High-Alert Medications and System Safety

Portuguese Society of Hospital Pharmacists
Cascais, Portugal

October 28, 2018
Sylvia Hyland

Institute for Safe Medication Practices Canada
Objectives

1. Define High-Alert Medications
2. Describe the rank order of medication error reduction strategies
3. Provide examples of incidents and initiatives in Canada
4. Highlight the importance of sharing, and sustaining learning through collaboration
Medication Incident Reporting Programs

**Practitioners**
Healthcare Professional - (e.g., nurse, pharmacist, physician)

**General Public**
Preventing harm from medication incidents is a responsibility of health professionals. Consumers like you can also play a vital role.

**CPhIR** - Community Pharmacy Incident Reporting Program
For participating community pharmacies.

http://www.ismp-canada.org/err_index.htm
Reporting Systems
Important Functions

• Use the results of analysis to develop and disseminate recommendations for system improvements.

• Produce a visible, useful response to stimulate improvement and continued reporting.
Incident Analysis Techniques

www.patientsafetyinstitute.ca/en/toolsResources/IncidentAnalysis/Documents
Deaths Associated with Medication Incidents: Learning from Collaborative Work with Provincial Offices of the Chief Coroner and Chief Medical Examiner

Background

Each Canadian province and territory has an Office of the Chief Coroner or Chief Medical Examiner responsible for investigating deaths from unspecified, unexpected, or unusual causes. Within the scope of these investigations are deaths associated with medication incidents. An in-depth analysis of information from these cases offers unique opportunities to identify underfunded factors and generate recommendations to reduce the chances of similar incidents in the future. ISMP Canada has had a formal collaborative relationship with the Office of the Chief Coroner in one province since 2004, and has worked with other Offices on selected cases. A collaborative medication safety project undertaken with the Offices of the Chief Coroner or Chief Medical Examiner in 4 provinces provided an opportunity to test a coordinated process for analysis of medication incidents from several jurisdictions, and to share learning broadly. This bulletin describes selected findings from the project.

Methods and Findings

An analysis team from ISMP Canada, consisting of 3 pharmacists, a registered nurse, and a physician with experience in a coroner, reviewed 523 death cases (from the years 2007 to 2012) in which a medication incident was potentially associated with the death. Of these, 122 cases were determined to have involved a medication incident and were abstracted into the ISMP Canada database for further analysis. In 115 of the 122 cases analyzed, the medication incident met the criteria for a category I incident (defined as an incident that may have contributed to or resided in the patient’s death).

Medications Involved

The medication classes most commonly involved in incidents associated with death were opioids, psychotherapeutic agents (e.g., benzodiazepines, antidepressants, antipsychotics), antiplatelet agents, anticoagulants, cardiovascular agents, and insulin (Table 1).

Table 1: Medication classes most commonly involved in incidents associated with death

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>No. (%) of Incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of category I cases</td>
<td>115 (100%)</td>
</tr>
<tr>
<td>Opioids</td>
<td>54 (47%)</td>
</tr>
<tr>
<td>Psychotherapeutic agents</td>
<td>28 (24%)</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>21 (18%)</td>
</tr>
<tr>
<td>Cardiovascular agents</td>
<td>11 (10%)</td>
</tr>
<tr>
<td>Insulin</td>
<td>6 (7%)</td>
</tr>
</tbody>
</table>

*aSome incidents involved more than one medication class.*

http://www.ismp-canada.org/ISMPCSafetyBulletins.htm
Medication Incident Analysis Findings

Analysis of reports found an association between a large percentage of harmful errors and a small number of drugs - warranting additional investigation.
High-Alert Medications

Definition:

High-alert medications are medications that bear a heightened risk of causing significant patient harm when they are used in error.

Although mistakes may not be more common in the use of these medications, when errors do occur, the impact on the patient can be significant (ISMP, 2011).
High-Alert Medications in Acute Care

ISMP List of High-Alert Medications in Acute Care Settings

High-alert medications are drugs that bear a heightened risk of causing significant patient harm when they are used in error. Although mistakes may or may not be more common with these drugs, the consequences of an error are clearly more devastating to patients. We hope you will use this list to determine which medications require special safeguards to reduce the risk of errors. This may include strategies such as standardizing the ordering, storage, preparation, and administration of these products; improving access to information about these drugs; limiting access to high-alert medications; using auxiliary labels; employing clinical decision support and automated alerts; and using redundancies such as automated or independent double checks when necessary. (Note: manual independent double checks are not always the optimal error-reduction strategy and may not be practical for all of the medications on the list.)

<table>
<thead>
<tr>
<th>Classes/Categories of Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>adrenergic agonists, IV (e.g., EPINEPHrine, phenylephrine, norepinephrine)</td>
</tr>
<tr>
<td>adrenergic antagonists, IV (e.g., propranolol, metoprolol, labetalol)</td>
</tr>
<tr>
<td>anesthetic agents, general, inhaled and IV (e.g., propofol, ketamine)</td>
</tr>
<tr>
<td>antiarrhythmics, IV (e.g., lidocaine, amiodarone)</td>
</tr>
<tr>
<td>antithrombotic agents, including:</td>
</tr>
<tr>
<td>- anticoagulants (e.g., warfarin, low molecular weight heparin, unfractionated heparin)</td>
</tr>
<tr>
<td>- thrombolytics (e.g., alteplase, tenecteplase)</td>
</tr>
<tr>
<td>- antiplatelet agents (e.g., aspirin, clopidogrel, ticagrelor)</td>
</tr>
</tbody>
</table>

Specific Medications:
- EPINEPHrine, IM, subcutaneous
- epoprostenol (e.g., Flolan), IV
- insulin U-500 (special emphasis*)
- magnesium sulfate injection
- methotrexate, oral, nononcologic use
- nitroprusside sodium for injection
- opium tincture
- oxytocin, IV
- potassium chloride for injection concentrate

https://www.ismp.org/recommendations/high-alert-medications-acute-list
High-Alert Medications in Long-Term Care

**ISMP List of High-Alert Medications in Long-Term Care (LTC) Settings**

High-alert medications are drugs that bear a heightened risk of causing significant patient or resident harm when they are used in error (e.g., wrong drug, wrong dose, wrong route). Although mistakes may or may not be more common with these drugs, the consequences of an error with these medications are clearly more devastating to patients or residents. We hope you will use this list to determine which medications require special safeguards to reduce the risk of errors. This may include strategies such as standardizing the ordering, storage, preparation, and administration of these products; improving access to information about these drugs; limiting access to high-alert medications; using auxiliary labels and automated alerts; and employing redundancies such as automated or independent double-checks when necessary. (Note: manual independent double-checks are not always the optimal error-reduction strategy and may not be practical for all of the medications on the list). Please note that long-term acute care (LTAC) facilities, and LTC facilities with subacute units or where a wide variety of intravenous medications are administered, should also use the ISMP List of High-Alert Medications in Acute Care Settings, which can be found at: [www.ismp.org/tools/institutionalhighAlert.asp](https://www.ismp.org/tools/institutionalhighAlert.asp). Facilities are also encouraged to use other resources, such as the Beers Criteria® and STEPP and START Criteria, to identify and address medications that should be avoided in the elderly population, which are different from high-alert medications.

<table>
<thead>
<tr>
<th>Classes/Categories of Medications</th>
<th>Specific Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticoagulants, parenteral and oral*</td>
<td>digoxin, parenteral and oral</td>
</tr>
<tr>
<td>Chemotherapeutic agents, parenteral and oral (excluding hormonal agents)</td>
<td>Epinephrine, parenteral</td>
</tr>
<tr>
<td>Hypoglycemics, oral (including combination products with another drug)</td>
<td>iron dextran, parenteral</td>
</tr>
<tr>
<td>Insulins, all formulations and strengths (e.g., U-100, U-200, U-300, U-500)</td>
<td>methotrexate, oral, non-oncology use **</td>
</tr>
<tr>
<td>Parenteral nutrition preparations</td>
<td>Concentrated morphine solution, oral ***</td>
</tr>
<tr>
<td>Opioids - parenteral, transdermal, and oral (including liquid concentrates, immediate- and sustained-release formulations, and combination products with another drug)</td>
<td></td>
</tr>
<tr>
<td>* Including warfarin and newer agents.</td>
<td></td>
</tr>
</tbody>
</table>

**All forms of chemotherapy are considered a class of high-alert medications. Oral methotrexate for non-oncology purposes has been singled out for special emphasis to bring attention to the need for distinct strategies to prevent wrong frequency errors that occur with this drug when used for non oncology purposes that can result in death.**

**All forms of opioids are considered a class of high-alert medications. Concentrated morphine solution has been singled out for special emphasis to bring attention to the need for distinct strategies to prevent wrong frequency errors that occur with this drug that can result in death.**

[https://www.ismp.org/recommendations/high-alert-medications-long-term-care-list](https://www.ismp.org/recommendations/high-alert-medications-long-term-care-list)
High-Alert Medications in Community Care

**ISMP List of High-Alert Medications in Community/Ambulatory Healthcare**

High-alert medications are drugs that bear a heightened risk of causing significant patient harm when they are used in error. Although mistakes may or may not be more common with these drugs, the consequences of an error are clearly more devastating to patients. We hope you will use this list to determine which medications require special safeguards to reduce the risk of errors and minimize harm.

This may include strategies like providing mandatory patient education; improving access to information about these drugs; using auxiliary labels and automated alerts; employing automated or independent double checks when necessary; and standardizing the prescribing, storage, dispensing, and administration of these products.

<table>
<thead>
<tr>
<th>Classes/Categories of Medications</th>
<th>Specific Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>antiretroviral agents (e.g., efavirenz, lamivudine, raltegravir, ritonavir, combination antiretroviral products)</td>
<td>carbAMazepine</td>
</tr>
<tr>
<td>chemotherapeutic agents, oral (excluding hormonal agents) (e.g., cyclophosphamide, mercaptopurine, temozolomide)</td>
<td>chloral hydrate liquid, for sedation of children</td>
</tr>
<tr>
<td>hypoglycemic agents, oral</td>
<td>heparin, including unfractionated and low molecular weight heparin</td>
</tr>
<tr>
<td>immunosuppressant agents (e.g., azathioprine, cycloSPORINE, tacrolimus)</td>
<td>metFORMIN</td>
</tr>
<tr>
<td>insulin, all formulations</td>
<td>methotrexate, non-oncologic use</td>
</tr>
<tr>
<td>opioids, all formulations</td>
<td>midazolam liquid, for sedation of children</td>
</tr>
<tr>
<td>pediatric liquid medications that require measurement</td>
<td>propytiouracil</td>
</tr>
<tr>
<td>pregnancy category X drugs (e.g., bosentan, ISOtretinoin)</td>
<td>warfarin</td>
</tr>
</tbody>
</table>

[https://www.ismp.org/recommendations/high-alert-medications-community-ambulatory-list](https://www.ismp.org/recommendations/high-alert-medications-community-ambulatory-list)
Designing Effective Recommendations

1. Consider the rank order of risk reduction strategies.

2. Include a consultation and review process.
Rank Order of Error Reduction Strategies

<table>
<thead>
<tr>
<th>Error-Reduction Strategy</th>
<th>Power (leverage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fail-safes and constraints</td>
<td>High</td>
</tr>
<tr>
<td>Forcing functions</td>
<td></td>
</tr>
<tr>
<td>Automation and computerization</td>
<td></td>
</tr>
<tr>
<td>Standardization</td>
<td></td>
</tr>
<tr>
<td>Redundancies</td>
<td></td>
</tr>
<tr>
<td>Reminders and checklists</td>
<td></td>
</tr>
<tr>
<td>Rules and policies</td>
<td></td>
</tr>
<tr>
<td>Education and information</td>
<td></td>
</tr>
<tr>
<td>Suggestions to be more careful or vigilant</td>
<td>Low</td>
</tr>
</tbody>
</table>

Table 1. Rank order of error-reduction strategies
Hierarchy of Effectiveness

Advice for Hospitals

- Review patient safety incidents using a systematic, team-oriented approach, as described in the Canadian Incident Analysis Framework.¹
- Recognize that certain types of risk-mitigation strategies are more effective than others. Mitigation strategies can be ordered by hierarchy of effectiveness.²

High Leverage

Forcing functions and constraints (e.g., removal of a product from use)

Medium Leverage

Simplification and standardization (e.g., standardized paper or electronic order sets)

Low Leverage

Rules and policies (e.g., policies to prohibit borrowing doses from other areas)

PERSON-Based

Education and information (e.g., education sessions on high-alert medications)

SYSTEM-Based

Reminders, checklists, double checks (e.g., independent double checks for high-alert medications)

Automation or computerization (e.g., automated patient-specific dispensing)

Wrong injection causes death

BY GRAEME SMITH

A drug used to execute death-row prisoners was mistakenly injected into an elderly woman, whose death in a Peterborough, Ont., hospital will be examined in a coroner’s inquest.

Bonita Porter, Ontario’s deputy chief coroner of inquests, announced yesterday that a jury will look at why Frances Marie Tanner, 84, died at the Peterborough Regional Health Centre on Jan. 21.

The cause of Ms. Tanner’s death is already known: Somebody injected a dose of potassium chloride into her vein. Small quantities of the drug can cure potassium deficiencies, but larger amounts are poisonous.

At least three other Canadians have died after receiving the same drug, sometimes from nurses who thought it was a different medicine.

Some doctors blame these accidents on manufacturers who sell potassium chloride in plastic ampoules and vials that closely resemble containers of sterile water, saline solution, and other harmless solutions.

Others say hospitals need stricter controls over potentially deadly substances. Ontario’s chief coroner sent a memo to hospitals last year specifically warning them that potassium chloride has been wrongly administered in the past.

After the latest death, however, the coroner’s office decided it was time to emphasize the danger.

“It was felt that an inquest might be the best way to get the information out,” Dr. Porter said.

The medical community knows surprisingly little about its own errors. A newsletter published last month by the Institute for Safe Medication Practices Canada recorded five cases in which patients were accidentally given potassium chloride; three died, and two were considered “near misses.”

More cases could exist, said the institute’s president, physician David U. While many hospitals have removed potassium chloride from nursing stations, he said, some doctors still demand to have it on hand, particularly in intensive-care units. And the drug manufacturers have a financial interest in maintaining their products’ uniform packaging.

“The companies have just one assembly line, so they all look the same,” he said. “It’s an accident waiting to happen.”

Researchers have suggested that perhaps 5,000 to 10,000 Canadians die because of medical error in hospitals every year.

The estimate is extrapolated from just one American study; however, a Canadian study was launched last month.

Litany of errors

Incidents involving potassium chloride in Canada:

1. Potassium chloride (KCl) was administered via direct IV when the intended action was to flush an intravenous line with diluted sodium chloride. Result: Patient died.

2. KCl concentrate was used to reconstitute a drug for parenteral administration when the intended diluent was sterile water. Result: Error was noted before administration.

3. KCl concentrate was administered as a bolus injection – an injection given in high quantity, all at once – by a health-care professional who was unaware that KCl concentrate cannot be given as a bolus but must be diluted in a minibag and given as an infusion. Result: Patient died.

4. A one-litre IV solution was prepared with potassium chloride and although it was administered at a very low rate, the incident was felt to be a near miss because of the potential for accidental overdose. Result: Error was noted during administration.

5. IV solutions containing KCl were administered as a fluid replacement in a patient requiring several litres of fluid in a short time frame. Result: Hyperkalemia, patient died.


SOURCE: INSTITUTE FOR SAFE MEDICATION PRACTICES REPORT, MAY, 2002 IMAGE: PHOTOIDSC

THE GLOBE AND MAIL – JUNE 12, 2002
Incidents associated with administration of Concentrated KCl:

- Administered direct IV (intended action was to flush an IV line with 0.9% NaCl)

- Used to reconstitute a drug for parenteral administration (intended diluent was sterile water)

- Used as an additive to a renal dialysis fluid for Continuous Renal Replacement Therapy (CRRT) (intended additive was 23.4% NaCl for injection)

- Administered as a bolus (provider unaware that concentrated KCl should not be given as a bolus)
Initiative to eliminate concentrated potassium chloride from patient care areas was supported by the Ontario Ministry of Health and Long-Term Care.

Similar packaging and storage contributed to fatal errors.
Provincial Advisory Committee

- Ontario Ministry of Health and Long-Term Care
- Ontario Hospital Association
- Registered Nurses Association of Ontario
- Registered Practical Nurses of Ontario
- Ontario Medical Association
- Ontario Pharmacists’ Association
- Quality Health Network
- College of Nurses of Ontario
- **Canadian Society of Hospital Pharmacists – Ontario Branch**
- College of Physicians and Surgeons of Ontario
- Ontario College of Pharmacists
- Institute for Safe Medication Practices Canada
Province-wide effort

** CAUTION **
Concentrated KCl
Fatal if Injected Undiluted
DILUTE before use
Prevention Strategies

Simple, but not easy.
To remove concentrated KCl products from patient care areas:

- Purchase pre-mixed/commercial IV solutions containing KCl
  - Collaboration with Manufacturers for additional products

- Prescribe standardized product solutions

- Create order sets, update guidelines and electronic order systems to reflect standardized product solutions

- Educate and train and inform so that everyone understands “why” these changes are being implemented
Prominence of Critical Information

2A0138
23.4% SODIUM CHLORIDE
INJECTION, USP
LOT G024455
EXP. DATE JAN '06

1D-41-92
15% POTASSIUM CHLORIDE
INJECTION, USP
(2 mEq/mL)
LOT G022418
EXP. DATE NOV '05
Global Impact

Original Carton Label

Canadian Initiated Over-label (April ’04)

New Global Carton Label
Reports involving Neuromuscular Blocking Agents
Result: Package and Label Changes
Neuromuscular Blocking Agent Labelling and Packaging Initiative

A collaborative meeting of representatives of pharmaceutical manufacturers of neuromuscular blocking agents was convened by ISMP Canada in Toronto on February 27th, 2006. The foremost outcome was agreement among the attending stakeholders on the “ideal features” for packaging and labeling of neuromuscular blocking agents:

1. Red cap with white lettering: “Paralyzing agent” or “Warning: Paralyzing Agent”
2. Red ferrule with white lettering: “Paralyzing agent”
3. Red lettering on the product label: “Paralyzing agent” or “Warning: Paralyzing Agent”
4. Peel-off label, using the colour scheme and content information recognized by the ASA/CAS recommended standards, for application to a prepared syringe (ASA = American Society of Anesthesiologists (www.asahq.org); CAS = Canadian Anesthesiologists’ Society (www.cas.ca))
5. Space on the product label for bar code application
6. Development of a universal symbol for neuromuscular blocking agents and proposal for global use: placement of this symbol (e.g., on the label), to be determined
7. Review of potential benefit of using TALL-man lettering for generic names of neuromuscular blocking agents

Participating manufacturers (Sandoz Inc, Hospira, Organon, and Abbott) are evaluating the feasibility of incorporating some or all of these features.
Interim Situation
All manufacturer’s now include a warning:
Inadvertent injection of neuromuscular blocking agents

Prevention strategies:

• Not stored in patient care areas unless necessary
• Store with a warning label

WARNING: Paralyzing Agent
Causes Respiratory Arrest
For use in intubated patients only.

• Limit the selection available on the hospital formulary to enhance familiarity and expertise with products
Report: Transdermal Fentanyl Patch
Not Visible after Application
Result: Product Change Implemented

ratio-fentanyl
25 mcg/h
Report: Dose Calculation Difficulty
Result: Label Change Implemented

- Concentration now expressed in g per total volume, and mg per mL
- Manufacturer logo removed to give prominence to critical information
- CEO called to express appreciation for improvement recommendation
Sustaining the Learning


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ISMP MSSA for High-Alert Medications 2017

Includes:

- Known safe practices
- Considerations with use of technology (e.g., computerized order entry, smart infusion pumps, bar coding, ADCs);
- Safeguards that can be incorporated into protocols, labelling, patient education

https://www.ismp.org/assessments/high-alert-medications
## ISMP MSSA for High-Alert Medications

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<th>Questions/Items</th>
<th>Page</th>
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<td>26</td>
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<td>Neuromuscular Blocking Agents</td>
<td>(1 demographic, 15 self-assessment)</td>
<td>31</td>
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<td>Concentrated Electrolytes Injection</td>
<td>(26 self-assessment)</td>
<td>34</td>
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<td>Magnesium Sulfate Injection</td>
<td>(2 demographic, 22 self-assessment)</td>
<td>38</td>
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<td>Moderate Sedation in Adults and Children, Minimal Sedation in Children</td>
<td>(40 self-assessment)</td>
<td>42</td>
</tr>
<tr>
<td>Insulin, Subcutaneous and Intravenous</td>
<td>(5 demographic, 45 self-assessment)</td>
<td>48</td>
</tr>
<tr>
<td>Lipid-Based Medications and Conventional Counterparts</td>
<td>(9 self-assessment)</td>
<td>58</td>
</tr>
<tr>
<td>Methotrexate for Non-Oncologic Use</td>
<td>(7 self-assessment)</td>
<td>60</td>
</tr>
<tr>
<td>Chemotherapy, Oral and Parenteral</td>
<td>(5 demographic, 48 self-assessment)</td>
<td>61</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>(1 demographic, 43 self-assessment)</td>
<td>68</td>
</tr>
<tr>
<td>Neuraxial Opioids and/or Local Anesthetics</td>
<td>(32 self-assessment)</td>
<td>74</td>
</tr>
<tr>
<td>Opioids</td>
<td>(60 self-assessment)</td>
<td>79</td>
</tr>
</tbody>
</table>

https://www.ismp.org/assessments/high-alert-medications
Sharing the Learning

Hospital Harm Improvement Resource Guide

ISMP MSSA is referenced

http://www.patientsafetyinstitute.ca/en/toolsResources/Hospital-Harm-Measure/Improvement-Resources
High Alert Medication Safety Processes

- Develop order sets, and clinical pathways or protocols to establish a standardized approach to treating patients with similar problems, disease states, or needs.
  - Consider computerized order entry defaults for safety
- Minimize variability by standardizing concentrations and dose strengths to the minimum needed to provide safe care.
- Include information and reminders about monitoring parameters in the order sets, protocols, and flow sheets.
- Consider protocols for vulnerable populations such as elderly, and pediatrics.

http://www.patientsafetyinstitute.ca/en/toolsResources/Hospital-Harm-Measure/Improvement-Resources
Methods to identify errors and harm

• Ensure that critical lab information is available to those who need the information and can take action.

• Implement independent double-checks where appropriate.

• Instruct patients on symptoms that indicate side effects and when to contact a health care provider for assistance.

http://www.patientsafetyinstitute.ca/en/toolsResources/Hospital-Harm-Measure/Improvement-Resources
Methods to Mitigate Harm

• Have rescue protocols available

• Allow for the administration of reversal agents without having to contact the physician.

• Ensure that antidotes and reversal agents are readily available.

http://www.patientsafetyinstitute.ca/en/toolsResources/Hospital-Harm-Measure/Improvement-Resources
Sustaining the learning

Medication Management Standards and Required Organizational Practices

- *High-Alert Medications*: Organizations are required to implement a comprehensive strategy to manage high-alert medications, based on the ISMP list of high-alert medications.

http://www.patientsafetyinstitute.ca/en/toolsResources/Hospital-Harm-Measure/Improvement-Resources
Never Events in Hospital Care in Canada

http://www.patientsafetyinstitute.ca/en/toolsResources/NeverEvents/
Never Event Definition

Patient safety incidents in a healthcare facility that result in serious harm or death, and are preventable using organizational checks and balances.
Never Event Criteria

**Serious:**
- High risk that the event would cause significant patient harm or death

**Recurrence:**
- Available evidence of a past occurrence (e.g. incident reports)
- Risk of the event happening to another patient if it is not addressed

**Identifiable:**
- The event is easily recognized, clearly defined, and not attributable to other possible causes

**Preventable:**
- Appropriate organizational barriers, (guidance and safety recommendations) when implemented, can prevent the event from occurring
5 Pharmaceutical Never Events

1. Wrong route administration of chemotherapy agents (e.g. incidents with vincristine)

2. Intravenous administration of undiluted/ concentrated potassium solutions (e.g. potassium chloride)

3. Inadvertent injection of epinephrine intended for topical use

4. Inadvertent overdose of hydromorphone by administering a higher concentration solution than intended

5. Neuromuscular blockade without sedation, airway control, and ventilation capability
Wrong route administration of chemotherapy agents (e.g. vincristine incidents)

Prevention Strategies:

- Remove vincristine from areas where intrathecal medications are prepared, administered, or stored
- Prepare and dispense vincristine (and other vinca alkaloids) in small-volume IV minibags (not syringes)
  - less likely to result in a ‘mix-up’ in route of administration
- Employ unique and non-interchangeable connections
- Include warnings

Inadvertent Injection of Epinephrine intended for Topical Use

- Multiple, similar open basins holding different solutions (topical and injectable) were present in the sterile field.
- The practice of withdrawing a medication intended for topical use into a parenteral syringe poses a risk of substitution error and inadvertent injection.

Inadvertent Injection of Epinephrine intended for Topical Use

Prevention Strategies:

• **Topical** (concentrated) epinephrine should **not** be in a parenteral syringe

• Products should be designed for intended use.

• **Injectable products** should be kept in original vial, **not** in an open solution bowl
Overdose of HYDROMorphine by administration of higher-than-intended concentration solution

2 mg/mL  10 mg/mL  20 mg/mL  50 mg/mL  100 mg/mL
Overdose of HYDROMorphone by administration of higher-than-intended concentration solution

Prevention strategies:

• Eliminate high-concentration items (e.g. hydromorphone injectable products with concentration over 2 mg/mL) from patient care area stock

• In circumstances where high-concentration hydromorphone cannot be eliminated (e.g. in palliative care), ensure that it is segregated and requires an independent check

• Ensure electronic systems and labels are designed with end-users in mind to help prevent calculation errors or misunderstandings with directions
  • Consider a cognitive walk-through (proactive risk assessment) for designs

• Eliminate dangerous dose designations such as a ‘trailing zero’

• Use prefilled, ready to use syringes
Design Electronic Systems with End-User in Mind

Fatal Incident
Contributing factor: eMAR design

Design Electronic Systems with End-User in Mind

<table>
<thead>
<tr>
<th>Schedule for Sep 2018</th>
<th>Hours</th>
<th>Sat</th>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHENobarbital Sodium Solution</td>
<td>0600</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<td>120 MG/ML Inject 20 mg subcutaneously two times a day for Seizures amount to be administered 0.167 ml</td>
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- Start Date -
  09/21/2018 1700

Software developer was required for changes
Insulin safety

ISMP Guidelines for Optimizing Safe Subcutaneous Insulin Use in Adults

https://www.ismp.org/guidelines/subcutaneous-insulin
Pharmaceutical Bar Coding Project Resource Guide

To create a national environment for automated identification at each point of the medication chain.

https://www.ismp-canada.org/barcoding/
Collaboration
5 Questions to Ask About Your Medications

1. CHANGEMENTS?
   Est-ce que des médicaments ont été ajoutés, supprimés ou changés et pourquoi?

2. CONTINUER?
   Quels médicaments dois-je continuer à prendre et pourquoi?

3. USAGE CORRECT?
   Comment dois-je prendre mes médicaments et pour combien de temps?

4. SURVEILLER?
   Comment vais-je savoir si mes médicaments agissent et quels effets secondaires faut-il surveiller?

5. SUIVI?
   Aurai-je besoin de tests et quand dois-je prendre mon prochain rendez-vous?

Visitez safemedicationuse.ca pour en savoir plus.
“The ‘most powerful’ strategy for improving safety and achieving desired clinical results, may be motivating providers and organizations to support the FULL ENGAGEMENT of patients and their guardians in improving the safety and effectiveness of medication use.”

Lyle Bootman, Co-chair, Committee on Identifying and Preventing Medication Errors, Institute of Medicine, July 2006
Our Aim

Empower patients and families with ‘questions to ask’ to improve knowledge about medications and prevention of harm.
Co-Designed with Patients

- Environmental scan
- Working group consisted of patients, nurses, doctors and pharmacists
- Draft developed
- Iterative improvements following surveys and user-testing and feedback

Be an active partner in your health!

5 questions to ask about your medications

Ask your doctor, nurse, or pharmacist:

1. Have any of my medications stopped or changed and why?
2. Can you review my medications with me?
3. What side effects do I need to watch for?
4. What tests do I need to have done?
5. When do I need a follow-up appointment?

TIPS: Keep your list of allergies and your medication record up to date.
- Don't forget to include:
  - vitamins and minerals
  - herbal products
  - puffers, eye drops, patches
  - medications you buy without a prescription

If you have problems or questions, SPEAK UP and talk to your family doctor or pharmacist.
Visit SafeMedication.ca for more information and tools on safe medication use.

©2018 Institute for Safe Medication Practices Canada (ISMP Canada)
5 QUESTIONS TO ASK ABOUT YOUR MEDICATIONS when you see your doctor, nurse, or pharmacist.

1. CHANGES?
   Have any medications been added, stopped or changed, and why?

2. CONTINUE?
   What medications do I need to keep taking, and why?

3. PROPER USE?
   How do I take my medications, and for how long?

4. MONITOR?
   How will I know if my medication is working, and what side effects do I watch for?

5. FOLLOW-UP?
   Do I need any tests and when do I book my next visit?

Keep your medication record up to date.

Remember to include:
- drug allergies
- vitamins and minerals
- herbal natural products
- all medications including non-prescription products

Ask your doctor, nurse or pharmacist to review all your medications to see if any can be stopped or reduced.

Visit aemrecanada.ca for more information.

https://www.ismp-canada.org/medrec/5questions.htm#l=tab2
200 Endorsements at national, provincial and local levels
How it can be used

Patients
- Before leaving the hospital
- At every appointment

Healthcare providers
- Guide discussion
- Guide ‘teachback’
5 QUESTIONS TO ASK ABOUT YOUR MEDICATIONS when you see your doctor, nurse, or pharmacist.

1. CHANGES?
   Have any medications been added, stopped or changed, and why?

2. CONTINUE?
   What medications do I need to keep taking, and why?

3. PROPER USE?
   How do I take my medications, and for how long?

4. MONITOR?
   How will I know if my medication is working, and what are the side effects do I need to tell?

5. FOLLOW-UP?
   Do I need any tests and when do I book my next visit?

Keep your medication record up to date.

Ask your doctor, nurse or pharmacist to review all your medications to see if any can be stopped or reduced.

Visit safemedications.ca for more information.
5 QUESTIONS TO ASK ABOUT YOUR MEDICATIONS
When you see your doctor, nurse, or pharmacist.

1. CHANGES?
   - Have there been any changes to your medication?
   - Can I continue to use the dosage form I am currently using?

2. CONTINUE?
   - Is there any reason why I should not continue to use the medication I am taking?
   - Can I continue to use the dosage form I am currently using?

3. PROPER USE?
   - Is it possible to increase the dosage or switch to a different dosage form?
   - Is there any other alternative I can use?

4. MONITOR?
   - Do I need to monitor any side effects or blood levels?
   - Do I need to take any additional medications?

5. FOLLOW-UP?
   - Is there anything else you need to follow-up on?
   - Do I need to make any changes to my medication?
National Action Plan Evaluation: Collective Impact Model

Results showed:

- The ‘5 questions to ask’ received one of the highest ‘usefulness’ ratings.

- ‘5 questions to ask’ was ranked as the top output with which survey respondents improved patient safety.

Opioids for pain after surgery: Your questions answered

1. Changes?
   You have been prescribed an opioid. Opioids reduce pain but will not take away all your pain. Ask your prescriber about other methods of reducing pain including using ice, stretching, physiotherapy, or non-opioid drugs like acetaminophen or ibuprofen. Know your pain control plan and work closely with your prescriber if your pain does not improve.

2. Continue?
   Opioids are usually required for less than 1-2 weeks after surgery. As you continue to recover from your surgery, your pain should get better day by day. As you get better, you will need less opioids. Consult your doctor or pharmacist about how and when to reduce your dose.

3. Proper Use?
   Use the lowest possible dose for the shortest possible time. Overdose and addiction can occur with opioids. Avoid alcohol and sleeping pills (e.g., benzodiazepines like lorazepam) while taking opioids. Do not drive while taking opioids.

4. Monitor?
   Side effects include: sedation, constipation, nausea and dizziness. Contact your doctor or pharmacist if you have severe dizziness or inability to stay awake.

5. Follow-Up?
   Ask your prescriber when your pain should get better. If your pain is not improving as expected, talk to your healthcare provider.

It is important to:

- Never share your opioid medication with anyone else.
- Store your opioid medication in a secure place, out of reach and out of sight of children, teens and pets.
- Ask about other options available to treat pain.
- Take unused medications back to a pharmacy for safe disposal.
- Talk with your pharmacist if you have questions. For locations that accept returns: [1-844-535-8889](tel:18445358889) [healthsteward.ca](http://healthsteward.ca)

Did you know?

- About 1 in 4 Canadians are hospitalized each day with opioid poisoning. — Canadian Institute for Health Information, 2017

Examples of opioids used for pain after surgery:

- Hydromorphone
- Morphine
- Codeine
- Oxycodone
- Tramadol

Notes:

To find out more, visit: [OpioidStewardship.ca](http://OpioidStewardship.ca) and [DeprescribingNetwork.ca](http://DeprescribingNetwork.ca)

www.ismp-canada.org/opioid_stewardship/
Opioid Safety

Health Canada requires Community Pharmacies to add a Warning Sticker and provide a Patient Information Handout with opioid prescriptions.

Sustain and Improve Impact

Global collaboration:

Key action area of focus is High Risk Situations

Preventing harm from high-alert medications is a key opportunity.
Thank You

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There are no commercial financial affiliations related to the content of the presentation.