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Middle East Forum on Quality and Safety in Healthcare 2017

Adding Value in Healthcare

Medication Safety

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Hamad Medical Corporation
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Objectives

- Background and definitions
- Where do medication errors happen? and why do they occur?
- How common are medication errors? and how harmful are they?
- What to do when we suspect a medication error?
- Drivers of improving medication safety in healthcare organizations
- Principles of a safe system
- Role of technology and patient engagement

What does medication safety mean to you?

Medication safety is defined as freedom from preventable harm with medication use (ISMP Canada, 2007). Medication safety issues can impact health outcomes, length of stay in a healthcare facility, readmission rates, and overall costs to healthcare system.

Background

- Healthcare is one of the basic needs of any society
- It helps to cure diseases, relieve suffering, and save lives
- There has been a tremendous improvement in healthcare so that many previously fatal diseases have become easily treatable
- **HOWEVER** healthcare itself is still a source of patient harm.

Vincent, 2011

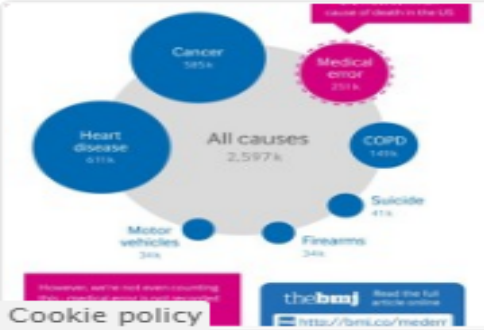
Background

thebmj | Research | Education | News & Views | Campaigns | Archive

Analysis

Medical error—the third leading cause of death in the US

BMJ 2016 ; 353 doi: http://dx.doi.org/10.1136/bmj.i2139 (Published 03 May 2016)
Cite this as: *BMJ* 2016;353:i2139



Article | Related content | Metrics | Responses | Peer review

Martin A Makary, professor1 , Michael Daniel, research fellow1

Background

- There were mixed opinions about medicine in early times including the double idea of death and doctor riding together

- In ancient Greece, Apollo was the god of physic and sender of diseases at the same time. ‘Pharmakos’ meant both remedy and poison and the words ‘kill’ and ‘cure’ were nearly indistinguishable

- Hippocrates had a famous dictum that says ‘first, do no harm’

- In modern medicine, Florence Nightingale was one of the first to address healthcare-associated risks. She introduced her book Notes on Hospitals with “It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm.”

Porter, 1999; Vincent, 2011; Nightingale, 1863

Why focus on medications?

- Medications are the most common intervention in health care
- Medication errors are common worldwide
- Medication-related harm is one of the most common harms in health care
- Medication optimization can keep people out of the hospital and reduce readmissions
- Medications are a major expense in all hospitals. Proper management will help manage costs

Why focus on medications?

The Telegraph

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Millions of GP prescriptions contain dangerous errors: research

Almost two million GP prescriptions contain potentially life threatening errors with mistakes in those given to one in five patients, research by the General Medical Council has found.

Human error and not a lack of understanding or knowledge was behind most mistakes, the study said Photo: ALAMY

By Rebecca Smith, Medical Editor
6:20AM BST 02 May 2012

Health News
News » UK News »

Why focus on medications?

https://psnet.ahrq.gov/resources/resource/20529

U.S. Department of Health and Human Services

HHS.gov

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

AHRQ.gov

PSNet
PATIENT SAFETY NETWORK

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Fact Sheet/FAQs Published December 2010

Preventing Medication Errors: A $21 Billion Opportunity.

CLASSIC

Washington, DC: National Priorities Partnership and National Quality Forum; December 2010.

Topics | Share | Print

Related Resources

NEWSPAPER/MAGAZINE ARTICLE

Sick children face potentially deadly danger: medication errors.

Furfaro H. Wall Street Journal. September 25, 2016.

JOURNAL ARTICLE › STUDY

Liquid medication errors and dosing tools: a randomized controlled experiment

Medication use in HMC (>65% of Qatar's use)

In 2015

- Over QR 1 billion spent on medicines
- Number of attendances
  - >1.2 million outpatients plus 1 million A&E
- Number of outpatient Rx items
  - >5.5 million
- Number of inpatient Rx items [%IV]
  - >3.6 million [20% IV]
- Junior doctors order more than 50% of inpatient Rx!!!

Definitions

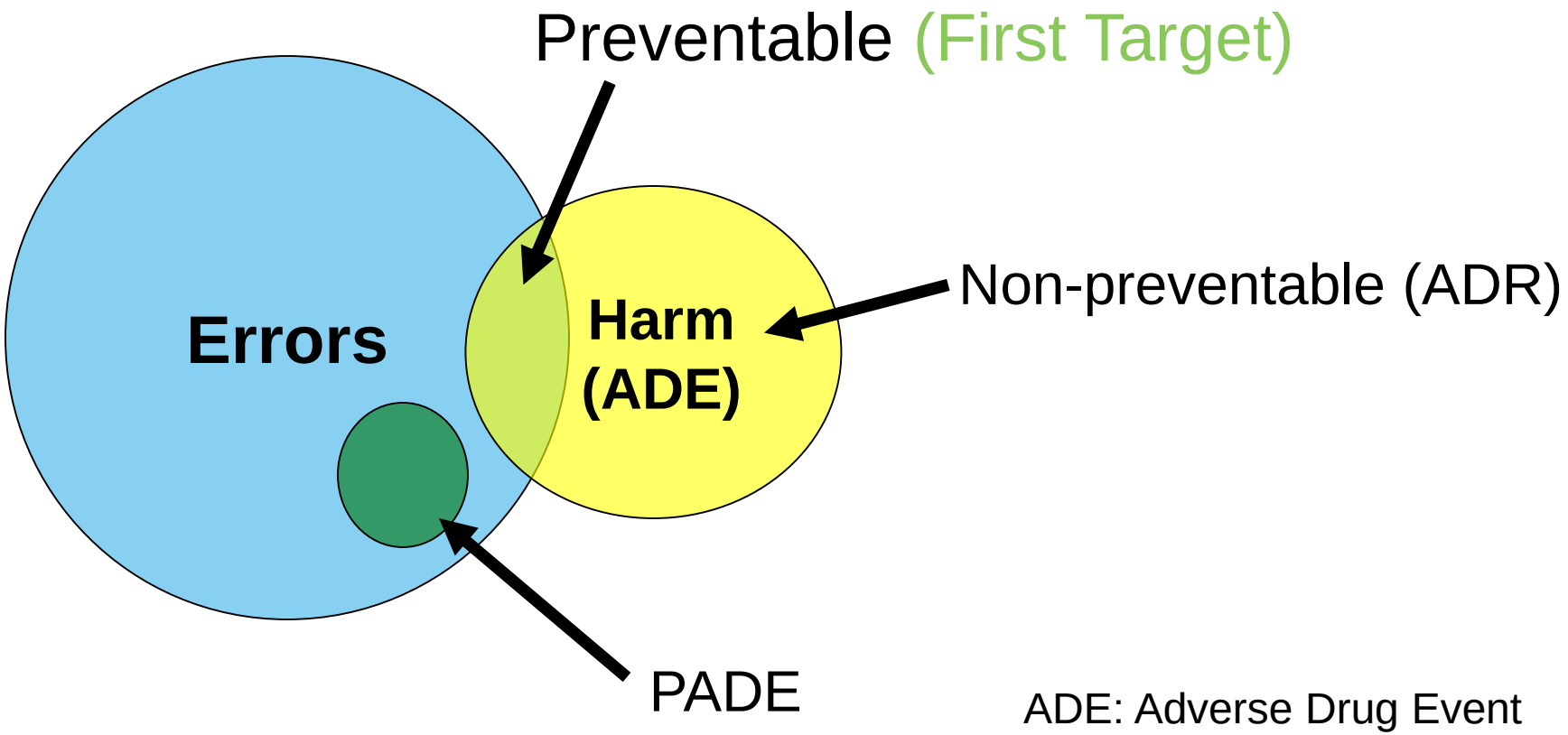
- **Harm:**
  Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting therefrom.

- **Medication Error:**
  Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.

  Such events may be related to professional practice, health care products, procedures, and systems, including prescribing, order communication, product labeling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use.

- **Adverse Drug Event:**
  Any untoward medical occurrence, unfavorable sign [e.g., abnormal laboratory finding], symptom, or disease, in a patient administered a drug. Adverse drug events include adverse drug reactions, and may be caused by medication errors

Medication Errors and Harm



ADE: Adverse Drug Event
PADE: Potential Adverse Drug Event
ADR: Adverse Drug Reaction

Adapted from Bates *et al*, 1995

NCC MERP Index for Categorizing Medication Errors Algorithm

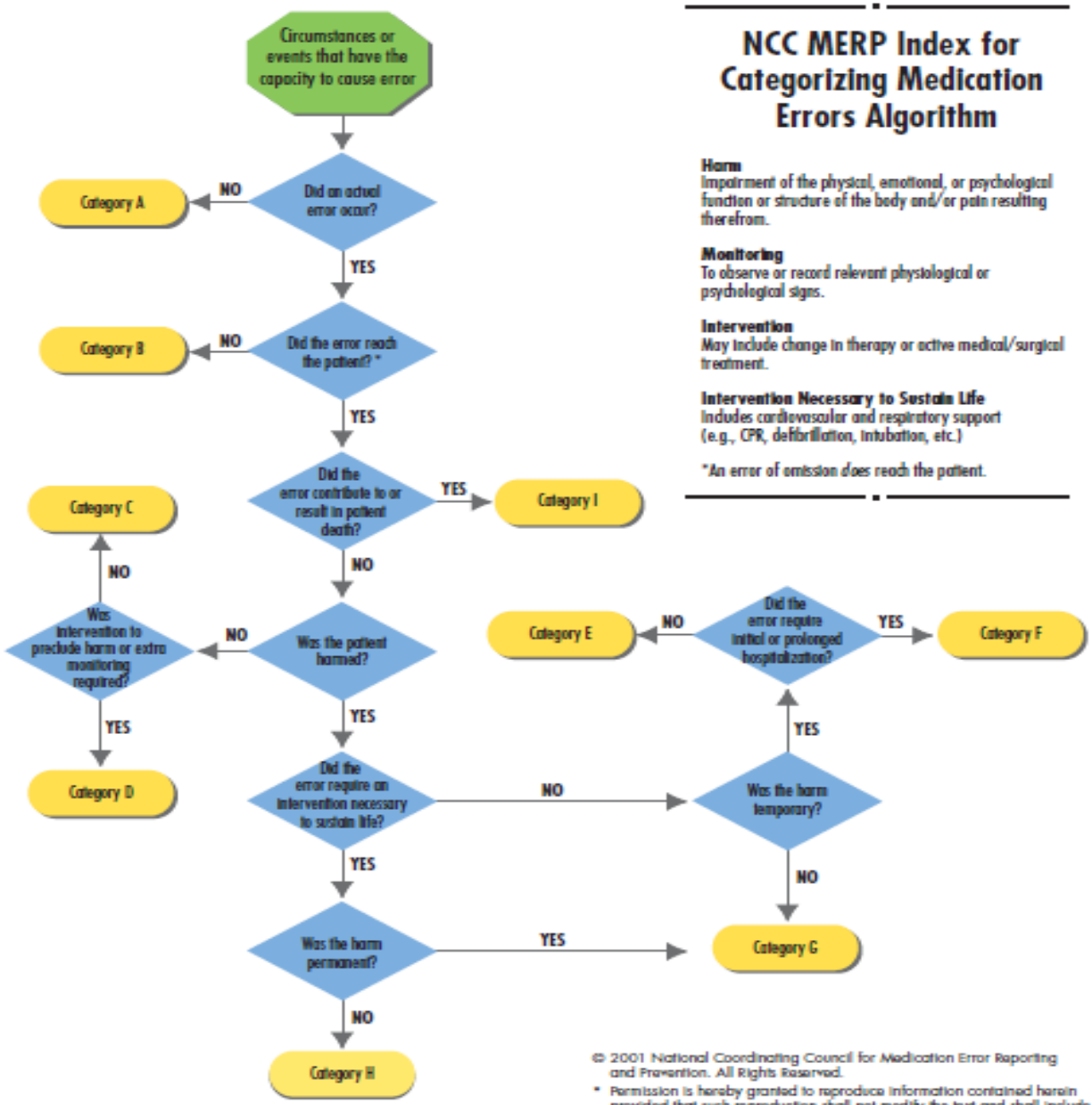
Harm
Impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting therefrom.

Monitoring
To observe or record relevant physiological or psychological signs.

Intervention
May include change in therapy or active medical/surgical treatment.

Intervention Necessary to Sustain Life
Includes cardiovascular and respiratory support (e.g., CPR, defibrillation, intubation, etc.)

*An error of omission does reach the patient.



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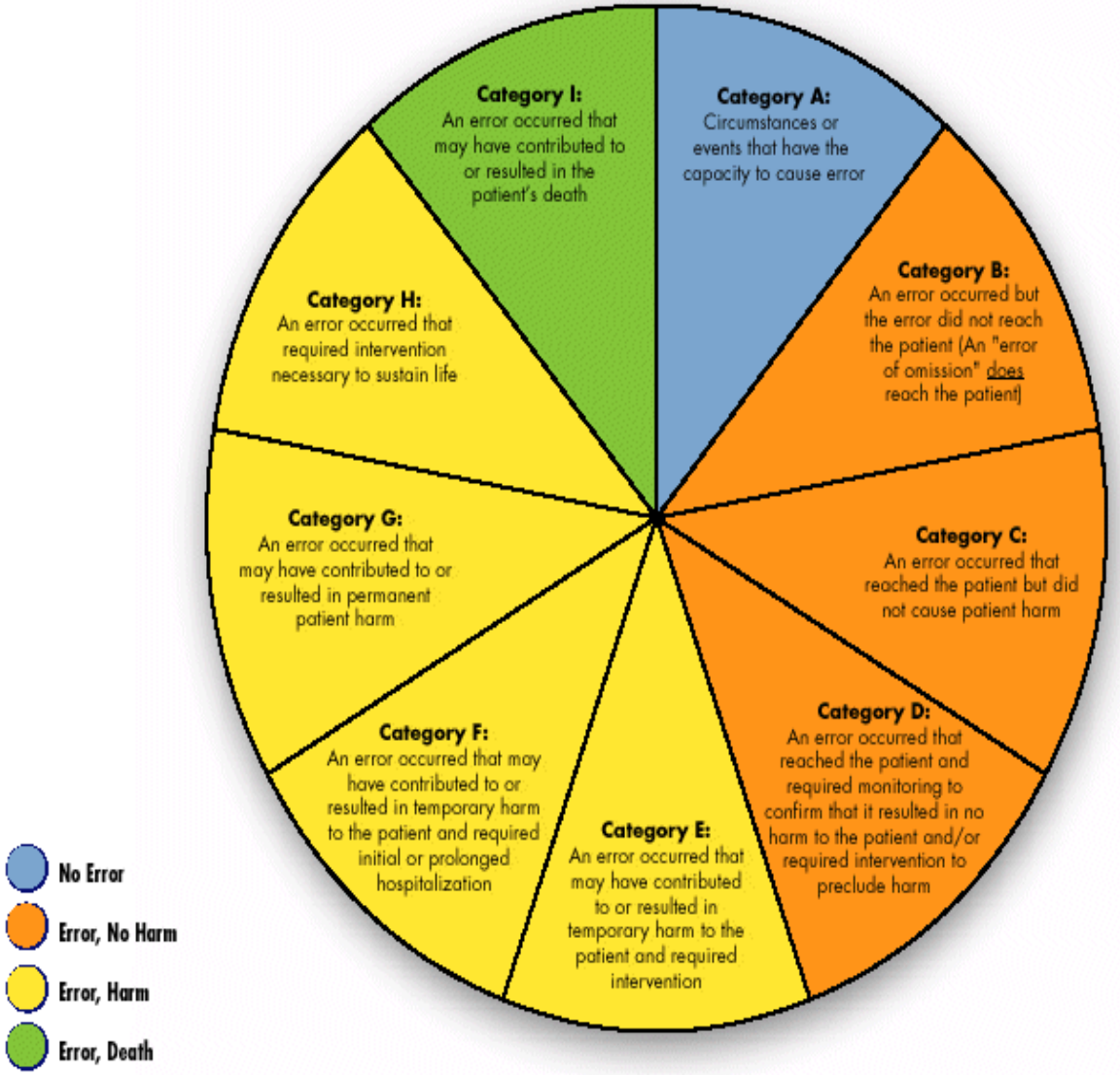
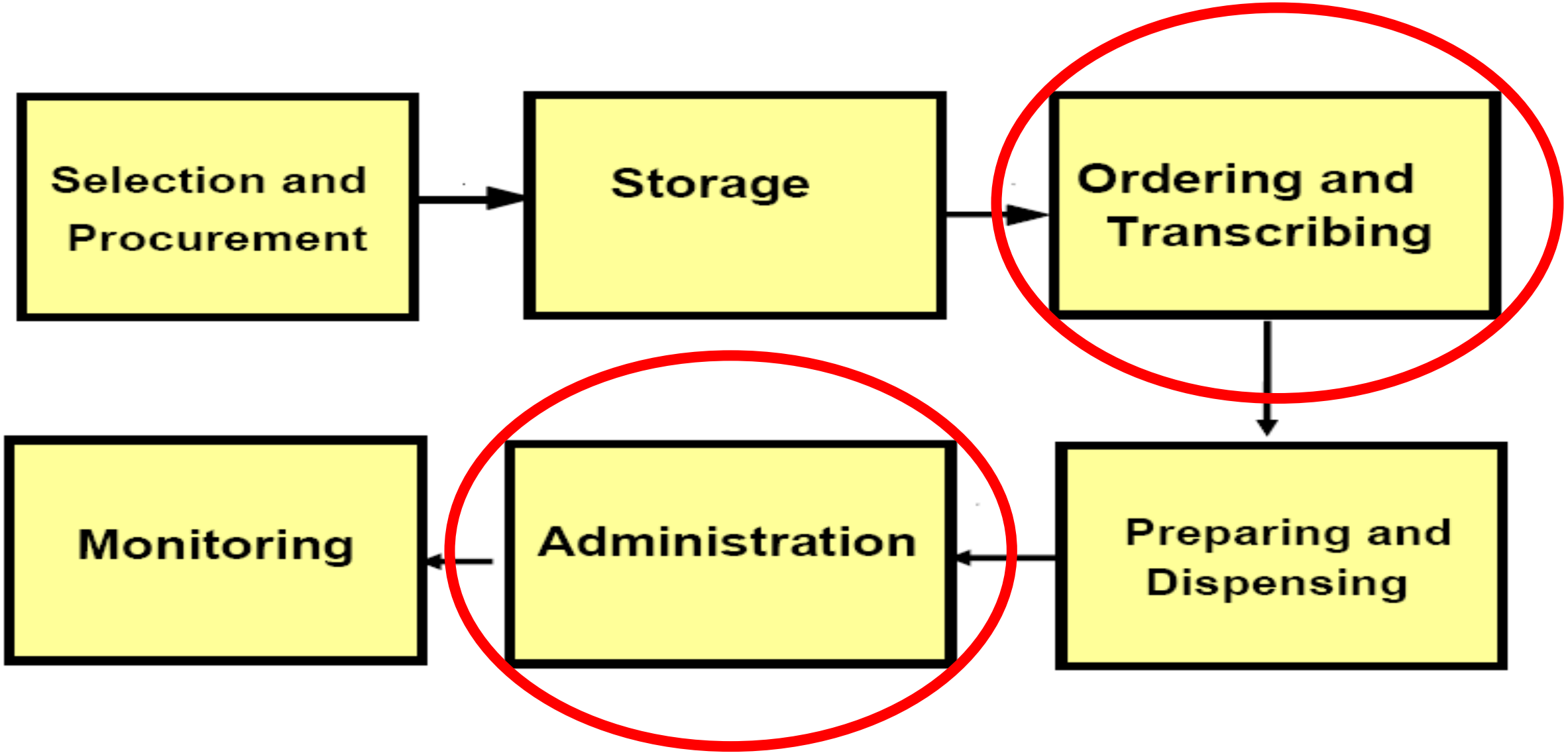


Where do medication errors happen?



Where do medication errors happen?

- Errors are not evenly distributed through the Medication Use Process

- Out of every 100 inpatient medication errors

  Medication ordering – 49%

  Order Transcription – 11%

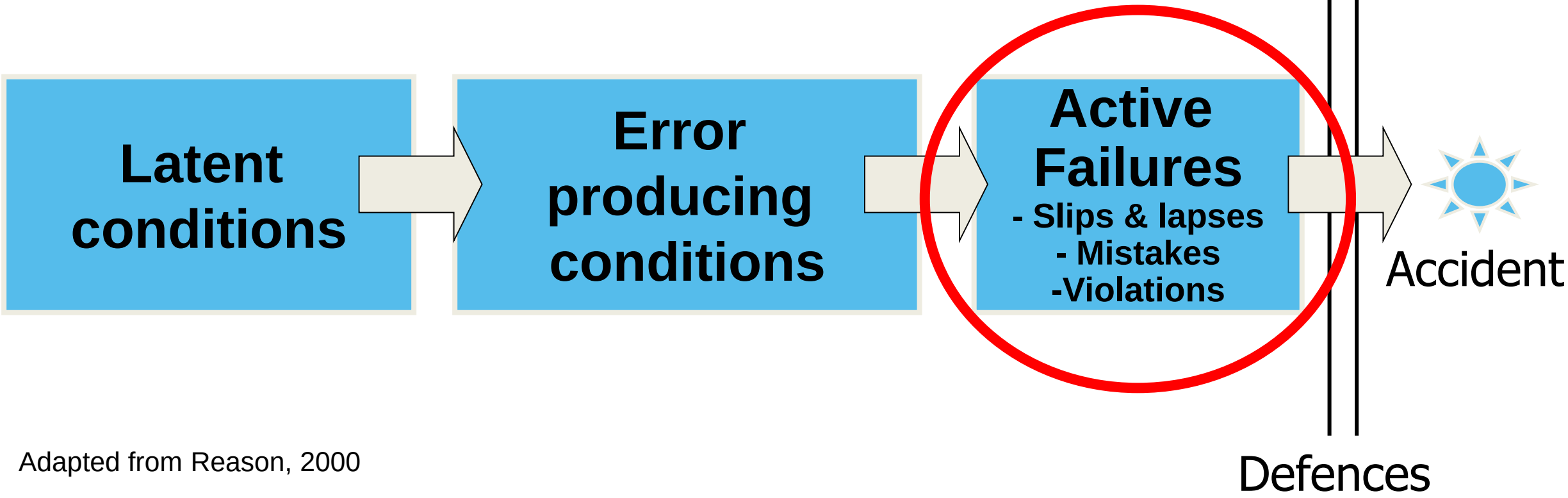
  Dispensing – 14%

  Administration of drugs – 26%

Leape *et al* , 1995

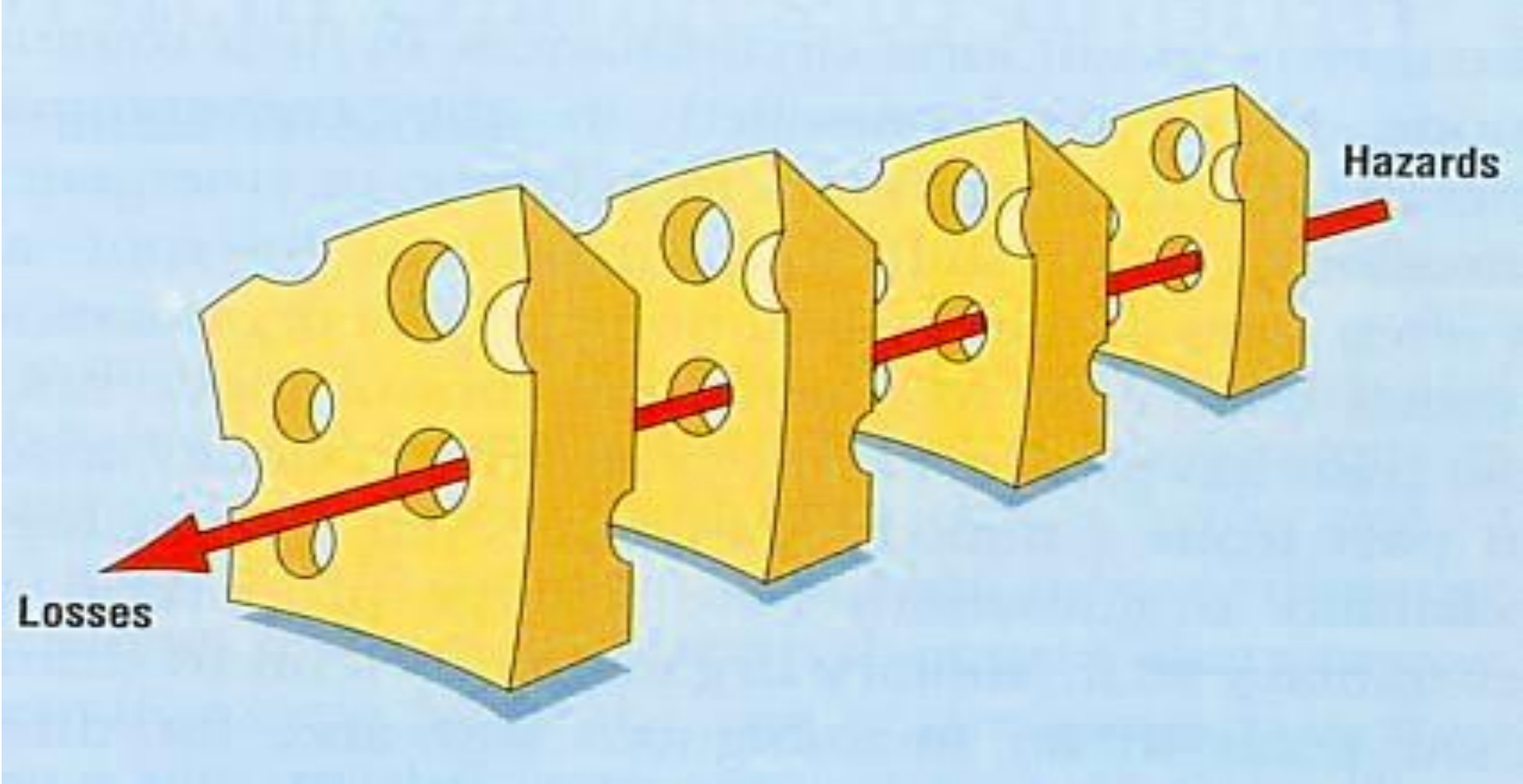
Why do medication errors occur?

Accident causation model

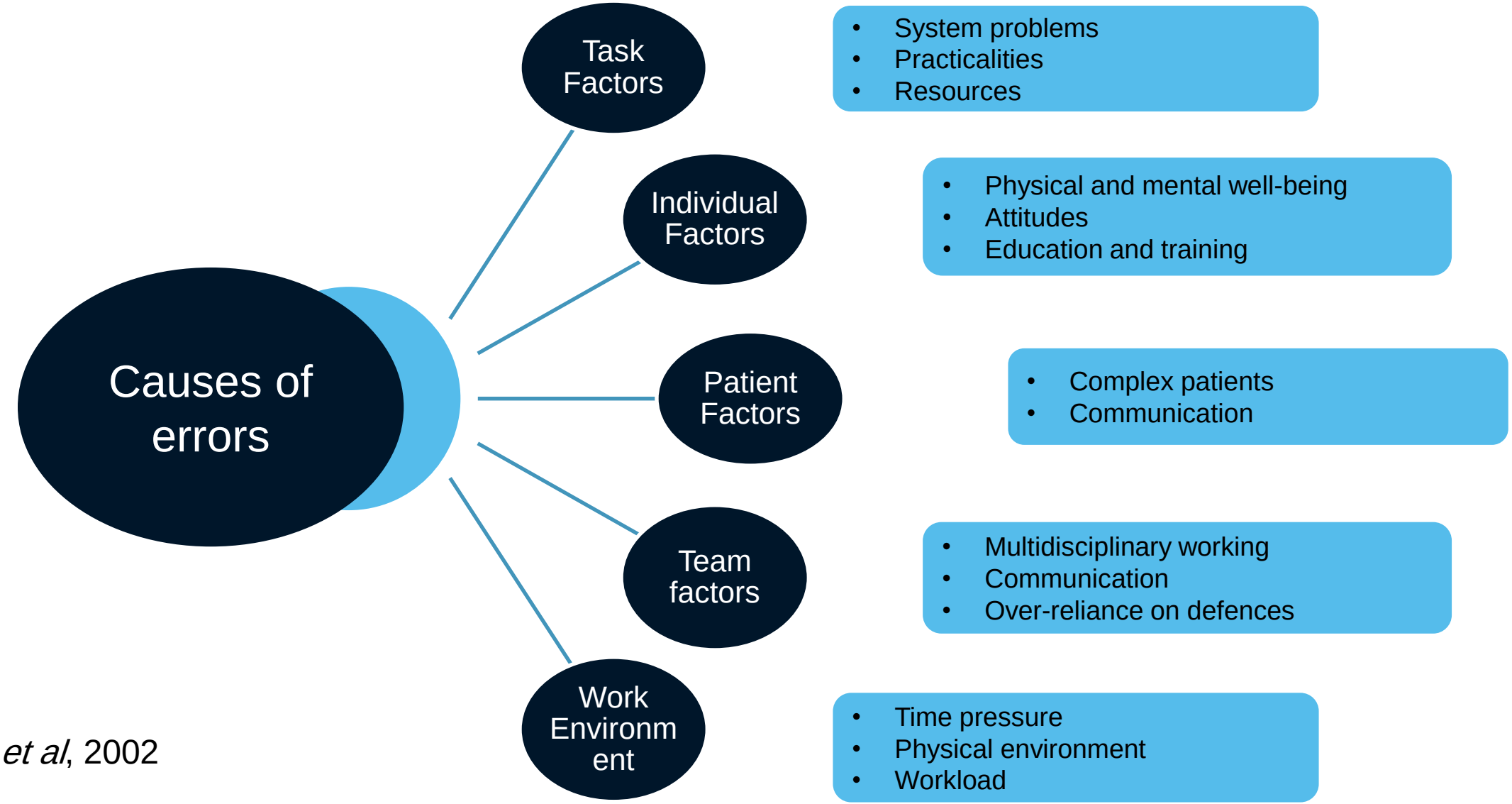


Adapted from Reason, 2000

‘Swiss cheese’ model - James Reason



Why do medication errors occur?



Dean *et al*, 2002

How frequent are medication errors in hospital?

Depends on the research method but…

- Junior doctors [FY1 and FY2]
  - 9% of orders written [Dornan *et al,* 2009]
- Other estimates range from 7% to 14.7% [Lewis *et al,* 2009, Dean *et al,* 2011]
- Affects 2% of Patient days and 50% of hospital stays [Lewis *et al,* 2009]

How many cause harm?

- Thankfully, most errors do NOT reach the patient

  and,

- Most do NOT cause patient harm
- Less than 1% of errors results in patient injury but …
- Each preventable Adverse Drug Event will increase the length of stay by an average of 4.6 days

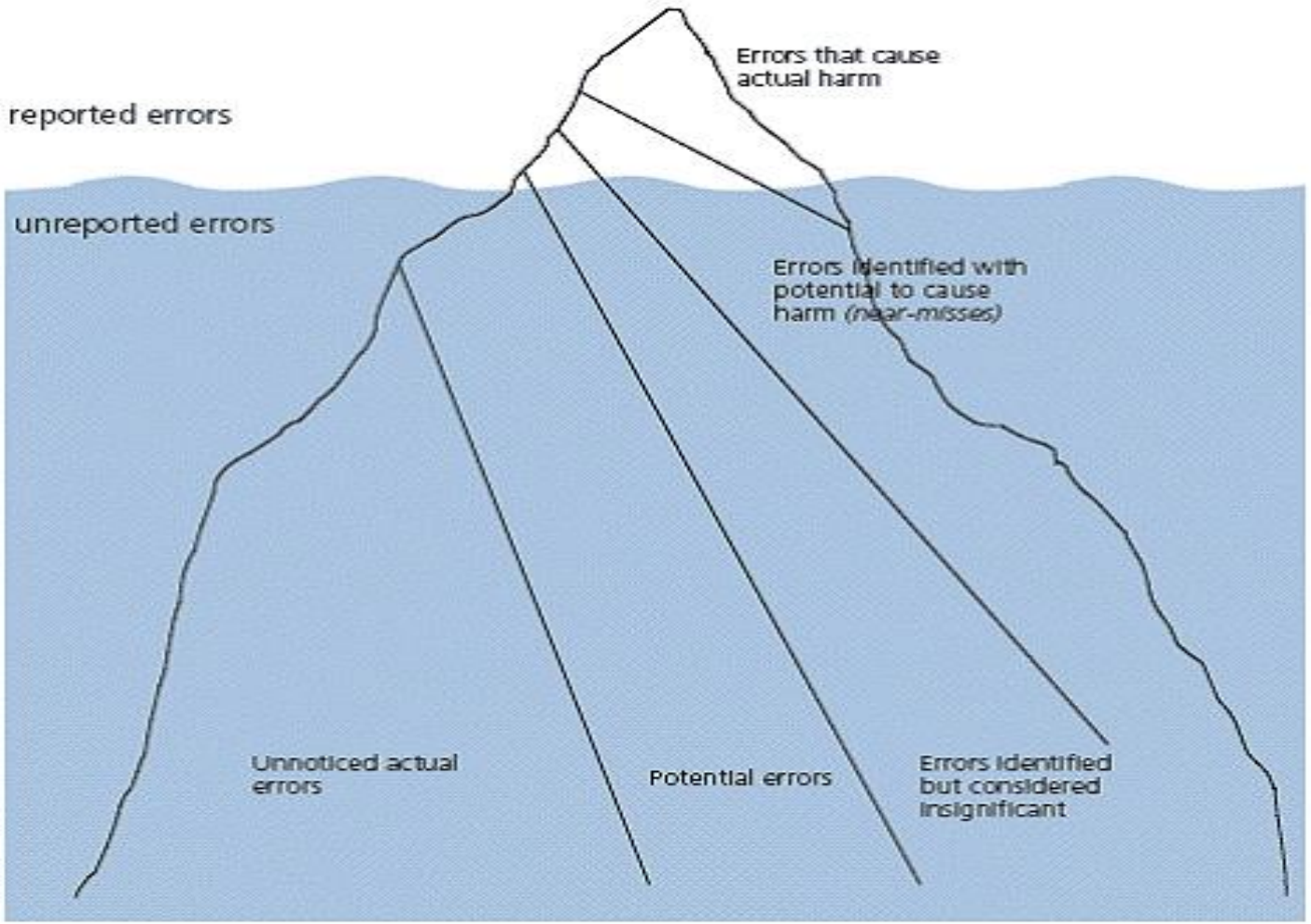
Bates *et al* 1995

Less than 1% of medication errors…

If 0.1% cause harm,

- HMC inpatient orders
  - Could be 3,600 harmful events per year
  - 10 per day ☹
- 10 patients a day have an extended stay
  - 10 x 4.6 = 46 days x 365 = ~16,800 extra days/year
  - ~ 50 Million QR

What if you find / suspect a medication error?



Known High Risks

- Poor hand writing
- Incomplete documentation
- Confusing abbreviations
- Dose calculations
- Therapeutic duplications
- Drug Interactions
- “High-Alert” drugs
- “Sound Alike – Look Alike” drugs
- Complex regimens
- Patient errors

Human Factors

- Interactions of people with other people
  - Communication failures
  - Misunderstanding
- Interactions with technology
  - Errors due to the interface with computers
  - Alert fatigue
  - Ignoring alerts
- Interactions with the environment
  - Noise as a distraction
  - Uncomfortable workflow

“Medicine used to be simple, ineffective, and relatively safe. Now it is complex, effective, and potentially dangerous.”

— Professor Sir Cyril Chantler

Outcomes	Primary Drivers	Secondary Drivers
Improve Medication Safety by Decreasing Harm and Errors	Engage All Layers of the Organization	Build Will Collect Ideas Reporting Culture Cultivated High Risk Areas identified Safety Lessons Learned & Shared Committees and Competencies in place
	Patient/Family/Caregiver Engagement	Health Literacy Mechanism to Listen and Learn from Patients/Families Patient and Family Engagement & Education
	Use Systems Approach	Get Results Standardized Protocols and Algorithms Use improvement science Measurement /Assessment of Processes and Outcomes
	Address Medication Reconciliation	Segment the population Effective Communication and Collaboration within/ between organizations Reduce Polypharmacy

Aim:

By When:

Avedis Donabedian

S + P + C = O

- **Structure:** how the system of care is configured and descriptions of its components
- **Process:** how care is delivered
- **Context:** the situation in which the system exists/culture
- **Outcomes:** mortality, functional status, quality of life, and patient satisfaction

Structures

- Pharmacy and Therapeutics Committee
- Competent staff recruited and hired
- Committee for continuous improvement
- Proper preparation areas for medications
- Policies and procedures that support evidence-based care
- Training and education as appropriate
- Restrictions and monitoring of drug prescribing
- A closed loop medication process

Processes

- Ordering
  - Guidelines and protocols
  - Complete ordering process
  - Clinical Decision Support
- Preparation and distribution
  - Pharmacy Review Process
  - Preparation process: Aseptic technique and non-sterile products
  - Monitoring drug utilization and harm
- Administration and ordering
  - Standardized administration process
  - Standardized monitoring process

Outcomes

- Mortality related to adverse drug events/harm
- Morbidity related to adverse drug events/harm
- Clinical outcomes
- Quality of life
- Patient satisfaction

High-Alert Medications

- All medications have the potential to cause harm
- High-alert medications are most likely to result in significant harm to the patient, even when used as intended
- Those “that have the highest risk of causing injury when misused.”

Institute for Safe Medication Practices

What Does the Evidence Tell Us?

Warfarin and insulins caused:

- One in every seven estimated adverse drug events treated in emergency departments
- More than a quarter of all estimated hospitalizations

In the elderly, insulin, warfarin, and digoxin were implicated in:

- One in every three estimated adverse drug events treated in emergency departments
- 41.5% of estimated hospitalizations

Budnitz DS, Pollock DA, Weidenbach KN, et al. National surveillance of emergency department visits for outpatient adverse drug events. *JAMA*. 2006;296:1858-1866.

IHI Global Trigger Tool Results*

- 40 harm events per 100 admissions
- 50% medication related
- Common harm:
  - Bleeding
  - Hypotension
  - Hypoglycemia
  - Delirium,
  - Lethargy, and
  - Bradycardia

Anticoagulants
Insulin
Narcotics/Opiates
Sedatives

*http://www.ihi.org/knowledge/Pages/IHIWhitePapers/IHIGlobalTriggerToolWhitePaper.aspx

Principles of a Safe System

- Prevent errors and harm
  - Use change concepts such as simplification and standardization
- Identify (detect) and mitigate
  - Improved monitoring
  - Readily available therapies to ameliorate harm
- Patient/Family involvement

Standardization

- One process will not be appropriate for all patients
- Must allow for variation if based on patient need
- Learn from variation
- Opt out strategy

Examples of Standardization

- Standardized protocols and order sheets
- Standard concentrations and dosage strengths
- Separate look-alikes and sound-alikes by labeling, by time, and by distance.

Identification and Mitigation

- Ensure appropriate monitoring through more rapid testing of blood sugars.
- Require an independent double-check of the drug, concentration, dose, pump settings, route of administration, and patient identity before administering
- Lab results reported to someone who can take action
- Nurse driven recovery protocols
- Engaging patients and families/caregivers in identifying harm

Dynamic Risk

- Must be aware that patient conditions will change
- Patients with co-morbid conditions may be difficult to manage
- Ensure you have systems to identify emerging risks
- Ensure that you have an action plan for these situations

Role of Technology

Global Problems with Technology

- Magical thinking – It starts something like this: Let’s have technology do that.
- What does this type of thinking miss?
- Can you think of examples of magical thinking?

Technology

- Introduces its own problems
- Alert-fatigue
  - Computer alerts
  - Alarms
- Selecting wrong medication from menu
- Locked into a protocol even when do not consider medication appropriate
- Decision support not effective

Impact of CPOE?

- Cerner® is now available in all HMC Hospitals and PHCC Healthcare Centers

- CPOE can reduce serious medication errors
  - Risk reduced by almost half
  - Error rate reduced by between 40% and 12.5% [Westbrook *et al,* 2012, Radley *et al,* 2013]

What is the impact of CPOE?

- It eliminates most transcription errors
- It eliminates bad hand-writing

However..

- It can introduce novel error types
- People are still the weak link
- Reduction in morbidity/mortality still to be proven

Polypharmacy

What more can we do? Polypharmacy

- Reduce polypharmacy
- Definitions:
  - More than 5 meds
  - More than a patient can handle
- Patients more likely to experience harm with multiple medications:
  - Drug interactions
  - Therapeutic duplication
  - Too many medications to manage

Where to start?

- Elderly
  - Overmedicated
  - More sensitive to side effects
  - Known medications that should not be used
  - Medications that will not have benefit in this age group

Bitter Pill: How the Medical System is Failing the Elderly

Engage Patients and Family/Caregivers

Patient and family/caregiver contributions to medication safety

- Self-administration
- Self-monitoring/managing
- Providing appropriate education
- Coordinating among providers
- Reporting side effects and ADRs
- Medication reconciliation
- Participating in research and improvement projects
- Participating in Patient Councils

What is our role to engage patients?

- Empowering patients with information
- Helping patients gain ownership of their medical information
- Involving patients in reporting systems and processes
- Giving a human face to the problem

Medications at the Interface

(Medication Reconciliation)

Medicines at the Interface

- Build WILL – explain the “Why”
- Start with a segment of the population
- Test ideas- technology may help but is not the only answer
- Engage patients/families/caregivers
- Work across the continuum
  - Overcome “Learned helplessness”
- Develop training program - simple is better.

Outcomes

- Harm from medications
- Optimum outcomes
- Patient satisfaction

Thank You