Auditor General
MANITOBA

Report to the Legislative Assembly

Independent Auditor's Report

eChart Manitoba

October 2018

Our Vision

Valued for positively influencing public sector performance through impactful audit work and reports.

Our Mission

To focus our attention on areas of strategic importance to the Legislative Assembly, and to provide Members of the Legislative Assembly with reliable and efficient audits.

Our mission includes easy-to-understand audit reports that include discussions of good practices within audited entities, and recommendations that, when implemented, will have a significant impact on the performance of government.

Our Values | Accountability | Integrity | Trust | Collaboration | Innovation | Growth

Auditor General
Norm Ricard

Deputy Auditor General
Tyson Shtykalo

Director
Fraser McLean

Principal
Reema Sohal

Communications Manager
Frank Landry

Desktop Publisher
Jomay Amora-Dueck

Cover Design
Waterloo Design House

Auditor General
MANITOBA

For more information, please contact our office at:

Office of the Auditor General
500-330 Portage Avenue
Winnipeg, Manitoba R3C 0C4

Phone: 204-945-3790 Fax: 204-945-2169
contact@oag.mb.ca | www.oag.mb.ca

Web Version

Auditor General

MANITOBA

October 2018

The Honourable Myrna Driedger
Speaker of the House
Room 244, Legislative Building
450 Broadway
Winnipeg, Manitoba R3C 0V8

Honourable Ms. Driedger:

It is an honour to provide you with my report titled, *eChart Manitoba,* to be laid before Members of the Legislative Assembly in accordance with the provisions of Section 28 of *The Auditor General Act*.

Respectfully submitted,

Original Signed by:
Norm Ricard

Norm Ricard, CPA, CA
Auditor General

Table of contents

Web Version

Auditor General's comments

eChart is an electronic system that pulls confidential health information from many of the Province's existing electronic health databases.

The quality of health care provided to Manitobans can be greatly facilitated when health practitioners have quick and easy access to required patient medical information.

Although launched in 2010, eChart remains a work in progress with a lot of the information envisioned by eHealth in 2007 to be included in eChart still not available. This information includes allergy profiles, blood type, emergency room diagnosis and discharge summaries, medical clinic visits and homecare reports. The original intended benefits of eChart included improving timeliness of care, increasing access to care in remote communities, reducing duplicate or unnecessary tests and creating more efficient and effective collaboration with specialists.

Given the significant cost of getting the system up and running, one of the objectives for this audit was to understand whether eHealth was adequately managing the risks that could prevent eChart's intended benefits from being realized. We found that these risks had not been identified by eHealth. So we identified what we thought were important risks for eHealth to manage and looked to see if those risks were being mitigated. They largely were not.

Risk assessments can be difficult and time consuming to do well and they do require constant updating as circumstances and risks evolve. But the management information that risk assessments generate is invaluable as it ensures management is fully aware of and understands the risks they face. This understanding in turn allows them to purposely focus their efforts on the most significant risks.

Web Version

As we have seen in this and other recent audits, preparing comprehensive documented risk assessments remains a significant management challenge.

I am pleased that Manitoba Healthy Living and Seniors, Manitoba eHealth and the Winnipeg Regional Health Authority have acknowledged the value of our 15 recommendations. Our first follow-up of these recommendations will be as at September 30, 2019.

I would also like to thank the dedicated staff we met with during our audit for their cooperation and assistance. I would especially like to thank the audit team for their excellent work.

Original Signed by:
Norm Ricard

Norm Ricard, CPA, CA
Auditor General

Recent audits where we discuss the need and value of risk assessments include:

- Information Technology Security Management – January 2013

- Manitoba Hydro – Managing Cyber Security Risks Related to Industrial Control Systems – March 2014

- Manitoba's Framework for an Ethical Environment – March 2014

- WRHA Management of Risks Associated with End User Devices – July 2015

- Management of Provincial Bridges – July 2016

- Manitoba East Side Road Authority – September 2016

- Keeyask Process Costs and Adverse Effects Agreements with First Nations – September 2016

- Management of Manitoba's Apprenticeship Program – July 2017

- Managing Climate Change – October 2017

Web Version

Report highlights

Performance audit

We assessed whether eHealth was managing the risks that could result in:

- Intended benefits not being realized
- Unauthorized access
- Gaps in the availability of eChart

15 recommendations

What we found

Intended benefits
- Future state of eChart not updated
- Progress not assessed
- System updates repeatedly delayed

Access
- Majority of users granted full access
- Monitoring of user activities had gaps
- Weakness in cybersecurity controls

Availability
- No disaster recovery plan
- Environmental controls in place

Web Version

Main points

What we examined

We wanted to know whether Manitoba eHealth (eHealth) was sufficiently managing the significant risks that might prevent it from achieving the following eChart Manitoba (eChart) operational objectives:

- Realizing its intended benefits.
- Ensuring its information is accessed only by authorized individuals.
- Ensuring it is available when needed.

We did not examine practices and controls that prevent, detect and correct inaccurate eChart information.

What we found

We concluded eHealth needs to better manage the risks of not achieving eChart's intended benefits; that eHealth needs to strengthen eChart access controls; and that good processes were in place to ensure eChart will be available when needed.

Our report includes 15 recommendations. Key findings are summarized below.

REALIZING INTENDED BENEFITS

We found that eHealth had not identified and assessed the risks that might prevent it from achieving eChart's intended benefits. As a result, we focused our audit effort on the risks that we believed were important for eHealth to manage.

The risks we identified do not represent a comprehensive risk assessment but our findings (as discussed below) indicate that there are many significant risks that need to be better managed.

Future state of eChart's clinical information not updated

In 2007, eHealth defined eChart's future state and how it can be reached within 5 years. This vision included both baseline and additional clinical information to be available in eChart. While eHealth has integrated the majority of the baseline information, much of the additional clinical information has yet to be integrated. For instance, allergy information was included as part of the 2007 vision, but this critical information is not yet available in eChart.

eChart remains a work in progress. Moving towards a desired future state for eChart's clinical information positively impacts the usefulness of eChart to users. But an updated future state document has not been prepared to help guide the planning decisions.

Initiatives to integrate additional clinical sources into eChart delayed

eHealth has implemented eChart releases 1 and 2, yet releases 3 and 4 have been repeatedly delayed. These releases involved filling in some of eChart's clinical information gaps. eHealth was in the early planning stages of 2 projects that would make additional clinical information available in eChart.

Sourcing additional clinical information into eChart requires integration with existing systems. eHealth officials advised that they were developing an overall interoperability and integration strategy, which will ultimately determine how existing systems will integrate and interact with eChart. It is unclear whether the delays noted above were caused primarily by the lack of such a strategy or by the competing priorities for IT projects.

Target for usage set, but no strategy in place

While health-care sites are not required to implement and use eChart, the total number of active users had grown to 5,534 (35% of all eChart user accounts) since release 1 inception in 2010. eHealth has established a target of 9,000 active users by 2020. eHealth officials noted that this target is aggressive and requires a concerted effort. They cited the need for a change management strategy that included communications, training and resistance management plans. eHealth had not yet developed such a strategy, but had some processes in place to help increase usage, for example communication tools and follow up with sites.

Progress in realizing intended benefits not assessed

While eHealth intended to establish a Benefits Evaluation Unit to ensure that benefit evaluations were done consistently and systematically, the unit was not yet operational because an evaluation coordinator was not in place.

eHealth identified a number of key performance indicators (KPIs) to help monitor eChart's usage, privacy and availability. KPIs were not in place to monitor the realization of eChart's intended benefits. We noted, however, that most of the eChart-related KPIs could be used to monitor (at least in part) 3 of the 7 eChart intended benefits. Also, while eHealth had established a target of 9,000 active users by 2020, it had not defined targets for any of the other KPIs (e.g. implementations by type of site).

eHealth's attempts to understand user satisfaction did not produce meaningful results. In 2012, eHealth conducted a benefits evaluation using interviews, focus groups and surveys. But eHealth subsequently concluded that the evaluation was conducted too soon after initial implementation, as users were not familiar enough with eChart to provide meaningful feedback. In 2014, eHealth evaluated eChart's benefits through a usage and satisfaction survey. However, the results had limited usefulness as only 244 users completed the survey (a response rate of only 1.95%). In addition, the survey did not target inactive users. Surveying inactive users would have generated useful information on their reasons for not frequently using eChart. No other techniques were used to gather information and evaluate eChart's benefits.

ACCESS CONTROLS

Privacy and risk assessments, and security safeguard audits, completed

Since 2012, eHealth has conducted eChart Privacy Impact Assessments in a timely manner. eHealth conducted an eChart Threat and Risk Assessment in 2012, but no additional Threat and Risk Assessments were conducted given that there were no major releases of eChart since 2012. Between 2013 and 2015 several eChart security safeguards were tested by eHealth.

Privacy controls need improvement

We assessed the adequacy of privacy controls in place to protect personal health information and found several weaknesses, including:

- The majority of users were granted access to all clinical information in eChart.
- While user access requirements were in place and communicated to users and sites, not all confidentiality pledges were signed.
- The removal of terminated users was not always timely because sites did not always request removal of user access in a timely manner, nor did sites consistently review the quarterly user account reports to identify users that should have been removed.
- eHealth's monitoring of user activities had gaps, most notably that few automated user activity triggers were used.
- Improvements to guidance on handling privacy incidents were needed.

Some weaknesses in eChart's cybersecurity controls

While eHealth has many cybersecurity controls in place, we found several deficiencies. Given the sensitive nature of the security findings, our detailed findings and recommendations were presented to management in an internal letter.

AVAILABILITY OF ECHART

Environmental controls in place to protect infrastructure

eHealth's primary and secondary data centres had sufficient environmental controls in place.

Backup processes in place, but no disaster recovery plan

eHealth has good practices in place for eChart backup and restoration. eHealth also developed a *Disaster Operation Centre Overview* document. While this document had many of the key components of a disaster recovery plan, it did not provide specific procedures for recovering eHealth's data, systems and supporting infrastructure (including for a critical system such as eChart).

Web Version

Response of officials

Manitoba Health, Healthy Living and Seniors (MHSAL), Manitoba eHealth, and the Winnipeg Regional Health Authority (WRHA) have reviewed this report. We thank the Office of the Auditor General (OAG) for their review of the eChart system. The scope of the audit and the detail provided will assist in informing current and ongoing efforts to ensure that eChart continues to be a trusted, sustainable and valuable information resource in support of health-care delivery.

eChart is a key foundational component in the provincial digital health strategy. This system connects in excess of 7,000 authorized health care providers across the province, as of February 2018, with secure access to key health-care information including drug prescriptions that have been filled, immunization histories and results from participating labs. eChart provides a comprehensive digital view of a patient's health history to support informed clinical decision making at the point of care.

Since the initial release of eChart in December 2010, there have been ongoing improvements including new information sources, improved functionality, and improved processes. The evolution of the system will continue to be a journey that mirrors health system changes and priorities. Today, eChart is an integral part of clinical workflows across a range of health delivery settings including hospitals, primary care, regional programs and nursing stations throughout the province. We continue to keep best practices related to cybersecurity, system availability and sustainment at the forefront of our operational and enhancement considerations.

Most importantly, in addition to services to health-care providers, Manitobans can request to see what information is maintained about them, who has viewed their record, and/or place a Disclosure Directive on their eChart record.

The feedback provided by the OAG will not only inform eChart practices but also inform broader health system processes as well. Many of the recommendations are reflective of a new and maturing digital health sector. As such, future enhancements to eChart will continue to be balanced against the perspective of broader health system demands and funding capacity. In particular, recommendations with workload or process implications for sites will be assessed with careful consideration for the impact and available capacity.

MHSAL, Manitoba eHealth, and the WRHA accept the findings detailed in the OAG report; we will review how these recommendations will be implemented, and develop and monitor plans of action where needed.

Web Version

Background

What is eChart?

In 2010, Manitoba eHealth (eHealth) implemented eChart Manitoba (eChart) – part of the Province's electronic health record initiative. eChart allows authorized healthcare providers to view any Manitoban's health information when needed.

Manitoba does not have a singular and comprehensive information system for all of our personal health information. Our health information resides in multiple different systems, each with its own clinical objective. Health-care providers do not have access to all of these electronic systems. eChart pulls together clinical information from many of these existing systems allowing thousands of health-care providers access to their patient's confidential health-care information. It complements existing systems, helping health-care providers obtain a comprehensive picture of a patient's health history and their interactions with Manitoba's health-care system.

> Electronic health records are one of the most transformational innovations in health care in a generation.
>
> – Canada Health Infoway, 2014-15 Annual Report

eChart is one of the many tools used to help coordinate care and exchange clinical information in Manitoba. The need to coordinate care was highlighted in an October 2016 Canada Health Infoway Report that summarized the perspectives of more than 6,000 adult Canadians (over 3 years from 4 public opinion surveys). The report found that:

- Canadians are generally seeing more health care providers in their circle of care.
- 86% agree that digital health ensures clinicians have easy access to a comprehensive medical history.
- 85% agree that digital health helps coordinate care between multiple health care providers.
- 96% believe it is important that health records be kept electronically so the records can be easily transferred within the health system.
- 70% are not confident that their health care providers are sharing information for a holistic view of their health. [1]

---

[1] https://www.infoway-inforoute.ca/en/component/edocman/resources/3152-connecting-patients-for-better-health-2016

FIGURE 1 highlights the benefits eChart is intended to provide patients and providers.

Figure 1 – Benefits eChart is intended to provide patients and providers	
Patient benefits	**Provider benefits**
• Improves quality, safety and timeliness of care. • Increases security and confidence in healthcare providers' access to information. • Increases access to and management of care in remote communities. • Reduces duplicate and unnecessary tests and rescheduled visits from undelivered results.	• Increases efficiency in workflow in practice: less time searching for information to allow more time for patient care. • Improves access to patient information. • Develops ability to share information across the continuum of care, strengthening networks and creating more efficient and effective collaboration with specialists and other healthcare providers.

Source: eHealth's Increase Uptake of eChart Users Project Brief (April 2015)

Who uses eChart?

While primarily used within the acute care community (hospitals), at the time of our audit 404 sites within Manitoba had implemented eChart. A total of 5,534 health-care providers were actively using eChart, spanning across different groups - physicians, nurses, administrative staff, and other professionals (clinical assistants, midwives).

What information can be viewed in eChart?

Clinical information such as lab results, medications, immunizations and diagnostic imaging reports are the main reasons health-care providers use eChart. FIGURE 2 shows the data sources fed into eChart (at the time of our audit). Once fully implemented, eChart will provide a lifetime record of an individual's key health history. [2]

---

[2] https://www.ombudsman.mb.ca/uploads/document/files/10-points-to-know-about-echart-update-2012-en.pdf

Figure 2 – Clinical information fed into eChart

Data Sources (Note 1)	Data available
Provincial Client Registry/Registration Systems – Personal identifying information including name, address, date of birth, personal health identification number (PHIN).	All records in the Client Registry
Immunizations recorded in and provided by the Manitoba Immunization Monitoring System (MIMS) and the Provincial Immunization Registry. Information is derived from physician billing claims and from public health provided immunizations.	Child – 1980
Prescriptions filled at retail pharmacies provided through the Drug Programs Information Network (DPIN).	Adult - 2000
Laboratory test results from Diagnostic Services Manitoba (DSM) locations (Winnipeg sites December 2010 and rural sites added since 2013).	April 2010
Laboratory test results from Diagnostic Services Manitoba (DSM) – Westman Laboratory (Brandon).	December 2010
Laboratory test results from Unicity Laboratory.	May 2011
Laboratory test results from Dynacare.	May 2011
Laboratory test results from Cadham Provincial Laboratory.	July 2011
Diagnostic image reports from Manitoba's Radiology Information Systems (RIS).	March 2013
Encounters from St. Boniface Hospital. Provides administrative information regarding a visit to St. Boniface Hospital (e.g. admission date, type of visit, visit reason, discharge date).	November 2011

Source: eHealth website – October 2015

NOTE 1 - Subsequent to our audit, eHealth added additional data sources:

- Encounter information from Winnipeg (July 2016), Interlake-Eastern (July 2016) and Southern-Sante Sud (May 2017) hospitals. Provides administrative information regarding a visit to these hospitals (e.g. Admission date, type of visit, discharge date).

- Diagnostic image reports from Prairie Mountain Health region (December 2016)

- Diagnostic images from Manitoba's Radiology Information System (December 2016)

Web Version

What is eHealth?

In June 2006, Treasury Board approved the creation of the Manitoba eHealth Provincial Program as a central organization for the planning, development, coordination, oversight, and ongoing support/delivery of provincewide health care Information Technology (IT) projects.

eHealth operates as the main vehicle by which the Department of Health, Seniors and Active Living (Department) pursues its goals concerning IT in the health-care sector. Although it is a provincial program, eHealth is housed within the Winnipeg Regional Health Authority (WRHA).

How is eHealth funded?

eHealth receives funding for both IT capital projects and operations. eHealth operations are funded through WRHA's annual budgeting process. IT initiatives requiring capital funds are approved by Treasury Board, through the Department. As of March 31, 2015, eHealth spent $40.588 million in capital funds on eChart projects. Of this, $27.358 million was reimbursed by Canada Health Infoway. Additionally, $9.5 million in operating funds was spent on eChart.

How does PHIA apply to eChart?

eChart holds a vast amount of personal health information. Every Manitoban has a record of care available for viewing in eChart.

In 1997, the province enacted the *Personal Health Information Act* (PHIA) to "ensure individual access to, and privacy of, personal health information maintained by health care providers, government and local public bodies." PHIA contains privacy and security requirements that trustees must follow. It defines a Trustee as "a health professional, health care facility, public body, or health services agency that collects or maintains personal health information."

WRHA is the legal entity responsible and accountable for the eChart initiative and is the trustee of eChart's personal health information. WRHA must comply with PHIA's legislative requirements. Other provincial trustees would be accountable for the personal health information maintained in their source systems.

About the audit

Audit objective

We wanted to know whether Manitoba eHealth (eHealth) was sufficiently managing the significant risks that might prevent it from achieving the following eChart Manitoba (eChart) operational objectives:

- Realizing its intended benefits (SECTION 1).
- Ensuring its information is accessed only by authorized individuals (SECTION 2).
- Ensuring it is available when needed (SECTION 3).

Scope and approach

The audit examined whether eHealth was sufficiently managing the significant risks impacting eChart operational objectives. eHealth is governed by both the Department of Health, Seniors and Active Living (Department) and the Winnipeg Regional Health Authority (WRHA).

We selected a targeted sample of 16 sites throughout the province that had implemented eChart. Our testing included interviews with the Department, the WRHA and the sampled sites. We obtained the necessary documentation from these entities during the course of our audit.

We did not examine practices and controls that prevent, detect and correct inaccurate eChart information.

Criteria

To determine whether eHealth was sufficiently managing the significant risks that might prevent them from achieving eChart's operational objectives, we used the following criteria.

Criteria	Sources
Appropriately detailed plans should be developed and monitored for progress.	• COBIT 5
Privacy and risk assessments, and security safeguard audits should be performed periodically. Privacy controls and processes should be in place to protect the eChart's personal health information. Cybersecurity controls should be in place to protect the eChart's health information.	• COBIT 5 • ISO 27002 • The *Personal Health Information Act* and supporting regulations. • 2005 Infoway Privacy and Security Requirements.
Environmental controls should be in place to protect eChart's infrastructure. Backup and recovery process should be in place to ensure eChart information and systems are available when needed.	• COBIT 5 • ISO 27002 • 2005 Infoway Privacy and Security Requirements.

Period covered by the audit

The audit originally covered the period between June 2012 and September 2014 and was planned to be substantially completed between June 2014 and December 2014. However, in September 2014, the audit was suspended and the audit team was reassigned to the audit of *WRHA's management of risks associated with end-user devices* audit [3] (report released in July 2015).

In September 2015, we-recommenced the audit. In areas where much of our testing had already been completed by September 2014, we determined if eHealth's practices changed during the year. Any noted changes, as of June 2016, were reflected and addressed, as necessary, in our report.

This is the period (June 2012 to June 2016) to which the audit conclusion applies. However, to gain a more complete understanding of the subject matter of the audit, we also examined certain matters that preceded the audit coverage period.

---

[3] http://www.oag.mb.ca/wp-content/uploads/2015/08/Report-WRHA-Mgmt-Risks-End-user-Devices-Web-Version.pdf

Findings and recommendations

1 Risks of not achieving eChart's intended benefits need to be better managed

In working towards the realization of eChart's intended benefits (FIGURE 1), there are many risks that need to be managed. If not managed, these risks could hinder or prevent eHealth from realizing eChart's intended benefits. We looked to see if eHealth had identified and assessed these risks and found that eHealth had not.

As a result, we focused our audit efforts on the following risks that we believe were important for eHealth to manage in order to realize eChart's intended benefits:

- Updated future state of eChart's clinical information may not be prepared (SECTION 1.1).
- Existing clinical information systems may not be integrated/sourced into eChart (SECTION 1.2).
- Health-care providers may not actively use eChart and the clinical information it provides (SECTION 1.3).
- Progress made in realizing eChart's intended benefits may not be known (SECTION 1.4).

The risks we identified do not represent a comprehensive risk assessment, but our findings discussed below indicate that there are many significant risks that need to be managed in order for eHealth to achieve eChart's intended benefits.

Recommendation 1: We recommend that eHealth identify, assess and mitigate (if needed) the risks associated with not realizing eChart's intended benefits.

1.1 Updated future state of eChart's clinical information not prepared

In 2007, eHealth defined eChart's future state and how it would be reached within 5 years. But, an updated future state document has not been prepared.

Each year, provincial stakeholders (the Department, WRHA, other Regional Health Authorities (RHAs), CancerCare, Diagnostic Services Manitoba) develop the annual *Provincial eHealth Strategy*. eHealth officials advised that the *Provincial eHealth Strategy* encompasses their long-term plan for eChart. We found that the 2015 strategy highlights many future initiatives impacting eChart, but provides minimal information regarding eChart's future path or desired future state.

In FIGURE 3 we compared the 2007 vision to the current state of eChart's available clinical information (baseline and additional) and found gaps.

Figure 3 – eChart's baseline and additional clinical information comparison	
2007 Vision	eChart status (as at October 2015)
Baseline clinical information	
Client identification and base demographics - first name, last name, date of birth, gender, address, phone number, identification numbers and other demographic information deemed required	All records in the Client Registry (since December 2010) sourced into eChart.
Dispensed drugs	Drugs dispensed from retail pharmacies (DPIN) were sourced into eChart. However, information regarding medications provided at hospitals, health centres, and clinics were not yet sourced into eChart. (Note 1)
Laboratory test results	Partially sourced into eChart through the Provincial Lab Information System (PLIS). Results from Unicity Laboratory, Dynacare, and Cadham Provincial Laboratory were sourced into eChart. Also, 39 of the 77 Diagnostic Services Manitoba (DSM) sites were sourced into eChart.
Diagnostic imaging reports	Partially sourced into eChart (77% of annual diagnostic imaging exam reports were available in eChart). (Note 3)
Immunizations	Immunization information is sourced into eChart.

Cont'd

2007 Vision	eChart status (as at October 2015)
Additional clinical information	
Allergy profile	Not yet sourced into eChart
Encounter history events from Admission, Discharge and Transfer systems (Note 2)	Encounter information from St. Boniface Hospital was sourced into eChart (administrative information regarding a visit – i.e. admission date, type of visit, discharge date). However, encounter administration information from other hospitals were not yet sourced into eChart. (Note 3)
Clinic visit encounters (Note 2)	Not yet sourced into eChart (however, Outpatient clinic visits at St. Boniface Hospital are captured under the Admission, Discharge and Transfer as noted above).
Diagnosis, conditions, observations and discharge summaries from EMRs (Note 2)	Not yet sourced into eChart
Diagnosis, conditions, observations and discharge summaries from EPRs (Note 2)	Not yet sourced into eChart
Diagnosis, conditions and observations from Provincial chronic disease management solutions (Note 2)	Not yet sourced into eChart
Diagnosis, conditions and observations from Home Care solutions (Note 2)	Not yet sourced into eChart
Discharge summaries used by medical departments in acute care, tertiary care, quaternary care, long-term care and rehabilitation institutions (Note 2)	Not yet sourced into eChart
Other clinically relevant information (blood types, clinical referral summary, care summary, adverse events, medical error documentation) (Note 2)	Not yet sourced into eChart

NOTE 1 - eHealth's 2007 vision stated that eChart would include all drug prescription and dispense events, but that this would only be limited to drugs dispensed at retail pharmacies in version 1.

NOTE 2 - eHealth's 2007 vision stated that the definitions and requirements of these items were in their early stages of development. The vision stated that requirements analysis work would have to be done to confirm the uses and types of the clinical information. As per the 2007 vision, these were only contemplated sources of data at the time.

NOTE 3 - Subsequent to our audit, eHealth added 2 additional data sources:

- Encounter information from Winnipeg (July 2016), Interlake-Eastern (July 2016) and Southern-Sante Sud (May 2017) hospitals. Provides administrative information regarding a visit to these hospitals (e.g. Admission date, type of visit, discharge date).
- Diagnostic image reports from Prairie Mountain Health region (December 2016)
- Diagnostic images from Manitoba's Radiology Information System (December 2016)

As detailed in **FIGURE 3**, eChart remained a work in progress. While eHealth has integrated the majority of the baseline clinical information into eChart, much of the additional clinical information highlighted in the 2007 vision has yet to be integrated into eChart. For instance, allergy information was included as part of the 2007 vision, but this critical information is not yet available in eChart.

Without an updated eChart future state, it is not clear whether the 2007 vision remains the intended future state.

Sourcing clinical information into eChart requires integration with existing systems. A clearly defined future state would help ensure that the desired systems are identified as early as possible and that ongoing work on these systems, and eChart, is conducted with the eventual integration goal in mind.

Recommendation 2: We recommend that eHealth periodically update their vision of the clinical information that will be included in eChart.

1.2 Initiatives to integrate additional clinical sources into eChart delayed

The need to continuously move toward eChart's desired future state is no doubt a significant determinant in its ability to grow its active users. In theory, the more useful clinical information eChart provides, the more active users it will have and the more likely its intended benefits will be realized. Therefore, in managing the risk that eChart's progress may be stalled, it is imperative that the decision-makers (the Department, the RHAs, and eHealth) be fully apprised of the impact funding decisions have on eChart's progress in achieving its intended benefits.

While Provincial health-care spending has increased, the annual IT capital spending limit, which is capped at $40 million, has remained unchanged since 2008. Of this $40 million, each year $3 million is allocated to small projects and $8 million to infrastructure renewal (i.e. refreshes, upgrades, etc.), leaving $29 million to implement large-scale, complex IT solutions (which would include projects related to eChart).

FIGURE 4 shows that annual eHealth IT capital expenditures (net of Canada Health Infoway and other recoveries) have decreased to $22.66 million in 2015 from its peak in 2011 ($40.64 million) and 2012 ($39.95 million), and have been below the annual limit since 2010.

Figure 4 – Annual eHealth IT capital spend				
Fiscal year	MB capital allocation ($)	Gross capital spend ($)	Canada Health Infoway reimbursement ($)	Net capital spend ($)
2009/10	35,674,000	27,158,900	4,456,600	22,702,300
2010/11	40,000,000	56,555,000	15,917,000	40,638,000
2011/12	40,000,000	45,214,000	5,280,000	39,934,000
2012/13	40,000,000	32,789,100	1,913,000	30,876,100
2013/14	40,000,000	36,900,000	13,000,000	23,900,000
2014/15	40,000,000	33,140,600	10,482,000	22,658,600

Source: eHealth

The annual *Provincial eHealth Strategy* lists and prioritizes initiatives for the next 5 years. This process helps determine which initiatives will be funded within the annual capital limit of $29 million. In addition, many other future initiatives are listed that are not slated to commence within the upcoming 5 year window. eHealth's 2015 strategy lists 79 in-progress and planned IT capital projects ranging in size ($150,000 to $22 million), complexity, and importance. The budgeted cost of these projects total just under $350 million.

RELEASES 3 AND 4 REPEATEDLY DELAYED

eHealth had implemented eChart releases 1 and 2. eHealth's 2015 *Provincial eHealth Strategy* listed 2 additional releases as initiatives that would augment the overall value of eChart by filling in some of the clinical information gaps noted in FIGURE 3. Specifically they would integrate additional clinical information from acute, community and long-term care source systems.

FIGURE 5 summarizes and tracks the decisions regarding the implementation of these 2 releases in each of eHealth's annual provincial program strategies from 2011 to 2015 and highlights that work on these releases has been repeatedly delayed.

Figure 5 – Estimated implementation timelines for Releases 3 and 4		
Strategic plan	Release 3	Release 4
2011 - 2016	Both releases noted as initiatives, but not listed on their 5 year capital plan.	
2012 - 2017	Both releases listed on the 5 year capital plan, but not to start before 2016-17.	
2013 - 2018	Listed as an initiative, with planned start in 2015-16.	Listed as an initiative, with planned start in 2017-18.
2014 - 2019	Listed as an initiative, with planned start in 2016-17.	Listed as an initiative, with no planned start date before 2017-18 (eHealth's 2014 plan did not include the fifth year listing of initiatives).
2015 - 2020	Listed as an initiative, with planned start in 2019-20.	Listed as an initiative, with no planned start date before 2019-20.

Source: Provincial eHealth Strategies – 2011 to 2015

OTHER ECHART RELATED PROJECTS

eHealth was also in the early planning stages for the following 2 eChart related projects - *Primary Care Information Sharing*, and *Increase Uptake of eChart Users*.

We also noted that at the time of our audit, eHealth began work on the **Primary Care Information Sharing** project. The project's purpose was to implement a solution that enables the sharing of relevant information between Home Clinics and primary care episodic providers. While this project is not specific to eChart, Officials noted that the work could result in multiple new clinical information sources for eChart (these new clinical information sources were not identified in the project documentation we were given).

The April 2015 **Increase Uptake of eChart Users** project documentation noted that eChart's clinician benefits could be achieved by increasing its content of clinical information and that patient benefits could be met by increasing its use by clinicians. The project's scope was to add additional sources to eChart (encounter information from additional EPR hospitals, additional radiology reports, provide radiology images through Diagnostic Image Viewer Integration).

INTEGRATION STRATEGY BEING DEVELOPED

eHealth officials advised that eChart's progress is dependent on the readiness of the clinical information within source systems to be integrated. As such, they noted that they were developing an overall interoperability and integration strategy for the eHealth IT environment. They indicated this strategy, along with its supporting architecture, will ultimately help determine how existing systems will integrate and interact with eChart. It is unclear whether the delays noted above were caused primarily by the lack of such a strategy or by the many competing priorities for IT projects.

> **Recommendation 3:** We recommend that as part of the annual budgetary process, eHealth clearly communicate to the IT capital-spending decision-makers the impact that significant delays in implementing eChart related releases and projects will have on the ability to achieve eChart's intended benefits.

Web Version

1.3   Target for usage set, but no strategy in place

Health-care sites are not required to implement and use eChart.

As of January 31, 2016, 404 sites had implemented eChart. As noted in FIGURE 6, the total number of active users (defined as a user logging in at least once in the past month) increased substantially since 2010 to 5,534 (36.05% of 15,351 total eChart user accounts). eHealth has established a target of 9,000 active users by 2020.

Figure 6 – eChart usage
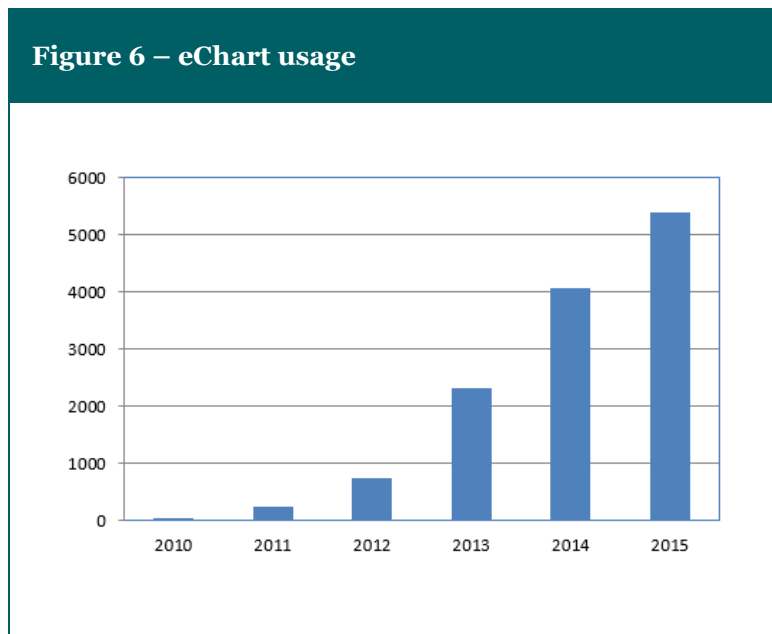
While FIGURE 6 highlights that eChart usage continues to increase, eHealth officials have noted their target of 9,000 users is aggressive and that a concerted strategic effort will be needed to achieve it. They cited the need for a change management strategy that included communications, training, and resistance management plans. At the time of our audit, however, eHealth had not yet developed such a strategy. We also noted that eHealth had not identified all possible health-care sites that could implement eChart nor had it established a site implementation target.

eHealth activities to increase eChart usage have focused primarily on communication tools such as presentations to medical residents and sites, promotional materials submitted to media outlets within the Province, eChart website and newsletters, and RHA and professional association external newsletters.

eHealth also sends user access reports to sites every quarter (SECTION 2.2.5). eHealth follows up with sites where 20% or less of their users are active. eHealth's follow-up guidelines outline various steps to be taken when meeting and discussing usage with the selected sites (i.e. review responsibilities, promote eChart benefits).

Once a site implements eChart, usage may be limited for several reasons:

- A site may not have fully integrated its use into their workflows and practices.
- Services provided by the site, along with the demographics and medical conditions of visiting patients, may not warrant frequent use of clinical information within eChart.
- Users may access the same (often more detailed) information from existing systems. For instance, we found that 1,312 users with access to eChart's medications view and/or clinical view (see FIGURE 8) also have read-only access to the Drug Provincial Information Network (DPIN).
- Also, usage may be impacted by a clinician's lack of familiarity and comfort with eChart. For example, users have the ability to print eChart records. Many clinicians, who are not as comfortable with the technology, may prefer to get assistants and administrative staff to print records instead of directly accessing eChart themselves.

Recommendation 4: We recommend that eHealth develop and implement strategies to achieve eChart usage and site implementation targets.

1.4   Progress in realizing intended benefits not assessed

It is important for eHealth to assess its progress in realizing eChart's intended benefits (listed in FIGURE 1). Understanding this progress would help inform strategic planning decisions dealing with eChart (SECTIONS 1.1, 1.2 and 1.3).

NO BENEFITS EVALUATION COORDINATOR IN PLACE

eHealth's *Provincial eHealth Strategy* documents from 2011 to 2013 stated that "Manitoba eHealth is establishing, over time, a Benefits Evaluation unit to ensure that evaluation of benefits is done consistently and systematically and that results inform future decisions by both clinical/business and eHealth leadership." However, this unit was not yet operational because an evaluation coordinator was not in place.

PROGRESS IN REALIZING INTENDED BENEFITS NOT MONITORED USING KEY PERFORMANCE INDICATORS

eHealth identified a number of key performance indicators (KPIs) to help monitor eChart's usage, privacy and availability but had not identified KPIs for each of the intended benefits.

We wanted to understand if any of the existing eChart KPIs could be useful in monitoring whether eChart was realizing its intended benefits. We mapped each KPI, where possible, to an intended benefit and found that most of the KPIs could be used to monitor (at least in part) 3 of the 7 intended benefits (FIGURE 7). Our mapping only serves to identify some of the KPIs that eHealth could use to monitor the realization of eChart's intended benefits.

NO TARGETS SET FOR KPIs, EXCEPT FOR NUMBER OF ACTIVE USERS

eHealth had not defined targets for its eChart KPIs (except for the active user target of 9,000 users – see SECTION 1.3). Without targets, it is difficult for eHealth to determine if eChart is making the desired progress in meeting its intended benefits. For example, as of January 31, 2016, while KPIs indicated eChart had been implemented at 75% of hospitals, 96% of nursing stations, and 53% of primary care sites, but it is not clear if the ultimate goal for each of these types of sites is 100% implementation or whether there were intermediate goals. In addition, eHealth had not yet determined how many other kinds of sites could eventually implement eChart (for example - health centres, long-term care and rehabilitation sites, and specialty clinics).

ATTEMPTS AT UNDERSTANDING USER SATISFACTION HAVE NOT PRODUCED MEANINGFUL RESULTS

In 2012, eHealth conducted a benefits evaluation[4] using interviews, focus groups and a survey (6% response rate obtained from the survey). In the resulting report, eHealth indicated that the evaluation was conducted too soon after initial implementation, and as a result users had not yet become sufficiently familiar with eChart (understanding its benefits and how it has been, and could be, incorporated into their health-care practice workflows) to provide meaningful feedback.

---

[4] https://www.infoway-inforoute.ca/en/component/edocman/resources/reports/benefits-evaluation/1097-echart-manitoba-release-1-a-benefits-evaluation

In 2014, eHealth surveyed eChart users regarding their usage and satisfaction. The web-based survey (open for 6 weeks) was distributed to all sites that had implemented eChart and had been using it for at least 6 months. Out of 12,498 active and inactive users at the time, only 244 completed the survey – a response rate of 1.95%, limiting the usefulness of the information obtained from the survey.

Figure 7 – eChart Key Performance Indicators (KPIs)	
Intended benefit (Figure 1)	**KPIs in place**
Improves quality, safety and timeliness of care.	None
Increases security and confidence in healthcare providers' access to information.	- Number of Disclosure Directives (and overrides). - Information regarding privacy issues, including total number of issues, categories, site reports, source reported issues, status of issues, and report time from sites. - Personal Health Information service requests (i.e. records of user access information).
Increases access to and management of care in remote communities.	None (eHealth has information on which remote communities have implemented eChart, but this is not specifically tracked as a KPI).
Reduces duplicate and unnecessary tests and rescheduled visits from undelivered results.	None
Increases efficiency in workflow in practice: less time searching for information to allow more time for patient care.	None
Improves access to patient information; and Develops ability to share information across the continuum of care, strengthening networks and creating more efficient and effective collaboration with specialists and other healthcare providers.	- Number of site implementations by site type (i.e. hospital, nursing stations, primary care). - Number of active users. - Average logins per active user. % of active users. - Number of active users (and clinical information views) by location group. - Clinical information views by domain. - Average access views by labour group. - Availability of eChart (# of outage hours) % of annual diagnostic imaging exam reports available in eChart.

Web Version

No other techniques were used to gather information on satisfaction with, and usage of, eChart. We encourage eHealth to target inactive users in future evaluations to better understand their reasons for not frequently using eChart.

Recommendation 5: We recommend that eHealth develop key performance indicators for each eChart intended benefit, and that targets be determined for each indicator. We also recommend that eHealth monitor results achieved against the targets and identify any needed corrective action for performance short falls.

2 eChart access controls should be strengthened

eChart holds a significant amount of personal health information. Protecting eChart's information from unauthorized access is critical and required by The Personal Health Information Act (PHIA).

To determine if the risk of unauthorized access was being properly managed, we first looked to see if eHealth conducted Privacy Impact Assessments and Threat & Risk Assessments, and also if they audited eChart's security safeguards (SECTION 2.1). We then assessed whether eHealth had implemented effective privacy and cybersecurity controls to mitigate the significant risks of unauthorized access to eChart's clinical information (SECTIONS 2.2 and SECTION 2.3 are the controls we identified as significant in mitigating these risks).

2.1 Privacy and risk assessments, and security safeguard audits, completed

A Privacy Impact Assessment identifies and assesses the risks associated with electronic collection, storage, use and disclosure of personal health information. They help management identify the necessary safeguards to ensure authorized individuals only access eChart's clinical information to provide care. Periodic testing of security safeguards helps identify weaknesses and maintain their effectiveness. PHIA requires that a trustee audit its security safeguards at least every 2 years.

RECENT ECHART PRIVACY IMPACT ASSESSMENTS COMPLETED IN A TIMELY MANNER

As per eHealth's Privacy Impact Assessment guide, a Privacy Impact Assessment should be conducted prior to implementing each eChart upgrade, release or newly sourced information.

We found that Release 1 (December 2010) and Release 2 (November 2011) assessments were not signed off until 7 months after Release 2 had been implemented. We found eHealth conducted subsequent assessments prior to the implementation of eChart enhancements in 2013 and 2014, such as the addition of Cadham Provincial Lab information and the eChart tab within the Electronic Patient Record.

THREAT & RISK ASSESSMENT LAST CONDUCTED IN 2012

In 2012, eHealth conducted a Threat & Risk Assessment to identify and assess security risks associated with eChart. We did not assess whether the 2012 assessment was sufficiently comprehensive, but we noted that the assessment identified 5 high-level and 8 medium-level security risks related to eChart, and included a management action plan to mitigate these risks. As at December 2015, no additional Threat & Risk Assessments were conducted given that there were no major releases of eChart after 2012.

ECHART SECURITY SAFEGUARDS AUDITED

eHealth conducted the following audits on eChart's security safeguards:

- Physical security of Manitoba eHealth's Primary Data Centre – September 2013.
- WRHA Internal Audit Privacy Report on eChart – December 2013.
- Manitoba eChart security test and evaluation – May 2014.

As of December 2015, eHealth was completing an audit of the security safeguards protecting their Secondary Data Centre.

2.2   Privacy controls need improvement

We assessed whether eHealth had adequate privacy controls and processes in place to:

- Help ensure eChart user access is limited to "need to know" (**SECTION 2.2.1**).
- Communicate access requirements to eChart users (**SECTION 2.2.2**).
- Ensure site privacy officers understand their roles and responsibilities (**SECTION 2.2.3**).
- Mask eChart clinical information when requested (**SECTION 2.2.4**).
- Ensure eChart user access is removed in a timely manner (**SECTION 2.2.5**).
- Monitor eChart user activity (**SECTION 2.2.6**).
- Manage eChart privacy incidents (**SECTION 2.2.7**).

2.2.1   Majority of users granted access to all clinical information in eChart

PHIA requires that access to personal health information be limited to those who "need to know" for the purpose of providing care. Under the Master Service Agreement's Terms and Conditions, eHealth and the health-care sites agreed to share information through the eChart viewer. Department of Health officials noted that when a health-care provider accesses eChart, it is a disclosure of personal health information from the trustee (WRHA) to another trustee (site).

Sites are responsible for determining and approving their users' access to eChart in accordance with their requirements for providing care. eHealth prepared 2 documents to assist sites in determining which views are appropriate for users; but we found each lacked specificity.

> **PHIA states that a trustee:**
>
> May disclose personal health information without the consent of the individual the information is about if the disclosure is to a person who is or will be providing or has provided health care to the individual, to the extent necessary to provide health care to the individual, unless the individual has instructed the trustee not to make the disclosure.
>
> May disclose information only to the extent the recipient needs to know the information.

- *eChart Handbook for Health-care Providers* - presents a high-level workflow diagram to assist in assigning access. However, it does not provide any guidance as to which views would be most appropriate for specific health-care roles (i.e. nurse, dentist, etc.).

- *Labour Classification and Possible eChart Access Role matrix* - lists 42 different health-care roles (psychiatrist, pharmacist, administrative personnel, etc.) and notes which views each role should have. The matrix indicates that all 42 roles can be provided clinical view allowing them to see all of eChart's information (**FIGURE 8**).

As noted in **FIGURE 8**, information prepared by eHealth shows 87.12% of all eChart user accounts have the ability to view all of the clinical information of any patient through either *Clinical View* (70.47%) or *Clinical View with Override* (16.65%). We are concerned that while many health-care providers may require access to all of the clinical information available in eChart, many sites may be defaulting to providing users with full *Clinical View* regardless of actual need. The lack of specific guidance for each health-care role may have contributed to an overall higher percentage of users with *Clinical View* access.

Figure 8 – eChart user access views		
Type of view	**Description**	**% of Users**
Demographic view	Access to any patient's demographic information (name, address, date of birth, PHIN and gender).	5.24%
Laboratory and Reports View	Access to any patient's laboratory results and diagnostic imaging reports as well as all documents under the clinical documents tab (includes microbiology and diagnostic imaging reports). This view also has access to any patient's demographic information.	6.13%
Medication view	Access to any patient's medication and demographic information.	0.72%
Immunization view	Access to any patient's immunization and demographic information.	0.54%
Clinical view	Access to all of any patient's clinical and demographic information.	70.47%
Clinical View with Override	Access to all of any patient's clinical and demographic information with the ability to override a patient's disclosure directive. This access is granted to individuals who are members of a regulated healthcare profession and who also have the ability to prescribe in a clinical setting (emergent or non-emergent) where the inability to access medical information would substantially compromise assessment, diagnosis and care.	16.65%

Source: eHealth

Web Version

Recommendation 6: We recommend that eHealth update their eChart user access guidance to specifically link health-care roles to appropriate eChart views and establish a process to handle any necessary exceptions identified by the sites.

2.2.2 User access requirements in place but not all confidentiality pledges signed

Policies, controls and practices help reduce the risk associated with unauthorized disclosure of eChart's personal health information. They outline user expectations and guide behaviour, while also helping ensure PHIA requirements are followed.

REQUIREMENTS COMMUNICATED TO SITES AND USERS

All eChart site and user requirements are listed in the *Master Service Agreement*, *Terms of Use Agreement*, and the *eChart Handbook for Health-care Providers*.

Master Service Agreement

Each site signs an *eHealth Master Services Agreement* that defines the services, standards, roles, responsibilities, terms and conditions associated with the delivery and use of eChart. The agreement states that eHealth and the site are to use "best efforts" to adhere to Provincial eHealth standards when using eChart. FIGURE 9 highlights many of these roles and responsibilities.

Web Version

Figure 9 – eHealth and site requirements

eHealth	Site
• Provide access to, and support of, eChart Manitoba, to authorized users.	• Use the eChart Viewer to access information in the eChart CDR for activities as set out in this Service Module and authorized under PHIA.
• Establish guidelines and processes for the identification and assignment of appropriate levels of access for authorized users and communicate this during training and through regular updates.	• Name designated individual(s) to authorize to request access for authorized users in their organization.
• Fulfill access requests received from the site, and assist with confirming appropriate levels of access, as required.	• Comply with user registration processes and guidelines for authorization, and identification of authorized users and appropriate levels of access.
• Provide training material for use by the site regarding appropriate use of the eChart viewer based on the site's setting.	• Notify eHealth when authorized user access should be terminated or changed as soon as reasonably possible.
• Reserve the right to remove or restrict the access of any authorized user found, in the sole opinion of eHealth, to have misused eChart Manitoba.	• Be responsible for any obligations, under PHIA or other relevant legislation, related to the activities of their authorized users.
• Establish logging and auditing processes to monitor user access and provide reports to the site regarding activities of its authorized users in response to possible breaches, when possible misuse is detected, or on request, as part of routine auditing processes.	• Ensure that all authorized users have received orientation to appropriate use of eChart Manitoba, orientation to the site's privacy policies, and has signed a pledge of confidentiality as required.
• Manage eChart Manitoba related incidents and service requests as defined in eHealth's eChart Manitoba Service Description and Service Management Practices.	• Ensure that each authorized user sign/agree to the Terms of use document in either an electronic or hard copy form before getting access to eChart.

Source: eChart Manitoba Service Module

Terms of Use Agreement and eChart Handbook for Health-care Providers

When first logging into eChart, each user must electronically acknowledge they have read and will follow the *Terms of Use Agreement*. Under these terms, individuals accessing and using eChart are required to:

- Restrict their access to the eChart information that is necessary in providing or supporting care.

- Not access or use eChart for any other purpose or with respect to any other individual.

- Keep confidential all of the eChart information seen
- Immediately report any actual, suspected or potential eChart privacy or security breaches.

- Maintain the confidentiality of their user ID and password.
- Be responsible for all activities performed using their user ID (eHealth informs sites and users that they log and potentially monitor eChart activity -**SECTION 2.2.6**).
- Log out of eChart Manitoba as soon as they have completed each session – they are not to leave the computer screen unattended while it is displaying personal health information.

In addition to agreeing to the terms of use, eHealth provides users with the *eChart Handbook for Health-care Providers*. It outlines additional expectations for eChart users, such as user account processes and some password requirements.

PHIA CONFIDENTIALITY PLEDGES NOT SIGNED BY ALL USERS

PHIA outlines several expectations in regards to granting access to personal health information. The *Terms of Use Agreement* requires that sites ensure all authorized eChart users have received training on the appropriate use of eChart and the site's privacy policies. Sites are also required to ensure their users have signed pledges of confidentiality, as required by PHIA (**FIGURE 9**).

For a sample of 10 eHealth staff, we found that all had signed their pledges. However, for a sample of 29 eChart users (across the 16 sampled sites) we found that:

- 21 were properly signed.
- 5 users did not have signed pledges.
- 2 users' pledges were only signed at the time of our audit request.
- 1 user's pledge was found at a different site (not from their assigned site).

We also selected a sample of 6 non-eHealth individuals under contract to support eChart (e.g. source system support staff). We found that while the selected system support individuals were contractually required to sign a pledge, eHealth did not obtain signed pledges from these individuals and did not ensure that took the PHIA training.

Recommendation 7: We recommend that eHealth as part of their periodic audits of user activities at sites, (referenced in section 2.2.6) obtain assurance from each site that eChart users have signed their PHIA confidentiality pledges.

Recommendation 8: We recommend that eHealth ensure their consultant staff attend PHIA training and sign confidentiality pledges.

2.2.3   Not all site privacy officers attended eHealth's training sessions

To help ensure health-care sites maintain the confidentiality of their patients' personal health information, PHIA requires that each site have a designated privacy officer. Site privacy officers are responsible for implementing safeguards, training staff, ensuring staff members sign pledges of confidentiality, conducting user audits, and investigating potential privacy breaches.

Roles and responsibilities are communicated to site privacy officers through eHealth-provided training and an *eChart Handbook* . We also noted that each of the 16 eChart sites in our sample had designated privacy officers, but 6 privacy officers had not yet taken the initial eHealth-provided training. eHealth does not require periodic training for site privacy officers after taking the initial training.

Recommendation 9: We recommend that eHealth ensure site privacy officers are trained upon implementation of eChart or upon being assigned to this role, and periodically thereafter.

2.2.4 Personal health information masked when requested

Trustees can disclose personal health information to other trustees when needed to provide care. However, individuals can place a disclosure directive on their eChart record, masking their personal health information, limiting what other providers can see.

eChart does not have the ability to mask only portions of an individual's clinical record – it must mask all of the clinical information (except for demographic information). At the time of our audit, only 106 Manitobans had Disclosure Directives placed on their eChart health record.

As noted in SECTION 2.2.1 FIGURE 8, only users with *Clinical View with Override* have the ability to override Disclosure Directives. FIGURE 8 shows that approximately 16% of all eChart user accounts can override disclosure directives. If an override is needed, the provider must indicate the reason why, and eHealth staff are alerted each time an override occurs. All overrides are recorded and audited by the eHealth Privacy Analyst who contacts the privacy officer at the site to review the details and confirm the appropriateness of the override.

We tested a sample of 20 individuals who requested Disclosure Directives and found all of their clinical information was properly masked. Two overrides occurred within the selected 20 disclosure directives and we found that eHealth handled them properly.

2.2.5 Removal of terminated users not always timely

It is essential that only authorized users have access to an organization's system and data. As such, users who are no longer employed by the organization or who otherwise should no longer have access, should have their access privilege removed in a timely manner.

SITES DID NOT CONSISTENTLY REQUEST REMOVAL OF USER ACCESS IN A TIMELY MANNER

eHealth relies on sites to notify them of any necessary removals. eHealth's *eChart Handbook for Health-care Providers* states that any user who no longer requires access to eChart Manitoba must be removed as soon as possible. However, eHealth had not defined minimum timing requirements for sites to request removal.

For the 16 eChart sites selected, we obtained a listing of individuals who left each site over a 2-year period (terminations). In comparing the sites' listing of terminations to the eChart user listing, we noted numerous instances in which sites did not ask eHealth to remove the user in a timely manner. Some users continued

to have access to eChart almost 2 years after termination. However, none of these sampled users logged into eChart after their termination.

SITES DID NOT CONSISTENTLY REVIEW QUARTERLY USER ACCOUNT MANAGEMENT REPORTS

eHealth automatically emails a *User Account Management Report* to each site sponsor. It is a 3-month quarterly snapshot of the site's eChart user information (names and roles of all users, active and inactive users, number of logins each user has made in the last quarter). eHealth asks site sponsors to review this report and identify any changes to user views or terminations. However, eHealth does not require sites to report back on their review.

Our testing across the 16 sites found the sites were not consistently reviewing these reports in a timely manner and many could not provide evidence of their review. Timely review of these reports helps ensure terminated users are identified and removed shortly after the change occurs.

Recommendation 10: We recommend that eHealth define and communicate minimum timing requirements for sites to request removal of eChart users.

Recommendation 11: We recommend that eHealth require sites to certify the quarterly *User Account Management Report* as reviewed and communicate any needed changes in user views and authorized users in a timely manner.

Web Version

2.2.6 eHealth's monitoring of user activities had gaps

As noted in FIGURE 8, 87% of eChart users can access anyone's personal health information, highlighting the importance of monitoring user activities. PHIA requires a trustee to:

- Audit records of user activity to detect security breaches, in accordance with guidelines set by the minister.
- Maintain a record of user activity for at least 3 years.
- Ensure that at least one audit of a record of user activity is conducted before the record is destroyed.

The Department has published its *Guidelines for Records of User Activity* on the government's website[5] to help trustees meet their legislative requirements when auditing user activities. The guidelines identify possible triggers (activities) a trustee should look out for when selecting a particular user for audit. Such possible triggers include, but are not limited to – accessing the records of co-workers, VIPs (e.g. government officials, celebrities), their own record, and individuals with the same last name. Other possible triggers include accessing records outside of normal hours or accessing records with highly sensitive information (i.e. HIV, psychiatric disorders).

The Departmental guidelines state the frequency of audits is to be greater for higher risk systems that are large, complex, have a high number of users, contain sensitive information, and share information with multiple trustees. As such, eChart would be considered a higher risk system requiring a higher frequency of random audits.

All user activities conducted within eChart are logged electronically. eHealth officials noted that audits of eChart user activities can be triggered in many ways – patient requested, sites initiated, or eHealth initiated. Below we focus on improvements that could be made to the eHealth-initiated audits of user activity.

EHEALTH AUDITS OF USER ACTIVITY DRIVEN BY SITE IMPLEMENTATION DATES

eHealth's audits of eChart user activities are not primarily driven by users (as directed in the Department's guidelines, see above), but rather by site implementation date. Typically sites are scheduled for audit 2 years after implementation. Once a site is selected, it is scheduled and eHealth audits user activities at the site going back only for a limited amount of time (typically 2 weeks).

---

[5] http://www.gov.mb.ca/health/phia/docs/gfroua.pdf

The site visits may become predictable over time with eHealth's schedule of visits 2 years after implementation date and every 2 years thereafter.

MINIMAL AUTOMATED ACTIVITY TRIGGERS USED

eChart's growth (see **FIGURE 6**) could make it difficult for eHealth to sustain the current manual and highly labour-intensive audit approach. We believe a more efficient and effective process, using automated tools and triggers, is needed.

Automated triggers for alerts are in place for only a small number of eChart activities – multiple accesses to a single patient file, multiple successful user logins, multiple valid/invalid failed user logins, and disclosure directive overrides (**SECTION 2.2.4**). Further, only the alerts triggered by disclosure directive overrides are reviewed in real time. Alerts from all other automated triggers are only reviewed when conducting site audits.

While eHealth has a program in place to audit eChart user activities, it should be supplemented with more robust automated triggers to help identify inappropriate activity sooner. Such triggers could include:

- No action was taken when a record was accessed and the record is of a type which should not be accessed unless action is to be taken.
- The access is outside the user's normal working hours.
- The access does not correspond to the user's role.
- Access to records of individuals related to publicized/media events, VIPs, highly sensitive diagnosis, and HR related events (new hires, employee departures).

Recommendation 12: We recommend that eHealth update their eChart audit methodology to:

    a) Include a site selection process that is random and unpredictable.

    b) Monitor user activities through automated triggers and alerts.

2.2.7 Some improvements to guidelines on handling privacy incidents needed

Privacy breaches are identified in different ways - unauthorized overrides of Disclosure Directives (SECTION 2.2.4), patient requested audits of activities regarding a user, audits of user activity initiated by the sites, or eHealth selected site audits of user activity (SECTION 2.2.6).

PHIA requires that a trustee establish policies and procedures to record and take corrective action on security (privacy) breaches. eHealth follows WRHA's PHIA policy *Reporting and Investigating Privacy Breaches and Complaints*. The WRHA noted this policy is applicable to all sites (including non-WRHA sites) when accessing and using eChart.

GUIDANCE PROVIDED TO SITE PRIVACY OFFICERS ON HANDLING PRIVACY INCIDENTS

It is up to the sites to determine if there was a breach when accessing and using eChart. eHealth's *eChart Handbook for Site Privacy Officers* provides guidance to site privacy officers on conducting privacy investigations and in communicating with eHealth. Site privacy officers are expected to:

- Notify the eHealth Privacy Analyst of a potential eChart privacy breach at the site.
- Report eChart privacy breach investigation results to the eHealth Privacy Analyst.
- Provide additional information to eHealth on remedial action taken.

GUIDANCE FOR REPORTING PRIVACY BREACHES SHOULD BE STRENGTHENED

eHealth's privacy incident handling process requires the eHealth Privacy Analyst to report breaches to eHealth's Chief Privacy & Risk Officer when the:

- Responsible site is not responding to an identified breach event.
- Responsible site is not taking any action to prevent future breach events.
- Breach could have significant impact on an individual or the organization.

eHealth officials stated the WRHA's Chief Privacy Officer would be apprised of all identified eChart incidents and would communicate regularly with eHealth's Chief Privacy & Risk Officer regarding eChart privacy incidents. However, eHealth has also not defined what would constitute a breach with "significant" impact, nor are there clear escalation practices that identify who is responsible for notifying the patient and the public in the event of an eChart privacy breach - the site or the WRHA. Officials from eHealth and WRHA noted that they were currently developing a "When to notify" toolkit. Of note is that PHIA does not indicate what constitutes a significant breach and when patients and the public should be notified.

PRIVACY INCIDENT FOLLOW-UPS IMPROVED

In looking at eHealth's internal tracking of eChart privacy incidents, we found 18 suspected and confirmed breaches, spanning many years, remained under investigation at the time of our audit (3 suspected breaches from 2012, 3 confirmed and 8 suspected breaches from 2013, and 2 confirmed and 2 suspected breaches from 2014).

We selected and tested a sample of 10 identified incidents between June 2012 and 2015. We found eHealth's follow-ups for 4 of the incidents we selected between 2012 and 2014 did not conclude on the appropriateness of each access, nor did they obtain confirmation from the site that they were in fact privacy breaches. These 4 incidents were still pending in October 2015.

eHealth officials indicated that in 2014 they intensified their follow-up processes with the sites. Our testing of 5 sample eChart privacy incidents that occurred between October 2014 and October 2015 found eHealth properly handled and resolved the incidents.

Recommendation 13: We recommend that eHealth, in collaboration with the WRHA Chief Privacy Officer, update their eChart privacy incident handling process to clarify responsibility for patient and public notifications.

2.3   Some weaknesses in eChart's cybersecurity controls

Cybersecurity controls help protect the confidentiality, integrity and availability of information and include both preventative and detective controls (i.e. physical controls, firewalls, Intrusion Detection Systems, event monitoring).

We assessed whether eHealth protects eChart's personal health information with:

- Physical security controls.
- Network security controls.
- Secure data at rest and data in motion (encryption).
- Security patching.
- Configuration and update management.
- Logical access controls (administrator access, password controls).

While eHealth had many cybersecurity controls in place, we found several weaknesses. Of concern is that a 2012 eChart Threat Risk Assessment and a 2014 security review conducted by eHealth (SECTION 2.1) identified many of these gaps. Given the risk associated with cybersecurity, weaknesses should be corrected promptly. Due to the sensitive nature of the security findings, our detailed findings and recommendations were presented to management in an internal letter.

> **Recommendation 14:** We recommend that eHealth promptly implement the cybersecurity control recommendations presented in our letter to management.

3   Good processes in place to ensure eChart's availability

An organization's IT infrastructure, systems and data could become unavailable through natural disasters, system crashes, security breaches, or outages. eHealth's mission is to provide the right information to the right people at the right time. Health-care providers fully expect health information to be available when needed. Not having critical clinical systems and data available could impact the quality of care provided. As usage and reliance on eChart continue to increase, it is important for eHealth to not only protect eChart's infrastructure, supporting systems and data, but also ensure effective recovery processes are in place.

We assessed whether eHealth had:

- Environmental controls to protect eChart's infrastructure (SECTION 3.1).
- Backup and recovery processes to ensure eChart information and systems are available when needed (SECTION 3.2).

3.1 Environmental controls in place to protect infrastructure

eChart's data systems reside in eHealth's Primary Data Centre and are backed up daily to its Secondary Data Centre. Both centres had sufficient environmental controls in place (i.e. air conditioners, fire suppression systems, smoke and heat detectors).

3.2 Backup processes in place, but no disaster recovery plan

It is important to back up systems and information and to also ensure the backed-up information is complete, accurate and recoverable.

BACKUP AND RECOVERY PROCESSES IN PLACE

We found eHealth has good practices in place for eChart backup and restoration. eHealth refreshes the eChart data to its Secondary Data Centre on a daily basis. They refresh and synchronize the eChart system at least twice per year. eHealth's procedures also require a check on the integrity of the data. We found no issues in our testing of the backup process. We also found no issues in our review of one semi-annual eChart refresh and integrity check.

DISASTER RECOVERY PLAN NOT COMPLETE

WRHA's IT Security Policy requires that eHealth develop, test and maintain a disaster recovery plan. A sound disaster recovery plan helps restore systems, supporting infrastructure and data while reducing recovery time and costs during and following a disruptive event.

eHealth recently developed an *ICT Disaster Operation Centre Overview* document. The document defines:

- Defines roles, responsibilities and a detailed contact information listing.
- Lists critical systems and their recovery time objectives (eChart is noted as a critical system with a recovery time objective of 24 hours).
- Lists critical application/system interdependencies.
- Includes an incident management guide outlining the process for handling and resolving incidents.

While the overview document has many key components of a disaster recovery plan as noted above, it does not provide specific procedures for recovering eHealth's data, systems and supporting infrastructure (including its stated critical systems).

Recommendation 15: We recommend that eHealth develop, communicate, implement and test a disaster recovery plan for their data, systems and infrastructure, which would include eChart.

Web Version

Additional information about the audit

This independent assurance report was prepared by the Office of the Auditor General of Manitoba on eHealth's management of the significant risks that might prevent them from achieving eChart's operational objectives.

Our responsibility was to provide objective information, advice and assurance to assist the Legislature in its scrutiny of the government's management of resources and programs, and to conclude on our audit objectives.

All work in this audit was performed in accordance with the standards for assurance engagements established by the Chartered Professional Accountants of Canada in place as of June 30, 2017.

The Office applies Canadian Standard on Quality Control 1 and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards, and applicable legal and regulatory requirements.

In conducting the audit work, we have complied with the independence and other ethical requirements of the Rules of Professional Conduct of Chartered Professional Accountants of Manitoba and the Ethical Requirements – Code of Professional Conduct and Independence of the Office of the Auditor General of Manitoba. Both the Rules of Professional Conduct and the Code are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality, and professional behavior.

In accordance with our regular audit process, we obtained the following from management:

1) Confirmation of management's responsibility for the subject under audit
2) Acknowledgement of the suitability of the criteria used in the audit
3) Confirmation that all known information that has been requested, or that could affect the findings or audit conclusion, has been provided; and
4) Confirmation that the findings in this report are factually based.

Summary of recommendations

Section 1: Realizing intended benefits

1) We recommend that eHealth identify, assess and mitigate (if needed) the risks associated with not realizing eChart's intended benefits.

2) We recommend that eHealth periodically update their vision of the clinical information that will be included in eChart.

3) We recommend that as part of the annual budgetary process, eHealth clearly communicate to the IT capital-spending decision-makers the impact that significant delays in implementing eChart related releases and projects will have on the ability to achieve eChart's intended benefits.

4) We recommend that eHealth develop and implement strategies to achieve eChart usage and site implementation targets.

5) We recommend that eHealth develop key performance indicators for each eChart intended benefit, and that targets be determined for each indicator. We also recommend that eHealth monitor results achieved against the targets and identify any needed corrective action for performance short falls.

Section 2: Access controls

6) We recommend that eHealth update their eChart user access guidance to specifically link health-care roles to appropriate eChart views and establish a process to handle any necessary exceptions identified by the sites.

7) We recommend that eHealth; as part of their periodic audits of user activities at sites, (referenced in section 2.2.6) obtain assurance from each site that eChart users have signed their PHIA confidentiality pledges.

8) We recommend that eHealth ensure their consultant staff attend PHIA training and sign confidentiality pledges.

9) We recommend that eHealth ensure site privacy officers are trained upon implementation of eChart or upon being assigned to this role, and periodically thereafter.

10) We recommend that eHealth define and communicate minimum timing requirements for sites to request removal of eChart users.

11) We recommend that eHealth require sites to certify the quarterly *User Account Management Report* as reviewed and communicate any needed changes in user views and authorized users in a timely manner.

12) We recommend that eHealth update their eChart audit methodology to:

   a) Include a site selection process that is random and unpredictable.
   b) Monitor user activities through automated triggers and alerts.

13) We recommend that eHealth, in collaboration with the WRHA Chief Privacy Officer, update their eChart privacy incident handling process to clarify responsibility for patient and public notifications.

14) We recommend that eHealth promptly implement the cybersecurity control recommendations presented in our letter to management.

Section 3: Availability of eChart

15) We recommend that eHealth develop, communicate, implement and test a disaster recovery plan for their data, systems and infrastructure, which would include eChart.

Web Version

Acronyms and definitions

Acronyms

ADT – *Admission, Discharge and Transfer*
CCMB *– CancerCare Manitoba*
COC *– Coordination of Care*
DPIN *– Drug Provincial Information Network*
DSM *– Diagnostic Services Manitoba*
EHR *– Electronic Health Record*
EMR *– Electronic Medical Record*
EPR *– Electronic Patient Record*
ICT *– Information, Communication & Technology*
KPI *– Key Performance Indicator*
MIMS *– Manitoba Immunization Monitoring System*
PHIA *– Personal Health Information Act*
PHIN *– Personal Health Identification Number*
PIA *– Privacy Impact Assessment*
PDC *– Primary Data Centre*
PLIS *– Provincial Lab Information System*
POS *– Point Of Service*
WRHA *– Winnipeg Regional Health Authority*
RIS *– Radiology Information System*
RHA *– Regional Health Authority*
SDC *– Secondary Data Centre*
VIP *– Very Important Person*

Definitions

Primary Care – First-contact care addressing wellness and prevention as well as general ongoing care of conditions. Examples of service units: family physician offices, primary care centres operated by Health Authorities; primary health care clinics operated by community health agencies. (eHealth Provincial Strategy)

Acute Care – Care (normally episodic) provided in hospitals (on an in-patient or outpatient basis) as well as specialist physician services (e.g. surgery) and supporting services (e.g. diagnostics). (eHealth Provincial Strategy)

Community and Long-Term Care – Care (often continuing) provided in the community – e.g. in the person's home, personal care home, supportive housing etc. Examples of service units: home care, community mental health and addictions treatment, public health programs. (eHealth Provincial Strategy)

Coordination of Care – "Care coordination is the deliberate organization of patient care activities between 2 or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services." (AHRQ) It requires the sharing of patient health information, which will be enabled by Electronic Health Record (EHR) services, but is not limited to sharing information on the patient's history. (eHealth Provincial Strategy)

Continuum of Care – Continuum of Care is a concept involving a system that guides and tracks patients over time through a comprehensive array of health services spanning all levels and intensity of care. The Continuum of Care covers the delivery of health care over a period of time, and may refer to care provided from birth to end of life. (http://www.himss.org/definition-continuum-care)

Diagnostic Imaging – Refers to a variety of non-invasive methods for identifying and monitoring diseases or injuries via the generation of images representing internal anatomic structures and organs of the patient's body (MRIs, ultrasounds). (http://www.imaginis.com/faq/what-is-medical-diagnostic-imaging-and-radiology)

Episodic Care – Episode of care means the managed care provided by a health care facility or provider for a specific medical problem or condition or specific illness during a set time period. Episode of care can be given either for a short period or on a continuous basis or it may consist of a series of intervals marked by 1 or more brief separations from care. (http://definitions.uslegal.com/e/episode-of-care-health-care)

Home Clinic - Primary care clinic which uniquely provides comprehensive, continuous care for an enrolled client, and coordinates care received from other providers.

Disclosure Directives – hides an individual's personal health information in eChart from being viewed by healthcare providers – except for the name, personal health identification number, date of birth and address. (http://www.manitoba-ehealth.ca/ehr/mbDisclosure.html)

Record of user activity – PHIA defines a record of user activity as "a record about access to personal health information maintained on an electronic information system, which identifies the following:

(a) individuals whose personal health information has been accessed,

(b) persons who accessed personal health information,

(c) when personal health information was accessed,

(d) the electronic information system or component of the system in which personal health information was accessed,

(e) whether personal health information that has been accessed is subsequently disclosed under section 22 of the Act;"

Tertiary care *– is specialized consultative health care, usually for inpatients and on referral from a primary or secondary health professional, in a facility that has personnel and facilities for advanced medical investigation and treatment, such as a tertiary referral hospital. Facilities that provide medical care that requires highly specialized skills, technology, and support services. In Manitoba, the only tertiary hospitals are Health Sciences Centre and St. Boniface General Hospital.*

Quaternary care *- The term quaternary care is sometimes used as an extension of tertiary care in reference to advanced levels of medicine which are highly specialized and not widely accessed. Experimental medicine and some types of uncommon diagnostic or surgical procedures are considered quaternary care. These services are usually only offered in a limited number of regional or national health care centers.*

Threat Risk Assessment – *A Threat and Risk Assessment analyzes a software system for vulnerabilities, examines potential threats associated with those vulnerabilities, and evaluates the resulting security risks.*

Web Version