

Medication Safety: Lessons Learned

**CINA 30th Anniversary
Conference**

October 20th, 2005

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Medication Safety: Lessons Learned

- **ISMP Canada**
- **Research Highlights**
- **Making Health Care Safer: Key Steps**

ISMP CANADA

- Independent nonprofit national organization
- Founded in 1999 with assistance from ISMP US and Board of Directors
- Established for:
 - collection and analysis of medication error reports and
 - development of recommendations for the enhancement of patient safety.

Collection of Reports

- To date, we have collected 11,687 medication incidents in our database.
- Voluntary reporting
 - Errors, near-misses and hazardous situations confidential
 - non-punitive
 - Front-line practitioners provide detailed, unrestricted information on incidents

How Error Reports are received:

1. website: www.ismp-canada.org;
2. e-mail: info@ismp-canada.org;
3. Phone: 1-866-54-ISMP [47672] or 416-480-4099.

ISMP Canada guarantees confidentiality and security of information received. ISMP Canada respects the wishes of the reporter as to the level of detail to be included in publications.

How Error Reports are received:

4.



Version 2.7.0.3



The permission to use the Taxonomy of Medication Errors copyrighted by the National Coordinating Council for Medication Error Reporting and Prevention in this program is gratefully acknowledged.

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Supported by MOHLTC for facilities in Ontario

ISMP Canada Programs cont'd

- Analyze-Err
- Medication Safety Support Service
 - Potassium Chloride
 - Narcotics
- Medication Safety Self-Assessment
- Fellowship program- *new*
- Education/ Presentations

The Institute for Safe Medication Practices Canada (ISMP Canada) is an independent national nonprofit agency established for the collection and analysis of medication error reports and the development of recommendations for the enhancement of patient safety.

The Healthcare Insurance Reimbursement Company of Canada (HIROC) is a member-owned expert provider of professional and general liability coverage and risk management support.

Volume 4, Issue 10

ISMP Canada Safety Bulletin

October, 2004

A Need to "Flush" Out High Concentration Heparin Products

ISMP Canada has received a medication error report involving heparin. The information has been shared by a hospital to provide an alert to other hospitals and healthcare providers.

A triple-lumen catheter was inserted into a patient requiring central venous access (also known as a central venous line [CVL] or central venous access device [CVAD]). After insertion, 1 mL of heparin 10,000 units/mL (instead of the intended 1,000 units/mL) was diluted with 9 mL normal saline and administered into each of the three lumens (total of 30,000 units of heparin). The next day a nurse found the central line catheter had been accidentally pulled out. Since central venous access was still required, it was decided to reinsert another CVL. Again, three 1 mL vials of concentrated heparin (10,000 units/mL) were used (each diluted with 9 mL normal saline), however the total dose of heparin administered after second CVL insertion is unknown.

The following day, there was a decrease in blood pressure and severe bruising at the site of the catheter. It was found to have an elevated hematocrit level and a decrease in hemoglobin levels. There was also some intravenous fluid extravasation noted around the catheter. There was transient hypotension and tachycardia. The patient was transferred to the intensive care unit for further monitoring.

Several factors may contribute to this incident:

Heparin is commonly used to "lock" central venous lines. Generally, protocols provide for a minimal concentration of heparin and a volume equivalent to that of the lumen. The protocol may also require the withdrawal of the heparin lock solution from the lumen prior to flushing (with normal saline) to prevent systemic heparin administration. Confusion can arise because protocols for various types of central lines sometimes combine flushing and locking in one step.

The contributing factors to the incident described above, as identified by the hospital include:

- Availability of multiple concentrations of heparin in the patient care area.
- Poor legibility of the 1 mL heparin vial label due to small size of vial, small label and small print.
- Incomplete communication between physicians and nurses at the time of gathering drugs and supplies for CVL insertion and during the procedure. It is noteworthy that the new hospital protocol for locking of central venous lines was to use a heparin concentration of 10 units/mL.

* High concentration product, however unit dose ampoules provides only 5,000 units.

Available on ISMP
Canada's website

	Unit Size
10,000 Units/mL	1 mL
10,000 Units/mL	10 mL
10,000 Units/mL	2 mL
10,000 Units/mL	2 mL
10,000 Units/mL	10 mL
10,000 Units/mL	1 mL
10,000 Units/mL	10 mL
10,000 Units/mL	30 mL
10,000 Units/mL	1 mL
10,000 Units/mL	5 mL
25,000 Units/mL*	5,000 Units/0.2 mL
25,000 Units/mL	50,000 Units/2 mL

1

- 12 per year

Analysis and Recommendations

ISMP Medication Safety Alert!®

May 29, 2003 ■ Volume 8 Issue 11

SafetyBriefs

Zetia and Zebeta mix-ups. In March, we alerted you to look-alike confusion between ZETIA (ezetimibe), a new medication used to treat hypercholesterolemia, and ZESTRIL (lisinopril), an angiotensin-converting enzyme inhibitor. Now we've also heard about a mix-up between Zetia and ZEBETA (toprolol fumarate), a beta-blocker. Zetia 10 mg was ordered but Zebeta 10 mg was dispensed and given to the patient. Zetia was not yet on the hospital formulary, so the pharmacist was unfamiliar with the medication. Consequently, the physician's handwritten order appeared to be the more familiar drug, Zebeta. Fortunately, the error was quickly discovered. The patient experienced hypotension, but no permanent harm. Several letters, Z-E-T-A, and a 10 mg tablet strength are shared between these drugs, and the dosing frequency is once daily for both. When combined with poor handwriting, these similarities can lead to a mix-up.

Unintended discontinuation of drugs. Hospital pharmacists should have a safety system to ensure antibiotic doses needed upon discharge are not stopped. In one case, a pharmacist reported a system error that caused a patient's antibiotics to be discontinued. The patient's condition worsened, and the pharmacist had to restart the antibiotics. The patient's condition improved after the antibiotics were restarted.

Mind your "Medrols"

PROBLEM: Numerous cases of confusion between methylprednisolone acetate (DEPO-MEDROL) and methylprednisolone sodium succinate (SOLU-MEDROL) have been reported over the years. While both forms of the product are used to treat inflammation, dosing may differ, and the acetate form should never be administered intravenously (IV). Most recently we heard about a 3-year-old child in the emergency department (ED) who was prescribed Solu-Medrol 40 mg IV. The nurse accidentally selected methylprednisolone acetate 40 mg, which was the first form and strength of the generic methylprednisolone that appeared on the dispensing cabinet screen. After the pharmacist noticed the error, the pharmacist called the physician to confirm the order for Solu-Medrol. The physician noticed the error and immediately called the pharmacist to confirm the order for Solu-Medrol. The pharmacist then administered the correct medication.

Safe Practice Recommendation: To reduce the risk of confusion between Solu-Medrol and Depo-Medrol, consider the following:

Increase awareness. Alert practitioners to the differences between Solu-Medrol and Depo-Medrol. Some may not be aware that the word "depo" or "depot" in association with a drug indicates slow release or slow absorption, with longer duration of action. Thus, these products are not intended for IV administration.

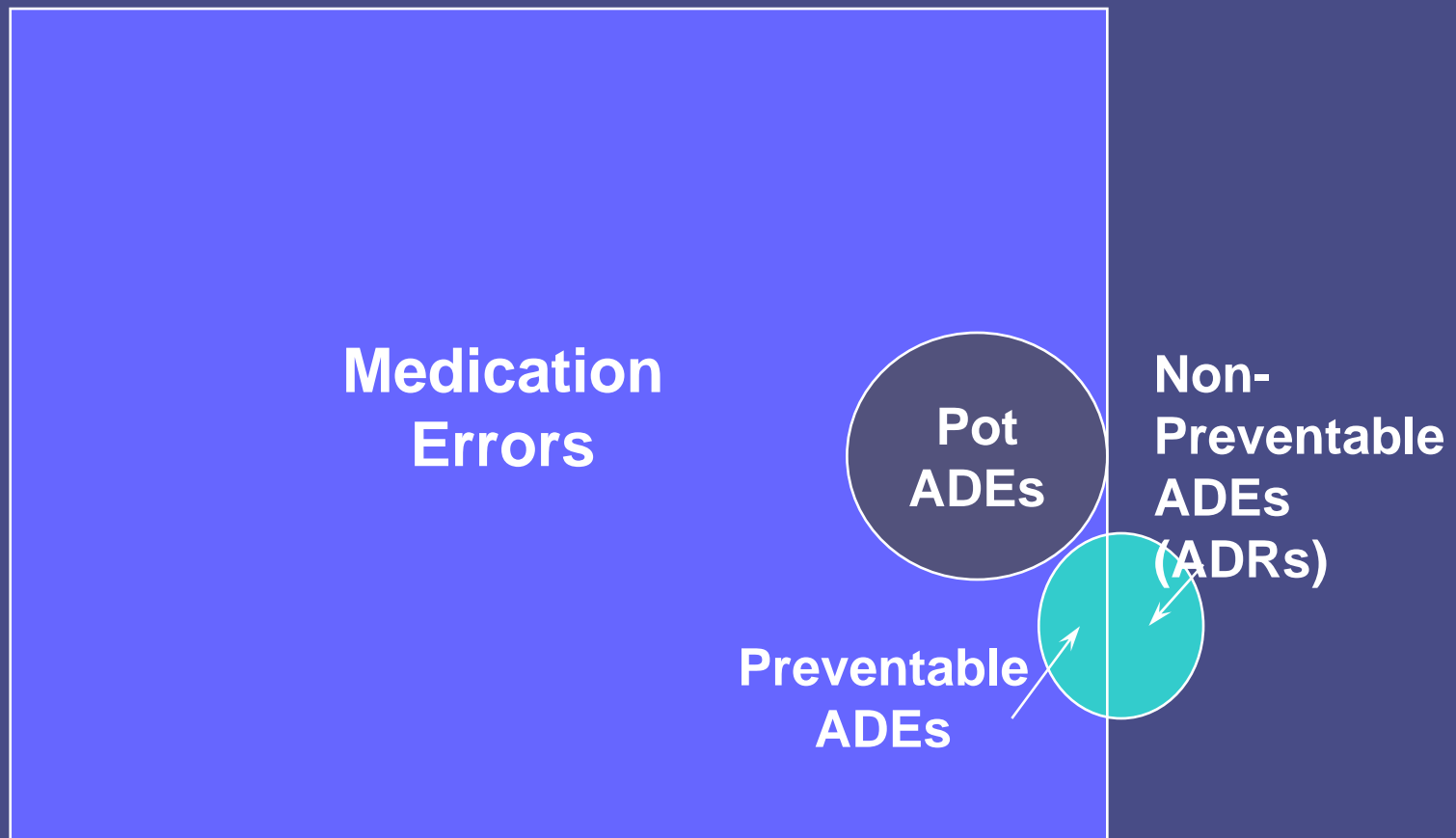
continued on page 2

Distribution supported by MOHLTC

Other Initiatives:

- Journal publications on medication safety
 - *CMAJ, CACCN, CHSP*
- *Hospital News* - monthly article
- Collaborations:
 - organizations, associations, pharmaceutical, manufacturers, provincial and federal governments

Relationships Between Med Errors, Potential ADEs and ADEs



United States

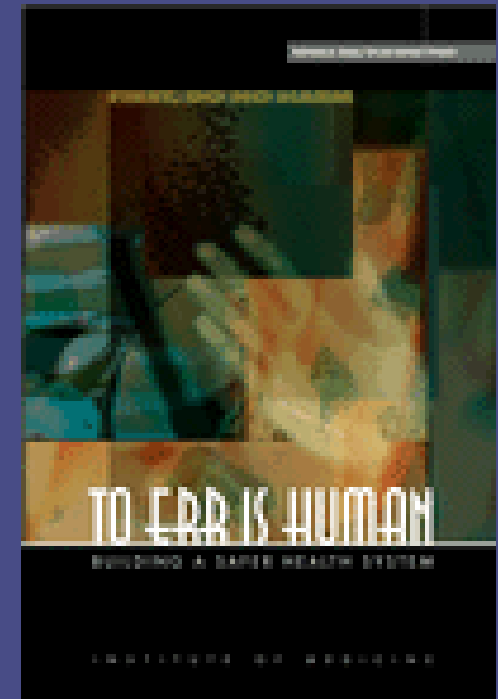
IOM (1999): To Err Is Human

**Hospital medical errors kill
44,000-98,000 people per year:**

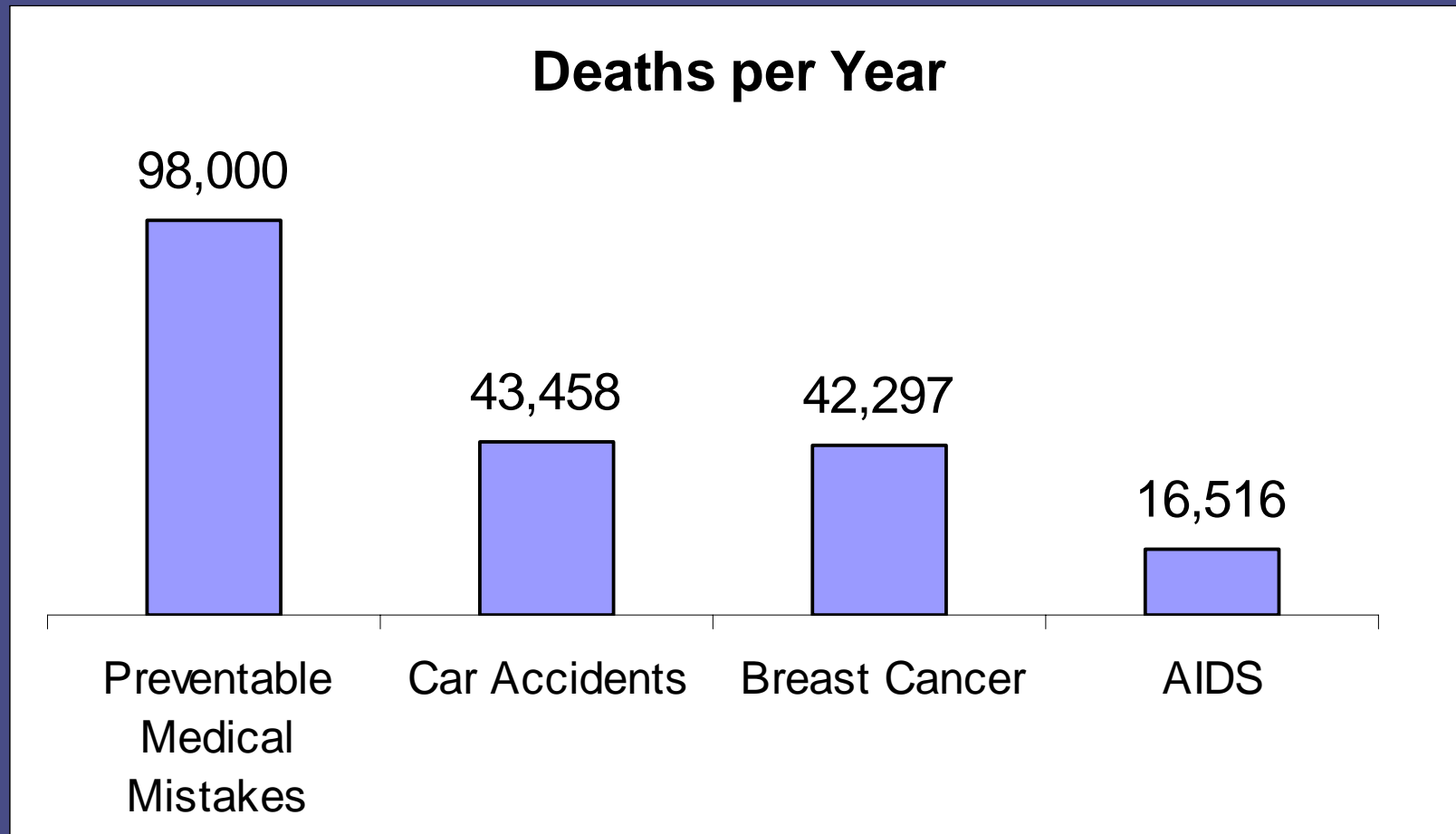
**“More people die from medical
errors each year than from
suicides, highway accidents,
breast cancer, or AIDS.”**

**“These stunningly high rates of medical
errors - resulting in deaths, permanent
disability, and unnecessary suffering -
are simply unacceptable in a system
that promises to first ‘do no harm’.”**

William Richardson



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

Comparisons to Other Industries:

What if we had 99.9% Accuracy?

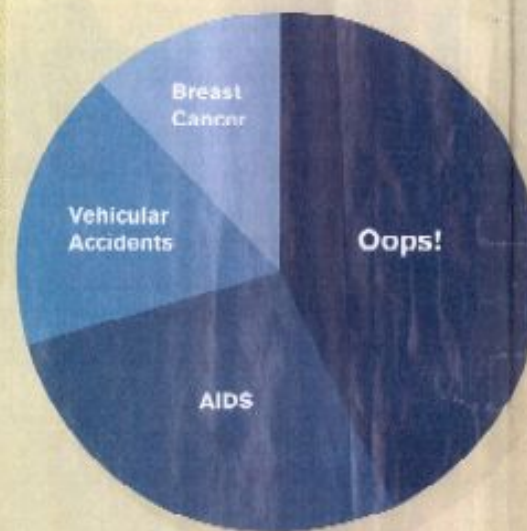
- **2 unsafe landings at O'Hare Airport/ day**
- **16,000 pieces of mail lost/ day**
- **32,000 bank cheques deducted from the wrong account each HOUR!**

(Deming, 1987)

One specialist says:
'The pen and prescription
pad are killing people'



MAJOR CAUSES OF DEATH IN THE UNITED STATES:



1. Make sure you are taking an *adult* dose of your heart care team knows about, not your own. And, over the counter medication, herbal products or supplements you take for a day. Be sure your doctor knows about any allergy to a known medicine you have or any medicine.

It means you can't write a prescription, treat
anyone you can't treat, and that you just can't
treat what it's for. The same you know exactly
what and how to treat it and that you are aware
of any potential side effects your medication
may cause.

A. When you pick up your medicine from the pharmacy, ask the pharmacist to explain the action, side effects, and the dosage that your doctor ordered.

It is possible to find a case in which the results of a test are not statistically significant.


Is it possible that we, who were hospitalized and you have a choice, choose one where we may actually have had the procedure or surgery you want?

5. If you're having trouble, be sure the two hands can meet again in exactly what will be your normally contracted all your body's living the way in most of our circumstances. It's a good idea.

7. When being discharged from a hospital ask your doctor or health professionals to thoroughly explain the treatment plan you will need to follow. Review your medications and symptoms you will need to watch.

It's important that you have confidence in someone you don't have any shared history with, because you can't ask for more information from relatives. However, Good Health professionally vetted the relationships they have with their scientists.

WE BELIEVE that the more you know about your health, the better you'll be. **Using the information you share with us gives a better and safer health care team.** For more information on participating, visit www.ahrq.gov and other health care related issues, visit us at www.aahrq.org

UnitedHealth 

Incidence From Other Chart Review Studies

Country	N Charts	Year	Incidence of AE	Preventable?
Australia	14,000	1995	16.6%	51%
USA (Utah & Colorado)	15,000	1999	2.9%	--
England	1014	2001	11.7%	50%
New Zealand	1326	2001	10.7%	71.8%
Denmark	1097	2001	9.0%	40.4%

Canadian Adverse Events Study

Baker GR, Norton PG, Flintoft V, et al.

CMAJ. 2004;170(1):1678-1686.

Available online at www.cmaj.ca

Adverse Event

“an unintended injury or complication that results in disability at the time of discharge, death or prolonged hospital stay and that is caused by health care management rather than by the patient’s underlying disease process.”
(p.1679).

Canadian Results

- 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.
- 37% of adverse events were determined to be preventable.

Related Adverse Events

#1

Surgical = 34.2%

#2

**Medication and
fluid-related =
23.6%**



Table 5: Procedures or events to which AEs were related, by service most responsible for delivery of care at time of AE

Type of procedure or event*	Most responsible service; no. of AEs			Total
	Medicine	Surgery	Other†	
Surgical	6	115	2	123
Drug- or fluid-related event	69	15	1	85
Other clinical management	30	11	2	43
Diagnostic	26	11	1	38
Medical	16	9	1	26
Other‡	9	8	1	18
System event§	3	4	4	11
Fracture	2	5	1	8
Anesthesia-related event	1	6	0	7
Obstetric	0	1	0	1
Total	162	185	13	360

*Physician reviewers could attribute events to more than 1 type of procedure.

†Includes dentistry and oral surgery, nursing, osteopathy, pharmacy, physiotherapy and podiatry.

‡AEs not covered in previous categories (e.g., burns, falls).

§System events include AEs that cannot be attributed to an individual or specific source (e.g., communication, reporting, lack of equipment).

Other Canadian Studies

- Forster AJ et al. Ottawa Hospital Patient Safety Study: incidence and timing of adverse events in patients admitted to a Canadian teaching hospital CMAJ 2004; 170(8): 1235
- Forster AJ et al. Adverse events among medical patients after discharge from hospital. CMAJ 2004; 170(3): 345
- Gurwitz JH et al. The incidence of adverse drug events in two large academic long-term care facilities. AMJ 2005; 118: 251-258

James Bagian, Anesthesiologist, space shuttle astronaut involved in the analysis of the *Challenger* explosion

“Just telling doctors and nurses to be more careful won’t do much. We need to change the systems that allow errors to happen”.

Scientific America May 2000 New and analysis : Medicine

Human Error Rates With Selected Activities

Activity *	Rate of Human Error**
General error of commission for example, misreading a label	3/1000
General error of omission in the absence of reminders	1/100
General error of omission when items are embedded in a procedure for example, cash card is returned from cash machine before money is dispensed	3/1000
Simple arithmetic errors with self checking but without repeating the calculation on another sheet of paper	3/100
Monitor or inspector fails to recognize an error	1/10
Staff on different shifts fail to check hardware condition unless required by checklist or written directive	1/10
General error rate given very high stress levels where dangerous activities are occurring rapidly	1/4

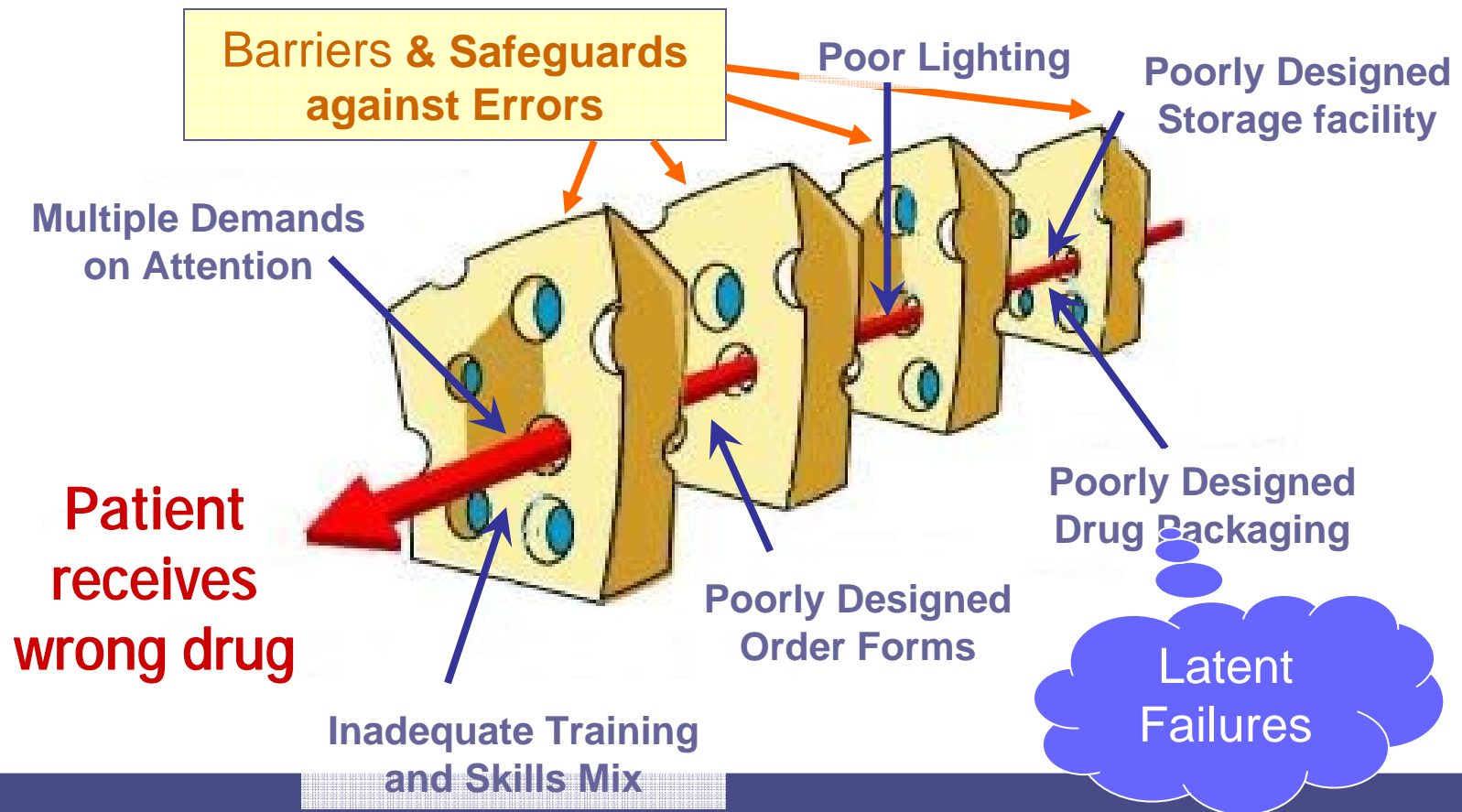
* Unless otherwise indicated, assumes the activities are performed under no undue time pressures or stress.

** (# of errors / # of opportunities for the error)

Adapted from Nolan TW. System changes to improve patient safety. BMJ 2000;320(7237):771-773 Nolan

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Swiss Cheese Model



(modified from James Reason, 1991)

Making Health Care Safer

Key steps:

- A. **Recognize** that improving safety is a **priority**
- B. Improve the **reporting** of errors and near misses
- C. Increase focus on **system changes**
- D. Gain greater **knowledge** about safer systems – much already exists
- E. **Leadership** is needed on all levels

G R Baker & P G Norton

A. Recognize that Improving Safety is a Priority

- National
 - CPSI: Safer Healthcare Now! – Medication reconciliation
 - Canadian Medication Incident Reporting and Prevention System (CMIRPS)
 - Canadian Council on Health Services Accreditation (CCHSA) include patient safety goals
- Provincial (MOHLTC)
 - ISMP Canada – Medication Safety Support Service (KCI, Opioids, next anticoagulants)
 - EMS / LTC / Community Pharmacy
 - Patients (OHA)

CCHSA Patient Safety Goals

NEW

Culture

Goal 1: Create a culture of safety within the organization

Communication

Goal 2: Improve the effectiveness and coordination among care/service providers and with the recipients of care/service across the continuum

Medication Use

Goal 3: Ensure the safe use of high risk medications

Goal 4: Ensure the safe administration of parenteral medications

B. Improve Reporting of Errors and Near Misses



Incident Reports As Safety Measures

Method	AE/1000 admissions
Incident Reports	5
Retrospective Chart Review	30
Stimulated Voluntary Reports	30
Computer Flags	55
Daily chart review	85
Computer Flags and Daily review	130

Jha J Am Med Inf Assoc 1998;5:305

O'Neil Ann Int Med 1993;119:370

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The Healthcare Insurance Reciprocal of Canada (HIROC) is a member-owned expert provider of professional and general liability coverage and risk management support.

ISMP Canada Safety Bulletin

Volume 2, Issue 4

April, 2002

SENTINEL EVENT WITH STERILE WATER – LESSONS SHARED

Hospitals are urged to review their storage conditions and supply processes for selected sterile water preparations.

ISMP Canada has recently received an error report describing accidental intravenous infusion of sterile water, instead of the intended normal saline solution. Unfortunately, close to 600 mL

3. The one-litre Sterile Water for Injection product had been used as an alternate to other sterile water products (inhalation and irrigation solutions) as a result of previous back-orders with the sterile water products. This resulted in increased availability of the product in the hospital.

Bulletin excerpt

Canada: 3 reports


**2 hospital
1 ambulance**

**US: several reports
1 death**





MORPHINE
SULFATE INJECTION USP

 mg/mL

STERILE




For subcutaneous, intramuscular or intravenous administration
Pour administration sous-cutanée, intramusculaire ou intraveineuse



SABEX®

MORPHINE
SULFATE INJECTION USP

 mg/mL

STERILE



For subcutaneous, intramuscular or intravenous administration
Pour administration sous-cutanée, intramusculaire ou intraveineuse



SABEX®


5 ampoules x 1 mL

DIN 02242484

5 ampoules x 1 mL

DIN 02242484
Code 8841

® **SULFATE DE
MORPHINE**
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Pour administration sous-cutanée, intramusculaire ou intraveineuse



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2 mg/mL

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For subcutaneous, intramuscular or intravenous administration
Pour administration sous-cutanée, intramusculaire ou intraveineuse



SABEX®



C. Increase the Focus on System Changes

Typical 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

Culture Change



Need to dispel the belief that healthcare workers are or can be perfect

High Alert Medications

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

From the ISMP Medication Safety Alert!, October 16, 2003 , Survey on high-alert medications - Differences between nursing and pharmacy perspectives revealed

Examples of High-Alert (Risk) Medications

- hypertonic IV solutions
- IV potassium (phosphate & chloride)
- **all narcotic** medications
- chemotherapeutic agents
- heparin & oral warfarin
- neuromuscular blocking agents
- insulin & oral hypoglycemics
- inotropic medication (e.g. digoxin)

www.ismp.org/msaarticles/highalert

Reality of Health Care Environments

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

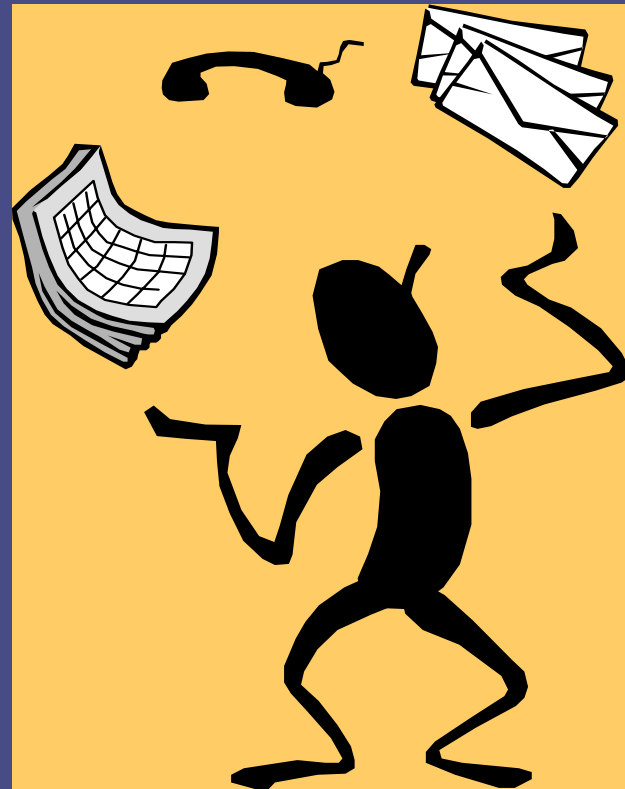


Figure 2. Cognitive pathway for RN #1

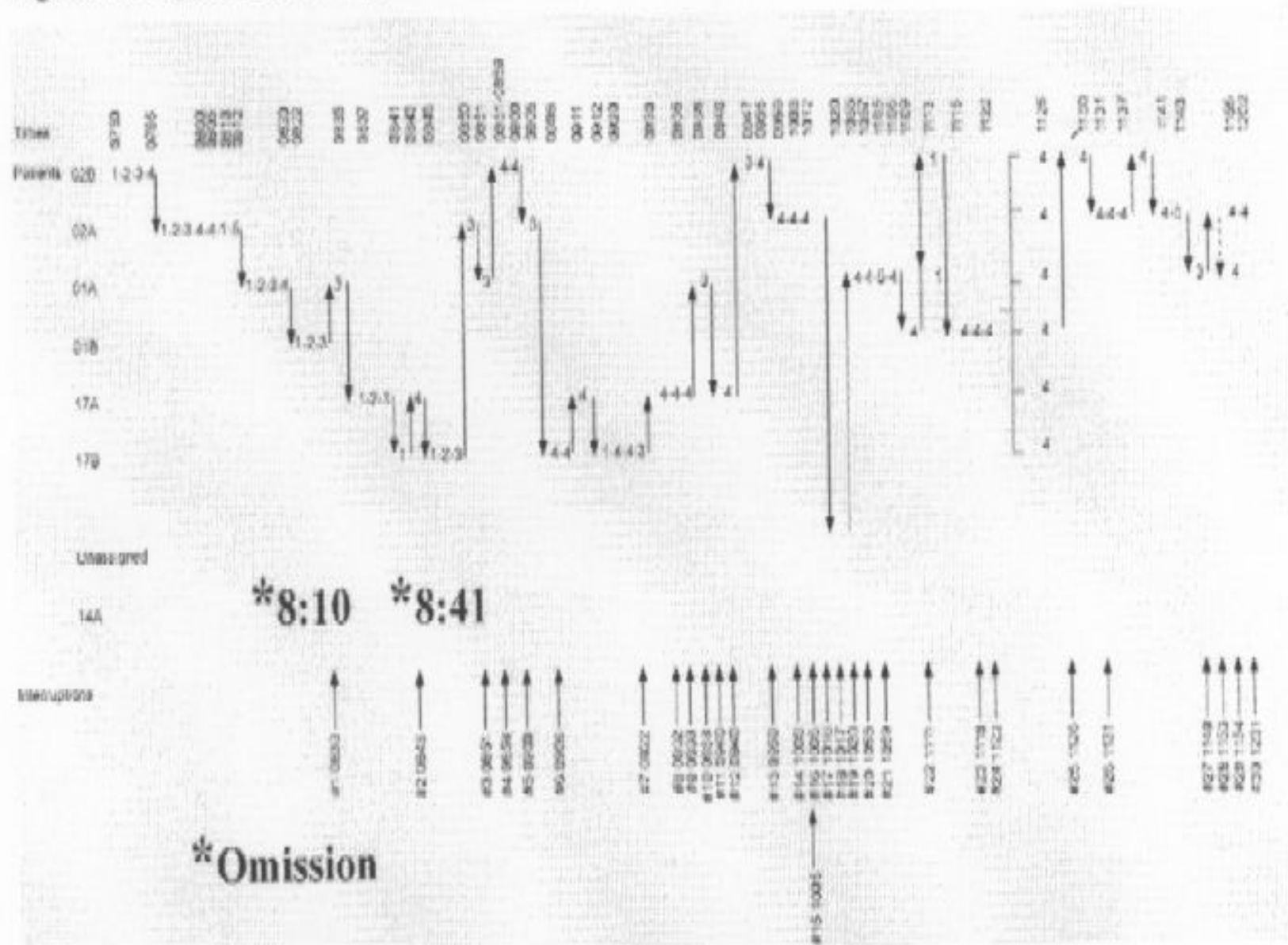


Figure 1. Link analysis for RN #1

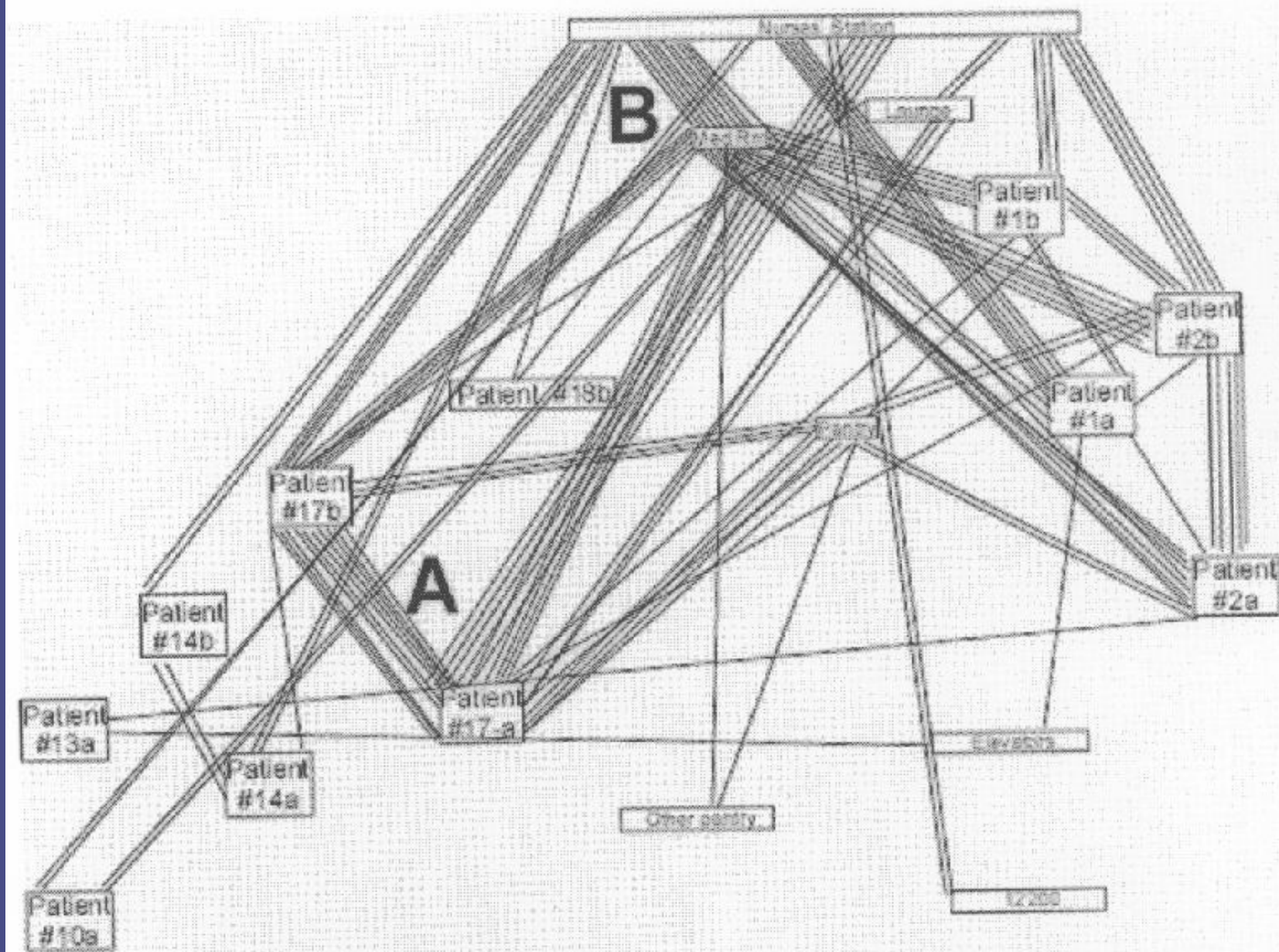


Table 1. Interruptions for single RN observation (RN#3)

Interruption	Time	Description of interruption	Location	Type	Nursing process	Cognitive stacking measure: # activities
1	0734	Unit Clerk inquiry	Nurses desk	Delay	N/A	5
2	0808	Paged	Patient room	Disrupt direct	Intervention	10
3	0852	RN inquiry	Nurses desk	Disrupt indirect	Intervention	18
4	0853	Patient inquiry	Nurses desk	Disrupt indirect	Intervention	19
5	0935	MD rounds	Patient room	Disrupt direct	Intervention	18
6	0941	Paged	Patient room	Disrupt Indirect	Intervention	18
7	0957	Answers phone	Patient room	Delay	N/A	17
8	1010	Responds to patient call out	Hallway	Delay	N/A	17
9	1014	Computer malfunction	Patient room	Delay	N/A	17
10	1021	Unit Clerk report	Nurses desk	Disrupt direct	Planning	17
11	1104	MD inquiry	Nurses desk	Disrupt direct	Planning	19
12	1105	Unit Clerk inquiry	Nurses desk	Delay	N/A	18
13	1239	Computer malfunction	Patient room	Delay	N/A	14
14	1248	Paged	Patient room	Delay	N/A	14
15	1359	Patient inquiry	Hallway	Delay	N/A	15
16	1451	Unit Clerk report	Nurses station	Delay	N/A	11

Confirmation Bias

It leads one to “see” information that confirms our expectation rather than to see information that contradict our expectation.

B

The power of the human mind

According to a research at Cambridge University, it doesn't matter in what order the letters in a word are. The only important thing is that the first and last letter be at the right place. The rest can be a total mess and you can still read it without problem. This is because the human mind does not read every letter by itself, but the word as a whole.

Amazing huh?

60 Regular INSULIN NOW

Lynthroid 0.1 mg P.O.
Dig 0.125 mg P.O. qid
Mini pro 5 mg P.O. qd
Foley catheter
wt's daily

Urine test p each meal + noc
Meban 25mg. @ HS
Hydrocortisone - 25mg. qid + tablet
Ferro Sequel bid + capsule
PKC
Urinalysis

Synthroid 1mg

RUN 25ML/H

250 mL 70% NaHCO₃/L
250 cc/h





Enalaprilat
Injection

1.25 mg/mL

Anhydrous Equivalent
FOR INTRAVENOUS
USE ONLY



Pancuronium
Bromide Injection

2 mg/mL

For IV Use **Rx only**

2 mL Vial Preserved
Contains 0.9% Benzalkonium Chloride

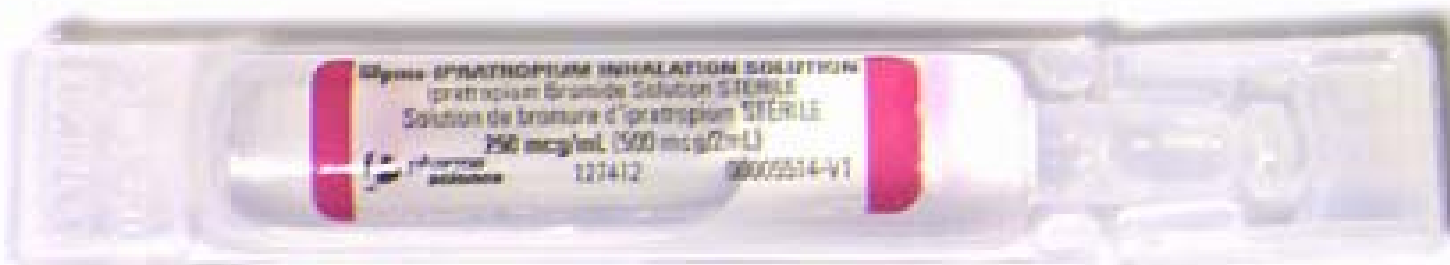
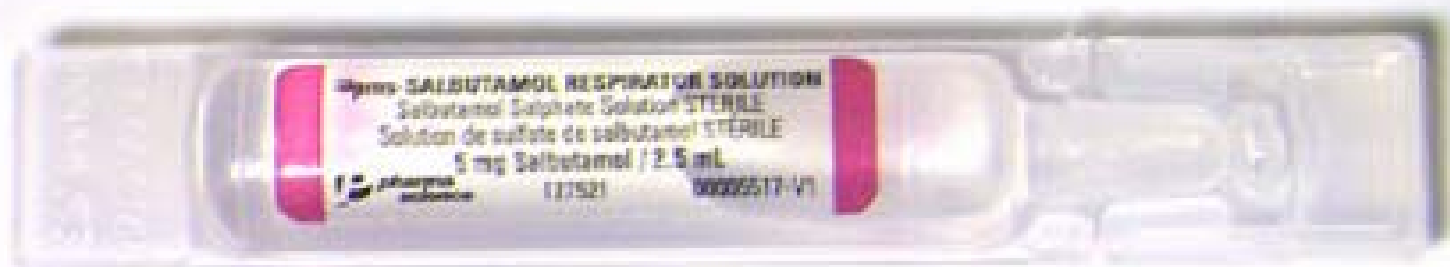
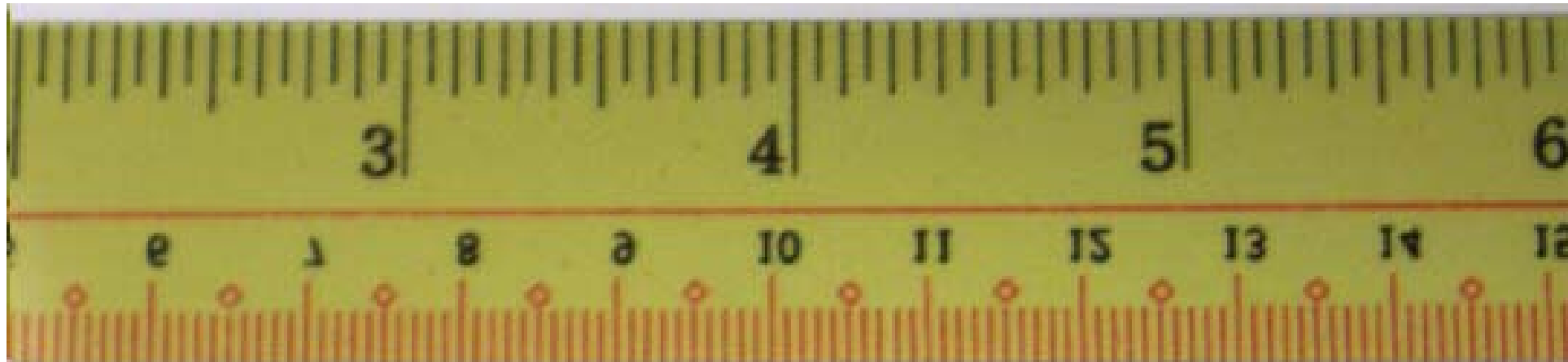

















Medication Errors- a new way of thinking

- Who did it?  What allowed it?
- Punishment  Thank you!
- Errors are rare  Errors are everywhere
- Add more layers  Simplify/standardize
- Calculating error rates  No thresholds

D. Gain Greater Knowledge About Safer Systems

Human Factors Engineering

- Research and practical applications designed to improve the interface of humans with systems
- Develops practical design principles that account for the psychological and physical characteristics of people

Principles

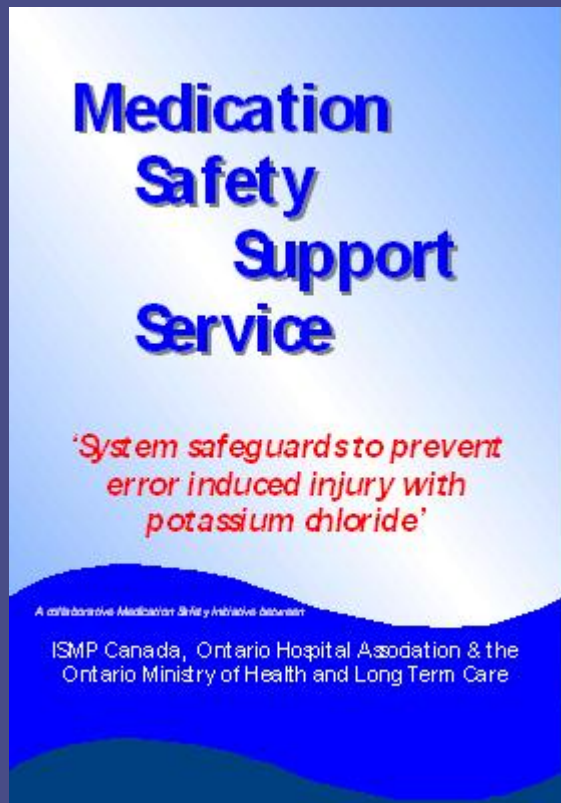
- Reduce or eliminate the possibility of errors
- Make errors visible
- Minimize the consequences of errors

Rank Order of Error Reduction Strategies

1. Forcing functions and constraints
2. Automation and computerization
3. Simplify, standardize and differentiate
4. Reminders, check lists and double check systems
5. Rules and policies
6. Education
7. Information
8. Punishment (no value)

Applying Error Reduction Strategies

1. Forcing functions and constraints



Constraint:

Hydromorphone 10 mg was removed

Man's death after drug error to be probed

Red Deer, Alberta — A man died after being given the wrong narcotic following a horse-riding accident.

The man, who was brought in by ambulance but was in stable condition, was X-rayed and observed in the hospital's emergency room for a few hours. Before being discharged, he was prescribed 10 milligrams of morphine for pain.

into a "serious medication error" that may have caused a patient's death.

The 69-year-old man, who was not identified, died after being treated at the Red Deer Regional Hospital Centre for a chest injury from a horseback riding accident on Sunday.

"This is a tragedy. Our first concern and attention indeed is to this family who... are grieving and very distressed at what has happened," said David Dawson, vice-president of medicine for the David Thompson Health Region.

"We also, of course, are very much concerned to make sure we take the immediate actions that are needed to reduce to an absolute minimum the likelihood that anything like this may subsequently occur."

The case is the third known death

from a drug mix-up in Alberta this year.

The man, who was brought in by ambulance but was in stable condition, was X-rayed and observed in the hospital's emergency room for a few hours. Before being discharged, he was prescribed 10 milligrams of morphine for pain.

However, a nurse instead injected him with 10 milligrams of hydromorphone — an amount considered an overdose. The medication is a highly concentrated narcotic that can slow breathing and is normally used in palliative care.

"The two drugs have a similar name, they look very similar. There are a number of factors that could have led to the error," said Denise McBain, the health region's senior vice-president and chief operating officer.

The mistake was discovered about an hour after the injection, and about 30 minutes after the man left with his family, when the ER shift changed and staff did a routine narcotic count.

A phone message was quickly left instructing the patient to go to hospital immediately.

However, as the man and his family drove home, his condition "deteriorated very quickly," Dr. Dawson said.

He died after arriving at a hospital in Innisfail, south of the central city of Red Deer, despite the use of a drug to combat the effects of hydromorphone.

The "very experienced" nurse who made the mistake was put on indefinite paid leave and feels terrible, Ms. McBain said.

Officials stressed that they will not know whether the mistake resulted in the man's death until the medical examiner's final report is available in about 10 days.

"The evidence is not all in and therefore I think it would be unfair to conclude what the cause of death is," Dr. Dawson said.

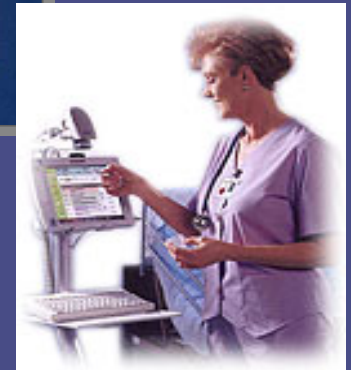
Alberta Health Minister Gary Mar told reporters he will work with the health region to ensure such an error does not happen again.

Ms. McBain said an independent team of experts from outside Alberta will be asked to conduct an investigation and issue public recommendations.

Applying Error Reduction Strategies

2. Automation and Computerization:

- CPOE
- Bar Code technology
- Automated bedside verification
- Smart pumps



Applying Error Reduction Strategies

3. Simplify, standardize and differentiate

- **Bedrock Human Factors Principles**
 - reduce steps and interfaces
 - Call 911
- **Standardize processes and procedures**
 - Airline industry



10 mL DIN 02141019
C31119 Latex Free Stopper

CALCIUM GLUCONATE
Injection/Injectable USP 10%

1 g/10 mL

100 mg/mL

Sterile/Stérile
For IV Infusion After Dilution
Pour perfusion IV
après dilution



ELECTROLYTE REPLENISHER

Single-dose vial Discard unused portion. Each mL contains:
• Calcium gluconate 90 mg (0.465 mEq Ca^{++} /mL) plus Calcium sesquihydrate 4.5 mg which is equivalent to 100 mg Calcium gluconate (0.232 mmol Ca^{++}) • Hydrochloric acid/sodium hydroxide to adjust pH
• Osmolality 680 mOsm/L

Consult package insert for complete information.

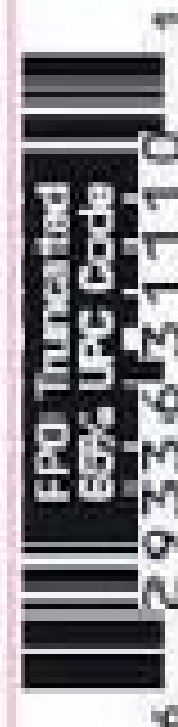
Store between 15°C and 30°C.

PHARMACEUTICAL PARTNERS
OF CANADA INC.
Richmond Hill, ON L4B 3P6

☎ 1-877-821-7724

401190C

LOT
EXP



Standardization

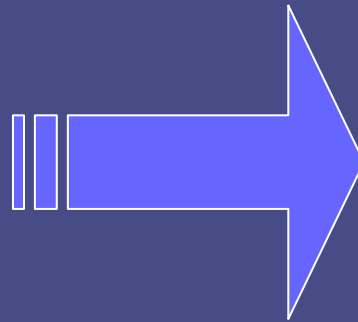


Standardize Order Communication

- Use leading zero (0.1 mg not .1 mg)
- No trailing zeros (1 mg not 1.0 mg)
- Avoid nonstandard abbreviations (“U” for unit, q.d., drug name abbreviations such as “MS”)

Differentiate

**vincristine
vinblastine**

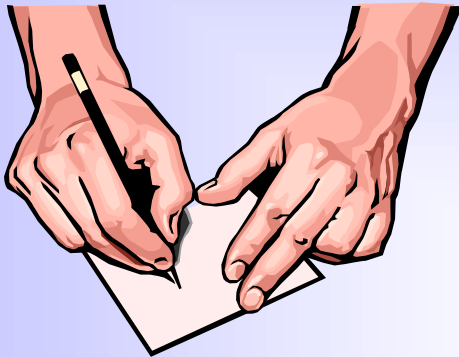


**vinCRIS^tine
vinBLAS^Tine**

Applying Error Reduction Strategies

4. Independent double checks & other redundancies

Where Medication Errors Occur...



PRESCRIBING
39% of errors



TRANSCRIPTION
12% of errors



DISPENSING
11% of errors



ADMINISTERING
38% of errors

Independent Double Checks: **Working Definition**

An Independent Double Check is a process in which a second practitioner conducts an individual verification.

Independent Double Checks

- Common in other industries





- Acknowledges complex and high risk systems and that practitioners are human, and therefore fallible

Independent Double Checks

Research show that people find 95% of mistakes when double checking the work of others

Grasha et al. Process and Delayed Verification Errors in Community Pharmacy. Tech Report Number 112101. (2001) Cognitive Systems Performance Lab

It Reduces the Probability of Error

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


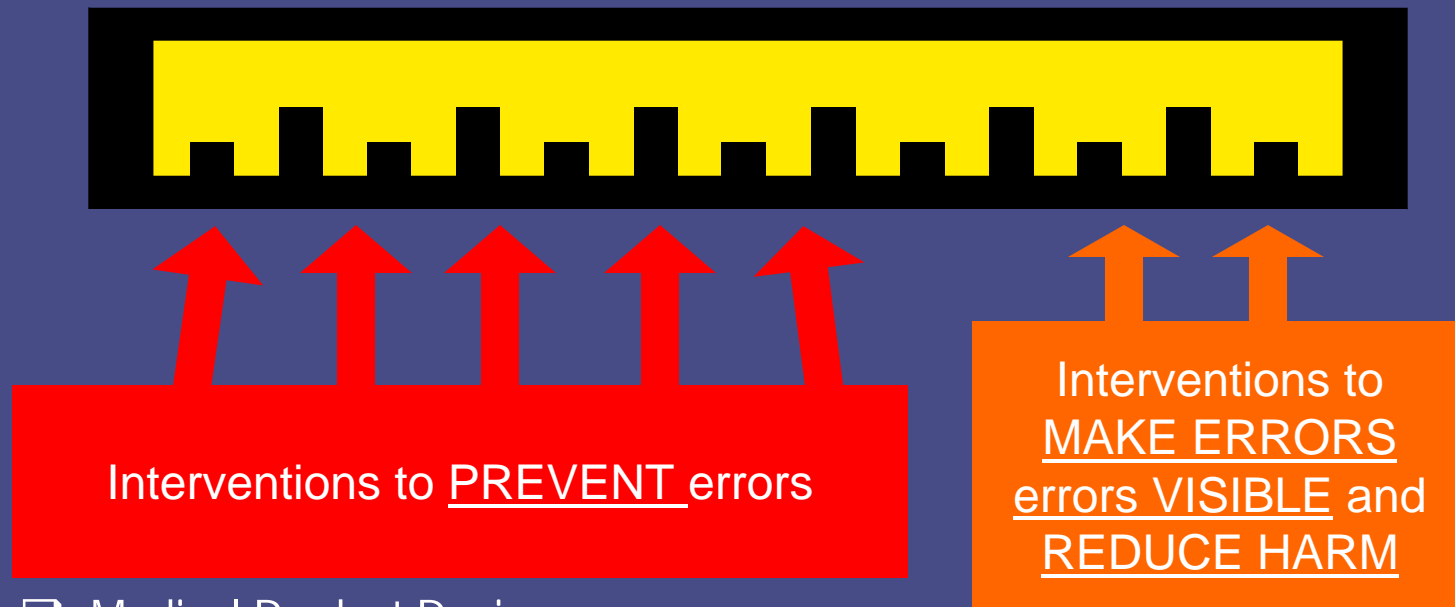
Expectation of the 5 Rights

- Right drug
- Right patient
- Right dose
- Right route
- Right time

These are desired outcomes but do not provide standardized process on how to achieve them

Patient Safety

MEASURING PATIENT SAFETY



☐ Medical Product Design

(IV tubing, pumps, monitors, drug packaging & labels, medical records)

☐ Work Environment Design (Architecture, Work Station Design)

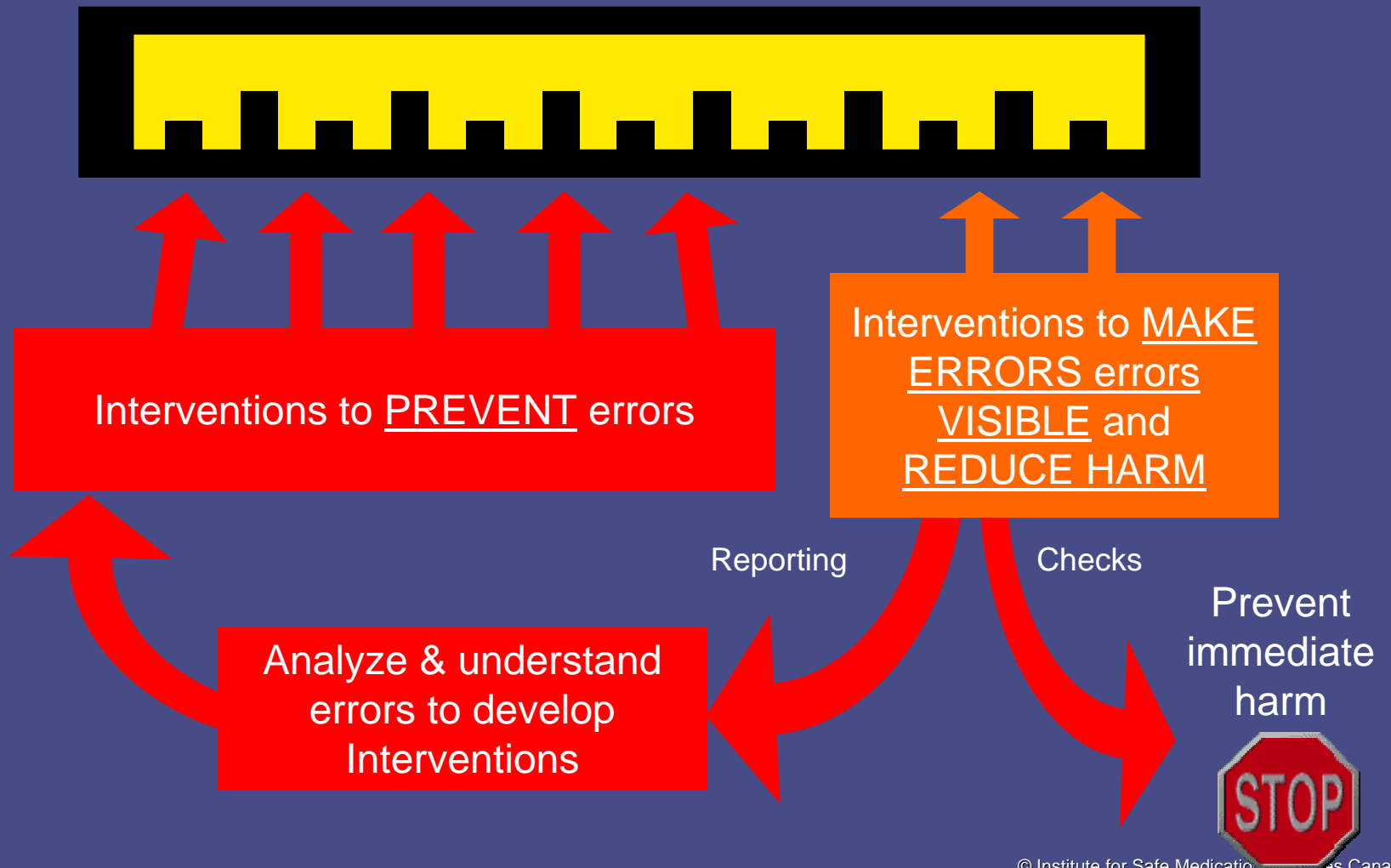
☐ Task or Process Design

☐ Close Call Reporting

☐ Checks (auto or manual)

Patient Safety

MEASURING PATIENT SAFETY





Why do we need independent double checks?



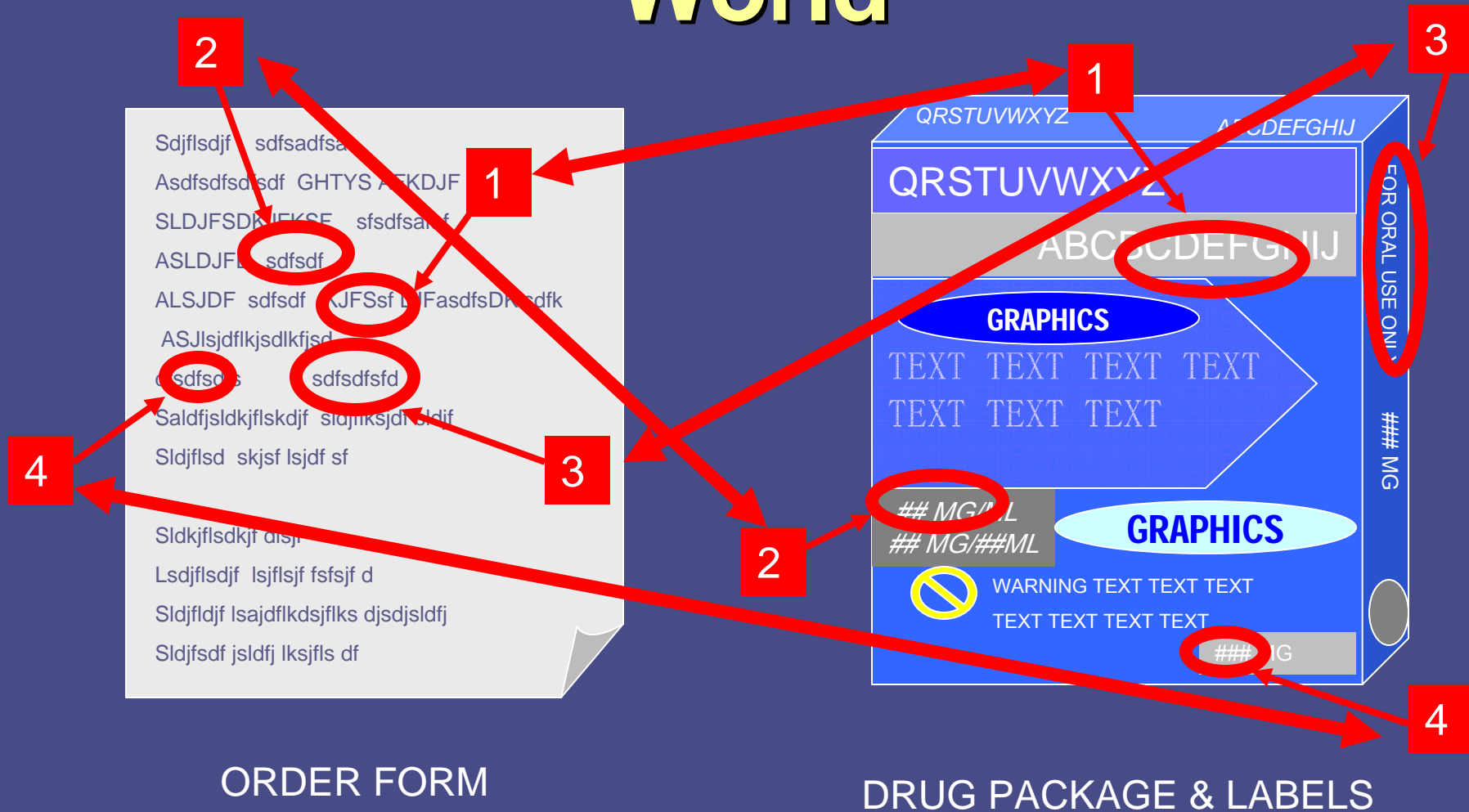
Front line staff work with:

- ✓ High Stress Environment
- ✓ High Risk Drugs
- ✓ Poorly designed Order Forms
- ✓ Poorly designed Packages & Labels!
- ✓ Poorly designed Pumps

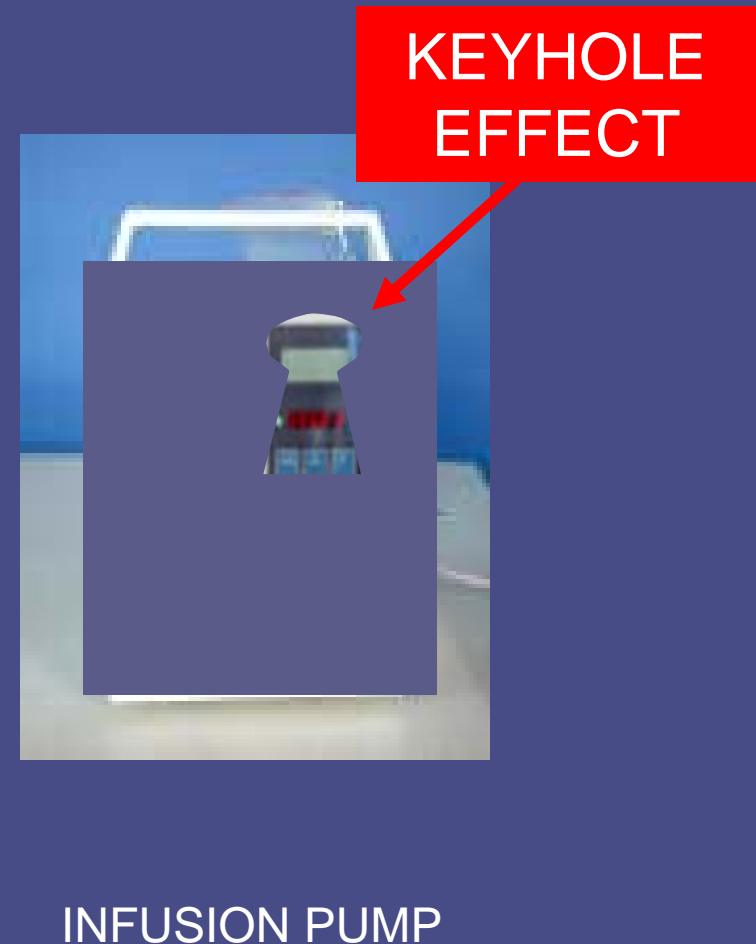


Human
Factors

The Physical & Cognitive World



Infusion Pumps

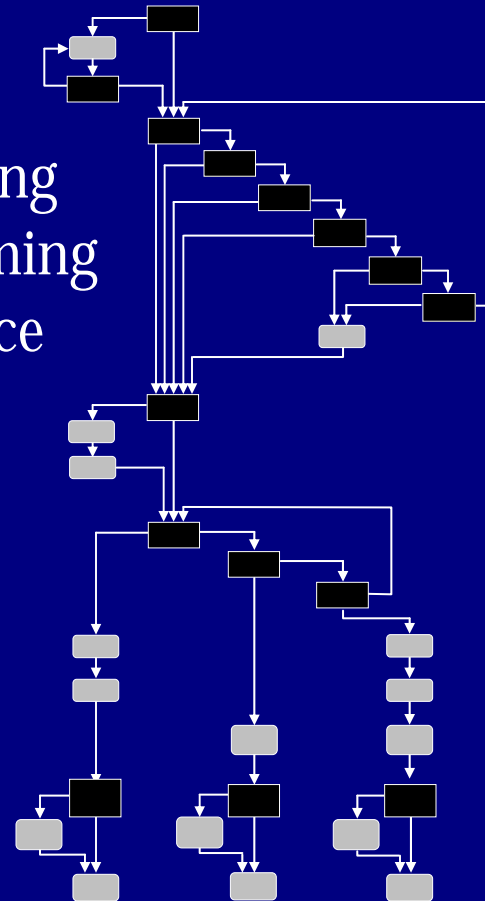


Looking Through the Keyhole



INFUSION PUMP

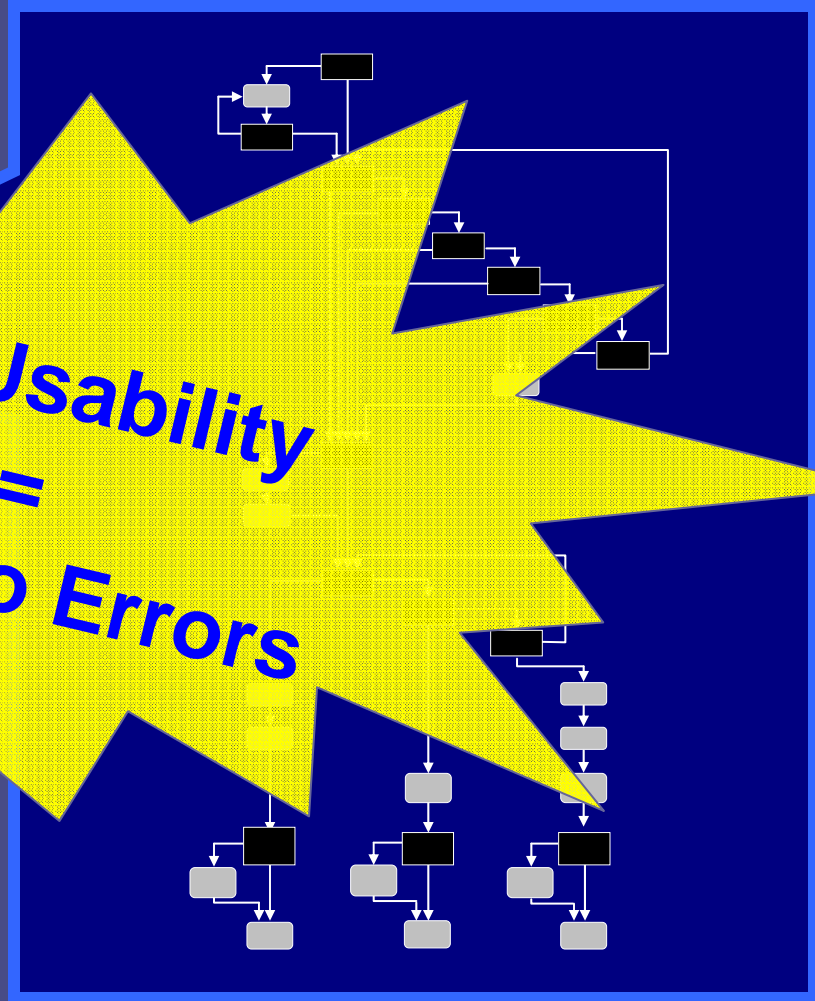
Underlying
Programming
Sequence



Looking Through the Keyhole



INFUSION PUMP



ISMP Canada Medication Safety Support Service (MSSS) – Supported MOHLTC

5. Rules and Policies

- bring to point of care

This is an example of an existing PCA order form. This order form was NOT evaluated. Only the *Independent Double Check CHECKLIST* was evaluated in the usability test.

Doctor's Order Sheet

Anesthesia/Acute Pain Service
Patient Controlled Analgesia (PCA) Orders

IN FAST USE BLACK OR BLUE BALLPOINT PEN, PRESS FIRMLY

ALLERGIES:
NO KNOWN ALLERGIES
KNOWN ALLERGIES (Specify):

PHYSICIAN'S ORDER AND SIGNATURE

While on PCA device, the patient is to receive No further supplemental Narcotics or other CNS depressants unless approved by the Anaesthesia/Acute Pain Service.

Only the patient should press the PCA delivery pendant unless otherwise directed by the APS.

(Check ☒ appropriate box(es) and complete orders as required)

1. **PCA DRUG:**
☐ Morphine 2 mg/mL.
☐ Hydromorphone 0.4 mg/mL.
☐ Other: _____

2. **PUMP SETTINGS:**
Dose _____ mg to _____ mg.
Initial Lockout Interval _____ minute(s).
Four hour limit _____ mg.

3. **MONITORING:**
i) a) Two RN's will check and verify the initial PCA settings and document on PCA Flowsheet.
b) RN will check and verify PCA setting every shift and document on PCA Flowsheet.
c) Respiratory Rate and Sedation Score q 2 h x 24 hours, then q 4 h. Record on PCA Flow Sheet.
ii) **Call Acute Pain Service (APS) if:**
a) Respiratory Rate less than 10/minute.
b) Blood Pressure Systolic less than 90 mm Hg.
c) Pulse less than 50 beats per minute.
d) Sedation Score of 3 (somnolent, difficult to rouse) or if patient confused.
e) Inadequate pain control (eg: Pain score greater than 4 out of 10).
f) If four hour limit of drug dose is reached before 4 hours has elapsed.
iii) If side effects of slow respiratory rate, hypotension or somnolence occur, **STOP** PCA Pump immediately and inform attending service as well as Acute Pain Service.

Independent Double Check CHECKLIST


☐ Patient Name?
☐ Syringe drug?
☐ Syringe Conc?
☐ Programmed Conc?
☐ Micro- or Milligram?
☐ Dose?
☐ Lockout?
☐ Four hour limit?

Signature _____

Focus of usability test

Independent Double Check

CHECKLIST

<input type="checkbox"/>	Patient Name?
	<input type="checkbox"/> Syringe Drug?
	<input type="checkbox"/> Syringe Conc?
	<input type="checkbox"/> Programmed Conc?
	<input type="checkbox"/> <i>Micro</i> or <i>Milligram</i> ?
	<input type="checkbox"/> Dose?
	<input type="checkbox"/> Lockout?
	<input type="checkbox"/> Four hour limit?
x	_____
	signature

Independent Double Check Tool

Applying Error Reduction Strategies

Culture and Communication

6. Education and Information

- Educating staff:
 - System-based causes of medication errors
 - Hierarchy of effectiveness of error prevention strategies
 - **Bring patients and family into the medication-use process**

E. Leadership Needed

- “Culture of Safety” = FOUNDATION
- Making safety a priority (quality, outcomes)
- Eliminate use of “error rates” as a measurement tool
- Use of meaningful error tracking methods
- Proactive approach
 - Failure Mode and Effects Analysis (FMEA)
 - Learning from each other (internal, external, outside healthcare)
 - High reliability organizations

What Nurses Can Do?

- Cultivate a culture of safety
 - Report errors/ near misses/ hazardous conditions
 - Learn and talk about errors in your system
- Ensure orders are complete
- Authority gradient challenge
- Avoid use of dangerous abbreviations (telephone or verbal orders, MAR, PCP)
- Embrace patient/ family into process

What Nurses Can Do?

- Avoid work-a-rounds
- Read- back orders (e.g., “five zero”)
- Independent double checking
- Learn and apply system-based strategies
- Be vigilant
- Trust your intuition: “if it doesn’t feel right, it probably isn’t”

“Technically the biggest ‘safety system’ in healthcare is the minds and hearts of the workers who keep intercepting the flaws in the system and prevent patients from being hurt. They are the safety net, not the cause of injury”.

Don Berwick, IHI