Canadian Pharmaceutical Bar Coding to Improve Patient Safety

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Institute for Safe Medication Practices Canada (ISMP Canada)

• Independent not for profit organization
• Established to review and analyze medication error reports and to develop recommendations and programs for the enhancement of patient safety
• Serves as a national resource for promoting safe medication practices throughout the health care community in Canada
ISMP Canada Services

- Individual practitioner medication incident reporting program (Canadian Medication Incident Reporting and Prevention System – CMIRPS)
- Publication and distribution of safety bulletins and newsletters
- Medication Safety Self Assessment® (a QA tool)
- Analyze-Err® software program
- Root cause analysis of sentinel events
- Medication system reviews
- Root Cause Analysis (RCA) training
- Failure Mode and Effects Analysis (FMEA) training
ISMP Canada’s key Initiatives:

• Canadian Medication Incident Reporting and Prevention System (CMIRPS)
• Medication Safety Support Services (MoH-ON)
• BC Patient Safety Task Force
• Health Quality Council of Alberta
• Other Provincial Medication Safety Initiatives (SK, MB, NS, NFD)
• Safer Healthcare Now (Medication Reconciliation)
Insulin Injection 30% and Insulin Isophane 70%, Human Biosynthetic
100 IU/mL
Shake carefully. Do not freeze.
Refrigerate between 2° and 10° C.
Dose and directions for use: Read enclosed leaflet.
A Penfill® cartridge must not be used by more than one person.
0.15% m-cresol and 0.065% phenol added as preservative
HUMAN

Insuline asparte. Solution pour injection s.c.
100 U/mL
Ne pas congeler. Conserver entre 2° et 10° C.
Dose et mode d’emploi : Lire le feuillet ci-joint.
Une cartouche Penfill® ne doit pas être utilisée par plus d’une personne.
1,5 mg/mL phénol et 1,72 mg/mL métacresol comme agents de conservation.
Garder hors de la portée des enfants.
Medication Management Process

with specific technologies to adverse drug events

Adapted from Classen – VHA 2001

**History-Taking**
- Obtain Medication-related History
- Document Medication History

**Ordering**
- Diagnostic/Therapeutic Decisions Made
- Medication Ordered
- Order verified and submitted

**Surveillance**
- Incident/adverse event surveillance and reporting

**Medication Inventory Management**
- Formulary, purchasing decisions
- Inventory management

**Pharmacy Management**
- Evaluate order
- Select medication
- Prepare medication
- Dispense/distribute medication

**Administration Management**
- Intervene as indicated for adverse reaction/error
- Assess and document patient response to medication according to defined parameters

**Document**
- Document administration and associated information

**Administer Medication**
- Administer according to order and standards for drug
- Select the correct drug for the correct patient

**Education**
- Educate patient regarding medication
- Educate staff regarding medications

**Bar-coding administration**

**Smart Pumps**
Events by Stages
(ISMP Canada Database, n=42893)

- Administration, 43.8%
- Monitoring, 5.7%
- Physician Ordering, 5.0%
- Order Entry and Transcription, 19.9%
- Dispensing and Delivery, 15.3%
- Not Applicable, 10.4%
Events by Stages (Harm or Death only)
(ISMP Canada Database, n=1987)

- Administration, 43.5%
- Monitoring, 8.1%
- Not Applicable, 6.8%
- Physician Ordering, 9.5%
- Order Entry and Transcription, 14.8%
- Dispensing and Delivery, 17.2%

ISMP Canada Database search, 12th June, 2008
Event by Stages
(MEDMARX Data Report, n=197313)

Prescribing 22%
Transcribing/documenting 21%
Dispensing 26%
Administering 30%
Monitoring 1%
Procurement 0%

Rockville, MD: USP Center for the Advancement of Patient Safety.
Errors in the medication use process

Errors

Prescribing 39% 12% 11% 38%

Transcribing

Dispensing

Administering

Source: JAMA 1995;274:35-43
Sources of harm

Prescribing: 28%
Transcribing: 11%
Dispensing: 10%
Administering: 51%

Errors: 39%
Transcribing: 12%
Dispensing: 11%
Administering: 38%

Source: JAMA 1995;274:35-43
Rank Order of Error Reduction Strategies

Forcing functions
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**Automation and computerization**

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Standardization and protocols

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Checklists and double check systems

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Rules and policies

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Education / Information
The main impact of CPOE is on ordering and transcription errors; the technique has relatively little impact on administration errors. For reducing the frequency of the latter errors, machine identification techniques such as bar coding – especially when linked to an electronic medication administration record – hold substantial promise, although the evidence for their efficacy is less strong than is the case for CPOE.
Bar-coding

Mature technology used in virtually every American industry except....
Bedside Bar-Coding... at the Point-of-Care
Basic components of a bedside bar-coding system

- Patients issued a wrist band with a bar-coded unique patient identifier
- Medications dispensed in unit-doses with a readable bar-code listing at least a drug identification number
- Bedside scanners that are linked to other IT systems are available during drug administration
- Drug administered to patient only after scanning provider, patient, and drug
Dispensing Errors and Potential ADEs: Before and After Barcode Technology Implementation

- Before Period (115164 doses observed)
  - 0.88% Dispensing Error Rate
  - 0.19% Potential ADE Rate

- After Period (253984 doses observed)
  - 0.61% Dispensing Error Rate
  - 0.07% Potential ADE Rate

Projections for errors prevented per year at study hospital:
- >13,500 medication dispensing errors
- >6,000 potential ADEs

* p<0.0001 (Chi-squared test)
Common challenges

- Staffing and other resources
- Technology
- Leadership and culture
- Unit-dose dispensing
- Pharmacy and nursing workflow
Other challenges

- Hardware troubleshooting
- Readable bar code on all packages
- Lack of trust or over reliance on technology
- Managing data
- Cross-departmental lack of knowledge of medication use processes
- Non-standard orders
- Responsiveness
Use of Bar Code Technology in USA

- FDA mandated bar code on all pharmaceuticals including unit of use package by January 2006
- Approximately 20-25% hospitals have fully implemented BCMA
Use of Bar Code Technology in Canada

- No regulatory requirement on bar code in pharmaceuticals for now
- Most if not all bulk containers have bar code (but not standardized)
- Application so far for material management purpose
- A handful of hospitals have started BCMA projects
- All SDM pharmacies have new computer system requiring bar code verification of medications to be dispensed
ERROR: stackunderflow

OFFENDING COMMAND: ~

ERROR: stackunderflow