



The Canadian Pharmaceutical Bar Code Project: Pharmaceutical Bar Coding to Improve Patient Safety & Rising Above the Bar: A Canadian Success Story – North York General Hospital



***Presentation for the Global Healthcare Conference, June 2010
By Doris Nessim, Director of Pharmacy, North York General Hospital***

Presentation Objectives

To Describe:

1. **The need for bar code medication administration (BCMA) - internal and external patient safety drivers**
2. **Case Example: NYGH Medication Bar Code Strategy & Design Considerations**
3. **The Need for a National Strategy - The Canadian Bar Coding Project**
4. **Future Direction in Canada**



Why Implement Bar Code Medication Administration (BCMA)?

... there is a need for enhancing patient safety related to medication use in hospitals

The Canadian Adverse Events Study

Drs. Ross Baker and Peter Norton, Lead investigators, CMAJ, May/04

Errors at each stage of the Medication Use Process



38%



11%



39%



12%

“Human errors do not occur in isolation but when humans confront systems and processes whose design either invites, or at least does not prevent it.”*

*Richard Bohmer. Complexity and Error in Medicine. Harvard Business School. 1998.

Ref.: Leape et al. JAMA July 5, 1995

Errors at each stage of the Medication Use Process

only 2% of errors that originate at the patient's bedside are captured, making the **administration phase** of medication delivery the most hazardous phase
nurses have *no* safety net



North York General Hospital Profile

General Site

454 Acute Beds
34 Mental Health & Rehab
~ 100,000 ED visits/year
~30,000 inpatient cases/year
~1000 medical staff
~3200 staff

Branson Site

Rapid Care Clinic- Provides urgent care to community
➤ 30,000 urgent care visits/year
➤ Centre of Excellence

Seniors Health Center

192 bed LTC
Ambulatory Geriatric

Philips House Outpatient

Pediatric speech & language services

NYGH's Electronic Medical Record Strategy

External Drivers: Federal Electronic Health Record Strategy:

Patient Safety:

Federal Government –
EHR:

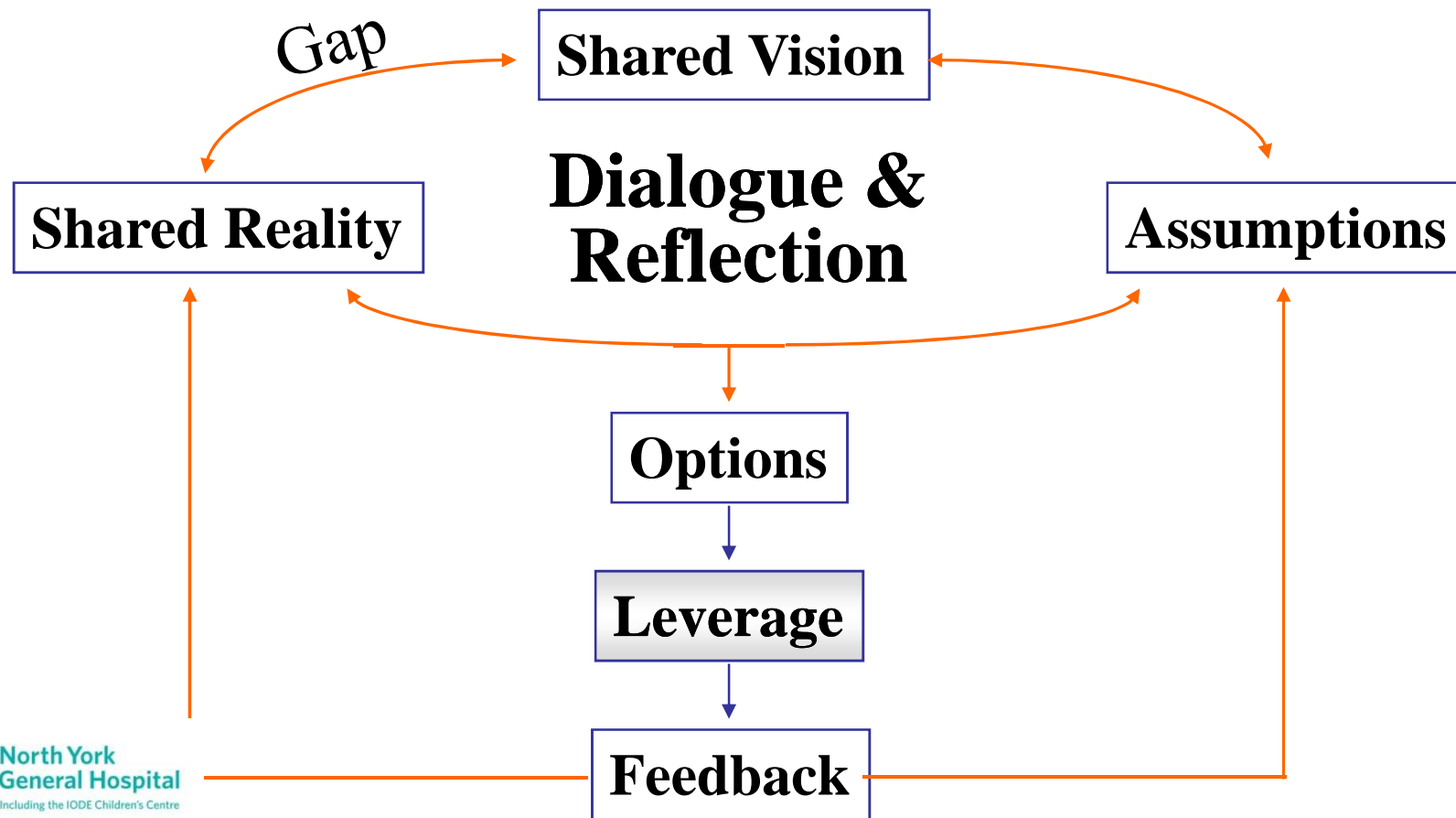
“Canada needs electronic health records. They will help our health providers to be more efficient, improve the quality of care provided and reduce the chance of medication errors.”

*The Honourable James
Flaherty, Minister of Finance, 2007
Federal Budget Speech*

Internal Drivers: NYGH Electronic Medical Record Strategic Themes:

- Quality & Patient Safety
- Clinical Process Improvement
- Comprehensive EMR (alignment with Ministry of Health/LHIN/eHealth/ Infoway)
- Empower People
- Create & Share Knowledge and Innovation
- High Performing IT Systems

The Learning Organization Systems Leverage Model



Why Implement BCMA?

Impact:

Reduce medication errors – dispensing and administration errors

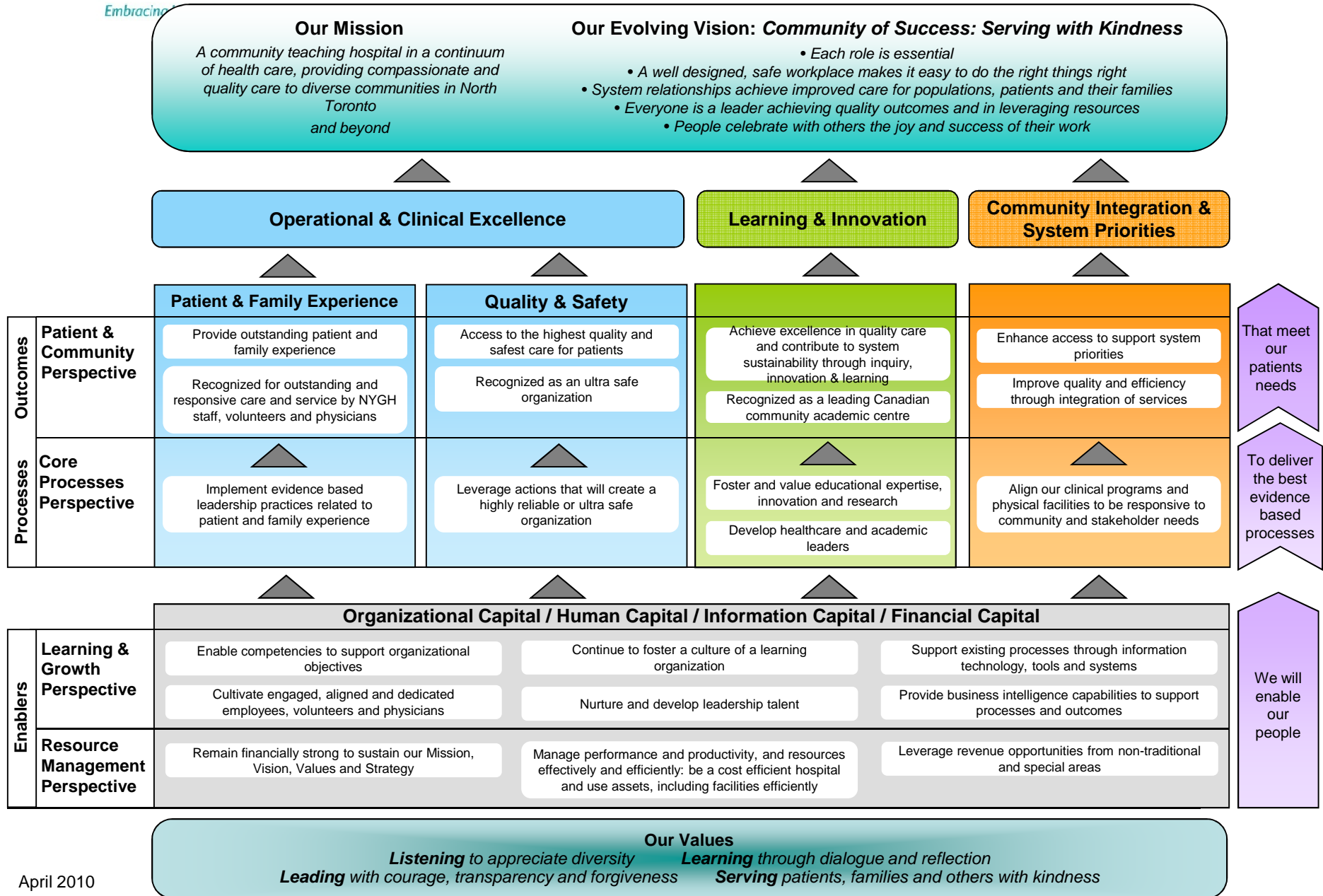
Increase staff productivity and workflow

Improve overall operational efficiencies and quality of care

Enable data collection and feedback

Enable standardization across the system

North York General Hospital Strategy Map



NYGH's Electronic Medical Record Strategy

Phase I

- **Positive Patient Identification** (barcoded wristband): July/07
- **Hospital-wide Electronic Scheduling:** April/08
- **Electronic Interprofessional Documentation:** June/08

Phase II

- **CPOE:** ~200 Order Sets - using Cerner Knowledge Catalog clinical decision support (Zynx)
- **Medication Integration Process:** eMAR, electronic Medication Reconciliation, ADE alerts, Dose Range Management, Rx Writer, and Depart Process
- **Addition: Bar Code Medication Administration (BCMA)** and the Medication Use Process



Future Process

Physician enters order in eCare

*PowerChart CPOE
Zynx
Knowledge Catalog*

Orders reviewed by pharmacy and nursing

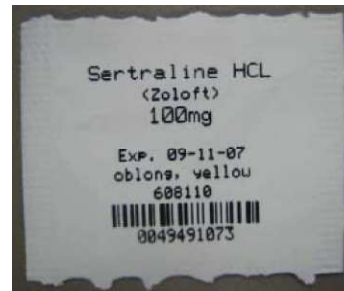
*PharmNet
PowerChart eMAR*

Barcoded medication sent from pharmacy to unit

Nurse scans patient and medication, confirms "5Rs"

CareMobile

GHERARDINI, LISA		Age: 31 years		Sex: Female		** Allergies **	
Loc 3B, 36, A		DOB: 01/01/1972		MRN: 5014426		Fin#: 2503116831	
Inpatient [11]							
03 December 2006 9:41 CST - 05 December 2006 9:41 CST [Clinical Range]							
Medications							
☑	Scheduled	12/04/2006	12/04/2006	12/04/2006	12/04/2006	12/03/2006	
☑	Subcutaneous	9:00 CST	8:00 CST	7:30 CST	8:00 CST	21:30 CST	
☑	Subcutaneous						
☑	Continuous Pump						
	Scheduled						
	Subcutaneous (Prevent)						
	2.5 mg Soln, Nebulized,		2.0 mg				
	4x/24hrs/6hrs, Start Date 11/30/06						
	15:00:00 CST						
	Subcutaneous						
	2.0 mg		2.000 mg		2.000 mg		
	12/04/2006 11:18:00 CST						
	48 Hrs F.						
	cefazolin						
	Sodium Chloride 0.9%						
	collagenase topical (Santyl)						
	1 app		1 app				
	17/20/06 11:26:00 CST						
	Mouth care						
	collagenase topical						
	10 mg, 3% Glycerol, 0.1% Lidocaine, Start						
	Date 11/30/06 21:00:00 CST						



Barcode Strategy: Design Considerations

BACKGROUND: U.S. Experience

- The Joint Commission: National Patient Safety Goals
 - To implement bar coding that would help *identify patients* and *match them to their medications and treatments*.
- Barcoded NDC - required by the FDA since April 2004 with compliance required by April 2006
- Implementation experience suggests that readability, user prepared products, partial doses, backorders, devices, workflow, and workarounds continue to be issues.

Barcode Standards



Background: Canada

Canada currently has no Federal mandate for regulating barcode medication requirements

Barcode medications provide an opportunity to **improve patient safety and efficiency** in the medication distribution system.

Canadian Hospitals that seek to take advantage of the opportunities are forced to **determine the priority, strategy, and capital** to undertake the barcoding internally.

NYGH - Pharmacy

Barcode Medication Strategy



Determined bar code content, data format, and symbology requirements and developed 'selection criteria':

- Formed basis for functionality specifications for new automation; determined functionality with existing automation

Created a flow chart identifying touch points in the medication use system where bar codes are needed to assure safe medication administration

Tested compliance with electronically readable ID symbology and location using Cerner CareMobile

Developed an implementation plan, identifying and securing equipment, resources, and timeline aligned with CPOE and eMAR implementation

NYGH – Pharmacy

Design considerations for assuring medication safety with bar code medication implementation with various forms of pharmacy automation

- Hours of Service Pharmacy Services NOT 24 x 7
- Medication Formulary: 2200 medications
- Approximately 3 M doses/year (po and IV)
- % of Commercially Available Medications in Unit Dose / 'single unit of use' packaging
- % of medications with 'UPC' codes
- Compatibility with automated medication cabinets
- Capital & Resource Requirements & Plan:
 - Automated medication prepackaging system
 - 'Bar code medication station' (new capital)
 - Pharmacy Resource Requirements



NYGH – Pharmacy Design Considerations: Bar Code *Content, Data Format & Symbology*

- **Established Bar Code Characteristic:**

static and unique

- **Bar Code Content:**

Options:

- Drug Identification Number (DIN)
- **Universal Product Code (UPC)**
- **Cerner Item_ID Number**
- **Cerner Dispense_ID Number**

Drug Identification Number (DIN)



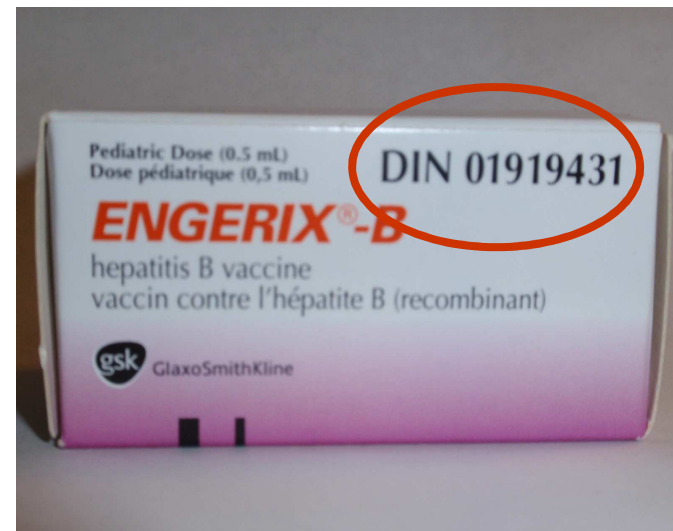
PROS

- Unique for each medication strength/concentration
- Assigned by Health Canada (National registry)

Drug Identification Number (DIN)

CONS

- Not barcoded by the manufacturer
- Not unique for different bottle package sizes or volume sizes



UPC

PROS

Assigned by the manufacturer

- Unique for each medication strength, bottle/volume size
- Barcoded by the manufacturer; do not need to add a bar code for hospital use



UPC

CONS

- Most UPC codes are printed on the external package, not on the container itself
- Different data formats of UPC code (GS1 or HIBCC)
- Can be assigned by the manufacturer based on different batches



NYGH – Pharmacy



Design Considerations:

Bar Code *Content*, *Data Format* & *Symbology*

- Standards are the foundation for clear, understandable exchanges between companies in an increasingly globalised economy. (GS1)
- Two standards for data format in health care:
 - **Global Standard (GS) 1 using the GTIN**
 - Compatible with Cerner functionality and devices (CareMobile)
 - **Health Information Business Communications Council (HIBCC)**



NYGH – Pharmacy Design Considerations: Bar Code *Content, Data Format* & *Symbology*

- **Bar Code Symbology selected:**



NYGH – Pharmacy Medication Bar Code Implementation



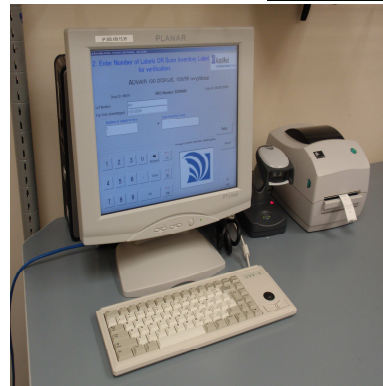
Prepackager

Create bar code for unit dose oral full or split tablets



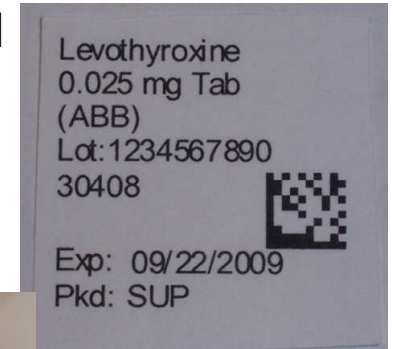
Bar coding station

Create barcode for injectables, topicals, inhalers



Bubble (Medidose) packaging

Create barcode for oral solid (cytotoxic) and oral liquid





Keys to Success

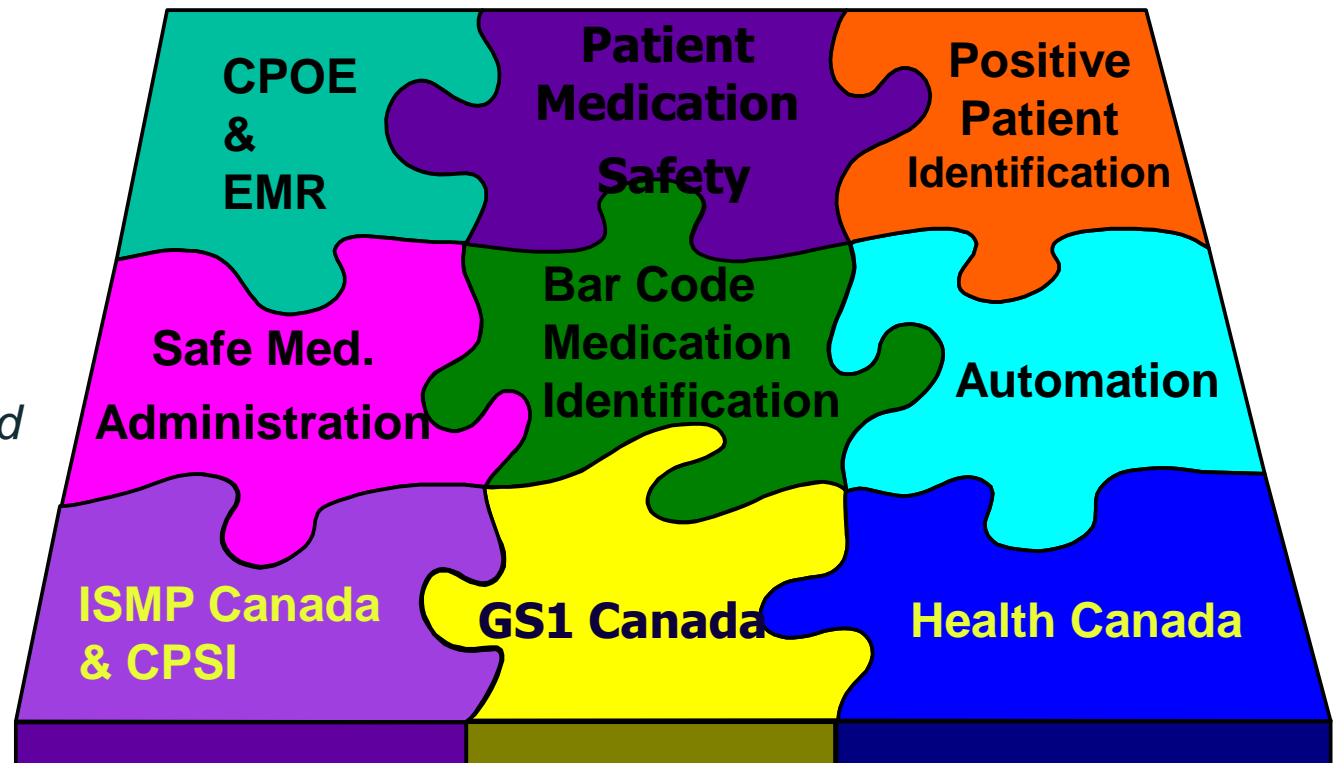


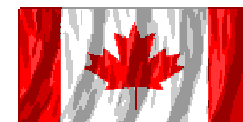


Beyond Bar Code Medication: System Improvements – Building Capacity

Successful and **sustainable** realization is based on strong inter-relationships and collaboration requiring:

- **culture transformation**
- **executive leadership and support**
- **human factors thinking,**
- **enabling technologies.**





The Canadian Pharmaceutical Bar Code Project

Pharmaceutical Bar Coding to Improve Patient Safety

GS1 Canada Board

**Referencing Presentation by: Ian Sheppard, Project Manager,
The Canadian Pharmaceutical Bar Coding Project**



The Need for National Pharmaceutical Barcoding Standards: ADE Rate

The exact rate of Adverse Drug Events is uncertain, as is the number of related deaths or significant injury per admission. Equally, the proportion of ADE caused by human (system) error is not precisely known. Yet, we can reasonably conclude:

- The number of ADEs is unacceptably high (3-6% of admissions to hospitals).**
- Serious patient injury in 20-30% of events. Death in approximately 1%. (Estimated 700 deaths annually in Canada.)**
- Many ADEs are caused by human error; the majority at the point of administration.**
- Approximately 30-40% of ADEs are preventable, and the more serious the ADE, the more likely the event was preventable.**

The Need for National Pharmaceutical Barcoding Standards: **Lack Standardization**

“We learned early in the planning process that “a bar code is not necessarily a bar code,” meaning that just because a product has a bar code on it, the bar code will not necessarily be usable in a BCMA system.

The **lack of a standard barcode format** is a significant hurdle ...”

Improved control of medication use with an integrated bar-code-packaging and distribution system.

Am J Health-Syst Pharm. 2005; 62: 1075-9

The Need for National Pharmaceutical Barcoding Standards: Current Situation in Canada (2009)

Bar codes are not found on all levels of packaging. Many primary (e.g. vial) and secondary (outer package) labels lack bar codes.

There is **no standard for the type of bar code to use, nor the required information within the code itself.** Reader/scanners and software cannot be seamlessly written to read the codes.

There is **no national standard for the rules regarding how to assign an identification number,** which is used continuously through the medication chain, and at every package level, or a common product descriptor database connected to the bar codes.

Bar codes, when applied, are **different between hospitals and community, and often between healthcare sites.**



The Canadian Pharmaceutical Bar Code Project

(21) ABCDEFG123456789

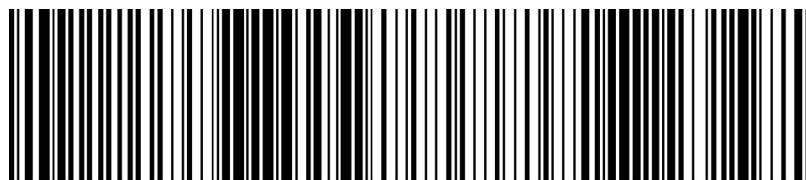


(01) 00314141999995

(21) ABCDEFG123456789



(01) 00314141999995



(01) 00314141999995 (21) ABCDEFG123456789



(01) 00314141999995
(10) 987654321GFEDCBA

Project Overview

**A National Collaboration between six
healthcare sectors.**

A two-year project comprised of 3 phases.

Major Objectives:

To develop a **pan-Canadian strategy** for bar coding of commercial pharmaceutical products.

To develop a **common product database** for standardized product data

To facilitate **clinical information systems** development which utilizes automated identification and data capture at each point of the medication chain

To create a **national environment for automated identification** (and data capture) implementation within each identified healthcare sector.

Collaborating Organizations



GENERIC DRUGS.



SAME QUALITY. LOWER PRICE.



Project Outputs: **Phases II and III**

<p>Phase I</p>	<p><i>Needs Assessment for Automated Identification and Data Capture National Consensus on Pharmaceutical Bar-Coding Initiative Convened the Canadian Bar Coding Project</i></p>	<p><i>Completed June 2008</i></p>
<p>Phase II</p>	<p><i>Development and Approval of National Bar-Code Standards</i></p>	<p><i>Completed Dec 2009</i></p>
<p>Phase III</p>	<p><i>Dissemination and Stakeholder Engagement Phases</i></p>	<p><i>Jan 2010 - Sep 2010</i> <i>Current Phase</i></p>
<p>Phase IV</p>	<p><i>Implementation of Variable Bar-code Elements (Out of Scope)</i></p>	<p><i>Out of Scope of Two-Year Project</i></p>
<p>Phase V</p>	<p><i>Post-Implementation Interventional Change (Out of Scope)</i></p>	<p><i>Out of Scope of Two-Year Project</i></p>

GS1 Global Standard Endorsement: A Global Automated Identification Standard



Canadian Pharmaceutical Bar Coding Project Endorsement Statement

April 27, 2009

The Institute for Safe Medication Practices Canada (ISMP Canada) and the Canadian Patient Safety Institute (CPSI), following broad consultation, jointly endorse the adoption of the GS1 global standard for automated identification (e.g., bar coding) of pharmaceutical products in Canada. Going forward, ISMP Canada and CPSI will work with stakeholders to ensure that the Canadian standard continues to evolve so that user requirements for implementing bar coding for enhanced safety of medication use within the healthcare system are fully identified and met across all healthcare sectors.

The Canadian Pharmaceutical Bar Coding Project is a unique opportunity for all stakeholders of the Canadian medication system to collaborate nationally and internationally, from industry to healthcare providers, on a comprehensive strategy for enhanced medication use to improve patient safety.



GS1 Canada Pharmacy Sector Board Mission

GS1 Canada's Healthcare Pharmacy Sector Board ultimately seeks to ensure that **Canada's pharmacy sector trading partners** are able to fully operate in an increasingly e-driven global supply chain reality.

Through collaboration with sector representatives, as well as government and key healthcare stakeholders, **the Board identifies opportunities to leverage global standards-based solutions and transferable adoption models** that support a safe and sustainable healthcare delivery system across Canada.



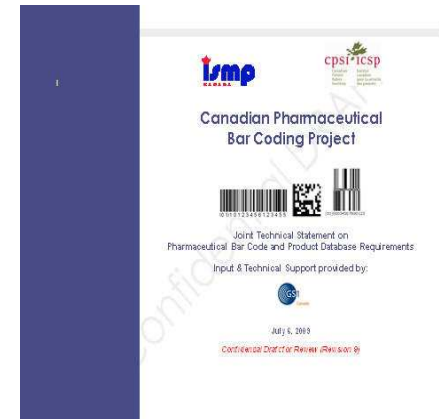
The Joint Technical (Task Force) Statement (Phase II)

Section 1: Pharmaceuticals to be Encoded

Section 2: Common National Standard

Section 3: Content of the Bar Codes

***Section 4: Pharmaceutical Packaging Levels and Placement
of Bar Codes***



The Joint Technical Statement (Phase II)



Section 5: Common Canadian Pharmaceutical Product Registry (CCPPR)

Section 6: Bar Code Symbology

Section 7: Expectations of Professional Practice Organizations and End-Users

Section 8: Timeline Adoption of Standard by each Health Sector (Pharmaceuticals Dec 2012)

Other Health Jurisdictions Undertaking barcoding for either Medical/Surgical or Pharmaceutical products:

US FDA

UK NHS

Canada

Australia

New Zealand

France

Brazil

India

China and Hong

Kong

Turkey

Columbia

Japan

Council of Europe

Chile

Many are based on GS1 global standards.

How will the standardized bar coding of commercial pharmaceuticals integrate into professional practices?

-Phase 3: Sustainability strategies for engaging stakeholders
Healthcare IT solution providers
Healthcare end users
Cost effectiveness models for averting adverse events

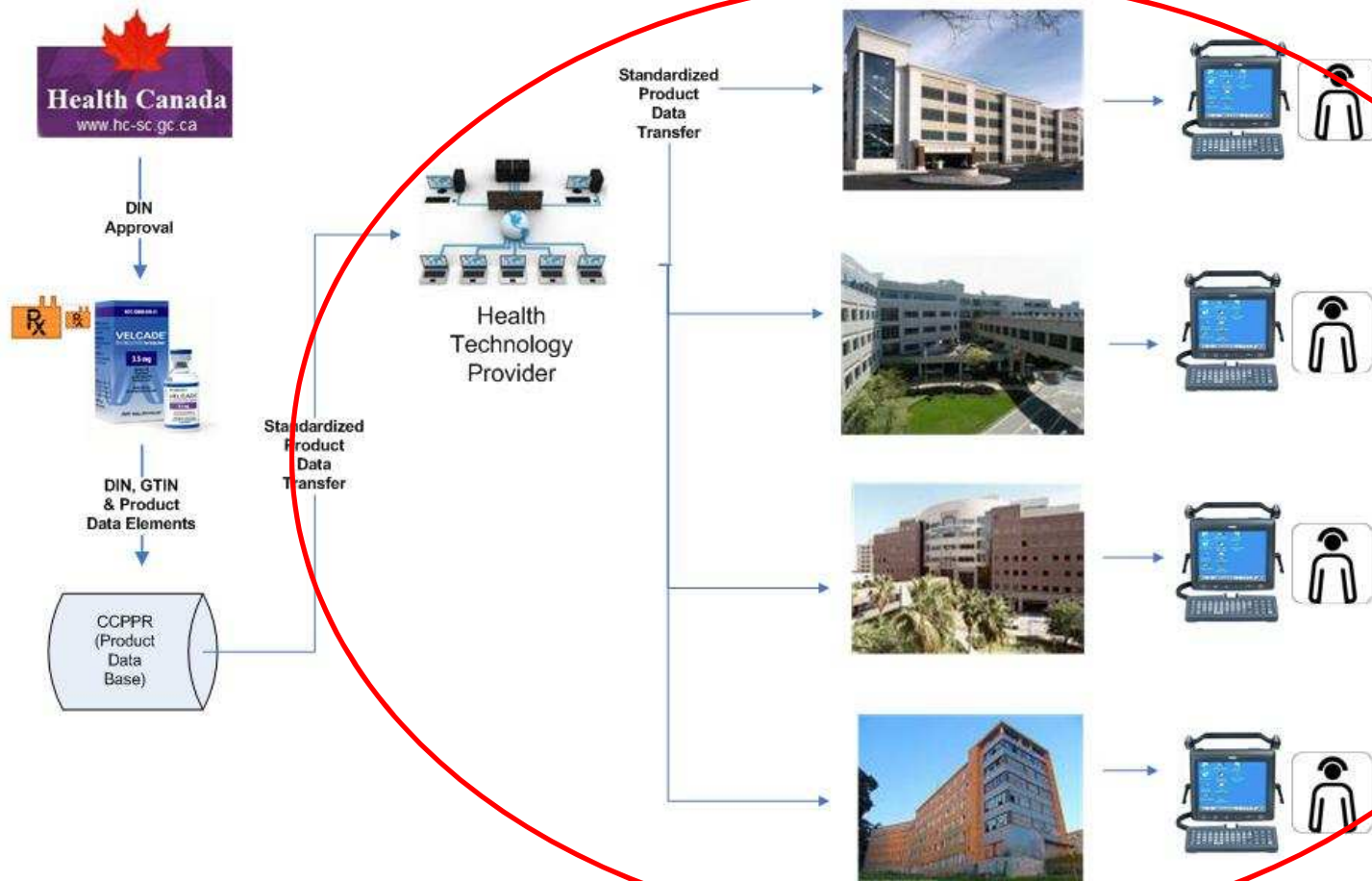


Practice Implementation

Pharmaceutical Manufacturer Adoption

Health Technology System Engagement

End User (Clinical) Adoption Begins



The Medication Chain



Evidence of Effectiveness of Bar Coding (AI) on Patient Safety and Return on Investment

Effectiveness of Bar Code on Medication Safety ...('Toolkit')

Effect of Bar-Code Technology on the Safety of Medication Administration

Poon EG, et al. New England Journal of Medicine 2010; 362:1698-707

Summary: **Using a bar coded eMAR**

Brigham Young, Boston

- * 41.4 % reduction in dose administration and order transcriptions, excluding potential timing errors.**
- * A 27.3% reduction in dose timing errors.**

Conclusion:

- * Use of bar-code eMARs reduced the rate of errors and adverse drug events in order transcription and medication administration.**
- * Bar-code eMAR is an important intervention to improve medication safety.**

Future Canadian Bar Code Project Phases and Initiatives

The Dissemination and Stakeholder Engagement Strategy

(Phase III – Integration with practice and implementation)



Three Tiers of Communications , then....

Step 1: Manufacturer Engagement

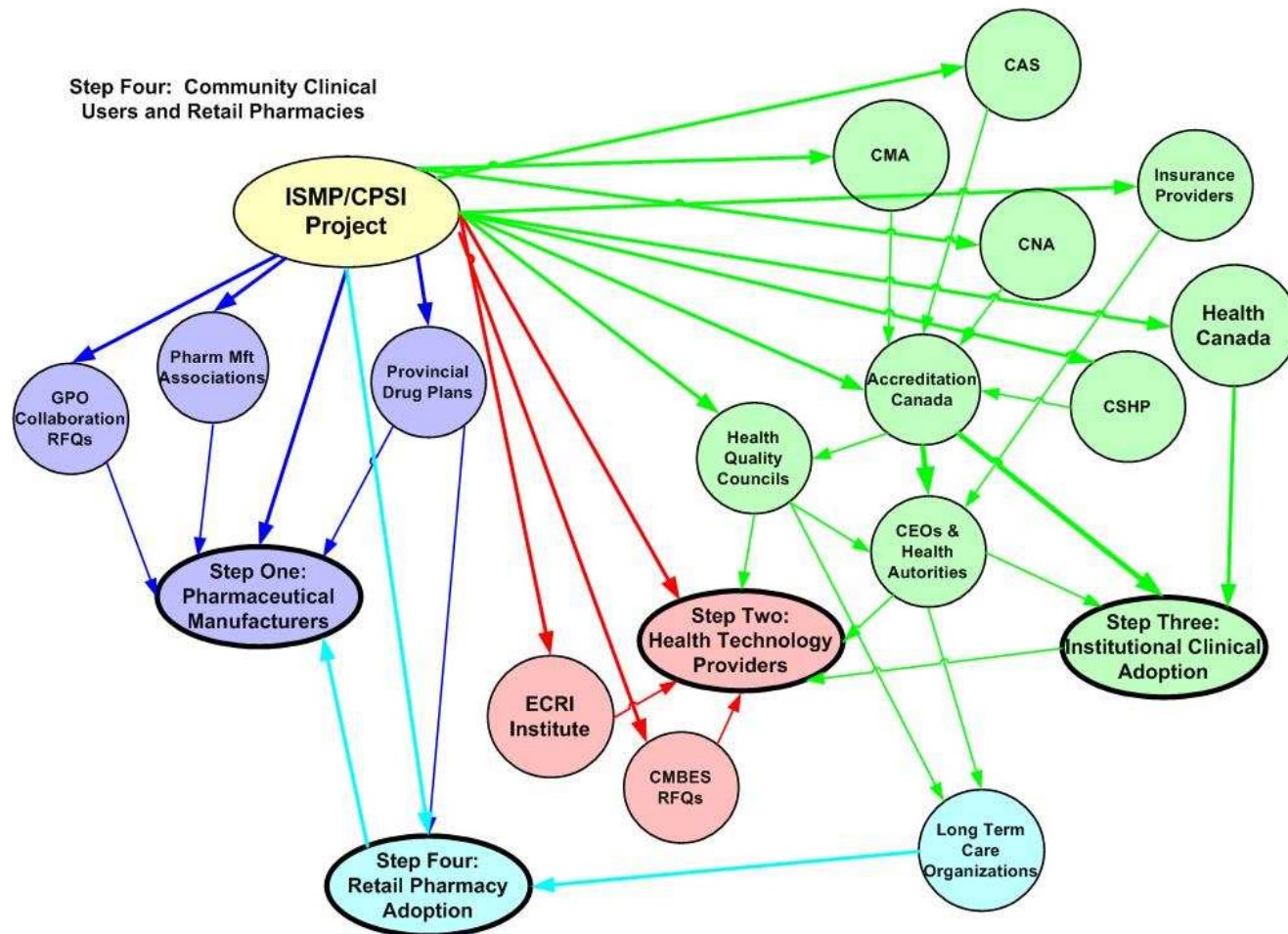
Step 2: Health Technology Provider Engagement

Step 3: End-User Practice Engagement

Step 4: Community/Retail Engagement

The Dissemination and Stakeholder Engagement Strategy

Inter-relationships of Key Organizations

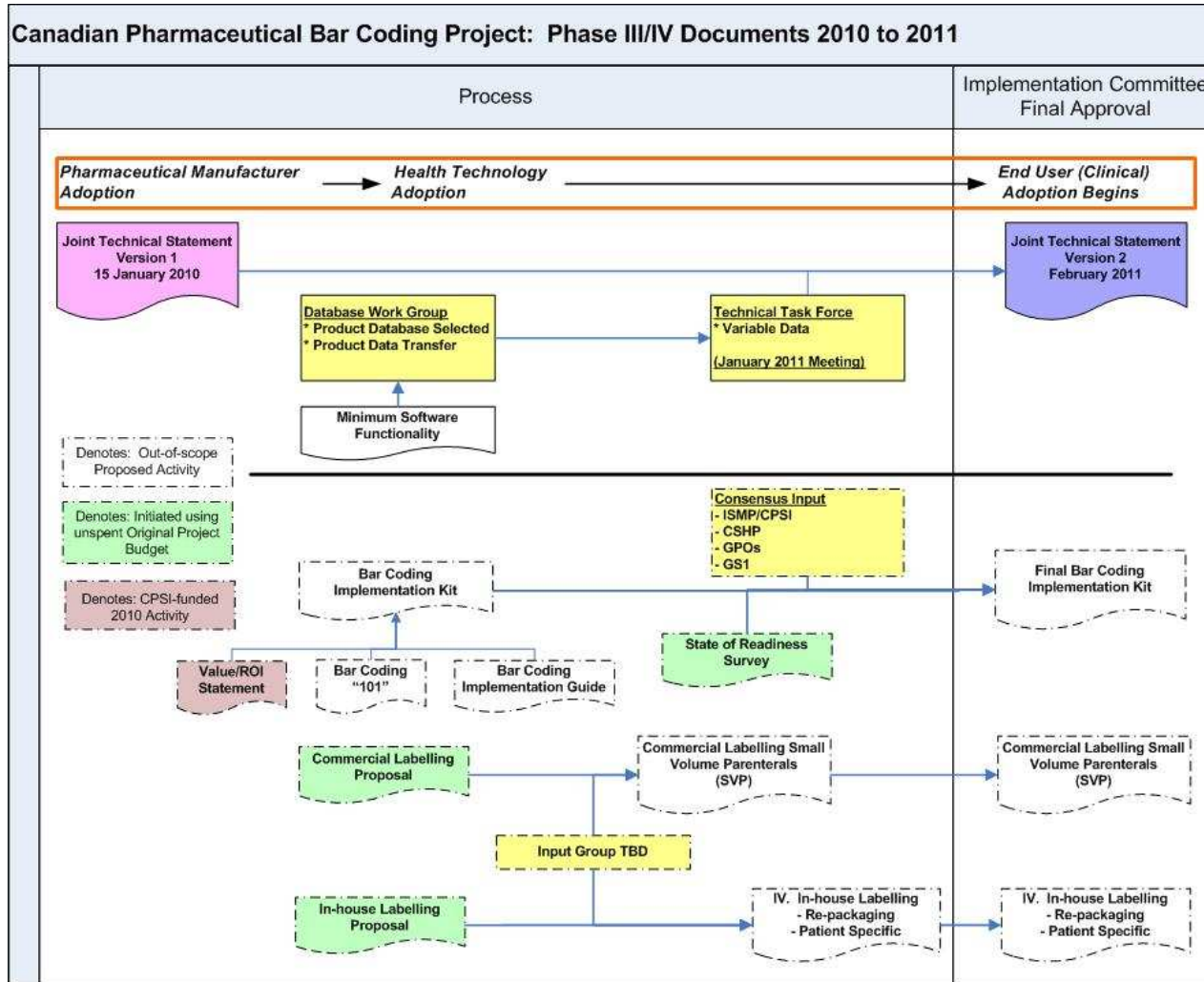


Practice Endorsements (Phase III)



2010 TerraPharma
WayPaver Award (U.S.)

2010 and Future Potential Project Phases



“We Are Very Happy with the Association with GS1 Canada and are Seeking a Continuation of the Special Project Partnership with GS1 Canada, the “engine of integration”

”

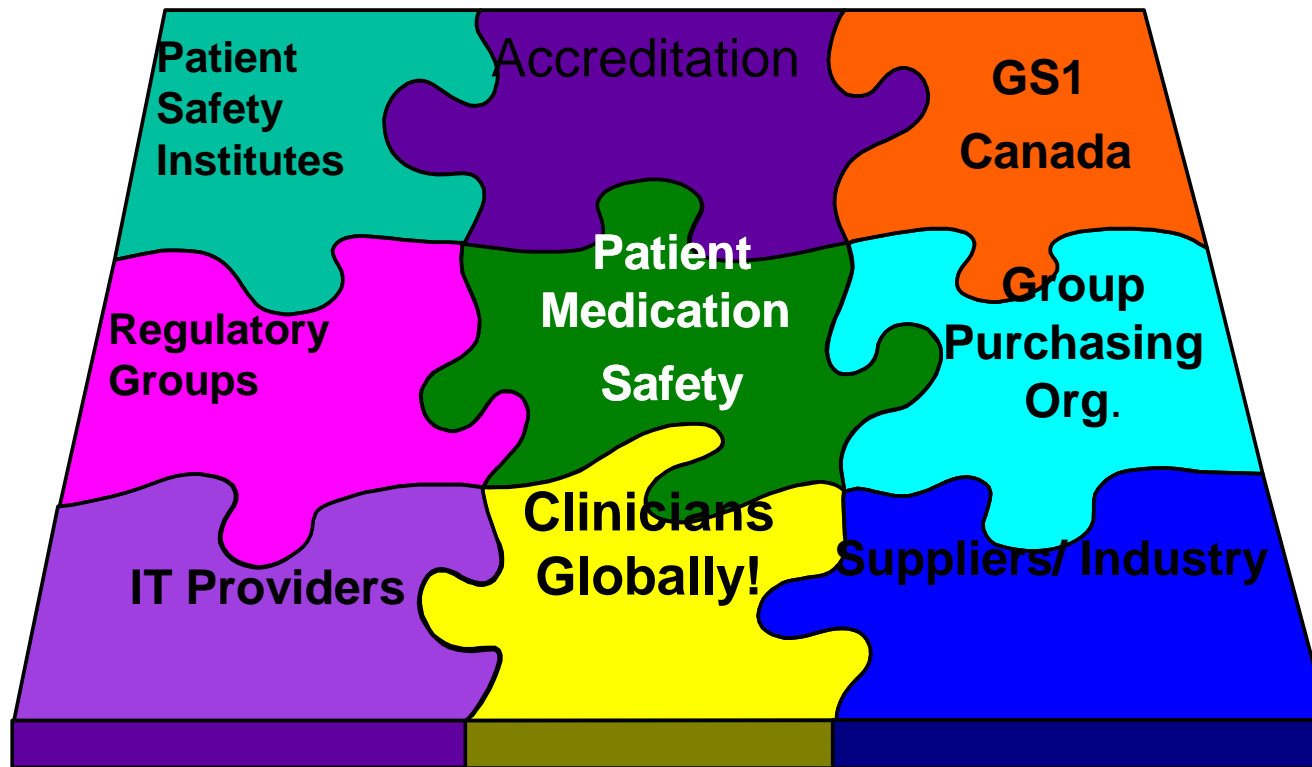
Medication Management Standard	GS1 Support	ISMP	Project	Discussion
Joint Technical Statement Version 2				
Database Work Group: Data Transfer Issues	✓		✓	Summer/Fall 2010
Develop Minimum Software Requirements for HTPs			✓	Summer 2010
Facilitate JTS Review and Amendments (Version III)			✓	January 2011
Implementation Readiness				
Implementation Kit:				
IK: Value ROI Statement	✓		✓	Spring/Early Summer 2010
IK: Barcoding Training Module for Clinical End-Users	✓		✓	Fall 2010
IK: Bar Coding Implementation Guide	✓		✓	Fall 2010
State of Readiness Assessment				
SoR: Pharmaceutical Sector	✓			Initial: Early Summer 2010
SoR: Health Technology Providers	✓			Initial: Early Summer 2010
SoR: Hospitals and Retail	✓		✓	Summer 2010
End-user and Practice Knowledge Dissemination				
End-user and Practice Knowledge Dissemination			✓	Duration 2010
International communications	✓		✓	Duration 2010/2011
Labelling and Packaging				
Commercial Packaging and Labeling Guidelines		✓		Possible Health Canada collaborative: Fall 2010
In-house Bar Code and Labeling Guidelines	✓	✓		Fall 2010

So, from a 'client's' perspective,

Collaboration:

Inspite of the absence of a National *Mandate*....

Canada now *has* a National Bar Code Strategy..





Thank you!

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