EHRS BLUEPRINT
an interoperable EHR framework

SOA in the pan-Canadian EHR

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Outline

- Infoway
- EHR Solution
- EHRS Blueprint Approach
- EHR Standards
- Services Oriented Architecture
- Summary & Conclusion
Mission
To foster and accelerate 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.

Vision
A high-quality, sustainable and effective Canadian healthcare system supported by an infostructure that provides residents of Canada and their healthcare providers timely, appropriate and secure access to the right information when and where they enter into the healthcare system. Respect for privacy is fundamental to this vision.

Goal
By 2010, every province and territory and the populations they serve will benefit from new health information systems that will help transform their healthcare system. Further, by 2010, 50 per cent of Canadians and by 2016, 100% of Canadians will have their electronic health record available to their authorized professionals who provide their healthcare services

Shared Governance Facilitates Collaboration
Canada Health Infoway is an independent not-for-profit organization, whose Members are Canada’s 14 federal, provincial and territorial deputy ministers of health.
Client / Patient at the Centre of the Circle of Care
EHR: Integrated Shared View of Client / Patient Data
EHR – The Infoway Definition

An **Electronic Health Record** (EHR) provides each individual in Canada with a secure and private lifetime record of their key health history and care within the health system. The record is available electronically to authorized health providers and the individual anywhere, anytime in support of high quality care. This record is designed to facilitate the sharing of data across the continuum of care, across health care delivery organizations and across geographies.
Guiding Principles for EHRS

- Patient-centric
- Mass customized views of all clinical data
- Value add for the provider
- Timely, accurate information
- Enable sharing at local, regional, cross-jurisdictional
- Interoperable, integrated
- Standards based
- Replicable solution – patterns, components

- Leverage legacy systems & solutions
- Design for phased rollout with near term results
- Scalable
- Extensible to support future growth
- Cost-effective
- Secure & private
- Allow for innovation & competition
- Comprehensive
Key Factors Affecting How to Share

- Sharing creates some very profound issues & requirements
  - Unique identification of clients, providers, service delivery locations, etc.
  - Protecting privacy and confidentiality of patients and providers while simultaneously not limiting the ability to deliver appropriate services
  - Ensuring information is stored, shared securely
  - Ensuring compatibility of how data is interpreted/understood

- These issues are the same no matter which model is chosen to share patient identified information

- Canadian governance model for healthcare means these issues are F/P/T jurisdictional responsibilities – requirements vary

- People increasingly mobile, especially when considering long periods of time
- Provider’s confidence in the mechanisms to enable sharing is crucial
Integrating Health IT Systems: Key Challenges

• Protecting Privacy
  • Governance, accountability & data custodianship
  • Controlling access
  • Managing & applying consent directives
  • Controlling feeds and queries to the data
  • Trust relationships & contracts

• Existence & availability of data
  • Discovery capability
  • Availability in electronic format
  • Timeliness

• Harmonization
  • Data structures (format)
  • Vocabularies (encoding, normalization)
  • Semantics

• Heterogeneous technology environments
• Number of organizations, connection points & systems
• Costs inherent to integration
# Methods of Sharing EHR Information

<table>
<thead>
<tr>
<th>The “Big Database in the Sky”</th>
<th>Broadcast to other systems</th>
<th>The “Big Index in the Sky”</th>
<th>Our Choice: A Shared Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>• All Point-of-Service (POS) systems share same data store</td>
<td>• Replication of data from one system to all other relevant/participating POS systems</td>
<td>• EHR Index or locator service that holds links to all POS systems where information resides</td>
<td>• POS systems populate Shared, Interoperable EHR</td>
</tr>
<tr>
<td></td>
<td>• Every POS system holds same information</td>
<td>• Each POS system interfaces to other systems</td>
<td>• POS systems or viewers reference it</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• External to the “operational” store</td>
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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

Health Information Access Layer

Point of Service Application
Point of Service Application
EHR Viewer
EHR Infostructure

The **EHR Infostructure** is a collection of common and reusable components in the support of a diverse set of health information management applications. It consists of software solutions for the EHR, data definitions for the EHR and messaging standards for the EHR.
End-User Perspective: EMR Application

JURISDICTIONAL INFOSTRUCTURE

Registries Data & Services
- Client Registry
- Provider Registry
- Location Registry

Ancillary Data & Services
- Immunization Management
- PHS Reporting

EHR Data & Services
- Shared Health Record
- Drug Information
- Diagnostic Imaging
- Laboratory

EHR Data & Services
- EHR Index
- Message Structures

Longitudinal Record Services
- Normalization Rules
- Terminology Repository

Common Services
- Security Mgmt Data
- Privacy Data
- Configuration

Communication Bus
- HIAL

EMR Database

EMR APPLICATION

POINT OF SERVICE

Physician Office EMR

Physician/Provider
Pan-Canadian EHR Infostructures as Peers
Distributed, Federated, Message Based

EHR SOLUTION (EHRS)

EHR INFOSTRUCTURE (EHRI)

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

Longitudinal Record Services
Health Information Access Layer

Point of Service Application
Point of Service Application
EHR Viewer

Point of Service Application
Point of Service Application
EHR Viewer

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Rational for Recommended Approach

- Only cost effective scenario to handle degree of application integration required
- Maximized ability to deliver proper response time and consistent access to data across thousands of source systems
- Maximized ability to apply privacy and security policies in a harmonized and consistent fashion
- Enables evolutionary path to semantic harmonization of health information across service delivery points
- Enables high degree of scalability from local health services integration, to regional, provincial or territorial and cross-jurisdictional
- Enables high degree of flexibility in reconfiguration of health services delivery networks
Standards-based EHR Solutions

- Standardized Architecture
- Standardized Interfaces
- Standardized Data Structures
- Standardized Data Vocabularies
- Standardized Functional Behavior
Standards-based EHR Solutions

Why Standards?

- They facilitate information exchange; are a critical foundation for EHR
- They create opportunity for future cost reduction as vendors and systems converge on pan-Canadian and international standards
- They ease effort required for replication

Mandatory Investment Requirements

- Compliance to standards (infostructure, interoperability)
- Initiatives must comply with existing guidelines or standards adopted by Infoway
- Where standards or guidelines do not exist, projects must support longer-term interoperability and congruence of solutions

Infoway’s role is to set standards and requirements for robust, interoperable products and outcomes
Movement and sharing of data with messaging standards
Service Oriented Architecture as an Enabler

Application of SOA in EHRi Solutions

- Repurposed legacy applications to offer services as part of SOA-based EHR Infostructure
- New breed of services to enable coordinated transactions in an EHR Infostructure (e.g. Longitudinal Record Services)
- Use of commercially available solutions to enable components of EHR Infostructure
Service Oriented Architecture as an Enabler

The HIAL as an Application Abstract Layer

- Each jurisdictional HIAL deployed will have different
  - Physical deployment model
  - Some interfaces which are unique to that implementation
- HIAL acts as an abstraction of the EHR such that applications see the EHR in a consistent way across EHR implementations
- Services exposed outside of an EHRi in the form of supported EHR Interoperability Profiles for an entire Infostructure perceived as a single system with transactional services
- Services within an EHR Infostructure to optimize scalability, maintainability and functional flexibility
  - Interfaces not necessarily exposed or standardized
First Type of Abstraction: The EHR as Services

**JURISDICTIONAL INFOSTRUCTURE**

- 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 Service Delivery Locations
- Get Encounter Summary
- List Laboratory Orders
- Put Laboratory Result
- List Medications
- Get Clinical Dashboard
- Get Client Demographic
- Get Prescription
- **EHR SERVICES**
- **POINT OF SERVICE**
  - Public Health Services
  - Pharmacy System
  - Radiology Center PACS/RIS
  - Lab System (LIS)
  - Hospital, LTC, CCC, EPR
  - Physician Office EMR
  - EHR Viewer

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Second Type of Abstraction: Generic Application

JURISDICTIONAL INFOSTRUCTURE

CR Services
Outbreak Services
Detection & Reporting Services
Shared Health Record Services
Drug Services
DI Services
Lab Services

PR Services

LR Services

Terminology Services

Rules Services

A & A Services
Brokering Services
Consent Services
Session Services
Logging Services

Orchestration Services

EHR Index Services
Assembly Services
Normalization Services

Any Point-of-Service Application

EHR IP

POINT OF SERVICE
EHR Infostructure: Communication Bus

JURISDICTIONAL INFOSTRUCTURE

Registries Data & Services

Ancillary Data & Services

EHR Data & Services

Data Warehouse

COMMUNICATION BUS

MESSAGING
- Transformation Services
- Routing Services
- Encrypt/Decrypt Services
- En/Decoding Services
- Parser Services
- Serialization Services

PROTOCOL
- App Protocol Services
- Network Protocol Services

POINT OF SERVICE

Communication Bus

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EHR Infostructure: EHR Viewer
In Conclusion
Summary

Supporting Clinicians

- Provider adoption – Approach designed to support use cases across continuum of care with timely and accurate information for the clinician
- Mass customized views of data tailored to provider needs that is authoritative, reliable, responsive
- Semantic interoperability of health information across service delivery points
Summary

Health Care Information Solution Architecture

• Interoperability that is cost effective using a SOA approach
  • Standardized within a jurisdiction
  • Standardized to some degree for inter-jurisdictional interoperability
• Common model of integration, secure and private, scalable, extensible, preserves current investments – an application abstraction layer that provides a common integration view and EHR view across Canada
• Standards – common messages and nomenclatures adopted across Canada
• Enables high degree of flexibility in reconfiguration of health services delivery networks
Thank you!

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