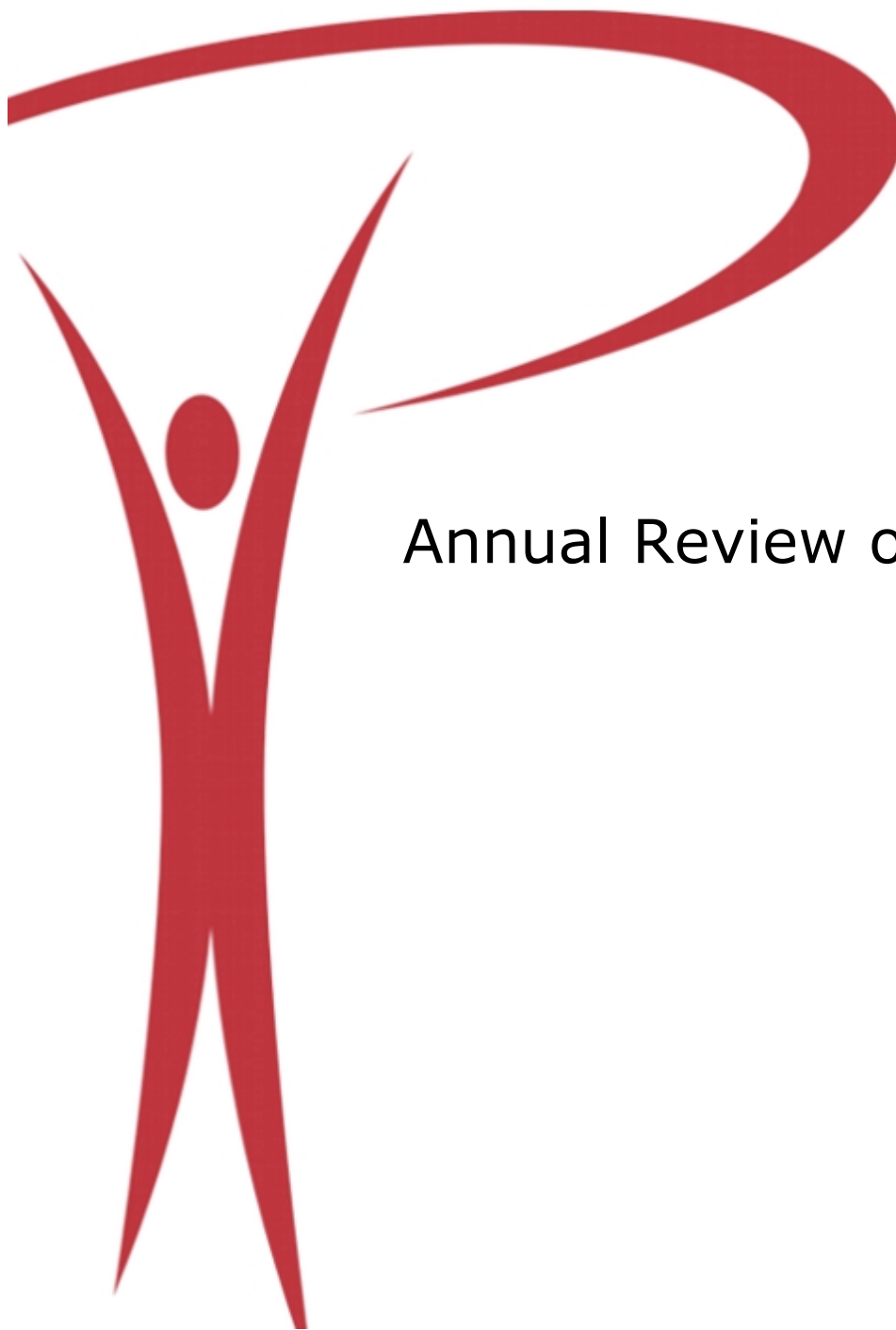




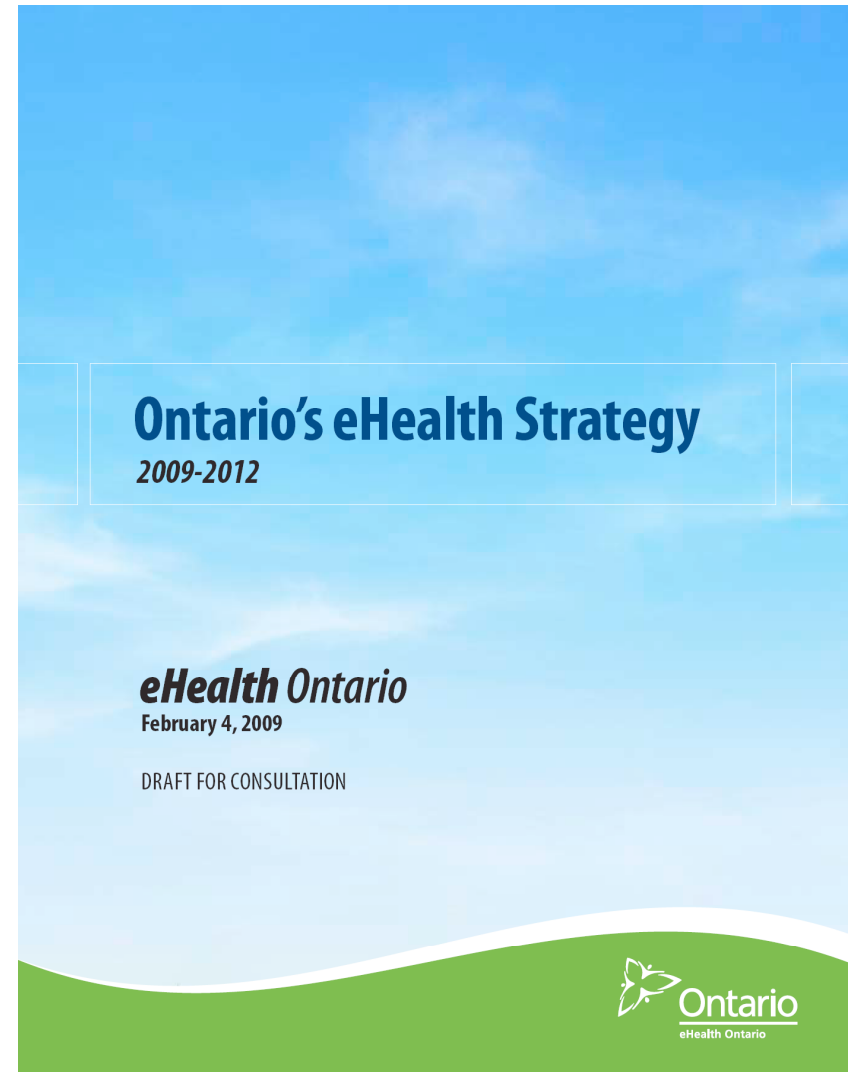
Annual Review of IM/IT in Healthcare

Breakfast with the Chiefs
March 3, 2009



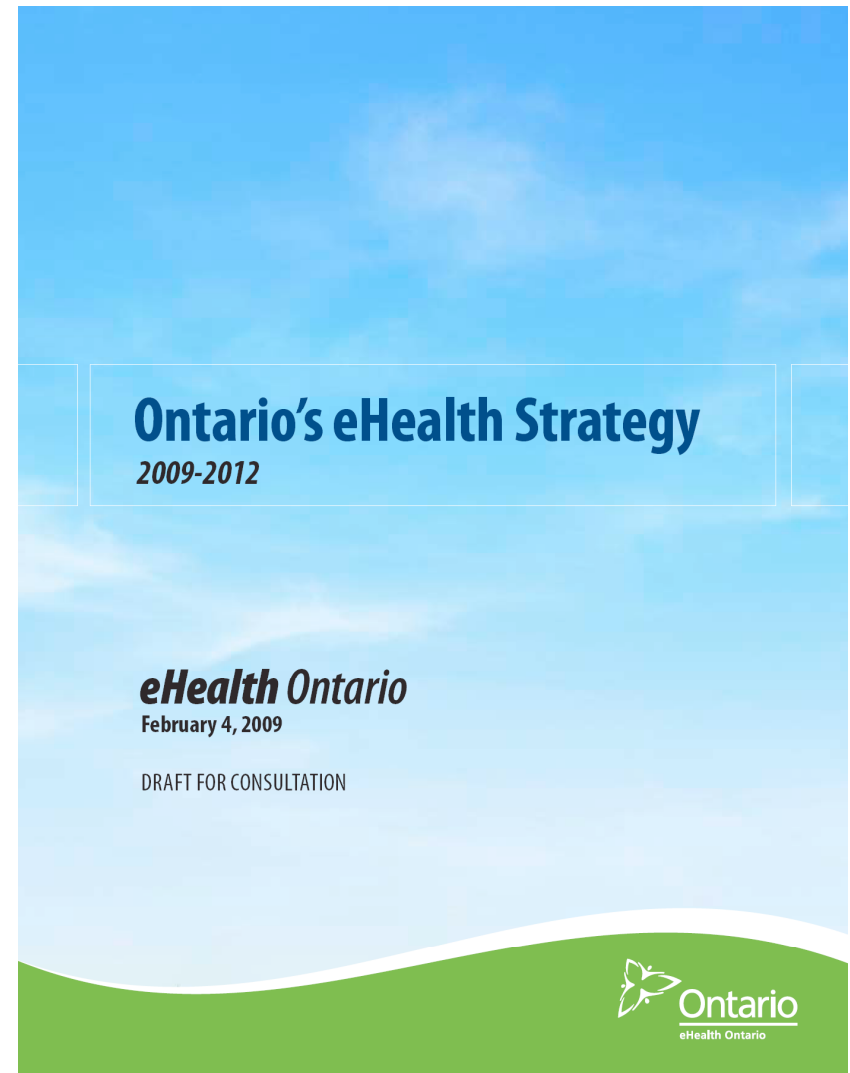
The draft Ontario eHealth Strategy is based on ten principles

-  **eHealth Ontario will focus on enabling clinical outcomes (value) for better patient care, not technology for its own sake**
-  **Early clinical benefits are the key to building and sustaining support for the eHealth Strategy**
-  **The eHealth Strategy will be transparent**
-  **Advice from experts with a track record of success will be sought**
-  **Performance metrics and success indicators will be measured and reported publicly**
-  **Partnerships will be established to deliver eHealth solutions**
-  **Deployment models will vary by project**
-  **Wherever possible, legacy systems will be leveraged to achieve provincial goals**
-  **Clinical content of solutions must be relevant and complete**
-  **Clinicians will be engaged early and often to ensure project success**



Guiding Principle

***eHealth Ontario* will focus on enabling clinical outcomes (value) for better patient care, not technology for its own sake.**



The Ontario eHealth Strategy is focused on achieving three clinical imperatives

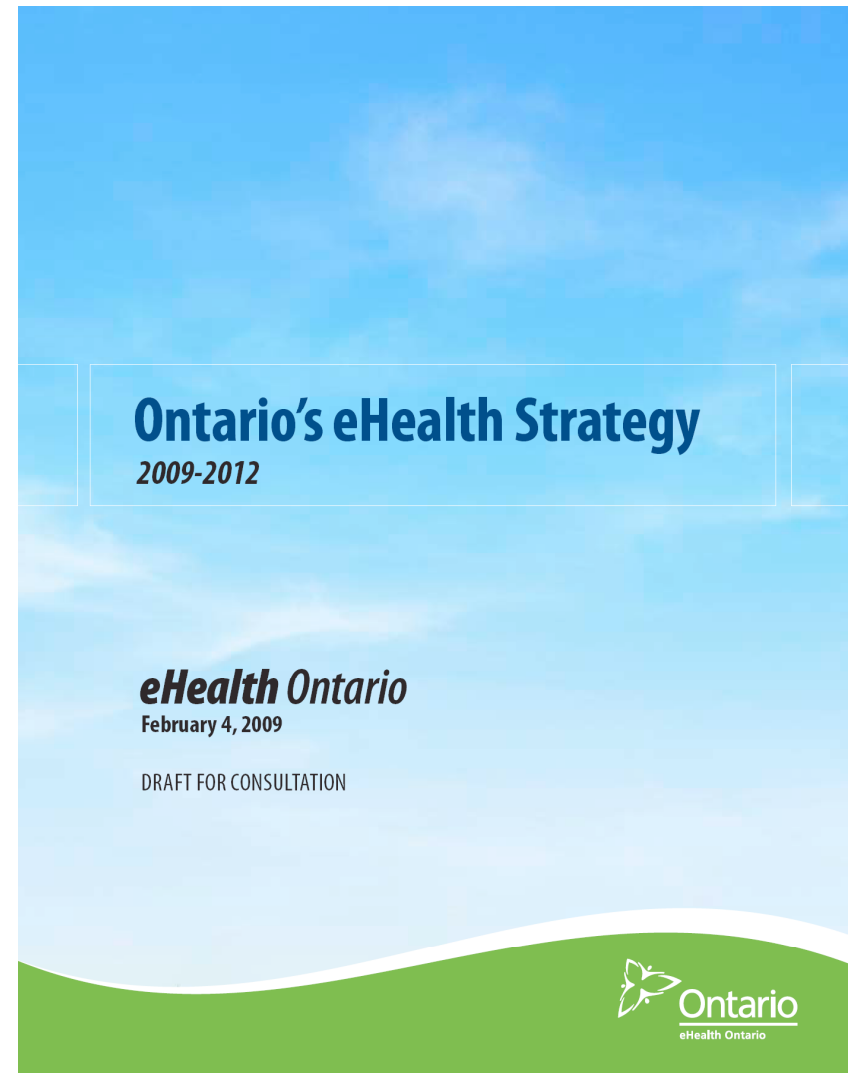
Clinical Strategy		
Diabetes Management	Medication Management	Wait Times
<i>eHealth Ontario</i> will Monitor patient compliance with evidence-based interventions Alert physicians when best practices not being followed Report on care gaps	<i>eHealth Ontario</i> will Enable online prescriptions & medication history Provide decision support for physicians ordering drugs Alert clinicians of potential adverse drug events	<i>eHealth Ontario</i> will Enable public reporting & performance management Expedite patient referrals out of acute care where appropriate Divert ER visits to more appropriate community care settings
To Reduce Blindness Heart attacks Amputations Renal failure Deaths	To Reduce Adverse drug events Physician office visits Hospitalizations Deaths	To Reduce ER length of stay Wait times To Increase Focus of ERs on most urgent patients Access to community services
Measured By % patients receiving best practice care*	Measured By % prescriptions ordered online % reduction in adverse drug events	Measured By ER length of stay Wait for post acute care

* Based on 4 services: HbA1c, foot exam, retinal exam and LDL

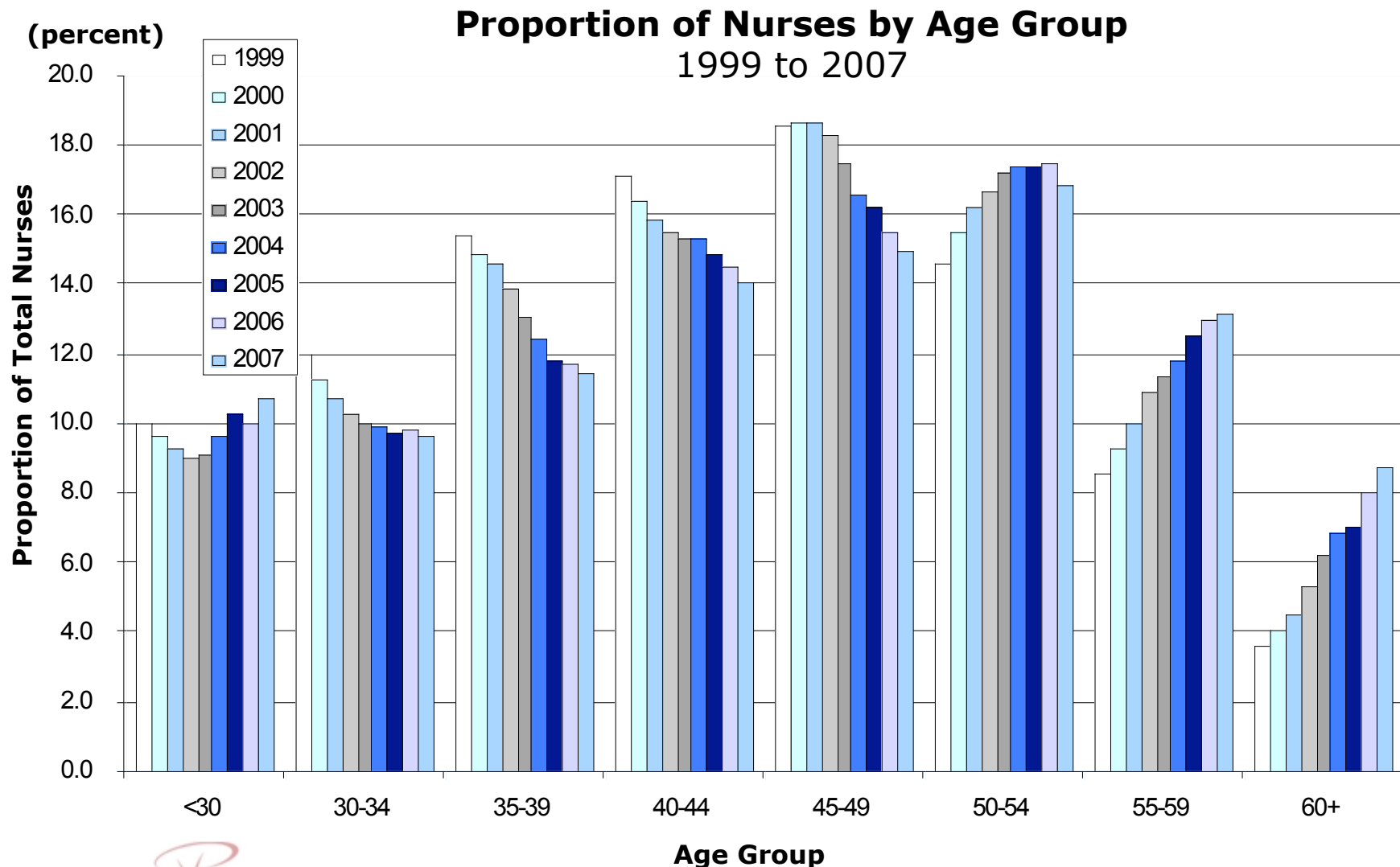
Guiding Principle

Early clinical benefits are the key to building and sustaining support for the eHealth Strategy

Meaningful clinical impact must be demonstrated in the first 18 months of each eHealth initiative

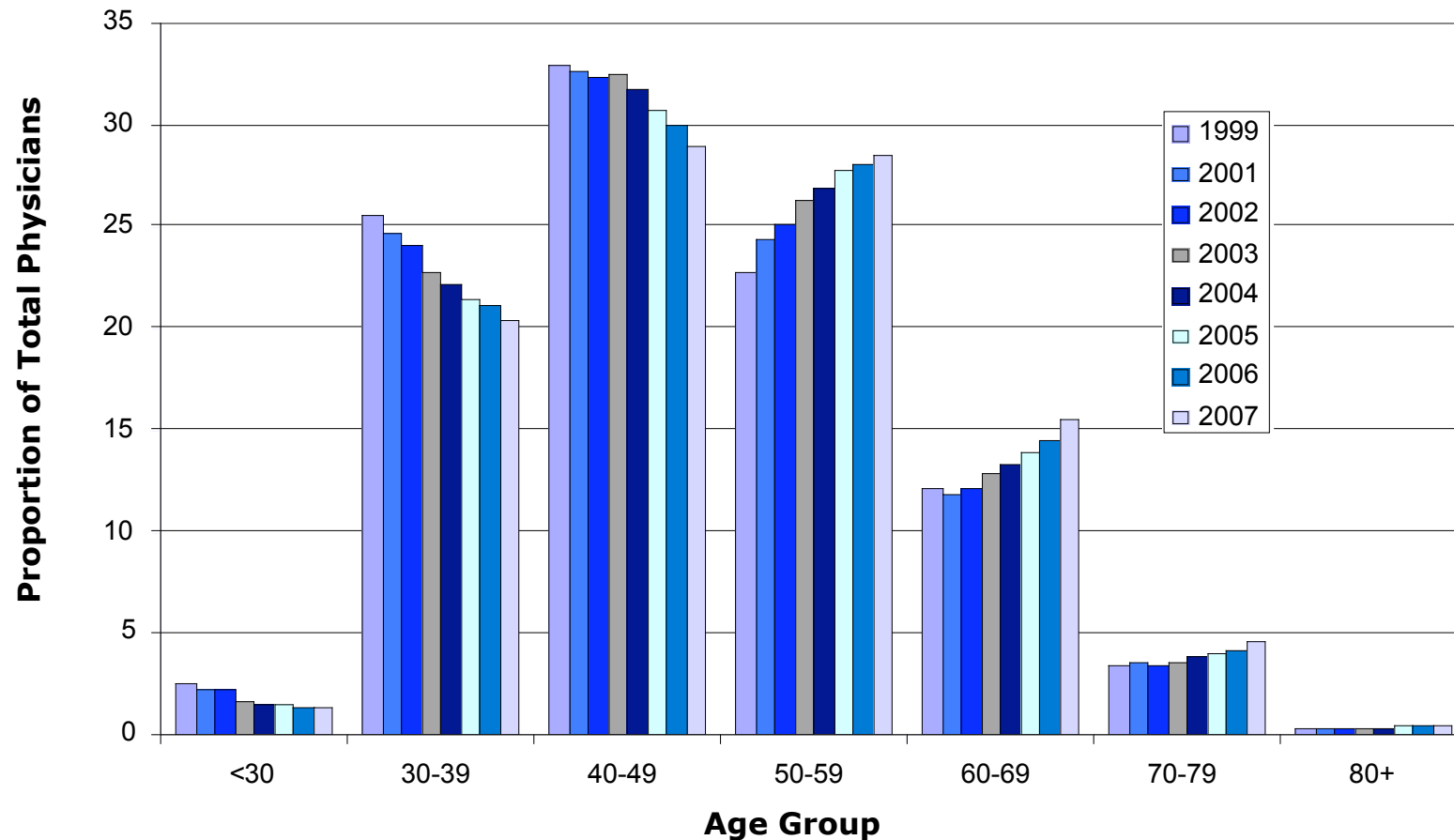


Clinician demographics continue to challenge the system



Physician demographics show a similar pattern

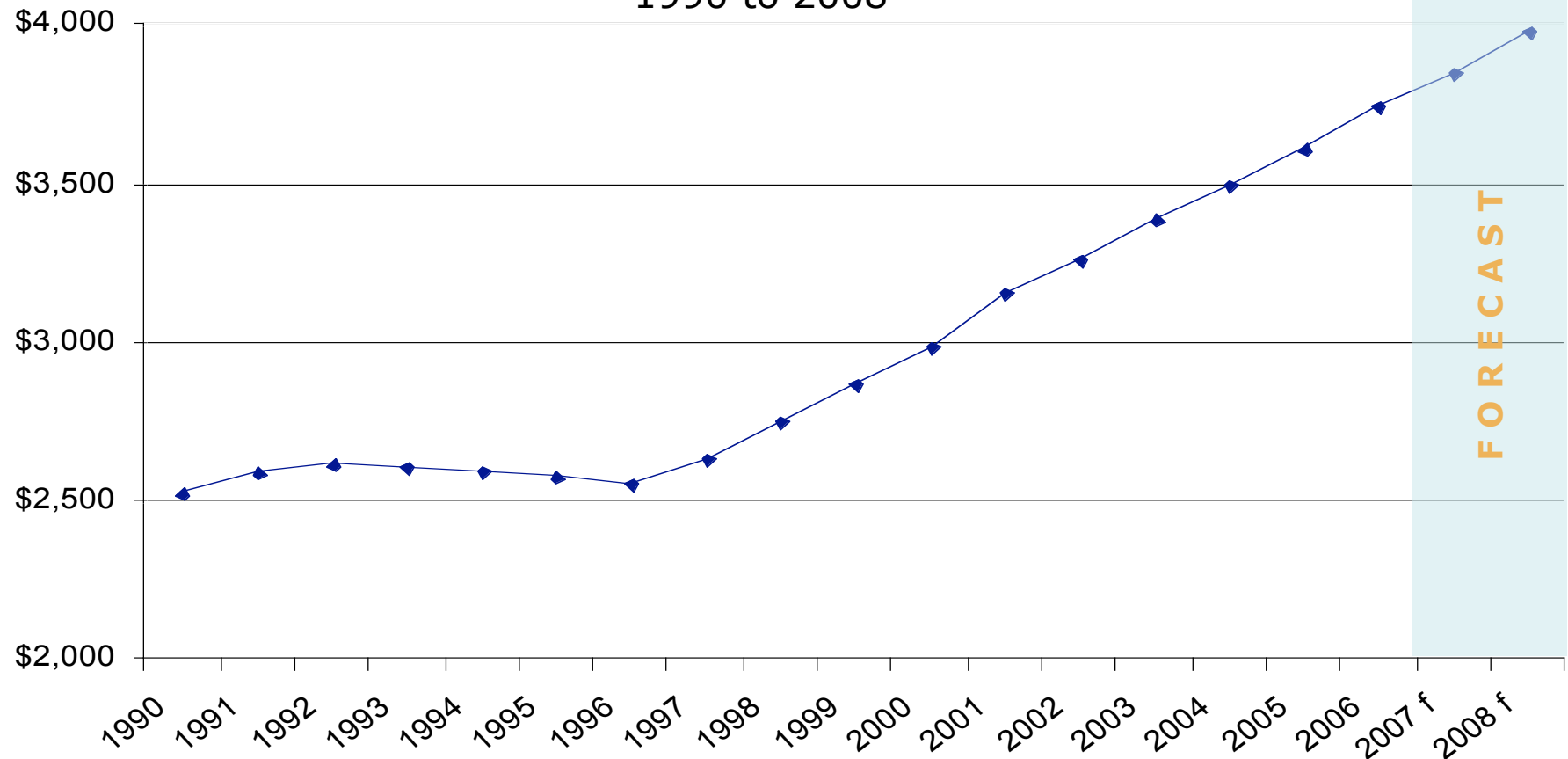
Proportion of Physicians by Age Group
1999 to 2007



Healthcare expenditures in Canada continue to increase

Per Capita Health expenditures in Canada

1990 to 2008

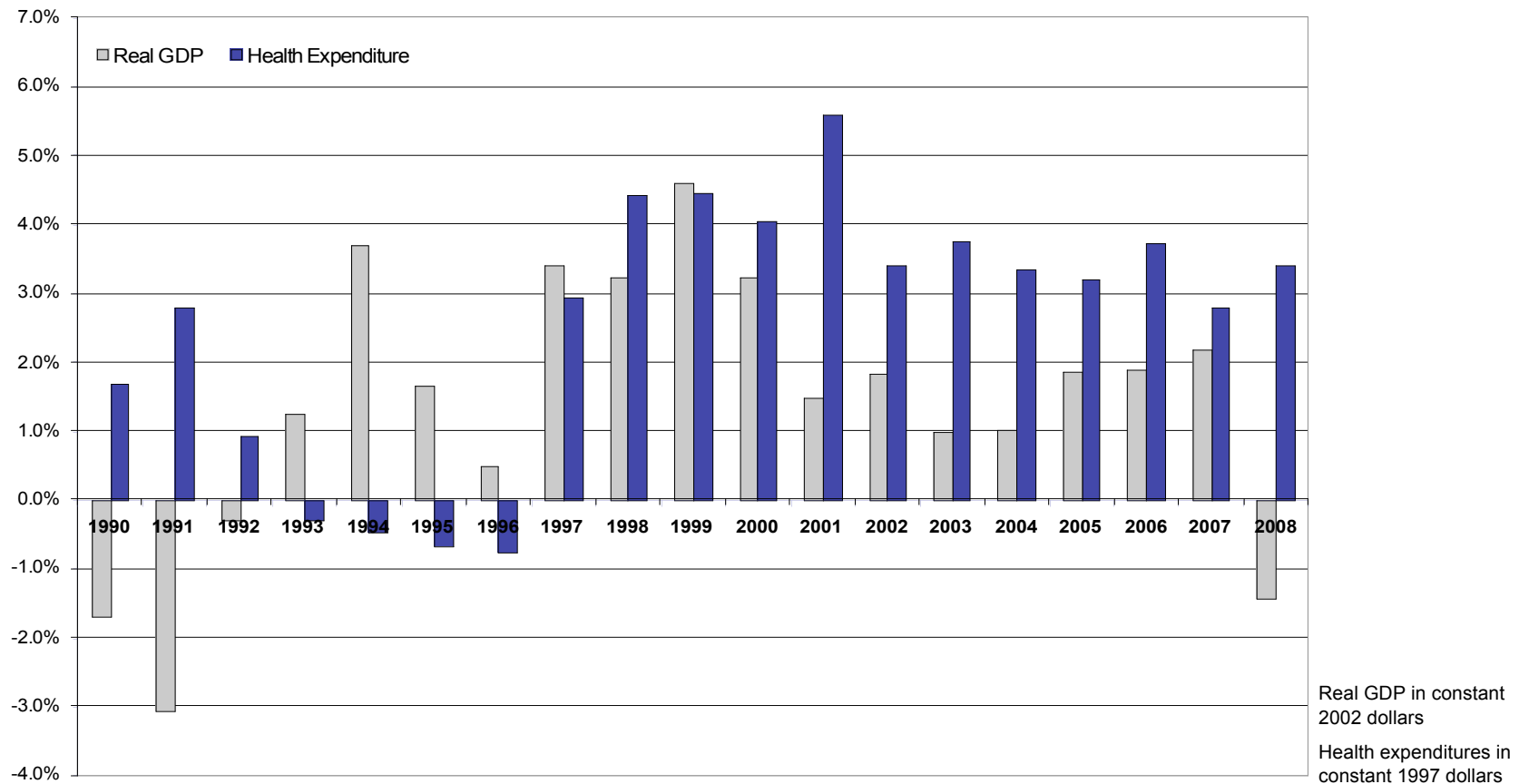


Note: Real growth is expected to have been 3.8% in 2007 and 4.3% in 2008.

Healthcare spending has grown faster than the economy in the last decade

Annual Canadian Growth Rate in Health Expenditures & Real GDP

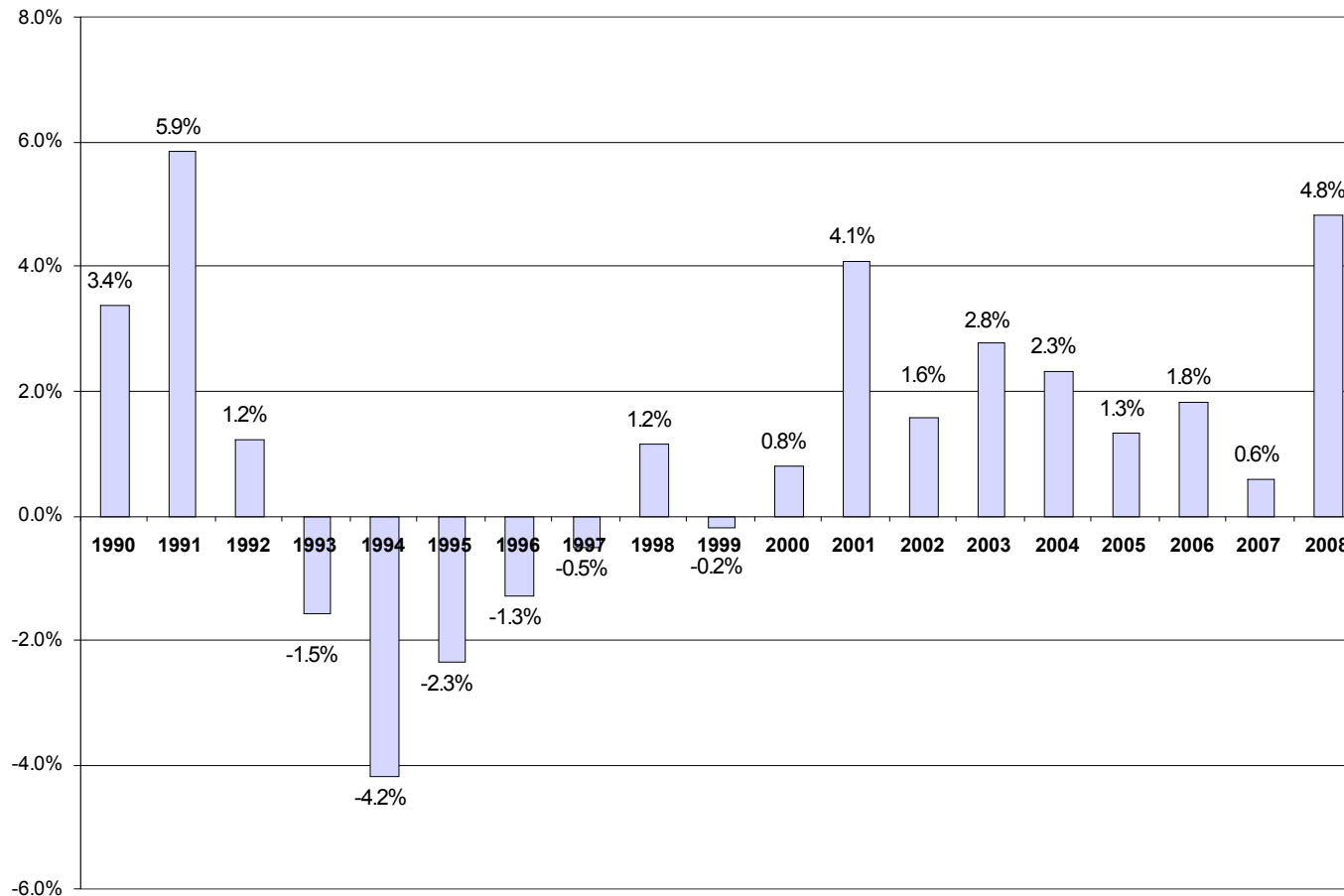
1990 to 2008



Healthcare spending that outstrips economic growth is unsustainable in the long term

Growth in Health Expenditures Exceeding Real GDP Growth

1990 to 2008

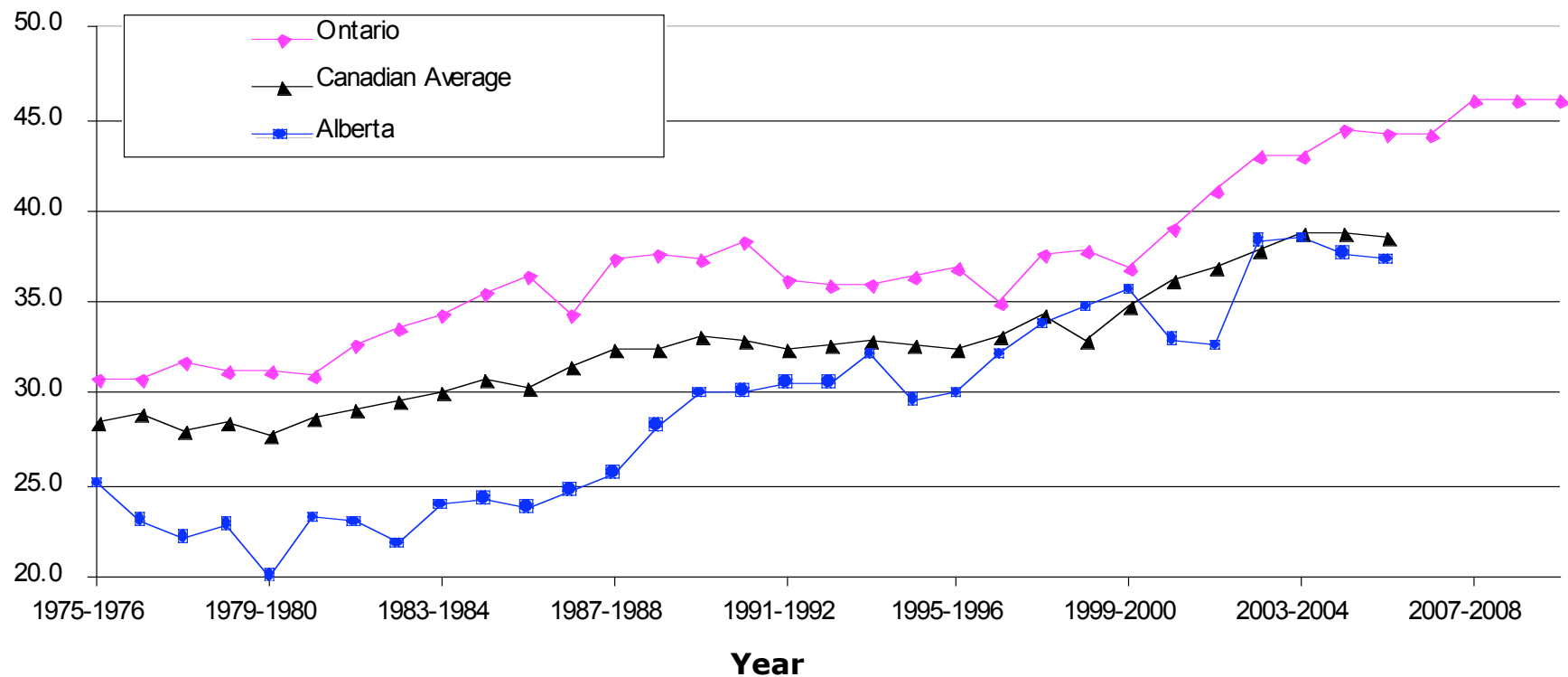


Health consumes an ever greater proportion of the provincial budget

Provincial health expenditures, as a % of provincial expenditures

1975-1976 to 2005-2006

(percent)



Study shows correlation between degree of hospital automation and clinical performance

ORIGINAL INVESTIGATION

Clinical Information Technologies and Inpatient Outcomes

A Multiple Hospital Study

Ruben Amarasingham, MD, MBA; Laura Plantinga, ScM; Marie Diener-West, PhD; Darrell J. Gaskin, PhD; Neil R. Powe, MD, MPH, MBA

Background: Despite speculation that clinical information technologies will improve clinical and financial outcomes, few studies have examined this relationship in a large number of hospitals.

Methods: We conducted a cross-sectional study of urban hospitals in Texas using the Clinical Information Technology Assessment Tool, which measures a hospital's level of automation based on physician interactions with the information system. After adjustment for potential confounders, we examined whether greater automation of hospital information was associated with reduced rates of inpatient mortality, complications, costs, and length of stay for 167 233 patients older than 50 years admitted to responding hospitals between December 1, 2005, and May 30, 2006.

Results: We received a sufficient number of responses from 41 of 72 hospitals (58%). For all medical conditions stud-

ied, a 10-point increase in the automation of notes and records was associated with a 15% decrease in the adjusted odds of fatal hospitalizations (0.85; 95% confidence interval, 0.74-0.97). Higher scores in order entry were associated with 9% and 55% decreases in the adjusted odds of death for myocardial infarction and coronary artery bypass graft procedures, respectively. For all causes of hospitalization, higher scores in decision support were associated with a 16% decrease in the adjusted odds of complications (0.84; 95% confidence interval, 0.79-0.90). Higher scores on test results, order entry, and decision support were associated with lower costs for all hospital admissions (-\$110, -\$132, and -\$538, respectively; $P < .05$).

Conclusion: Hospitals with automated notes and records, order entry, and clinical decision support had fewer complications, lower mortality rates, and lower costs.

Arch Intern Med. 2009;169(2):108-114

Author Affiliations: Center for Knowledge Translation and Clinical Innovation, Parkland Health & Hospital System and Department of Medicine, University of Texas Southwestern Medical Center, Dallas (Dr Amarasingham); Departments of Epidemiology (Ms Plantinga and Dr Powe), Biostatistics (Dr Diener-West), and Health Policy and Management (Dr Powe), Bloomberg School of Public Health, and Department of Medicine (Dr Powe) and Welch Center for Prevention, Epidemiology, and Clinical Research (Ms Plantinga and Dr Powe), The Johns Hopkins University School of Medicine, Baltimore, Maryland; and Department of African American Studies, University of Maryland, College Park (Dr Gaskin).

IN RECENT YEARS, AMERICAN HEALTH care has been criticized as fragmented, expensive, unsafe, and unfair.¹ Clinical or "health" information technologies, such as electronic medical records, computerized provider order entry systems, and clinical decision support systems, have emerged as one antidote, promising reductions in waste, gains in communication, improvements in quality, and new accountabilities through automated performance measurement. Benefits have emerged.^{2,3} However, studies examining the

impact of these technologies are not easily generalized; most studies are limited to single-site evaluations, often academic hospitals that have developed their systems internally and incrementally, sometimes for decades.⁴ In contrast, most US hospitals must consider purchasing commercially developed information systems with a broad range of elec-

tronic capabilities. Few studies have been performed across multiple hospitals to forecast the effect of clinical information technologies in these settings.

For editorial comment see page 105

The clinical information system of a hospital can be divided into 4 principal subdomains: notes and records, test results, order entry, and decision support. Information in each of these areas would ordinarily be managed through paper-based systems; to the degree that a hospital is "paperless," these functions are automated. We previously developed a physician-based assessment tool that quantifies the degree to which a hospital has effectively computerized these 4 subdomains. The instrument has demonstrated reliability and validity.⁵ In this study, we examined the association between a hospital's automation and inpatient mortality, complications, costs, and length of stay

CME available online at www.jamaarchivescme.com and questions on page 103

(REPRINTED) ARCH INTERN MED/VOL 169 (NO. 2), JAN 26, 2009 WWW.ARCHINTERNMED.COM 108

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Methodology:

Researchers conducted a cross sectional study of 41 urban Texas hospitals which examined the association between a hospital's use of automation

- Notes and Records
- Order Entry
- Test Results
- Clinical decision support

And:

- Inpatient mortality
- Costs
- Complications
- Length of stay

Findings:

Hospitals with more automation also had fewer complications and lower costs.

Hospitals with more automation seem to show lower complication rates and lower case costs

Type of Automation	Inpatient Mortality	Patient Complications	Patient Costs	Length of Stay
Notes and records	●	●	●	●
Test results	●	●	-\$110	●
Order entry	●	●	-\$132	●
Decision support	●	-16%	-\$538	●

● No significant correlation with degree of automation

Note: Numbers shown have a p-value of <0.05

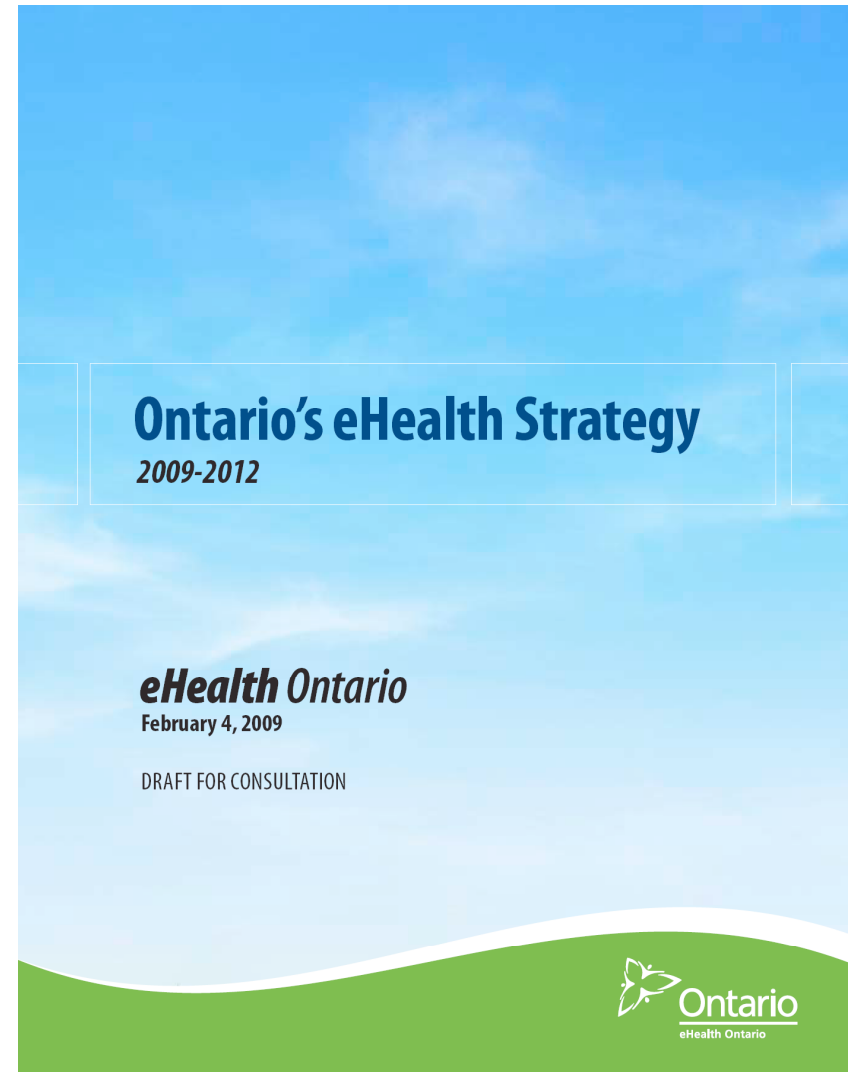
Guiding Principles

The eHealth Strategy will be transparent

Builds trust among those funding and deploying eHealth initiatives across the province

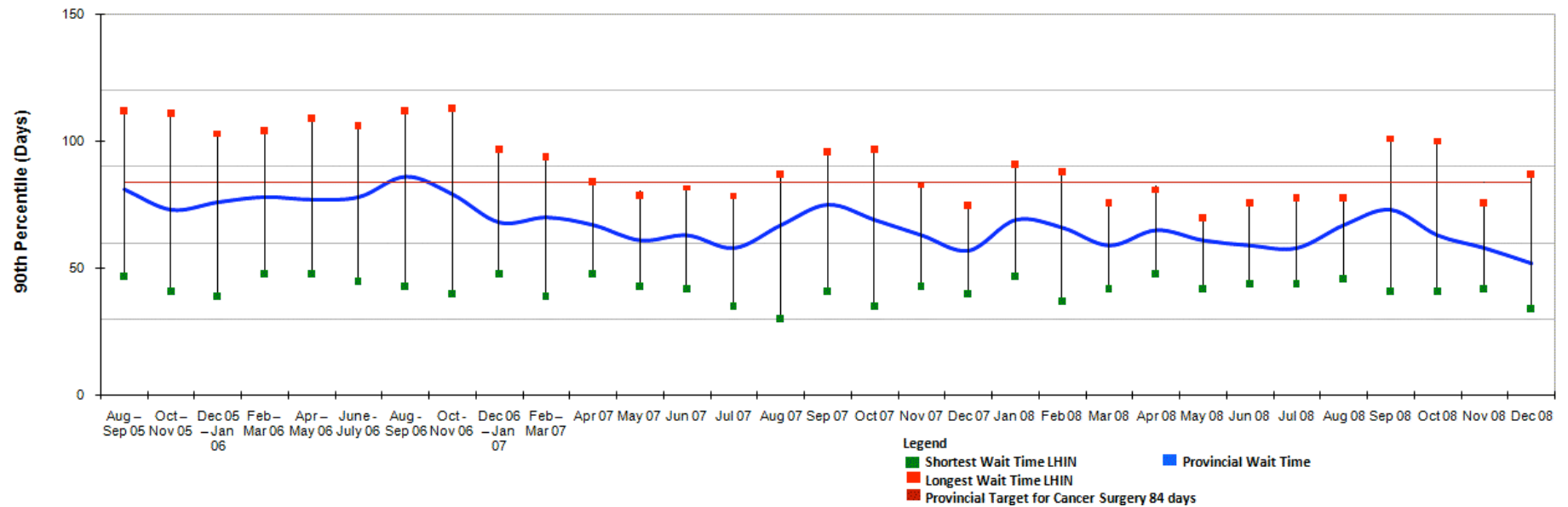
Performance metrics and success indicators will be measured and reported publicly

eHealth Ontario will track eHealth metrics for all health IT activities in Ontario
Goals will be expressed in clinically relevant terms



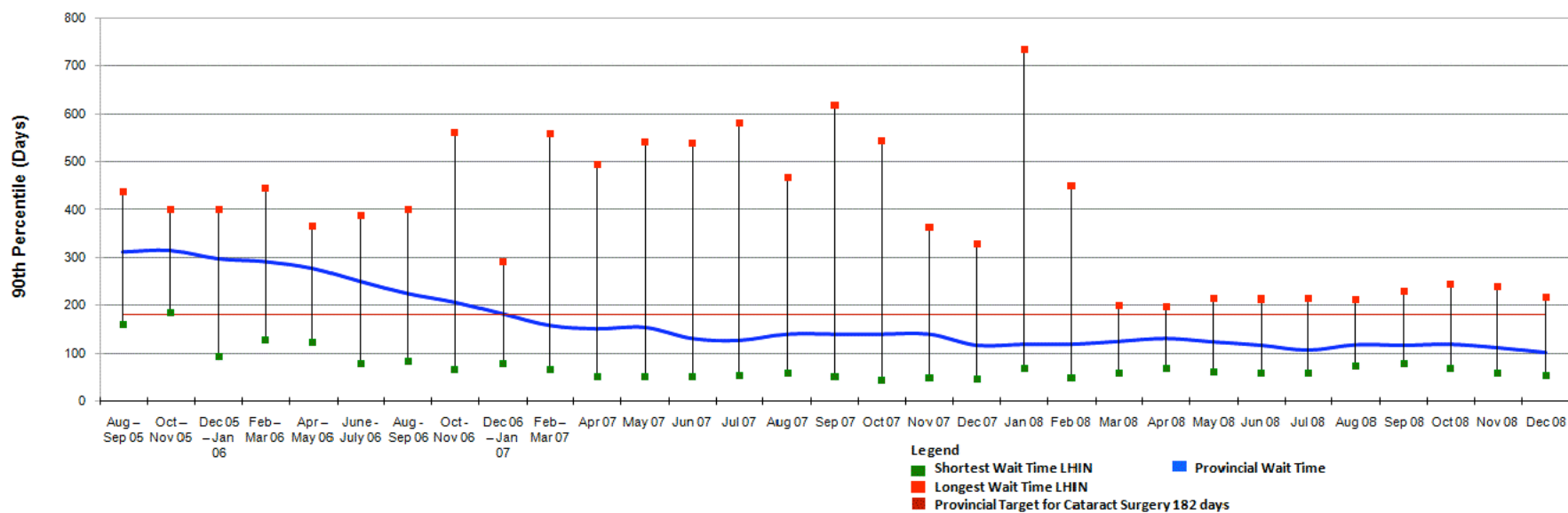
Cancer Surgery

90th Percentile Wait Times



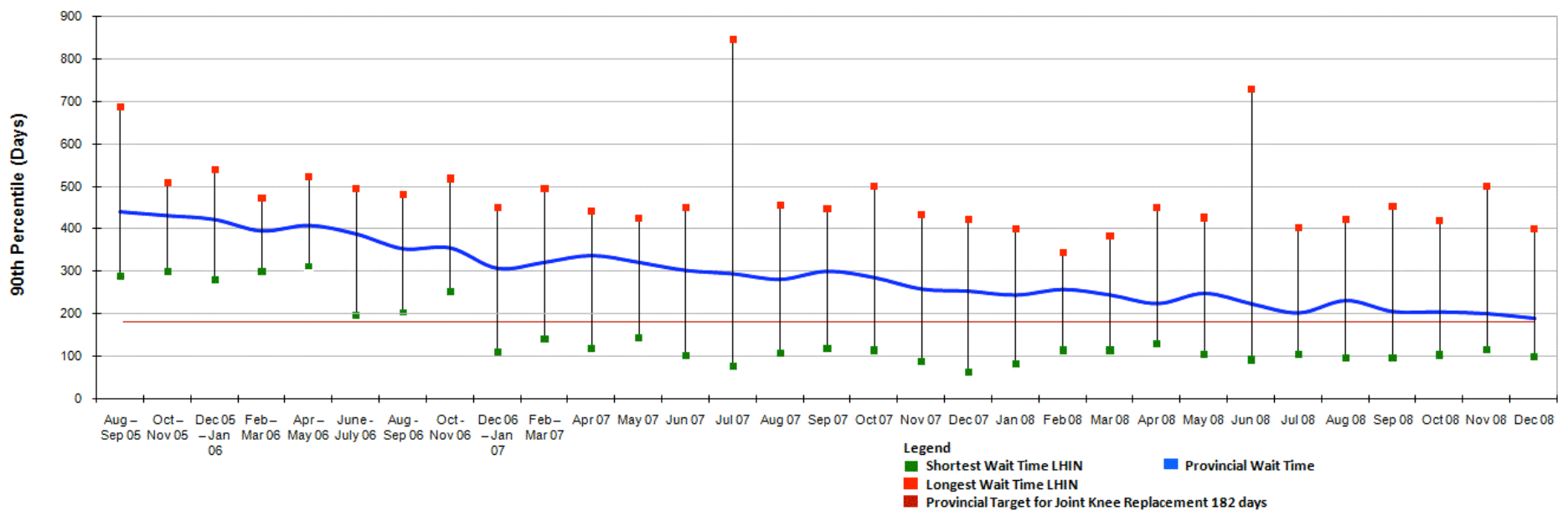
Cataract Surgery

90th Percentile Wait Times



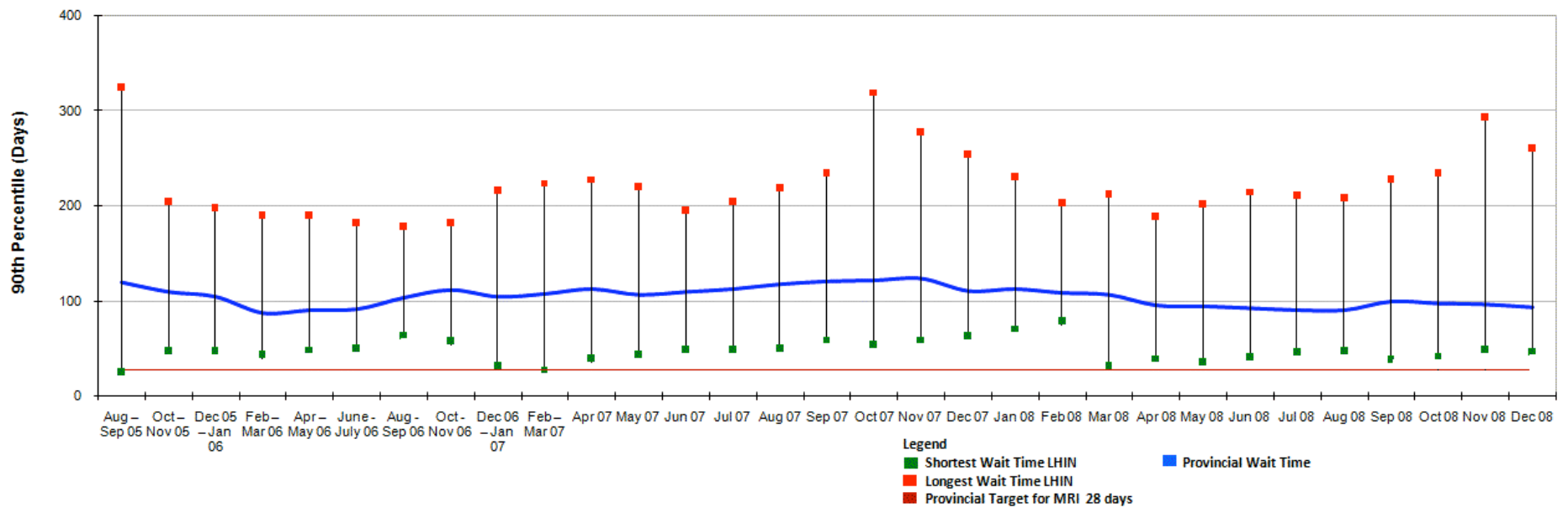
Joint Knee Replacement

90th Percentile Wait Times

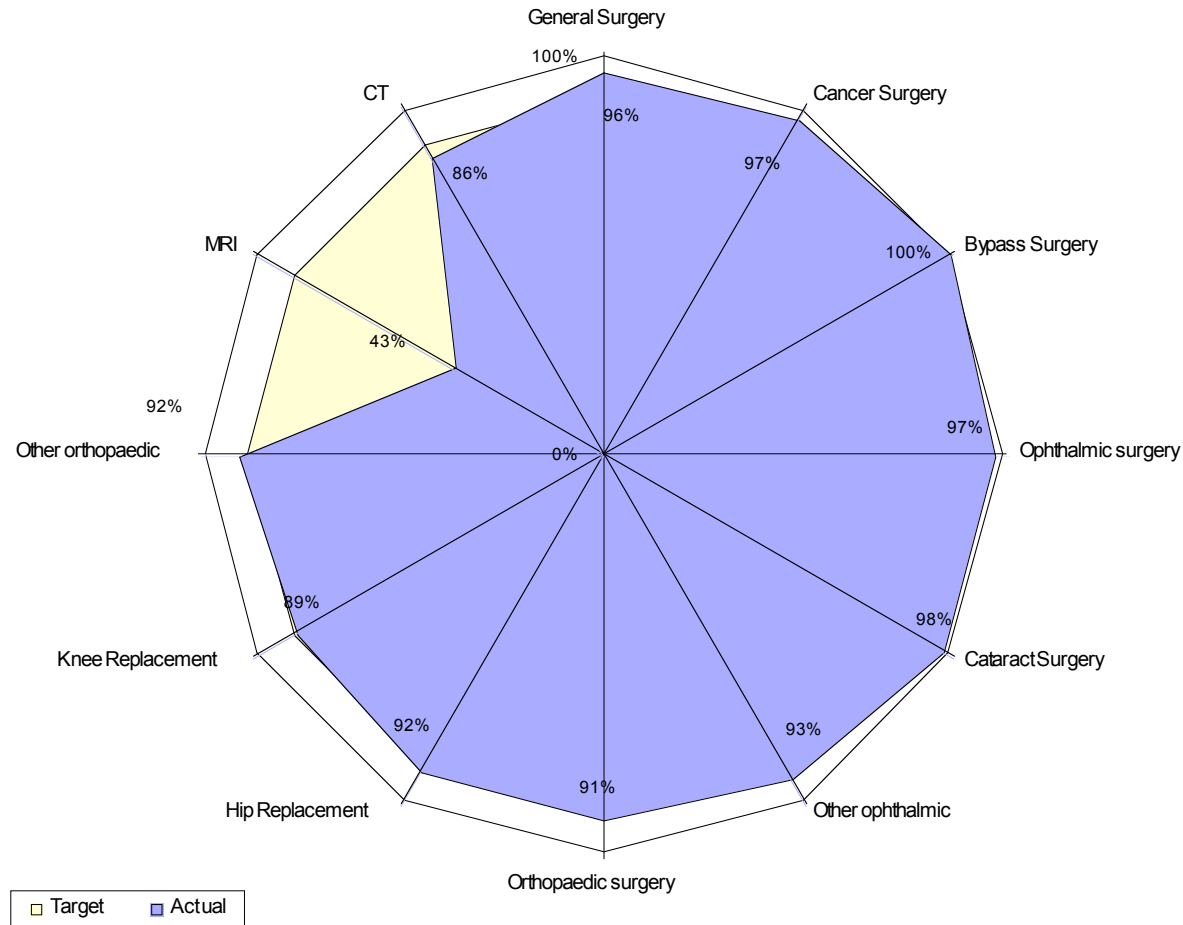


MRI

90th Percentile Wait Times



Cases Completed Within Target, December 2008

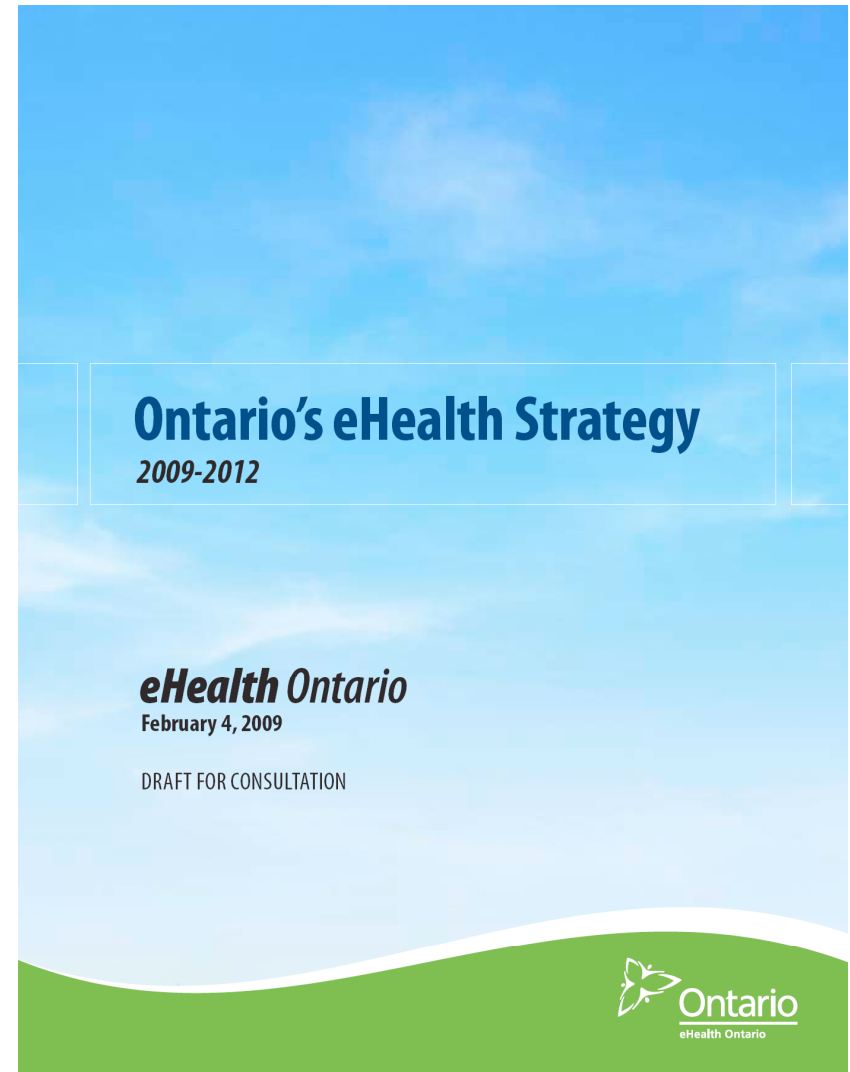


Guiding Principle

Advice from experts with a track record of success will be sought

People with a track record of successful engagement of clinicians in eHealth initiatives will be sought to take advisory and leadership positions in *eHealth Ontario*

Stakeholders across the province will be invited to voice opinions on the strategic direction of *eHealth Ontario* and offer recommendations for improvement



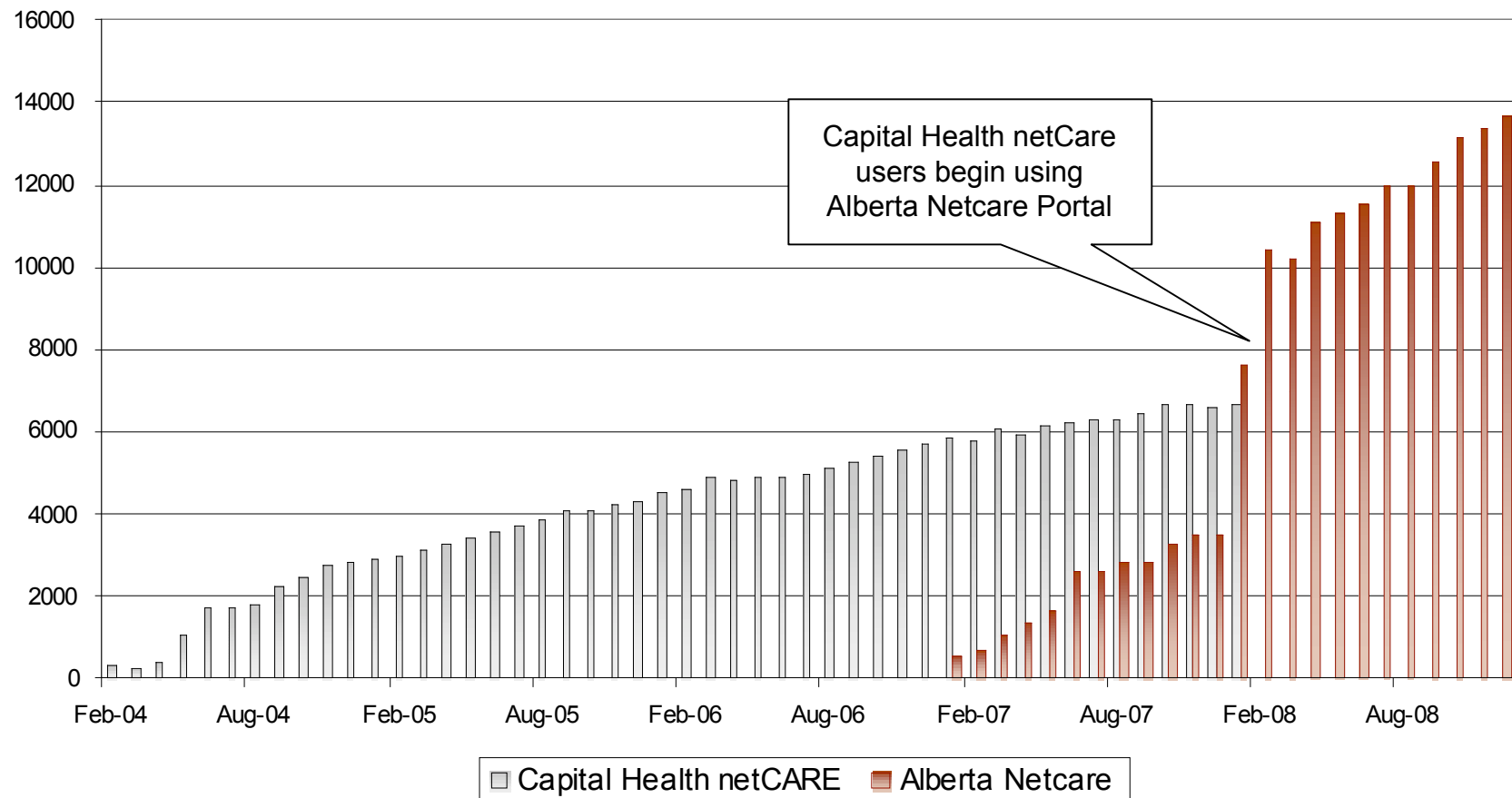
Allaudin Merali and Donna Strating created Alberta netCARE

- Capital Health Region (~1.1M residents) developed an EHR strategy and procured database and portal software to support it in 2003/04
- Alberta Government Health and Wellness (AHW) was engaged in a parallel effort to build a provincial EHR portal
- Notwithstanding the merits of the provincial portal, clinicians with access to both systems overwhelmingly favored the Capital Health portal, because it provided access to a more complete set of data on their patients
- AHW and Capital Health negotiated an agreement to make netCARE available across the province, linked to both provincial and local databases, and provided by Capital Health

**Access to comprehensive and accurate patient information
is the principal driver of clinical system adoption**

Alberta Netcare continues to enjoy broad clinical support

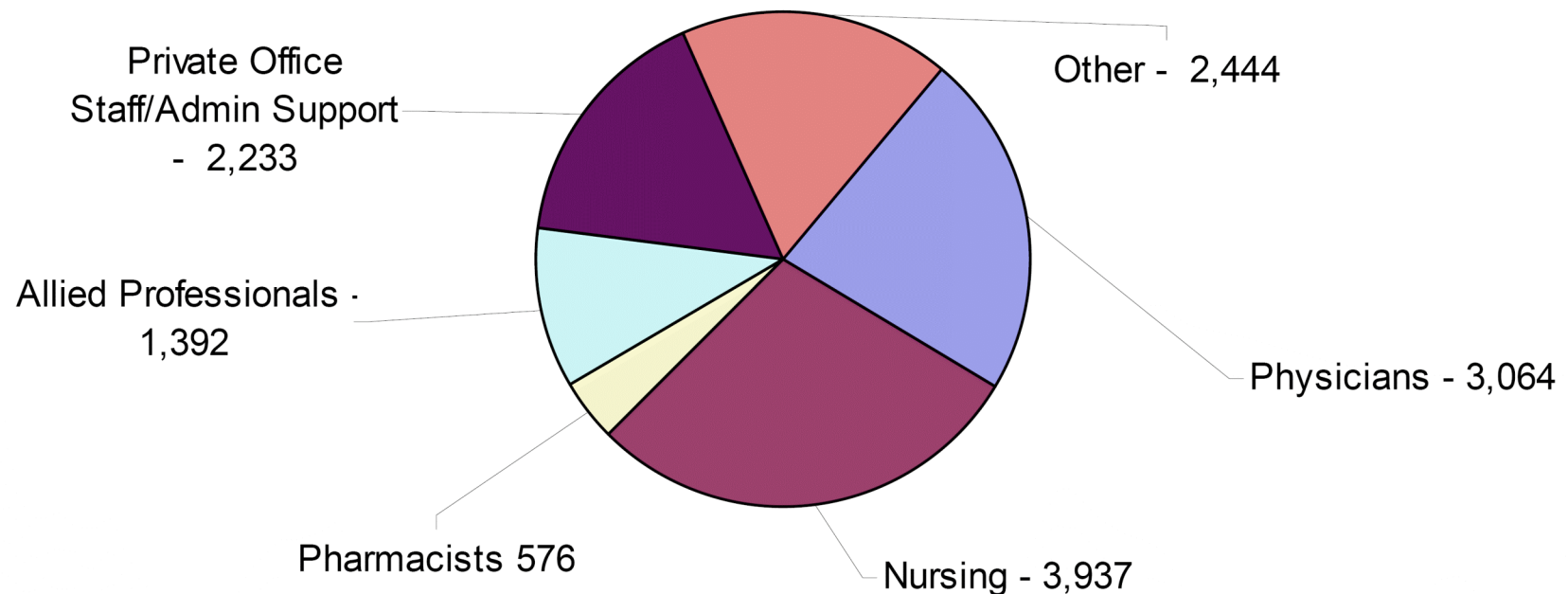
Active Users per Month



Clinician adoption of Netcare has been impressive

Active User Profile

Total Number of Users, December 2008 (13,646)



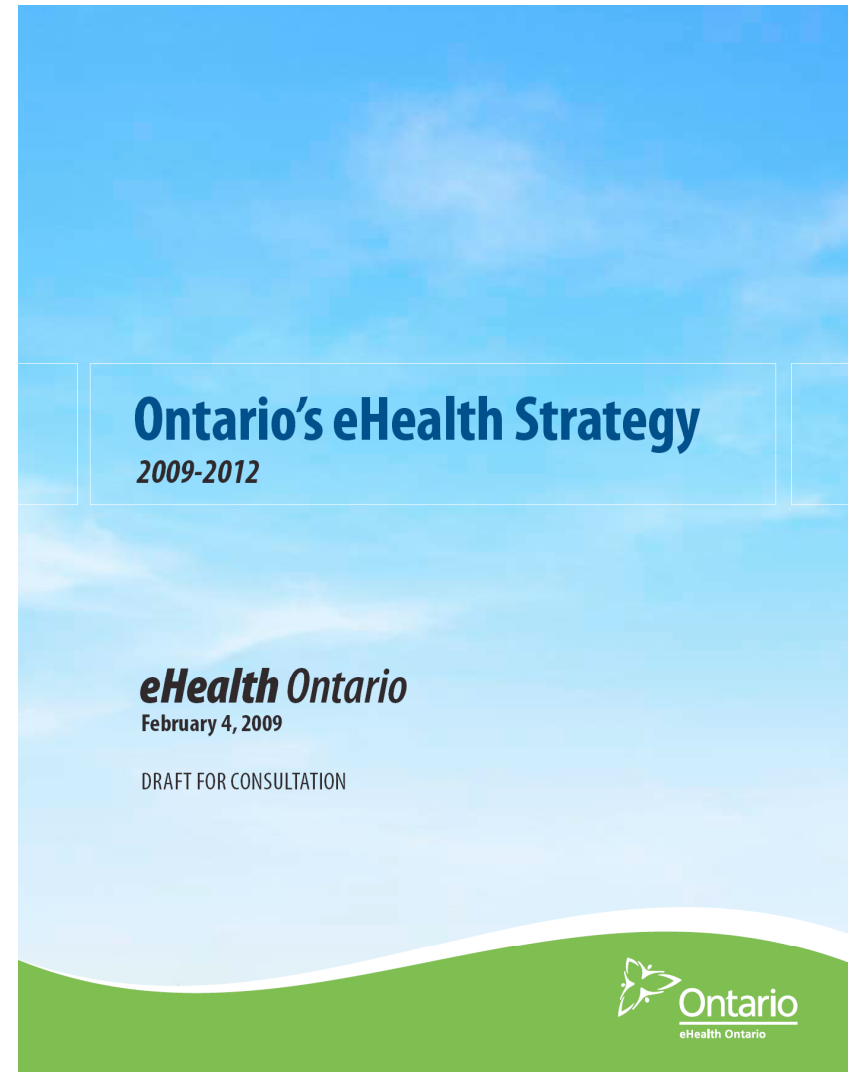
Guiding Principle

Partnerships will be established to deliver eHealth solutions

A variety of organizations will be engaged to deliver solutions *eHealth Ontario* recognizes that not everything must be or is best delivered centrally

Currently *eHealth Ontario* has limited delivery capacity and is unlikely to expand rapidly enough to deliver the Strategy on its own

eHealth Ontario spends less annually than aggregate spending on IT by hospitals (~\$600M by hospitals)



eHealth Delivery Organizations in Ontario

Organization	Approximate Number of Staff	Area Serviced
<i>eHealth Ontario</i>	700 people	Clinicians across Ontario
Health Services I&IT Cluster (HSC)	600 people	MOHLTC, Ministry of Health Promotion and their agents
eHealth Program (MOHLTC)	250 people	Clinicians and patients across Ontario
Cancer Care Ontario (CCO)	220 people	Clinicians and patients across Ontario
Ontario Telemedicine Network (OTN)	170 people	Clinicians and patients across Ontario
OntarioMD (OMA)	60 people	Physicians across Ontario
electronic Child Health Network (eCHN)	40-50 people	Pediatric clinicians and patients across Ontario
Ontario Association of Community Care Access Centres (OACCAC)	40 people	Support CCACs across Ontario; increase ability for CCACs to serve clients

Hospital Based eHealth Staff by LHIN

LHIN	Approximate # IT FTEs	Approximate # Facilities
Erie St. Clair	78	5
South West	275	16
Waterloo Wellington	95	8
Hamilton Niagara Haldimand Brant	155	10
Central West	47	2
Mississauga Halton	18	3
Toronto Central	686	17
Central	107	7
Central East	131	9
South East	41	7
Champlain	88	19
North Simcoe Muskoka	47	7
North East	109	22
North West	42	13
TOTAL	1919	145

Facilities include acute teaching hospitals, community hospitals, small hospitals, CCC, rehab, mental health

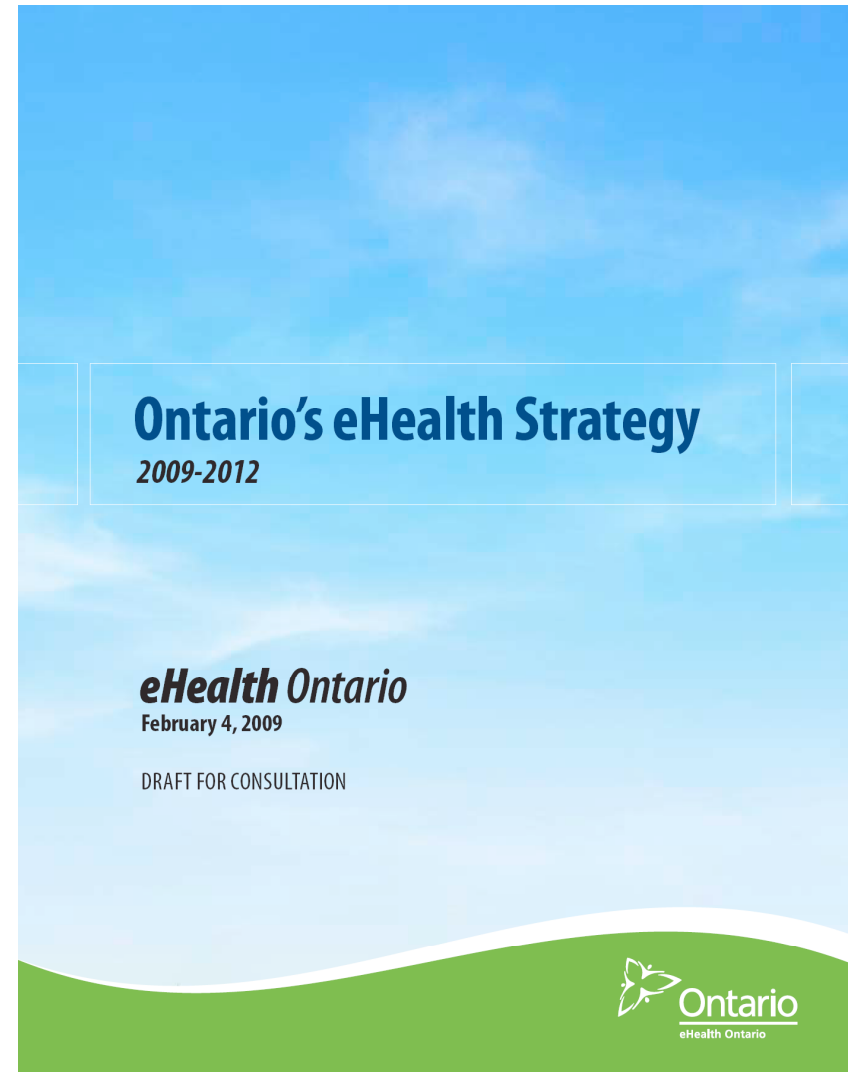
Source: Ontario Hospital Survey, Ontario Hospital Association, January 2009

Guiding Principle

Deployment models will vary by project

Methods for delivering eHealth initiatives, such as a provincial or regional deployment model, will vary based on the nature of the project

Risk of fragmentation and misalignment will be mitigated by strong oversight, standards and accountability framework



Application Delivery Model Characteristics

- Systems best managed as single instance, province-wide applications have the following characteristics:
 - Data is required across the province
 - Solution is very well defined and can interoperate easily with a wide variety of clinical system vendors
 - System supports province-wide programs or strategies
- Systems best managed at a regional level have the following characteristics:
 - Handle clinical information that supports or follows referral patterns
 - Require tight integration with legacy systems
- Systems best managed locally include:
 - A wide variety of legacy application vendors are already installed
 - Few standards exist resulting in incompatible data models and user interfaces
 - Strong influence on local clinical workflows
 - Cost of moving to standard platforms is very high

Each solution group will be delivered using the most appropriate delivery model

1	2	3	4	5
Province-wide application; provincial standards; managed/hosted by <i>eHealth Ontario</i> *	Province-wide application; provincial standards; not managed/hosted by <i>eHealth Ontario</i>	Regional applications (more than 1 LHIN); provincial standards	LHIN, hospital or physician office applications; provincial standards	LHIN, hospital or physician office applications; no provincial standards
Diabetes Registry Drug Information System Drug Profile Viewer Client Registry Provider Registry User Registry Consent Registry OLIS Province-wide DI Exchange Panorama HIAL	WTIS EDRS Telemedicine eCHN Chronic Disease Management and Prevention / ColonCancerCheck CCIS SETP CCIM	DI/PACS HIAL	eReferral Systems Physician EMRs CCAC Systems	Hospital Information Systems
Portal				

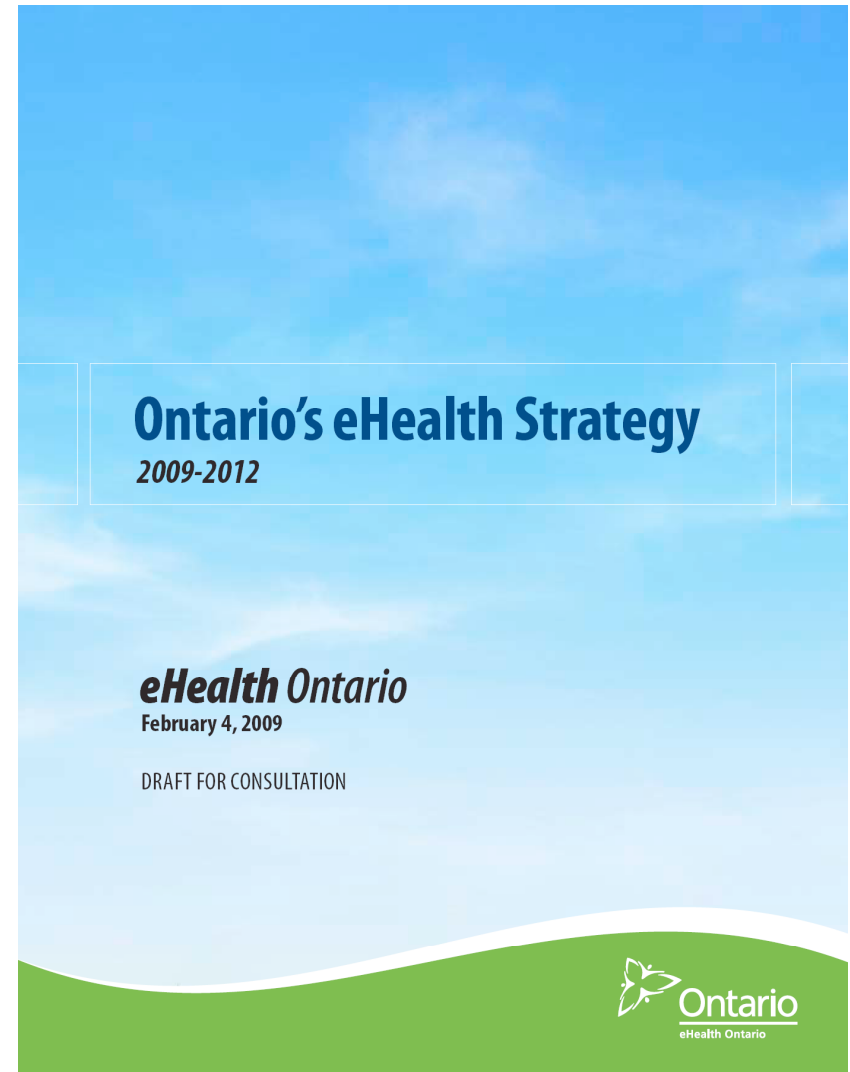
Guiding Principle

Wherever possible, legacy systems will be leveraged to achieve provincial goals

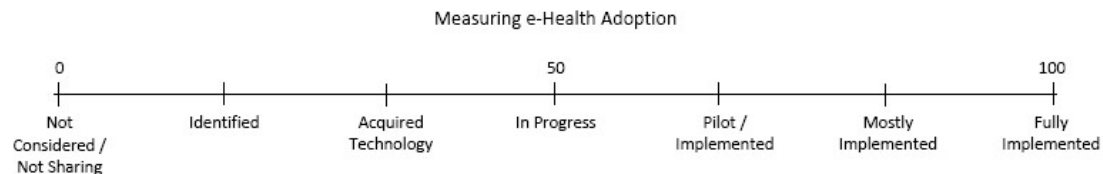
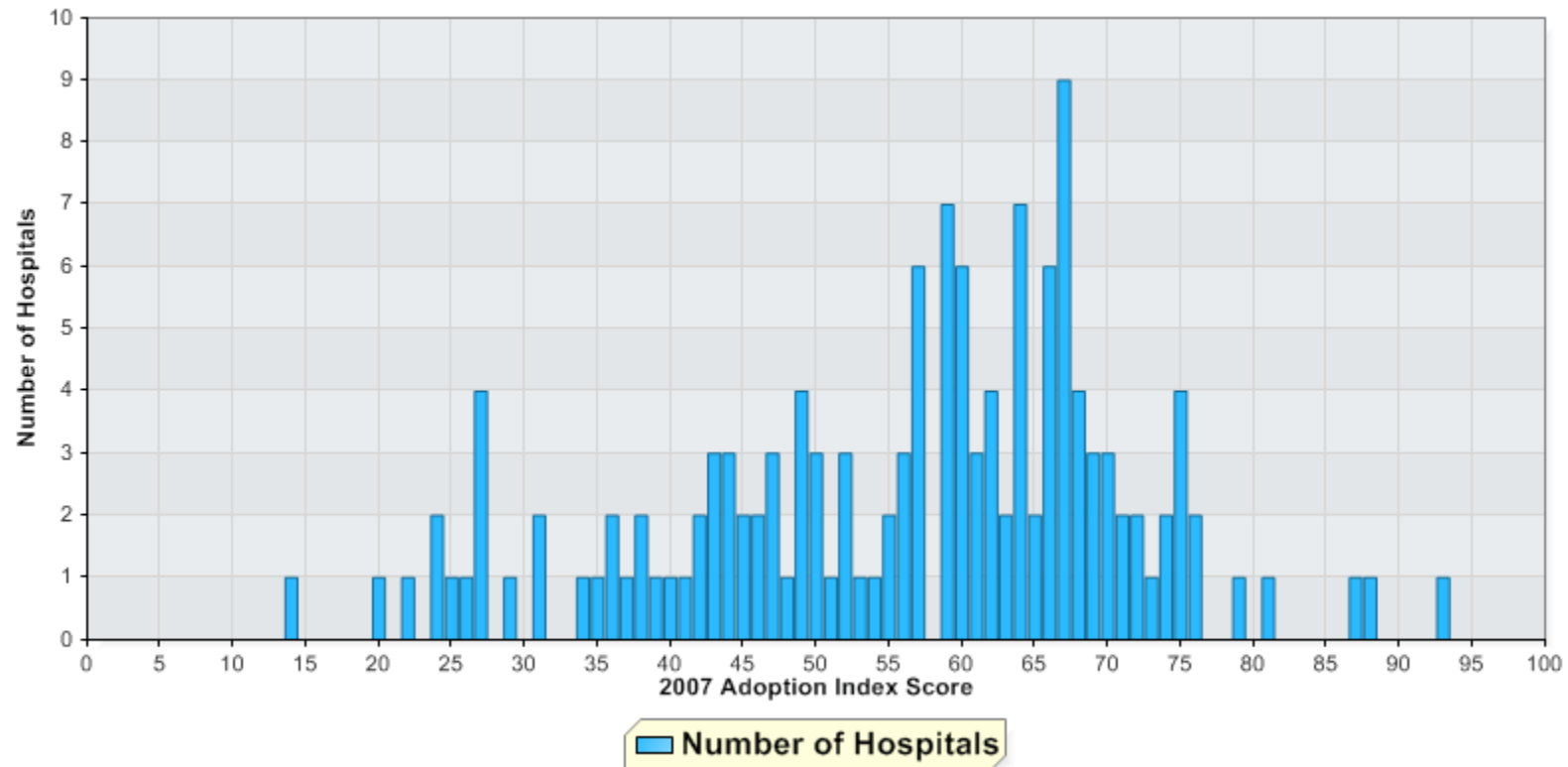
If not integrated with local systems, provincial initiatives will have difficulty engaging clinicians

Stand alone legacy systems with strong clinician loyalty make integrated provincial solutions difficult to deploy

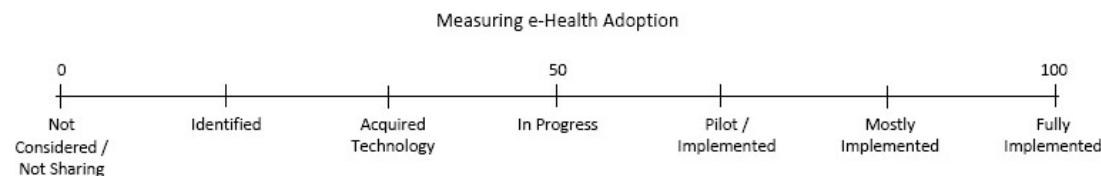
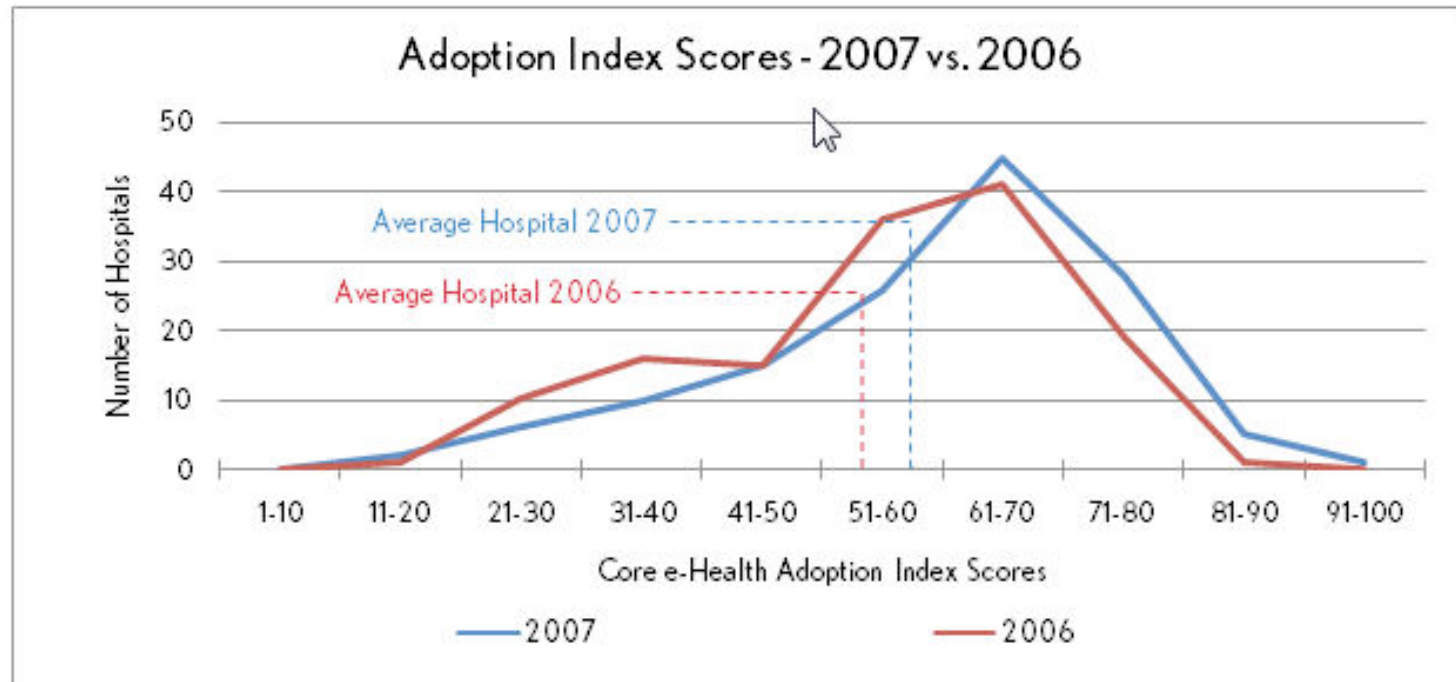
Hospital systems and physician office Electronic Medical Records (EMRs) will always have more content of interest to physicians than provincial applications



The OHA / HIMSS Analytics e-Health Adoption Index is starting to provide insight into hospital adoption rates



Provincial eHealth initiatives must be aligned with provider-based initiatives to keep clinicians engaged



Guiding Principle

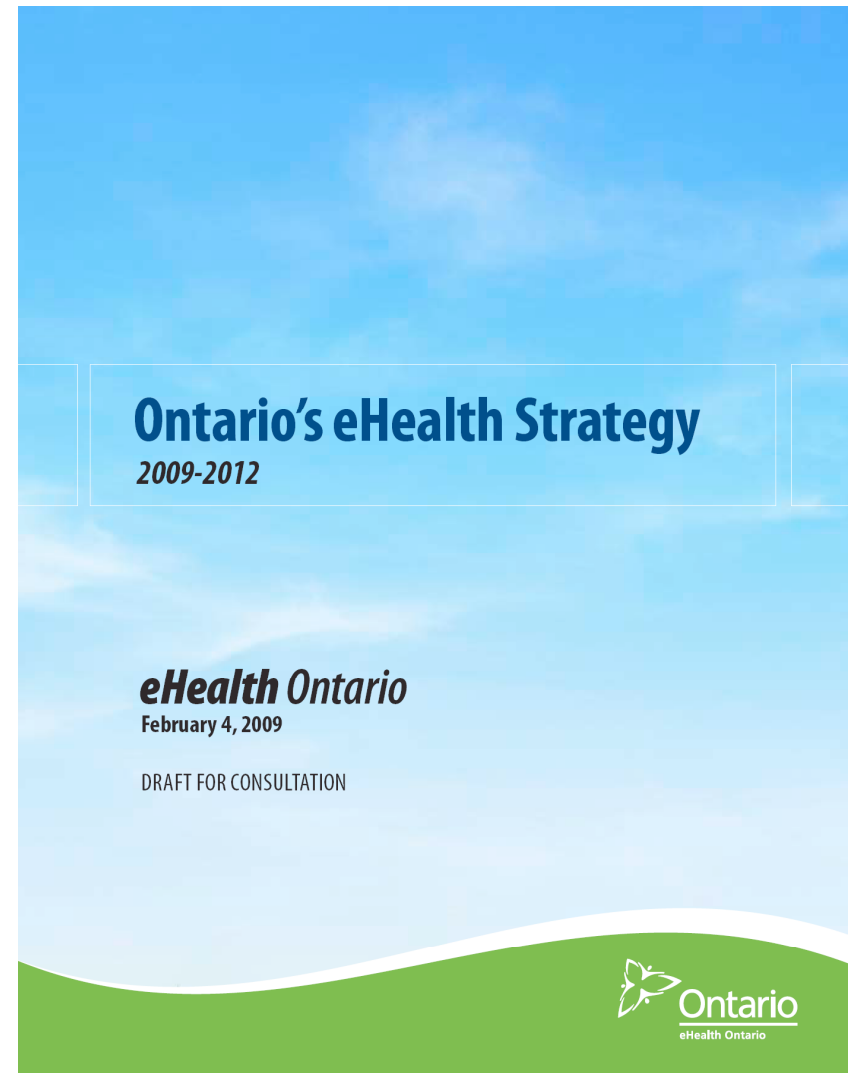
Clinicians will be engaged early and often to ensure project success

Active users are a much better source of feedback than advisory panels

Clinical content of solutions must be relevant and complete

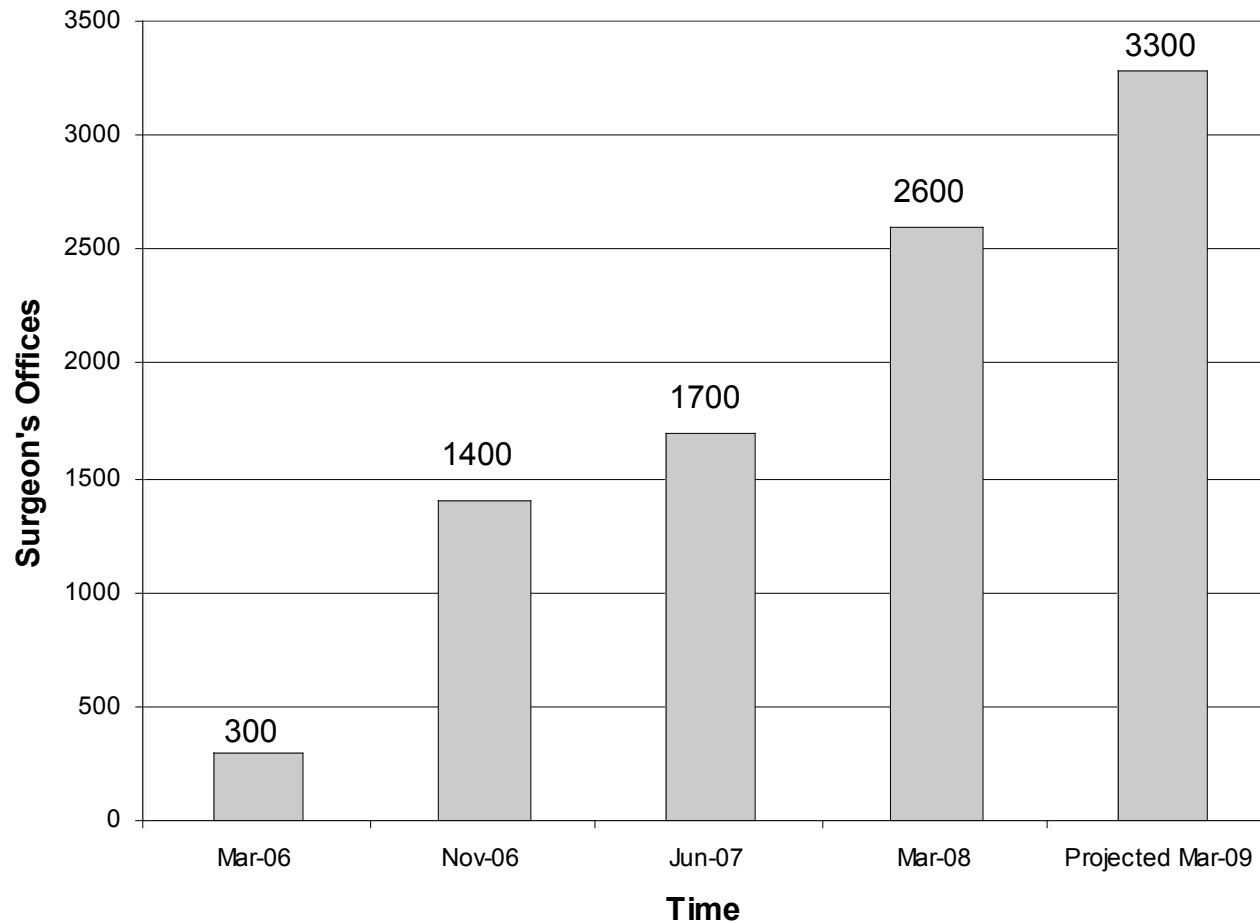
Valuable clinical content is the key to clinician engagement; functionality is less important

Complete databases are more compelling for clinicians to use, as this increases the likelihood of finding useful data on a patient



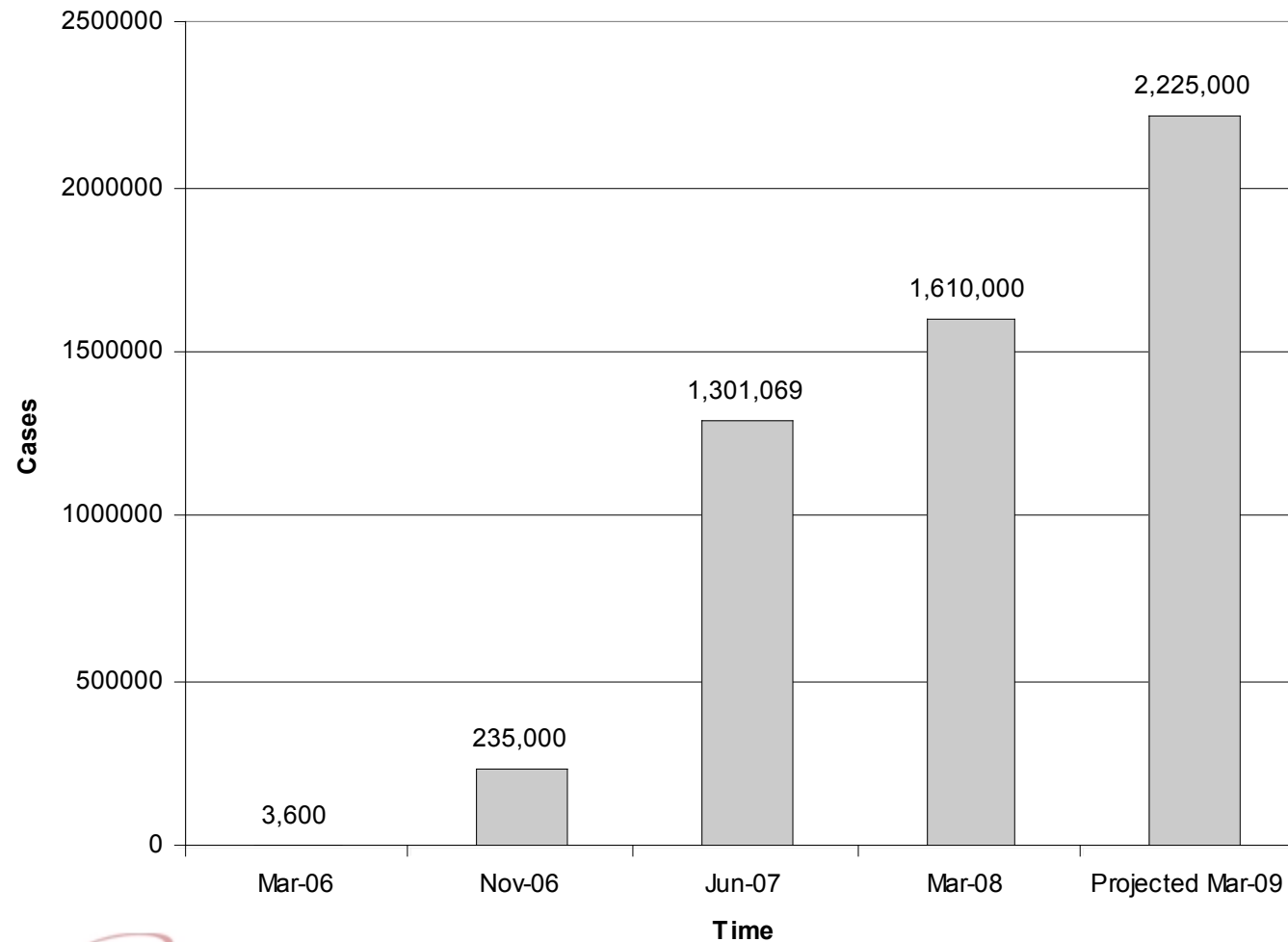
Surgeons were engaged by specialty group, ensuring a complete dataset at each stage of the implementation

WTIS Implementation by Surgeon's Office



Data from the first wave of implementation was immediately useful for reducing wait times

WTIS Implementation by Volume of Surgical Cases



Ontario Laboratory Information System has yet to engage clinicians

- Current scope and purpose
 - Repository of all lab test results
 - Clearinghouse for exchange of information on lab test orders and results between labs, hospitals and physician office CMS
- Software began accepting test results from some labs in April 2006
- Large and growing proportion of test results in Ontario being collected from hospitals & commercial labs
- Test results not yet available for clinical use
- Total investment to date >\$80M (including \$19M from Infoway)
- Annual costs are \$15M with major infrastructure upgrades needed

**Initiatives that do not engage clinicians early
have difficulty achieving clinical relevance**

Patient Results Online (PRO) made clinician engagement an early priority

Data Sources



Women's
College
Hospital



University
Health
Network

MOUNT SINAI HOSPITAL
Joseph and Wolf Lebovic Health Complex



LifeLabs®
Medical Laboratory Services

COURTYARD  GROUP

 **Toronto
Rehab**
Everything Humanly Possible

 **WEST PARK
HEALTHCARE CENTRE**

 **BRIDGEPOINT
HEALTH**

 **ST. MICHAEL'S HOSPITAL**
A teaching hospital affiliated with the University of Toronto
Leading with Innovation
Serving with Compassion

RVH
exceptional
People
exceptional
Care

ST. JOSEPH'S
HEALTH CENTRE TORONTO

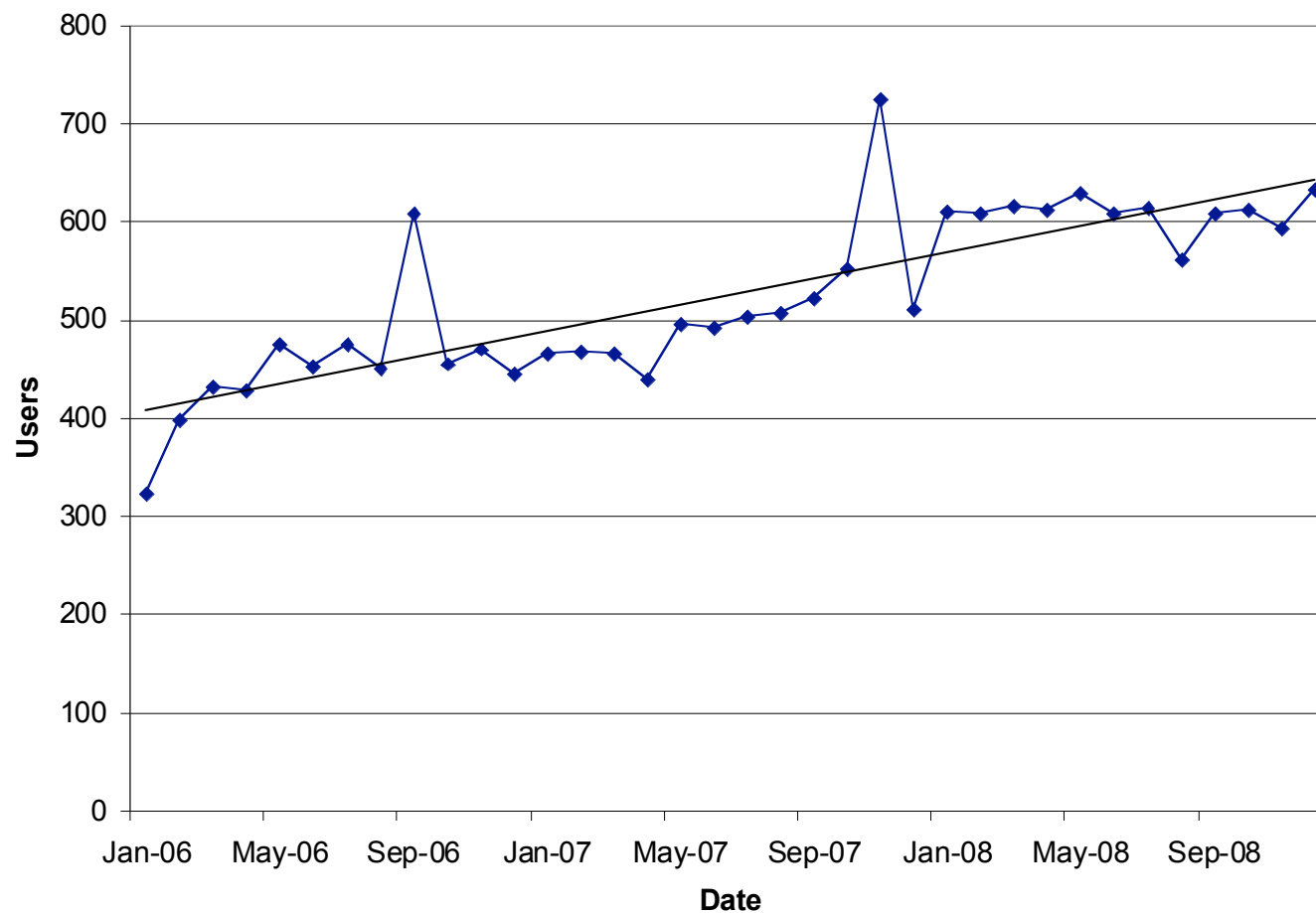
 **St. John's Rehab
HOSPITAL**
Rebuilding people's lives

Central
Community Care Access Centre **CCAC**

CASC Centre d'accès aux soins communautaires
du Centre

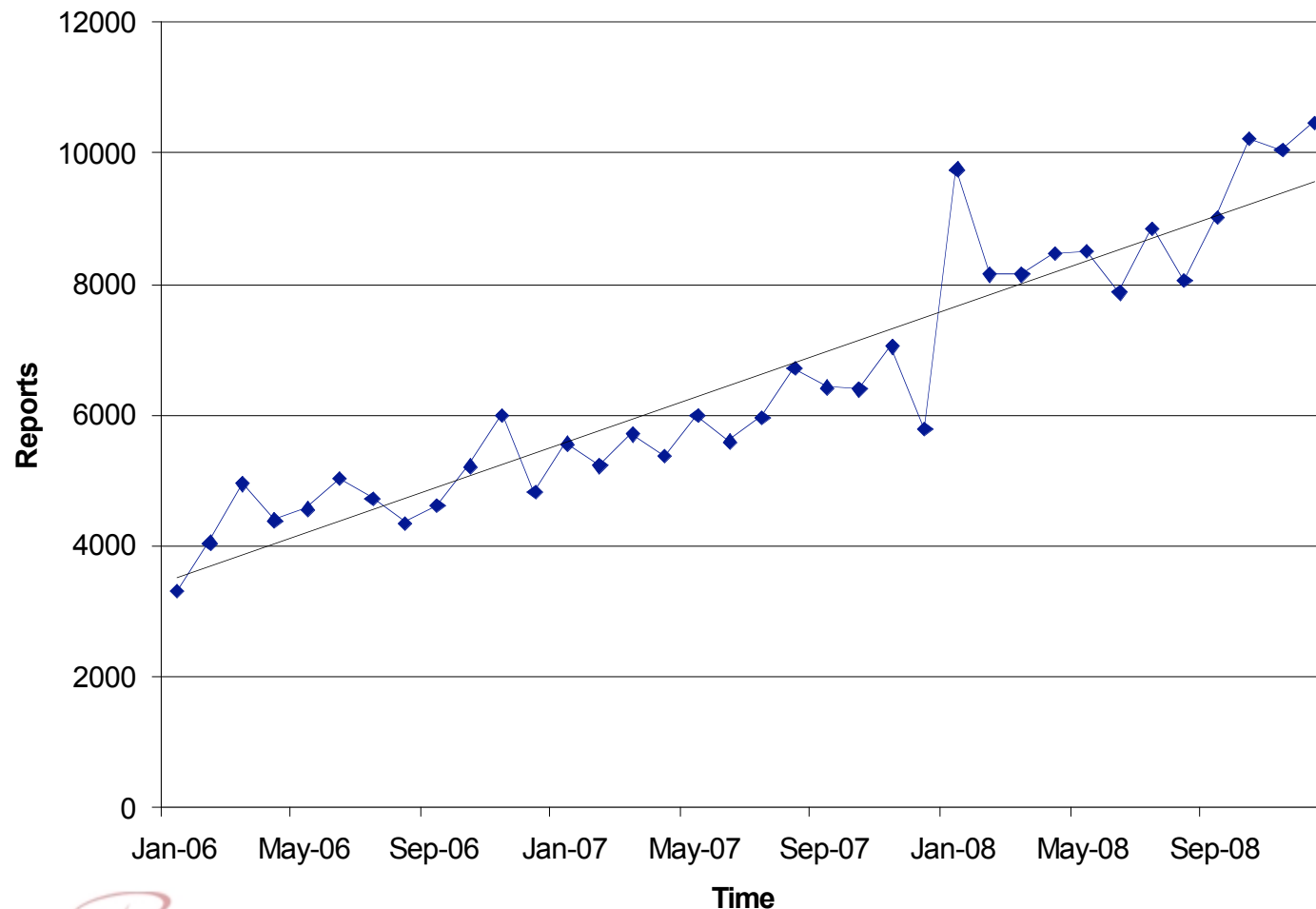
Clinician adoption continues to grow

Total Number of Active Clinical Users per Month



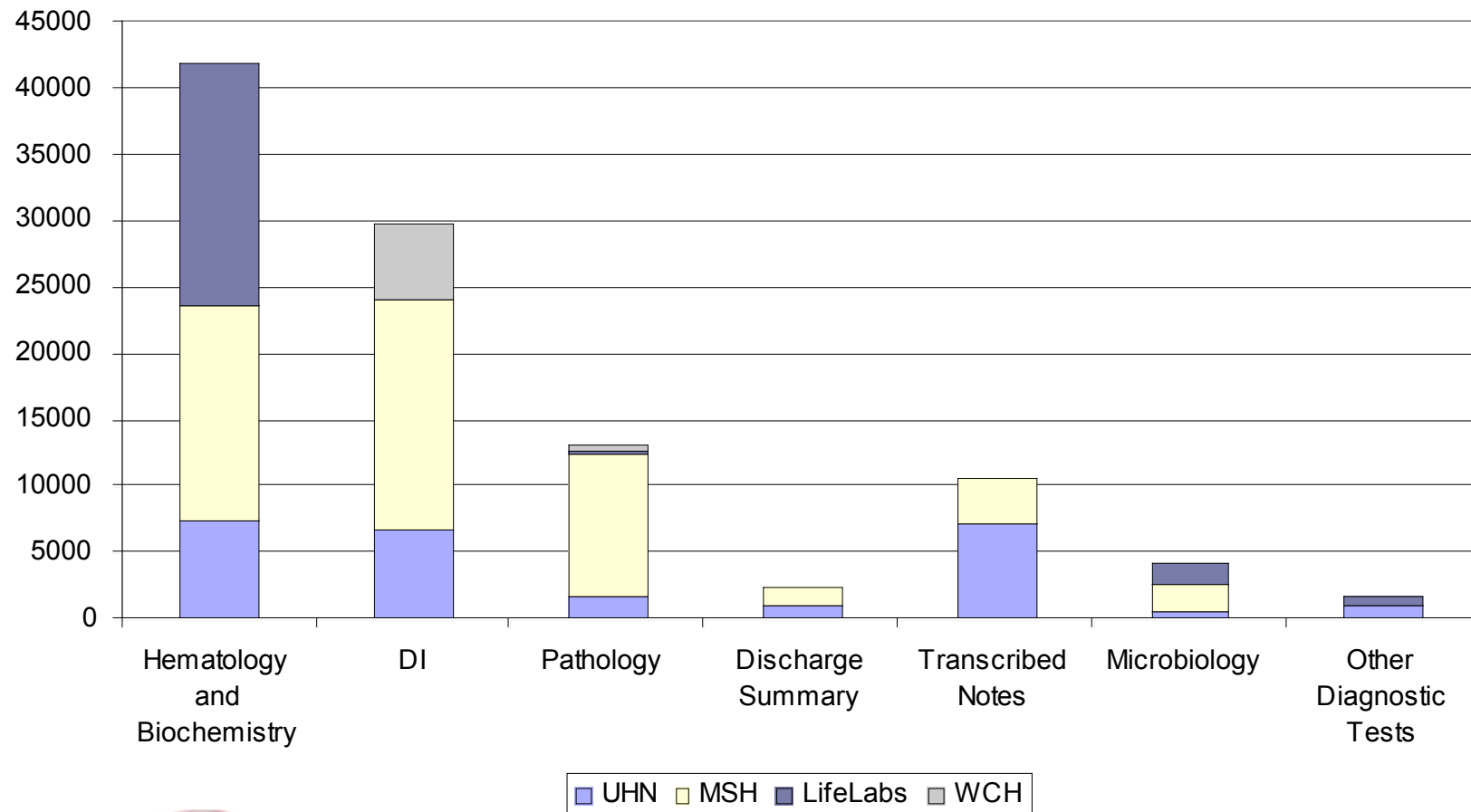
The steady addition of new sites (content) has increased clinician adoption

Total Number of Reports Accessed from all Sources per Month



User activity is carefully tracked to focus improvements on clinical priorities

Total Reports Accessed by Type, 2008



Ontario Telemedicine Network (OTN) developed a clinical base of support before worrying about governance or scalability

- Began with grassroots efforts by clinicians at Sunnybrook Hospital to improve service to residents of northern and remote regions of Ontario with no provincial mandate or funding
- Piecemeal grants and hospital contributions funded initial projects
- Relentless focus on clinical value secured ongoing commitment of clinicians and other team members; steady leadership from Ed Brown ensured continued focus
- Results:
 - dozens of projects, supported with funding from the Government of Ontario, Canada Health Infoway and other sources
 - Annually provides over 38,000 remote consultations
 - More than 2,000 healthcare professionals deliver care using OTN
 - Programs and services are available in nearly 600 sites across the province

Initiatives that deliver demonstrable clinical value will engage clinicians and engender support

Concluding thoughts

Deciding what to build is not as important as deciding how
and when to engage clinicians

What we build will then be guided by clinical users

As a result, the risk of failure is dramatically reduced



**People.
Passion.
Results.**

Canada ■ United Kingdom ■ United States