small areas and to those areas lacking specialists.

- Any rural areas that at present cannot avail of this technology
- All of them especially those where the specialist does not exist in their area
- Rheumatology follow-up appointments with specialists in St. John's to aid in chronic disease management

A third theme was related to the expansion of telehealth to (or within) specific communities. Burgeo was the community most often noted for need of expansion, with other areas including the Central Newfoundland region, Burin, Grand Bank, Carbonear, Placentia, Bonavista, Fortune Bay North area, Springdale, Baie Verte and Ramea. It should be noted that it is possible that these areas were identified because these were the locations that providers were most familiar with and would therefore have likely been aware of present gaps in these areas.

In Question #15 providers were asked how much travel distance they saved, if any, by seeing patients by telehealth in the past month. Only 12 providers out of 61, evenly split between physicians and nurses, provided an estimate of travel distance saved. Five respondents reported a travel savings of 1,500-2,000 km during the past month, three reported savings of over 5,000 km, and three reported less than 1,000. One respondent reported *"thousands of kilometers"*.

In Question #16 providers were asked to provide any further comments about their experience with telehealth. Frequency of responses were grouped into five specific themes as shown in Table B7. Note: some respondents provided more than one response.

# Table B7Frequency of Patient Comments about Experienceswith Telehealth by Theme

Theme	#
Benefits/positive responses	44
Challenges	22
Suggestions for strengthening program	18
Space/location of sessions	8
General comments	7

Providers noted a number of benefits in their responses, the most frequent of which was that telehealth saved patients time, travel and money. Additional comments were related to family participation and enhancement of patient care.

- This is an excellent service to the clients in our area. The travel time to St. John's is approximately five hours for an appointment that lasts 10-15 minutes. It saves our clients time and money that some of them do not have much of.
- I feel telehealth is great. It saves the patient a trip to St. John's for what would be a five minute appointment. Many of these patients do not have their own transportation, places to stay or the money to do this.
- Patient care has been greatly enhanced by telehealth services, reduction in cost for travelling, time away from family and work and the user friendliness of the system translates to the money saved.
- *I want to see all my patients via telehealth and decrease my travel.*
- A small minority choose travel over video when offered a choice. Most of this minority has family in St. John's.
- Marked improvement in accessibility continuity of care, access to specialist services etc...Allows local healthcare providers to be on the front line when accessing specialist services.
- Excellent for oncology better when family doctor present.
- Telehealth is vital for a portion of my caseload. Some clients are medically not cleared for travel to St. John's to attend seating clinic and for the logistics to travelling are so significant that it is not an option. Before telehealth these clients either did without (no access to specialty services) or occupational therapists

would do their best with use of digital pictures and telephone...but this isn't the same

• I thought it was wonderful. It was if MD was in the room with the patient and myself. Quality was good.

Challenges to the provision of telehealth were also noted, the most common of which was that hearing loss in patients can make sessions difficult. Other problems were doctors being late for the appointment, technical issues, and difficulties with a lack of a shared patient record.

- Only disadvantage is when we are unfamiliar with the patient sometimes they may have hearing loss which make it difficult.
- No privacy is available to the patient though we have a small unit and all patients and family members can hear the discussion.
- Most frustrating issue is the delay in appointments. Sometimes waiting up to 45 minutes to one hour because Doctor is late or equipment is not working properly
- Is very dependent on staff at patient site and their familiarity with process. Not easy to use when the distance MD is only one of several providers interacting with the patient at same time. Big issue with lack of shared chart at provider/patient unit this needs to electronic and shared.
- Consult was good, but the ability to implement the recommendations was a challenge given limited resources (human and physical) in comparison to the specialty site resources in rural areas. There is still no plan for this person yet despite consult as a result of resource issues.
- Telehealth has been beneficial in some areas, however it has taken away site visits from the dialysis unit. There is not a lot of privacy in the dialysis unit at any time but the sound has to be high on the T.V so everyone can hear the physician's comments. Some patients refuse to discuss any private matters on telemedicine and therefore have no opportunity to discuss these matters.

There were also suggestions for strengthening the telehealth program, with the most frequent being that usage of telehealth among specialists needs to be encouraged. Additional comments included the need for improved policy and procedures, cordless headphones, and a second camera for zooming.

- More usages. All specialists should be encouraged to use it when appropriate.
- Need co-ordination. My patients have driven to Corner Brook to video-link with St. John's when they could have done it in Port aux Basques very unfortunate and not uncommon. One thing to drive to see the doctor but to drive then video.
- Need to be at least given family doctor bonus for this when fee for service.
- Improved access to peripheral devices, improved quality, assured telehealth facilities, improved policies and procedures will further enhance program
- Being able to control the remote camera can improve the quality of the interaction
- Cordless headphones would be beneficial. Also need a computer attached to the set so the physician can see blood work or other reports and can then discuss it with the client.

There were several responses related to the location in which the telehealth sessions were held, with the two most common being a lack of space and the need for better soundproofing (i.e., privacy). It was suggested that there is discomfort with some physicians in using their personal office space for telehealth sessions, and that sessions should be in a designated area.

- I hate using my office space...consider it my private space.
- Would like to have separate unit for oncology use, to be kept in oncology nurses
  office. Often have to have telehealth sessions in oncology unit as lecture room is
  unavailable. Involves having to move around a unit and have nurses leave their
  department.
- I think that telehealth conferences should be designated to one area with a computer or IT personnel there to fix any glitches during the session. I don't feel this is a nursing function other than a set of vital signs, height and weight.
- Our room is small can only fit 1-2 family members and room is also used for other treatments
- We have averaged 15-20 videoconference visits/month. We are currently using an examination room or doctor's office and if patient has more than one person with him/her there is not enough space in either of these rooms.

#### **Patient Survey**

A total of 88 patient surveys were returned completed. Five surveys were excluded because the evaluation team felt that these respondents misunderstood the instructions included with the survey. Of the 83 respondents, 43 (53.1%) were female and 38 (46.9%) were male; (two non-responses); mean age of respondents was 58.2 years. Figure B4 presents survey respondents by age group. Over 83% of respondents fell into the 45+ age groups, with the 65+ being the most common (six non-responses).



Figure B4

Figure B5 presents the patient respondents by telehealth program; (eight nonresponses). The largest group of patients were involved in the tele-oncology program (49.3%), with tele-nephrology being the second most common (33.3%). The remaining 17.4% were involved in other programs such as psychiatry, dietetics, hematology, genetics, urology, and pediatrics and were grouped into a single 'Other' category due to small numbers.



Figure B5 Patient Survey Respondents by Telehealth Program

Figure B6 presents patient respondents by the Health Authority in which the telehealth site was located. The highest proportion of responses came from Western at 31.2%; 29.9% from Eastern; 24.7% from Labrador/Grenfell; and 14.3% from Central (six non-responses).



Figure B6 Patient Survey Respondents by Regional Health Authority

Patients were asked to rate their agreement with each statement using a five-point Likert Scale; all statements were positively-worded. "Don't Know" and "Not Applicable" categories were also included. Percent agreement is the sum of the percentage of respondents indicating either "Agree" or "Strongly Agree", while for reporting purposes the percent agreement was rolled-up into five levels of agreement as shown in Table B1 (p. 32). Table B8 presents the percent distribution of responses across categories for each statement, as well as the level of agreement with each response. If there were missing responses, the number of respondents (x) providing a valid response for that statement is indicated by (n = x).

There was strong agreement with all but two statements, suggesting that patients had a very positive experience with telehealth. There was moderate agreement with two statements: *"The facility space in which I attended the telehealth session was appropriate"*, and *"I had no privacy or confidentiality concerns about my telehealth session"*.

Statement	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)	Don't Know n (%)	N/A n (%)	Level of Agreement
#1. Telehealth has made it easier for me to get an appointment to see the specialist/other provider at the provider site	55 (66.3)	12 (14.5)	9 (10.8)		3 (3.6)	2 (2.4)	2 (2.4)	Strong
#2. Telehealth allows me to see the specialist/other healthcare provider more often then if telehealth was not available	60 (72.3)	12 (14.5)	4 (4.8)	2 (2.4)	2 (2.4)	3 (3.6)		Strong
#3. I was able to get a telehealth appointment in an acceptable amount of time (n=82)	57 (69.5)	10 (12.2)	7 (8.5)	1 (1.2)	2 (2.4)	1 (1.2)	4 (4.8)	Strong
#4. The facility space in which I attended the telehealth session was appropriate	57 (68.7)	9 (10.8)	10 (12.0)	1 (1.2)	5 (6.0)		1 (1.2)	Moderate
#5. During telehealth sessions the specialist (other healthcare provider at provider site) and I are able	66 (79.5)	11 (13.3)	4 (4.8)	1 (1.2)	1 (1.2)			Strong

Table B8Percent Distribution of Likert Scale Responses - Patient Survey (N = 83)

to see and hear each other								
#6. During telehealth sessions the videoconference equipment was ready and working properly (n=81)	63 (77.8)	11 (13.6)	3 (3.7)	2 (2.5)	2 (2.5)			Strong
<ul><li>#7. I had no privacy or confidentiality concerns about my telehealth session (n=81)</li></ul>	52 (64.2)	6 (7.4)	8 (9.9)	6 (7.2)	7 (8.4)	1 (1.2)	1 (1.2)	Moderate
#8. The process used to schedule and confirm my telehealth appointment was acceptable (n=80)	60 (75.0)	9 (11.3)	6 (7.5)	1 (1.2)	2 (2.4)	2 (2.4)		Strong
#9. During my telehealth session I had time to ask questions (n=81)	67 (82.7)	8 (9.9)	3 (3.7)		2 (2.5)	1 (1.2)		Strong
#10. Telehealth makes it more likely for me to see the same specialist than if telehealth was not available (n=81)	58 (71.6)	9 (11.1)	7 (8.6)	1 (1.2)	3 (3.7)	2 (2.4)	1 (1.2)	Strong
#11. My travel time to telehealth site was acceptable (n=81)	62 (77.5)	8 (10.0)	3 (3.6)		2 (2.4)		5 (6.3)	Strong
#12. I was satisfied with the overall quality of my telehealth sessions (n=81)	65 (80.2)	5 (6.2)	7 (8.6)		3 (3.7)		1 (1.2)	Strong
#13. I would use telehealth service again (n=81)	68 (84.0)	6 (7.4)	4 (4.9)		2 (2.5)	1 (1.2)		Strong
#14. I would recommend the use of the telehealth service to others (n=82)	64 (78.0)	8 (9.8)	5 (6.1)	1 (1.2)	2 (2.4)	2 (2.4)		Strong
#15. I had no problems finding the location/room where my telehealth session was supposed to take place (n=81)	64 (79.0)	7 (8.6)	5 (6.2)	1 (1.2)	1 (1.2)		3 (3.6)	Strong
#16. I was provided with an explanation of what to expect during my telehealth session (n=82)	63 (76.8)	11 (13.4)	4 (4.8)		4 (4.8)			Strong
#17. I am comfortable seeing the specialist/other healthcare provider by telehealth (n=81)	63 (77.8)	8 (9.9)	7 (8.4)		3 (3.6)			Strong

Table B9 presents the percent agreement with statements by telehealth program. Patient agreement was significantly lower for the nephrology program than the other programs for the following four statements: #4 *"The facility space in which I attended the* 

telehealth session was appropriate"; #7 "I had no privacy or confidentiality concerns about my telehealth session"; #10 Telehealth makes it more likely for me to see the same specialist than if telehealth was not available"; and #12 "I was satisfied with the overall quality of my telehealth session(s)", and significantly lower for the 'Other' program group for statement #9 "During my telehealth session I had time to ask questions."

Statement	Pe		p-	
Statement	Oncology (n=14)	Nephrology (n=24)	Other (n=11)	value
#1. Telehealth has made it easier for me to get an appointment to see the specialist/other provider at the provider site	81.1	76.0	84.6	0.93
#2. Telehealth allows me to see the specialist/other healthcare provider more often then if telehealth was not available	89.2	80.0	92.3	0.76
#3. I was able to get a telehealth appointment in an acceptable amount of time	86.5	72.0	76.9	0.51
#4. The facility space in which I attended the telehealth session was appropriate	91.9	52.0	92.3	0.001*
#5. During telehealth sessions the specialist (other healthcare provider at provider site) and I are able to see and hear each other	91.9	100	84.6	0.16
#6. During telehealth sessions the videoconference equipment was ready and working properly	94.6	92.0	84.6	0.06
#7. I had no privacy or confidentiality concerns about my telehealth session	86.5	44.0	76.9	0.003*
#8. The process used to schedule and confirm my telehealth appointment was acceptable	89.2	84.0	84.6	0.08

Table B9Percent Agreement by Telehealth Program: Patient Survey

#9. During my telehealth session I had time to ask questions	94.6	96.0	84.6	0.03*
#10. Telehealth makes it more likely for me to see the same specialist than if telehealth was not available	94.6	64.0	84.6	0.006*
#11. My travel time to telehealth site was acceptable	86.5	84.0	92.3	0.37
#12. I was satisfied with the overall quality of my telehealth sessions	94.6	76.0	84.6	0.04*
#13. I would use telehealth service again	94.6	88.0	92.3	0.10
#14. I would recommend the use of the telehealth service to others	91.9	80.0	84.6	0.52
#15. I had no problems finding the location/room where my telehealth session was supposed to take place	91.9	80.0	76.9	0.39
#16. I was provided with an explanation of what to expect during my telehealth session	91.9	88.0	84.6	0.80
#17. I am comfortable seeing the specialist/other healthcare provider by telehealth	91.9	80.0	84.6	0.36

\* Statistically significant difference

Table B10 presents the percent agreement for patients with statements by Health Authority. Patient agreement was lower for Eastern than for the other Health Authorities for statement: #7 *"I had no privacy or confidentiality concerns about my telehealth session"* 

Ototomont					
Statement	Eastern (n=23)	Central (n=11)	Western (n=24)	Lab/Grenfell (n=19)	p-value
#1. Telehealth has made it easier for me to get an appointment to see the specialist/other provider at the provider site	78.3	90.9	83.3	73.7	0.87
#2. Telehealth allows me to see the specialist/other healthcare provider more often then if telehealth was not available	87.0	81.8	91.7	84.2	0.86
#3. I was able to get a telehealth appointment in an acceptable amount of time	73.9	90.9	83.3	78.9	0.87
#4. The facility space in which I attended the telehealth session was appropriate	65.2	90.9	91.7	73.7	0.17
#5. During telehealth sessions the specialist (other healthcare provider at provider site) and I are able to see and hear each other	95.7	100	83.3	94.7	0.46
#6. During telehealth sessions the videoconference equipment was ready and working properly	91.3	100	83.3	94.7	0.21
#7. I had no privacy or confidentiality concerns about my telehealth session	47.8	90.9	83.3	73.7	0.02*
#8. The process used to schedule and confirm my telehealth appointment was acceptable	73.9	90.9	83.3	89.5	0.72
#9. During my telehealth session I had time to ask questions	95.7	100	87.5	89.5	0.24

Table B10Percent Agreement by Regional Health Authority: Patient Survey

#10. Telehealth makes it more likely for me to see the same specialist than if telehealth was not available	69.6	90.9	87.5	78.9	0.53
#11. My travel time to telehealth site was acceptable	78.3	100	87.5	78.9	0.50
#12. I was satisfied with the overall quality of my telehealth sessions	73.9	100	87.5	89.5	0.20
#13. I would use telehealth service again	87.0	100	87.5	94.7	0.29
#14. I would recommend the use of the telehealth service to others	82.6	90.9	87.5	89.5	0.97
#15. I had no problems finding the location/room where my telehealth session was supposed to take place	82.6	90.9	79.2	94.7	0.65
#16. I was provided with an explanation of what to expect during my telehealth session	87.0	90.9	87.5	89.5	1.00
#17. I am comfortable seeing the specialist/other healthcare provider by telehealth	82.6	81.8	87.5	89.5	0.94

\* Statisically significant difference

# Other Patient Survey Questions

Question #18 asked the patient what they would have done if telehealth was not available. The distribution of responses for the four possible options is illustrated in Figure B7. The majority of respondents (77.8%) indicated that they would have had to travel to St. John's to see the specialist in-person; 12.5% would have waited to see a specialist in a travelling clinic near their community, while the remaining 3.8 % would not have seen the specialist at all. A small proportion (5.0%) selected the "other" category indicating that they would have taken another option, such as "would not be able to live in Labrador".

Figure B7 Patient Options if Telehealth were not Available



Question # 19 asked patients what would be the main issue in making an in-person specialist visit difficult. The most common issue selected was transportation (33.1%), followed by financial (30.0%), sickness (24.2%), employment (6.7%) and 'other' (5.8%), such as "distance to travel," "travel time" and "no specialist in area". The distribution of responses for the possible issues is illustrated in Figure B8. Note: some respondents provided multiple responses.

Figure B8 Issues Identified by Patients which Made In-person Specialist Visits Difficult



Question #20 asked the patient to estimate the distance (in km) they would need to travel to see the specialist if telehealth was not available. Table B11 presents the distribution of distances indicated by respondents. The majority (79.5%) of patients estimated they would have had to travel over 200 kilometers to see the specialist, with almost half (47.0%) having to travel more than 500 kilometers.

Distance (km)	Respondents	Percentage (%)
0-50	2	2.4
51-100	8	9.6
101-200	7	8.4
201-500	27	32.5
501-1000	22	26.5
1001+	17	20.5
Total	83	100.0

 Table B11

 Distance to Travel to See Specialist if Telehealth were not Available

Question #21 asked patients to provide an estimate of the cost savings they experienced by seeing the specialist by telehealth for the current telehealth session. As shown in Table B12, 33.0% of the telehealth patients estimated savings between \$100-\$500, 20.3% between \$500-\$1,000, and 22.8% estimated savings of over \$1,000. The average savings for each patient across all ranges for the current session was estimated to be \$868<sup>1</sup>.

Savings	Respondents	Percentage (%)
\$0-100	19	24.1
\$101-200	5	6.3
\$201-500	21	26.6
\$501-1000	16	20.3
\$1001-2000	10	12.7
\$2001-5000	5	6.3
\$5000+	3	3.8
Total	79	100.0

Table B12Approximate Cost Savings for Current Telehealth Session

<sup>1</sup> Estimate based on mean of mid-ranges of all response selected

In Question #22 patients were asked the number of telehealth sessions in which they had participated, including the current session. The mean number of sessions for respondents was 9.1. As shown in Table B13 nephrology patients tended to have the greatest number of sessions, while for patients in the "other" category the current telehealth session tended to be their first. Note that patients in programs other than nephrology and oncology were categorized into an "other" category due to small numbers.

Table B13Number of Telehealth Sessions which Patients haveAttended by Telehealth Program

Number of Telehealth Sessions	Oncology	Nephrology	Other	All Programs
1	16	2	12	30
2-9	20	6	1	27
10+	0	12	0	12

Question #23 asked patients to reflect on their telehealth session and to provide any further comments. Responses fell into four categories as shown in Table B14. Note: the majority of respondents (n = 49) did not provide a response to this question.

# Table B14 Further Comments

Category	#
Satisfaction with Telehealth	17
Privacy Concerns	6
General Comments	6
Travel & Cost Savings	5

The most frequent responses were related to the patient's satisfaction with telehealth services:

- The situation was excellent. No problems were experienced whatsoever. All staff and the participating doctor were very accommodating.
- Excellent process. Not losing personal touch
- Great system and hope that more will benefit from this

- Telehealth sessions have enabled me to connect with my doctors at St. John's from my local area. Very beneficial.
- Doctro was very clear and provided full explanations we were not rushed
- Very convenient

The second most frequent responses were related to privacy:

- More privacy would be nice
- I would like to see a doctor or specialist in person at least every 10 weeks so that I could talk in privately
- Main concern would be privacy issues

Some responses were categorized as general comments:

- As a dialysis patient I don't see the need of talking with a doctor every week unless there are health issues.
- Before had to decide who needs to talk to specialist. No need to waste doctor's time if you don't have a problem.
- Just miss one-on-one. This takes getting used to. Right now would rather see a doctor in person at least once a month.

Comments related to travel and cost savings for patients through telehealth included:

- The cost of travelling from the Great Northern Peninsula to the Avalon is enormous. Then there the extra burden of finding a place to stay and getting around the city. This service certainly omitted that cost. It is much easier for family members to attend without having to miss a lot of time from work.
- Time and cost savings are great. Its tough spending 1-5 days travel/versus 30 minutes in telehealth
- Doctor's need to use this to save travel for patients.

# C. INTERVIEWS

Twenty interviews were completed as part of the CDM Telehealth Program Evaluation, including:

- 1) 2 Provincial telehealth staff at the Centre
- 2) 4 Regional Telehealth Clinical Coordinators
- Physician specialists (two Oncologists, one Nephrologist and one Psychiatrist)
- 4) 7 Nurses at remote telehealth sites
- 5) 3 Occupational Therapists at remote telehealth sites

Interview participants provided informative feedback, reflections, and opportunities for the future of telehealth. There were three main categories identified in the interviews: 1) application of telehealth, 2) strengths and challenges of telehealth, and 3) reducing waittimes and hospitalizations. Categories (headings) and the themes within categories (sub-headings) are discussed.

# Category 1: Application of Telehealth

# Productivity and Efficiency

Participants felt that telehealth had a positive impact upon the productivity and efficiency of healthcare providers, with a noted reduction in the amount of travel time. One participant commented that before telehealth only the more seriously ill patients were seen in traveling clinics, with regular follow-ups often bumped into subsequent sessions: "Definitely because what they have been finding before telehealth was when they did travel to their clinics there were so many that needed to be seen that they were seeing the more chronic patients and the ones that were just the regular follow-up were getting bumped into the next sessions, the next time that they were traveling. So they weren't being seen every three or six months or a year as planned." Other participants felt that telehealth, through reducing travel time, led to more focused and dedicated time for healthcare providers: "What we've gained, of course, is the time on the road spent as unproductive hours in Gander in a hotel room at night when you're waiting to see patients the next day." Another interviewee commented: "I mean it is not going to replace

everything, I don't think, but just expands what you can do and increases the efficiency quite a bit".

Follow-up with patients has been made easier and more convenient through telehealth, and the frequency and interaction of follow-up visits was thought to have increased: "Now all the dialysis patients that participate in the telehealth are seen once a week by their physician which provides support to the patients and knowledge transfer for the staff, and it provides them with the opportunity to ask questions at that time as well". One physician noted that they could see more patients through videoconferencing: "so I tend to see them in half the amount of time as my regular clinics and they actually book them that way as well". Some physicians noted that not being away from home makes it easier: "Well not being away from home makes it easier and I find it a lot easier to follow my own patients than to follow somebody else's", while a nurse noted that with telehealthcare is more manageable: "You know, the doctors will and we nurses would go and be with the doctor in the clinic, so those clinics were long and lengthy, and you would work long hours just to make sure everybody got seen. Whereas, now the clinics are more manageable because people are being seen throughout the month by videoconference".

An important point was also raised regarding improved continuity of care, both with respect to patient information and the maintenance of a relationship with a single provider: "*I think the patient is getting better care as well because those orders are being reviewed and monitored on a more regular basis by the specialist.*" Another participant noted: "…*I think that if we're here when the patients get seen initially, and we're here from the very beginning, we start their care from day one*". Continuity of care was also thought to have improved through more consistent follow-ups, "*it's a cleaner connect in that they've [specialists] got more consistent follow-up with patients*", and reduced travel and costs: " *It's for continuity of care for patients who don't have to travel and for things that patients are able to see their doctors - I don't know how to say it.* Makes them more comfortable, I suppose, knowing that they don't have to spend x number of dollars to go…sometimes it makes them a little easier for patients to continue with their treatments as well when they're doubtful if they want to because of telehealth they don't have to travel, as well it takes that burden away".

#### <u>Training</u>

Participants were asked to discuss the training they received for operation/participation in telehealth sessions. Many participants noted that while their training was not extensive, it was

effective: "She [the trainer] spent an hour with me and just explained how to set up the equipment and how to shut it down and if you have like different little issues and the different little perks of it and how to angle the camera and how to zoom and that kind of stuff. So that was really good". Another participant noted: "they [the trainers] even provided, you know, all the hand outs and you know anytime you had a sessions they would -- if you had a question they would just email you again...very, very accessible". The use of telehealth was seen at times to be an evolving process: "there is always the American Telemedicine Association and their conference which has really good information as well". A number of participants noted that there is always the opportunity for future consultations if there is a need. The Western Authority has enhanced the general training available to users and has created e-learning tools: "It is not designed per se as initial training for people but it's an e-learning resource where you go on and there's video clips of the cart and how to train people." Another participant in reference to this felt: "...as we start to move forward with provincial e-health initiatives in this province, we need to look at a provincial e-learning tool". Overall it was felt that the one-on-one training enabled users to become more comfortable with the technology. One specialist did note that while the physicians have been trained effectively, they do not have a good understanding of the training that staff at remote sites received. "I don't know what training they have and it is obvious that some of them had no training".

#### Adoption

Participants were asked to reflect on the reasons why they believe that telehealth is not being used more widely. Many participants felt that the technology may be overwhelming for some, or that they might have a fear of new things/technology: *"I think the younger physicians are certainly adopting it easier because they have been exposed to the technology certainly in their studies, but some physicians are reluctant to change their current practice"*. Others noted the importance of taking time to learn the new technology and that over time the problems will be minimized: *"Well, I think it's gone well. It is a new technology and you kind of expect problems, but if you look at how it was when we started, where it is today, and that's only over -- I don't know when we started doing this here. I think maybe it was 2004, 2005, I guess." Participants commented that patients may be uncomfortable discussing health information through the use of video, and that dialysis patients in particular may have privacy/confidentiality concerns given that they are in close proximity to other patients while undergoing a telehealth session: <i>"I mean the patients have about six or eight feet in between each other but I mean no more than, you know, when the doctor visits when he comes to see them"*. Another participant noted that there

may also be legal fears: "Some people here have had a fear of by making such a radical departure in the way we see patients that they might be held medically accountable if anything went wrong. So that's one of the fears is this medical/legal part".

There was also a sense that some physicians are uncomfortable with the inability to do handson assessment face-to-face with the patient: "One of the biases is that, well, they can't examine people. So that means it's useless. It is not really true. There are some forms of examination you can do, if the quality of the picture is good enough and you are with an experienced nurse who is in the room with the patient, which is, you know, the case 99 percent of the time".

Remuneration was also brought up as an issue. Some participants felt that those who have to "go through a series of hoops for payment" would be less likely to engage in telehealth. There was some discussion about changes being made to the Medical Care Plan (physician billings) so that this could be made easier. As one participant noted, "Certainly remuneration is one of, is one thing because everyone likes to be paid for what they do. So, certainly as we're sorting through that, that is something that needs to be addressed...". Another participant stated, "...but it's making sure that we have remuneration issues that are really easy for physicians and that. Making sure the service is easy to use and that sometimes has been an issue. They're wondering about that. Well it's not an issue for salary, some fee for service if they're general practitioners, it's only the specialists I think that are yet remunerated. So that could be considered one of the weaknesses of telehealth."

Others noted that there needs to be more awareness of telehealth: "Just because they [some physicians] don't know enough about it probably, they're not aware of how good it can be and what a good experience it can be, probably just lack of knowledge or scared of something new". The integration of telehealth into the overall healthcare system was also seen as a critical step: "...until we are integrating telehealth with how we deliver healthcare, that's where we need to get to and that's where our focus is going to start to move towards, more from a clinical driven program versus a technology".

#### **Special Needs**

There were comments concerning patients with physical and mental disabilities, and what can be done to make telehealth a positive experience for these individuals: "So by Telehealth we have the vendor here and people that do the modifications as well if required, and they meet with the patient, they can get all the measurements and everything they need. So I think for that special needs group it is imperative that they have telehealth". Another participant noted that some physically-disabled patients are unable to travel due to "skin pressure issues and therefore they can't sit for very long".

As well, travel for some special needs patients is extra costly as they may need an escort to accompany them: "Well, again, I guess, if there's special needs and if they did need to travel, a lot of those special needs, if they're wheelchair – most of them would need an escort and it would come down to the financial barriers again for travel for those patients with special needs. Other than that, I'm not sure what other benefits other than financial benefits that they could avail of." Another participant stated "Yeah. I mean it certainly serves the physically disabled if they're impeded for travel. Like that example I gave you about rehab. The client is like I'd say a Level III care, if you want to go by levels. Like complete care. They need to be washed, dressed, fed, carted around in their wheelchair. So that rehab session certainly serves that client because they would have had to fly to St. John's with an attendant to provide their care and then with an assistant to provide. So it would have been three people flying to St. John's for two weeks."

Somewhat related to patients with special needs, one participant noted that telehealth may be a preferred method of communication with violent patients: "Some of them can be difficult to transport by plane, so in those cases probably if we can do a video assessment, that perhaps is better". Illness was also noted as a special need that has to be considered, with cancer patients often identified as patients that are too ill to travel: "some of the patients that I have on chemotherapy are too unwell to travel". Another physician commented: "I think the really sick patients are the ones ... They are the ones that I think are benefiting the most, because a lot of these people just couldn't travel and we just wouldn't see them before". Another special needs group that was mentioned was the hearing impaired, however several participants noted that this would be an issue for face-to-face visits as well: "I think these people have the same hearing impairment when you're talking to them face to face but they seem to struggle a little more on the video than face-to-face. Usually it is not a big problem, there is a relative there, because the relative will sort of repeat what I'm saying or there is a nurse there. Like, they help translate. But some of them are a little uncomfortable with it".

#### Travel Time and Costs

Travel time and cost savings were frequently identified as benefits of telehealth: "Oh the cost saving to the patient and to the province has been tremendous when you look at coming from especially Labrador to fly down here, Telehealth has certainly cut those costs, you know, as much as possible". Another participant stated: "They're happy not to have to be traveling, leaving home for extended periods of time for a 15-minute follow-up. It's just really good for the province and for the people". The savings in travel time and costs was even more apparent for physically disabled patients: "So the person has to go in with their own healthcare providers, stay in either the hospital or the hotel, find their own travel arrangements, have all the equipment they need such as lifts or hospital beds arranged and that's much more costly...a bed at the Miller Center is very expensive too...So those costs have been diminished because all the person has to do is find their way into hospital, if they're in their own community. So that's been a huge savings".

Savings of time and money is also applicable to healthcare providers given many perform travelling clinics: "*Thirty working days a year spent in Central Newfoundland. Now they have it cut down to about two days*". Overall, the reduced travel time and cost savings were seen as beneficial to both the patients and providers, and ultimately, the healthcare system: "*[It's] priceless, it is. It's unbelievable, the impact, because like I said earlier, sometimes the appointment time is very early in the morning and some families have to leave the night before to get in town...so it's much better than the three and a half hours. That's been a huge plus to the system*".

# Category 2: Strengths and Challenges

#### **Strengths**

There were a number of positive aspects of telehealth identified by participants with not having to travel and associated cost savings seen as major benefits: "...like they come right to our institution, they sit down, they see their doctor face to face, and then they don't have that long drive to St. John's and back again for a five-minute appointment. So it saves the patient the time as well as the physician....". One provider commented: "It is great for us as providers and it's most definitely great for the patients and clients that use it. It saves them money that a lot of those people don't have, and a lot of time that traveling back and forth. Some, a lot of that for

most of those patients are precious time that they don't have a lot of". The ability to follow-up with participants in remote areas and improvements in continuity of care were also noted: "the big thing for us is they get to see the specialist, you know, once a week other than, you know, three times a year. It certainly gives us much better continuity of care here". That patients could be seen in (or near) their home community was also a major strength: "... just people being able to receive care in their communities, not having to travel, having that family support behind them while they're dealing with their physicians, where they would have to in all likelihood have to travel alone if they're coming into St. John's. So they have their family support system with them when they're staying in their own community, less wear and tear to their health when they don't have to travel. Telehealth also allows healthcare providers in rural/remote communities to become more integrated into the care process: "...being able to be a part of the appointment with the oncologist is a strength for me...and I'm able to, well, re-communicate, if necessary, what was said, and often I take notes so that if the patient is not really focused on what is being said then it can be repeated back to them...and if there is any treatment changes or changes in plan then I know right away what they want to be done".

Telehealth was seen as a benefit in the delivery of emergency services: "It certainly has provided great improvement in our site here because it cuts down on the travel for patients, and in an emergency situation, like, there's a couple of emergency situations that we do give chemo, and they're seen by Telehealth rather than travelling to St. John's". That telehealth supports the delivery of equitable access to service was noted: "Yes, it has filled gaps, there's no question, and certainly when you look at our focus on chronic disease management, we've been able to see where we've been able to provide, I guess, a more equitable level of service across the province...", which is particularly true in Labrador: "In our region, Labrador, we're quite isolated from the island part of the province, of course, which restricts travel for many of our clients, financial and whatever reasons, and just, I quess, they often can be unwell to travel. So having this videoconference set up enables patients to be seen by their specialist that they wouldn't otherwise be able to be seen". A less known benefit of telehealth brought out in the interviews was the potential for telehealth patients to access services from clinics outside of the province: "Our mainland follow-ups and pre-op assessment that are being conducted through Telehealth to University Hospital Network and Shriner's in Montreal for both neurosurgery, heart/lung transplant patients have been tremendous...".

#### **Challenges**

Participants provided insight into potential challenges to telehealth. One participant discussed the additional work involved with telehealth, including the secretaries who do all the bookings for patients. "It is not so much the physicians sometimes but their staff are the ones that do all the booking for telehealth and that's not within their job description." Another challenge that was identified was limited funding for human resources, equipment, and the telehealth program overall. In regards to equipment one participant noted: "The equipment itself is good but we need to expand the type of technology that we're using". The issue of equipment also was considered within the context of accessing patient information and the privacy concerns that go with such access: "To the extent that I know the patient well, I can remember stuff but with a hundred patients to know, and the fact that they're coming and going fairly quickly within the population, means that we're often challenged by that. There are probably ways around it but we've had technical difficulties getting access to remote electronic health records, some privacy concerns about opening up with the outside regions as well". The use of the internet more was also a suggestion: "I often wondered if there's some way of making it a little more, to going internet-based or something. Kind of, I don't know if that's doable or not. But you're just making, you're taking away the physical and geographic barriers completely".

The interviews brought out a paradox in that some providers spoke about the lack of hands on assessment, yet at the same time understood that face-to-face interventions was not the intent of telehealth: "The big one is the personal touch. Not being able to actually put your hands on for an examination but then again if an examination is required then the patient, in all likelihood, is brought in to see the physician in person anyway". Another issue identified was that scheduling could be improved: "Yeah. I guess we can say some difficulty in scheduling the appointments fast enough." Another participant stated: "[There are] some problems of scheduling and infrastructure with clerical staff and nursing staff. There are a few bottlenecks around the province with nurses now actually trying to get a nurse to be at the other site, trying to get things set up and working.". The coordination of sessions between sites was also noted as a challenge with scheduling: "So I think that the cumbersomeness of the having to book it, that may improve, but right now would involve a slew of e-mails back and forth. Obviously it's important to have some control over the booking because it would become chaos otherwise. We've run into trouble though where either the tele unit at the distance site is being used for some other service or we have two nephrologists here who are doing simultaneous dialysis care in say Burin and Gander and they're trying to both fit it in at the same time but yet we have only
one unit that we can use in the city". The issues with scheduling had been previously identified and Telehealth Program is currently in the process of introducing new software which is intended to improve the scheduling process: "Well we are, we are in the process of improving the scheduling right now. I am using Microsoft Outlook to monitor the systems and the appointments that are out there now. Using a lot of color coding and everything else for different disciplines and stuff, and it is starting to get a bit tangly, but we just recently purchased a scheduling package that will be rolled out province wide. It will allow -- well, to begin with it will be a centralized booking system which we have right now anyway, I do all the booking. But once rolled out it will be start becoming decentralized as we introduce it to different sites and do more training and allow both sites to do their own bookings" (Provincial Scheduling Coordinator).

The need to further expand telehealth to other communities was noted: "I think the telehealth program is an excellent program that should be, like I said, spread out to all specialists in all the different areas because it is so much easier for a patient or a client or whatever to come to a telehealth appointment, especially in a remote area of Newfoundland, than trying to get to St. John's or Corner Brook or wherever to see a specialist. Another interviewee commented: "I would like to see it definitely continued for our region because I see the value now for our region and not just now but into the future. I think it's really going to be instrumental in looking at addressing some of the gaps in services and enhancing service delivery to clients, especially those in rural and remote areas".

The limited role of telehealth in chronic disease management was indentified: "Well, I mean, we have a lot of chronic lung diseases, we have diabetes that's not being managed through telehealth as we speak. These are big disease entities, and congestive heart failure or cardiovascular disease is not being managed using telehealth as we speak. These are huge entities within the population of this board and within the population of the province. So I think they're very large targets that should be considered, and, of course, with those, they all fall in a chronic disease model of care which looks at self-care, and hence homecare supports, and I think that's where the next biggest mileage is to be gained, both getting those programs on and extending them out beyond the reach that we currently have". Another interviewee commented: "I think we're doing great things. I think we could do a lot more. We're within the guidelines of the chronic disease management now but I think there is a lot more we can do in the future along with the chronic disease management; such as, surgical follow-up. You know, so many

programs that don't fall under the chronic disease management umbrella, I think there is so much we can do".

Related to expansion was the issue of sustainability: "I think right now from a program perspective, we're in project status, our number one concern right now is getting that sustainability for our regions, and by that, I mean, sustainability for the positions. Right now they're funded through project dollars and they're temporary positions, and we're working with government right now to make those positions permanent positions within the regional health authorities so that it'll be part of their base funding". The sustainability of telehealth as an integral part of the overall health system was noted: "I think certainly funding from the government for sustainability is absolute key and with that brings the need for additional resources and to help us integrate it into the healthcare system and that is exactly what we want to do. Telehealth is not meant to be something different or on the side. It is just meant, it is just a different model for delivering care, whether you have an in-house appointment or you have telehealth, but in order to do that we need good resources and funding".

#### **Category 3: Reducing Wait Times and Hospitalizations**

#### **Reducing Wait times**

While there was support found during the interviews for the claim that telehealth reduced wait times for some services, a lack of supporting data makes the extent of this benefit uncertain: "I think impact on wait times has gone down. But I mean I don't have any data to back that up, but I mean to say, for instance, with our oncology sessions what would happen was for the very initial assessment the client would have to travel to St. John's to meet the oncologist, and right now some of the oncologists are taking it on that they do the official first meeting by video conference as well". The lack of data on wait times and the potential impact of telehealth was also considered within the context of a provincial waitlist management system: "I would say there's been a significant reduction in wait times. Right now, I don't know that we would have the data to be able to measure that, and hopefully at some point in time we'll have a provincial waitlist management system, but there's no question". A possible reduction in wait times was also considered to be dependent on the type of care: "That could be a hard one to say. I mean there is a bunch of different types of waits, I think. I think in oncology we really haven't had, we don't generally have long waits anyway". A reduction in wait times was also thought to be possible because bad weather would have less of an impact on scheduling: "For example, if

there are storms and that sort of thing then they're going to have a quicker appointment or it's going to be a more efficient appointment because it's more likely that they'll get to their appointment. So I guess if you look at it that way".

#### **Reducing Hospitalizations**

There was no consensus during the interviews that telehealth had an impact on reducing hospitalizations: "I don't know how it has affected it. I guess, if we were able to see the patients more frequently and if things arise, they can be seen quicker than having to go in, so it may have improved hospitalization or preventing hospitalization, but on the other side of it, if the patient requires hospitalization, the videoconference is not going to – ultimately not going to stop that. If they're sick, they need to be coming in". The type of patient seen in telehealth was also considered somewhat independent of hospitalizations: "99 percent of patients are outpatients anyway. So we are not really thinking about inpatient beds when we're seeing people. So it might have saved a few admissions but it is hard to say, it is probably a small number overall". Others noted that it would be difficult to measure this at this point as telehealth is still relatively new: "We're still in our infancy stages so it's conceivable that by seeing our patients as often as we do for the applications that we presently have, that they are seen in a timely way and therefore hospital admission is reduced as a consequence of the gaps that are being filled by this service". Related to hospitalizations one participant commented that there was potential to shorten the stay in hospital through telehealth: "...because you can follow the person up in their home environment almost in a convalescing type of way, and telehealth permits that over the broad geography".

#### D. ANALYSIS OF ADMINISTRATIVE DATA

#### **Analysis of Oncologist Visits**

Table D1 presents the number of oncologist visits by year for the four most common types of cancers.

Site of Cancor	Oncologist Visits						
Sile of Calicer	2005	2006	2007	2008	4-year Total		
Breast	4602	4348	4153	4840	17,943		
Colorectal	3478	3495	3524	3912	14,409		
Lung	2522	2712	2670	2589	10,493		
Prostate	2244	2003	2251	2593	9091		
Total	12,846	12,558	12,598	13,934	51,936		

### Table D1Oncologist Visits by Type of Cancer and Year

Table D2 shows the percentage of oncologist visits that are seen via telehealth by site of cancer and year. The percentage of cancer related visits conducted by telehealth increased over time, with prostate cancer having the most visits reported.

Table D2Percentage of Visits Seen by Telehealth by Site of Cancer and Year

Site of	Percentage of Oncologist Visits Seen via Telehealth					
Calicer	2005	2006	2007	2008	4-year Total	
Breast	0.3	1.2	1.1	3.5	1.6	
Colorectal	0.1	0.6	0.7	5.3	1.7	
Lung	0.2	1.2	1.6	3.1	1.5	
Prostate	1.8	8.5	11.3	12.8	8.8	
Total	0.5	2.2	2.9	5.7	2.9	

Table D3 presents the number of oncologist visits by type of visit. Approximately 15% of all visits were consults (i.e. initial visits), while the remaining 85% were follow-up visits; this trend was consistent across the four years of data.

### Table D3Oncologist Visits by Type of Visit

Vicit	Oncologist Visits										
VISIL	Visit 2005			2006		2007		2008		4-year Total	
would the	Count	%	Count	%	Count	%	Count	%	Count	%	
Consult	1990	15.5	1915	15.2	1896	15.1	2063	14.8	7864	15.1	
Follow-											
up	10,856	84.5	10,643	84.8	10,702	84.9	11,871	85.2	44,072	84.9	
Total	12,846	100.0	12,558	100.0	12,598	100.0	13,934	100.0	51,936	100.0	

Table D4 presents the number of oncologist visits by sub-specialty. For each of the four years slightly more than half of the visits were made to medical oncologists.

Sub		Oncologist Visits								
Sub-	2005		200	2006 2		)7	2008		4-year Total	
specially	Count	%	Count	%	Count	%	Count	%	Count	%
Radiation Oncology	5911	46.0	5299	42.2	5204	41.3	6047	43.4	22,461	43.2
Medical Oncology	6935	54.0	7259	57.8	7394	58.7	7887	56.6	29,475	56.8
Total	12,846	100.0	12,558	100.0	12,598	100.0	13,934	100.0	51,936	100.0

## Table D4Oncologist Visits by Sub-Specialty

Table D5 presents oncologist visits by location of telehealth site. For the majority of visits (83.3%) tracked by the Oncology Patient Information System (OPIS), whether via telehealth or in-person, the oncologist was located at the H. Bliss Murphy Cancer Centre in St. John's. For the remainder, the oncologist was either located in another area of the Health Sciences Centre, at St. Clare's Hospital, or traveled to one of five larger centres as part of a travelling clinic.

	Oncol	ogist Visits
Location	Count	Percentage of Total
H. Bliss Murphy Cancer Centre*	43,264	83.3
Health Sciences Centre	425	0.8
St. Claire's Mercy Hospital	67	0.1
Corner Brook	4216	8.1
Grand Falls-Windsor	1954	3.8
Gander	1733	3.3
Burin	277	0.5
Total	51,936	100.0

Table D5 Oncologist Visits by Location

\* Cancer Centre is physically attached to Health Sciences Centre

Table D6 presents the number of unique patients who visited an oncologist between 2005 and 2008. There was an average increase of 15% in the number of patients seen over the four-year period for each of breast, colorectal and lung cancer. Prostate cancer experienced a 31% increase over the same period.

Site of Cancor	Number of Patients						
Sile of Calicer	2005	2006	2007	2008			
Breast	1375	1379	1433	1577			
Colorectal	841	861	938	977			
Lung	532	606	612	611			
Prostate	822	881	970	1075			
Total	3554	3724	3944	4220			

# Table D6Number of Unique Patients Involved with Oncology Sessionsby Site of Cancer and Year

Table D7 presents the number of oncologists per year involved in clinical visits for each of the four cancer types. Given that many oncologists treat multiple types of cancers, the number of oncologists involved in treating the four types of cancers combined is greater than the number involved in treating each type. A small number of oncologists were associated with less than 10 visits per year (e.g. medical resident, physician leaving or retiring, or a generic provider code used for a given site). Overall, the number of oncologists remained relatively constant over the fouryear study period.

Site of Canaar	Number of Oncologists						
Sile of Calicer	2005	2006	2007	2008			
Breast	17	22	20	17			
Colorectal	17	17	20	17			
Lung	19	18	18	18			
Prostate	16	18	15	18			
Total	22	27	24	20			

Table D7Number of Unique Oncologists Involved with Oncology Sessionsby Site of Cancer and Year

Table D8 presents the average number of oncologist visits (both consults and follow-up visits) per patient by year. The results demonstrated a small but statistically significant difference in the number of visits over the four-years for breast cancer (p=0.021), prostate cancer (p=0.001) and all four cancers combined (p=0.004). Overall, there was a decrease in number of visits between 2005 and 2006, and then a slight increase from 2007 to 2008.

### Table D8 Average Number of Oncologist Visits per Patient by Site of Cancer and Year

	C	t			
Site of	2005	2006	2007	2008	n value
Cancer	Average	Average	Average	Average	p-value
	(Std. Dev.)	(Std. Dev.)	(Std. Dev.)	(Std. Dev.)	
Breast	3.35 (3.22)	3.11 (2.67)	2.90 (2.58)	3.07 (2.75)	0.021*
Colorectal	4.14 (4.06)	4.06 (3.62)	3.76 (3.29)	4.00 (3.45)	0.301
Lung	4.74 (3.76)	4.48 (3.49)	4.36 (3.46)	4.24 (3.11)	0.308
Prostate	2.73 (2.46)	2.27 (1.95)	2.32 (1.88)	2.41 (1.85)	0.001*
Total	3.60 (3.44)	3.35 (3.02)	3.19 (2.86)	3.29 (2.88)	0.004*

\* Statisically significant difference

Table D9 presents the number of oncologists seen per patient by year. The results show a small but statistically significant decrease in the number of oncologists seen per patient over the four-year period for prostate cancer (p < 0.001), and the four cancers combined (p=0.001).

Site of	2005	2006	2007	2008	n_valuo
Cancer	Average	Average	Average	Average	p-value
	(Std. Dev.)	(Std. Dev.)	(Std. Dev.)	(Std. Dev.)	
Breast	1.58 (0.79)	1.49 (0.70)	1.54 (0.76)	1.53 (0.73)	0.065
Colorectal	1.59 (0.89)	1.52 (0.76)	1.59 (0.81)	1.56 (0.81)	0.306
Lung	1.73 (0.90)	1.69 (0.80)	1.72 (0.84)	1.66 (0.80)	0.810
Prostate	1.26 (0.57)	1.15 (0.45)	1.17 (0.44)	1.15 (0.45)	0.001*
Total	1.53 (0.80)	1.45 (0.71)	1.49 (0.75)	1.46 (0.72)	0.001*

Table D9Average Number of Oncologists Seen per Patientby Site of Cancer and Year

\* Statisically significant difference

#### Analysis of Wait Time to Consultation

Wait time was defined as the number of days between the patient referral date and the oncologist visit date. Reliable wait time data was only available for radiation oncologists for the period 2006 onward, thus other years and sub-specialties were excluded from this analysis. As well, the analysis examined only wait times for consults (initial assessment) as most follow-up visits were pre-scheduled and would not reflect a valid waittime. Waittime analysis was limited

to prostate cancer given only 1% of consults for the other three cancer types were done via telehealth.

Table D10 presents the number of radiation oncologist visits for prostate cancer by modality and year of visit. Wait time data was available for 88% of visits, with the majority of consults completed in-person. The proportion of telehealth visits for prostate cancer increased from 13.9% in 2006 to 17.4% in 2007, and then decreased to 11.2 % in 2008.

 Table D10

 Radiation Oncology Consults for Prostate Cancer by Year and Modality

Vicit			C	ncolog	ist Visits			
VISIL Modality	2006		200	2007 200		8	3-year Total	
wouldry	Count	%	Count	%	Count	%	Count	%
In-person	186	86.1	200	82.6	221	88.8	607	85.9
Telehealth	30	13.9	42	17.4	28	11.2	100	14.1
Total	216	100	242	100	249	100	707	100

Table D11 presents the number of oncologists involved in radiation oncology sessions (both telehealth and in-person) for prostate cancer by year. Although there were six oncologists for 2006 and 2008, three of the oncologists were associated with 97% of the visits in 2006, while five were associated with 98% of the visits in 2008.

# Table D11Number of Unique Oncologists Involved in Radiation Oncology Visits(Telehealth and In-Person) for Prostate Cancer by Year

Number of				
0	Oncologists			
2006	2007	2008		
6	4	6		

Table D12 compares average wait times for a radiation oncology consult (both telehealth and inperson) for each year. Average wait times were higher than median wait times indicating positively-skewed wait time distributions. This indicates the mean value is larger than the median and is the result of a small number of visits having higher than normal wait times (i.e., outliers). Although there was no statistically significant difference between years, there was a decreasing trend for the average wait times from 2006 to 2007, but no difference between 2007 and 2008. Median wait times remained relatively constant at approximately 30 days.

 
 Table D12

 Wait Time to Radiation Oncology Consult (Telehealth and In-Person) for Prostate Cancer by Year

Wait Time (Days)								
200	6	200	2007 2008					
Average (Std. Dev)	Median	Average (Std. Dev)	Median	Average (Std. Dev)	Median	0.955		
42.4 (65.5)	30.5	36.1 (28.3)	31.0	36.1 (29.3)	30.0			

Table D13 compares the average wait time for a consult using telehealth versus in-person over the three year period 2006-2008. In most cases the mean wait times were higher than median wait times indicating positively skewed wait time distributions. Although there were no significant between-group differences, there was a trend towards lower average wait times for telehealth sessions than for in-person sessions in 2006 and 2008. Also, average wait time for telehealth sessions showed a decreasing trend between 2006 and 2008.

Table D13Wait Time to Radiation Oncology Consult for Prostate Cancer by YearTelehealth Visits vs. In-person Visits

Year	In-pers	son	Telehe	n value	
	Mean (Std. Dev)	Median	Mean (Std. Dev)	Median	p-value
2006	43.0 (70.1)	29.0	38.8 (22.0)	36.5	0.065
2007	36.0 (30.1)	31.0	36.8 (17.5)	37.0	0.078
2008	36.9 (30.1)	30.0	29.5 (21.7)	23.0	0.197
3-year Period	38.5 (46.2)	30.0	35.3 (20.3)	35.0	0.188

#### **SECTION 4: DISCUSSION**

The evaluation involved mixed methodologies incorporating an analysis of telehealth utilization (i.e., session scheduling), provider and patient surveys, interviews with key stakeholders and analysis of administrative data (i.e., wait times). The results of each approach will be discussed separately, followed by a discussion of the two research questions put forward in the evaluation framework.

#### A. Utilization Analysis

The analysis of telehealth utilization using data obtained from the Telehealth Utilization Database found a gradual increase in the number of telehealth sessions from the start of the telehealth program (i.e., tele-oncology) in 2004 to the end of 2008. After becoming the CDM Telehealth Program in 2006, increases in the number of sessions per quarter continued and the service subsequently expanded to include psychiatry, nephrology, neurology, diabetes care and genetics. More recently these programs have expanded to include a larger number of telehealth sites across the province. The increase seen in the number of telehealth sessions after the third quarter of 2008/09 mainly came about because of the expansion of the telenephrology program to three large sites in the province. Currently (December 2009), there are forty-eight active clinical telehealth sites in the province, with many offering telehealth programs in multiple chronic disease management areas and healthcare disciplines.

In addition to increasing use, telehealth users in the province have expanded from the traditional user groups of physicians, nurses, patients and family members/care-givers to include pharmacists, occupational therapists/physiotherapists, dietitians, and social workers. The increase in usage indicates that teleheath has gained increasing acceptance with both patients and healthcare providers throughout the province. Our findings further suggest that there is overall satisfaction with telehealth services in meeting the expectations of both providers and patients in the delivery of healthcare to rural and remote areas of Newfoundland and Labrador.

#### B. Surveys

The provider and patient surveys provided valuable information concerning the CDM Telehealth Program. Comparisons of survey responses between telehealth programs, regional health authorities, and provider groups provided evidence of the benefits of telehealth, as well as areas for improvement.

Patient surveys found strong levels of agreement with statements specific to satisfaction with, and benefits of, telehealth; conversely providers only reported moderate or low levels of satisfaction. This finding suggests that patients had more positive experiences with telehealth than did providers, or that patients saw more immediate benefits, particularly with respect to improvements in access and reduced travel. The patient survey results also indicated that telehealth can result in time and cost savings, which may support further improvements in quality of life. Such benefits may not have been as pronounced for providers. The provider survey found moderate levels of agreement that telehealth was providing benefits such as reduced travel time and cost savings, better access to care, and increased frequency of followup visits. Providers identified three specific areas of telehealth having a low perceived benefit: 1) wait times, 2) ability to examine patients, and 3) prevention of hospitalizations. With respect to wait times, there was some support, however it was apparent that providers were reluctant to confirm that telehealth leads to wait time reductions, given the lack of data to support this claim. With respect to the ability to examine patients, it is usually the specialist who determines whether the patient is an appropriate candidate for telehealth, although nurses at the sites may also feel that they are unable to examine the patient adequately. If it is thought that an extensive examination is required then it may be decided that the specialist see the patient inperson. This is why most consults (i.e. initial assessments) tend to occur in-person. Currently, cameras and other peripheral devices are being implemented at some sites across the province in an effort to enhance the examination process via videoconferencing. Many providers felt that telehealth did not prevent hospitalizations, while still others indicated they did not know, suggesting that respondents may be reluctant to speculate in the absence of supporting data. Of note, telehealth staff indicated that some hospital patients may be seen via telehealth, which may reduce immediate transfers to larger centres for specialty care. For statements related to these three areas, it is interesting to note that a significant number of providers selected either 'Don't know' or 'Not Applicable' as their response (28.4%, 25.4%, 49.2%, respectively).

When comparing the results of the provider survey between telehealth programs it was found that providers in the oncology program and the "Other" program group had lower agreement with statements about the equipment working properly and having received adequate training. Problems might be expected in the 'Other' group, which consists of occupation therapy, diabetes and genetics, as these providers may be unfamiliar with the equipment given their lack of experience with telehealth. However, it was unexpected that providers involved in teleoncology would show lower agreement given this program is the longest running program, having been operational since late 2004. It is possible that providers in the oncology program are scoring these questions based on their experience with telehealth in the past. Teleoncology originally had no formal training program and experienced many "growing pains", including network and process problems with training, scheduling and determining points of contact for remote sites. The tele-nephrology program, in contrast, did not have the same problems at start-up, perhaps a result of the lessons learned with the oncology program.

Nephrology patients indicated they were more likely than other telehealth patients to have privacy concerns. This is due to the nature of tele-dialysis sessions taking place in the dialysis unit where patients are in close proximity to one another, and others may hear conversations of other patients undergoing telehealth sessions at the same time. Agreement was somewhat lower for respondents in the 'Other' telehealth program for statements related to facility space and the ease of obtaining an appointment with the specialist. With smaller centres, teleheath sessions often take place in an office or boardroom setting, which is not the most appropriate place for certain healthcare-related procedures. There may not be enough room to accommodate a patient's wheelchair when an occupational therapist is required to adjust the patient seating during a session, or conduct a gait analysis (which requires the health professional to observe a patient walking). There was no evidence to fully explain why healthcare disciplines in the 'Other' group perceived that telehealth would be less likely to make it easier for patients to obtain a specialist appointment. It may be that wait lists in the healthcare disciplines included in this group were relatively short to start with, so for this group telehealth not be considered a major contributor to obtaining an appointment. Also, it is important to consider that the sample sizes for the nephrology and psychiatry programs are relatively small for this analysis, and as such these results need to be interpreted with caution.

When comparing provider survey results between Health Authorities, Eastern and Central were found to have lower agreement than Western and Labrador-Grenfell in relation to telehealth making it more likely that patients would see the same specialist. This finding is likely resulting from the nature of the tele-nephrology program, given that Eastern and Central do the majority of these sessions and tele-nephrology patients are generally seen by the specialist who is scheduled to conduct the clinic on that day. Agreement was higher in Labrador-Grenfell related to telehealth improving communication/information transfer among healthcare providers. The telehealth program in Labrador is highly integrated into their healthcare delivery model, particularly in coastal areas where nursing stations rely on telehealth as their only direct source of communication with physicians. Nurses often communicate with physicians located in the emergency room of larger centres such as Goose Bay. Of note, these sessions are not part of the Provincial Telehealth Program, and as such were out of the scope of this evaluation. Nevertheless, this may explain the higher level of agreement in Labrador-Grenfell with this statement. Among health authorities there were low levels of agreement in the provider survey that telehealth has prevented hospital admissions, however Labrador-Grenfell did score the highest for this statement (45%). Contributing to the relatively high level of agreement among Labrador-Grenfell respondents is the aforementioned high degree of integration of telehealth into healthcare delivery in this region.

There was a trend in Central towards lower agreement with statements about videoconferencing equipment working properly, and receiving adequate training in using the telehealth system. There have been technical difficulties with set-ups that are thought to be related to a lack of familiarity with the equipment by staff having received training 'on the fly'. As well, some providers within Central indicated that they hadn't received enough training in the telehealth system. The possibility of refresher training has been discussed in Central. There was also an indication of privacy concerns in Labrador-Grenfell. Given that privacy concerns seemed mostly related to the space used for tele-nephrology, and the relatively low number of these sessions that occur in Labrador-Grenfell, this finding is somewhat surprising. A possible explanation for this finding is that even though there were only a few tele-nephrology sessions in Labrador-Grenfell, the proportion of providers involved with tele-nephrology responding to the survey was higher in Labrador-Grenfell than the other Health Authorities.

When comparing the provider survey results between groups, agreement was lower for physicians and the 'Other' provider group for the statement related to telehealth enabling the patient to be seen more frequently by the specialist. It may have been that some physicians responding to the survey were general practitioners and, as such, would not know if telehealth increases specialist visits. Unfortunately, the provider survey did not ask if the responding physician was a specialist or a general practitioner. Agreement tended to be lower for

physicians compared to other user groups for statements that the patient and provider are able to hear each other adequately during telehealth sessions, and that the provider is able to examine patients in an acceptable manner. The specialist cannot do a hands-on examination via telehealth so they often have the nurse at the remote site carry out examinations on their behalf. This result may also have been due to greater resistance to technology in the physician group than in the 'Other' provider groups. When comparing results for the patient survey between telehealth programs, respondents in tele-nephrology had lower agreement on three survey questions, indicating there were some issues with space, privacy and overall satisfaction the telehealth session. The low agreement with these statements is not surprising, given the previously noted findings with respect to the close proximity of patients in tele-nephrology sessions. Patients in Eastern indicated that they had more privacy concerns than respondents from the other Health Authorities, a result that may be attributed to the majority of respondents from Eastern being tele-nephrology patients.

More than half of the patients responding to the survey estimated a reduction in travel distance of over 200 km per session. Further, patients indicated significant costs savings as a result of seeing the specialist via telehealth, with an average savings of \$868 realized for the last session they attended. Travel, time and cost savings to patients, providers and the overall health system were major benefits of telehealth that were brought forward throughout the evaluation.

#### C. INTERVIEWS

Interviews with providers and regional telehealth coordinators provided valuable information, not only in regard to the benefit of the telehealth program, but also in identifying areas in which the program could be strengthened. Interviews with telehealth providers and provincial regional telehealth staff complemented the results of both the surveys and the analysis of the administrative data in addressing the research questions set out in the telehealth evaluation framework. Through the interviews, it was found that telehealth was associated with many benefits, but there are still challenges to overcome.

The interviews with providers and administrative staff corroborated survey findings in that telehealth has improved access to many different types of chronic disease management services in many geographic areas, and has filled many previous gaps in the delivery of healthcare services to rural and remote parts of the province. As with the utilization analysis (i.e. session bookings), the interviews indicated that both patient and provider participation in

telehealth sessions has increased over time. There was broad agreement among the interviewees that over a relatively short period of time, they had seen an increasing number of sites, disease entities, and healthcare providers becoming involved in the telehealth program. It was noted that many sites are now offering healthcare services in multiple disease areas/healthcare disciplines which patients would have previously only been able to access by travelling to St. John's. Efficient and effective access to specialist services in or near their home community provided by telehealth will facilitate increased comfort and improved quality of life for patients. Telehealth has also resulted in huge travel time and costs savings for patients, providers and the healthcare system in general. The interview findings concurred with both the provider and patient surveys in that patients realized significant cost savings, especially for those patients living in remote areas and those seriously ill or disabled. Providers also reported savings in time and costs due to telehealth because of a reduction in travel to in-person clinics and having to spend fewer days away from their main clinics. This savings of time, travel and costs for both the providers and patients was seen as having a significant positive impact on the productivity and efficiency of healthcare providers, and the overall healthcare system. The interviews brought out the positive impact that telehealth has had on the management of patient care, and in particular continuity of care. Enhancements to the patient-specialist relationship, improved communications and transfer of patient information among providers, and the increased frequency of patient follow-ups were all benefits of telehealth identified during the interviews. As well, nurses reported being more integrated into the care process and that patients were able to be better managed and tracked. Other benefits of telehealth brought out in the interviews included the potential for telehealth to reduce wait times and hospitalizations, and earlier discharges from hospital. As with the surveys and administrative data, there was no consensus found as to telehealth's role in increasing efficiencies in these areas, with most interviewees being cautious in giving a definite opinion given a lack of supporting data.

Several challenges facing telehealth discussed during the interviews were found to be in line with those reported in the surveys. Many providers suggested that there is a need to expand the areas already serviced by telehealth, as well as the programs and disciplines that make up the telehealth basket of services. Interviewees also reiterated the survey findings by highlighting the need for new equipment, better space, increased human resources, improved training and scheduling, and better access to electronic patient information during telehealth sessions. The most strategic challenge raised during the interviews was the need to further integrate telehealth into the broader healthcare delivery model and to move away from a project-based funded program.

#### D. ANALYSIS OF ADMINISTRATIVE DATA

An analysis of medical and radiation oncologist clinical visits was conducted for the four most common types of cancers seen in the telehealth program (i.e., breast, colorectal, lung, and prostate). Most visits were completed in-person with only a small proportion being completed via telehealth, although the proportion of oncologist visits being completed via telehealth has increased over time. Findings showed significant changes, mainly in the form of a decrease in the number of oncologist visits per patient over the four-year period for breast and prostate cancer, and for the four cancers combined. It is important to realize that a statistically significant difference does not always equate to one that is clinically significant and it is unclear whether these decreases in follow-ups would be large enough to impact on the quality of patient care.

In order to examine whether the increasing proportion of telehealth visits was associated with an increased likelihood that a patient would see the same oncologist (i.e. continuity of care), the average number of oncologists seen per patient was calculated for each year. There was a small yet significant decrease in number of the oncologists seen per patient for prostate cancer and the four types of cancers combined. This suggests an increase in continuity of oncologist care, however it is not known if telehealth is responsible for this change. This evaluation has only demonstrated an association between telehealth and certain benefits (e.g., continuity), and there may be many other confounding factors (e.g., number of sessions scheduled, size of wait lists, number of patients referred, number of available oncologists, number of available telehealth units, etc.) at play which impact on these benefits and their relationship with telehealth. There was found to be no significant change in the wait times to oncologist visit over the study period, nor was there a significant difference found in wait times for telehealth vs. in-person oncologist visits

#### E. DISCUSSION OF INDICATOR QUESTIONS

Following is a discussion of the indicators for each of the two research questions put forward in the evaluation framework.

Research Question #1: Does telehealth support equitable access to services?

#### Indicators:

#### 1) Is there adequate access to existing telehealth services?

Patients strongly agreed that they were able to get a telehealth appointment in an acceptable amount of time. No issues were identified in regard to accessing existing telehealth services, and there is evidence that teleheath has filled many gaps in healthcare services with respect to chronic disease management. However, it was noted that telehealth should be expanded to support more diseases, and to areas where telehealth is not currently unavailable.

2) Is there a need for additional telehealth services at sites?

In general, healthcare providers and regional coordinators felt that telehealth should be expanded to other care areas and to other sites. New programs suggested included diabetes care, autism, and wound care. There was also a suggestion for additional equipment at some sites in an effort to enhance current services. The type of equipment mentioned included more sophisticated cameras and other peripherals for improved examination ability; wireless microphones to eliminate bothersome electrical cords, and improved access to electronic patient information during the telehealth session.

3) Has Telehealth changed healthcare service levels?

Findings suggest that telehealth has improved access to many different types of chronic disease management services in many rural sites in the province. Expansion of telehealth to new sites and disease areas and healthcare disciplines would allow more patients to receive healthcare services, which they currently may only been able to access by travelling to St. John's.

4) Has Telehealth changed patient waiting time for access to services?

Patient surveys found strong agreement that telehealth improves access/wait times to specialist visits, whereas the provider survey only found moderate agreement. Interview participants were divided on the issue of telehealth reducing wait times, with some expressing reluctance given the lack of supporting data. The analysis of administrative data suggested that there was no significant impact of telehealth on wait time to initial consult with a radiation oncologist.

5) Has Telehealth changed travel time to access services? and 6) Has Telehealth changed travel costs to access services?

Perhaps the most tangible benefits of telehealth, which were constantly conveyed throughout the evaluation, are those associated with time and costs savings. Findings indicate savings in travel time and costs for patients, providers and the healthcare system overall. Savings are especially evident with patients living in remote areas (e.g., Labrador) and those that are seriously disabled or ill. Cost and time savings also apply to providers who have seen a large reduction in travel to clinics in smaller areas, and are spending fewer days away from home and their main clinics.

7) Are patients/providers satisfied with telehealth services?

Patients reported a high level of satisfaction with most aspects of telehealth services, whereas providers expressed high levels of satisfaction with telehealth in the interviews, and only moderate satisfaction in the surveys. Although overall satisfaction levels were high, this does not preclude room for improvement, or mean that there are no challenges in accessing telehealth services. Patients, mainly those in the nephrology program, expressed concerns with both privacy and space. Providers suggested telehealth be expanded to other disease areas, for improvements in facility space, increased human resources, new equipment and training, and better access to patient information during sessions. Other challenges identified included remuneration, lack of hands on assessment, scheduling, and the integration of telehealth into the broader healthcare delivery model.

#### **Research Question #2: Does Telehealth increase patient empowerment?**

#### Indicator questions:

1) Have there been changes in patient participation in telehealth?

The utilization analysis found that the number of telehealth sites and sessions have been gradually increasing over time, with sharper increases experienced more recently. Many sites are now offering telehealth services in multiple disease/healthcare areas, with people in these areas being able to access many services without travelling to St. John's. This allows for increased comfort, improved quality of life, and reduced time and cost from the reduction in

travel. In addition, many more different healthcare providers are becoming involved with the telehealth program in the province.

2) Has Telehealth resulted in changes in continuity of care for individuals suffering from targeted chronic diseases, such as diabetes?

It was felt that telehealth resulted in improvements in continuity of care, both with respect to patient information and the patient/provider relationship, as well as increasing the frequency of patient follow-up. Findings suggest that telehealth allows providers, such as nurses at the telehealth site, to be more integrated into the care process and for the patient to be better managed and tracked. This allows the nurse to facilitate information transfer about patient care between the specialist and the family physician. Administrative radiation oncology visit data showed a small drop in the mean number of oncologist visits per patient over time indicating a slight improvement in provider continuity, although the evaluation also found a small decrease in the frequency of follow-up.

3) Has Telehealth resulted in earlier discharges from acute care facilities due to availability of appropriate community services (via telehealth)? and 4) Has Telehealth resulted in prevention of unnecessary admissions to acute care facilities?

Most participants felt that telehealth did not have a significant impact on hospital admission or earlier discharge from hospital. In this regard it was suggested that it may be too early to determine if the service is having any impact on hospitalization as telehealth is still a relatively new program in most areas. Given many of the telehealth programs did not start until 2007, data was not available to examine changes in hospitalization patterns post-telehealth implementation. It was noted that access to specialist care via telehealth for inpatients may prevent immediate transfer to hospitals in larger centres. However, it was also felt that most telehealth services involved out-patients, and telehealth would not, in most instances, facilitate earlier discharge from hospital. There were some providers who felt telehealth may allow for earlier discharge in some disciplines because of increased availability of care services in the community due to telehealth.

#### **SECTION 5: LIMITATIONS**

The utilization analysis involved the use of the Telehealth Utilization Database which is maintained at the Newfoundland and Labrador Centre for Health Information. The integrity of this database relies on accurate completion of the telehealth booking request form completed by the provider (or their administrative assistant). Patient chart numbers were unavailable for the tele-nephrology and adult tele-psychiatry programs, thus the evaluation team was unable to determine the number of patients who were involved with these sessions. In addition, the data on radiation oncologist visits is subject to all of the limitations of administrative data. For example, the data just tracks visit events and says nothing about the severity of the cancer case. Wait time data was limited to the oncology program only and limited even further to only radiation oncology. The existing number of telehealth patients in the province could not be determined using the Telehealth Utilization Database as this system is a historical database with no means for determining the number of patients that have died, moved out of province, or were no longer involved with telehealth sessions. Aside from survey responses and some discussion on these topics in the interviews, little empirical data was available on time, travel and cost-savings resulting from telehealth. Although the provider survey was associated with a very high response rate (72.6%), the patient survey involved only 83 respondents representing all chronic disease management telehealth patients in the province. Small sample sizes are especially evident when comparisons are made between telehealth programs and Health Authorities. As well, given that tele-oncology is the oldest and most widespread program, it is overrepresented in the surveys. An exception to this is for the patient survey for the Eastern Authority, where most respondents were from the tele-nephrology program.

#### **SECTION 6: CONCLUSION**

The evaluation found increases in the use and acceptance of telehealth over time and that the CDM component of the Provincial Telehealth Program has expanded to many chronic disease areas, as well as to diverse groups of healthcare professionals. The Telehealth Program was found to be associated with high levels of satisfaction for both patient and providers, with both survey and interview data suggesting telehealth can contribute to significant savings with respect to time, travel and costs. Improved access to patient information, provider and management continuity, and an increase in frequency of patient follow-ups were also identified as benefits. Although there is room for improvement, the CDM Telehealth Program has demonstrated tremendous benefit to patients, healthcare providers, and to the overall healthcare system in Newfoundland and Labrador.

#### ACKNOWLEDGEMENTS

The evaluation team would like to thank the Provincial Telehealth staff at the Centre as well as the Regional Clinical Telehealth Coordinators for their co-operation throughout the evaluation process. We would also like to thank the workshop, survey and interview participants. A special thank you is extended to Ms. Alice Nolan, Provincial Telehealth Scheduling Coordinator, for her invaluable assistance throughout the project.

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#### APPENDICES

Appendix A: Telehealth Benefits Evaluation Workshop Summary

# Newfoundland and Labrador Chronic Disease Management Telehealth Program Benefits Evaluation Workshop November 19, 2008

# Workshop Participants

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Diar	Vera	Vive	Pat (	Joan	Brer	Bon	Judy

Delphine Roberts Alice Nolan Sheila Miller Dr. Tracey Scott Scott LeMessurier Rufina O'Dell Pat Hepditch Dr. Jonathan Greenland

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# Facilitators

John Knight, Senior Epidemiologist Kayla Collins, Manager, Research & Evaluation Kim Bonia, Qualitative Research Specialist

# Note-takers

Sonya Bowen, Research Analyst Heather Watkins, Research Analyst Angela Marsh, Research Analyst

# **Process Summary**

Key stakeholders for the Newfoundland Chronic Disease Management (CDM) Telehealth program representing the four regional health authorities, the Department of Health and Community Services, and the Newfoundland and Labrador Centre for Health Information (NLCHI), participated in a

workshop to validate and provide input into the CDM Provincial Telehealth Benefits Evaluation Framework. The workshop was facilitated by the NLCHI. Workshop participants were provided an overview of NLCHI including its structure, research areas, and evaluation experience. They were also given an orientation to the Infoway and NLCHI evaluation frameworks as well as the CDM Telehealth Evaluation Framework, all of which are being used to guide the current evaluation. During the morning break-out session stakeholders were divided into the three groups each with a facilitator and note-taker. Group members were provided the two research questions identified in the evaluation framework, each with several underlying indicator questions. Each group was asked to validate the research questions and indicator questions as well as suggest/refine possible measures for the indicators. Data sources to support the indicators were also discussed. Facilitators led the group discussion and note-takers documented the discussion that was generated. In the afternoon each group reported back to all participants on the results of the breakout session. Following there was a discussion of additional areas/indicators that were not included in the original CDM Telehealth Evaluation Framework, but which stakeholders felt were important to include in the evaluation the evaluation where possible.	The workshop ended with a discussion of next steps that were to be taken in the evaluation process. It was stated that a workshop summary would be distributed to workshop participants to allow for further feedback and adjustment of the evaluation framework. The final evaluation framework will include recommended modifications to existing indicator questions as well as incorporation of new questions where possible. Research and Indicator Question Discussion	Participants agreed that most questions were valid for inclusion in the telehealth evaluation, but in some cases modification or clarification was needed. The group identified several other potential areas/indicators of interest to be considered in evaluating the CDM Telehealth program. As an initial observation, it was noted that the term "Chronic Disease Management" may not be appropriate for the name of the telehealth program as the program currently encompasses only a small subset of the spectrum of chronic diseases. The table below provides a summary of discussions for the two research questions and underlying indicator questions as well for additional potential areas suggested by participants to be included in the evaluation. Some indicators also include a related question and/or brief text providing clarification on intended scope of the indicator question. It is intended that this document will serve as the basis for the CDM Telehealth evaluation and it will be used as an aid in the development of appropriate study tools (i.e. survey questionnaires and interviews).
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Question	Main Discussion Points
Research Question 1: Does telehealth support equitable access to services?	No discussion
<ol> <li>Is there adequate access to existing telehealth services? (site specific; disease specific) Has telehealth allowed improved access to services?</li> </ol>	<ul> <li>Terms 'access' and 'adequate access' should be clearly defined</li> <li>Through questionnaires/interviews ask providers about perceived gaps in services, whether telehealth has improved care access and/or allowed more referrals as well as obtain insight into why some specialists not involved in telehealth; also ask patient/providers about other disease areas which could benefit from telehealth</li> <li>Important to examine capacity characteristics which may impact access (e.g. facility space, human resources, organizational planning)</li> <li>Lack of baseline data in the Province</li> <li>Obtain information on current utilization from telehealth utilization database</li> <li>Use OPIS system to examine how access has changed as new telehealth sites become active</li> </ul>
<ol> <li>Is there a need for additional telehealth services at sites? Inventory of services at each site (including available Telehealth services).</li> </ol>	<ul> <li>Best determined through questionnaires/interviews</li> <li>Would first need information on current volumes of referrals and place of residence</li> <li>Would need to determine adequacy of existing telehealth equipment as well as availability of resources required for new services</li> <li>Evaluation team could make use of project team documents detailing telehealth sites/equipment</li> <li>Question would be difficult to answer for many sites which have just recently gone active</li> <li>Examine adequacy of telehealth services for special needs groups</li> <li>Examine how well telehealth equipment and facilities support privacy concerns</li> <li>In determining need for additional services, should take into account characteristics of remote communities (e.g. availability of broadband access and/or transportation)</li> </ul>
<ol> <li>Has Telehealth decreased the fear of loss of health services brought on by health board restructuring?</li> </ol>	<ul> <li>Many thought question was not relevant</li> <li>Question assumes that health board restructuring has led to a fear of loss of services</li> <li>Question assumes that health board restructuring has led to a fear of loss of services.</li> <li>Leading question as it asks about "decreased fear" and "loss of health services".</li> <li>Suggestion made to remove piece about health board restructuring and reword question to ask whether 'telehealth has altered expectations for changes in levels of health services in the area' and also whether 'telehealth has changed the level of healthcare services in the area'.</li> </ul>
4) Has Telehealth reduced patient waiting time for access to services? (Wait time for referral. Wait time to initial specialist visit. Wait time to diagnosis and treatment.)	<ul> <li>Leading question as it implies telehealth reduced wait times; ask whether telehealth has 'impacted' wait times</li> <li>Wait times being measured need to be clearly defined</li> <li>Went fines being measured need to be clearly defined</li> <li>General of data on wait times; most wait time data would require chart reviews which would not be feasible</li> <li>Participants agreed it would be difficult to measure wait times to specialist referral and diagnosis/treatment</li> <li>Item on patient/provider survey asking opinion on whether wait times have changed because of telehealth</li> <li>Ask patient how long they waited and their satisfaction with the wait time</li> <li>Ask about factors which may affect wait time (e.g. physicians not referring to telehealth, lack of patient</li> </ul>

<ul> <li>attendance, lack of human resources capacity required for telehealth services)</li> <li>It was suggested to use OPIS to examine changes in wait time to initial specialist visit pre- and post-telehealt</li> <li>Most participants did not expect to see a reduction in wait times</li> <li>It was suggested to consult with the Provincial Wait Times Coordinator around measuring wait times</li> <li>It was suggested to consult with the Provincial Wait Times Coordinator around measuring wait times</li> <li>Question leading and should ask whether 'telehealth has changed travel time"</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>Question considered the best indicator of equity of services for rural populations</li> <li>It was thought that telehealth would save a lot of travel time for both patients and providers</li> <li>OPIS could be used to estimate travel distance and time savings by examining data on place of residence vs. place of service before and after telehealth</li> <li>It was suggested to include an item on patient survey asking if telehealth has saved people from having to relocate</li> </ul>	<ul> <li>Ask question on travel costs savings on both patient and provider surveys</li> <li>Use of cost ranges was suggested given that people are sometimes are reluctant to provide exact cost data</li> <li>Participants felt that telehealth has been able to reduce some financial strain on families</li> <li>Participants suggested that an overall cost benefit analysis of telehealth be conducted and it was suggested th a question on overall cost benefit could be included in provider surveys and/or interviews</li> </ul>	<ul> <li>Availability and access should be better defined</li> <li>Availability and access should be better defined</li> <li>Questions should be asked on patient and provider surveys/interviews</li> <li>Evaluation should probe satisfaction with scheduling, ability to obtain appointments, availability of necessar: telehealth equipment, facility space and qualified personnel, as well as limitations of services for the disabled</li> <li>Evaluation should also examine perceptions of other telehealth services/treatment modalities needed, comfor level with telehealth services relative to conventional in-person specialist services, as well as privacy concerns</li> <li>Ask providers whether telehealth has affected their work/life balance and/or quality of their work day</li> <li>In measuring satisfaction, should be aware of both what telehealth was intended to do and patient expectation</li> </ul>	<ul> <li>Use of the word empowerment was questioned as its definition was unclear</li> <li>Participants felt it would be difficult to attribute a change in empowerment to telehealth services given that there are so many other factors which could affect empowerment</li> <li>Leading question and should reword to ask whether 'telehealth changes patient empowerment'</li> <li>Some participants felt there was not much room for patient control in telehealth while others felt empowerment meant having the choice to stay at home vs. travel or relocate.</li> </ul>	<ul> <li>Telehealth utilization database could be used to examine participation patterns</li> <li>OPIS could be used to determine the number of new patients being seen by telehealth in different regions as new sites become active, examine the changes in the ratio of initial visits to follow-up visits and the ratio of simple to complicated cases seen over time</li> <li>Complexity of cases difficult to determine from available administrative data; chart reviews not feasible</li> <li>Provider interviews could be used to obtain perceptions on changes in patient participation; patient interview could be used to examine how changes are being experienced and to describe changes in perception/comfort level with telehealth over time</li> <li>Examine factors, other than participation, which contribute to or may act as proxies for patient empowerment</li> </ul>
5) Has Telehealth reduced travel time to access services?	6) Has Telehealth reduced travel costs to access services?	<ol> <li>Are patients/providers satisfied with telehealth services? (Satisfaction with service availability/access, satisfaction with service quality)</li> </ol>	Research Question 2: Does Telehealth increase patient empowerment?	1) Have there been changes in patient participation in Telehealth? (focused on earlier stages of disease monitoring and follow-up)

	<ul> <li>(e.g. changes in patient-provider relationship, patient satisfaction, the way patients participate in treatment which are due to telehealth, as well as changes in quality of care measures )</li> <li>Examine measures of how telehealth compares to conventional in-person specialist care (e.g. are telehealth patients more likely to request educational material on their health conditions?)</li> </ul>
2) Has Telehealth resulted in improvements in continuity of care for individuals suffering from targeted chronic diseases, such as diabetes? (e.g. Provider continuity, informational continuity, management continuity/coordination of care)	<ul> <li>Participants agreed that it was important to measure changes in continuity of care as this may affect patient empowerment</li> <li>Leading question; should be reworded to ask whether 'telehealth resulted in changes in continuity of care'</li> <li>Definition/type of continuity being measured should be better defined (e.g. continuity of information)</li> <li>Should obtain both provider and patient perspectives through surveys/interviews</li> <li>Should obtain both provider and patient perspectives through surveys/interviews</li> <li>Could use OPIS to examine changes in frequency of follow-up and proportion of patients seeing the same specialist pre- and post-telehealth</li> <li>Should also measure changes in frequency of follow-up and proportion of patients seeing the same specialist pre- and post-telehealth</li> <li>Should also measure changes in factors related to continuity of care which may be due to telehealth (e.g. access to existing and new services, wait times, availability of specialists and frequency of follow-ups)</li> <li>Important that telehealth sessions are continuous with other elements of patient's care</li> <li>Details of telehealth sessions should be documented and available to other providers involved in care</li> <li>Need for appropriate and consistent telehealth privacy policies to allow adequate information transfer while still protecting the patient's right to privacy</li> </ul>
3) Has Telehealth resulted in earlier discharges from acute care facilities ?	<ul> <li>Some participants thought this question was not relevant</li> <li>Difficult to measure and may be too early given that most telehealth programs are only in their infancy</li> <li>Could be measured in a survey/interview but would be subjective</li> <li>Examine common diagnoses seen in acute care and examine differences in time to admission and length of stay for these cases pre- and post- telehealth, or examine differences between telehealth users and non- users</li> <li>Participants indicated that telehealth may result in earlier or later admissions depending on the situation and thus a net change over time may be difficult to measure</li> </ul>
4) Has Telehealth resulted in prevention of unnecessary admissions to acute care facilities?	<ul> <li>Reduction in hospitalization rates due to telehealth may be difficult to measure because the reduction may be small and because of the impact of confounding variables</li> <li>Indicator could be measured via a survey and/or interview</li> <li>Participants felt that access to improved provider education, and quality or care/patient management may result in less need for hospital admissions</li> <li>Participants felt that telehealth may result in avoidance of hospitalizations for certain patients groups (e.g. dialysis, palliative care, heart failure)</li> <li>Participants suggested exploring potential for further reductions in hospital admissions through provision of additional telehealth services in the future (e.g. wound care)</li> </ul>

Additional Areas to Consider for Evaluation:	
F. 1) Cost Benefit Analysis	Participants suggested that an overall cost-benefit analysis of telehealth services should be completed. It was suggested that this may not need to necessarily be part of the evaluation, but that the evaluation should involve some way of documenting and itemizing costs (including human resources) associated with telehealth. It was also suggested that a question on overall cost benefit of telehealth could be added to the provider surveys or interviews.
<ul> <li>G. 2) Regular Data Collection of Telehealth Indicators</li> </ul>	Another recurring theme that emerged was that consideration should be given to what data elements are needed to measure telehealth indicators for continued evaluation so that they may be incorporated into information systems being developed and collected regularly on a go-forward basis.
3) Barriers and Limitations to Telehealth Services	Another new question that was proposed was around barriers or limitations to providing telehealth services. Some potential barriers mentioned included being able to obtain an appointment, scheduling of appointments, availability of adequate telehealth equipment, building space and personnel with appropriate skill sets, organizational planning, patient's comfort level with the telehealth experience, privacy/confidentiality issues as well as a language barrier that exists in Labrador.
3) Patient and Provider Awareness of Telehealth	Throughout the workshop participants maintained that it was important to determine the extent to which patients, their primary care physicians and specialists are aware of the option of having consultations via telehealth.
4) Specialist Recruitment	Another recurring theme was that it is important to explore reasons why some specialists aren't participating in telehealth.
5) Training	A final area for consideration in the evaluation was around adequacy of training for telehealth users which may affect benefits of telehealth

Appendix B: Provider Survey

Dear \_\_\_\_:

You have been identified as a potential informant for the evaluation of the Chronic Disease Management Provincial Telehealth Program by the Newfoundland and Labrador Centre for Health Information (NLCHI). Your name was provided to NLCHI from a list of healthcare providers involved in telehealth in the province. The purpose of the evaluation is to examine the overall benefits of the telehealth program, including the level of satisfaction of both patients and healthcare providers.

As part of the study, you are invited to take part in a survey. Participation is voluntary.

All information you provide will be anonymous and kept confidential. Only personnel conducting the survey will have access to the information you provide in the survey. You will not be asked for your name or any other information that could identify you. The information you provide in the survey will be combined with information provided by other survey participants and only summary information will be used in any reports produced from the survey.

It would be greatly appreciated if you would complete and return the survey in the preaddressed, stamped envelope provided with this package.

If you have any questions about this study, you can contact the investigator conducting the study. That person is:

#### John Knight, PhD(c) (709) XXX-XXXX

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

#### Office of the Human Investigation Committee (HIC) at 709-XXX-XXXX Email: hic@mun.ca

Sincerely,

Jon L. Doll

Don MacDonald PhD, Senior Director - Research and Evaluation Newfoundland and Labrador Centre for Health Information Principal Investigator, Chronic Disease Management Provincial Telehealth Program Benefits Evaluation

#### CHRONIC DISEASE MANAGEMENT PROVINCIAL TELHEALTH PROGRAM BENEFITS EVALUATATION

#### **PROVIDER SURVEY QUESTIONNAIRE**

#### CONSENT:

You have been identified as a potential informant in an evaluation of the Chronic Disease Management Provincial Telehealth Program by the Newfoundland and Labrador Centre for Health Information (NLCHI). Your name was obtained from a list of healthcare providers involved in telehealth provided to NLCHI. The purpose of the evaluation is to examine the benefits of the telehealth program as well as examine the level of satisfaction of patients and healthcare providers with the telehealth program.

As part of the study, you are being asked to take part in a survey. Participation is voluntary.

All information you give will be anonymous and confidential. Only personnel conducting the survey will have access to the information you provide in the survey. You will not be asked for your name or any other indentifying information. The information you provide in the survey will be combined with information provided by other survey participants and only aggregate information will be used in any reports resulting from the survey.

If you have any questions about taking part in this study, you can contact the investigator conducting the study. That person is:

#### John Knight (709) XXX-XXXX

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

#### Office of the Human Investigation Committee (HIC) at 709-XXX-XXXX Email: hic@mun.ca

#### **INSTRUCTIONS:**

Please complete the following.	
Telehealth site and community :	Site :
Community where site lo	cated :
To which healthcare provider group do you belong?	
□ Physician □ Nurse □ Pharmacist □ Other (Plea	ase specify)
In which telehealth program(s) are you involved? Oncology Nephrology (Dialysis) Psychiatry Other (Please specify	<ul> <li>Neurology (O/T)</li> <li>)</li> </ul>
Age Sex : Male Female	
How many telehealth sessions have you been involved	with in the past month including today's

session ? \_\_\_\_

For the following items, please read each item carefully and circle the correct response indicating your level of agreement/disagreement with the statement. If the statement does not apply to you, please circle N/A indicating 'not applicable'. If you do not know the answer circle 'Don't Know'. Unless otherwise stated, statements apply to today's telehealth session. For purposes of the survey the term 'telehealth' refers to an appointment/visit with a specialist doctor which takes place though videoconferencing (i.e. videocamera and video screen).

1) Telehealth has made it easier for my patients to obtain their initial appointment with me.

<b>Strongly A</b>	gree			St	trongly Disagree		
	1	2	3	4	5	Don't Know	N/A

3) Telehealth decreases the wait time to initial specialist visit for my patients

Strongly A	Agree				Strongly Disagree		
	1	2	3	4	5	Don't Know	N/A

4) The availability of telehealth allows me to see my patients more frequently than if telehealth was not available.

Strongly Ag	gree			Sti	rongly Disagree		
	1	2	3	4	5	Don't Know	N/A
5) In the most recent telehealth session with which I was involved, there were no problems in obtaining the following:

a) adequate telehealth equipment

Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
b) adequate	facility sp	bace for	the ses	sion					
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
c) qualified	telehealth	staff							
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
7) During a telehealth session my patients and I are able to communicate with each other as well as we would have been able to in-person.									
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
8) During the most recent telehealth session I attended the videoconference equipment did not inconvenience me in any way.									
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
9) I had no p	orivacy or	confide	entiality	' cor	ncerns about my most rece	nt telehealth session.			
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
10) I find tel	lehealth a	n accep	table wa	ay to	provide healthcare service	ces.			
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		
11) During a	a telehealt	th sessio	on I am	able	e to examine patients in an	acceptable manner.			
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A		

12) Availability of telehealth makes it more likely for patients to see the same specialist for their health problem.

Strongly A	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A
13) Teleheal	th impro	ves con	nmunica	atior	/information transfer amo	ong healthcare provider	S.
Strongly .	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A
14) Availabi	lity of te	lehealth	has pre	even	ted my patient(s) from be	ing hospitalized.	
Strongly <b>A</b>	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A
15) Teleheal	th enhan	ces the	quality	of h	ealthcare I am able to pro	vide to my patients.	
Strongly <b>A</b>	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A
16) I feel I h	ave recei	ved ade	equate ti	raini	ing in using the telehealth	system.	
Strongly .	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A
17) Do you t	hink tele	health s	should b S or (Plea	e ex N(	xpanded to other healthca ) eck one)	re service in your regio	n?
If so, to what	t healthc	are serv	ices are	as s	hould it be expanded?		
18) If any, he month? Plea	ow much ise provi	travel de a dis	distance tance in	e hav km	ve you saved by seeing pa (Please provide best estim	atients by telehealth in t	he past
(e.g. recomm	nendation	iy furthe	nproven	nent	s about your experience v t, benefits or disadvantage	es of telehealth, etc.)	

21) Would you agree to being contacted for a telephone interview to discuss benefits of telehealth?  $\Box$  YES or  $\Box$  NO (Please check one)

If yes, please provide your name and contact phone number:

Name \_\_\_\_\_\_

Phone Number:\_\_\_\_\_

Appendix C: Patient Survey

### CHRONIC DISEASE MANAGEMENT PROVINCIAL TELHEALTH PROGRAM BENEFITS EVALUATATION

### PATIENT SURVEY QUESTIONNAIRE

### **INVITATION SCRIPT/CONSENT:**

We invite you to take part in a survey which is part of a research study. (If you are under 16 years of age your parent or guardian can complete the survey for you.) We are doing the study to gather information about the benefits of telehealth services and to find out whether patients and healthcare providers are satisfied with telehealth services. It is up to you to decide whether or not you would like to participate in this survey. Regardless of whether you decide to participate in the survey or not, your healthcare will not be affected in any way.

All information you give will be anonymous and kept confidential. Only personnel conducting the survey will have access to the information you provide in the survey. You will not be asked for your name or other information that would directly identify you. The information you provide in the survey will be combined with information provided by other survey participants and only summary information will be used in any reports resulting from the survey.

If you have any questions about taking part in this study, you can contact the investigator conducting the study. That person is:

### John Knight (709) XXX-XXXX

Or you can talk to someone who is not involved with the study at all, but can advise you on your rights as a participant in a research study. This person can be reached through:

### Office of the Human Investigation Committee (HIC) at 709-XXX-XXXX Email: hic@mun.ca

(Please tear off this sheet and keep for your records.)

### CHRONIC DISEASE MANAGEMENT PROVINCIAL TELHEALTH PROGRAM BENEFITS EVALUATATION

### PATIENT SURVEY QUESTIONNAIRE

For purposes of the survey the term 'telehealth' refers to an appointment/visit with a specialist doctor or other healthcare provider which takes place though videoconferencing (i.e. video camera and video screen). For the following items, please read each item carefully and circle the number indicating your level of agreement/disagreement with the statement. If the statement does not apply to you, please circle 'N/A' indicating 'not applicable'. If you do not know the answer circle 'Don't Know'. Unless otherwise stated, statements apply to your experiences with telehealth today or any time in the past.

1) Telehealth has made it easier for me to get an appointment to see the specialist / other healthcare provider at the provider site.

Strongly	е			Strongly Disagree	Disagree		
	1	2	3	4	5	Don't Know	N/A
N <b>T</b> - 1 - 1 10				0	' - l' - ( <i>1</i> - 1)		<i>c</i> , , ,

2) Telehealth allows me to see the specialist/ other healthcare provider more often than if telehealth was not available.

Strongly A	gree				Strongly Disagree		
	1	2	3	4	5	Don't Know	N/A

3) I was able to get a telehealth appointment in an acceptable amount of time.

Strongly Agree					Strongly Disagree		
1		2	3	4	5	Don't Know	N/A

4) The facility space in which I attended the telehealth session was appropriate.

Strongly A	gree	e			Strongly	/ Disagree		
	1	2	3	4	5	Do	on't Know	N/A

5) During telehealth sessions the specialist (other healthcare provider at the provider site) and I are able to see and hear each other.

Strongly A	gree				Strongly Disagree		
	1	2	3	4	5	Don't Know	N/A

6) During telehealth sessions the videoconference equipment was ready and working properly.

Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
7) I had no p	orivacy o	or confi	dential	ity c	oncerns about my teleh	ealth session.				
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
8) The proce acceptable.	ess use	d to scł	nedule	and	confirm my telehealth a	appointment was				
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
9) During my telehealth session I had time to ask questions.										
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
10) Telehealth makes it more likely for me to see <b>the same</b> specialist than if telehealth was not available.										
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
11) My trave	el time to	o the te	lehealt	h si	te was acceptable.					
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
12) I was sa	tisfied v	vith the	overal	l qu	ality of my telehealth se	ssion.				
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			
13) I would u	use tele	health	service	e aga	ain.					
Strongly	Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A			

14) I would recommend use of the telehealth service to others

Strongly Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A				
15) I had no problems finding the location/room where my telehealth session was supposed to take place.										
Strongly Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A				
16) I was provided with an explanation of what to expect during my telehealth session.										
Strongly Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A				
17) I am comfortable seeing the specialist/other healthcare provider by telehealth										
Strongly Agree 1	2	3	4	Strongly Disagree 5	Don't Know	N/A				
For the following questions please check the appropriate box(s) and/or fill in the blanks as appropriate.										
<ul> <li>18) If telehealth were not available, I would have: (Please check appropriate box)</li> <li>Travelled to see the specialist in-person</li> <li>Waited to see a specialist at a traveling clinic in or near my home community</li> <li>Not seen the specialist at all</li> <li>Other (Please specify:</li> </ul>										
<ul> <li>19) What would be the main issue that would make seeing the specialist in-person difficult or inconvenient?</li> <li>□ Sickness □ Financial Issues □ Transportation Issues □ My employment □ Other (Please specify) (Please check appropriate box)</li> </ul>										
20) About how far l not available ? Plea	now wo ase pro	uld you vide di	ı ha' stan	ve to travel to see the s ce in km (Please	pecialist if telehealth provide best estimate)	was				

0-50 km
 51-100 km
 101-200 km
 201-500 km
 501-1000 km
 1001 or more km
 (Please check appropriate box)

21) Considering all costs associated with travelling to see the specialist in-person, including travel, accommodations, meals, child care, loss of pay from work, and any other related costs, what were your approximate cost savings by seeing the specialist by telehealth for this session? \_\_\_\_\_ (Please provide best estimate)

\$0-100
\$101-200
\$201-500
\$501-1000
\$1001-2000
\$2001-5000
Greater than \$5000
(Please check appropriate box)

22) On approximately what date did you participate in your first telehealth session ? \_\_\_\_\_ Month \_\_\_\_\_ Year

23) Please provide any further comments you may have about your telehealth session (e.g. recommendations for improvement, benefits or disadvantages of telehealth, etc.)

today's session ? \_\_\_\_\_

Please fold the survey, place it in the white envelope provided, and return to the nurse/telehealth staff member.

Thank you for your time and participation in this study.

### Appendix D: Telehealth Coordinator/Provider Interview Guide

### CHRONIC DISEASE MANAGEMENT PROVINCIAL TELEHEALTH PROGRAM EVALUATATION

### TELEHEALTH COORDINATOR/PROVIDER INTERVIEW GUIDE

# 1) Discuss whether you feel that telehealth has filled existing gaps in healthcare services in your region.

Prompts:

- Past, present and future
- Examples?
- Gaps in services?
- Are telehealth services levels adequate?
- Was there/is there adequate capacity for telehealth expansion at your site ?
  - availability of resources for expansion
    - facility space,
    - human resources,
    - organizational planning
    - network capacity

# 2) What are some of the reasons you think some healthcare providers are not using the telehealth?

Prompts:

- Technology
- Scheduling
- Communication issues
- Adequate resources
- Uncomfortable
- Privacy concerns
- Unaware

## **3) How does telehealth accommodate special needs groups in receiving care?** Prompts:

- Physically-disabled
- Hearing-impaired
- Those speaking a different language
- Does telehealth make it easier for special-needs groups to receive healthcare services?

### 4) What impact does telehealth have on wait times?

Prompts:

- specialist referral
- initial specialist visit;
- diagnosis
- treatment
- increase, decrease or no significant change?
- Why/how ?

### 5) Describe the impact teleheath has had on travel time and costs?

Prompts:

- provider and patient
- approximate amount of time and cost savings in past month
- details of costs saved

## **6)** How does telehealth impact the productivity and/or efficiency of healthcare providers? Prompts:

- More referrals
- More patients
- Follow-up patients more frequently
- Made job easier or more efficient
- impact on in-person services

### 7) How does telehealth affect hospitalization rates ?

Prompts:

- Has telehealth assisted in preventing patients from being hospitalized?
- Increase or decrease in rates?
- How ? /why ?
- Later admissions?/earlier discharges?

# 8) What are the barriers and/or facilitators to achieve effective telehealth services for both the patient and provider?

Prompts:

- scheduling
- access
- training
- technology
- awareness
- resources

#### 9) What are the major strengths/advantages of the telehealth program?

Prompts:

- improved access
- travel time and costs savings
- improvements in continuity/quality of care

### 10) What are the major weaknesses/disadvantages of the telehealth program?

- functioning of videoconferencing equipment (Technical aspect)

- ability to examine patients via telehealth if needed (Clinical aspect)

### 11) Describe the training providers and telehealth staff have received in using telehealth services.

- adequacy

### 12) Describe your overall level of satisfaction with telehealth services.

- Prompts:
- scheduling
- access
- resources
- comfort level
- benefits
- problems

Telehealth site and community :	Site :	
refereatin site and community :		

Community where site located :

To which healthcare provider group do you belong?

□ Physician □ Nurse □ Pharmacist □ Other (Please specify	ist <b>D</b> Other (Please specify )
--	--------------------------------------

In	which teleh	ealth progra	am(s) are you ir	ivol	ved?	
	Oncology	□ Nephrol	ogy (Dialysis)		Psychiatry	

□ Oncology □ Nephrology (Dialysis) □ Psychiatry □ Neurology (O/T) □ Other (Please specify \_\_\_\_\_) (Please check all that apply)

Age : \_\_\_\_ Sex : Male 🗖 Female 🗖

### Appendix E: Telehealth Booking Request Form

Centre for Health Information Newfoundland & Labrador **Telehealth Booking Request** 

Please fax completed form to XXX XXXXX @ XXX-XXXX for processing

Office Us	se Only:
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ID		
<b>Booking Information</b>		
Date of Request:	-	
Conference Date:	Booked Time:	to
		Start
Finish Degreested By:		
Title/Discipline:		
Organization:	Contact Tel	
Number:		
<u>Conference Type</u> (Please check the ap	propriate box)	
Clinical: Consult Assessm	ent Follow-up Support	
Education , Title/purpose: Administration Other (Specify):		
Conference Site(s) Information (use set	eparate paper if additional space is needed)	<i></i>
Video Conference Location	Community	# 01 Participants
Equipment Required at Presenting S	Site	
PowerPoint VCR DVD	Other (Specify):	
CLINICAL SESSION Patient Information		
OPIS #: Diagnosis:	Male Female	
MCP#	Patient Name·	

**Additional Comments:** 

Appendix F: Ethics Approval Letters



#### Faculty of Medicine

Human Investigation Committee 2<sup>nd</sup> Floor, Eastern Trust Bildg. 95 Bonaventura Avenue St. John's, NL Canada: A18 2X5 Fel: 709-777-6974. Fax: 709-727-8776 hic@mun.ca: www.med.mun.ca.hic

#### March 26, 2009

#### Reference #09.34

Dr. Donald MacDonald 28 Pippy Place St. John 's, NL A1B 3X4

Dear Dr. MacDonald

## RE: Newfoundland and Labrador Chronic Disease Management Telehealth Program Benefits Evaluation

This will acknowledge receipt of your correspondence, dated March 26, 2009.

The co-chair reviewed your correspondence and Full **approval** was granted for one year effective March 26, 2009.

This is to confirm that the Human Investigation Committee reviewed and approved or acknowledged the following documents:

- Application to access data from the Telehealth Utilization Database, acknowledged
- Letter from the Chief Privacy Officer, acknowledged
- Approval emails from the Registry co-ordinator approving access to data, acknowledged
- Patient survey questionnaire, approved
- Provider survey questionnaire, approved

This approval will lapse on March 26, 2010. It is your responsibility to ensure that the Ethics Renewal form is forwarded to the HIC office prior to the renewal date. *The information provided in this form must be current to the time of submission and submitted to HIC not less than 30 nor more than 45 days of the anniversary of your approval date.* The Ethics Renewal form can be downloaded from the HIC website <a href="http://www.med.mun.ca/hic/downloads/Annual%20Update%20Form.doc">http://www.med.mun.ca/hic/downloads/Annual%20Update%20Form.doc</a>

The Human Investigation Committee advises THAT IF YOU DO NOT return the completed Ethics Renewal form prior to date of renewal:

- Your ethics approval will lapse
- You will be required to stop research activity immediately

• You may not be permitted to restart the study until you reapply for and receive approval to undertake the study again

Lapse in ethics approval may result in interruption or termination of funding

For a hospital-based study, it is <u>your responsibility to seek the necessary approval from Eastern</u> <u>Health and/or other hospital boards as appropriate.</u>

Modifications of the protocol/consent are not permitted without prior approval from the Human Investigation Committee. Implementing changes in the protocol/consent without HIC approval may result in the approval of your research study being revoked, necessitating cessation of all related research activity. Request for modification to the protocol/consent must be outlined on an amendment form (available on the HIC website) and submitted to the HIC for review.

This research ethics board (the HIC) has reviewed and approved the research protocol and documentation as noted above for the study which is to be conducted by you as the qualified investigator named above at the specified site. This approval and the views of this Research Ethics Board have been documented in writing. In addition, please be advised that the Human Investigation Committee currently operates according to *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and applicable laws and regulations. The membership of this research ethics board is constituted in compliance with the membership requirements for research ethics boards as per these guidelines.

Notwithstanding the approval of the HIC, the primary responsibility for the ethical conduct of the investigation remains with you.

We wish you every success with your study.

Sincerely,

Solun Harnet

John D. Harnett, MD, FRCPC Co-Chair Human Investigation Committee

Richard S. Neuman, PhD Co-Chair Human Investigation Committee

C C Dr. R. Gosine, c/o Office of Research, MUN
 Mr. W. Miller, c/o Patient Research Centre, Eastern Health
 HIC meeting date: April 2, 2009





28 Pippy Place, St. John's, NL A1B 3X4 Telephone: 709-752-6000 \* Facsimile: 709-752-6011

Registry Integrity Unit, P.O. Box 5800, Taylor Building Old Carbonear Road, Harbour Grace, NL AOA 2MO Telephone: 709-945-5335 • FacsImile: 709-945-5340

March 19, 2009

Mr. John Knight Senior Epidemiologist Newfoundland and Labrador Centre for Health Information 28 Pippy Place St. John's, NL A1B 3X4



Dear Mr. Knight:

This is to advise you that the Centre's Secondary Uses Advisory Committee has reviewed and conditionally approved you request to use data from the Telehealth Utilization Database for the Newfoundland and Labrador Chronic Disease Management Provincial Telehealth Program Benefits Evaluation. This conditional approval is subject to approval by the Human Investigation Committee of Memorial University.

Notwithstanding this approval, as an employee of the Centre all the confidentiality of the individual records and the database must comply with the privacy and security policies and procedures adopted by the Centre for Health Information as of January 17, 2008 in addition to any data sharing agreement, confidentiality agreement, Privacy Impact Assessment, or other written or verbal correspondence that you may enter into in relation to the project.

Yours sincerely

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Lucy McDonald Chief Privacy Officer/Corporate Secretary

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April 15th, 2009

Dr. Don MacDonald 28 Pippy Place St. John's, NL A1B 3X4 Lentre to: Health Information

Dear Dr. MacDonald,

### Re: Newfoundland and Labrador Chronic Disease Management Telehealth Program Benefits Evaluation

The Western Health Research Ethics Board (REB) met on April 8th, 2009 and reviewed the above proposal. Based on the decision of the REB, I am pleased to advise you that the above study has been approved. Please consider the following change:

1. use of neutral wording in the invitation script. The script presently includes the sentence, "The purpose of the evaluation is to examine the benefits of the telehealth program..." This wording suggests that there should be positive outcomes from the program. You may want to consider, "The purpose of the evaluation is to examine the effectiveness of the telehealth....".

We wish you the best of luck with your study. If you have any questions or concerns, please contact Darlene Hutchings, Regional Research Coordinator/Planner at 709-634-4306.

Sincerely,

Hodding &

Lisa Hoddinott VP~ Quality Management and Research On behalf of the Western Health Research Ethics Board

c.c. Dr. John Knight, Research Coordinator, Senior Epidemiologist, NLCHI Darlene Hutchings, Western Health Regional Research Coordinator/Planner

- Research Ethics Board P. O. Box 2005 Corner Brook, NL A2H 6J7
  - Telephone: 709-634-4306 Facsimile: 709-634-4591
    - Web Site: www.westernhealth.nl.ca •



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April 3, 2009

Dr. Don MacDonald 28 Pippy Place St. John's. NL A1B 3X4

### RE: Newfoundland and Labrador Chronic Disease Management Telehealth Program Benefits Evaluation

Dear Dr. MacDonald:

The Labrador Grenfell Health Research Review Committee has reviewed the research project "Newfoundland and Labrador Chronic Disease Management Telehealth Program Benefits Evaluation" as submitted, and has given ethical approval for the study.

Although not stipulations for approval, the Committee would like to offer the following comments for consideration:

- Reference to "benefits" in the project title creates a bias whereas it's clear in various components that the project is seeking to identify impacts or outcomes of Telehealth use.
- In the survey questionnaires, some questions ask if services or facilities were 'acceptable' or 'appropriate' without any context for an assessment so consequently responses will be entirely subjective and not analytically meaningful.
- The benefits really depend on the outcome measures chosen: The benefits for the hospital is less admissions and quicker discharges. The patient benefits are supposedly in terms of the logistics and finance of travel. The proposed study does not look at the degree of actual clinical outcome measures. The project would need to look at two cohorts of patients in terms of age, sexes, similar disease and medication profiles, socioeconomic status, and geographic distances etc and compare those getting telehealth to those not. Only then can it be determined that for a particular disease the number of saved admissions was significant. It would also provide a better comparison of morbidity and mortality trends if any with telehealth vs physician visits.



### Labrador-Grenfell Health

Upon completion of the research study, please forward a report of the results to myself for dissemination within the organization. (An electronic PDF format would be preferred).

Thank you, and good luck with the project.

Sincerely,

-Thimme the ing

Norma Forsey Regional Director, Patient Safety & Quality Labrador Grenfell Health P.O. Box 7000 Stn "C" Happy Valley-Goose Bay, NL, A0P 1C0 Ph. (709)896-6694 Fax.(709)896-6659 norma.forsey@lghealth.ca



Department of Research Corporate Strategy & Research Rutter Building, 22 Pearl Place P.O. Box 13122 St. John's, NL A1B 4A5 Tel: (709) 752-4636 Fax: (709) 752-4733

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Centre for Health Information

April 14, 2009

Dr. D. MacDonald 28 Pippy Place St. John's, NL A1B 3X4 Dear Dr. MacDonald:

Your research proposal *HIC* # 09.034 – "*Newfoundland and Labrador chronic disease* management telehealth program benefits evaluation" was reviewed by the Research Proposals Approval Committee (RPAC) of Eastern Health at its meeting on April 14, 2009 and we are pleased to inform you that the proposal has been approved.

The approval of this project is subject to the following conditions:

- The project is conducted as outlined in the HIC approved protocol;
- Adequate funding is secured to support the project;
- In the case of Health Records, efforts will be made to accommodate requests based upon available resources. If you require access to records that cannot be accommodated, then additional fees may be levied to cover the cost;
- A progress report being provided upon request.

If you have any questions or comments, please contact Donna Bruce, Manager of the Patient Research Centre at 777-7283.

Sincerely,

Muchael Dol

Mike Doyle, PhD Director of Research Corporate Strategy & Research Chair, RPAC

cc: Ms. Donna Bruce, Manager Patient Research Centre

70 O'Leary Avenue, St. John's, NL A1B 2C7 Telephone: 709-752-6000 • Facsimile: 709-752-6011 Registry Integrity Unit, 41 Conception Bay Highway E. K. Jerrett & Associate Building, Bay Roberts, NL AOA 1G0 Telephone: 866-279-1198 • Facsimile: 709-786-5337

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