



Medication Error and Patient Safety: A Systems Approach Building the Foundation

November 18, 2015

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ISMP Canada

ISMP Canada is an independent not-for-profit organization dedicated to reducing preventable harm from medications.

Our goal is the creation of **safe and reliable systems** for managing medications in all healthcare environments.

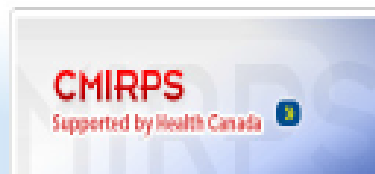
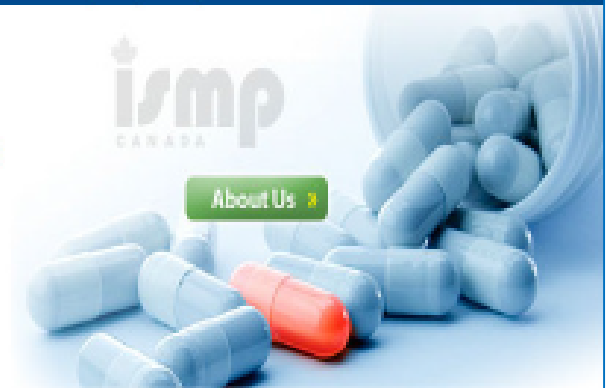
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- Home
- Safety Bulletins >
- Report a Medication Incident
- News >
- Education Events >
- Products & Services >
- Publications >
- Current Projects >
- CMIRPS
- Related Links
- Definitions
- About Us >
- Contact Us >

Advancing safe medication use

The Institute for Safe Medication Practices Canada is an independent national not-for-profit organization committed to the advancement of medication safety in all healthcare settings. ISMP Canada works collaboratively with the healthcare community, regulatory agencies and policy makers, provincial, national and international patient safety organizations, the pharmaceutical industry and the public to promote safe medication practices. ISMP Canada's mandate includes analyzing medication incidents, making recommendations for the prevention of harmful medication incidents, and facilitating quality improvement initiatives.



Reporting and Prevention Systems



Medication Incident and Near Miss Reporting Programs for:

- Practitioners
- General Public (SafeMedicationUse.ca)

Ontario MOHLTC Supported Initiatives



Ontario Critical Incident Learning

- Safe Use of Insulin Interventions
- Safe Use of Insulin Pen e-Learning Module
- Safer Medication Use in Older Persons

Multi-Stakeholder Projects



Canadian Pharmaceutical Bar Coding Project



Medication Reconciliation



MyMedRec App- Keep track of your medicines and vaccines



Canadian Incident Analysis Framework

Ontario Critical Incident Learning

Improving quality in patient safety



Home

Collaboration



To advance the patient safety agenda, in August 2011 the Ontario Ministry of Health and Long-Term Care issued a directive that hospitals must report critical incidents involving medications and intravenous fluids to the Canadian Institute for Health Information National System for Incident Reporting (NSIR). A critical incident is an "unintended event that occurs when a patient receives treatment in the hospital that results in death, or serious disability, injury or harm, and does not result primarily from the patient's underlying medical condition or from a known risk inherent in providing treatment".

ISMP Canada has been identified as the lead organization for analysis of the reported incidents. A multidisciplinary team reviews each submitted critical incident report to ensure effective identification of the contributing factors. In addition, ISMP Canada will periodically conduct aggregate analysis of reported incidents to provide a more in-depth assessment of events involving a particular medication or care setting. On the basis of these analyses, ISMP Canada will develop and disseminate outcome-directed recommendations, with an emphasis on high-leverage actions that take into account human factors engineering principles and the need to design systems with integrated safeguards.

Bulletins:

- [Naloxone Saves Lives](#) - Iss. 10/2014
- [Sharing Insulin Pens Is a High-Risk Practice](#) - Iss. 9/2014
- [Safe Pain Control in the Emergency Department](#) - Iss. 8/2014
- [Smart Pumps Need Smart Systems](#) - Iss. 7/2014
- [Monitoring Processes Contribute to Safe Use of Warfarin](#) - Iss. 6/2013
- [Promoting the Safe Use of Insulin in Hospitals](#) - Iss. 5/2013
- [Designing Effective Recommendations](#) - Iss. 4/2013
- [Quality Medication Reconciliation Processes Are Critical](#) - Iss. 3/2013
- [Hydromorphone remains a high-alert drug](#) - Iss. 2/2013
- [Mandatory Reporting—Can We Do Better?](#) - Iss. 1/2012

Analysis Report:

- [Ontario Hospital Critical Incidents Related to Medications or IV Fluids Analysis Report - 2014](#)
- [Ontario Hospital Critical Incidents Related to Medications or IV Fluids Analysis Report - 2013](#)

Webinars:

- [Medication Safety Learning from Ontario Coroners' Cases - Focus on Opioids](#) - 2013/03/06



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

Reporting Medication Incidents
benefits all Canadians.



REPORT NOW

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Latest News and Resources

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- 🔊 [SafeMedicationUse.ca's Jennifer Turple talks about medication safety and drug interactions on CBC \(interview starts at the 22nd minute\)](#)
- 📺 **NEW!** [One Simple Solution for Medication Safety – Doc Mike Evans Video now available!](#)
- 📄 [Additional information on Mylan Pharmaceuticals nitroglycerin spray recall](#)
- 📄 [Health Canada Advisory - Mylan Pharmaceuticals recalling nitroglycerin spray due to defective pump](#)
- 📄 [Sharing Opioid Medicines Can Be Deadly 2014-09-03](#)
- 📄 [Traveling: Always Medically Alert, Always Prepared, Always in Control / Conditions](#)

Safety Bulletins



Institute for Safe Medication Practices Canada
REPORT MEDICATION INCIDENTS
Online: www.ismp-canada.org/err_index.htm
Phone: 1-866-544-7672

A KEY PARTNER IN
CMIRPS **SCDPIM**
Canadian Medication Incident Reporting and Prevention System Systemes canadiens de déclaration et de prévention des incidents médicamenteux

ISMP Canada Safety Bulletin

Volume 14 • Issue 8 • September 10, 2014

Aggregate Analysis of Medication Incidents in Home Care

Safety in home care is becoming a national focus. The shift from institutional to community care presents new challenges as governments, healthcare organizations, and families try to help patients maintain their independence as long as possible in the comfort of their own homes. As a result, a growing number of medically complex patients are receiving care in the community with the support of multiple caregivers coordinated by home care agencies. Many of these caregivers (including family members and personal support workers) are attempting to manage complex medication regimens with limited training or education, which may increase the risk of a medication error. Recent home care safety reviews have confirmed that medications are a major cause of preventable adverse events.¹⁻³ ISMP Canada undertook a multi-incident analysis to better understand the underlying challenges faced by individuals involved in supporting safe medication use in the home care setting. This bulletin shares findings from the analysis, highlighting the major themes and selected contributing factors, to identify opportunities for system-based improvements.

Methodology and Overview of Findings

Reports of medication incidents that occurred at home were extracted from voluntary reports submitted to ISMP Canada's medication incident reporting database from August 1, 2000, to February 18, 2014. Of the 246 incident reports reviewed, only those with descriptive text suggesting the provision of home care (use of terms such as "service provider", "case management", "home-visiting"

regulated or unregulated professional) were retained. A total of 153 incidents were included in the final analysis, which was conducted according to the methodology outlined in the Canadian Incident Analysis Framework.⁴ Fifty-seven (37%) of these incidents resulted in harm to the patient. High-alert medications in the community setting (anticoagulants, opioids, hypoglycemic agents, pediatric liquids, immunosuppressants)⁵ accounted for 37 (24%) of the total. Antibiotics, proton pump inhibitors, and medications for inhalation were involved in 15 (10%), 10 (7%), and 10 (7%) of the incidents, respectively.

Findings of the Qualitative Analysis

Analysis of the incidents identified 3 main themes (see Figure 1). Some incidents were categorized under more than one theme. The following sections describe each of the main themes in some detail, along with an illustrative example.

Figure 1. Main Themes from the Qualitative Analysis



ISMP Canada Safety Bulletin – www.ismp-canada.org/ISMPCSafetyBulletins.htm

1 of 7

Ontario

CRITICAL Incident Learning

Improving quality in patient safety

Issue 10
September 2014

Naloxone Saves Lives

Opioids constitute a class of high-alert medications whose toxic effects can cause sedation, confusion, and respiratory compromise and can lead to death. Fortunately, an effective and life-saving reversal agent—naloxone—is available. Naloxone temporarily replaces the opioid at the site of action of the drug, counteracting the toxic effects. With appropriate monitoring, patients known or suspected to be experiencing toxicity can be identified and rescued from the effects of opioid overdose with timely administration of naloxone and the initiation of other medical interventions.

Naloxone has a shorter duration of effect than some opioids, and once it has been metabolized by the body, there is a risk that the pharmacological effects of the opioid will re-emerge, causing harm to recur.¹ Therefore, patients receiving naloxone must be monitored closely for a prolonged period to ensure that any re-emergence of toxic effects is immediately addressed. Further administration of naloxone along with a higher level of care and medical intervention may be required.

Distributed to:

- Chief executive officers
- Chiefs of staff
- Board chairs
- Quality/patient safety leads
- Directors of pharmacy
- Directors of nursing

Suggested action items:

- Refer bulletin to pharmacy and therapeutics committee with a

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SUPPORTED BY HEALTH CANADA



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Consumers Can Help Prevent
Harmful Medication Incidents

SafeMedicationUse.ca Newsletter

Volume 5 • Issue 6 • September 3, 2014

Sharing Opioid Medicines Can Be Deadly

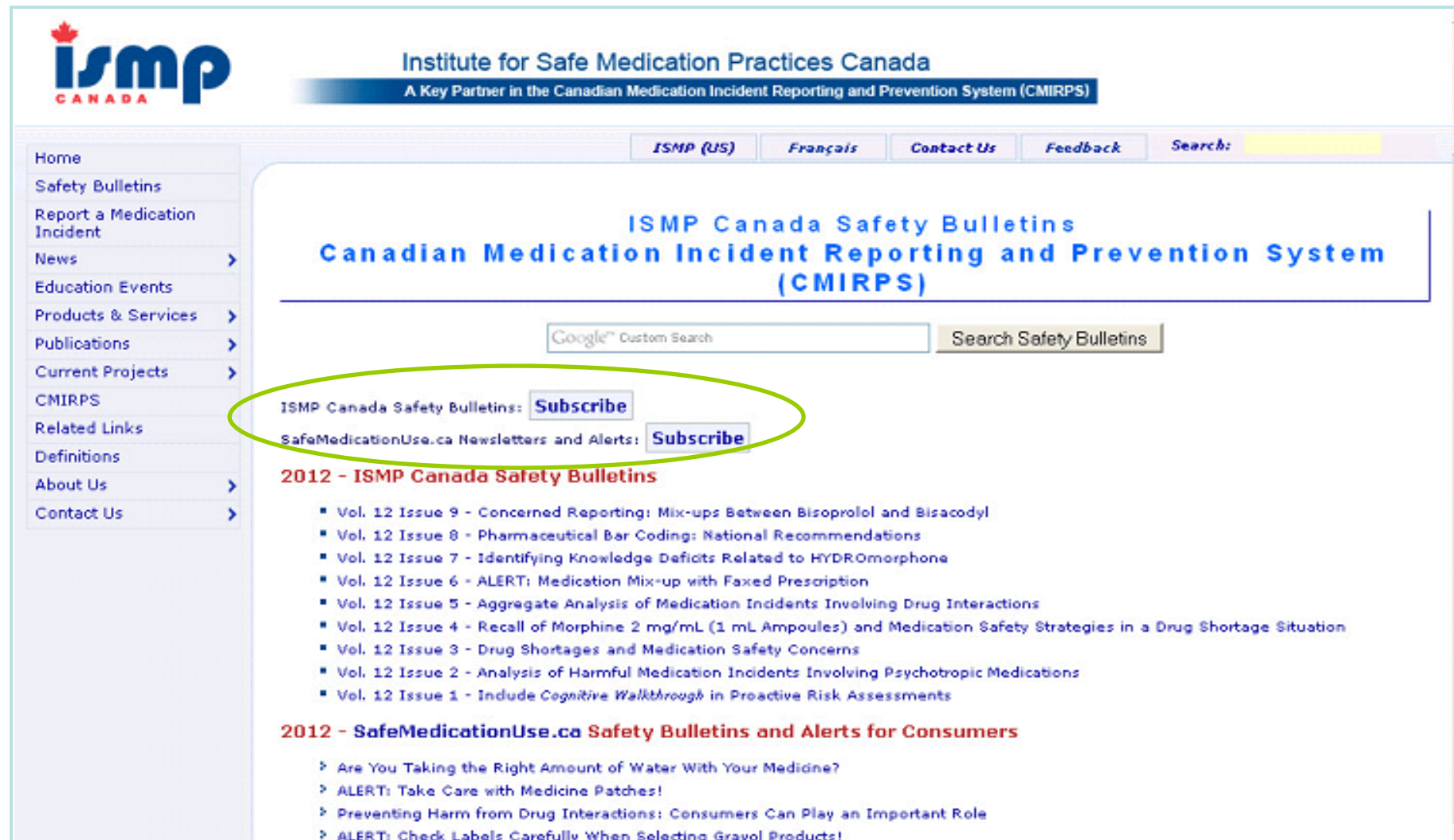
Sharing any prescription medicine can be dangerous, but even a single dose of an opioid medicine can cause death in someone who has never taken it before. Through recent work with Offices of Chief Coroners and Chief Medical Examiners, ISMP Canada has learned of a case in which sharing opioid medicines resulted in someone's death.

What are opioids?

Opioids are medicines used to treat pain. The following drugs are some **examples*** of opioids:



Bulletin Subscriptions



The screenshot shows the ISMP Canada website. The header includes the ISMP Canada logo and the text "Institute for Safe Medication Practices Canada" and "A Key Partner in the Canadian Medication Incident Reporting and Prevention System (CMIRPS)". The navigation bar contains links for "ISMP (US)", "Français", "Contact Us", "Feedback", and a search bar. A left sidebar lists various site sections. The main content area features a heading for "ISMP Canada Safety Bulletins" and a search bar. Below this, two "Subscribe" buttons are highlighted with a green oval: "ISMP Canada Safety Bulletins: Subscribe" and "SafeMedicationUse.ca Newsletters and Alerts: Subscribe". The page also lists "2012 - ISMP Canada Safety Bulletins" and "2012 - SafeMedicationUse.ca Safety Bulletins and Alerts for Consumers" with their respective topics.

ISMP Canada

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News >
Education Events
Products & Services >
Publications >
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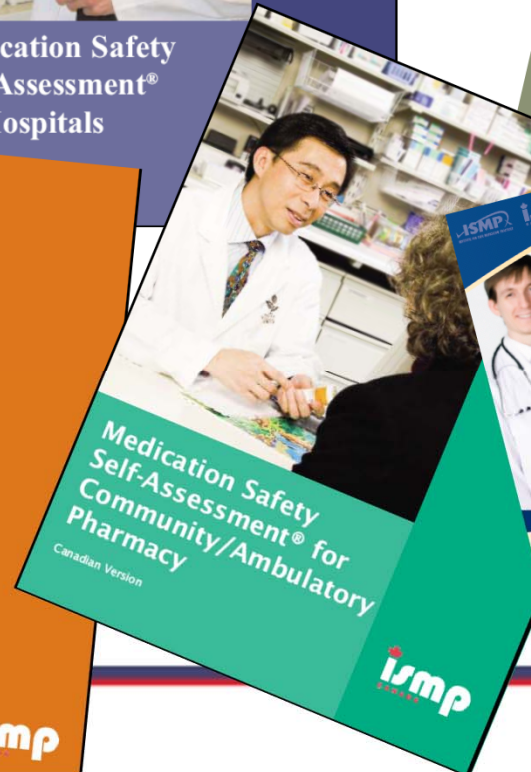
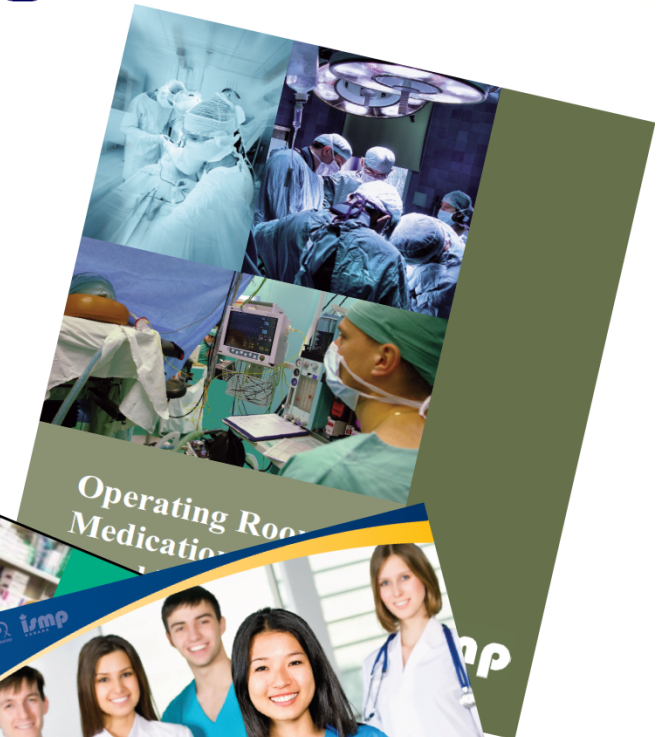
2012 - ISMP Canada Safety Bulletins

- Vol. 12 Issue 9 - Concerned Reporting: Mix-ups Between Bisoprolol and Bisacodyl
- Vol. 12 Issue 8 - Pharmaceutical Bar Coding: National Recommendations
- Vol. 12 Issue 7 - Identifying Knowledge Deficits Related to HYDROMORPHONE
- Vol. 12 Issue 6 - ALERT: Medication Mix-up with Faxed Prescription
- Vol. 12 Issue 5 - Aggregate Analysis of Medication Incidents Involving Drug Interactions
- Vol. 12 Issue 4 - Recall of Morphine 2 mg/mL (1 mL Ampoules) and Medication Safety Strategies in a Drug Shortage Situation
- Vol. 12 Issue 3 - Drug Shortages and Medication Safety Concerns
- Vol. 12 Issue 2 - Analysis of Harmful Medication Incidents Involving Psychotropic Medications
- Vol. 12 Issue 1 - Include Cognitive Walkthrough in Proactive Risk Assessments

2012 - SafeMedicationUse.ca Safety Bulletins and Alerts for Consumers

- > Are You Taking the Right Amount of Water With Your Medicine?
- > ALERT: Take Care with Medicine Patches!
- > Preventing Harm from Drug Interactions: Consumers Can Play an Important Role
- > ALERT: Check Labels Carefully When Selecting Gravol Products!

ISMP Canada Self-Assessment Programs



Learning Objectives

After attending this lecture and completing the assigned readings, students should be able to:

1. Define key terms associated with patient safety in health care.
2. State the evidence that medical error, and medication error in particular, is a significant problem in healthcare.
3. Understand the latent failure model and human factors engineering to explain medication error as multisystem failures.
4. Understand the impact of medication error on the individual patient and/or family.
5. Understand how the traditional culture and values in healthcare interfere with health care providers ability to acknowledge and respond to error.

Alignment with CPSI Patient Safety Competencies

1. Contribute to a culture of safety
2. Work in teams for patient safety
3. Communicate effectively for patient safety
4. Manage safety risks
5. Optimize human and environmental factors
6. Recognize, respond to and disclose adverse events

The Safety Competencies

Enhancing Patient Safety Across the Health Professions

Patient safety, defined as the reduction and mitigation of unsafe acts within the health care system, as well as through the use of best practices shown to lead to optimal patient outcomes, is a critical aspect of quality health care.

The *Safety Competencies* provide a framework of six core domains of abilities that are shared by all health care professionals. By contributing to the patient safety education of health care professionals, the *Safety Competencies* can contribute to safer patient care.

- **Domain 1: Contribute to a Culture of Patient Safety**
A commitment to applying core patient safety knowledge, skills and attitudes to everyday work.
- **Domain 2: Work in Teams for Patient Safety**
Working within interprofessional teams to optimize both patient safety and quality of care.
- **Domain 3: Communicate Effectively for Patient Safety**
Promoting patient safety through effective health care communication.
- **Domain 4: Manage Safety Risks**
Anticipating, recognizing and managing situations that place patients at risk.
- **Domain 5: Optimize Human and Environmental Factors**
Managing the relationship between individual and environmental characteristics in order to optimize patient safety.
- **Domain 6: Recognize, Respond to and Disclose Adverse Events**
Recognizing the occurrence of an adverse event or close call and responding effectively to mitigate harm to the patient, ensure disclosure, and prevent recurrence.



Canadian Patient Safety Institute
Institut canadien pour la sécurité des patients



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www.safetycomp.ca



Snapshot of the *Safety Competencies* framework

- 20 Key Competencies
- 140 Enabling Competencies
- 37 Knowledge Elements
- 34 Practical Skills
- 23 Essential Attitudes

The *Safety Competencies* - produced in collaboration with The Royal College of Physicians and Surgeons of Canada - September 2008

Background Reading

- Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox J, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ* 2004 May 25; 170(11):1678-86.
- Matlow AG, Baker GR, Flintoft V, et al. Adverse events among children in Canadian hospitals: the Canadian Paediatric Adverse Events Study. *CMAJ* 2012;184(13): 790-781.
- Prowse DE, Long S. Healing after harm. *Pharmacy Practice* 2014; 1(4): 23-25.
- Reason J. Human error: Models and management. *BMJ* 2000; 320:768-770.

Objective 1

Define key terms associated with patient safety in health care.

Key Terms and Concepts

Adverse Event:

Undesired and unplanned occurrence, directly associated with the care or services provided to a patient/client in the health care system. Includes both preventable and non-preventable injuries.

The Canadian Patient Safety Dictionary

Adverse Drug Event:

An injury from a medicine or lack of an intended medicine. Includes adverse drug reactions and harm from medication incidents.

Adapted from Bates DW et al by the collaborating parties of the CMIRPS, 2005

Key Terms and Concepts

Safety:

Freedom from accidental injuries.



Kohn LT, Corrigan JM, Donaldson MS, eds.
To err is human: Building a safer health system, 1999.

Harm:

Temporary or permanent impairment in body functions or structures. Includes mental, physical, sensory functions and pain.

Developed by the collaborating parties of the Canadian Medication Incident Reporting and Prevention System (CMIRPS), 2005.



Key Terms and Concepts

Critical Incident:

An incident resulting in serious harm (loss of life, limb, or vital organ) to the patient, or the significant risk thereof.

Incidents are considered critical when there is an evident need for immediate investigation and response. The investigation is designed to identify contributing factors and the response includes actions to reduce the likelihood of recurrence.

Davies J, Hebert P and Hoffman C, Canadian Patient Safety Dictionary (Ottawa: Royal College of Physicians and Surgeons of Canada, 2003).

Key Terms and Concepts

Near Miss

An event that could have resulted in unwanted consequences, but did not because, either by chance or through timely intervention, the event did not reach the patient.



Developed by the collaborating parties of the Canadian Medication Incident Reporting and Prevention System. 2005.

Key Terms and Concepts

High-Alert Medications

Drugs that bear a heightened risk of causing significant patient harm when they are used in error.

ISMP's List of High-Alert Medications. Available at:
www.ismp.org/Tools/highalertmedications.pdf.

High Alert Medications

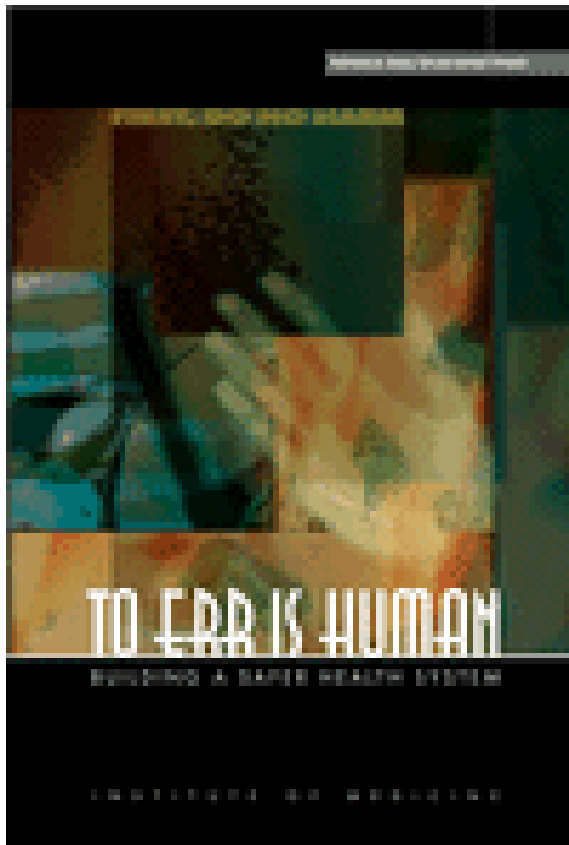
Can you think of examples of medications that might be considered high alert?

Objective 2

To state the evidence that medical error, and medication error in particular, is a significant problem in healthcare.

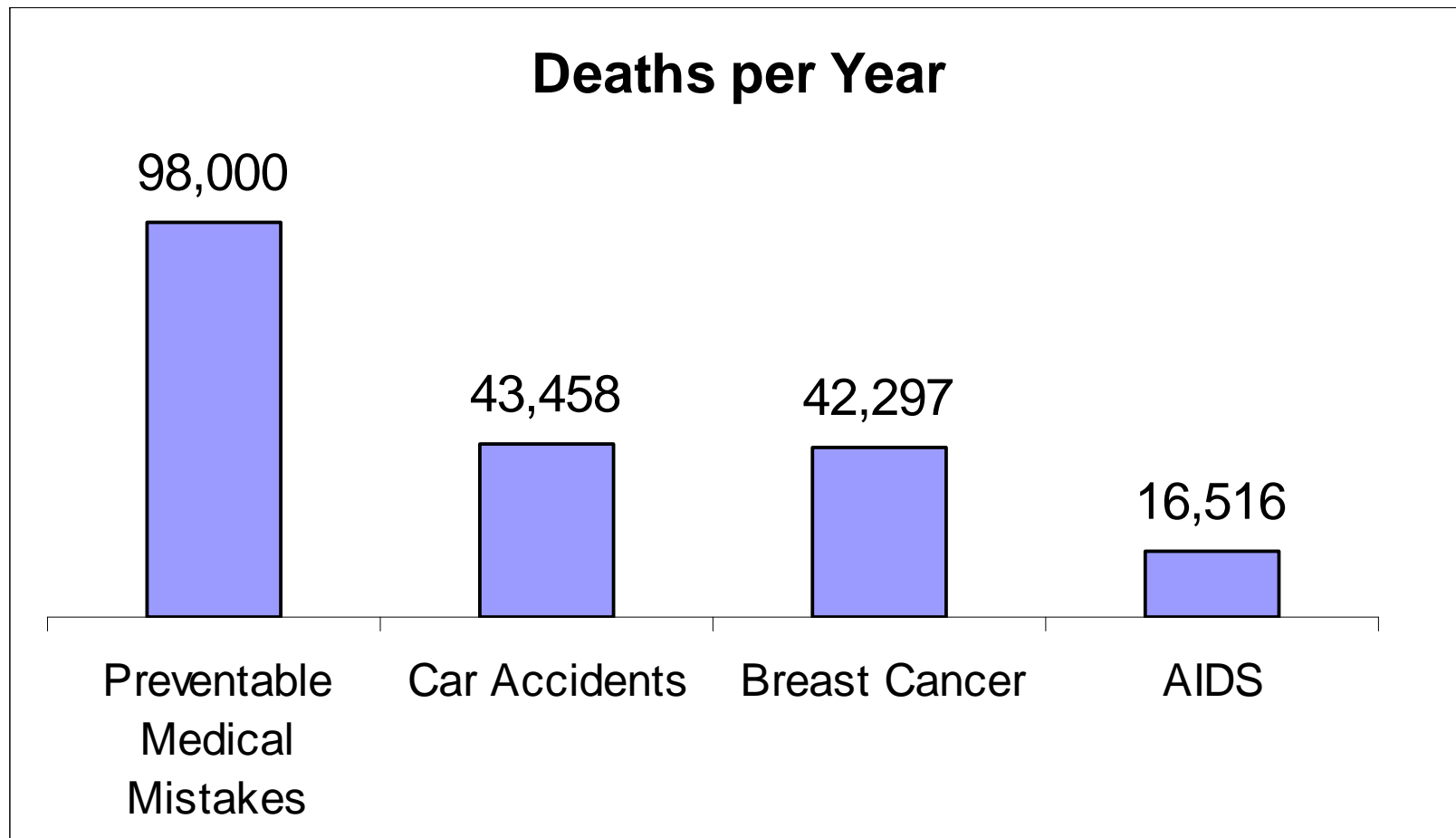
“Is there a problem?”

To Err Is Human: Building A Safer Health System



- Institute of Medicine (IOM) Report in 1999
- Estimated 44,000 to 98,000 deaths yearly due to error.
 - 44,000 = 8th leading cause of death in U.S.
 - 7,000 die from medication errors

Preventable medical mistakes cause more deaths per year than car accidents, breast cancer or AIDS



Source: The Institute of Medicine: To Err is Human: Building a safer health system, 1999. Additional estimates from the Centres for Disease Control and Prevention, National Vital Statistics Reports, Vol. 47, No. 25

The Canadian Adverse Events Study

- 3745 charts reviewed from 5 provinces
- 360 adverse events identified in 255 patients
- 24% of adverse events were related to medication or fluid administration
- 37% of adverse events were determined to be preventable

Extrapolation:

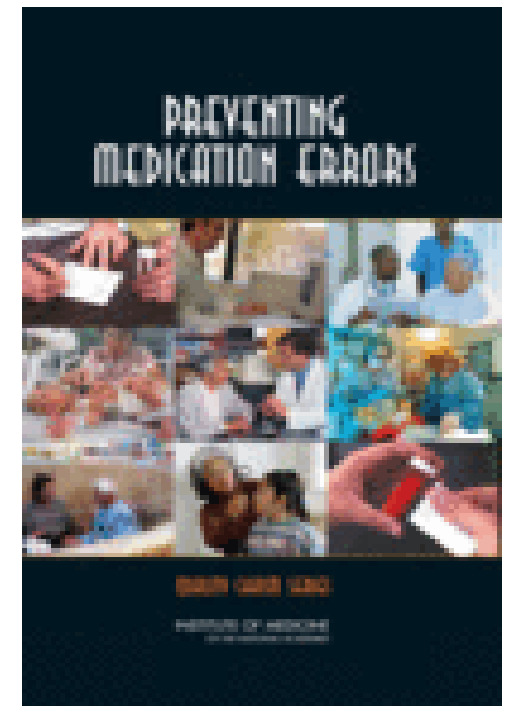
- 7.5% (or 187,500) patients in Canadian hospitals were seriously harmed by their care.
- As many as 9,250 to 23,750 people died in a Canadian hospital as a result of medical errors.

Baker et al, CMAJ, May 25, 2004; 1780(11): 1678-1686

Institute of Medicine (IOM): Preventing Medication Errors 2006

Medications harm too many – at least
1.5 million people per year

- Hospitals
 - 400,000 preventable ADEs per year
 - *About 1 medication error per patient per day*
- Outpatient setting
 - Also frequent, though data less solid
 - 530,000 ADEs/year in Medicare patients



Canadian Paediatric Adverse Events Study

- 3669 children admitted from April 2008-March 2009
- 8 academic paediatric centres and 14 community hospitals in Canada
- Weighted rate of adverse events was 9.2%
 - 10.2% academic paediatric centre vs. 3.3% in community hospitals
 - Preventable adverse events 3.9% in academic centres vs. 2.0% in community hospitals
 - Surgical events 32.9%; **drug-related 13.5%**

Boy survives after same hospital that gave infant fatal overdose makes second drug error

BY TRAIN ••

Dr. Frank Thompson

It's the name, coming just out last night, that has helped a doctor's interest in the case. "If he had been properly treated, the right will be able to say, at least in the court of law, that he was innocent," says Dr. Robert Williams, representing the pediatric group. "The alternative is a group of doctors who play the minor role in the child's death."

The child's mother, a 26-year-old woman, told Williams she had signed into the hospital last night, and that she knew so much about the case. "The examination, which I want to finish a year ago, has been going on."

The 26-year-old woman was later told her son had been given the wrong drug.

Toronto lawyer Harry McMurtry, who represents Sabina Pariselli and her husband Bruno, said documents obtained from the hospital indicate Juliano was given three milligrams of morphine.

A document prepared by Dr. Gail Hirano said Juliano was supposed to receive 12 milligrams of codeine before surgery.

The mistake was noted at noon by Hirano on the doctor's orders and progress report.

"Patient received morphine . . . instead of codeine at 08:30," Hirano's handwritten note reads. "Explained to mother that medication error occurred and that Juliano would be

observed in PACU (pediatric acute care unit) until ... effects of morphine have passed."

no indication on the baby's medical chart. She said she repeatedly checked the chart, but there was never any indication of the dose administered. It wasn't until she and her husband

Using the media is not the way to deal with errors involving drugs and drawing parallels between recom-

➤ Please see Medication, A17

Man, 69, went to ER
following accident
Injected drug normally
used in palliative care

but not before receiving a 10-milligram injection of what was thought to be morphine for the pain.

**Numerous high
profile examples of
errors
causing harm**

Heparin Mix-Ups

Sept 06

- 3 premature infants died after having vascular access lines flushed with 10,000 units of heparin instead of 10 units




Nov 07

- Similar error in 3 neonates – all survive




ASHP Midyear 2009 – Keynote Address



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GUIDING
change

Events

Opening Session

Spotlight on Science

Wednesday Evening Concert

Thursday Networking Luncheon

Networking Sessions

Business & Social Functions

Best Practices Award Reception

Opening Session


Dennis Quaid
Monday, December 7, 9:00am - 10:30am
Venetian Ballroom, Level 2 (Venetian Conference Center)

Widely acclaimed as one of the most charismatic actors of our time, Dennis Quaid is also an advocate for reducing medical errors. In his keynote address to ASHP, Quaid will tell how he and his wife, Kimberly, became motivated to launch *The Quaid Foundation*, an organization whose mission is to help minimize the impact of human error in patient medical care.

With insight into how such potentially catastrophic errors evolve, Quaid doesn't blame the healthcare workers. "Individually, nurses, doctors, and pharmacists are good people," he says, "but they're hamstrung by working in a broken system."

As hospital pharmacists, we welcome Dennis Quaid's efforts. His keynote address at our Midyear Clinical Meeting will be a memorable, must-see event.

You can read more about *The Quaid Foundation* and their efforts to help reduce medication errors on their website at www.thequaidfoundation.org.



Adverse Drug Events in LTC

- Retrospective chart review in 2 facilities
- 42%¹ - 51%² of adverse drug events are considered preventable
- Errors associated with preventable events most often related to ordering and monitoring stages of the medication use process
- Increased risk of events with antipsychotics, diuretics and antiepileptic agents.

¹Gurwitz JH et al. Am J Med 2005;118:251-258

²Gurwitz JH et al. Am J Med 2000;109:87-94.

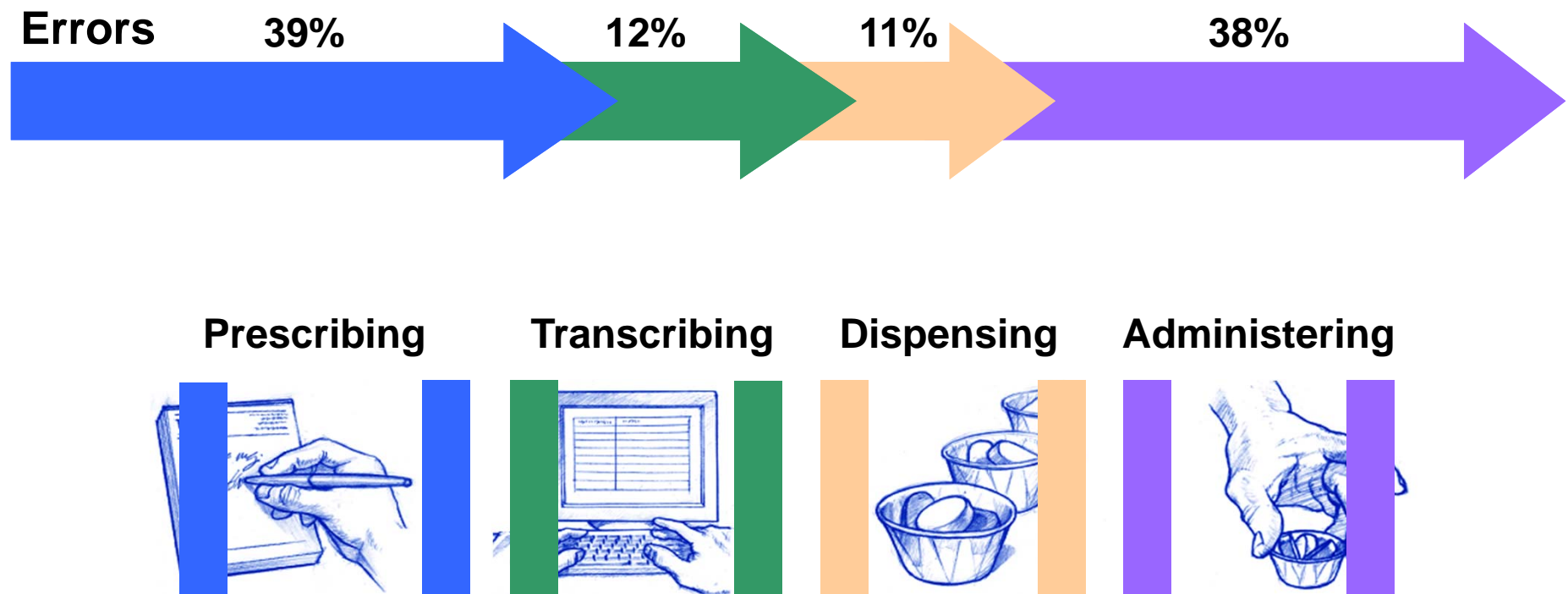
What about community pharmacy?

- Observational study in 50 pharmacies in 6 US cities – one pharmacist inspected 100 prescriptions
- Overall dispensing accuracy 98.3%
 - 77 errors in 4481 prescriptions
 - 5 clinically important
- Extrapolation
 - Approximately 4 errors per day if pharmacy fills 250 prescriptions
 - 51.5 million errors in the US annually (3 billion prescriptions filled annually)

Flynn EA, Barker KN, Carnahan BJ

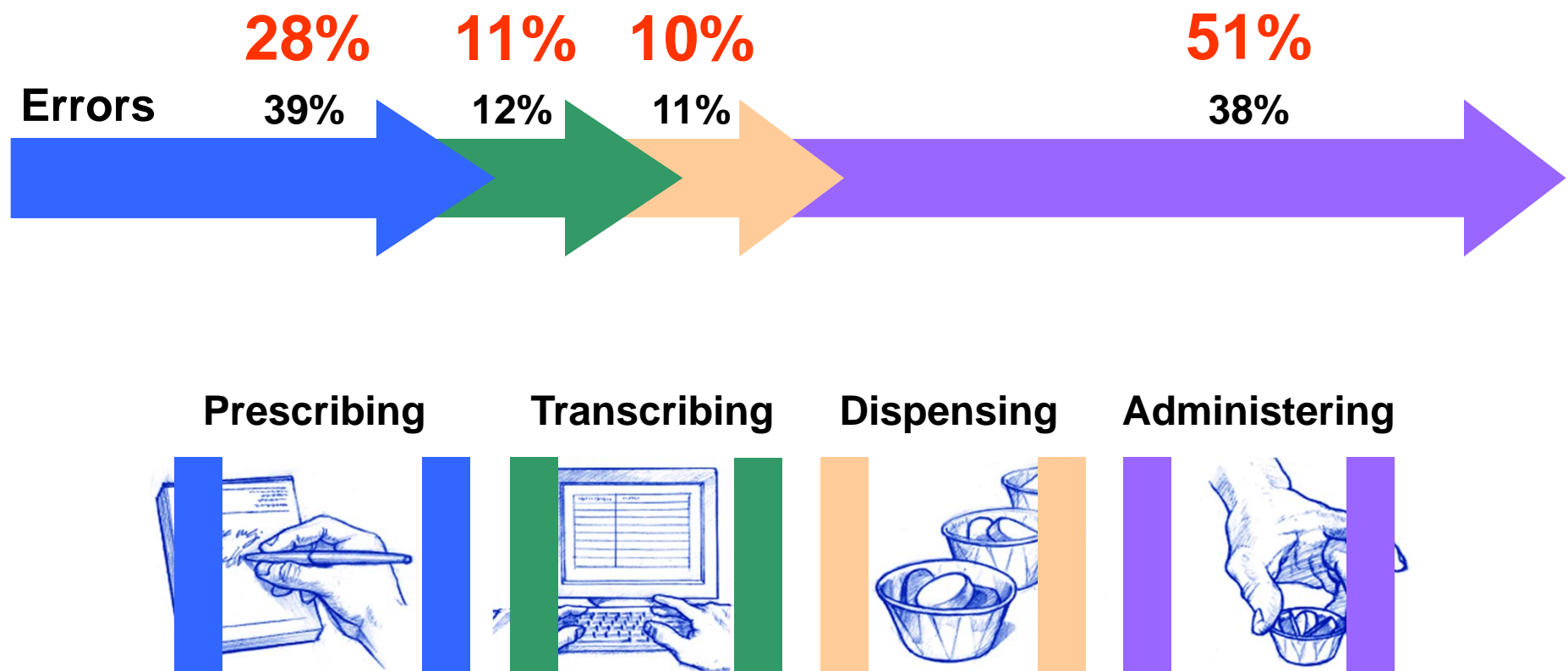
National observational study of prescription dispensing accuracy and safety in 50 pharmacies. J Am Pharm Assoc (Wash.) 2003 Mar-Apr; 43(2): 191-200.

Stages in the medication use process

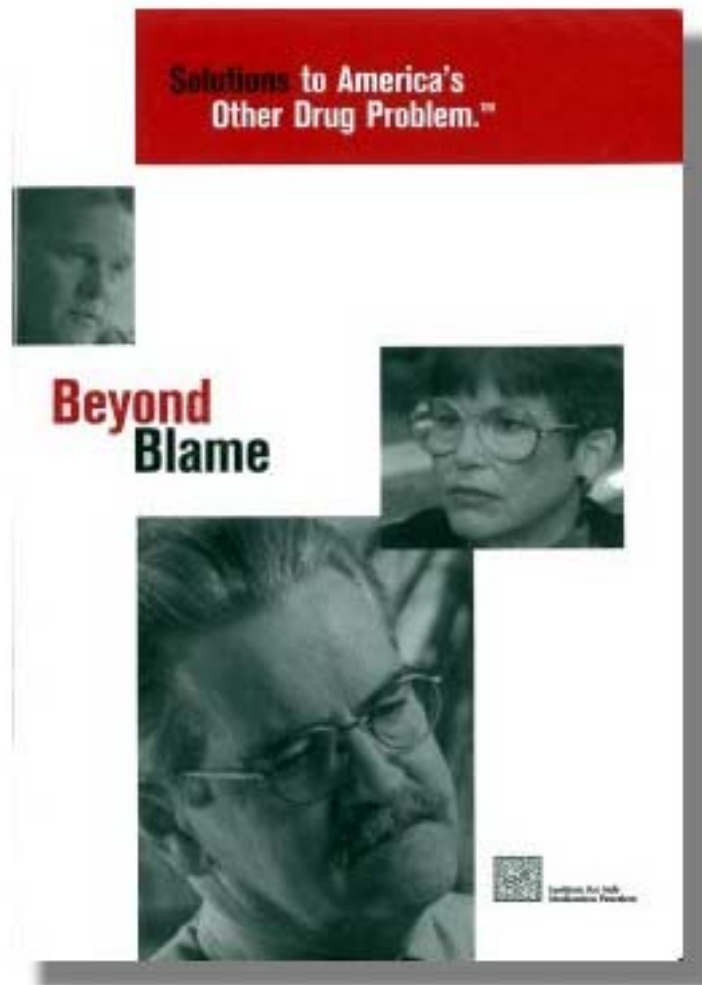


Source JAMA 1995;274:35-43

Sources of harm



Source: JAMA 1995;274:35-43



Video Presentation

Beyond Blame 2:
<https://youtu.be/OkTiCY3qJJk>



Objective 3

Understand the latent failure model and human factors engineering to explain medication errors as multisystem failures.

“Why and how do errors happen?”

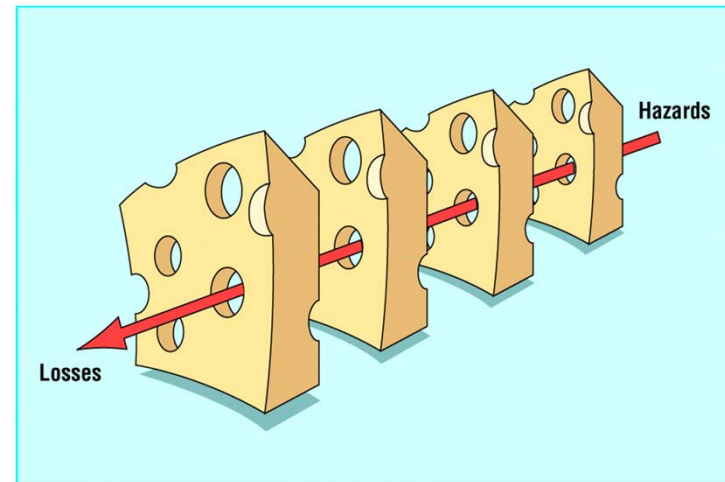


As healthcare professionals we are taught to maintain competence, practice due diligence and take care to avoid mistakes.

Systems theory states that although this is necessary, it is not enough. The way to prevent mistakes or mitigate harm from mistakes is to re-design systems with integrated safeguards, in addition to practicing due care.

Systems Approach

Focus on improving the processes, systems, and environment in which people work rather than attempting only to improve individual skills and performance.



Reason, J. (2000). Human error: models and management. *BMJ*, 320(7237): 768-770. Retrieved from: <http://www.bmj.com/cgi/content/full/320/7237/768>

The Systems Approach

Recognizes that:

- Humans are incapable of perfect performance.
- Accidents are caused by flaws in the working environment (system) and human errors that are an expected part of any working environment.
- Accidents can be prevented by building a system that is resilient to expected human errors.

The Systems Approach

“...though we cannot change the human condition, we can change the conditions under which humans work”

Reason J. (2000). Human error: models and management.

BMJ, 320(7237): 768-770. Retrieved from: <http://www.bmj.com/cgi/content/full/320/7237/768>

Quality in Health Care

“The degree to which health services for individuals and populations increase the likelihood of desired outcomes and are consistent with current professional knowledge.”

Institute of Medicine, 1990

Nuances Regarding Safety and Quality

- Safety is not the same as quality
 - Quality focuses on elimination of defects (six-sigma)
⇒ Safety focuses on elimination of injury (i.e., “what doesn’t happen”)
- Safety is not the same as risk management
 - Risk management focuses on organizational risk reduction
⇒ Safety focuses on patient/staff risk reduction

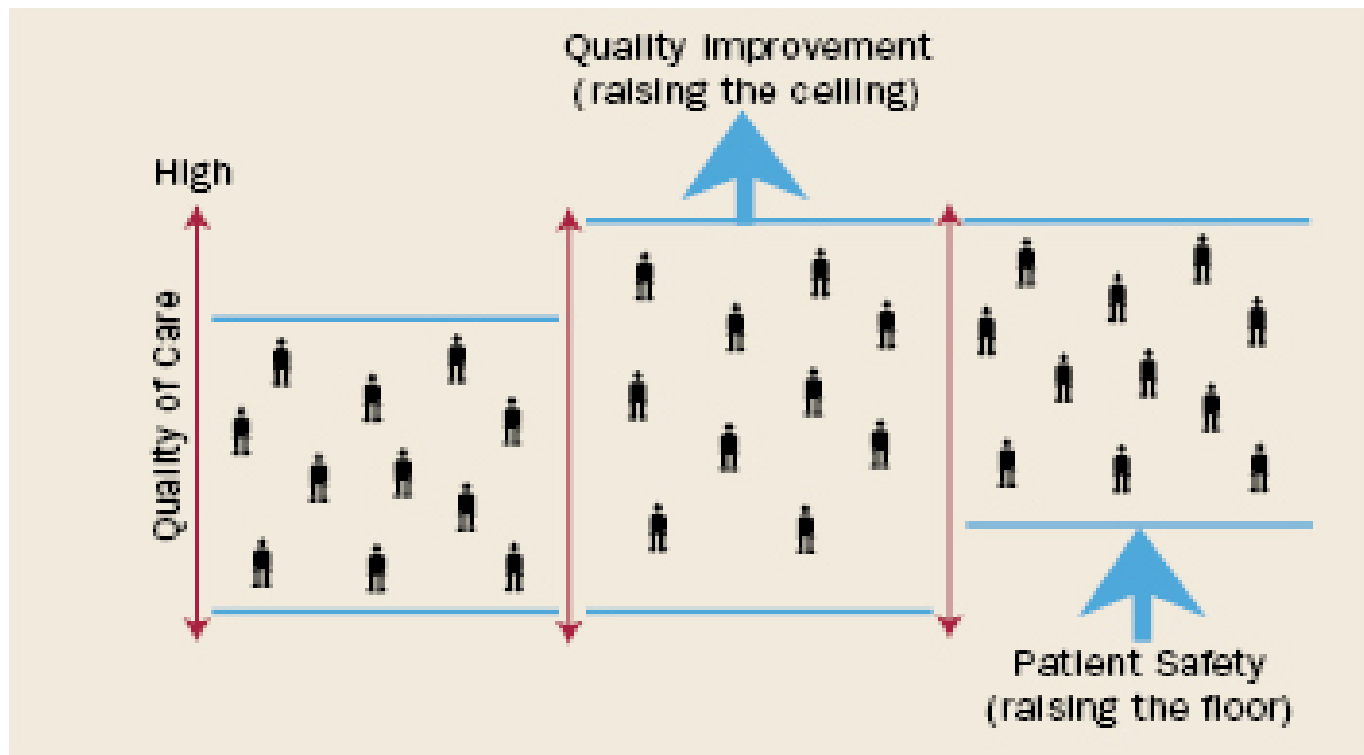
Safety Relationship to Quality

- ***Safety** is the foundation upon which **Quality** is built*
- ***You can have safety without quality but not vice versa***



Safety and Quality

Figure 1. Relationship between quality improvement and patient safety



[Stevens P](#), [Matlow A](#), [Laxer R](#). Building from the Blueprint for Patient Safety at the Hospital for Sick Children Healthc Q. 2005;8 Spec No:132-9.

Healthcare vs. High Reliability Organizations

(E.g. aviation, nuclear power)

Health Care (in transition)

- Errors are the result of human failures
- Humans generally perform flawlessly
- Perfect performance is the expectation
- Use retraining and punishment to root out “bad apples”

High Reliability Organizations

- Begin with the premise that anything can and will go wrong
- Don't expect humans to perform perfectly
- Design systems accordingly in a proactive way

Human Factors Engineering (HFE) 101

HFE: a discipline concerned with design of systems, tools, processes, machines that takes into account human capabilities, limitations, and characteristics



Why does it matter?

- Some problems are inconvenient
- Some problems are unsafe





Reality of Health Care Environments

- Cognitive overload
- Workloads
- Multitasking
- Interruptions
- Difficult technology



*"Abundant research has demonstrated that the term **multitasking** is a misnomer-- performance degrades rapidly when people try to do several things simultaneously, whether it's your kids doing homework while texting or a pharmacist checking orders while answering the phone.*

Psychologists speak of the concept of "cognitive load"—the overall volume of things a mind is grappling with at a given time.

While there are some individual differences in the ways we manage cognitive load, one thing is clear: none of us does this as well as we think we do."

The Overdose: Harm in a Wired Hospital

<https://medium.com/backchannel/the-overdose-harm-in-a-wired-hospital-8e5ac74fe73c>

Human Factors Engineering Health Care Applications

- Medical devices
- Computer software design
- Labelling and packaging
- Medication distribution systems
- Work environment design
- Workflow design

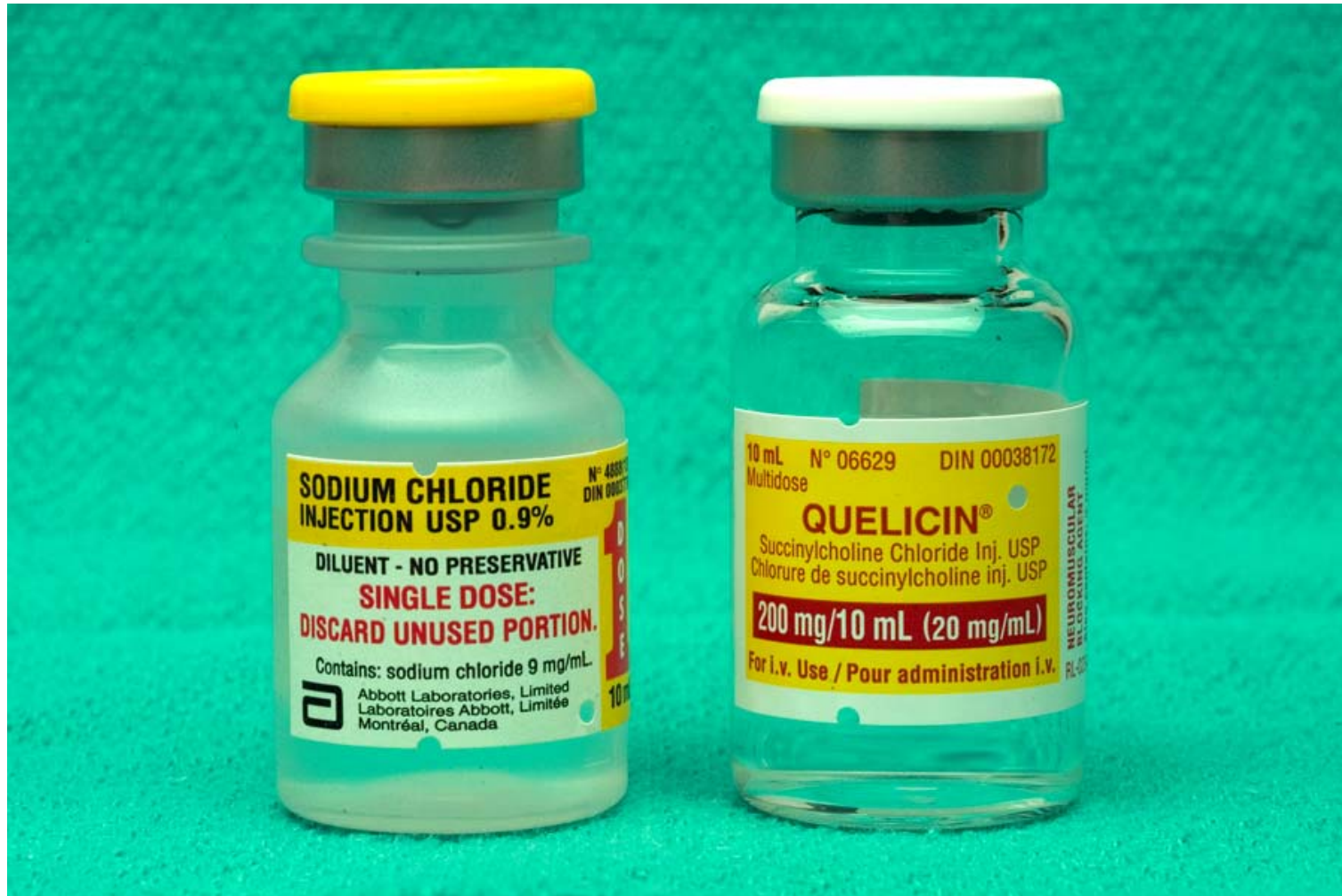
Confirmation Bias

Leads one to “see” information that confirms our expectations, rather than information that contradicts our expectations.

Can you read this?

7H15 M3554G3
53RV35 7O PR0V3
H0W 0UR M1ND5 C4N
D0 4M4Z1NG 7H1NG5!
1MPR3551V3 7H1NG5!
1N 7H3 B3G1NN1NG
17 WA5 H4RD BU7
N0W, 0N 7H15 LIN3
Y0UR M1ND 1S
R34D1NG 17
4U70M471C4LLY
W17H 0U7 3V3N
7H1NK1NG 4B0U7 17,
B3 PROUD! 0NLY
C3R741N P30PL3 C4N
R3AD 7H15.
PL3453 F0RW4RD 1F
U C4N R34D 7H15.

Packaging and Labelling



Packaging and Labelling





Attention: Inherent human limitations



Inattentional Blindness

- Failing to see what should have been plainly visible
 - Because attention is not focused on it
- Most of our perceptual processing occurs outside of conscious awareness

Safety Strategies

Eliminate

- Remove the hazard

Control

- Provide safeguards

Accept

- Not an option – if a serious hazard is identified, the minimum safety strategy is a *control* measure

SYSTEM-Based

PERSON-Based

Low Leverage

LEAST EFFECTIVE

Rules and policies

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

Education

and information

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

Medium Leverage

MODERATELY EFFECTIVE

Simplification and standardization

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

Reminders, checklists, double checks

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

High Leverage

MOST EFFECTIVE

Forcing functions and constraints

(e.g., removal of a product from use)

Automation or computerization

(e.g., automated patient-specific dispensing)

HIERARCHY OF EFFECTIVENESS

From: Designing Effective Recommendations.
Ontario Critical Incident Learning Bulletin 2013;

Using Technology to Re-engineer Medication Management

Physician Order
Entry/Pharmacist Clinical
Order Screening



Electronic MAR
and To Do List



Just-In-Time
Inventory



Or, automated
med/supply depot door
or drawer opens

Smart Drawer Opens



Scan
Medication





Scan Patient's
Wristband



Standardization



Reducing the Probability of Error – Independent Double Checks

$$\frac{1}{100} \times \frac{1}{100} = \frac{1}{10,000}$$


Incident Reporting

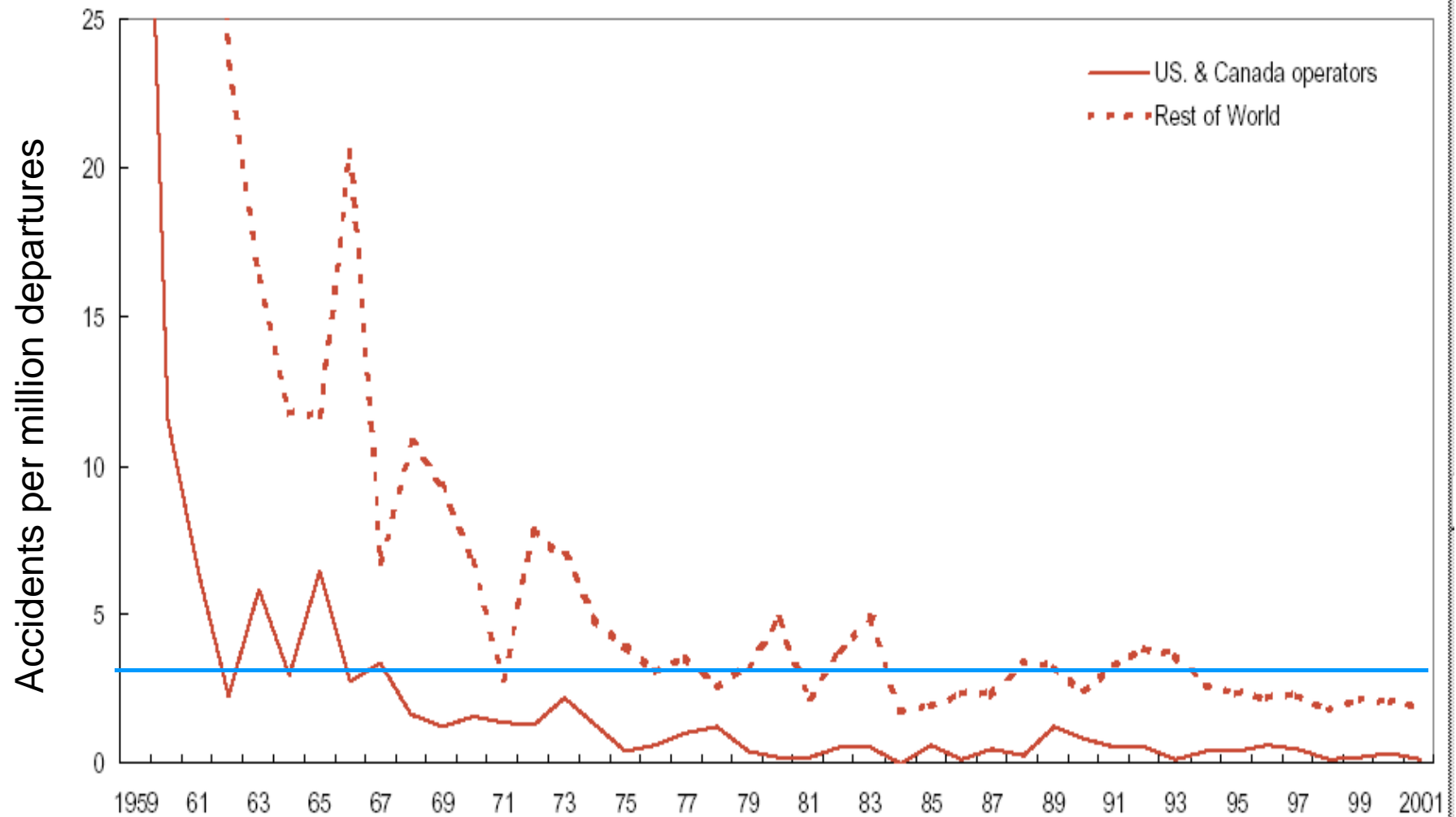
- Risk management processes needed to track all unusual occurrences / incidents.
- Need to respond to and review critical incidents

High Reliability Organizations

- Collective preoccupation with the possibility of failure
- Expect to make errors and train their workforce to recognize and recover from them
- Continual rehearsal of familiar scenarios of failure

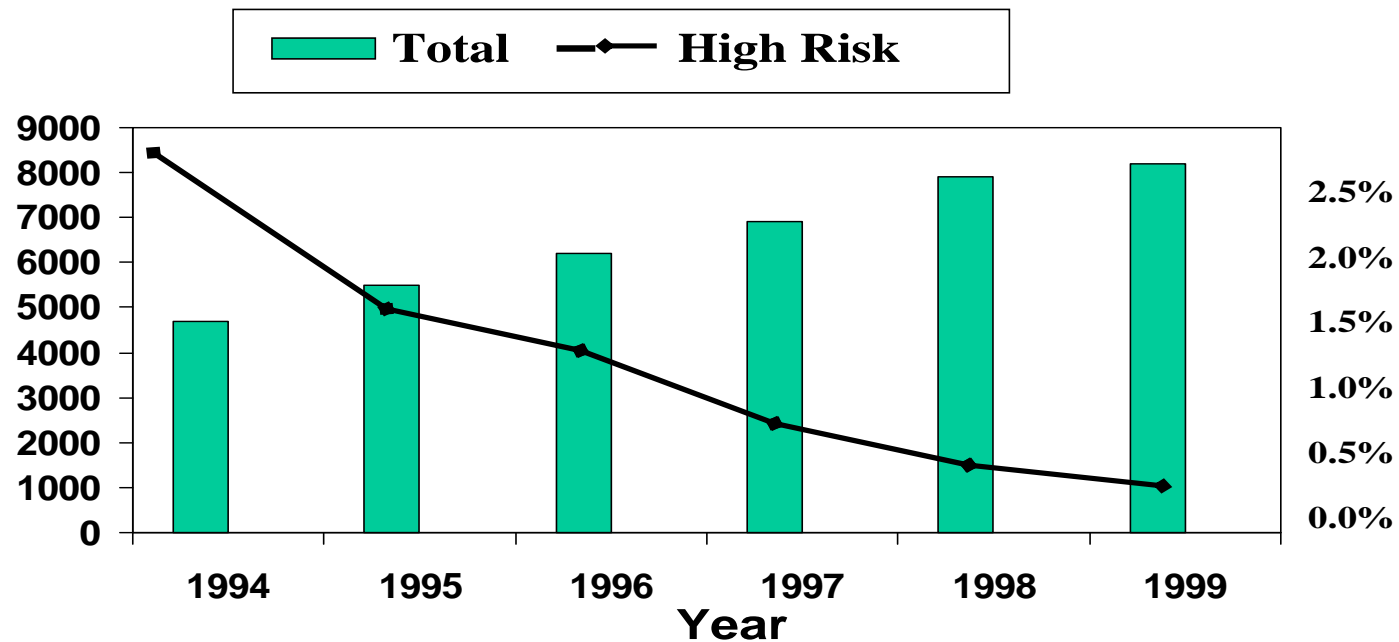
E.g. aviation, nuclear power

Aviation Error Reduction Over Time



British Airways Incident Reports

Air Safety Reports (UK) Volume & Risk



Incident Review Process: Lessons for Health Care

- Transparent to all health care providers
- Fair treatment applied consistently
- Human resources processes (discipline) separated from quality review

Ignorance is not bliss!



Objective 4

To understand the impact of medication error on the individual patient and/or family

A patient's perspective

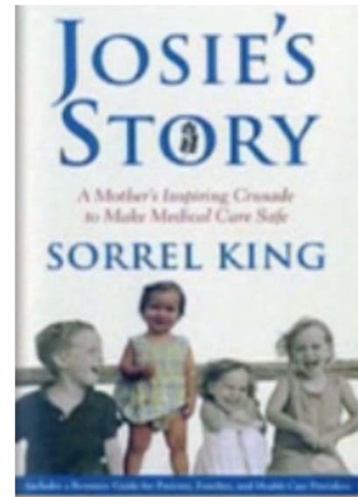
- Serious medication errors lead to profound suffering and grief for the patients / family affected:
 - A patient with advanced nasopharyngeal cancer inadvertently received an infusion of fluorouracil over 4 hours that was intended to be administered over 4 days.
 - Profound mouth sores and reductions in red blood cells, white blood cells and platelets developed.
 - The patient died 22 days after the medication incident occurred.

Fluorouracil Incident Root Cause Analysis: Follow-up. *ISMP Can Saf Bull* 2007;7(4).
Available at: <http://www.ismp-canada.org/download/safetyBulletins/ISMPCSB2007-04Fluorouracil.pdf>

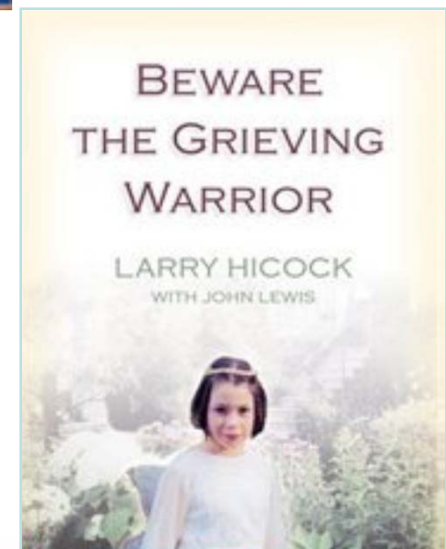
Patient/Family

Josie King -

<http://www.josieking.org/>



John Lewis – Beware
the Grieving Warrior

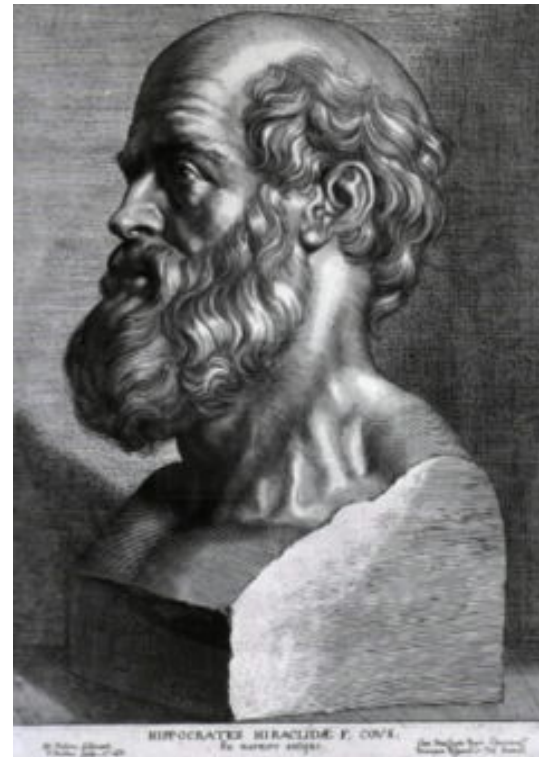


Objective 5

To understand how the traditional culture and values in healthcare interfere with health care providers ability to acknowledge and respond to error.

Hippocratic Oath

“First do no harm”



Health Care Culture: Perfection Myth

“We have created systems that depend on idealized standards of behaviour that require individual physicians, nurses and pharmacists to perform tasks at levels of perfection that cannot be achieved by human beings.”

Chassin M. Is Healthcare Ready for Six-Sigma Quality? (1998) 76 Milbank Quarterly 565 at 576 in Waite M. To Tell the Truth: The Ethical and Legal Implications of Disclosure of Medical Error. Health Law Journal 3; 2005.

“Patients, who have an understandable need to consider their doctors infallible, have colluded with doctors to deny the existence of error. Hospitals react to every error as an anomaly...with a promise that ‘it will never happen again’.”

Wu, A. Medical error: the second victim. The doctor who made the mistake needs help too. BMJ 2000; 320:726-7.

“Blame and Shame”

- Actions directed at individuals
 - Errors are the result of human failures
 - Use re-training, and punishment to root out “bad apples”



Medication Error Response

"I should have read the label."

"This has not happened before."

"This is unlikely to happen again."

Physician who reported a medication error

The 2nd Victim

- Reporting situations that have caused harm or *could cause harm* is a **vital** step in protecting our patients and our colleagues.
- Health care professionals involved in an error that causes patient harm can be as devastated, or more devastated, than the patient and family involved.

Wu A. Medical Error: the second victim. BMJ 2000; 320:

Lack of Reporting Due to:

Many reasons including:

- Failure to recognize error
- Failure to look beyond incident to the whole system
- Lack of certainty if it “really is an error”
 - definition (? related to harm)
- Punitive culture
 - Fear of reporting: self and others

What about professional accountability?

Does “non-punitive” mean “blame-free”?

Does a “system” approach mean that individual practitioners are not accountable for their actions?

Shared Accountability: “Just Culture”

“...it is about creating a reporting environment where staff can raise their hand when they have seen a risk or made a mistake.....where risks are openly discussed between managers and staff.”

“...while we as humans are fallible, we do generally have control of our behavioural choices.”

“...good system design and good behavioural choices of staff together produce good results. ***It has to be both.***”

Marx D, Comden SC, Sexhus Z (2005).
Our inaugural issue – in recognition of a growing community.
The Just Culture Community News and Views, 1(1).

Need to move away from “blame & shame”

Who did it?



What allowed it?

Punishment



Thank you for reporting!

Errors are rare



Errors are everywhere

Add more layers



Simplify/standardize

"A smart person learns from his or her own experiences....a wise person learns from the experiences of others."



Captain Chesley "Sully" Sullenberger
US Airways
"Miracle on the Hudson"

We encourage you to report medication incidents



Practitioner Reporting

https://www.ismp-canada.org/err_report.htm



Consumer Reporting

www.safemedicationuse.ca/



Contact information:

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canada.org](mailto:jgreenall@ismp-canada.org)

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416-733-3131

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