Accelerating the Development and Implementation of Electronic Health Records (EHR) in Canada

Waterloo Smarter Health Seminar Series
University of Waterloo
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Canada Health Infoway
Agenda

- The case for the Electronic Health Record
- Measuring Benefits
- Canada Health Infoway
  - Role
  - Progress
- Infoway Challenges and Priorities
Last Year, In Canada

- 35 million Diagnostic Images
- 440 million Laboratory Tests
- 2.8 million Inpatient hospitalizations
- 382 million Prescriptions filled
- 3.4 million Vioxx Prescriptions in 2003 for patients that had to be contacted in 2004
- 322 million office-based physicians visits - 94% resulting in handwritten paper records
- 60,000 physicians faced 1.8 million new medical papers in 20,000 journals and 300,000 clinical trials

About 2,000 health care transactions per minute, many quite complex, and all requiring documentation and information flow

Information is the Lifeblood of our Healthcare System!
In spite of spectacular advances in medicine, the foundation of healthcare delivery is still primarily paper-based.
Electronic Health Records
The International Scene

Most industrialized countries have recognized the need to implement electronic health record solutions quickly to improve the quality and safety of patient care and system efficiency.

United States
United Kingdom
Australia
France

...and in Canada
Calls for Accelerated EHRs

The First Ministers continue to recognize the necessity of EHRs. In their “10-Year Plan to Strengthen Health Care”, they

Agreed “to accelerate the development and implementation of the electronic health record, including e-prescribing.”

Recommended a National Pharmaceuticals Strategy that would “broaden the practice of e-prescribing through accelerated deployment of the Electronic Health Record”

Health Council of Canada’s first report, which recommended an “immediate broadening of the use of IT”, saying “electronic patient records will pay huge health dividends in improved patient safety and lives saved”. “Canada can and should achieve this goal for all Canadians in five years – not fifteen “.
And Why Not? The Stakes are High
The Reality Behind the Headlines
Adverse Events and Lack of Patient Data

<table>
<thead>
<tr>
<th>For Every...</th>
<th>...In Canada</th>
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<tbody>
<tr>
<td>1000 hospital admissions</td>
<td>75 people will suffer an Adverse Event</td>
</tr>
<tr>
<td>1000 patients with an ambulatory encounter</td>
<td>20 people will suffer a serious Adverse Drug Event</td>
</tr>
<tr>
<td>1000 patients discharged from hospital</td>
<td>90 people will suffer a serious Adverse Drug Event with the drugs received on discharge</td>
</tr>
<tr>
<td>1000 Laboratory tests performed</td>
<td>up to 150 will be unnecessary</td>
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The Reality Behind the Headlines
Adverse Events and Lack of Patient Data

<table>
<thead>
<tr>
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<tr>
<td>1000 Emergency Department visits</td>
<td>320 patients had an information gap identified, resulting in an average increased stay of 1.2 hours</td>
</tr>
<tr>
<td>Study of 168 traditional medical records</td>
<td>81% lacked the information required for patient care decisions</td>
</tr>
<tr>
<td>1000 women at risk of cervical cancer</td>
<td>300-400 are not screened</td>
</tr>
<tr>
<td>1000 Canadians recommended for influenza protection</td>
<td>370-430 are not vaccinated</td>
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The Canadian Institute for Health Information (CIHI) estimates up to 24,000 deaths each year result from preventable adverse events in hospitals in large part due to incomplete information.
Electronic Health Records

Healthcare in Canada – the Priorities

- Improving access
- Wait time reduction
- Health human resources
- Home care
- Primary care reform
- National pharmaceuticals strategy
- Public health
- Health innovation
- Aboriginal health
- Accountability

Ten Year Plan to Strengthen Health Care (2004)

“….. First Ministers agree to accelerate the development and implementation of the electronic health record, including e-prescribing. To this end, First Ministers commit to work with Canada Health Infoway to realize the vision of the electronic health record through an ambitious plan and associated investment……”

This is the complex and rapidly changing environment into which Infoway has been challenged to introduce the electronic health record
Electronic Health Records

Electronic Health Records in Canada

Electronic health records give authorized providers rapid access to their patients’ complete, up-to-date health information.

An Electronic Health Record (EHR) is a secure and private lifetime record of an individual’s key health history and care. It creates significant value, providing a longitudinal view of clinical information. The record is available electronically to authorized health care providers and the individual anywhere and anytime in the support of care.

A network of interoperable electronic health record solutions is being implemented in Canada – one that links clinics, hospitals, pharmacies and other points of care.

Will help improve Canadians’ access to health services, enhance the quality of care and patient safety, and assist the healthcare system to become more efficient and effective.
Electronic Health Records – Access
The Benefits of Electronic Health Records and Infoway’s Priorities

**Infoway Electronic Health Record**
- Demographics
- Diagnostic Images
- Laboratory Results
- Drug Profile
- Clinical Reports
- Immunizations
- Telehealth

**Access**
- Availability of Services
- Ability to Access Services
- Patient Participation

- Increased interpretations by remote specialists
- Improved 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
- Increased patient access and use of their health record
Electronic Health Records - Quality
The Benefits of Electronic Health Records and Infoway’s Priorities

Infoway
Electronic Health Record

- Demographics
- Diagnostic Images
- Laboratory Results
- Drug Profile
- Clinical Reports
- Immunizations
- Telehealth

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

Quality

- Safety
- Effectiveness
- Appropriateness
Electronic Health Records - Productivity
The Benefits of Electronic Health Records and Infoway's Priorities

Infoway Electronic Health Record
- Demographics
- Diagnostic Images
- Laboratory Results
- Drug Profile
- Clinical Reports
- Immunizations
- Telehealth

- Increased access to integrated patient information
- Reduced duplicate tests and prescriptions
- Reduced physician prescription call-backs
- Reduced patient and provider travel costs
- Improved vaccine management
- Improved information management resulting in reduced costs

Productivity
- Efficiency
- Care Coordination
Electronic Health Records
The Financial Payoff

**Access**

Infoway
Electronic Health Record

- Demographics
- Diagnostic Images
- Laboratory Results
- Drug Profile
- Clinical Reports
- Immunizations
- Telehealth

**Benefits = $30 million/year**
- Medical Transportation Savings = $30 m/yr

**Quality**

**Benefits = $3.4 billion/year**
- Inpatient ADE = $1.6 b/yr
- Ambulatory ADE = $1.4 b/yr
- Post Discharge ADE = $0.4 b/yr

**Productivity**

**Benefits = $1.6 billion/year**
- Diagnostic Imaging Efficiencies = $1.1 b/yr
- Laboratory Test Efficiencies = $0.5 b/yr

**Sources**
2. Booz Allen Hamilton – EHR ROI Model
3. Courtyard Group – DI ROI Model
Infoway’s Investment Strategy

Infoway’s Role

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. To build on existing initiatives and pursue collaborative relationships in pursuit of its mission.

Goal
• Infoway’s plan is to have an interoperable electronic health record in place across 50 percent of Canada (by population) by the end of 2009.

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.
Infoway’s Investment Strategy

Infoway’s Role

Core Business

- We strategically invest with public sector partners to develop, replicate and re-use compatible electronic health systems, thereby leveraging public funds, knowledge and results across Canada, to build a safer, more efficient healthcare system.

<table>
<thead>
<tr>
<th>Funder</th>
<th>Strategic Investor</th>
<th>Intervener</th>
<th>Developer</th>
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<tbody>
<tr>
<td>“Fund &amp; ignore”</td>
<td>“Invest, advise &amp; monitor”</td>
<td>“Work alongside &amp; take over if needed”</td>
<td>“Write code &amp; build modules”</td>
</tr>
<tr>
<td>Grants funding</td>
<td>Invests with Partners</td>
<td>Invests with partner</td>
<td>Invests independently</td>
</tr>
<tr>
<td>Is uninvolved in project execution</td>
<td>Involved in project planning</td>
<td>Involved with partner in planning, and execution</td>
<td>Engages potential partners in needs analysis and testing</td>
</tr>
<tr>
<td>Checks on status of phase-based deliverables</td>
<td>Monitors progress of projects and quality of deliverables</td>
<td>Ensures success through ongoing, active participation or intervention when something goes wrong</td>
<td>Aims for speed and success by working without a partner or on behalf of a future partner</td>
</tr>
</tbody>
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Infoway also provides leadership in setting the strategic direction and standards for EHR deployment across Canada.
Infoway’s Business Model

- Infoway’s business model is built on seven complementary strategies which is allowing Canada’s provinces and territories to accelerate the implementation of interoperable electronic health records while minimizing costs and risk.

- **Targeted Investment Programs** - focused on nine investment programs
- **Collaboration with Health Ministries and Other Partners** - joint planning with health ministries and other parties to ensure alignment
- **Co-Invest with Public Sector Partners** - share the investment in projects with our public sector partners
- **Leveraged Investment** - invest in solutions that can be replicated across the country
- **Form Strategic Alliances with the Private Sector** - form strategic alliances with the private sector to implement standards-based commercial solutions that reduce cost and risk
- **Focus on End-User Acceptance** - early and ongoing focus on end-users to gain acceptance and adoption
- **Measure Benefits and Adjust** - continually measure the benefits achieved against those planned and make the necessary adjustments
Nine Strategic Investment Programs

A 3-year joint technology and investment plan is developed with each jurisdiction to provide a long-term roadmap as to how these EHR components will roll out.
The EHR integrates standalone, disparate Clinical information systems and Physician Electronic Medical Records (EMR) into a powerful, complete personalized medical information system.
141 active and completed projects valued at $427 million in all 9 investment programs. The 82 projects jointly developed with provinces and territories are shown. In addition, 59 national projects are also underway.
Canada Health Infoway

Infoway’s Investment Progress

- *Infoway* has an investment target range of $275 - $375 million in project approvals for 2005-06. On a cumulative basis this will result in $646 million or 54% of the $1.2 billion that Infoway has committed to its nine investment programs.
Example
Diagnostic Imaging Systems

- The DI program contains 17 active and 5 completed projects in 10 jurisdictions
- Implemented “Shared Service” model to realize economies of scale even for smaller hospitals
- 20% radiology productivity gains
- Cost avoidance -$350 million annually, by eliminating duplicate and unnecessary procedures and film
- $1 Billion in total annual savings estimated

“With the system up and running, I have become a better diagnostic radiologist. I don’t think there’s any doubt

Dr. K Wong, Radiologist, Fraser Valley

Better results at less cost.
Infoway Toolkits capture all phases of the projects (lessons learned, RFP templates, software components, adoption strategies) to reduce the cost and risks for other jurisdictions
25

When VIOXX was pulled from the market, it took our practice just one hour to produce a report on patients who had been prescribed the medication, allowing us to contact every one of them the same day.”

Dr. Sue MacLean, Founding Partner, Markham Family Physicians

Example Drug Information Systems

- 7 active projects in 7 jurisdictions
- AB: Province-wide DIS with e-prescribing, drug profile, adverse-reaction alerts
- ON: To view Ontario’s Drug Program information, initially Emergency room access
- SK: Province-wide DIS for 95% of meds prescribed – begins 2005
- Developing clinical drug messaging standards. Drug claims message standards already developed

Expect $3.6 billion annual savings, Canada wide, avoiding adverse drug reactions and drug compliance issues
Program Investments - Ontario

Client Registries – Phase 1B, Phase 2 (March 2006)

Provider Registries - no project planned

Diagnostic Imaging Systems
• TVPP Phase 2
• SWO Phase 2 (Q3, 2005)
• TEN Phase 2 (Q4, 2005)
• PNO Phase 2 (Q4, 2005)

Drug Information Systems
• ODPV Phase 2
• ADAP

Laboratory Information Systems – Phase 2

iEHR – Phase 0 (Q3, 2005)

Telehealth – Phase 0/1 (Q3, 2005)

Public Health Surveillance – Phase 1 (Q3, 2005)
Registries Investment Program

2005-06 Client Registries Actions

- Project Planning in ON, NS, YK
- Project Implementation in BC, AB, SK, MB, QC, NB
- Complete in AB (urban), NL, PE
- Pan-Canadian HL7 v3 messaging standards for client registries

% Population Uniquely Identified

- ON 38.3%
- QC 23.1%
- AB (urban) 6.2%
- BC 13.2%
- AB (rest) 3.8%
- SK 3.1%
- MB 3.7%
- NL 1.6%
- NB 2.3%
- NS 2.9%
- PE 0.4%
- NT 0.1%
- NU 0.1%

Phase 0/1 underway: 8.2%
Phase 2 underway: 25.2%
Completed: 32.2%

FY
04/05 05/06 06/07 07/08
8.2% 25.2% 32.2% 99%
Registries Investment Program

2005-06 Provider Registries Actions

- Project Implementation in QC, NS, NB, PE, NL (HIA)
- Projects Complete in BC, AB, SK, MB
- Pan-Canadian HL7 v3 messaging standards for provider registries

% Physicians Uniquely Identified

04/05 29.3%
AB 9.5%
SK 2.6%
MB 3.5%
BC 13.7%
QC 26.4%
HIA (NB,NS,PE,NL) 7.1%
ONT 0.1%
NT 0.1%
NT 0.1%
Diagnostic Imaging Investment Program

2005-06 Diagnostic Imaging Systems Program Actions

- Project Planning in QC, NT
- Project Implementation in BC, AB, SK, MB, ON, QC, NS, NB, NL
- Project Completed in BC (FHA), ON (TVHPP)

Target Planning Implementation Completed

% Exams Digitally Stored

- FY 2005/06: 48.2%
- FY 2006/07: 35.8%
- FY 2007/08: 95%
- FY 08/09: 95%

- ON-TVHPP: 32.2%
- BC-FHA: 3.6%
- Completed: 12.4%

Map of Canada with various regions marked for planning, implementation, and completion status.
Drug Information Systems Investment Program

2005-06 Drug Information Systems Program Actions

- Project Planning in BC, YK
- Project Implementation in AB, SK, ON, QC, PE, NL
- Pan-Canadian HL7 v3 clinical drug messaging standards completed

Target Planning Implementation Completed

% Population Covered

- BC 13.2%
- MB 3.7%
- PE 0.4%
- ON 38.8%
- QC 23.5%
- SK 3.1%
- AB 10.0%
- NB 2.3%
- NS 2.9%
- NT 0.1%
- NU 0.1%
- NL 1.6%
- YK 0.1%

Phases:
- Phase 0/1 underway
- Phase 2 underway
- Completed
Laboratory Information Systems Investment Program

2005-06 Laboratory Information Systems Program Actions

- Project Planning in MB, QC, NL
- Project Implementation in BC, AB, SK, ON, PE
- Pan-Canadian HL7 v3 laboratory messaging standards project initiated

Target Planning Implementation Completed

2005-06 Phase 0/1 underway

Completed

% Population Covered

- AB 2.1%
- BC 13.7%
- ON 38.6%
- PE 4%
- SK 3.1%
- MB 3.7%
- NL 1.6%
- QC 23.6%
- YK 0.1%
- NT 0.1%
- NU 0.1%
- NB 2.3%
- NS 2.9%

07/08 62.5%
09/10 100%
08/09 100%
08/08 94.5%
07/08 62.5%
Public Health Surveillance Investment Program

2005-06 Public Health Surveillance Program Actions

- Pan-Canadian solution design and development
- Project Planning in BC, ON, QC, NS, NB, PE, NL (HIA)
- Pan-Canadian PHS Standards project initiated

Target Planning Implementation Completed

2005-06 % Population Covered

<table>
<thead>
<tr>
<th>Province</th>
<th>FY 07/08</th>
<th>FY 08/09</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC</td>
<td>10.0%</td>
<td>13.2%</td>
</tr>
<tr>
<td>AB</td>
<td>7.2%</td>
<td>10.0%</td>
</tr>
<tr>
<td>SK</td>
<td>3.7%</td>
<td>3.1%</td>
</tr>
<tr>
<td>MB</td>
<td>38.8%</td>
<td>38.8%</td>
</tr>
<tr>
<td>YK</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>SK</td>
<td>3.7%</td>
<td>3.1%</td>
</tr>
<tr>
<td>NT</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>NU</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>SK</td>
<td>3.7%</td>
<td>3.1%</td>
</tr>
<tr>
<td>ON</td>
<td>38.8%</td>
<td>38.8%</td>
</tr>
<tr>
<td>QC</td>
<td>23.6%</td>
<td>23.6%</td>
</tr>
<tr>
<td>HIA</td>
<td>7.2%</td>
<td>7.2%</td>
</tr>
<tr>
<td>(NB, NS, PE, NL)</td>
<td>0%</td>
<td>0%</td>
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Phase 0/1 projects forecast to begin in FY 2005/06.
Telehealth Investment Program

2005-06 Telehealth Program Actions
- Planning in all jurisdictions
- Projects underway in BC, MB, QC, NB, NL, NU

% Community Coverage

- FY 09/10: 100%
- FY 08/09: 71.5%
- FY 07/08: 53.3%
- FY 04/05: 41.6%

Completed 41.6%

Target  Planning  Implementation  Completed
iEHR Investment Program

2005-06 iEHR Program Actions

- Project Planning in SK, MB, ON, NB, NL, YK, NU
- Project Implementation in BC, AB, QC, NS, PE, NT
- Pan-Canadian iEHR standards project initiated

Target Planning Implementation Completed

% of Target Population Coverage

Completed

Phase 0/1 underway

Completed
Positive Signs of Progress

The Signs

- All investment programs are approved by the board
- Reviews of programs will be conducted to optimize the investment

Annual 3 year jurisdiction planning will ensure alignment

- Continues in 2005-06

More collaboration / common action among jurisdictions

- Coordinated RFPs (e.g. AB, MB on EMPI)
- Joint Procurement in Diagnostic Imaging
- Shared Services Models within and among jurisdictions (e.g. HIA Health Surveillance)

The jurisdiction EHR spend is starting to increase

- We are seeing increasing EHR spend in most jurisdictions
- Changing the investment ratio has been received positively
Challenges

Adoption / Acceptance by healthcare professionals

- Physician automation remains a major challenge [CMA/Infoway Survey]
- Working with the Deputy Ministers to move this agenda forward

Infoway capitalization insufficient to achieve objectives

- The 10 year cost of acquisition for a pan-Canadian EHR, covering all Canadians and all domains, is estimated to be $10 billion
- The 10 year total cost of ownership for a pan-Canadian EHR, covering all Canadians and all domains, which includes both acquisition and recurring costs is estimated to be $22.7 billion.
- Based on Infoway’s current mandate of a limited EHR implementation, Booz Allen estimates Infoway’s projected costs to be $4.1 billion.
Challenges

Ability of some jurisdictions to support several programs

- In the last 2-5 years there has been a significant increase in EHR activity in Canada and around the world
- Jurisdictions are finding it harder to recruit and retain the required skills sets
- The issues around quality and quantity of resources are especially apparent in smaller and remote regions
- A number of health informatics programs, at all levels, are now being offered at colleges and universities across the country (e.g. Conestoga College in Kitchener and U of Waterloo Bootcamp)

Benefits evaluation

- Bottom-up research necessary
Challenges

Interoperable standards

- Use of Pan-Canadian messaging and vocabulary standards are key to interoperability
- Standards are being developed to support EHR initiatives but the standards development process is slow
- Infoway is actively engaged national and international

Managing Multi-Million Dollar Projects
Criteria for Success

- **Commitment** – Strong support to complete the job together
- **eHealth Strategy** – clear, concise, pragmatic and well understood
- **eHealth Governance** – collaborative leadership to get the job done quickly and effectively
- **Project Leadership** – the key players are in place with the know-how to get the job done
- **Human Resources** – the right mix of qualified public and private sector resources are in place
- **Technology** – a well designed set of interoperable commercial solutions - custom develop only as a last resort
- **Deployment** – a sensible staged approach to deploying the EHR
- **Change Management** - well designed approach that stimulates adoption by clinicians, especially physicians
- **Privacy** – the rules around consent and access to information are clear
Infoway Focus

End-User Focus

• End-user adoption strategy approved by Infoway Board of Directors
• Clinical Advisors appointed to support the implementation of the strategy and related initiatives within the clinician community
  – Dr. Lynn Nagle
  – Dr. Bob Burns
  – Dr. Mark Dermer

EHR Funding

• Infoway continues to advocate for the implementation of electronic health records solutions at all levels of government
Infoway Focus

Measure and Communicate Benefits

• **Benefits Framework** - the over-arching benefits framework plus the indicators and measurement approach for investments are “under construction”.

• **Sampling approach** – not all projects will be measured; a sampling of projects will be used.

• **Focus on key indicators** – there will be 3-4 key indicators per investment program that are measured.

• **Develop credible evidence** – use the appropriate measurement technique, including primary research, to develop evidence that is credible and can withstand peer review – has to be the basis for benefits that are truly realizable.

• **Confirm top-down analysis** – use the “bottom-up evidence” to confirm or modify the original top-down analysis.
Electronic Health Records for Better Health Care

**Reduced Wait Times**

**Better Prescribing Practices**

**Improved access to care in rural and remote communities**

**Complete and accurate clinical information to diagnose and treat**

**Less administrative burden, More time for patients**
Electronic Health Records for Better Health

Less adverse drug events

Better therapeutic outcomes

Healthier lifestyles

Well managed chronic illness

Increased patient participation in care
Thank-you!