



Diagnosing Gaps: Investigating the potential of the EHR as a future CIHI data source

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An electronic health record (EHR) can increase efficiency and effectiveness across all levels of health care. While intended primarily for point-of-care (clinical) decision-making to improve patient care and outcomes, EHR content, in particular, the interoperable electronic health record (iEHR) also has the potential to allow analysts and researchers to inform health care system decision-making. It presents an opportunity to enhance population health through the use of non-identifiable patient health data, monitoring outcomes and determining best practices.

To assess whether current jurisdictional iEHRs have the potential to be among many data sources for use by the Canadian Institute for Health Information (CIHI), in October 2007, CIHI and Canada Health Infoway (Infoway) conducted an analysis to determine the differences between the content of current iEHR and registry messaging specifications and two of CIHI's data holdings—the Discharge Abstract Database (DAD) and the National Ambulatory Care Reporting System (NACRS). This formed the basis for the DAD and NACRS Gap Analysis with pan-Canadian EHR Standards report. It should be noted that the DAD and NACRS data holdings are used to populate CIHI products, including grouping methodologies, indicators, health and hospital reports, which in turn inform federal and jurisdictional decision-making and funding.

By analyzing and comparing these data holdings to the pan-Canadian content of both the iEHR and registries messaging specifications, the goal was to identify where there is complete, partial or no alignment between them. (Note: the standards were used only as a surrogate for what might be the data content in the iEHR and registries.) To do this, CIHI developed a framework for the gap analysis documentation in Excel and populated it with mandatory DAD and NACRS (2007) data elements incorporating the element name, definition and representation. CIHI reviewed each data element to determine if a similar element or attribute

existed in the stable for use pan-Canadian iEHR, provider and client registries messaging specifications. Once the analysis was complete, a coloured rating scale to categorize the results was developed.

The findings were validated by Infoway, and ultimately formed the basis of the DAD and NACRS Gap Analysis report, which revealed that among DAD data elements, 22% of the mandatory data elements aligned, while 78% only aligned partially or not at all. For the DAD grouping methodology, 43% of data elements aligned, while 57% aligned partially or not at all.

Red–Yellow–Green Rating System

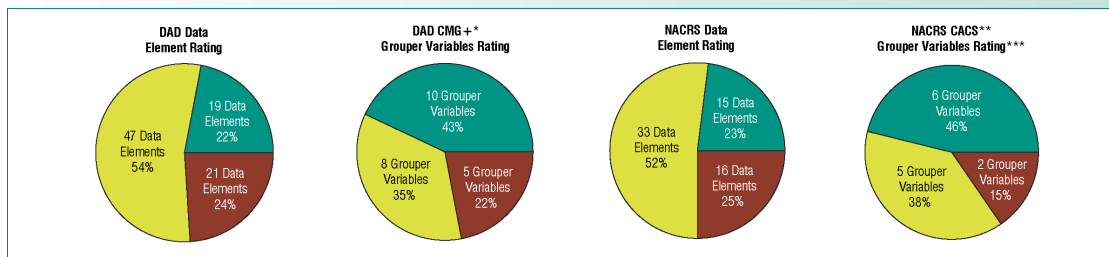
FOR MAPPING BETWEEN DAD/NACRS AND THE iEHR/REGISTRY MESSAGING SPECIFICATIONS	
No alignment	<p>No alignment: two criteria resulted in a red rating.</p> <ul style="list-style-type: none"> Data elements cannot be mapped. Data elements can be mapped, but with significant differences in definition and/or representation.
Partial alignment	<p>Partial alignment: two criteria resulted in a yellow rating.</p> <ul style="list-style-type: none"> CIHI data elements map but the definition or representation differs. Some optionality occurred in the mapping. Partial alignment of the better option resulted in a yellow rating.
Strong alignment	<p>Strong alignment: two criteria resulted in a green rating.</p> <ul style="list-style-type: none"> CIHI data elements map with little or no definitional or representation difference. Some optionality occurred in the mapping. 100% alignment of an option resulted in a green rating.

Among NACRS data elements, only 23% of the mandatory data elements aligned, while 77% aligned partially or not at all. For the NACRS grouping methodology, 46% of data elements were found to align, while 54% were partially or not at all aligned.

Any grouping methodology requires 100% alignment to be successful.

Initial findings focused on the structure and consistency of data. Since the pan-Canadian iEHR was designed in a way to encourage faster transition to electronic data capture, it allows for free text (uncoded data). This presents a challenge for analysts and researchers who would find it difficult to report on uncoded data. Further challenges arise in terms of attempting to source data from iEHR message streams, where the same data may exist across multiple message sets, versus mining clinical data stores with numerous unique data architectures. Difficulties would arise in retrieving data for analytical purposes. Lastly, SNOMED-CT® and ICD-10-CA are both acceptable in the iEHR in some circumstances, but not all. The structure of these codes is significantly different as is

Rating Results



Note: *CMG+: DAD Case Mix Groups Plus **CACS: NACRS Comprehensive Ambulatory Classification System

***For NACRS CACS Grouper Variables, percentages do not sum to 100% due to rounding. Percentages were Green—46.15%, Yellow—38.46% and Red—15.39%.

their purpose and intent, once again offering a significant challenge when using the data for purposes beyond primary care, such as for health system management.

There were also some granular differences in common concepts found during the gap analysis. Simply, the level of detail captured in the jurisdictional iEHRs will not match the level of detail required in CIHI databases. Researchers and analysts require more granularity than what is in each jurisdictional iEHR, so the source of data for the CIHI databases will be, in part, the point-of-service (POS) systems. Organizational and regional data warehouses may also be sources of data for the CIHI data holdings. Inconsistencies were noted in value domains and vocabulary. It is recognized that the iEHR specifications incorporate administrative data when relevant to point-of-service care. Administrative information that is required for health system management will have to be sourced elsewhere.

CIHI's core business requires specific data, and the iEHR can be one source of these; CIHI will seek other data sources and make use of the ETL tools to extract, transfer and load data from other sources in order to meet its core business requirements. If CIHI considers the iEHR as one of its data sources in the future, CIHI might want to consider how it will use this new data source for reporting and informing the health care system.

It is understood that not all of CIHI's data requirements can be met by the existing iEHR, because the intent of the iEHR was for primary use. However, CIHI and Infoway do see an opportunity to work together and leverage Infoway's existing EHR Infostructure while pursuing other strategies. This may cause CIHI to review some of its reporting content or encourage Infoway to improve or enhance the pan-Canadian iEHR messaging standards.

Infoway's Patient Access to Quality Care (PAQC) Architecture and Standards project will determine the standards and architectures needed to support health system management use of iEHR data. CIHI and Infoway will work collaboratively to ensure that changes to the Blueprint accomplish this.

Privacy concerns must always remain at the forefront of any and all discussions.

CIHI must also examine other data sources that are not part of the iEHR solutions in order to meet its core business requirements. As the iEHR solutions evolve,

there may come a time when the gaps are substantially reduced and CIHI can receive most of its DAD/ NACRS data through iEHR solutions. Until then, CIHI will continue to utilize other primary data sources to populate DAD/NACRS and will work collaboratively with Infoway to reduce the gaps. ●

The detailed DAD and NACRS Gap Analysis with pan-Canadian EHR Standards report will be released this fall and will be available on both CIHI and Infoway's websites – www.cihi.ca and www.infoway-inforoute.ca

A NACRS multi-year project is currently underway at CIHI, which will result in different levels of reporting to the NACRS database for 2009–2010. CIHI intends to conduct an additional gap analysis using the data elements designated for the different reporting levels. This may result in changes to the percentages reflected in this article. If you require further information about the new NACRS reporting levels, please contact Cathy Davis at cdavis@cihi.ca.

Proposed next steps to further develop an approach for the population of health system management use repositories:

- Conduct business analysis and develop use cases on how source systems will populate data warehouses. Develop a roadmap describing how to go from current to future state (short term).
- Assess the cost/implications of potentially narrowing the gaps (moving yellows to greens).
 - Five DAD and three NACRS data elements could align through updating of the recommendation to update HL-7 or other international standard(s).
 - Twelve DAD and six NACRS data elements could align through updating of the iEHR messages/ registry specifications.
- Conduct additional gap analyses, for example, Health Human Resources and Pharmaceuticals.
- Continue monitoring and review of the ability for health system management use of EHR data (long term).
- Establish a CIHI/Infoway team that plans for taking the "next steps" forward and operationalizes them.