Canada Health Infoway and Open Source Solutions
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Health care in Canada

$170 billion business
60% of cost for hospitals, drugs and physicians
70:30 public vs. private funding
Federal/provincial governance
Governance of Canada’s health care: a shared accountability

Federal government sets and administers national principles
13 provincial/territorial governments plan, finance, manage, evaluate health services in their own jurisdictions
100+ health regions coordinate care delivery over a set geographical area
900+ hospitals and 2,500+ long-term-care homes
Approximately 400,000 general practitioners, specialists, nurses, pharmacists and health care professionals deliver care to Canadian patients
Canada Health Infoway

Created in 2001
$2.1 billion in federal funding
Independent, not-for-profit corporation
Accountable to 14 federal/provincial/territorial governments

Mission:

Fostering and accelerating the development and adoption of electronic health information systems with compatible standards and communications technologies on a pan-Canadian basis with tangible benefits to Canadians. Infoway will build on existing initiatives and pursue collaborative relationships in pursuit of its mission.
Infoway business strategies

Collaborate with health ministries and other partners
Co-invest with public sector partners (75:25 formula)
Leveraged investment
Engage clinicians
Form strategic alliances with the private sector
Manage risk and ensure quality solutions
Measure benefits and adjust
Strategic investor
Privacy safeguards
Investment approach

12 targeted investment programs totalling more than $2.1 billion
315 active and completed projects with an estimated value of $2.006 billion as at March 31, 2011
EHR Consolidates Information From All Sources

Patient Details
- Name: GME0000 Smith, Caroline
- Sex: Female
- DOB: 09/01/1980
- Address: 1100, Edmonton, AB T5Y 8L9
- Phone: 205-555-9000
- Next of Kin: Jack Smith
- Admission Date: 10/01/19

Patient Record
- Allergies: Sults Drugs
- Medications:
  - 11/01/20: Metformin 500 mg, One tab before food, 12/01/20
  - 10/02/20: Amoxicillin 500 mg, One tab before food, 12/02/20
  - 09/03/20: Simvastatin 40 mg, One tab before food, 12/03/20

Diagnosis
- Diabetes: 12/20/19
- Artery Disease: 02/02/20
- Venous Ulcers: 10/03/20

GP Details
- Name: James Evans
- Phone: 314-460-5545
- Address: 11 Terrance Ave., Edmonton, AB T5Y 8L9

Other Healthcare Providers
- Name: John Doe
- Phone: 555-555-5555
- Address: 111, Edmonton, AB T5Y 8L9

Lab Results
- Date: 11/20/19
- Test: Hemoglobin: 12.0 g/dL

Diabetic Indices
- Date: 01/20/20
- Type 1: Fasting Blood Sugar: 110 mg/dL
- Type 2: HbA1C: 7.5%
EHR: Overall Benefits and Value

**ACCESS**
- Reduced wait-times for diagnostic imaging services
- Improved availability of community based health services
- Reduced patient travel time and cost to access services
- Increased patient participation in home care

**QUALITY**
- Improved interpretation of diagnostic and laboratory results
- Decreased adverse drug events
- Decreased prescription errors
- Increased speed and accuracy in detecting infectious disease outbreaks

**PRODUCTIVITY**
- Increased access to integrated patient information
- Reduced duplicate tests and prescriptions
- Reduced physician prescription call-backs
- Reduced patient and provider travel costs
EHR Infostructure – The Framework for Sharing

EHR SOLUTION (EHRS)

EHR INFOSTRUCTURE (EHRI)

- Ancillary Data & Services
- Health Information Data Warehouse
- EHR Data & Services
- Registries Data & Services

Longitudinal Record Services (LRS)

Health Information Access Layer (HIAL)

Point of Service Application (PoS) → EHRS Locator

EHR Viewer

Point of Service Application (PoS)
Interoperability Enablers

Consistent and unique identity management
- Clients / Patients
- Service Providers
- Eventually for Organization, Location, Service

Use of EMPI to link public identities to EHR identity
- Recommend using a unique number inside the EHR that is never visible

Standardized interfaces between the systems at the point of service and the infostructure
- Not between each other
- Using a shared information source
- Using consistent authentication
Focus on standards and interoperability

- Common architecture accepted and in use by jurisdictions
- Updated architecture includes privacy and security requirements
- *Infoway* Standards Collaborative consolidates all standards activity
- Architecture is freely available
Infoway Standards Collaborative

A single point of coordination for all Health Informatics Standards
Infoway’s Role in Standards

To set and develop standards and requirements for robust, interoperable products and outcomes

$35.6 Million
Investments in the development of standards and tooling, both completed and active projects, through Infoway Programs

$43 Million
Actual and planned investments in the deployment and maintenance of standards through the Standards Collaborative FY 06-13.
Pan-Canadian EHR Infostructures as Peers
Distributed, Federated, Message Based
EHRS Serving Healthcare Service Delivery

[Diagram showing the EHRS solution with various services and applications such as EHR INFOSTRUCTURE, EHR SOLUTION, and different healthcare service delivery points like clients/patients, healthcare centers, and emergency services.]
Infostructure as Services

**JURISDICTIONAL INFOSTRUCTURE**

- Physician/Provider
- Public Health
- Hospital, LTC, CCC, EPR
- Physician Office EMR
- EHR Viewer
- Lab System (LIS)
- Radiology Center (PACS/RIS)
- Laboratory
- Pharmacy System
- Public Health Services
- Point of Service
- Ancillary Data & Services
- Registries Data & Services
- EHR Data Warehouse
- Outbreak Management
- PHIS Reporting
- Shared Health Record
- Drug Information
- Diagnostic Imaging
- Laboratory
- Health Information
- Business Rules
- EHR Index
- Message Structures
- Normalization Rules
- Security Management
- Data Privacy
- Configuration
- Terminology Repository
- Longitudinal Record Services

**EHR SERVICES**

- Get Client ID Resolution
- Put Immunization Data
- List CD Report Events
- List DI Results
- Get DI Report
- Get Provider Information
- List Encounter Events
- Get Laboratory Results
- Stream DI Image
- List Laboratory Orders
- Put Laboratory Result
- List Medications
- Get Encounter Summary
- Get Client Demographic
- Get Prescription
- Get Clinical Dashboard
- Get Encounter Summary
- Get Client Demographic
- Get Prescription
- Get Clinical Dashboard

**POINT OF SERVICE**

- Public Health Provider
- Pharmacist
- Radiologist
- Lab Clinician
- Physician/Provider
- Physician/Provider
- Physician/Provider
- Physician/Provider
OPEN SOURCE
Open Source - Focus on Interoperability

Our focus is on using Open Source for interoperability between Point of Service systems and the Infostructure.

For the Infostructure, we have a policy of COTS wherever possible, which has actually resulted in a large number of customized COTS implementations.

Open Source end-user software applications are not in our thinking at this point.
HL7 v3 as Interoperability Standard

- In 2003 Canada Health Infoway made a strategic choice to use HL7 v3 as the messaging standard between the Health Information Access Layer and Point of Service systems.
- This was explicitly stated in the Canadian EHRS Blueprint where HL7 v3 interoperability profiles were introduced.
  - However... there are still implementations built on HL7 v2 and other.
- In order to effectively manage standards, Infoway’s Standard Collaborative was given mandate for development and maintenance of pan-Canadian health informatics standards and specifications including HL7 v3.
HL7 interoperability and integration challenges

- Being an early adopter assumes unpredicted implications in implementation phase.
- Lack of the native support for HL7 V3 in the applications
- Cumbersome and complex model that requires in depth understanding to properly implements.
- Lack of experience and tools to assist with both development and implementation of the HL7 v3 standards.
Risk of not addressing HL7 interoperability needs

- Complexity associated with HL7 v3 model and message structure impacts Canadian EHRS implementation
- Jurisdictions decide to go with other (easier to implement standards)
- Lower then expected adoption rate of the current EHRS infrastructure
- Impacting general interoperability among systems that participate in the EHRS in Canada
How Infoway responded

- It was obvious that complexity of HL7 V3 spec needs to be addressed in order to make it appealing to the implementers of the standard.
- An abstraction in form of suitable business objects (tools, appliances, transform) that effectively obscure complexity of the underlying model, expose only business elements / attributes and ultimately foster HL7 interoperability.
- Address the need for business enablers for
  - Specification development and maintenance
  - Specification implementation
  - Specification conformance testing
- An immediate need to foster the adoption of the EMR systems and integration with EHRS resulted in development and procurement of the interoperability enablers (tools) as part of Infoway’s EMRI program.
**HL7 interoperability enablers**

Standards implementation support
- Infoway Message Builder (Message Builder) – APIs for solution development
- Infoway Testing Environment – provides platform for standard conformance testing

Standards development and maintenance support
- Infoway Message Remixer – provides the ability to constrain universal / pan Canadian HL7 specs (MIFs)
- Infoway Message Builder Validation – provides the ability to validate message structure and attributes of HL7 interactions
- V3 Generator – provides the ability to consumes the output of MBT and MR and generate standard artefacts
- General Purpose MIF Renderer – provides the ability to validate the message structure, create APIs, publish the artifacts
Standards Environment

From Infoway to implement and test
Tools Environment

Define National Specs

Author business functions

Constrain National Specs

Create Messages (MIFs)
Tools Environment

Generate Business APIs

Generate documenta-
tion from the MIF

Verify conformance to standards

EMR test cases and test data

Implementation Guide

Infoway SC
Publish pCS

Infoway Message Builder

Infoway WIKI

Infoway Remixer

EMR Testing Environment

MIF Generator

GPMR

WIKI style docs

MIF

RIM

Java, C#, XML

HL7 V3

Infoway Solution
Interoperability workflow – from specification to a product
Message Builder Architecture

Clinical Application – EMR, HIS, other POS

MBT API
- Java API (Business Objects)
- User Interface (Business View)

MBT Core and Runtime
- Marshall / Unmarshall
- Validator
- Terminology lookup
- pC spec release runtimes

Client
- Class
- ABusinessObject
Open Source Maturity

• We do not truly understand Open Source yet
• We have an “intent” to move products to the Open Source space
  – But we have not developed in an open source community and culture
• The best opportunity to develop is to find new opportunities rather than to attempt to transform legacy
• Our SOA approach and use of shared repositories for the longitudinal EHR offer a migration path to “gracefully” retiring legacy and innovating with new patterns
The New Blueprint
Enabling Collaborative Patient Centered Care
Enabling New Capabilities

The new architecture will enable many collaborative healthcare capabilities, including:

Enable improved client-patient access to services and participation in their record

Enable inter-professional collaboration

Facilitate integrated service delivery

Enable information to facilitate decision support, utilization of health care services and quality improvement
Interdependent Registries

JURISDICTIONAL INFOSTRUCTURE

Interdependent Registry Services
- Client
- Provider
- Location
- Health Service
- Dependency Management Services
- Registry Orchestration Services

Interdependent Registry Services
- Organization
- Application
- User
- Health Program

Interdependent Registry Services
- Shared Health Record Service
- Electronic Document Service
- Data Domain Services
- Analytic Services

Interdependent Registry Services
- LRS Services
- Health System Services
- Utility Services

Interdependent Registry Services
- Hospital, LTC, CCC, EPR
- Physician Office EMR
- Client / Patient
- Client / Provider
- Pharmacist
- Radiologist
- Lab Clinician
- Physician / Nurse
- Physician / Clerk
- Physician / Provider

POINT OF SERVICE

HIAL
New Capabilities

The new blueprint allows existing systems and organizations to participate in common patterns:

- Electronic referrals
- Appointment brokering
- Electronic ordering between and across organizations
- Provide decision support at a regional and discipline level
- Support chronic disease management programs regionally and nationally
- Improve the ability to discover and access available services
Open Source Opportunities

- Standardize on new patterns as services
- Stronger emphasis on SOA
- Focus on the intersection point between enterprise and application architecture
- Develop enabling components in Open Source communities
- Support development of open source client-side applications
FIN
Knowing is Better

www.knowingisbetter.ca
Making health care better in Canada

EHR technology in action
- Implementing an EHR system: a family doctor in Kelowna, B.C., talks about his experience, including the challenges and benefits of using an EHR system.
- New Alberta launches patient portal and wait times website: Susan Anderson of Alberta Health and Wellness talks about Netcare. MyHealth, the wait times website and
- More Saskatchewan's electronic health record initiative on track: Neil Gardner, strategic advisor to the Board Chair for eHealth Saskatchewan, discusses his province's

EHR Advancements
- Provinces and territories are at different stages of EHR development.

Demonstrating the Benefits
- Pan-Canadian benefit evaluation studies show EHR investments are saving money, increasing productivity and helping to deliver better patient care.
- Learn more
- See it in action
Questions and Comments?

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Thank you