



Insights and Lessons Learned From the
PHC VRS Prototype



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Table of Contents

Executive Summaryiii

EMR Data Collection at CIHI: CIHI's Prototype PHC VRS 1

PHC EMR Content Standard 1

Critical Insights..... 2

Road Ahead 4

Reference 7

Executive Summary

For most Canadians, primary health care (PHC) is the first point of contact with the health care system. Understanding and improving PHC is thought to be essential to a sustainable health care system in Canada. CIHI's Primary Health Care Voluntary Reporting System (PHC VRS) prototype was initiated as a proof of concept to assess the potential viability of extracting and analyzing data from electronic medical record (EMR) systems in their current state in conjunction with the development of a pan-Canadian EMR Content Standard (CS). The prototype consisted of data extraction, processing and analysis, as well as supporting quality feedback reporting in participating PHC practices.

This document provides insights and lessons learned from the PHC VRS, two EMR demonstration projects in Ontario and British Columbia, and environmental scans of jurisdictions' readiness to implement a pan-Canadian PHC EMR CS. Insights include the following:

1. PHC EMR data is challenging in its current state—it is non-standard, unstructured and collected mostly as free-text fields at the point of care.
2. The process of extracting, manipulating and analyzing non-standardized EMR data is not sustainable or affordable—the predominance of free text means that cleaning and using the data is resource-intensive and introduces data quality risks. Steps must be taken to ensure that streamlined, structured data extraction and processing is possible, and that risks related to data quality issues are minimized.
3. Implementing a pan-Canadian EMR CS into a provincial EMR specification does not, on its own, translate into the collection of meaningful, structured EMR data at the point of care in EMR systems. Other key components of success include jurisdictional leadership, clear data governance, collaborative partnerships, change management, capacity-building and engagement.
4. A priority subset of the PHC EMR CS data elements and corresponding constrained, clinician-friendly pick-lists for specific data elements (such as health condition) would help focus efforts on enabling data collection at the point of care and meaningful use of EMR data.
5. Even with an identified, focused priority subset, data collection and analysis will require a consistent, enabling policy framework and jurisdictional leverage to facilitate structured EMR data collection at the point of care.

In light of these insights, regular, systematic data collection and analysis from PHC EMR systems is neither viable nor sustainable at this time. CIHI will continue to develop and support PHC content standards and will work with jurisdictions to solidify a priority subset of PHC EMR CS data elements and constrained, clinician-friendly pick-lists. CIHI will also continue to monitor the PHC information environment and assess the potential for future EMR data collection and analysis.

The PHC VRS has been a valuable and informative tool for CIHI and PHC in Canada. Through real data extraction and clinician feedback reporting, CIHI has learned valuable lessons that will shape CIHI's approach and strategic direction and inform the evolution of the EMR landscape across Canada.

EMR Data Collection at CIHI: CIHI's Prototype PHC VRS

For most Canadians, PHC is the first point of contact with the health care system. Fortunately, most Canadians (91%) have access to primary care and have a regular place to go for their PHC needs.¹ In contrast, access to PHC data is less ubiquitous and has been a challenge for health system planners.

The EMR is a potential and promising source of PHC data. EMRs are being adopted in PHC practices across Canada at a rapid rate. According to The Commonwealth Fund, since 2006, the number of physicians with an EMR in their offices has nearly doubled. EMRs offer a potential new source of PHC data that could answer critical questions about health care quality in PHC settings and inform policy development, program planning and evaluation at regional, provincial and jurisdictional levels. EMR implementations to date rarely include these aspects within their scope.

The prototype PHC VRS was started in 2009 as a proof of concept to determine the feasibility of collecting and using EMR data as a PHC data source. De-identified EMR data was extracted from 12 different EMR applications in PHC practices across Ontario, B.C. and Nova Scotia and included nearly 450 family physicians and more than 50 nurse practitioners. The project consisted of data extraction, processing and analysis, as well as supporting quality improvement initiatives in participating PHC practices. The insights that follow were gleaned throughout the PHC VRS prototype project, as well as through EMR demonstration projects in Ontario and B.C. and environmental scans of jurisdictions' readiness to adopt an EMR data standard.

PHC EMR Content Standard

Across Canada, EMRs are being implemented to support improvements in PHC, including improved access, quality, outcomes and chronic disease prevention and management. To ensure that jurisdictional EMR implementations yield the desired results and can support comparable pan-Canadian analysis and reporting, the inclusion of EMR data standards is essential. Data that is collected in a standardized manner at the point of care not only is comparable but can be analyzed to determine trends, evaluate the impact of health initiatives and support health system planning. To this end, working with jurisdictions and Canada Health Infoway, CIHI led the development and release of the PHC EMR CS in early 2011.

The PHC EMR CS is a specification of key concepts that describe a subset of important data elements in EMRs. For PHC, this means that important data content, such as data on health conditions, risk factors and procedures, can be collected in the PHC clinician's EMR in a standardized way so that essential data is available to support clinical care and health system management. Our goal is to provide the PHC EMR CS so that jurisdictions can implement it in PHC EMRs across the country. This EMR CS initiative directly supports patient care improvements by both developing more effective EMRs and potentially enabling the appropriate health system use of EMR data. The standard was developed through a broad consultation process that engaged clinicians, standards experts, researchers and vendors to obtain their valuable expertise and insight on the PHC EMR CS and its implementation.

The PHC VRS served as a testing ground for the PHC EMR CS, in that it indicated which data elements were currently and commonly collected in EMRs and which were most complete. It also informed the need for constrained, clinician-friendly pick-lists associated with specific data elements in EMRs for more efficient data collection (for example, health conditions or reason for visit).

Critical Insights

In examining the feasibility and sustainability of extracting, processing and analyzing EMR data, several critical insights emerged. These are discussed below.

1. PHC EMR data is challenging in its current state—it is non-standard, unstructured and collected mostly as free-text fields at the point of care.

Several EMR software choices are available across Canada, and each has a unique interface, different options for data entry location and ample opportunities for free text. While this may support clinical practice at the individual patient level (as did paper charts), inconsistent and non-standard data entry practices, unstructured data entry fields and unlimited text fields limit the utility of data upon extraction, particularly for the purposes of analysis and comparative reporting. One important step to more standard, structured data is adopting and implementing the PHC EMR CS into EMR systems, including corresponding constrained, clinician-friendly pick-lists (see above). Systems designed in a way that affords seamless data entry practices, with limited freedom for free text and well-structured data fields, would enable consistent data extraction across systems.

2. The process of extracting, manipulating and analyzing non-standardized EMR data is not sustainable or affordable—the predominance of free text means that cleaning and using the data is resource-intensive and introduces data quality risks. Steps must be taken to ensure that streamlined, structured data extraction and processing is possible, and that risks related to data quality issues are minimized.

Given the current state of EMR data quality, cleaning and manipulating EMR data into a usable form is extremely resource-intensive. A disproportionate amount of time was spent processing the EMR data into a usable state in which it could be analyzed and used to populate clinician feedback reports for PHC VRS participants. In addition, data quality risks exist when dealing with free-text entries, because analysts are required to make judgments about how to code particular data fields. This model is not feasible to scale in a jurisdiction or across Canada.

3. Implementing a pan-Canadian EMR CS into a provincial EMR specification does not, on its own, translate into the collection of meaningful, structured EMR data at the point of care in EMR systems. Other key components of success include jurisdictional leadership, clear data governance, collaborative partnerships, change management, capacity-building and engagement.

While implementing a PHC EMR CS into EMR specifications is a critical step in achieving standardized, structured data entry at the point of care, it does not in itself guarantee standard data capture. Several barriers have been identified that must be overcome:

- All aspects of governance, including roles and responsibilities, should be clearly defined and accepted by all participants. There is often a lack of clarity around what data is to be collected by whom, and who the data can be shared with and for what purposes.
- There is a lack of policy to enable standard EMR data collection at the point of care. Jurisdictions need to determine their approach to this challenge, as it requires significant change by health care providers.
- Collaborative partnerships between various organizations are needed to ensure that all organizations align their EMR implementation and optimization objectives, reduce duplication of efforts and prioritize activities based on jurisdictional needs.
- Multiple levers and multiple partners must work together to lead to meaningful change in EMR data collection at the point of care and to monitor data quality.
- Clinicians may not fully understand the value of standardized data capture or how to use that data to further optimize EMR use and inform clinical program management or quality initiatives. Capacity-building with clinicians through education and engagement is critical.
- There are several challenges around implementing new EMR data capture practices, including the management of historical data, system upgrades, workflow and education. Coordinated change management with ongoing engagement is needed for clinicians, vendors and jurisdictions involved in EMR initiatives.

4. A priority subset of the PHC EMR CS data elements and corresponding constrained, clinician-friendly pick-lists for specific data elements (such as health condition) would help focus efforts on enabling standardized, coded data collection at the point of care and meaningful use of EMR data.

One identified barrier to implementing standards is readiness at the jurisdictional, clinician and vendor levels. Environmental scans revealed that jurisdictions were supportive of the PHC EMR CS in theory, but actually implementing 106 data elements was not realistic. Jurisdictions are at different phases of EMR maturity; some are still focusing on EMR adoption, others on meaningful use of data. Many are still identifying priority areas and managing multiple stakeholder needs, resulting in different stages of readiness to implement more standardized EMR data capture. It is critical to ensure that EMR initiatives align with jurisdictional priorities. A priority subset (starter set) of PHC EMR CS data elements that includes constrained, clinician-friendly pick-lists is under development for release in 2014. Implementing the pick-lists in addition to the data elements will limit the need for free-text entries and ensure that the data collected is structured and comparable across providers and jurisdictions.

5. Even with an identified, focused priority subset, data collection and analysis will require a consistent, enabling policy framework and jurisdictional leverage to facilitate structured EMR data collection at the point of care.

Jurisdictions are increasingly focused on performance measurement, quality improvement and EMR optimization to support clinical and health system use. There is a clear need to access PHC data through EMRs to inform policy and to provide support to clinicians as they implement quality improvement strategies. In order to effectively implement more standardized EMR data collection and use, jurisdictions may wish to act as enablers, leading and influencing clinicians and vendors to understand the value of standard, structured data capture at the point of care. Policy and regulatory frameworks and levers need to support the use of structured EMR data and enable data collection and use with regular feedback to PHC clinicians to support quality improvement.

Road Ahead

A Standards-Based Approach to PHC Information

The next step in the path to developing a new data source through EMRs is to ensure that the data is captured in a standard, structured way. Until rigorous data capture practices are enabled in EMR systems, CIHI will shift its focus away from EMR data collection to PHC EMR CS adoption and implementation across jurisdictions.

There are three critical pieces to successful uptake and adoption of the priority subset:

1. A small starter set of data elements must be built into EMR systems, which will provide an achievable goal.
 - CIHI is validating a priority subset of PHC EMR CS data elements that meet the priority health information needs of participating jurisdictions and allow quality indicators to be calculated.

2. Associated pick-lists must be constrained, clinician-friendly and implementable.
 - CIHI is investigating options for implementable pick-lists and will present a process and plan to jurisdictions.
3. A phased approach to implementing EMR data standards by ensuring the feasibility of collecting standardized, structured data for a priority subset of data elements will ensure the highest value up front and success in the longer run.

What Else Is CIHI Doing in PHC?

In addition to these activities, CIHI will continue to monitor and assess the PHC information environment. The following criteria could trigger consideration of PHC EMR data collection:

- The existence of an external partner willing to invest financially and exert leverage on changes in standardized EMR data capture at the point of care to ensure data quality;
- Implementation of the PHC EMR CS priority subset (**including constrained, clinician-friendly pick-lists**) with significant penetration and change in how PHC providers store information within their EMR systems;
- Availability of a data aggregator within a jurisdiction with influence over a significant number of PHC sites and willingness to enforce data quality; and
- Clarity and definition in the PHC information requirements across one or more jurisdictions to enable clear business requirements to help drive the potential development of a PHC information system either at CIHI or with another health system stakeholder.

Work is currently under way to identify and validate a priority subset (starter set) of the PHC EMR CS that will support jurisdictional priorities and the population of quality indicators. CIHI will continue to be a leader in PHC information through work in a number of areas, including indicator and survey tool maintenance and analysis and reporting. CIHI is working with various jurisdictions, such as Alberta and Saskatchewan, to include physician billing data in upcoming analytical reports.

The PHC VRS has been a valuable and informative tool for CIHI and PHC in Canada. Through real data extraction and clinician feedback reporting, CIHI has learned valuable lessons that will shape its approach and strategic direction and inform the evolution of the EMR landscape across Canada.

Reference

1. Canadian Survey of Experiences with Primary Health Care. Statistics Canada. 2008. <http://cansim2.statcan.gc.ca/cgi-win/cnsmcjs.exe?LANG=e&ResultTemplate=OLC&CORCMD=GETEXT&CORTYP=1&CORRELTYP=2&CORID=5138>. Last Updated November 11, 2011. Accessed 2009.

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