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eChart MANITOBA

eSafety in Interoperable Electronic Systems: Experiences from eChart Manitoba

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Purpose / Objective

- To explore **interoperability** and **eSafety** from the perspective of eChart Manitoba

Outline:

- What is eChart Manitoba
- Interoperable systems in Manitoba
- Overlays
- Case Examples
  - Lessons Learned
- Data Integrity Management Best Practices

Manitoba's Electronic Health Record

- EChart is Manitoba's **electronic health record** system, launched in 2010.
- EChart connects authorized health-care providers with a patient's **key health information** in a timely manner; information is current, secure and confidential.
- EChart is not intended to be used as the primary system to receive ordered information; it is an **adjunct to the information already available** to a provider at the site.
- EChart is a **web-based tool** and provides a **longitudinal** history across a variety of locations **from various source systems over time**.
- Goal is improving efficiency, access, safety and the quality of care.

- Data in eChart is from source systems across Manitoba including:
  - **Demographics** from health care facilities
  - **Lab results** from public and private labs
  - **Medication history** from retail pharmacies
  - **Immunization records** from the Manitoba Immunization Monitoring System
  - **Diagnostic imaging reports** from the Provincial Radiology Information System
  - **Encounter / visit information** from the EPR system (Hospital system)

Manitoba's Client Registry (CR)

- The Manitoba **Provincial Client Registry** (CR) provides a single, province-wide view of **demographic** and **identifying information** for clients receiving health care in Manitoba.
- 74 health care organizations across Manitoba are integrated with CR
  - Through their Admission Discharge Transfer systems
- CR is the demographic foundation for eChart Manitoba, linking identities across health care organizations.

The Concept of **Interoperable** electronic health systems

- In interoperable systems, the **data in one local electronic source is transmitted to one or more other electronic systems**, which in turn can transmit to one or more other electronic systems **without knowing the internal processes, functions, and data representations or display of the other systems** (Infoway Glossary)
- What's relevant in one system may not be or seem *directly* relevant in another

What's the impact?

- In an interoperable system, data flows downstream to interfaced systems
  - **Downstream systems receiving data are impacted by upstream activity**
- The following factors contribute to the extent data has impact
  - The volume of data
  - The number and size of downstream systems
  - The number of users of those systems
  - The type of data being transmitted
- The impact is exponentially larger in a multi-system interoperable network than it is in a local system
  - This is the intended benefit of interoperable systems
- These benefits can be transformed into a liability when the information is incorrect; **error proliferation poses a risk to patient safety**

The Concept of eSafety

- ESafety, a new concept emerging in the literature, is about preventing and minimizing risks to patient safety.
  - Identifies the importance of **understanding the way information travels in interoperable systems**
  - Recognizes the **critical nature of managing data integrity issues quickly** before incorrect patient data can propagate through systems
- In Manitoba, the **clinical implications** of data integrity events guide decision-making, expanding data integrity dialogue from technical to include clinical aspects and impacts to patient safety as well
- In Canada, as COACH says, our role is to "protect patients against risk and harm due to unintended safety risks introduced through the development, implementation and use of 'e' systems (EHR, EPRs, EMRs)".
  - COACH, Don Newsham and Grant Gillis, 2013, "Innovation – eSafety" (retrieved from http://coachorg.com/en/resourcecentre/resources/Presentations/COACH_eSafety_Partnership_Presentation_Final.pdf)

eChart and Client Registry

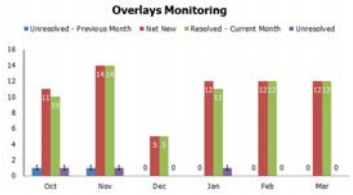
- Demographic and clinical data in eChart **relies on Manitoba's Provincial Client Registry** (CR) for:
  - Patient search functionality and demographic data
  - Demographic linkage algorithms and thresholds
  - Integrity of patient information
- EChart works closely with CR's Registry Integrity Unit to **prevent, identify, manage and remediate data integrity issues.**

- Two types of data integrity errors include **Overlays** and Incorrect Record Merges

Significance of Overlays and Incorrect Record Merges

- Overlays and Incorrect Merges are data integrity errors that impact Personal Health Information, and **create a risk for adverse patient impact which can be propagated and amplified** in interoperable systems
- Overlays and Incorrect Merges can be caused by
  - Manual errors which occur when individuals are entering data into registration systems
  - Local system changes, such as:
    - Poorly planned interface implementations
    - Version upgrades and 'hotfixes'
      - (e.g. Changes in analyzers in a lab can cause changes to reference ranges)
    - Unplanned system outages
- Overlays and Incorrect Record Merges can result in demographic and clinical information:
  - **Appearing in the wrong patient record (wrong information)**
  - **Disappearing from the correct patient record (missing information)**

Incidence of Overlay Occurrence



- Most Overlays only affect demographic information
  - In Manitoba, approximately 10% (e.g. ~1-2 /11) affect both demographic and clinical data.
- Overlays only affect a small fraction of the total number of monthly messages flowing into eChart
  - In Manitoba, there are an average of over 200,000 lab messages every month, and the Overlays we have seen usually only implicate about 5-50 messages
- Risks are further reduced as we improve our management of unresolved cases, and improve our remediation response times
- **Still, the potential clinical impact of one incorrect message to patient safety is vast!**

Overlay Case Study A

Slow Response Time Increased Risk to Patient Safety in a Diagnostic Imaging Case

- A grandfather's DI report was posted incorrectly on his grandson's record when his record was "overlaid" after a CT scan was ordered for him at one facility and the test was completed at another facility within same health region
- Overlay was **identified** by staff at the site the same day
- **Demographic info was corrected within one day** in both CR and local ADT at the site
- Queries were by eChart performed to see **how much Clinical data was linked to the implicated records**
- **Delays in remediation occurred** when the Health Information Management department involved did not understand the demographic and clinical impact of the situation (as they thought they had resolved the issue already – they had fixed it in their paper chart, so it was difficult to understand the larger impact). The Provincial Radiology Information System team intervened after 48 hours to ensure comprehensive remediation.
- **Total Time to Resolution: 8 days**

Lessons Learned: Case Study A

- Slow response times **increase the amount of time that incorrect data is available to clinical end users**
- Incorrect patient data, which could be obvious or –worse– inconspicuous, is visible to end users in all systems downstream
- **Communication between all implicated systems is critical, especially downstream clinical systems**
  - Demographic remediation may occur but communication to potentially impacted clinical systems is also critical so that corrections can be made quickly
- Correcting the issue involves many steps, such as destroying addressograph plates, pre-stamped requisitions and labels, and cancelled appointments

Slow Remediation Response Time
=
Increased Patient Risk

Overlay Case Study B

- **Extended ADT Outage procedures resulted in Overlays that implicated Lab and other clinical results**
- Fifty overlays resulted when a major hospital's ADT registration system went down unexpectedly for over 24 hours
- Once the outage was resolved:
  - A block of MRNs were inadvertently re-used and assigned to new patients
  - The clinical data queuing up – mainly lab results – were then associated with the wrong patient in eChart
- The issue was made more complicated by the fact that the original owner of the MRN was assigned a new MRN, leaving the new patient with the original MRN

Lessons Learned: Case Study B

- Downtime procedures need to be developed with an awareness of downstream system impacts
  - Planning ahead for multi-system impacts of outages is essential
- Best practice is to return MRN to original patient
- **Cross-team, cross-region communication and collaboration** with all possible implicated systems is required

Data Integrity Management Best Practices

Prevention	Identification	Evaluation	Remediation	Resolution
• System prompts • Data Validation Processes • Training • Testing • Vigilance	• Exception reports • Audits • User awareness and reporting	• Tracking • Checklist • KPIs/Score card • Workflow	• Site • CR • Clinical • Downstream systems	• Communication • Closure

Communication and Collaboration

Warning Message Added to EPR

Are you sure that the year of birth on this patient should be changed?

- If you are certain, select ***Acknowledge*** and enter reason in the required field
- If a correction is required, press ***Go Back***

- The benefits of interoperability are high
- **Mitigating the risks to patient safety are essential** in managing data integrity
- **Understanding and integrating the interoperable clinical impacts into e-practice is vital**
- Let's practice eSafety collectively!

Thank you

Questions?

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