

Developing a Primary Care Electronic Medical Record Chronic Disease Surveillance Network in Canada

Data Quality and Lessons Learned

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Canadian Association of Health Services and Policy Research
Conference
Calgary May 14, 2009



The College of
Family Physicians
of Canada

Le Collège des
médecins de famille
du Canada



Canadian Institute
for Health Information
Institut canadien
d'information sur la santé



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Overview

- Objectives
- Canadian Primary Care Sentinel Surveillance Network
 - Project Phases
- Results/ Findings
- Potential Opportunities to Address Existing EMR Data Gap
 - People
 - Process
 - Structure
- CIHI's Data Quality Framework
- CIHI's Primary Health Care Indicators EMR Content Standards
- Canadian Primary Health Care System



Objectives

- Increase awareness regarding the CPCSSN project
- Share knowledge from Phase One of the CPCSSN project
- Share framework for addressing EMR data gap
- Promote benefits and use of EMR information



CPCSSN

- Funded by Public Health Agency of Canada
- College of Family Physicians of Canada (CFPC)
 - Developing a pan-Canadian primary care electronic medical record (EMR) based chronic disease sentinel surveillance system
 - Chronic obstructive pulmonary disease
 - Depression
 - Diabetes
 - Hypertension
 - Osteoarthritis
 - Wide range of stakeholder engagement (Public Health Agency of Canada, university based researchers, clinicians, sentinel physicians, and Canadian Institute for Health Information)

CPCSSN Project Phases

- Phase One—Feasibility (November 2007- December 2008)
 - Define disease-specific case index
 - Describe EMR data inventory profile for five chronic diseases using multiple EMRs
 - Assess the quality and usability of EMR data capture
 - Inform next steps for developing primary care electronic medical record chronic disease surveillance network in Canada
- Phase Two— Build (Jan 2009-March 2010)
 - Cycle 1 (Jan 15-May 15, 2009)
 - Technical data extraction and transformation – learn and document
 - Cycle 2 (Jun 1-Sept 1, 2009)
 - “Gold Standard” data extraction – doctors to confirm patients with chronic diseases
 - Cycle 3 (Jan 15-Mar 15, 2010)
 - Speed data extraction – processes optimized for extraction, cleaning, transformation and upload in 8 weeks

CPCSSN Phase One - EMR Data Inventory

- Seven Practice-Based Research Networks (PBRN)
 - 62 sentinel physician practices and four provinces
- Six different EMRs
 - Data analysis included: patient demographics, patient encounters, health conditions, medications, lab results, referrals, procedures, risk factors and provider characteristics
 - MedAccess
 - Healthscreen
 - Nightingale
 - P&P
 - Da Vinci
 - Wolf



EMR Data Inventory Profile (CPCSSN Phase One)

	Calgary	Edmonton	London	Toronto	Kingston	St. Johns	Total
Patients (Physicians)	1314 (1)	925 (1)	10812 (10)	13689 (7)	860 (1)	3196 (2)	30796 (22)
Diabetes (%)	111	47	1194	907	–	209	2468 (8)
Depression (%)	80	128	2643	2403	–	221	5475 (18)
HTN (%)	203	115	2732	2182	55	532	5819 (19)
COPD (%)	6	10	609	227	–	44	896 (3)
Osteoarthritis (%)	109	28	1280	843	–	191	2451 (8)



CPCSSN Phase One Results / Lessons Learned

EMR Data Attribute	EMR Data Gaps
Lack of EMR data portability, exportability functionality, and usability	Lack of infrastructure to support electronic clinical information feed (lab and x-ray), therefore, unable to extract for potential transmission and use
Dirty data	Misspelling, extra words in field, inconsistent string (ex smoker, ex-smoker, multiple diagnosis in a single field)
Missing data	Dosages, date of onset, occupation, ethnicity
Lack of meta-data	Diagnosis not part of problem list, medication in encounter notes; referral to Dr. Jones vs. Dr. Jones' specialty.
Inappropriate meta-data	Diagnosis stored in several different places
Non-standard data	Inconsistent names or results of lab test, diagnosis stored in several and inconsistent places (notes, past medical history, and problem list etc)
Variable granularity data	Inconsistent field space
Identifying data	Identifying information is placed in data fields



Potential Opportunities to Address Existing EMR Data Gap—People

- Data managers at the practice site can clean some dirty data (e.g. misspelled words, extra words in the field, inconsistent string)
- Involve physicians
 - Provide feedback reports to physicians about EMR data quality
 - Ask physicians to enter missing EMR data
 - Train physicians and their staff to enter data in a standardized and structured form
 - Solicit support from physicians to use structured data entry templates for specific diseases

Potential Opportunities to Address Existing EMR Data Gap—Process

- Establish continuous quality improvement method to gather complete and good EMR data
 - Support local laboratory electronic feeds – interoperability between systems
 - Develop structured data entry clinical flow sheets for specific diseases
- Establish to mechanism to support EMR data exportability and transportability
 - Develop well-documented and robust processes for data extraction, transformation and upload to Central Repository
- Establish privacy and security guidelines according to industry standards
 - Develop a secure IT infrastructure that protects patient confidentiality, privacy and quality
 - Develop privacy and confidentiality procedures according to industry standards

Potential Opportunities to Address Existing EMR Data Gap—Structure

- Need pan-Canadian IEHR and EMR standards
 - Technical
 - Functional
 - Content
- Develop CPCSSN data repository metadata (entity relationship diagram)
- Develop continuous data quality improvement using:
 - CIHI Data Quality Framework
 - Accuracy
 - Timeliness
 - Comparability
 - Relevance
 - Usability
 - CIHI Primary Health Care Indicators EMR Content Standards
 - Standardized approach to collect diagnosis, intervention, medication, lab, DI
 - Support reporting on 12 pan-Canadian PHC clinical quality care indicators
- Develop structured data entry templates for specific diseases



CIHI Data Quality Framework

CIHI Data Quality Dimension	Potential Interventions	This will address EMR data gap
Accuracy	<ul style="list-style-type: none"> ▪ Document magnitude of unit non-response rate ▪ Monitor number of records by practice to detect for unusual values ▪ The degree of inconsistent data capture falls into one of the predetermined categories ▪ Validity checks for each data element ▪ Develop logical and consistent edit rules and imputation is automatically derived from edits ▪ Develop edit verification reports for users 	<ul style="list-style-type: none"> ▪ Missing data ▪ Erroneous data ▪ Unreliable data ▪ Non-standardized capture
Comparability	<ul style="list-style-type: none"> ▪ EMR data evaluation using CIHI DQ Framework ▪ Maintain original data element for every derived EMR data element ▪ Develop codes to uniquely identify practices and patients ▪ Use standard geographical classifications 	<ul style="list-style-type: none"> ▪ Inaccurate data ▪ Inconsistent capture ▪ unreliable data capture



CIHI Data Quality Framework

CIHI Data Quality Dimension	Potential Interventions	This will address EMR data gap
Usability	<ul style="list-style-type: none"> ▪ Develop and release meta-data definitions and data dictionary ▪ Document data quality assessment and release verification reports ▪ Develop mechanisms to receive feedback from data providers 	<ul style="list-style-type: none"> ▪ Non-standardized data ▪ Inconsistent use of meta-data ▪ Lack of validity checks
Relevance	<ul style="list-style-type: none"> ▪ Develop flexible CPCSSN repository to support clinical chronic disease requirements over time based on input from clinicians and researchers 	<ul style="list-style-type: none"> ▪ Lack of validity checks and non-standard data capture ▪ Limited use of EMR data for clinical decision-making



CIHI Primary Health Care Indicator EMR Content Standards

Unified Approach to Pan-Canadian EMR Information

Information Category	Content/ Structure	How would this work?	Comments
Lab Tests	<ul style="list-style-type: none"> LOINC: A1C, TG, LDL,HDL, TC, Albumin:Creatinine 	Pick-list (look-up table support at the back end)	<ul style="list-style-type: none"> ✓ Supported by Pan-Canadian Standards (iEHR) ✓ Currently used in some EMRs
Medication (code, strength, dose, form, frequency, route)	<ul style="list-style-type: none"> ATC classification system 	Pick-list (look-up table support at the back end)	<ul style="list-style-type: none"> ✓ Supported by Pan-Canadian Standards (iEHR and EMR) ✓ Supported by WHO and Health Canada



CIHI Primary Health Care Indicator EMR Content Standards

Unified Approach to Pan-Canadian EMR Information

Information Category	Content/ Structure	How would this work?	Comments
Past medical history	<ul style="list-style-type: none"> List of diagnosis (ICD-10) and procedures (CCI). Explore mapping to other classifications/ terminologies system. Captures procedures 	Look-up table support at the back-end –no added workload for PHC providers	<ul style="list-style-type: none"> ✓ Support high level concept data and data dictionary ✓ Support consistent and standardized capture of EMR data ✓ Supported by Pan-Canadian Standards (iEHR and EMR)
Current health issues			
Interventions			
Encounter type (Service Delivery Location Type)	<ul style="list-style-type: none"> PHC clinic, home, assisted living, residential care 	Pick-list (look-up table support at the back end)	<ul style="list-style-type: none"> ✓ Supported by Pan-Canadian Standards (iEHR)



Canadian PHC System—Benefits

- Point of care – practice level
 - Support evidence-based clinical care for data collected at point of service
 - Support evaluation of chronic care prevention and management
- Health system planners
 - Provide stronger links between PHC and public health
 - Improve the availability of data for health policy planners
 - Support improved evaluation of the health of Canadians and Canadian Health Care System
- Researchers (Surveillance)
 - Canadians with specific chronic conditions are accessing the right PHC services through right compliment of clinicians
 - Support improved understanding of patients with chronic conditions

Summary

- Consult with physicians to improve quality of EMR data capture
- Collaborate with PHAC to create stronger PHC / public health linkages
- Collaborate with CIHI to create PHC provider-level feedback reports
- Collaborate with CIHI to integrate CIHI Data Quality Assessment Framework and CIHI PHC Indicators EMR Content Standards



Thanks to Funders, Stakeholders & Sentinel Network Physicians



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