HEALTHTECH CONSULTANTS

Newfoundland and Labrador eHealth Review

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Executive Summary

The Government of Newfoundland and Labrador (NL) through the Department of Health and Community Services previously engaged Deloitte to assist in identifying opportunities for greater efficiencies with the objective of helping the Government of NL restrain growth in program spending. The primary objective was to identify services best suited for a shared services model. In its final report Deloitte identified Information Technology &Telecommunications (IT&T) as one of the best opportunities to realize benefits through integration and recommended further analysis in order to transition to a shared service model for eHealth. Healthtech Consultants has been engaged to complete the next steps for IT&T as recommended in the Deloitte report.

The scope of the current state review of health IT&T in NL includes the following organizations:

- Labrador Grenfell Regional Health Authority
- Western Health Regional Health Authority
- Central Health Regional Health Authority
- Eastern Health Regional Health Authority
- Newfoundland & Labrador Centre for Health Information

Healthtech has conducted a detailed review of the current state information gathered by the shared services implementation team and also conducted a series of interviews with stakeholders from the NL Health System. This review reveals that nearly 400 IT&T staff work in the various programs that support health services in all of NL's regional health authorities, as well as physician's offices and private pharmacies. Healthtech also reviewed the province's current eHealth strategic vision.

Based on the breadth and depth of the services and programs provided by the current organizations, trends across the country, and the province's existing eHealth strategic vision, a more appropriate model is a comprehensive provincial eHealth model, not just a transactional IT&T shared services model.

The most significant benefits of such a model are related to better service delivery and the provision of a higher quantity and quality of information for providers, receivers and managers of health services leading to better outcomes; clinical, administrative and financial.

The potential hard cost savings are not the main benefit of the creation of this eHealth model. There will be significant cost avoidance because a provincial eHealth model for IT&T will mean that NL will have to spend less in future to maintain a fragmented system with multiple duplicated systems. Economies of scale will contribute to future cost avoidance. Future consolidation of systems and establishment of provincial standards will be facilitated by the eHealth model and will be less costly than an implementation across five separate organizations.

A series of critical success factors was established to mitigate the concerns raised by various stakeholders and facilitate the achievement of identified benefits. These critical success factors were translated into a proposed model that would address the concerns and move the province towards achievement of the vision:

"Improve and maintain the quality of health by enabling access to quality health information for providers, recipients and managers of health services."

The following recommendation is offered to meet the critical success factors and facilitate the achievement of the potential benefits and the provincial eHealth vision.

Recommendation: Create a new provincial eHealth model combining IT&T functions from the four regional health authorities and the entire functionality of the Newfoundland and Labrador Centre for Health Information. The model should not be a status quo, transactional, shared services model, but a model that transforms eHealth into a high-performing, integrated system that drives quality health information to support improved health care delivery.

The following high level next steps are proposed:

- Make decision to move ahead with eHealth model including four RHAs & NLCHI.
- Establish eHealth governance model.
- Establish eHealth leadership.
- Begin detailed planning for transition to new model.
- Establish workforce transition plan.
- Continue all current operations as is. Do not risk negative impact on organizational operations.

1. Introduction and Background

1.1 Introduction

Healthtech Consultants (the consultant) was engaged to review the Information Technology &Telecommunications (IT&T) component of a shared services model being considered for the Newfoundland and Labrador (NL) health system. This report details the consultant's review of the current state of IT&T within the NL health system, presents the rationale for refocusing to an eHealth model and outlines the key components of a transition plan to move from the current state to the proposed eHealth model. Benefits of the new eHealth model and the critical success factors associated with moving to this new model are also outlined.

1.2 Background

The Government of NL through the Department of Health and Community Services (HCS) previously engaged Deloitte to assist in identifying opportunities for greater efficiencies with the objective of helping the Government of NL restrain growth in program spending. This review had three objectives: to identify services best suited for shared services across the regional health authorities (RHAs); to explore alternative service delivery models and governance for shared services across the RHAs; and to develop an implementation plan that sequences the prioritized opportunities.

The final report, released in June of 2015, indicated that IT&T was suited for possible inclusion in the shared services model for health services in NL. Specifically the findings related to IT&T were:

"The analysis performed to date confirms that significant benefits may be realized through the transition to a Full Service Integration model for Information Technology and Telecommunications for the NL health care system. However, further detailed analysis is required to fully assess the total provincial opportunity for health Information Technology and Telecommunications shared services by also considering the integration of NLCHI and the OCIO. The following next steps are recommended:

1. Analysis to further understand the full provincial Information Technology and Telecommunications health environment which includes HCS, the four RHAs, NLCHI, and a portion of OCIO. This should also include a detailed assessment at the sub-function level (e.g., helpdesk, end user support, project management, etc.) utilizing the defined evaluation criteria that have been established in this assessment.
2. Collaborative establishment of a provincial vision for an integrated strategy and approach to Information Technology and Telecommunications solutions and service delivery for the health system.
3. Development of a detailed design of future Information Technology and Telecommunications shared services and an implementation plan to transition from the current environment to the refined delivery model. Key to this implementation plan will be comprehensive change management activities to support and sustain the transition."[1]

[1] GNL Health Care Shared Services Strategy & Supply Chain Assessment: Final Report. Deloitte. June 10, 2015

Subsequent to this report, a shared services implementation team was appointed to further explore the development of an eHealth Model for the NL health system. Healthtech Consultants has been engaged to complete the next steps for IT&T as recommended in the Deloitte report.

2. Scope & Methodology

2.1 Scope

The scope of the current state review of health IT&T in NL includes the following organizations:

- Labrador Grenfell Regional Health Authority
- Western Health Regional Health Authority
- Central Health Regional Health Authority
- Eastern Health Regional Health Authority
- Newfoundland & Labrador Centre for Health Information (NLCHI)

Services provided by the Office of the Chief Information Officer (OCIO) are out of scope for this review.

The services of the consultant were engaged to ensure an in-depth analysis was completed of all the functions of NLCHI and the IT&T functions of the RHAs. The analysis includes insight on how to effectively design a future state for IT&T functions of a new model.

The NL shared services implementation team provided an overview of captured current state data and provided access to documentation along with being the prime contact for all questions and clarifications. This included resource demographic data, activity-based data, organizational data (departmental metrics, application inventory, service level agreements, etc.), and a comprehensive jurisdictional scan. The consultant reviewed the current state data set and other jurisdictional information and was asked to provide an independent analysis leading to a proposed future state for the functions of NLCHI and RHAs' IT&T components.

2.2 Methodology

Detailing of the current state was centered on a review of data gathered by the shared services implementation team. This data included organization charts of the IT&T organizations, detailed listings of applications supported by each organization and results of a jurisdictional scan, which is attached as **Appendix A: Jurisdictional Scan of Public Sector Health Information Functions - Synopsis, *September 12, 2016***.

Another major source of current state information reviewed was a detailed listing of staff and breakdowns of their work effort using an activity based analysis tool, completed using the American Productivity and Quality Center (APQC) framework. APQC helps organizations work smarter, faster, and with greater confidence. It is the world's foremost authority in benchmarking, best practices, process and performance improvement, and knowledge management.

Interviews were held with representatives of each major stakeholder organization involved including:

- Labrador Grenfell Regional Health Authority
  - Tony Wakeham, CEO
  - Wayne Brown, Director IT&T
- Western Health Regional Health Authority
  - Susan Gillam, CEO
  - Donna Hicks, VP
  - Pat Hepditch, Director IT&T
- Central Health Regional Health Authority
  - Rosemarie Goodyear, CEO
  - Robert Drover, Director IT&T
- Eastern Health Regional Health Authority
  - David Diamond, CEO
  - Oscar Howell, VP
  - Ron Johnson, VP/CIO
- Newfoundland & Labrador Centre for Health Information
  - Mike Barron, CEO
  - Paul Caines, VP
  - Gillian Sweeney, VP
  - Don MacDonald, VP
  - Steve Clark, VP
  - Jennifer Lawlor, Director of Communications
  - Ray Dillon, Board Chair
  - Jerry Vink, Board Member
  - Lynn Power, Board Member
  - Ted Dawe, Board Member
- Newfoundland and Labrador Medical Association
  - Robert Thompson, Executive Director
- Office of the Chief Information Officer
  - Ellen MacDonald, CIO
- Department of Health & Community Services
  - Beverley Clark, Deputy Minister
  - Michelle Jewer, Assistant Deputy Minister-Corporate Services
  - Denise Tubrett, Assistant Deputy Minister-Regional Services

3. Current State

The current state is presented in four major sections: overview, workforce, applications and programs/functions.

3.1 Current State-Overview

Health system IT&T services are provided primarily by NLCHI and the RHAs.

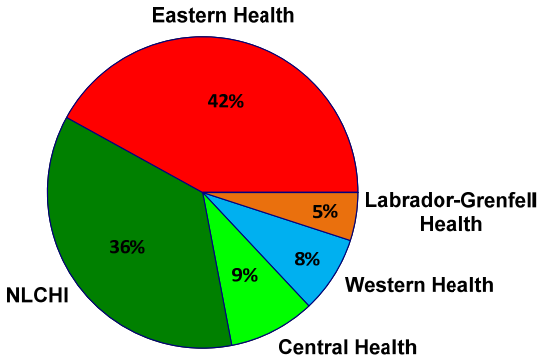
The OCIO provides support to a small number of applications used in the health system, the Client Referral Management System (CRMS) being the largest. Further details of OCIO operations are out of scope and not included in this review.

In total, the nearly 400 staff in the five organizations support over 750 applications. Core applications supported by all four RHAs are a suite of over 20 financial, administrative and clinical applications from MEDITECH. The core applications supported by NLCHI are a suite of applications that make up the EHR (Electronic Health Record built on Canada Health Infoway Blueprint) from TELUS Health, Orion Health and Initiate, as well as the soon to be implemented Electronic Medical Record software from TELUS Med Access.

Clients of the five organizations include RHA operational departments (administration, acute care, long term care, public health and community health), physician offices, private retail pharmacies, HCS and the public of NL.

3.2 Workforce

There are nearly 400 FTEs providing services in the RHAs and NLCHI. Approximately 42% of the FTEs work at Eastern Health, 36% at NLCHI, 9% at Central Health, 8% at Western Health and 5% at Labrador-Grenfell.



The chart below shows that 52% of the staff are classified as management or non-union non-management. 48% of staff are in a union, mostly NAPE but there are also staff in CUPE, NLNU and AAHP.

	HL	NB	CUPE	NAPE	AAHP	NLNU	Total
WH	13	0	20	0	0	3	36
CH	4	0	0	26	0	5	35
LG	1	0	0	19	0	1	21
EH	39	7	0	105	1	8	160
NLCHI	84	59	0	0	0	0	143
Total	141	66	20	150	1	17	395

A review of detailed activity based analysis tables attached as **Appendix B: Information Technology Employees Activity-Based Analysis** shows that staff at the three RHAs other than Eastern Health are concentrated in two major areas, Applications and Customer Support. In Eastern Health, a much larger organization, there are significantly more staff dedicated to other functions such as Privacy and Security, IT Infrastructure/Telecommunications and Health Analytics. NLCHI has a different set of applications and is in the midst of rolling out the provincial EHR which puts a higher emphasis on Project Management. The number of staff working on Health Analytics is significantly higher at NLCHI, which makes sense given the Centre's responsibility for health information and the presence of a team of researchers and epidemiologists.

3.3 Applications

The five organizations involved in this review support approximately 750 applications. Many of the applications are the same and there are some that are different but perform the same function.

An issue related to the applications and licenses is the number of data centers and associated infrastructure currently in play to run them. A detailed review of the potential consolidation of data centers and associated infrastructure has been completed separate from this review and has identified opportunities for streamlining data center operations.

The core applications in the 4 RHAs are a suite of over 20 financial, administrative and clinical applications from Medical Information Technology Inc. (MEDITECH). These applications are based on MEDITECH's oldest platform, MAGIC, and are currently three generations behind the latest version of the software, 6.1.

The core applications supported by NLCHI are a suite of applications that make up the EHR (Electronic Health Record built on Canada Health Infoway Blueprint) from TELUS Health, Orion Health and Initiate, as well as the soon to be implemented Electronic Medical Record software from TELUS Med Access.

All organizations have similar applications for office and email functions and also many similar applications for technical infrastructure functions.

3.4 Programs/Functions

A review of applications gives some idea of the type of work that each IT&T organization is conducting but a better view is facilitated by looking at the programs or functions that each organization supports.

Regional Health Authorities (Eastern Health, Central Health, Western Health, Labrador-Grenfell Health)

The RHAs support and operate a number of program areas/functions related to the operation of acute care, long term care, community and public health. A summary of these major programs are as follows:

- Financial and Human Resource Management Programs - the RHAs support a number of major financial/human resource programs including human resources, accounts payable, material management, payroll, general ledger, fixed assets and billing.
- Health Information Programs - the RHAs support a number of health information management programs including patient registration, medical records, and patient scheduling.
- Clinical Department Programs - the RHAs support a number of major clinical departmental programs including diagnostic imaging, pharmacy, allied health and therapies, dietary, laboratory, blood bank, microbiology and pathology.
- Clinical Programs - the RHAs support a number of clinical programs including nursing, order management, surgical services and the region's electronic patient record.
- Other Programs - the RHAs support community, public health and long term care programs.

In addition to the major programs outlined above the RHAs support many other program areas. A selection of these areas is included below:

- Application development
- Project management and application implementation
- Telecommunications support
- Telehealth

- Remote patient monitoring
- Decision support
- Privacy and security
- End user support (desktop support, helpdesk)
- Infrastructure (data centers, servers, data storage, networks)

Newfoundland and Labrador Centre for Health Information

NLCHI operates and supports a number of program areas, many, but not all, related to the implementation of an Electronic Health Record based on the Canada Health Infoway EHR Blueprint. A summary of the major programs operated and/or supported by NLCHI are as follows:

Electronic Health Record related programs:

- Client Registry - integrated client identification systems that help ensure that the right information gets on the right client electronic file and that individuals do not have multiple files. The Registry Integrity Unit is a small team of health records experts that provide hands-on quality assurance for this process.
- Pharmacy Network - connecting all provincial pharmacies to support safe patient care as well as population of the Drug Information System (DIS) component of the EHR.
- Laboratory Information System - This is a database of laboratory results that are generated by the MEDITECH laboratory applications.
- Shared Health Record - this is a database of all health information that is not laboratory results, medications or digital medical images. Radiology reports, discharge summaries, other medical reports and visit histories are the kinds of data held in this database.
- HEALTHe NL Viewer - this is the application that allows clinicians to access the data in the Drug Information System (DIS), the Laboratory Information System (LIS) and the Shared Health Record (SHR), all components of the provincial EHR.

Provincial Standards and Provincial Data Base Management:

- Standards - management and quality assurance of data elements mainly associated with the provincial Electronic Health Record
- Data base management - management and quality assurance of several provincial databases including abstracts of inpatient visits and MIS.

Applied research and data analytics
Coordination of provincial programs

- Telehealth
- Telepathology
- PACS

Electronic Medical Record Program (EMR) for physicians' offices
End user support (desktop support, helpdesk)
Privacy and security
Infrastructure (data centers, servers, data storage, networks)

In summary, the four RHA IT&T Departments offer a very similar list of programs/functions differentiated by size differences between Eastern Health and the others. Labrador

Grenfell Health is also somewhat different in that their major suite of applications is consolidated with the Eastern Health System.

NLCHI has some programs/functions that are similar to the RHA IT&T departments, mainly related to infrastructure and end user support. The majority of the programs/functions are different from those of the RHAs due to the mandate of the Centre to implement a provincial EHR, implement a provincial EMR, manage provincial health databases, and provide applied research services. A key area where the RHAs and NLCHI are linked is data. The data used in the major programs/functions supported by NLCHI comes almost exclusively from the systems supported by the RHAs.

4. Current State Analysis

4.1 IT&T Shared Services Model vs Provincial eHealth Model

This review was been predicated on the results of a study exploring the possibilities of adopting a shared services model for several “back office” functions, such as supply chain and payroll, in the NL health system. One of these areas is Information Technology & Telecommunications. This study includes what is known as IT&T with transactional-based functions such as purchasing, accounts payable and payroll. In fact, the term IT&T significantly undersells the breadth and depth of services provided by the five organizations within the scope of this review and the direct impact many of these services have upon the providers of care and the care provided to provincial residents.

There are components of the services being provided that are transactional within IT&T. Services such as desktop support, network and infrastructure operations, and helpdesk services could be seen as “back office”, however most of the other services being provided are key enablers in the provision of care and the management of the health system. Information systems have become tools for clinicians in the provision of care, as well as key patient safety tools. A heightened emphasis on the use of analytics to improve both health and healthcare is a key differentiator from IT&T functions solely providing application and technology support.

Another factor in this discussion is the province’s work on creation of an eHealth strategic vision. Development of such a vision was one of the three next steps recommended by the Deloitte Report as detailed on page 5 of this document. The vision, shown below, has been endorsed by the HCS and the CEOs of the RHAs and will be shared with other stakeholders later this year for further feedback. A key enabler to achieve this vision will be changing how eHealth services are delivered and creating a comprehensive integrated model with a provincial focus.

NL’s eHealth Strategic Vision: **“Improve and maintain the quality of health by enabling access to quality health information for providers, recipients and managers of health services.”**

This vision contemplates a comprehensive view of eHealth that includes quality health information helping to improve and maintain the health of both residents and the health system itself. Such a vision requires a provincial eHealth model, not a transactional IT&T shared services model. The integration and alignment of information silos across the entire existing health system is key to achievement of this vision.

Given the growth of direct care tools, the increasing emphasis on analytics, and the province’s eHealth vision, a more appropriate direction is the creation of a comprehensive eHealth model, not a transactional based shared services model for IT&T.

4.2 eHealth Model Current State Analysis

4.2.1 The RHAs

An analysis of the current state of what has been referred to as IT&T in the NL Health System, shows four organizations supporting administrative, financial and client care services within the four RHAs. The staff providing this support are distributed across the province as are the health services they support.

The IT&T functions of the four RHAs provide very similar services, using a similar set of applications and tools. All four RHAs utilize the MEDITECH platform as their main healthcare information system. Eastern Health, due to its size is able to provide more specialized services, but in general, the four RHA IT&T functions are very similar.

4.2.2 NLCHI

NLCHI does not directly support RHA operations as the four RHA IT&T functions do. It does, however, provide IT&T services and support for other components of the health system. Mandated to implement an EHR based on Canada Health Infoway's Pan-Canadian EHR Blueprint, manage many of the province's health databases, provide applied research services to support health policy decision making, and recently the implementation of an Electronic Medical Record System in the province's physician offices, NLCHI provides a different set of IT&T services to the NL health system.

The systems that NLCHI support, however, are not totally independent of the systems that the RHA IT&T support or the data that the RHAs create in the process of providing care to the residents of the province. The vast majority of the data to be included in the provincial EHR, provincial databases, and used in research comes from the RHA systems. NLCHI and the RHAs must be aligned in order to facilitate successful implementation of the systems supported by NLCHI. The integration and alignment of information silos across the RHAs and NLCHI is critical to creation of a provincial view of health information.

Although NLCHI supports a different set of systems, the underlying IT&T processes are not significantly different than those of the RHAs. Both develop/acquire required systems, use project management and change management techniques to implement the systems and maintain/upgrade the systems over time. One significant difference is the Applied Research arm of NLCHI. Eastern Health has a dedicated operational decision support group and the other three RHAs do limited operational decision support with available resources.

4.2.3 Other Jurisdictions

A jurisdictional scan of health information functions across Canada was completed by the shared services implementation team. Attached as **Appendix A- Jurisdictional Scan of Public Sector Health Information Functions-Synopsis, *September 12, 2016,*** this document shows a growing trend towards consolidation and sharing of health information functions. NL's current eHealth model with RHAs responsible for their own information systems, and separate organizations responsible for provincial EHR and EMR development, is not significantly different from many jurisdictions across the country. However many of these jurisdictions have adopted or are in the process of adopting a

more consolidated “sharing” model for provision of eHealth related services. The largest of these involve ongoing efforts to connect systems and data across the Ontario Health System.

There are several examples of IT&T organizations that support health services distributed across large geographic areas and multiple health organizations.

New Brunswick has a shared services organization called FacilicorpNB (now part of Service NB, a government-wide shared services organization) which supports IT&T in addition to other services. Although there are only two RHAs in New Brunswick now, at one time there were eight being supported by staff from FacilicorpNB.

In Manitoba, eHealth Manitoba is responsible for IT&T across the five RHAs that constitute the Manitoba health system as well as the provincial EHR.

The Government of Ontario has recently moved towards a formal policy of clustering information systems across multiple organizations. They have mandated that independent health organizations must share information systems. Ontario also has several large, and costly projects underway to connect the various health organizations and their health data. Projects such as Connecting North East Ontario (Cneo) have been working for years to try and align the multiple health information silos in Ontario’s health system.

Nova Scotia has had a shared services philosophy for a number of years and is currently consolidating eHealth support even further in conjunction with the changes in their health system. Nova Scotia has recently released a Request for Supplier Qualification for a One Patient, One Record system for the province.

There are many other examples of IT&T services being shared across multiple organizations throughout the Canadian health system. In general, the trend is towards consolidation and sharing.

5. Benefits of a Provincial eHealth Model

A discussion of the potential benefits of a provincial eHealth model involves two major factors:

Efficiency - are we doing things right?

Effectiveness - are we doing the right things?

The potential benefits of a provincial eHealth model are summarized below under these two factors. A separate discussion regarding possible steady state annual savings after up to five years of operational development, is included in section 5.3.

5.1 Efficiency

The reason often given for sharing of IT&T services, no matter the actual structure involved, is efficiency. Are services being provided in the most efficient manner? There are cost efficiencies to be achieved by consolidating individual IT&T organizations into one. Economies of scale, rationalization, standardization and consolidation are all tools to achieve cost efficiencies.

- Economies of scale: purchasing power for everything from PCs, printers, and other hardware to software and network bandwidth will be increased by the creation of one province-wide eHealth model.

- Rationalization and standardization:
  - rationalization and standardization of software applications will lead to cost reductions in maintenance fees and other support costs.

  - system rationalization will decrease integration requirements and create capacity for service quality improvement initiatives. Less individual systems will mean less requirements for interfaces and other integration methodologies leading to less costs of maintaining the disparate systems.

  - common tools and process standardization will improve consistency and quality of services delivered while reducing system administration and training effort.

- Consolidation: provincial eHealth planning and implementation will contribute to the wise use of resources, both personnel and financial. Avoidance of duplication of effort and cost will be facilitated.

5.2 Effectiveness

The other dimension of any change in service model is effectiveness. Are the right services being provided? Improvements in data quality, alignment of services, specialization of services, better data to manage the health system and, most importantly, improvements in the breadth and depth of clinical information available to clinicians to provide care to the

residents across the province, are all reasons to share IT&T services across multiple organizations.

- Improvements in breadth and depth of clinical information – the creation of a single integrated electronic record for residents of NL thru the integration of Electronic Patient Record (EPR), EHR, EMR into one provincial system will provide more quality information for providers, users and managers of the NL health system;

- Improvements in breadth and depth of clinical information - the creation of one provincial eHealth model will facilitate the consolidation of disparate clinical information systems and the future implementation of advanced clinical systems designed to improve patient safely and provide significant advancements in the breadth and depth of information available to clinicians across the province.

- Data quality - a provincial eHealth model with one vision will facilitate the standardization of data across the province and across the health system. Standardized data will enable province-wide and system-wide comparisons and facilitate the aggregation and analysis of data province-wide and system-wide;

- Specialization of services - Labrador-Grenfell Health, Western Health and Central Health are not large enough to allow specialization in such areas as health analytics. Staff are required to be generalists and often cover several areas. The creation of a province-wide model will allow these organizations access to specialized services that are possible in a larger group. Specialization will provide more comprehensive and higher level services;

- Better data to manage the health system - inclusion of NLCHI significantly increases health analytics capabilities;

- Alignment of services - development of comprehensive service catalogues and health system client service level agreements (SLAs) will drive improved alignment with health system client service expectations; and

- Alignment of services - consistency of service delivery across regions will enable measurement of common performance metrics, allowing for accurate assessment of service improvements.

An eHealth Model adopted for the NL health system must be inclusive of the entire health system, including: hospitals, long term care centers, public health, community health, physician and other clinician offices, private pharmacies and HCS. The merging of IT&T from the RHAs and NLCHI will create a province-wide and health system-wide eHealth model. Without all four RHAs and NLCHI, the set of services provided by the eHealth model is incomplete and will not represent the entire health system.

The improvements in alignment between the RHAs and NLCHI will truly improve the NL health system's ability to "improve and maintain the quality of health by enabling access to quality health information for providers, recipients and managers of health services".

The fact that most of the data utilized by the provincial EHR and NLCHI's applied research component is originally generated in the RHAs makes this alignment crucial. The alignment of the EMR will facilitate sharing of information generated in the RHAs (e.g., diagnostic reports) and information generated by NLCHI programs (e.g., Pharmacy Network). The breakdown of information silos will contribute to the success and adoption of all eHealth tools used by all sectors of the health system by providers, recipients and managers. The alignment of the EPR, the EHR and the EMR will facilitate the creation of one electronic record for all aspects of the health system and contribute to the improvement of care for all residents of NL.

5.3 Possible Steady State Annual Savings Discussion

This review did not include a separate detailed review of potential annual cost savings. A brief discussion of potential annual savings is be based on the information presented in the Deloitte report.

The Deloitte review identified three major categories of potential savings:

- Consolidation and rationalization of software licencing;
- Leveraging and standardization of infrastructure and technology; and
- FTE Reductions

The estimates of potential savings resulting from consolidation and rationalization of software licencing appear reasonable, however it must be noted that these savings of approximately $600,000 come with a potential investment of over $5 million.

The estimates of savings from leveraging and standardization of data centres and technology infrastructure have been reviewed by the shared services implementation team separate from this review and the $1 million order of magnitude annual savings after five years has been confirmed as a reasonable target.

The estimates of savings from FTE reductions make up over half of the potential savings. However as with the potential savings from consolidation and rationalization of software licencing, significant investments are required to meet the FTE reduction targets. Consolidation of the existing MEDITECH instances is one of the key investments identified as necessary for significant reductions in FTEs. Without significant ($15-$18 million according to the Deloitte report) investment, most of these savings will not be achievable. However, if the five IT&T organizations are consolidated into one eHealth model, there exists a potential reduction in management level staffing.

The Deloitte report identifies total costs for the five existing IT&T organizations at $66.6 million and potential steady state annual savings of $4.1 million to $5.4 million after five years. These annual savings are not net of required investments. The required investments for projects such as MEDITECH consolidation are significant and unlikely to happen in the near future. Given this assumption, the majority of the potential steady state

annual savings outlined in the Deloitte report are not likely realizable in the five-year period used in the review.

One of the major principles of this review is that all current implementation and support teams should transition intact. This means there will be no immediate or short term reduction in FTE levels. FTE levels will need to be tailored as service level expectations are determined.

Overall, the potential hard cost savings are not the main benefit of the creation of an eHealth model. There will be significant cost avoidance because a provincial eHealth model will mean that NL will have to spend less in the future to maintain a fragmented system with multiple duplicated systems. Economies of scale will contribute to future cost avoidance. Future consolidation of clinical systems and establishment of provincial standards will be facilitated by the eHealth model and should cost less than implementation across five separate organizations.

The most significant benefits are related to better service delivery and the provision of a higher quantity and quality of information for providers, receivers and managers of health services leading to better outcomes; clinical, administrative and financial.

6. Provincial eHealth Model-Critical Success Factors

The previous section discussed the benefits of an eHealth model for the NL health system. Moving ahead with an eHealth model must be dependent on the achieved benefits outweighing the mitigated risks. This section outlines the critical success factors that must be achieved so the risks are mitigated and the benefits can be achieved.

During the current state review, a number of stakeholders were interviewed and asked for their input into an eHealth model for IT&T in the NL health system (The complete list of stakeholders interviewed is detailed on page 8). A significant majority of the stakeholders indicated that an eHealth model including all four RHAs and NLCHI was possible and would be a significant benefit to the NL health system. However there were concerns expressed by several organizations as follows:

- Concerns were expressed regarding the potential effects on the mandates of the four RHAs involved.
- The difference in mandate between the RHAs and NLCHI and perceived risk to NLCHI's mandate in an eHealth model was a major concern identified during discussions.
- Concerns were expressed regarding the newly launched EMR Program and the concern that it would not receive appropriate priority among the many programs included in an eHealth model.
- Concerns were expressed regarding protection of the privacy of residents of NL, especially in a large complex eHealth organization.
- Concerns were identified by individual organizations related to the priority of their requirements and plans in a large eHealth model.
- Concerns were also identified related to the dilution of existing specialized services when they are included in a province-wide eHealth model.
- A number of concerns were expressed regarding the establishment of a province-wide eHealth model and its effect on current projects and staff.
- The change management requirements and how the new model would be established were also flagged as potential risks.

The following table outlines (in no particular order) the critical success factors that must be met in order to address the concerns raised by the stakeholders involved in this review.

Critical Success Factors
Maintain priority of RHA mandates
Maintain priority of NLCHI mandate
Maintain priority of EMR program
Minimize dilution of existing specialized services
Ensure clinical/business input into planning and operations
Avoid loss of skilled resources
Ensure Privacy Protection is a foundational building block
Avoid delay of current in-flight projects
Avoid "keep the lights on" only
Avoid top heavy model
Ensure province-wide leadership and resource model
Avoid perception of takeover by one organization.

A more detailed review of each of these critical success factors and the structure and/or policies that are proposed to address them are as follows:

Maintain Priority of RHA Mandates - the creation of a Program Framework that outlines the mandate of the new eHealth model will contribute to the achievement of this critical success factor. All current RHA programs related to eHealth are clearly and deliberately included in the model. In addition, several transition principles have been added that protect the existing RHA mandates. Principles including: not negatively affecting existing operations; becoming successor to existing MOUs, contracts, and agreements; continuing current in-flight projects; transitioning implementation and support teams intact; and, development of service level agreements with all stakeholders, all contribute to the maintenance of the priority of RHA mandates.

Maintain Priority of NLCHI Mandate - the creation of a Program Framework that clearly identifies the EHR Program as a key component of the mandate of the eHealth model will contribute to the achievement of this critical success factor. All current NLCHI programs are clearly and deliberately included in the model. In addition the creation of a research component within the structure and a data quality, standards and evaluation component within the structure will contribute to the achievement of this critical success factor. In addition, several transition principles have been added that protect the existing NLCHI mandate. Principles including; not negatively affecting existing operations; becoming successor to existing MOUs, contracts, and agreements; continuing current in-flight projects, transitioning implementation and support teams intact; and, developing service level agreements with all stakeholders, all contribute to the maintenance of the priority of NLCHI's mandate.

Maintain Priority of the EMR Program - the creation of a Program Framework within the structure of the eHealth model that clearly identifies the EMR Program as a key component of the mandate of the eHealth model will contribute to the achievement of this critical success factor. In addition, several transition principles have been added that protect the priority of the EMR Program. Principles including; not negatively affecting existing operations; becoming successor to existing MOUs, contracts, and agreements; continuing current in-flight projects, transitioning implementation and support teams intact; and, developing service level agreements with all stakeholders, all contribute to the maintenance of the priority of the EMR Program.

Minimize Dilution of Existing Specialized Services - the inclusion of an Operational Decision Support Component within the structure will contribute to the achievement of this critical success factor. The creation of province-wide teams will ensure that resources are assigned to these types of programs from across the province where appropriate and not just from one organization.

Ensure Clinical/Business Input into Planning and Operations - the Program Framework will ensure that clinical and business input is gained. The various sub components, EPR, EHR, EMR, health information, enterprise back office, and tele-programs, represent the mandate of the eHealth model and which programs it operates and supports. Another key component of the structure which will help ensure clinical input into the planning and operations of the eHealth model is the creation of a medical and clinical informatics framework including a physician that will provide direct input related to medical care and also lead efforts to include physicians and other clinicians in the creation of province-wide, and health system-wide, electronic tools to help improve care. The vast majority of major health organizations across the country have included a Chief Medical

Information Officer in their eHealth structure. The addition of a clinical informatics team with representatives from key clinical service areas and key clinical staff from the eHealth model will also be key to ensuring clinical input.

Avoid Loss of Skilled Resources - transitioning existing development, implementation and support teams in-tact, will contribute to achievement of this critical success factor.

Ensure Privacy Protection is a foundational building block - the inclusion of privacy and security as a major component of the eHealth model is required so that privacy of personal and personal health information is an overarching priority.

Avoid Delay of Current In-flight Projects - transitioning all in-flight projects in-tact will contribute to the achievement of this critical success factor.

Avoid "keep the lights on" Only - the establishment of effective leadership, the creation of the Program Framework and a Medical and Clinical Informatics Framework, will contribute to a model that is forward thinking and not only concerned with maintenance of current programs. There are policy components that will also assist mitigation of this risk. A comprehensive eHealth strategic plan with goals related to improvement of the electronic tools available to providers, consumers and managers of the health system will also contribute to the achievement of this critical success factor. The use of strategic indicators such as the Healthcare Information and Management Systems Society's (HIMSS) Electronic Medical Record Adoption Model (EMRAM) scale will provide concrete measurement of the health system's progress towards adoption of electronic records.

Avoid Top Heavy Model - the creation of a lean model with a small number of senior managers will contribute to the achievement of this critical success factor. Administration must be kept to the lowest level possible. The creation of an effective governance model with clear concise decision-making guidelines is key. Governance must balance the interests of individual stakeholders with a provincial eHealth vision

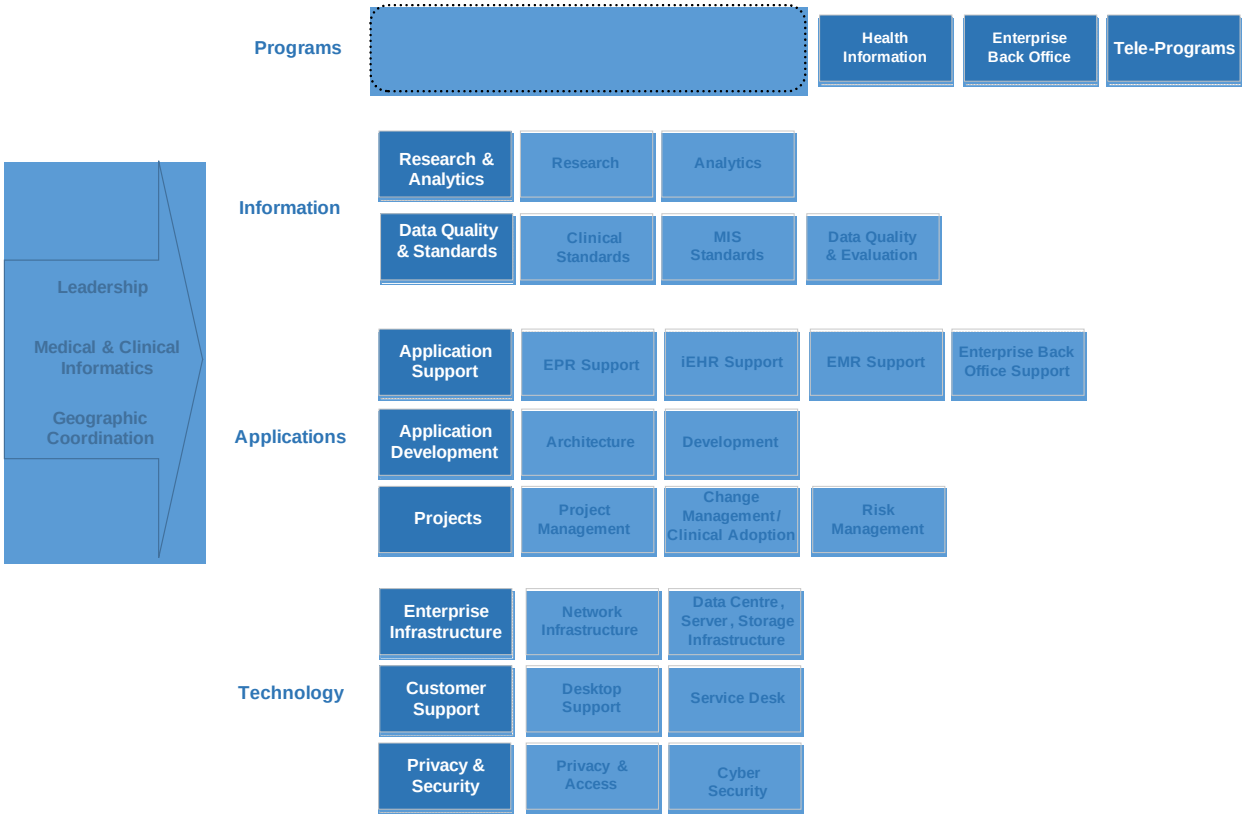
Ensure Province-wide Leadership and Resources Model - this concern was identified by some of the stakeholders from communities outside of St. John's. In addition to the establishment of a geographic coordination framework, establishment of clear policy on the geographically distributed and virtual nature of the eHealth model will contribute to the achievement of this critical success factor.

Avoid Perception of Takeover by One Organization - although difficult to mandate, consideration must be given to a balanced approach to filling leadership roles in the new model. Overall, the creation of a **new** eHealth model with a provincial vision should ease the fears of some that this will be a takeover by one of the existing organizations.

7. Proposed Provincial eHealth Model

The diagram below depicts how structural elements described above can be built into a proposed provincial eHealth model. This diagram is conceptual in nature and represents all of the existing components that currently exist in the five organizations included in the scope of this review as well as the new ones referred to above. **This is not an organization structure.**

It is critical that this proposed future state model not be seen as a menu of options that can be chosen to meet a limited set of goals. Each component is carefully positioned to ensure the critical success factors are met and the new eHealth model efficiently and effectively serves the entire NL Health System, while protecting the mandates of the existing organizations.



The major components of the model depicted by this diagram are discussed below.

Leadership

A key component of this proposed model is Leadership. Leadership will be responsible for implementation and operation of the proposed eHealth model and achieving the province's eHealth vision

Medical and Clinical Informatics

Clinical input into the provincial eHealth model is crucial to ensure it is meeting the needs of providers and recipients of health services in the province. This input includes medical (physician) as well as all other clinicians such as nurses and allied health professionals.

Geographic Coordination

Geographic coordination will help ensure that the needs and input of health providers and managers throughout the province will be addressed.

Programs, Information, Applications & Technology

Most small and medium sized IT&T functions within Canadian health system organizations have two major components, **Applications** and **Technology**. Many IT&T functions are structured similar to Labrador-Grenfell Health, Western Health and Central Health with two major divisions; those that take care of applications and those that take care of technology. The addition of NLCHI to the information/analytics resources of the RHAs creates the critical mass of expertise to add a third component, **Information**. Information should be the cornerstone of eHealth in any health organization, where information is the key to its operation. A close working relationship with health records departments within the various health system organizations is a key component of this component of the eHealth model.

In order to address many of the critical success factors detailed in this review, a fourth major component has been added, **Programs**. The Program component represents the mandate of the eHealth model; to support the health system with electronic tools and information to improve outcomes, both clinical and non-clinical.

a) Electronic Patient Record (EPR): All of the applications, technology and information supporting the clinical operations of acute care, long term care, community and public health.

b) Electronic Health Record (EHR): All of the applications, technology and information supporting the development and adoption of the Canada Health Infoway Pan-Canadian Blueprint EHR.

c) Electronic Medical Record (EMR): All of the applications, technology and information supporting the operations of physician and other clinician offices.

As indicated by the dotted line surrounding the EPR, EHR and EMR, the integration of these three components into a seamless electronic record for the entire NL health

system and the residents of the province will be greatly facilitated by their inclusion in a single eHealth model with a single vision.

d) Health Information: The provision of health information management/analytics for the health systems at all levels.

e) Enterprise Back Office: All of the applications, technology and information supporting back office systems such as financial systems, email, and telecommunications.

f) Tele-programs: There are a number of client-facing programs currently under the auspices of existing IT&T models in the province. If these are to be included in the shared services model, a separate program will ensure their continued visibility.

Governance

The model depicted above does not depict the governance level above operational leadership. The creation of a governance framework that ensures a provincial health system focus for the eHealth model as well as equitable and meaningful input from all provincial health system stakeholders impacted by eHealth will be key to the long term success of the model.

8. Summary and Recommendation

Healthtech Consultants was asked to conduct a review of the IT&T functions of the four RHAs and NLCHI. This review was recommended by an overall shared services review conducted by Deloitte.

Healthtech reviewed the current state staffing, applications and programs of the five organizations as well as a detailed jurisdictional scan, all compiled by the existing shared services implementation team.

Based on the breadth and depth of the services and programs provided by the current organizations, trends across the country, and the province's existing eHealth Strategic Vision, a more appropriate model is a comprehensive provincial eHealth model, not just a transactional IT&T shared services model.

A series of critical success factors designed to mitigate the concerns raised by various stakeholders was established. These critical success factors were translated into a proposed model that would address the concerns and move the province towards achievement of the vision of a model that would:

> "Improve and maintain the quality of health by enabling access to quality health information for providers, recipients and managers of health services."

The following recommendation is offered to meet the critical success factors and facilitate the achievement of the provincial eHealth vision:

Recommendation: Create a new provincial eHealth model combining IT&T functions from the four regional health authorities and the entire functionality of the Newfoundland and Labrador Centre for Health Information. The model should not be a status quo, transactional, shared services model, but a model that transforms eHealth into a high-performing, integrated system that drives quality health information to support improved health care delivery.

9. High Level Transition Principles and Next Steps

This section outlines a series of principles and steps necessary to transition the current five IT&T organizations within the NL health system to one eHealth model. This section is not designed to be a comprehensive transition plan. Development of such a plan is one of the first tasks of the eHealth leadership proposed in this document.

The following are a series of principles that should be adhered to so the creation of an eHealth model for NL can meet the critical success factors detailed in this report.

- Do not negatively affect operations of the various organizations affected by this change.
- The new organization will become the successor to all existing MOUs, contracts and agreements entered into by the five existing organizations.
- Always ask if issues contribute to building an organization to serve the provincial health system.
- Current in-flight projects will continue.
- Current implementation and support teams will transition intact.
- Implement geographical coordination.
- Develop a virtual organization where everybody is not located in one location.
- Implement province-wide leadership and resource model.
- Ensure implementation of a Medical & Clinical Informatics Framework.
- Service level agreements will be developed to address service level concerns of all impacted organizations.

The short term next steps that should be taken are outlined below. It is important that once a decision is made to move ahead, next steps happen in relatively short order. Long delays in implementing the plan will seriously impact the possible success of this initiative and may lead to its failure. The ability to achieve any of the benefits identified in this document and others will be seriously compromised by a long drawn out process.

One of the key first steps that must be taken is the continued development of an eHealth Strategic Plan for the province. Such a plan will lay the foundation for the creation and operation of an eHealth model.

Next Steps:

- Make Decision to move ahead with eHealth model including the four RHAs & NLCHI.
- Establish eHealth governance model.
- Establish eHealth leadership.
- Begin detailed planning for transition to new model.
- Establish workforce transition plan.
- Continue all current operations. **Do not risk negative impact on organizational operations.**

Appendix A

Jurisdictional Scan of Public Sector Health Information Functions

JURISDICTIONAL SCAN OF PUBLIC SECTOR HEALTH INFORMATION FUNCTIONS

Synopsis

September 12, 2016

This synopsis is based on responses provided by the individuals who completed the scan and may not represent the viewpoint of other individuals or groups. This synopsis does not necessarily represent the complex nature of how these functions are managed in each jurisdiction.

Background and Purpose

This pan-Canadian scan was conducted by the Department of Health and Community Services (HCS), Government of Newfoundland and Labrador. The purpose of this scan was to gather information on the experiences of jurisdictions in managing 15 public sector health information related functions to determine the different models for managing these functions in each jurisdiction (e.g., electronic health record, health analytics). Results will be used by the HCS for decision-making purposes. A detailed report of methodology and results will be shared with each Ministry of Health and participating organizations.

Methodology

The scope of the jurisdictional scan was determined in consultation with the Newfoundland and Labrador Centre for Health Information (NLCHI) and the Shared Services Implementation Team. The scan took place from February to June 2016 and was conducted in two parts. In Part I, a survey was used to identify which organizations in each jurisdiction manage the public sector health information functions listed above, including the design/build, implementation and maintenance of these functions (Appendix A). The survey was also used to identify the most appropriate contact person(s) for each function. The survey was distributed to 25 organizations throughout the country. Sixteen organizations (16/25=64%) across eleven jurisdictions completed the survey (none were completed for BC or YT).

In Part II of the scan, a follow-up survey was emailed to each contact person who was identified as knowledgeable about one or more of the health information functions (Appendix B). The purpose of this part of the scan was to collect more detailed information on topics such as governance and funding model for each function. This survey was distributed to a total of 77 individuals in 24 organizations throughout the country. Forty four individuals (44/77=57%) across 10 jurisdictions completed the survey (none were completed for BC, YT, or QU).

Results

The table below provides a summary of results from the jurisdictional survey Part I, including which organizations in each jurisdiction manage the design/build, implementation and maintenance[1] of each health information function. Each function is defined in the survey (Appendix A).

Table 1: Health information functions and organizations responsible in each jurisdiction (Part I results)

Health Information Function	Newfoundland and Labrador (NL)	Nova Scotia (NS)	Prince Edward Island (PEI)	New Brunswick (NB)	Quebec (QC)	Ontario (ON)	Manitoba (MB)	Saskatchewan (SK)	Alberta (AB)	Nunavut (NU)	Northwest Territories (NWT)
Electronic health record (EHR) - overall	NL Centre for Health Information (D/B, I and M)	NS Department of Health & Wellness (D/B, I and M). NS Health Authority (EHR support)	Health PEI (D/B, I and M)	NB Department of Health (D/B, I and M)	QC Ministry of Health & Social Services (D/B, I and M)	eHealth Ontario	Manitoba eHealth (D/B, I and M)	eHealth Saskatchewan (D/B, I and M)	Alberta Health Services (D/B, I and M)	NU Department of Health (D/B, I and M)	NWT Department of Health & Social Services (D/B, I and M) and Alberta Health Services (D/B and M)
Client registry	NL Centre for Health Information (D/B, I and M)	NS Department of Health & Wellness (D/B, I and M)	Health PEI (D/B)	NB Department of Health (D/B, I and M)	QC Ministry of Health & Social Services (D/B, I and M)	eHealth Ontario	Manitoba eHealth (D/B, I and M)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	NU Department of Health (D/B, I and M)	NWT Department of Health & Social Services (D/B, I and M). Alberta Health Services (D/B and M)
Clinical portal	NL Centre for Health Information for HEALTHe NL (D/B, I and M). Eastern Health for Shams Viewer (D/B, I and M)	NS Department of Health & Wellness (D/B, I and M)	Not in place	NB Department of Health (D/B, I and M)	*Information not provided*	eHealth Ontario	Manitoba eHealth (D/B, I and M)	eHealth Saskatchewan (D/B, I and M)	Alberta Health Services (D/B, I and M)	*Information not provided*	NWT Department of Health & Social Services (D/B, I and M) and Alberta Health Services (M)

[1] Key for Table 3: design/build=D/B, implementation=I, maintenance=M

Health Information Function	Newfoundland and Labrador (NL)	Nova Scotia (NS)	Prince Edward Island (PEI)	New Brunswick (NB)	Quebec (QC)	Ontario (ON)	Manitoba (MB)	Saskatchewan (SK)	Alberta (AB)	Nunavut (NU)	Northwest Territories (NWT)
Community health information system	NL Department of Health & Community Services (D/B, I and M) and Health Authorities (I and M). Western Health for RAI homecare (D/B, I and M)	NS Department of Health & Wellness (D/B, I and M)- addictions only	Health PEI (D/B)	NB Department of Health (D/B, I and M)	Not in place.	ON Ministry of Health & Long Term Care (M)	Manitoba eHealth (D/B, I and M) and Regional Health Authorities (D/B, I and M)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	*Information not provided*	Not in place.
Electronic Medical Record (EMR)	NL Centre for Health Information (D/B, I and M). Labrador-Grenfell Health for limited components. Eastern Health for some clinics (D/B, I and M)	NS Department of Health & Wellness (D/B and I) manages relationship with one Vendor (M)	Not in place	NB Department of Health (D/B and M for some components)	QC Ministry of Health & Social Services (I)	OntarioMD	Manitoba eHealth (D/B, I and M), Regional Health Authorities (D/B, I and M) and most private clinics (I and M)	eHealth Saskatchewan	Alberta Health Services (D/B, I and M)	NU Department of Health (D/B, I and M)	Yellowknife Health & Social Services (D/B and M) and NWT Department of Health & Social Services (D/B and I)
Hospital information system	Four Regional Health Authorities (D/B, I and M)	NS Health Authority	Health PEI (D/B, I and M)	Service New Brunswick	QC Ministry of Health & Social Services (D/B, I and M)	Varies per hospital	Manitoba eHealth (D/B, I and M)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	*Information not provided*	Health & Social Services Authorities (D/B, I and M). NWT Department Health & Social Services (I)
Laboratory information system	NL Centre for Health Information for repository (D/B, I and M). Health Authorities for regional systems (D/B, I and M)	NS Health Authority	Health PEI (D/B, I and M)	*Information not provided*	QC Ministry of Health & Social Services (I)	eHealth Ontario	Manitoba eHealth (D/B, I and M) and Diagnostic Services Manitoba (D/B, I and M)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	NU Department of Health (D/B, I and M)	Stanton Territorial Health Authority (D/B, I and M), NWT Health & Social Services (I)

Health Information Function	Newfoundland and Labrador (NL)	Nova Scotia (NS)	Prince Edward Island (PEI)	New Brunswick (NB)	Quebec (QC)	Ontario (ON)	Manitoba (MB)	Saskatchewan (SK)	Alberta (AB)	Nunavut (NU)	Northwest Territories (NWT)
Pharmacy Information System	NL Centre for Health Information (D/B, I and M) and Health Authorities (D/B, I and M)	NS Department of Health & Wellness (D/B, I and M)	Health PEI (D/B)	NB Department of Health (D/B, I and M)	QC Ministry of Health & Social Services (I)	*Information not provided*	Manitoba eHealth (D/B, I and M)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	*Information not provided*	Not in place.
Provider registry	NL Centre for Health Information (D/B, I and M)	NS Department of Health & Wellness (D/B, I and M)	Health PEI (D/B)	NB Department of Health (D/B, I and M)	QC Ministry of Health & Social Services (D/B, I and M)	eHealth Ontario	Function is planned	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	*Information not provided*	No formal provider registry.
Public Health Information System	NL Department of Health & Community Services (D/B, I and M) and Eastern Health for the "bucket" (D/B, I and M)	Not in place	Health PEI (D/B)	NB Department of Health (D/B, I and M)	QC Ministry of Health & Social Services (I and M)	*Information not provided*	Manitoba eHealth (D/B, I and M) as information manager for trustee (MB Department Health, Healthy Living & Seniors)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	NU Department of Health (D/B, I and M)	Not a full public health information system (modules for disease registry and infection tracking). NWT Department of Health & Social Services (D/B, I and M)
Radiology information system	NL Centre for Health Information governs provincial (D/B, I and M) and Health Authorities regional systems (D/B, I and M). Eastern Health operates for all NL.	NS Health Authority	Health PEI (D/B)	NB Department of Health (D/B, I and M for the Diagnostic Imaging Repository)	QC Ministry of Health & Social Services (I)	eHealth Ontario	Manitoba eHealth (D/B, I and M) and Diagnostic Services Manitoba (D/B, I and M)	eHealth Saskatchewan (I and M)	Alberta Health Services (D/B, I and M)	NU Department of Health (D/B, I and M)	Stanton Territorial Health Authority (D/B, I and M) and NWT Department of Health & Social Services (I)

Health Information Function	Newfoundland and Labrador (NL)	Nova Scotia (NS)	Prince Edward Island (PEI)	New Brunswick (NB)	Quebec (QC)	Ontario (ON)	Manitoba (MB)	Saskatchewan (SK)	Alberta (AB)	Nunavut (NU)	Northwest Territories (NWT)
Evaluation	NL Centre for Health Information, Department of Health & Community Services, and Health Authorities	NS Department of Health & Wellness	Health PEI	NB Department of Health (reviving this function)	*Information not provided*	*Information not provided*	Multiple organizations *(not listed)* perform elements of evaluation	*Information not provided*	Alberta Health Services	NU Department of Health	NWT Department of Health & Social Services and Health and Social Services Authorities
Health analytics	Primarily the NL Centre for Health Information and Health Authorities	NS Department of Health & Wellness	Health PEI	NB Department of Health and New Brunswick Health Council	QC Ministry of Health & Social Services	ON Ministry of Health & Long Term Care	MB Department Health, Healthy Living & Seniors and Regional Health Authorities	eHealth Saskatchewan	Alberta Health Services	NU Department of Health	Function is under review
Telehealth (coordination and scheduling)	NL Centre for Health Information and Health Authorities	NS Health Authority	Health PEI	Service New Brunswick	QC Ministry of Health & Social Services	Ontario Telemedicine Network	Manitoba eHealth	eHealth Saskatchewan	Alberta Health Services	NU Department of Health	NWT Department of Health & Social Services
Telepathology	NL Centre for Health Information and Eastern Health	NS Health Authority	Not in place	*Information not provided*	QC Ministry of Health & Social Services	*Information not provided*	Manitoba eHealth and Diagnostic Services Manitoba	*Information not provided*	Alberta Health Services	NU Department of Health	Not in place

Detailed responses were provided in the survey of key contacts (Part II) including information on how each jurisdiction manages specific public sector health information related functions (e.g., governance, funding model). Below is a synopsis of these results.

Organizations that Manage Health Information Functions

Based on responses to the jurisdictional scan, there is no one common model for managing public sector health information functions in jurisdictions across Canada. Functions are managed primarily by a combination of eHealth organizations, ministries of health and health authorities and are mainly funded by the PT Governments and Canada Health Infoway.

In NL, the NL Centre for Health Information, an entity of government, has the primary role in managing the majority of functions, in partnership with the regional health authorities and the Ministry. Similarly, in MB, Manitoba eHealth has the primary role in managing the majority of functions in partnership with the regional health authorities, Ministry of Health, Healthy Living and Seniors, and Diagnostic Services Manitoba (MB's public sector diagnostic health care service provider).

In NS the Ministry of Health and Wellness or the Nova Scotia Health Authority manages the health information functions. In NB the NB Department of Health also has the primary role in managing these functions, in partnership with Service New Brunswick, a corporation owned by the province and chief provider of services to the public. In NWT the Department of Health and Social Services in partnership with Alberta Health Services and health authorities manages these public sector heath information functions.

In PEI, all health information functions are managed by Health PEI, the island wide health authority responsible for delivery of all publically funded health services in the province. Alberta Health Services, the province wide fully integrated health system, is responsible for all health information functions in AB.

In QU and NU, all the functions are managed by the Ministry of Health and Social Services and Department of Health respectively.

In ON the management of these functions appears to be spread across eHealth Ontario (an independent agency of the ON Government to establish and maintain the EHR), the ON Ministry of Health and Long Term Care, and other organizations such as the Ontario Telemedicine Network and OntarioMD (a subsidiary of the ON Medical Association that manages the EMR adoption program).

Health information functions in SK are managed by eHealth Saskatchewan, a Treasury Board Crown Corporation with the mission of making patient information available electronically to patients and their health care team.

How Functions are Managed

Of the 15 public sector health information functions discussed in the survey, jurisdictions differed on which functions were in place, the maturity and integration of the solutions, and governance models. For example, of those who responded to the questions on the EHR overall, some jurisdictions, such as SK, described a mature and highly integrated system, while others such as NS have a new model with limited adoption to date.

Governance models also vary in structure and complexity between jurisdictions. For example, the EHR governance model in MB was described as "complex" with different levels of accountability and oversight including Manitoba eHealth, the Winnipeg RHA, and the Ministry. In SK, the EHR is governed by one organization: eHealth Saskatchewan.

Governance models also vary in structure even within jurisdictions, depending on the function. For example, in NL, the EMR is governed by an MOU between the Department of HCS, the Newfoundland and Labrador Medical Association, with the NL Centre for Health Information establishing the framework to govern the implementation and management of the EMR. On the other hand, the community health information system in NL is governed by two committees, and the hospital information system is an RHA-based system with operational governance being more regional in nature.

The majority of functions across jurisdictions are operationally funded through the PT Government with base budget funding, and through the annual budgeting process for specific projects. Capital funding mainly comes from PT Government funds as well as Canada Health Infoway.

Jurisdictions with an eHealth organization or other single organization involved in primary management of a function often cited the pros of the model to be centralization which helps maintain consistency and standardization across the jurisdiction, and the ability to determine system-wide priorities/budgeting. Cons of the more centralized models were challenges with getting standard agreements in place across stakeholders, sometime slow moving decision cycles, and conflicting priorities across the system.

Jurisdictions with a larger number of partners/groups involved in managing a function (e.g., Ministry, RHAs, vendors) cited pros such as a collaborative approach and sharing of workload, while cons included challenges with communication and determining priorities, and lack of clarity of the governance model.

When asked what is impeding the achievement of a fully integrated jurisdiction-wide patient record in their jurisdiction, responses included difficulty balancing competing priorities, multiple systems, government commitment, vendor costs, and reinforcing privacy.

When asked what is facilitating the achievement of a fully integrated jurisdiction-wide patient record responses included a clear mandate of a specific entity to manage the EHR, having a centrally based model, operating as one provincial system, and the ability to allocate capital investment to areas of need.

Appendix A: Part 1-Jurisdictional Survey

Background and Purpose

This pan-Canadian scan is being conducted by the Department of Health and Community Services (HCS), Government of Newfoundland and Labrador. The purpose of this scan is to gather information on the experiences of jurisdictions in managing public sector health information related functions. You are receiving this survey because your organization has been identified as being involved in some aspect of managing health information in your jurisdiction.

The public sector health information functions of interest are:

1. The electronic health record (EHR) and each individual component;
2. Evaluation;
3. Health analytics; and
4. Telehealth and telepathology

The model for managing these functions may differ by jurisdiction. Jurisdictions may deliver all functions through one entity, or functions may be managed by different agencies such as Health Authorities, the Ministry of Health, or a separate health information organization (e.g., the Newfoundland and Labrador Centre for Health Information).

All information gathered regarding how health information functions are currently managed and governed in each jurisdiction will be used by the HCS for decision-making purposes. Jurisdictional-specific data will not be released publicly. We will share the results of the scan with all participants including each Ministry of Health.

Survey Instructions

This brief survey is the first step in the process of conducting the jurisdictional scan. The purpose of this survey is only to identify which organizations in each jurisdiction are responsible for the public sector health information functions listed above, and who is the most appropriate contact person(s) for each function.

HCS officials will then contact those who are identified in the survey to arrange a more in-depth discussion around only the health information functions for which they are responsible. A Discussion Guide covering topics such as governance, funding model and standards related to the health information functions will be provided to participants in advance of the discussion.

Please complete the survey and submit responses to [*name of official*] at [*email*]. We would greatly appreciate your response by [*date*] so we can include the information from your organization in the scan results and provide the most complete picture possible of how health information is managed across Canada.

If you have any questions please call [*name of official*] at [*telephone number*].

Thank you for participating in this survey.

ORGANIZATION AND CONTACT INFORMATION

Organization Name:

Jurisdiction:

Contact Person (who completed this survey)

Name: Title:
Email: Phone #:

GLOSSARY OF TERMS

Each jurisdiction may have a different definition or understanding of the public sector health information functions listed below. For the purposes of this survey, please find below a definition of each term as defined by HCS in Newfoundland and Labrador. Please consider these definitions as you answer the questions that follow.

Client registry
An essential component of the Electronic Health Record that uniquely identifies individuals based on demographic information. It helps ensure that an individual is quickly and accurately identified by all health care providers, detects duplicate records and links data from other parts of the system (e.g., labs, pharmacies, hospitals).

Clinical portal
A clinical portal, or "viewer", is a component of the Electronic Health Record that is 'view-only'. It is used by clinical and administrative staff to see patient information within the Electronic Health Record. While in some instances information can be added or updated via the clinical portal, viewing patient information is the primary focus of the clinical portal.

Community health information systems
A community health information system captures, stores, manages or transmits information related to the community-based (e.g., mental health and addictions, long term care) services or activities provided within your jurisdiction.

Health analytics
Health Analytics makes extensive use of data, statistical and qualitative analysis, visualization, and explanatory and predictive modeling to identify ways to better manage and sustain the overall health system, support the delivery of health programs, and inform provincial health policy. Analytic services may include data extractions, linkage and analysis, data and database management, and health indicator development.

Electronic health record (EHR)
An electronic health record (EHR) is a secure and private record of an individual's health care information, available electronically to their authorized health care professionals. An EHR is designed to facilitate better sharing and interpretation of health information among the health professionals involved in a person's care anywhere within the jurisdiction.

Electronic Medical Record (EMR)
An Electronic Medical Record (EMR) is a computer-based patient medical record that allows clinicians, primarily physicians, and their administrative staff to access their patients' medical, demographic and diagnostic information.

Evaluation
Evaluation of health programs, services, policies and legislation is used to identify ways to improve the delivery of health programs and inform provincial health policy. Evaluation activities may include needs assessments, process or outcome evaluations, and program reviews.

Hospital information system
A hospital information system is a comprehensive, integrated information system designed to manage all the aspects of a hospital's operation, such as medical, administrative, financial, and legal issues and the corresponding processing of services.

Laboratory Information System
A laboratory information system is a component of the Electronic Health Record that allows clinicians to view laboratory results electronically regardless of where providers or patients are located within the jurisdiction.

Pharmacy Information System
A pharmacy information system is a component of the Electronic Health Record which gives health care professionals electronic access to a person's medication profile. When prescriptions are filled at a connected pharmacy, a pharmacy information system stores information about the medications a person is taking making it easier for pharmacists and other health care professionals to make better decisions about care and helps prevent harmful drug interactions.

Provider registry
A provider registry is a component of the Electronic Health Record that acts as a repository of identifying healthcare provider information such as license number and office address.

Public Health Information System
A public health information system is a secure, electronic information system which supports health surveillance. It is used to manage immunization information, vaccine inventory, and cases and outbreaks of communicable diseases throughout a jurisdiction.

Radiology information system
A radiology information system, typically a component of the electronic health record, allows health care providers to digitally view, manage, share and store images and related medical reports on a secure computer system from any location, regardless of where the test was performed. It replaces the use of film for diagnostic services such as x-rays, ultrasounds, computed tomography (CT) and mammography.

Telehealth
Telehealth uses videoconferencing technology to connect a patient to health care providers who are not located in the same community. A telehealth appointment allows the patient to see, hear and talk to their health care provider but reduces the need to travel and increases access to health care services.

Telepathology
Telepathology enables health care providers across the jurisdiction to view, manage, share and electronically store digital pathology images and related data on a secure computer system from any pathology laboratory location within the jurisdiction.

HEALTH INFORMATION FUNCTIONS IN YOUR ORGANIZATION

Below is a list of public sector health information related functions. Not all functions may be operational in every jurisdiction, and different organizations may be responsible for managing different functions for the jurisdiction. Please note that the list continues onto page 5.

Question 1: Please indicate the health information functions, if any, that YOUR organization manages.

If you answer "yes" to managing any function in question 1, please proceed to questions 2 and 3.

If you answer "no" to all functions in question 1, please skip to question 4.

Question 2: Please indicate which aspects of each function your organization is responsible for.

Question 3: Please provide the name and contact information of the person in your organization most knowledgeable about each function. We will contact the people identified below in the next stage of this jurisdictional scan.

Health Information Function	1. Does your organization manage this function? (Yes/No)	2. If yes, what aspects of this function is your organization responsible for?			3. Contact information for the person most knowledgeable about this function in your organization:		
		(a) Design/build (Yes/No)	(b) Implementation (Yes/No)	(c) Maintenance (Yes/No)	(a) Name and Title	(b) Email	(c) Telephone number
Electronic health record (EHR) - overall							
Client registry							
Clinical portal							
Community health information system							
Electronic Medical Record (EMR)							
Hospital information system							
Laboratory information system							

Health Information Function	1. Does your organization manage this function? (Yes/No)	2. If yes, what aspects of this function is your organization responsible for?			3. Contact information for the person most knowledgeable about this function in your organization:		
		(a) Design/build (Yes/No)	(b) Implementation (Yes/No)	(c) Maintenance (Yes/No)	(a) Name and Title	(b) Email	(c) Telephone number
Pharmacy Information System							
Provider registry							
Public Health Information System							
Radiology information system							
Evaluation							
Health analytics							
Telehealth (coordination and scheduling)							
Telepathology							

HEALTH INFORMATION FUNCTIONS OF OTHER ORGANIZATIONS IN YOUR JURISDICTION

QUESTION 4: Other than your own organization, are you aware of **OTHER** organizations in your jurisdiction that are responsible for any of the following health information functions? If so, please provide the information below so we can include them in this jurisdictional scan.

Health Information Function	Name of organization in your jurisdiction that is responsible for this function	Name of contact person	Email and/or phone number
Electronic health record (EHR) - overall			
Client registry			
Clinical portal			
Community health information system			
Electronic Medical Record (EMR)			
Hospital information system			
Laboratory information system			
Pharmacy Information System			
Provider registry			
Public Health Information System			
Radiology information system			
Evaluation			
Health analytics			
Telehealth (coordination and scheduling)			
Telepathology			

COMMENTS

QUESTION 5: Please provide any additional comments.

Please submit responses to [*name of official*] at [*email*].
If you have any questions please call [*name of official*] at [*telephone number*].

Thank you for participating in this survey.

Appendix B: Part 2-Survey of Key Contacts

Background and Purpose

This survey is Part 2 of a pan-Canadian scan being conducted by the Department of Health and Community Services (HCS), Government of Newfoundland and Labrador. The purpose of this scan is to gather information on the experiences of jurisdictions in managing public sector health information related functions.

In Part 1 of this scan, a survey was used to identify which organizations in each jurisdiction are responsible for public sector health information functions including the electronic health record (EHR), evaluation, health analytics, and telehealth/telepathology. You are receiving this survey because you have been identified as a key person in your organization that is knowledgeable about the health information function(s) listed below.

All information gathered regarding how health information functions are currently managed and governed in each jurisdiction will be used by HCS for decision-making purposes. Jurisdictional-specific data will not be released publicly. We will share the results of the scan with all participants including each Ministry of Health.

Survey process

The purpose of this survey is to gather information from key contacts on how your organization manages specific public sector health information related functions and includes questions on areas such as governance, funding model and standards.

Please complete the survey and submit responses to [*name of official*] at [*email*]. We would greatly appreciate your response by [*date*] so we can include the information from your organization in the scan results and provide the most complete picture possible of how health information is managed across Canada.

If you have any questions, or if you would prefer to discuss your responses in a telephone interview, please call [*name of official*] at [*telephone number*].

Thank you for participating in this survey.

PARTICIPANT INFORMATION

Name:
Organization:
Title:
Email:
Phone #:

SURVEY QUESTIONS

You have been identified as a key person in your organization that is knowledgeable about *[enter functions here].*

Each jurisdiction may have a different definition or understanding of each of these functions. For the purposes of this survey, please consider the definitions below.

[Enter the definitions only for the functions identified for this contact.]

Please answer the following questions as they relate to *[enter functions here]* **in your jurisdiction.**

[Provide only the questions applicable to the functions identified for the contact person]

<u>If health analytics:</u>

1. What health analytics functions/services do you provide (i.e., data management, data linkage, data analysis and reporting)?
2. To whom do you provide the above services (e.g., Ministry of Health)?
3. What types of data do you work with (e.g., human resource, clinical, financial, hospital)?
4. What type of process(es) do you have in place for accessing data or approval to access data (i.e., for people external to your organization)?
5. Do you do regular public reporting? If so, what methods do you us (e.g., dashboards, indicator reports)?
6. Is health analytics part of your e health strategy for this jurisdiction? Is there a separate health analytics strategy? Who is responsible for the strategy?
7. How is health analytics used to inform health policy and program decision-making in your jurisdiction?
   a) How are priorities determined (i.e., how are they aligned with those of key stakeholders)?
   b) How is delivery of priorities across stakeholders coordinated?
8. What is the governance model (i.e., who is responsible/accountable) for health analytics?
9. How is health analytics funded (e.g., base government funding)?
10. What are the pros and cons of using this type of model overall for managing health analytics (i.e., taking all elements of the model into consideration including governance and funding models, determining priorities etc.)?
11. Are there any recommendations for improvements to this model?
12. Are there any other comments that you would like to make?

<u>If evaluation:</u>

1. What evaluation functions/services do you provide?
2. To whom do you provide the above services (e.g., Ministry of Health)?
3. How is evaluation used to inform health policy and program decision-making in your jurisdiction?
   a) How are priorities determined (i.e., how are they aligned with those of key stakeholders)?
   b) How is delivery of priorities across stakeholders coordinated?
4. What is the governance model (i.e., who is responsible/accountable) for evaluation?
5. How is evaluation funded (e.g., base government funding)?

6. What are the pros and cons of using this type of model overall for managing evaluation (i.e., taking all elements of the model into consideration including governance and funding models, determining priorities etc.)?
7. Are there any recommendations for improvements to this model?
8. Are there any other comments that you would like to make?

<u>If the EHR overall, EHR component, telehealth and/or telepathology:</u>

1. If the function is operational:
   a) How mature is the solution? i.e., are all (or nearly all) potential users connected?
   b) Are all (or nearly all) data sources integrated?
2. a) Who is responsible for developing and maintaining standards for this function?
   b) Who is responsible for enforcing the proper use of these standards?
3. Who provides change management support for this function (e.g., related to adoption, system enhancements, changes to standards)?
4. a) How are priorities around this function determined (i.e., how are they aligned with those of key stakeholders)?
   b) How is delivery of priorities across stakeholders coordinated?
5. What is the governance model (i.e., who is responsible/accountable) for this function?
6. How is this function funded (e.g., base government funding)?
7. What are the pros and cons of using this type of model overall for managing this function (i.e., taking all elements of the model into consideration including governance and funding models, standards development and enforcement, etc).
8. Are there any recommendations for improvements to this model?
9. Who is responsible for the e health strategy for this jurisdiction (i.e., a document that defines e health and describes the long-term vision for eHealth, the leadership and governance structure, and what needs to be done to realize that vision)?
10. If different components of the EHR are managed by different organizations:
    a) How is integration between systems managed (i.e., sharing of data from frontline systems to the jurisdictional EHR)?
    b) Are there mechanisms for collaborative governance across systems (i.e., how are decisions coordinated)?
11. In what ways is the model for managing the EHR in your jurisdiction:
    a) Facilitating the achievement of a fully integrated jurisdiction-wide patient record?
    b) Impeding the achievement of a fully integrated jurisdiction-wide patient record?
12. Are there any other comments that you would like to make?

Appendix B

Information Technology Employees Activity-Based Analysis

Appendix B

Information Technology Employees Activity-Based Analysis

Process Category	FTE's by Region					Provincial	Provincial Total
8.0 Manage Information Technology (IT)	Lab/Gren	Western	Central	Eastern	NLCHI	Total RHA's	RHA's + NLCHI
8.1 Distributed / Enterprise Computing	5.30	3.95	7.28	17.55	2.65	**34.08**	**36.73**
8.1.1 Desktop / Workstation Device Service	1.20	1.55	2.44	10.25	0.90	**15.44**	**16.34**
8.1.2 Desktop and Office Productivity Suite	1.20	1.25	1.88	4.75	0.80	**9.08**	**9.88**
8.1.3 Email and Directory Service	1.40	0.50	2.60	0.45	0.45	**4.95**	**5.40**
8.1.4 File/Print Service	1.45	0.25	0.27	0.50	0.35	**2.47**	**2.82**
8.1.5 Remote Access Service	0.05	0.40	0.09	1.60	0.15	**2.14**	**2.29**
8.2 Application / Database Development / Project Portfolio Management	1.55	4.60	2.84	18.35	8.50	**27.34**	**35.84**
8.2.1 Application / Database Requirements Gathering and Analysis	0.40	0.35	1.03	3.00	1.90	**4.78**	**6.68**
8.2.2 Application / Database Design	0.20	1.85	0.38	2.40	0.40	**4.83**	**5.23**
8.2.3 Application/Database Development, Application Development (Architecture)	0.20	1.95	0.35	1.90	0.35	**4.40**	**4.75**
8.2.4 Development - Implementation Services	0.25	0.25	0.25	2.75	1.60	**3.50**	**5.10**
8.2.5 Development - Testing Services	0.20	0.10	0.33	3.05	2.85	**3.68**	**6.53**
8.2.6 Development - Certification/Release Services	0.00	0.05	0.15	1.45	0.75	**1.65**	**2.40**
8.2.7 Development Support	0.30	0.05	0.35	3.80	0.65	**4.50**	**5.15**
8.3 Application / Database Management / Ongoing Maintenance	0.95	4.25	5.38	15.20	7.70	**25.78**	**33.48**
8.3.1 Corrective Maintenance (applications/hardware)	0.25	1.10	0.93	5.15	1.70	**7.43**	**9.13**
8.3.2 Adaptive Maintenance	0.05	1.45	0.57	2.85	2.00	**4.92**	**6.92**
8.3.3 Preventative Maintenance (applications/hardware)	0.20	0.75	0.55	3.05	2.55	**4.55**	**7.10**
8.3.4 Maintenance support	0.45	0.95	3.33	4.15	1.45	**8.88**	**10.33**
8.4 Production and Operations Computing	0.70	0.55	0.75	0.70	3.20	**2.70**	**5.90**
8.4.1 Utility Computing - Infrastructure Management Services	0.00	0.20	0.25	0.25	1.65	**0.70**	**2.35**
8.4.2 Dedicated Application Hosting & Management Services	0.00	0.10	0.25	0.10	1.10	**0.45**	**1.55**
8.4.3 Data Center Services	0.70	0.25	0.25	0.35	0.45	**1.55**	**2.00**
8.5 Telecommunications (Wide Area Network Services)	1.00	0.40	1.75	7.10	1.65	**10.25**	**11.90**
8.5.1 Local Area Network Services	0.65	0.10	0.85	2.05	0.55	**3.65**	**4.20**
8.5.2 Wide Area Network Services	0.30	0.10	0.85	1.30	0.95	**2.55**	**3.50**
8.5.3 Voice and Telecoms Services	0.05	0.20	0.05	3.75	0.15	**4.05**	**4.20**
8.6 IT Security	1.25	0.65	4.06	8.70	3.60	**14.66**	**18.26**
8.6.1 IT Environment Protection Service	0.25	0.05	0.05	0.10	0.30	**0.45**	**0.75**
8.6.2 Identification, Authentication, Authorization Services	0.55	0.15	2.23	3.40	0.25	**6.33**	**6.58**
8.6.3 Secure Communication Service	0.15	0.05	0.04	1.15	0.55	**1.39**	**1.94**
8.6.4 Perimeter Defence, Detection, Response, Recovery, Audit Services	0.20	0.05	1.39	0.45	0.90	**2.09**	**2.99**
8.6.5 Security Strategy - Plan and Organize	0.05	0.10	0.15	0.65	0.30	**0.95**	**1.25**
8.6.6 Risk Assessment services (Threat Risk Assessments (TRA) , Privacy and Security Architecture Documents(PSAD))	0.00	0.00	0.00	0.15	0.55	**0.15**	**0.70**
8.6.7 Privacy/Privacy Incident Management Services	0.00	0.00	0.20	0.75	0.35	**0.95**	**1.30**
8.6.8 Auditing Services	0.00	0.10	0.00	1.85	0.25	**1.95**	**2.20**
8.6.9 Security training and awareness services	0.05	0.15	0.00	0.20	0.15	**0.40**	**0.55**
8.7 Conformance/ Release Management/Vendor Management/Product Management/Quality Assurance	0.40	2.25	0.35	5.20	1.50	**8.20**	**9.70**
8.7.1 - Conformance Activities	0.10	0.20	0.05	0.35	0.15	**0.70**	**0.85**
8.7.2 - Release Management	0.05	0.25	0.10	0.20	0.45	**0.60**	**1.05**
8.7.3 - Product Enhancement review	0.00	0.65	0.02	0.55	0.10	**1.22**	**1.32**
8.7.4 - Vendor Management and Relations	0.00	0.15	0.15	1.35	0.40	**1.65**	**2.05**
8.7.5 - QA/Testing Activities	0.25	1.00	0.03	2.75	0.40	**4.03**	**4.43**
8.8 IT Project and Portfolio Management	0.85	1.75	0.80	12.05	5.55	**15.45**	**21.00**
8.8.1 Manage Projects	0.85	1.45	0.50	9.60	3.65	**12.40**	**16.05**
8.8.2 Manage Portfolio	0.00	0.30	0.30	2.45	1.90	**3.05**	**4.95**
8.9 IT Change Management	0.15	0.20	0.55	0.80	1.40	**1.70**	**3.10**

Information Technology Employees Activity-Based Analysis

Process Category	FTE's by Region					Provincial	Provincial Total
8.0 Manage Information Technology (IT)	Lab/Gren	Western	Central	Eastern	NLCHI	Total RHA's	RHA's + NLCHI
8.9.1 Establish the IT Change Management framework and policies	0.05	0.05	0.10	0.15	0.10	**0.35**	**0.45**
8.9.2 Manage and Establish IT Change Management Process	0.05	0.05	0.15	0.25	0.10	**0.50**	**0.60**
8.9.3 Manage IT Change Management activities	0.05	0.10	0.30	0.40	1.20	**0.85**	**2.05**
8.10 Business Analysis	1.00	0.65	0.53	5.80	2.50	**7.98**	**10.48**
8.10.1 Business Analysis	1.00	0.65	0.53	5.80	2.50	**7.98**	**10.48**
8.11 Customer Service	0.25	3.65	0.05	13.30	6.90	**17.25**	**24.15**
8.11.1 Customer Service Management	0.00	0.35	0.05	3.55	0.80	**3.95**	**4.75**
8.11.2 External User/Corporate Support	0.20	2.85	0.00	7.45	4.20	**10.50**	**14.70**
8.11.3 Operations Support	0.05	0.45	0.00	2.30	1.90	**2.80**	**4.70**
8.12 Decision Support	1.30	2.10	0.42	1.55	1.80	**5.37**	**7.17**
8.12.1 Evaluate Strategic Plans	0.05	0.05	0.00	0.50	0.15	**0.60**	**0.75**
8.12.2 Manage the organizations Business Intelligence software	0.90	0.75	0.30	0.10	1.05	**2.05**	**3.10**
8.12.3 Inform Leadership on Operational Management, Clinical activity and outcomes and Performance measures	0.05	1.05	0.04	0.75	0.55	**1.89**	**2.44**
8.12.4 Support for external stakeholders	0.30	0.00	0.05	0.20	0.05	**0.55**	**0.60**
8.12.5 Canadian Institute for Health Information (CIHI) account management	0.00	0.25	0.03	0.00	0.00	**0.28**	**0.28**
8.15 Business Continuance and Disaster Recovery	0.25	0.40	0.15	2.75	0.65	**3.55**	**4.20**
8.15.1 Business Continuity and Disaster Recovery	0.15	0.15	0.05	0.55	0.25	**0.90**	**1.15**
8.15.2 Disaster Recovery Services	0.10	0.25	0.10	2.20	0.40	**2.65**	**3.05**
8.16 Enterprise IT Risk Management	0.00	0.15	0.10	0.60	0.75	**0.85**	**1.60**
8.16.1 IT Risk Management/ Framework and Policies	0.00	0.05	0.05	0.25	0.10	**0.35**	**0.45**
8.16.2 Oversee/Coordinate Division Risk Management Activities	0.00	0.05	0.05	0.35	0.40	**0.45**	**0.85**
8.16.3 Coordinate business unit and functional risk management activities with ERM (Enterprise Risk Management)	0.00	0.05	0.00	0.00	0.25	**0.05**	**0.30**
8.17 Resource Management	0.15	0.20	0.10	0.85	1.15	**1.30**	**2.45**
8.17.1 Resource Management	0.15	0.20	0.10	0.85	1.15	**1.30**	**2.45**
8.18 Architecture Services	0.30	1.80	0.15	3.80	3.30	**6.05**	**9.35**
8.18.1 Architecture Design Services	0.10	0.50	0.00	1.35	1.75	**1.95**	**3.70**
8.18.2 Evaluation and Assessment	0.00	0.55	0.00	0.85	0.60	**1.40**	**2.00**
8.18.3 Research and Development	0.05	0.40	0.00	0.80	0.55	**1.25**	**1.80**
8.18.4 Support to Operations	0.15	0.35	0.15	0.80	0.40	**1.45**	**1.85**
8.19 Health Information Management	0.15	0.20	0.00	0.60	0.00	**0.95**	**0.95**
8.19.1 Manage HIM functions	0.15	0.20	0.00	0.60	0.00	**0.95**	**0.95**
8.20 Privacy Services	0.00	0.05	0.00	0.65	2.55	**0.70**	**3.25**
8.20.1 Privacy Guidance Services	0.00	0.00	0.00	0.00	0.65	**0.00**	**0.65**
8.20.2 Privacy Risk Assessment Services	0.00	0.00	0.00	0.35	0.45	**0.35**	**0.80**
8.20.3. Consent Management Services	0.00	0.00	0.00	0.00	0.30	**0.00**	**0.30**
8.20.4 Privacy training and education	0.00	0.00	0.00	0.00	0.35	**0.00**	**0.35**
8.20.5 Privacy Incident Response	0.00	0.05	0.00	0.30	0.40	**0.35**	**0.75**
8.20.6 ATIPP services	0.00	0.00	0.00	0.00	0.40	**0.00**	**0.40**
8.21 IT Audit - External Entities	0.00	0.05	0.00	0.15	1.05	**0.20**	**1.25**
8.21.1 IT audit planning, execution, and report recommendations	0.00	0.05	0.00	0.15	1.05	**0.20**	**1.25**
8.22 Biomedical / Clinical Engineering	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
8.22.1 Preventative maintenance and repair of diagnostic and therapeutic medical equipment technology.	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
8.22.2 Customer Service Management	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
8.22.3Manage Computerized Maintenance Management System	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
8.23 Other (AV, Telehealth, Remote Patient Monitoring)	3.05	6.00	7.35	17.70	0.10	**34.10**	**34.20**
8.23.1 Audio Visual	0.00	0.05	0.10	4.30	0.00	**4.45**	**4.45**
8.23.2 Telehealth	2.00	0.60	0.42	3.25	0.10	**6.27**	**6.37**
8.23.3 Remote Patient Monitoring Program	0.00	0.00	0.04	4.80	0.00	**4.84**	**4.84**

Information Technology Employees Activity-Based Analysis

Process Category	FTE's by Region					Provincial	Provincial Total
8.0 Manage Information Technology (IT)	Lab/Gren	Western	Central	Eastern	NLCHI	Total RHA's	RHA's + NLCHI
8.23.4 Clinical Infomatics	1.05	5.35	6.79	5.35	0.00	**18.54**	**18.54**
8.24 Change Management	2.05	1.55	1.00	5.10	0.05	**9.70**	**9.75**
8.24.1 Change Management	0.85	0.75	0.15	3.40	0.05	**5.15**	**5.20**
8.24.2 Application Training	1.20	0.80	0.85	1.70	0.00	**4.55**	**4.55**
8.25 IT Incident Management	0.00	0.10	0.40	0.50	0.80	**1.00**	**1.80**
8.25.1 Establish & Manage IT Incident Management Process	0.00	0.10	0.40	0.50	0.80	**1.00**	**1.80**
8.26 General Administration and Management	0.85	0.50	0.65	9.55	6.65	**11.55**	**18.20**
8.26.1 Perform General Administrative Responsibilities	0.30	0.35	0.45	2.85	3.45	**3.95**	**7.40**
8.26.2 Manage Employees	0.05	0.15	0.20	3.85	1.55	**4.25**	**5.80**
8.26.3 Perform Clerical Duties	0.50	0.00	0.00	2.85	1.65	**3.35**	**5.00**
8.27 Information Management	0.00	0.00	0.00	0.00	2.00	**0.00**	**2.00**
8.27. 1 Information Management Governance	0.00	0.00	0.00	0.00	0.35	**0.00**	**0.35**
8.27.2 IM - Records Classification and Retention	0.00	0.00	0.00	0.00	0.50	**0.00**	**0.50**
8.27.3 Electronic Content Management	0.00	0.00	0.00	0.00	0.80	**0.00**	**0.80**
8.27.4 IM Advisory Services	0.00	0.00	0.00	0.00	0.30	**0.00**	**0.30**
8.27.5 Access to Information and Protection of Privacy	0.00	0.00	0.00	0.00	0.05	**0.00**	**0.05**
8.28 Health Analytics and Evaluation Services Definitions Framework	0.00	0.00	0.00	0.00	34.60	**0.00**	**34.60**
8.28.1 Standards Development (provincial and national standards)	0.00	0.00	0.00	0.00	2.20	**0.00**	**2.20**
8.28.2 Standards Implementation Support to internal and external stakeholders	0.00	0.00	0.00	0.00	0.80	**0.00**	**0.80**
8.28.3 Quality Management	0.00	0.00	0.00	0.00	2.85	**0.00**	**2.85**
8.28.4 Data management	0.00	0.00	0.00	0.00	3.55	**0.00**	**3.55**
8.28.5 Process Information Requests	0.00	0.00	0.00	0.00	5.70	**0.00**	**5.70**
8.28.6 Conduct analytic projects (includes internally initiated research)	0.00	0.00	0.00	0.00	8.00	**0.00**	**8.00**
8.28.7 Provide analytic and epidemiological consultative/support services (non-project)	0.00	0.00	0.00	0.00	3.60	**0.00**	**3.60**
8.28.8 Conduct Evaluations	0.00	0.00	0.00	0.00	5.40	**0.00**	**5.40**
8.28.9 Secondary Uses Committee Review	0.00	0.00	0.00	0.00	0.50	**0.00**	**0.50**
8.28.10 General Administration and Management	0.00	0.00	0.00	0.00	2.00	**0.00**	**2.00**
8.29 Decision Support - Eastern Health	0.00	0.00	0.00	8.20	0.00	**8.20**	**8.20**
8.29.1 Evaluate Strategic Plans	0.00	0.00	0.00	1.00	0.00	**1.00**	**1.00**
8.29.2 Manage the organizations Business Intelligence software	0.00	0.00	0.00	2.15	0.00	**2.15**	**2.15**
8.29.3 Inform Leadership on Operational Management, Clinical activity and outcomes and Performance measures	0.00	0.00	0.00	2.50	0.00	**2.50**	**2.50**
8.29.4 Support for external stakeholders	0.00	0.00	0.00	1.10	0.00	**1.10**	**1.10**
8.29.5 Canadian Institute for Health Information (CIHI) account management	0.00	0.00	0.00	0.55	0.00	**0.55**	**0.55**
8.29.6 General Administration and Management	0.00	0.00	0.00	0.90	0.00	**0.90**	**0.90**
8.30 Clinical Information	0.00	0.00	0.00	0.00	38.20	**0.00**	**38.20**
8.30.1 EHealth Governance	0.00	0.00	0.00	0.00	4.50	**0.00**	**4.50**
8.30.2 eHealth Program Operations	0.00	0.00	0.00	0.00	3.00	**0.00**	**3.00**
8.30.3 EHR Data Quality	0.00	0.00	0.00	0.00	1.90	**0.00**	**1.90**
8.30.4 eHealth Data Quality & Standards	0.00	0.00	0.00	0.00	1.55	**0.00**	**1.55**
8.30.5 Registry Integrity Unit	0.00	0.00	0.00	0.00	5.95	**0.00**	**5.95**
8.30.6 Pharmacy Network	0.00	0.00	0.00	0.00	8.90	**0.00**	**8.90**
8.30.7 PACS and Telepathology	0.00	0.00	0.00	0.00	0.40	**0.00**	**0.40**
8.30.8 Telehealth	0.00	0.00	0.00	0.00	2.65	**0.00**	**2.65**
8.30.9 eHealth Change Management	0.00	0.00	0.00	0.00	3.10	**0.00**	**3.10**
8.30.10 Provincial clinical stakeholder engagement	0.00	0.00	0.00	0.00	0.30	**0.00**	**0.30**
8.30.11 Develop, implement post go-live monitoring & evaluation strategies	0.00	0.00	0.00	0.00	0.35	**0.00**	**0.35**
8.30.12 ehealth Change Management practice development	0.00	0.00	0.00	0.00	0.20	**0.00**	**0.20**
8.30.13 Project and Program Communications and Stakeholder Relations	0.00	0.00	0.00	0.00	1.45	**0.00**	**1.45**

Information Technology Employees Activity-Based Analysis							
Process Category	FTE's by Region					Provincial Total RHA's	Provincial Total RHA's + NLCHI
8.0 Manage Information Technology (IT)	Lab/Gren	Western	Central	Eastern	NLCHI		
8.30.14 Corporate Communications and Stakeholder Relations	0.00	0.00	0.00	0.00	1.30	**0.00**	**1.30**
8.30.15 Crisis and Business Continuity Communications and Stakeholder Relations	0.00	0.00	0.00	0.00	0.05	**0.00**	**0.05**
8.30.16 Media Relations	0.00	0.00	0.00	0.00	0.15	**0.00**	**0.15**
8.30.17 Internal Communications	0.00	0.00	0.00	0.00	0.15	**0.00**	**0.15**
8.30.18 Electronic Medical Record (EMR)	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
8.30.19 Develop/Maintain Provincial EMR Program	0.00	0.00	0.00	0.00	0.95	**0.00**	**0.95**
8.30.20 General Administration and Management	0.00	0.00	0.00	0.00	1.35	**0.00**	**1.35**
8.31 Enterprise Risk Management, Business Continuity, Special Projects, PMO	0.00	0.00	0.00	0.00	3.00	**0.00**	**3.00**
8.31.1 Define the business concept and long-term vision	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
8.31.2 Develop organizational strategy	0.00	0.00	0.00	0.00	1.00	**0.00**	**1.00**
8.31.3 Manage enterprise (integrated) risk	0.00	0.00	0.00	0.00	1.00	**0.00**	**1.00**
8.31.4 Manage business continuity	0.00	0.00	0.00	0.00	0.90	**0.00**	**0.90**
8.31.5 Manage business processes	0.00	0.00	0.00	0.00	0.10	**0.00**	**0.10**
8.31.6 General Administration and Management	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**
Other	0.00	0.00	0.15	2.80	1.00	**2.95**	**3.95**
Totals	**21.50**	**36.00**	**34.81**	**159.55**	**142.80**	**251.86**	**394.66**