Medication management to reduce medication errors and patient's harm

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Learning Objectives

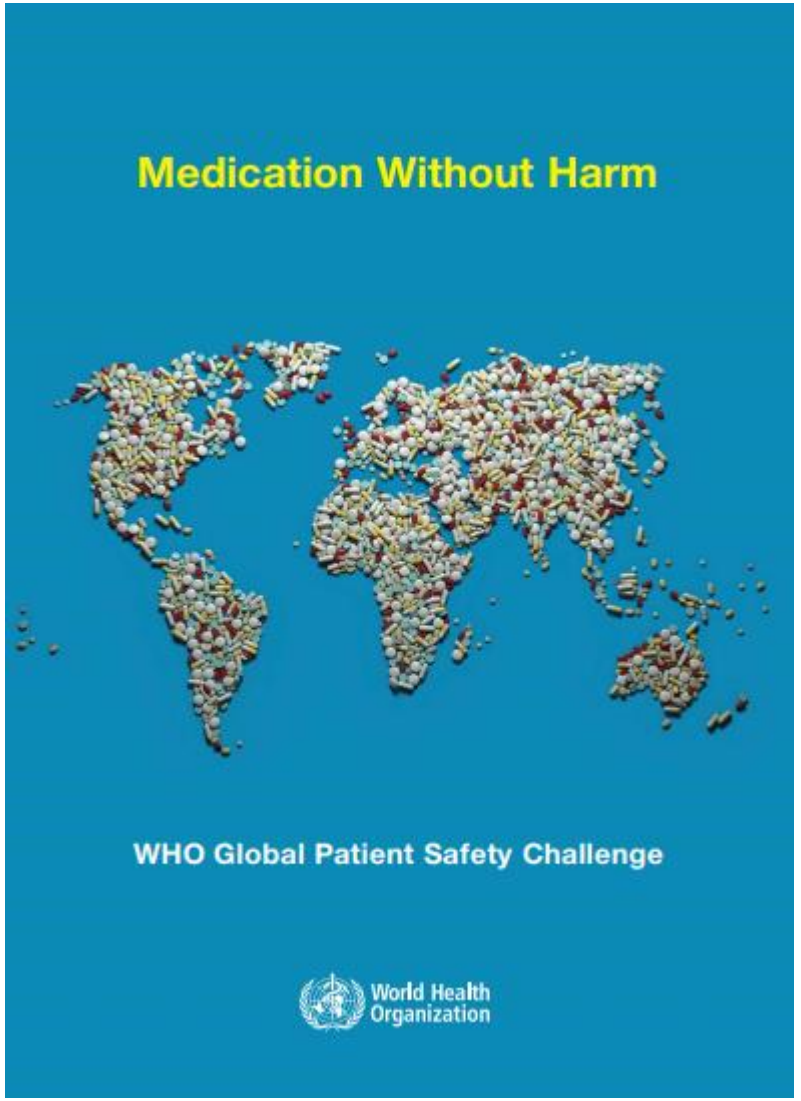
- Review medication errors across the continuum of care
- Discuss strategies to reduce medication errors and improve outcomes
- Appreciate the role of the pharmacist in medication management across the continuum of care and different practice scenarios

NPSF National Patient Safety Foundation®

CALL TO ACTION

Preventable Health Care Harm Is a Public Health Crisis and Patient Safety Requires a Coordinated Public Health Response

Magnitude	Incidence	Medications
1 in 4	**134 million**	**$42 billion**
As many as 1 in 4 patients are harmed whilst receiving primary and ambulatory health care	134 million adverse events occur each year in hospitals in LMICs, contributing to 2.6 million deaths annually due to unsafe care	Medication errors cost an estimated 42 billion USD annually



Third Global Patient Safety Challenge

- Third Global Patient Safety Challenge seeks the commitment of a range of stakeholders, including educational institutions, experts, medicines regulators, researchers, pharmaceutical companies, patient representative bodies, and professional organizations.
- **GOAL:** to reduce the level of severe, avoidable harm related to medications by 50% over 5 years, globally.

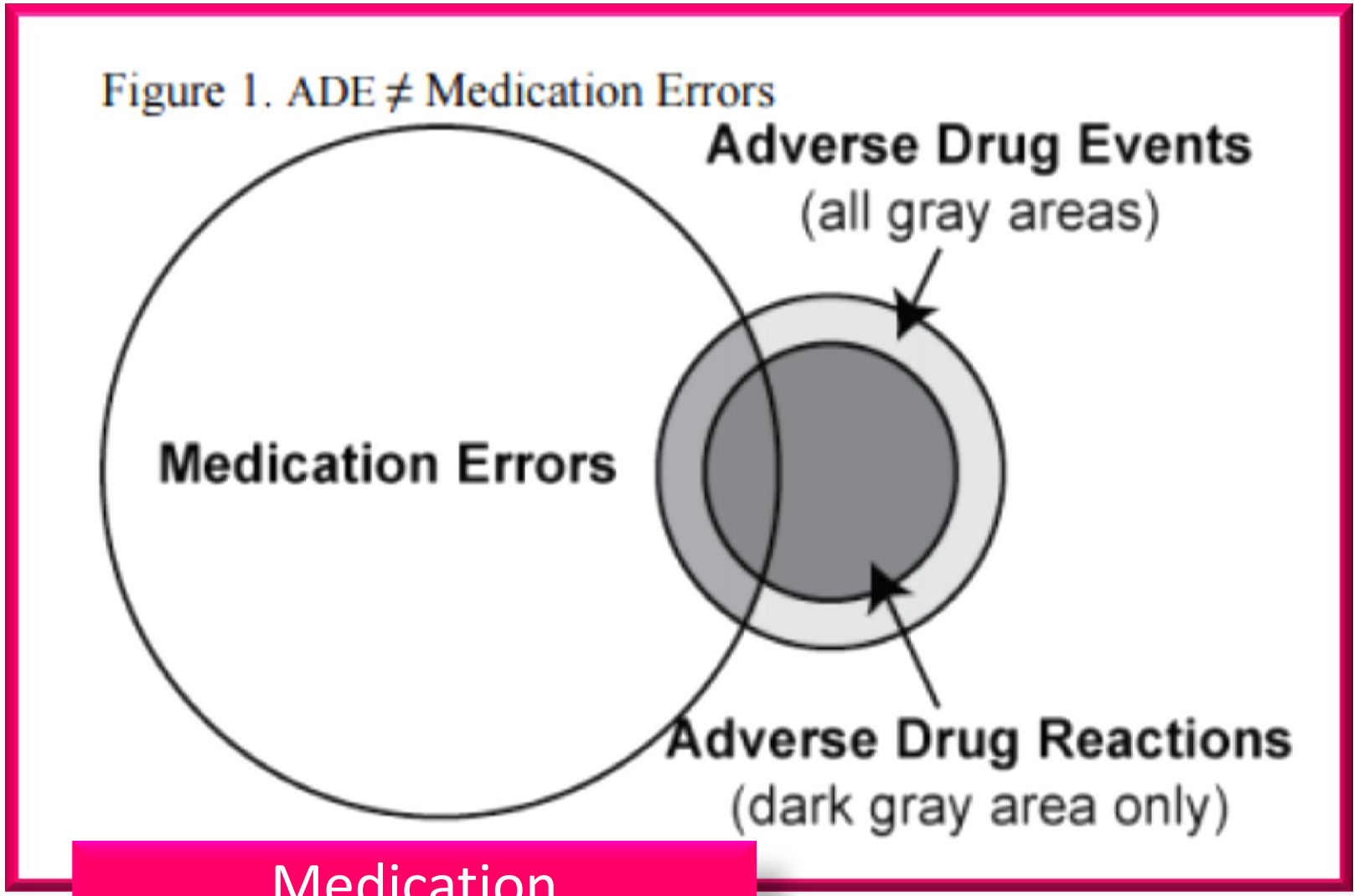
- www.thelancet.com Vol. 389 April 29, 2017

Medication Errors

"A medication error is 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.“

Organizations Involved in Patient Safety

Institute for Safe Medication Practices	www.ismp.org
Agency for Healthcare Research and Quality	www.ahrq.gov
Centers for Medicare & Medicaid Services	www.cms.gov
The Joint Commission	www.jointcommission.org
National Coordinating Council for Medication Error Reporting and Prevention	www.nccmerp.org
Institute of Medicine	www.iom.edu



Medication Misadventures

VA Center for Medication Safety, 2006

Patient Harm

- Patient safety is defined as the avoidance, prevention, and amelioration of adverse outcomes or injuries stemming from the processes of healthcare
- Patient incident is defined as any unintended event or hazardous condition resulting from the process of care, rather than due to the patient's underlying disease, that led or could have led to unintended health consequences for the patient.

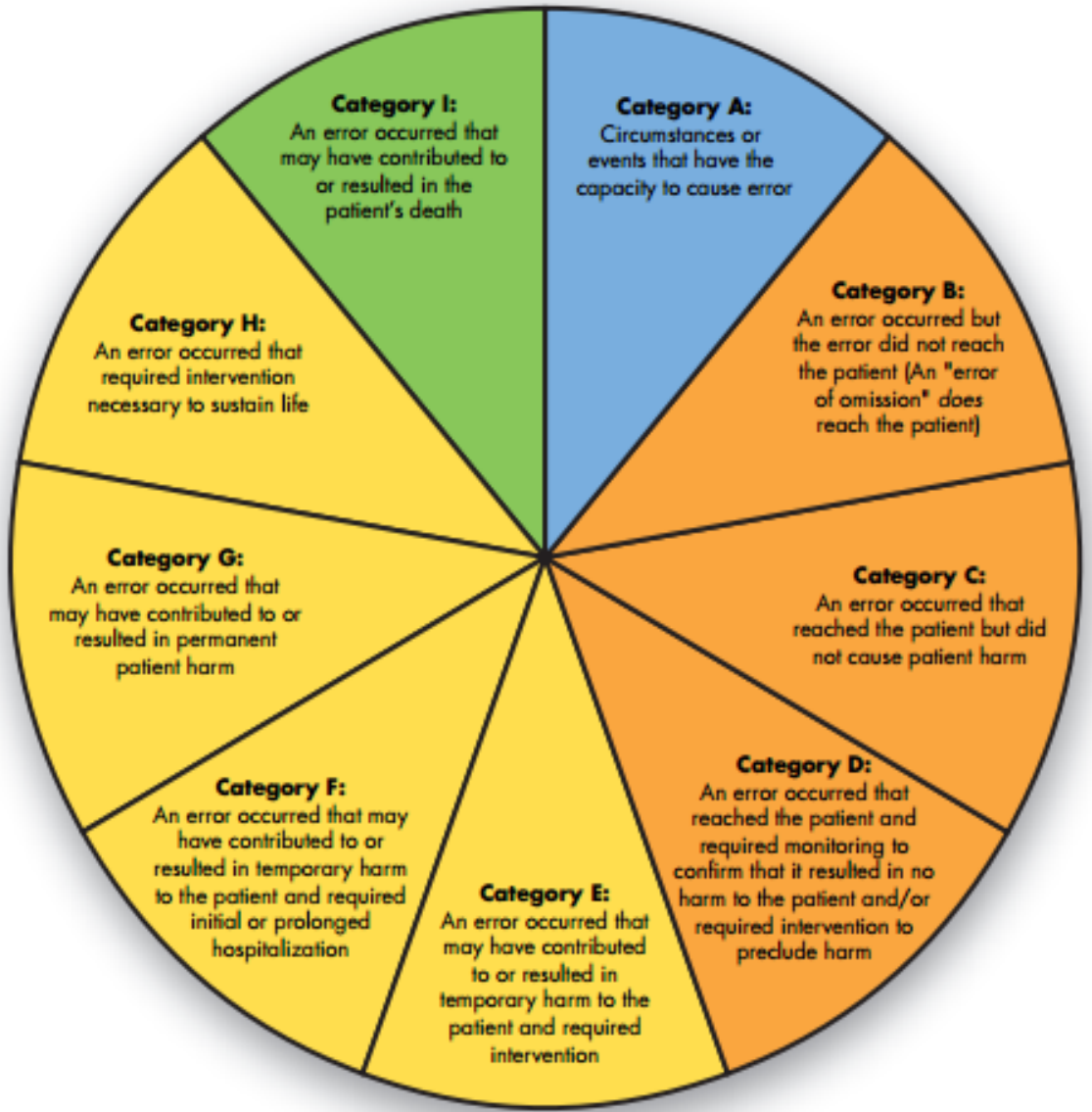
https://www.gmc-uk.org/-/media/documents/preventable-patient-harm-across-health-care-services_pdf-73538295.pdf

Patient harm

- Healthcare-associated harm is harm arising from or associated with plans or actions taken during the provision of healthcare, rather than an underlying disease or injury.
- Patient safety is the reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum.

- World Health Organization

NCC MERP Index for Categorizing Medication Errors



- No Error
- Error, No Harm
- Error, Harm
- Error, Death

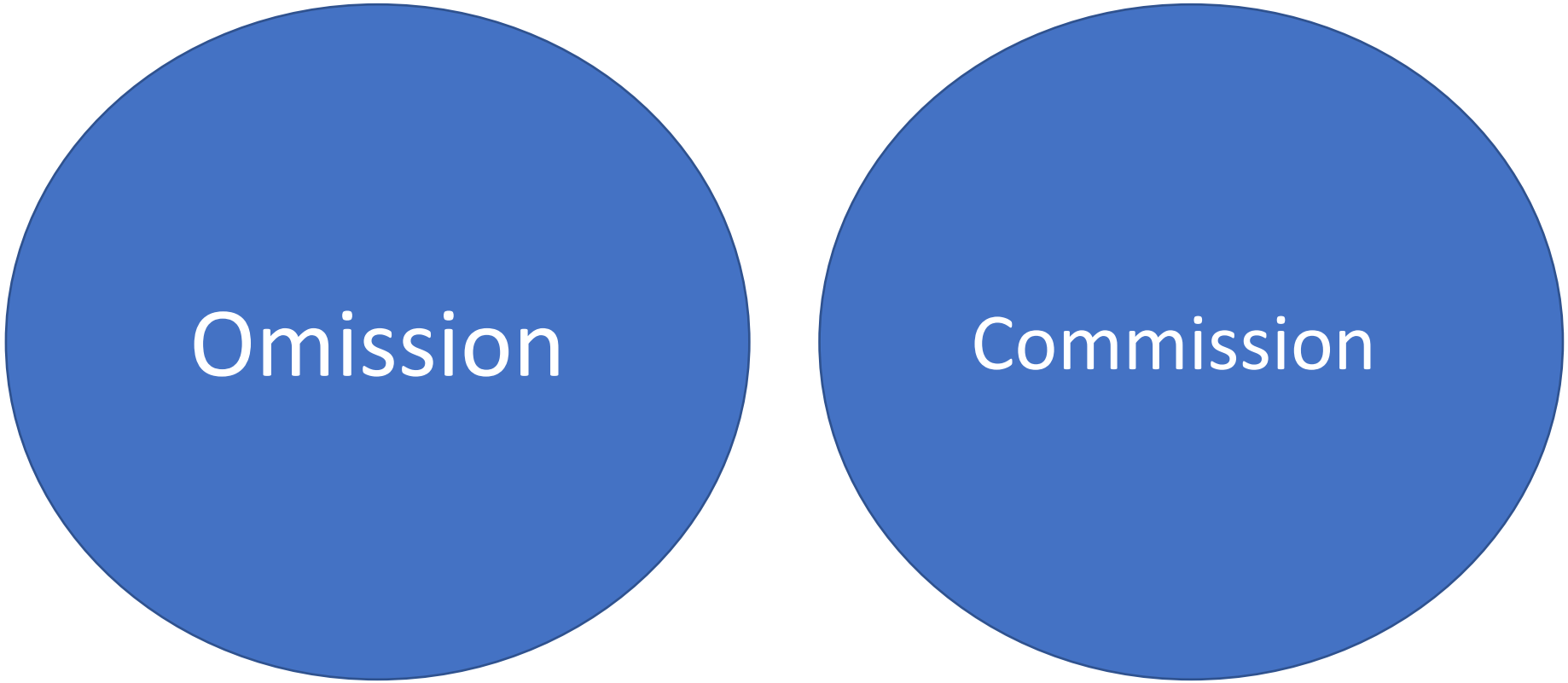
Definitions

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.)


Omission
Commission

Types of errors

1. Action-based errors- picking medication A when intending to pick medication B (slips/failures)
2. Rule-based errors- not asking for patient medication allergies (violations)
3. Knowledge-based errors- not knowing medication causes rash, being unaware of a drug interaction
4. Memory-based errors- knowing a drug must be discontinued and forgetting

Keers. 2013

Factor associated with patients

- Patient characteristics
- Complexity of clinical care: poly-pharmacy, High Risk medications, multiple health conditions

Vulnerable Populations

Blind

Parkinson

Elderly

Children and adolescents

Factor associated with work environment

- Training and experiences
- Workload and time pressures
- Distractions and interruptions
- Lack of standardized protocols and procedures
- Insufficient resources/staffing
- Issues with physical facilities (lightning, temperature and ventilation)
- Repetitive task
- Complexity of task
- Inadequate design (workflow)
- Poor oversight/supervision
- Errors in medicines supply

Factors associated with information systems

- Difficult process for generating first prescription
- Difficult process for generating refill
- Lack of accuracy in patient records
- Inadequate design that allows foe human error

Technology Related Problems/Risk

- Hybrid paper-electronic form
- Downtime
- Poor implementation
- Lack of user training
- Incorrect CPOE use

Technology has not reduced the risk
Report shows errors occurred in every step of the medication use

11.6% of free texting or medication order describing when to hold or DC where ignored.

Pennsylvania Safety Authority Report, 2016

Recetas electrónicas

- Errores provienen mayormente de la omisión de información
- Confianza en el sistema y creencia es más seguro ya que la receta proviene de un sistema electrónico
- Falta de conocimiento en el sistema de recetas electrónicas.
- Alerta Evento Centinela, marzo-2015

Factors associated with medicines

- Name
- Labeling and packaging

Medication Management standard MM.01.02.01

EP 1: The hospital develops a list of look-alike/sound-alike medications it stores, dispenses, or administers.

Look-alike/sound-alike medications list is the Institute for Safe Medication Practices website

Factor of Related to HCP

- Lack of therapeutic training
- Inadequate drug knowledge and experience
- Inadequate knowledge of the patient
- Overworked or fatigue HCP
- Physical and emotional issues
- Poor communication between HCP and with patients

Medication Errors Across the Continuum of Care

Continuum of care

- **Continuum of Care** is a concept involving a system that guides and tracks patients over time through a comprehensive array of health services spanning all levels and intensity of care.
- May refer to care provided from birth to end of life.
- Healthcare services are provided for all levels and stages of care.
    - *Health Information and Management System Society*

Types and settings of healthcare services connected through the Continuum of Care

- Acute healthcare services
- Hospitals
- Emergency departments
- Inpatient services
- Outpatient services
- Urgent care
- Physician practices
- Long-term care
- Assisted living
- Skilled nursing facilities
- Rehabilitation centers
- Visiting nurse services
- Hospices / Palliative care
- Behavioral health
- Wellness care
- Government / Public health services
- Care management
- Research
- Home care
- Homeless patients (street or shelter)
- Domestic travel
- International travel

Nursing Home

Table 6: Percentage of Preventable Adverse and Temporary Harm Events by Clinical Category

Types of Adverse and Temporary Harm Events	Percentage of Preventable Adverse and Temporary Harm Events (n = 155)
Events Related to Medication	66%
Events Related to Resident Care	57%
Events Related to Infections	52%

Source: OIG analysis of SNF stays for 653 Medicare beneficiaries discharged in August 2011.

- 21,777 post-acute Medicare SNF residents experienced at least 1 adverse event during stays
- 37% of all the adverse events were related to medications

Table 4: Temporary Harm Events Identified Among SNF Residents by Category

Types of Temporary Harm Events	Percentage*
Events Related to Medication	**43%**
• Hypoglycemic episodes (e.g., low or significant drop in blood glucose)	16%
• Fall or other trauma with injury associated with medication	9%
• Medication-induced delirium or other change in mental status	7%
• Thrush and other nonsurgical infections related to medication	4%
• Allergic reactions to medications (e.g., rash, itching)	3%
• Other medication events	3%
Events Related to Resident Care	**40%**
• Pressure ulcers	19%
• Fall or other trauma with injury associated with resident care	8%
• Skin tear, abrasion, or breakdown	7%
• Other resident care events	6%
Events Related to Infections	**17%**
• CAUTI	5%
• SSI associated with wound care	5%
• Other infection events	7%
Total	**100%**

*The percentages for conditions listed within the clinical categories do not sum to 100 percent because of rounding.
See Appendix D for percentage estimates and confidence intervals.
See Appendix F for a complete listing of all temporary harm events identified by the reviewers.
Source: OIG analysis of SNF stays for 653 Medicare beneficiaries discharged in August 2011.

Nursing Homes

- Care-home residents are at high risk: multi-morbidity (3-4 conditions) , poly-pharmacy (8 prescriptions)

- Medication errors occurred in two-thirds of residents, and prescribing errors, as defined by Dean et al, occurred in 39.1%.

- The most common types of prescribing errors seen in this cohort were “incomplete information” (no route or dose specified) at 37.9%, “unnecessary drug” at 23.5%, “dose error” at 14.4%, and “omission errors” at 11.8%.

Lavan, 2016

Medication Error at the Hospital

- Medication administration errors leading to death are common with anticoagulants and antibiotics in particular
- Incidents resulting in death were most often reported on hospital wards (66%) and in patients aged over 75 years.

- Almost one third of MAEs were omissions of a medication or ingredient (31.4%; n = 72), followed by administration of a wrong dose or at the wrong strength (10.5%; n = 24).

- The drug groups most commonly associated with administration errors were cardiovascular drugs, drugs impacting on the nervous system and drugs for treating infections.

- The individual drugs most commonly associated with administration errors, on the other hand, were injectable anticoagulants, antibiotics and analgesics.

Nurses

- Inadequate knowledge of medication in nurses is recognized as a contributor to ME
- Inadequate training in clinical pharmacology
- Limited knowledge in High alert medications (cardiovascular and electrolytes)

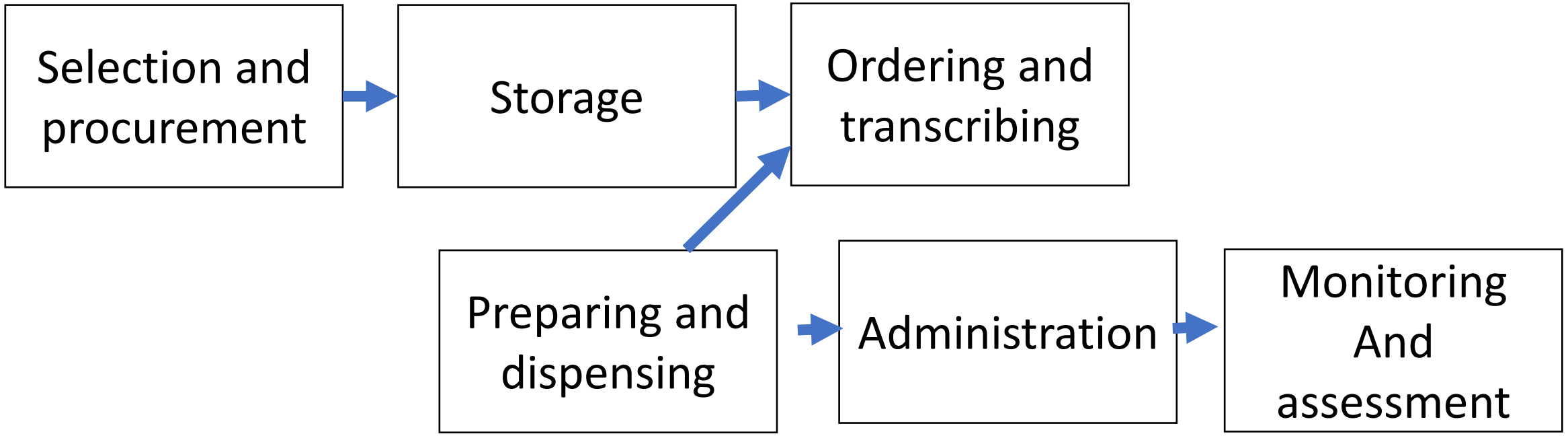
Keers' 2013

Patients harm caused by not discontinuing drugs.

- Patients given haloperidol, olanzapine, quetiapine, ziprasidone, aripiprazole or risperidone were followed for continuation of their medication after transfer or discharge
- Of the 30 patients included in this pilot study, “more than half [57%] were continued on therapy from the ICU to hospital discharge,”
- Robert Wood Johnson University Hospital, in New Brunswick, N.J.
- 2018 PADIS Clinical Practice Guideline

When ME's Happen?

Medication Use Process



Fox, Brent I., and Mark H. Siska.. "MANAGING MEDICATION USE PROCESS SUPPORTING TECHNOLOGIES AND AUTOMATION." *Pharmacy Management: Essentials for All Practice Settings, 4e* Eds. David P. Zgarrick, et al. New York, NY: McGraw-Hill

Types of Errors (ASHP/ NCC MERP)

- Prescribing error
- Omission error
- Wrong time error (time, rate, duration)
- Improper dose error (strength, concentration)
- Wrong dosage form error
- Wrong drug preparation error (splitting, compounding, calculation)
- Wrong administration error
- Deteriorated drug
- Monitoring error
- Compliance error
- Other: incorrect patient action

High Risk Processes

- Compounding
- Adherence packaging
- Immunization vaccine errors

Errors during Immunization

- MEDMARX data base error reporting
- Pediatric patient 2003-2006
- Errors occur mostly at administration (70%)
- Wrong drug, extra dose, improper dose or quantity
- Types of vaccination errors observed in children are predictable (and preventable), based on vaccine- and patient-related human factors.

Bundy DG, Shore AD, Morlock LL, Miller MR. Pediatric vaccination errors: Application of the “5 Rights” framework to a national error reporting database. Vaccine, 2009; 27(29): 3890-3896.

Errors during Immunization

Immunization Action Coalition - Reported Errors (2015-2016)

- Wrong interval
- Wrong vaccine
- Wrong dose
- Extra dose

VERP database (2012-2016)

- Influenza vaccines was the most frequently involved, followed by zoster and pneumococcal vaccines.
- Medical clinics were the setting that reported the most errors (33%) while community pharmacy was one of the least (2%).

Horn, D. (2017)

Vaccines Mostly Involved in Errors

- Influenza (IIV3, IIV4, RIV3, ccIIV3, or LAIV4)
- Hepatitis A (HepA)
- Tetanus toxoid, reduced diphtheria toxoid, acellular pertussis adsorbed (Tdap)
- Human papillomavirus, recombinant (4vHPV, 2vHPV)
- Diphtheria and tetanus toxoids, and acellular pertussis adsorbed (DTaP)
- Measles, mumps, rubella, and varicella (MMRV)
- Hepatitis B (HepB)

https://www.ismp.org/resources/recommendations-practitioners-prevent-vaccine-errors-part-2-analysis-ismp-vaccine-errors

Vaccines most frequently cited in reports for Community Pharmacies (2%)

- Influenza
- Zoster
- Pneumococcal 13
- Pneumococcal 23

Clinics (33%) and Physicians offices (25%) of errors reported

Horn, 2017

Strategies to reduce medication errors and improve outcomes

Medicines at home

- National Health and Nutrition Examination Survey between 2003 and 2014.
- Children and adolescents use prescription drugs concurrently
- Risk for serious drug–drug interactions (DDIs), 7.5%
- More than 8% may develop serious DDIs

Pediatrics 2018;142[3]:e20181042).

Oral Liquids

- Institute of Safe Medication Practices has recommended to cease translating ml to households measures and to cease using both mL and households measures.
- Eliminate the use of pounds in medication labeling.
- Eliminate cups with teaspoon or drams scale
- Pharmacist should adopt the metric system (mL) as the standard.
- Patient weights should be measured and expressed in kilograms, not pounds, to ensure proper dosing
- Pharmacist must provide appropriate device and use “teach back” to confirm understanding.

- ISMP, 2011

1. Commonly used dosing cup
rchaic measurement scale
ich has been confused
uld hav

Acetaminophen

- There is lack of knowledge among acetaminophen users about what medications contain acetaminophen and how to use them (maximum one time dose, intervals)

Acetaminophen: How much can you safely recommend?			
	325 mg IR	500 mg IR	650 mg ER
How many tablets/capsules at a time?	1 or 2	1 or 2	1 or 2
To take how often?	Every 4 to 6 hours	Every 4 to 6 hours	Every 8 hours
Safest maximum daily dose for most adults	8 tablets/capsules	6 tablets/capsules	4 tablets/capsules
Never take more than this in a 24-hour period	12 tablets/capsules (3,900 mg)	8 tablets/capsules (4,000 mg)	6 tablets/capsules (3,900 mg)

Kelly, et al. 2018

Note: The maximum daily dose for a healthy adult who weighs at least 150 pounds is 4,000 mg. However, in some people, taking the maximum daily dose for extended periods can seriously damage the liver. It's best to recommend the lowest dose necessary and to stay closer to 3,000 mg/d as the maximum dose. If patients require higher doses of acetaminophen for chronic pain, suggest that they consult providers first.

Elderly Patient

Absorption
- ↓ Saliva secretion
- ↑ Gastric pH
- ↓ Gastric acid secretion
- ↑ Gastric emptying time
- ↓ Gastric surface area
- ↓ Gastrointestinal motility
- ↓ Active transport mechanisms

Distribution
- ↓ Cardiac output
- ↑ Peripheral vascular resistance
- ↓ Hepatic blood flow
- ↓ Renal blood flow
- ↓ Body water content
- ↑ Adipose tissue
- ↓ Serum albumin
- ↑ Distribution for lipid-soluble drugs
- ↓ Distribution for water-soluble drugs

Metabolic
- ↓ Microsomal hepatic oxidation
- ↓ Clearance
- ↑ Steady-state levels
- ↑ Half-lives
- ↑ Levels of active metabolites
- ↓ First-pass metabolism

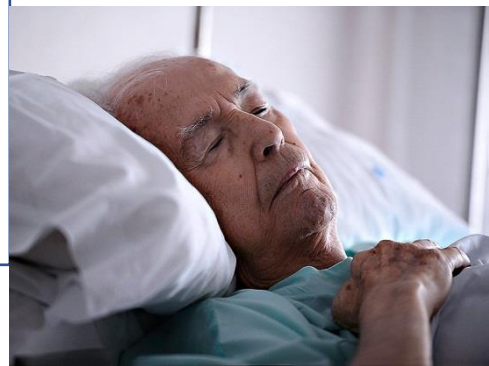
Excretion
- ↓ Renal perfusion
- ↓ Renal size
- ↓ Glomerular filtration rate
- ↓ Tubular secretion
- ↓ Tubular reabsorption excretion

Lavan, et al 2016

Patient knowledge on their medication.

Patient ability to communicate about their medication.

Patient honesty about their medication taking.



Medication Reconciliation (MR)

- “A process of identifying the most accurate list (best possible medication history) of all medications a patient is taking… and using this list to provide correct medications for patients anywhere within the health system.” Institute for Healthcare Improvement
- Most prescribing errors occur at the time of admission to hospital. For this reason.
- MR is advisable in older people at the point of entry to hospital or discharge or patients using high-risk medications.

Medication Reconciliation

Four steps:

- Verification of all drugs, both prescription and nonprescription, currently being taken
- Clarification/evaluation of each drug for appropriateness
- Reconciliation of the new complete drug list with the previous drug list
- Documentation of all medication changes and reasons for changes

At a minimum MR refers to collection of the BPMH and correction of unintended discrepancies on every admission-discharge. (home to hospital, hospital to nursing home, inpatient transfer).

Pharmacist Impact

- Clinical pharmacists corrected 176/904 (19.5%) discrepancies at admission and 86/865 (9.9%) at discharge.
- More than half of ME were omissions.
- Diabetic patients were more affected by ME than non-diabetic patients, both at admission and at discharge.

Cyril Breuker et al. , 2017

- Number of unintended discrepancies of clinical significance where 34% (28-49).

Kawn, et al,. 2013

- Pharmacist have contributed to reduce adverse events, hospitalization, and mortality.

Components of MR

- **Taking and documenting an accurate preadmission medication history**
- Using that history to order medications in the hospital
- Using preadmission and current inpatient medications to produce discharge medication orders
- Documenting and communicating discharge medication regimen to patient/caregiver and next provider(s) of care

At Discharge

- Period following hospital discharge is a vulnerable time
  - Multiple medication changes
  - Rushed event, inadequate patient education
  - Discontinuity of care, inadequate follow-up
- Result are potentially harmful medication discrepancies
  - Unexplained differences among documented regimens across different sites of care that have potential for patient harm

Potentially Inappropriate Medications (PIM)

- Risk > Benefit
- Over-prescribing
  - Excessive doses/duration of medicines
  - Polypharmacy
- Mis-prescribing
  - Unfavourable choice of medicine, dose, or duration
- Under-prescribing
  - Not prescribing a clinically indicated medicine, despite the patient not having any contra-indication to that medicine

STOPP

- A tool to identify potentially inappropriate medicines (PIMs) in older people.
- Review help patient be less likely to experience an adverse drug reaction or a medication-related hospital admission.
- https://www.pharmaceutical-journal.com/research/research-article/integrated-strategies-will-work-best/11090955.article?firstPass=false
- https://www.pcne.org/upload/ms2011d/Presentations/Ryan%20pres.pdf

Medication Appropriateness Index

1	Is there an indication for the drug?
2	Is the medication effective for the condition?
3	Is the dosage correct?
4	Are the directions correct?
5	Are the directions practical?
6	Are there clinically significant drug–drug interactions?
7	Are there clinically significant drug–disease interactions?
8	Is there unnecessary duplication with other drugs?
9	Is the duration of therapy acceptable?
10	Is this drug the least expensive alternative compared to others of equal utility?

Bulloch, 2014

Beers Criteria List

- Contains lists of potentially inappropriate medications to be avoided in older adults. Last revision 2015
- 2018 Draft
- Two draft lists detail potentially inappropriate medications for most older adults or for those with specific health conditions;
- One draft list describes certain medications that should be used only with considerable caution;
- One draft list details specific medication combinations that may lead to harmful “drug-drug” interactions; and
- A final draft list describes certain medications that should be avoided or dosed differently for older people with poor kidney function.

http://www.ospdocs.com/resources/uploads/files/Pocket%20Guide%20to%202015%20Beers%20Criteria.pdf

Antibiotic Stewardship

- 20-50% of all antibiotics prescribed in U.S. acute care hospitals are either unnecessary or inappropriate.
- A proportion of antibiotics prescribed for acute care in hospitals are either unnecessary or inappropriate. Inappropriate use of antibiotic potentially expose patients to risks for complications and increase health care cost.

- The primary goal of antibiotic stewardship is to optimize outcomes while minimizing the unintended consequences. A secondary goal is reducing healthcare costs without adversely affecting the quality of care.

CDC. Core elements of hospital antibiotic stewardship programs, 2016.

Pharmacist-driven Interventions in AS

- Automatic changes from intravenous to oral antibiotic therapy
- Dose adjustments
- Dose optimization
- Automatic alerts in situations where therapy might be unnecessarily duplicative
- Time-sensitive automatic stop orders
- Detection and prevention of antibiotic-related drug-drug interactions

Antimicrobial Stewardship

- Community-acquired pneumonia.
- Urinary tract infections (UTIs).
- Skin and soft tissue infections
- Methicillin-resistant *Staphylococcus aureus* (MRSA) infections
- Mycobacterium tubercullosis
- *Clostridium difficile* infections.
- Invasive infections

Patients harm- inappropriate use of antibiotics

AS and the community pharmacy

- Educating patients and parents about properly taking antibiotics and the potential harms of antibiotic use, including antibiotic resistance and adverse drug events
- Serving as the final healthcare provider to see a patient before an antibiotic is dispensed
- Providing guidance for symptom relief for common infections which do not require an antibiotic
- Promoting available vaccines

Opiods

Promoting Patient Care and Safety

THE US OPIOID OVERDOSE EPIDEMIC

The United States is in the midst of an epidemic of prescription opioid overdoses. The amount of opioids prescribed and sold in the US quadrupled since 1999, but the overall amount of pain reported by Americans hasn't changed. This epidemic is devastating American lives, families, and communities.

More than 40 people die every day from overdoses involving prescription opioids.[1]

Since 1999, there have been over 165,000 deaths from overdose related to prescription opioids.[1]

4.3 million Americans engaged in non-medical use of prescription opioids in the last month.[2]

https://www.cdc.gov/drugoverdose/pdf/guidelines_at-a-glance-a.pdf

Opioid Use Disorder (OUD)

- 21-29% of the patient prescribed opioid misuse them
- There is a strong relationship between initial exposure and future likelihood for long-term use.

Opioid Use Disorder

- Community pharmacy
- Can assess risk of developing opioid use disorder (OUD)
- Provide access to pain management, and at the same time,
- Ensure prescription and patient legitimacy

Risk Index for Overdose or Opioid induced

Pharmacist evaluation of Risk for Opioid abuse, OUD, diversion

CDC Guidelines for Prescribing Opiois

- Opioids are not first-line therapy. Clinicians should consider opioid therapy only if expected benefits for both pain and function are anticipated to outweigh risks to the patient. If opioids are used, they should be combined with non-pharmacologic therapy and non-opioid pharmacologic therapy, as appropriate.
- Establish goals for pain and function.
- Discuss risks and benefits, both before starting, and periodically during, opioid therapy.
- Use immediate-release opioids when starting.
- Use the lowest effective dose.
- Prescribe short durations for acute pain.
- Evaluate benefits and harms frequently. The first evaluation should be done within 1-4 weeks after starting opioid therapy, and at least every three months thereafter.

CDC Guidelines for Prescribing Opioids

- Use strategies to mitigate risk, including considering offering naloxone when factors that increase risk for opioid overdose, such as history of overdose, history of substance use disorder, higher opioid dosages, or concurrent benzodiazepine use, are present.
- Review prescription drug monitoring program (PDMP) data to determine whether the patient is receiving opioid dosages or dangerous combinations that put him or her at a high risk for overdose. Clinicians should review the PDMP data when starting opioid therapy and at least every three months, sometimes more often.
- Use urine drug testing.
- Avoid concurrent opioid and benzodiazepine prescribing.
- Offer treatment for opioid use disorder.

CARA, PMP and CMS Clinical Guidelines

Opioid Use Risk Criteria

1) use of opioids with an average daily Morphine Equivalent Dosing (MME) greater than or equal to 90 mg for any duration during the most recent six months and either

2) four or more opioid prescribers and four or more opioid dispensing pharmacies OR

3) six or more opioid prescribers, regardless of the number of opioid dispensing pharmacies.

Equianalgesic dosing dosing

Opioid	Oral dose	I.V.dose
Morphine	30	10
Codeine	200	100
Hydromorphone	7.5	1.5
Fentanyl	n/a	0.1
Oxycodone	20	n/a
Methadone	n/a	n/a
Levorphanol	2	n/a
Oxymorphone	10	1
Tramadol	120	100
Tapentadol	100	n/a

Brushwood, 2010

Benzodiazepine Taper

- National Institute on Drug Abuse, the number of overdose deaths involving a benzodiazepine increased from 1135 in 1999 to 8791 in 2015.
- Three quarters of the deaths involving a benzodiazepine also involved an opioid.

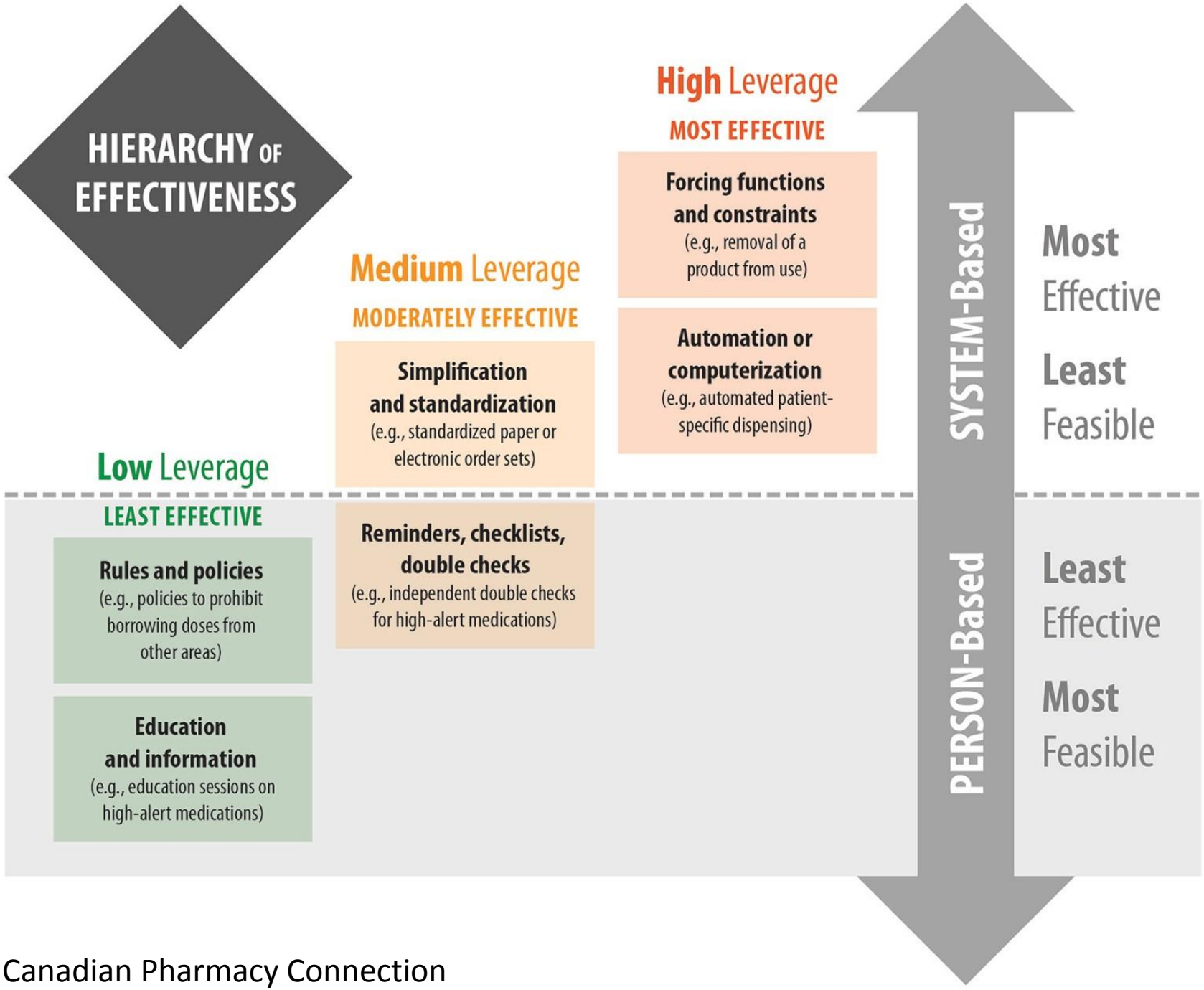
Managing Behavior

Principles of Safe Patient Care

- Culture of Safety
- Achieving Effective Communication and Teamwork
- Engagement & Empowerment
- Moving from Blame to Accountability
- Managing Behavior

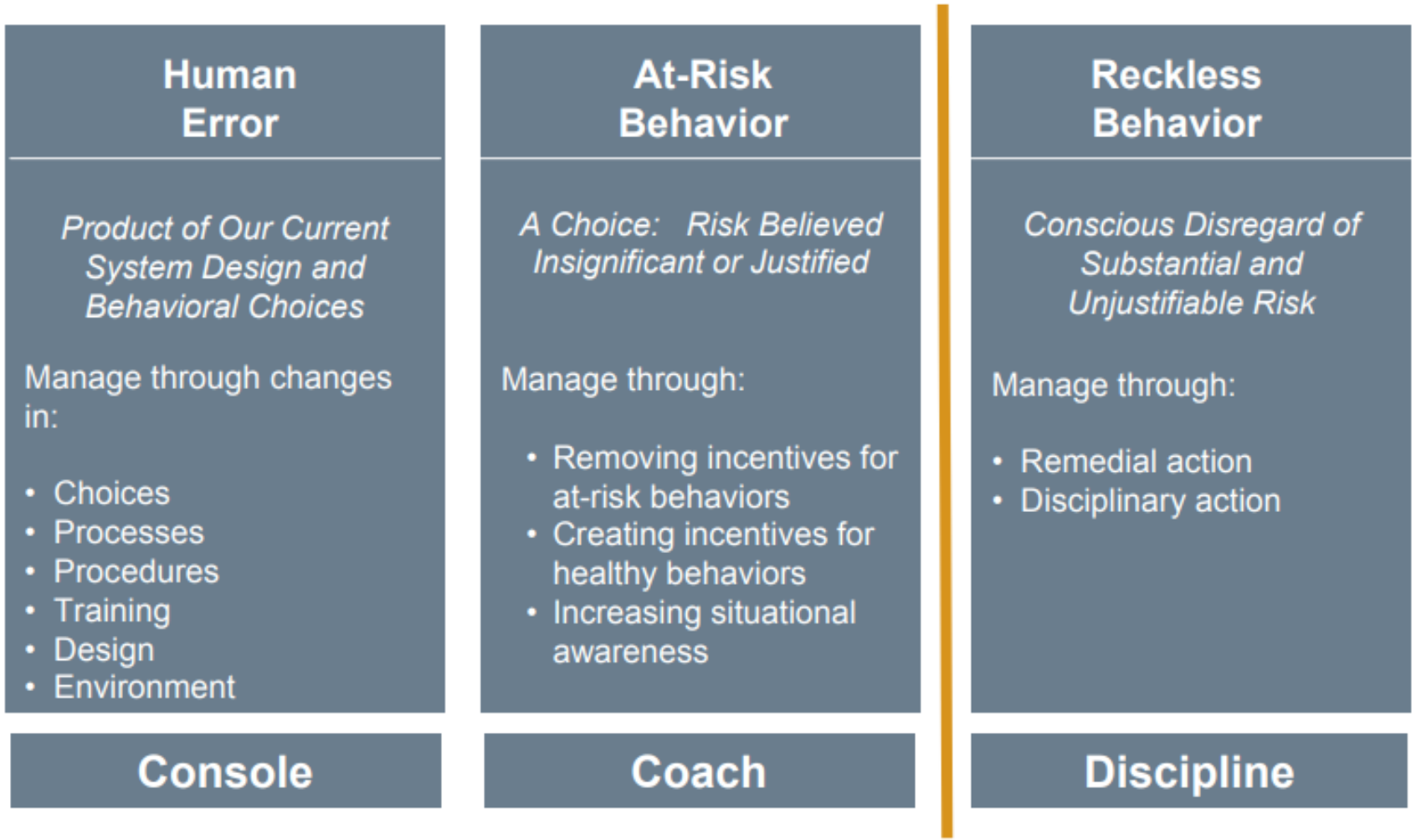
Behavior choices

- Human error - inadvertent action; inadvertently doing other that what should have been done; slip, lapse, mistake.
- At-risk behavior – behavioral choice that increases risk where risk is not recognized or is mistakenly believed to be justified.
- Reckless behavior - behavioral choice to consciously disregard a substantial and unjustifiable risk

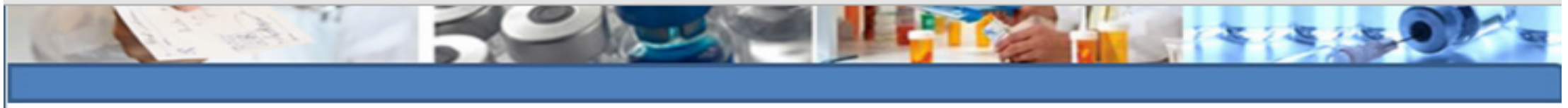


Boucher et al, 2018. Canadian Pharmacy Connection

The Three Behaviors



Documenting Medication Errors to Improve Safety



ISMP National Medication Errors Reporting Program

Thank you for your willingness to report to the ISMP National Medication Errors Reporting Program (MERP). When reporting an error or hazard:

- Tell us the story of what went wrong or could go wrong, the causes or contributing factors, how the event or condition was discovered or intercepted, and the actual or potential outcome of the involved patient(s).
- Be sure to include the names, dosage forms, and dose/strength of all involved products. For product-specific concerns (e.g., labeling and packaging risks), please include the manufacturer.
- Share your recommendations for error prevention.
- If possible, submit associated materials (e.g., photographs of products, containers, labels, de-identified prescription orders) that help support the report being submitted.

Please complete the form below and click on the "Submit" button to report the error or hazard to the ISMP National Medication Errors Reporting Program.

Name: (optional)

Email:

Confirm email:

Error Description: Please describe the incident as best you can. This information will be handled in confidence.

Upload Images (optional) Select

Up to three images can be uploaded, Input area will appear after each image is selected up to 3.

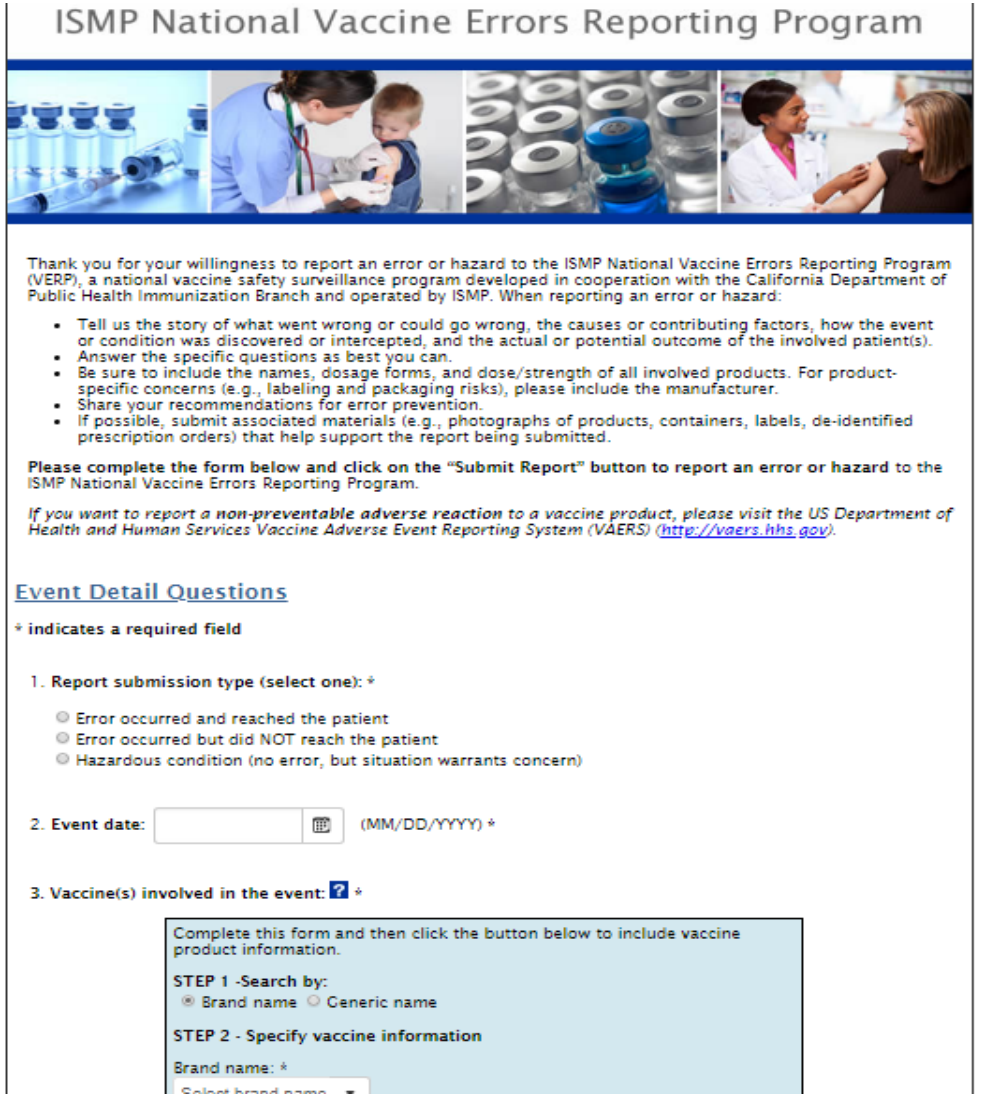
Submit

ISMP.org

Vaccine Errors Reporting Program (VERP)

- Established in 2012
- Institute for Safe Medication Practices (ISMP) and California Department of Public Health

http://verp.ismp.org/



ISMP National Vaccine Errors Reporting Program

Thank you for your willingness to report an error or hazard to the ISMP National Vaccine Errors Reporting Program (VERP), a national vaccine safety surveillance program developed in cooperation with the California Department of Public Health Immunization Branch and operated by ISMP. When reporting an error or hazard:

- Tell us the story of what went wrong or could go wrong, the causes or contributing factors, how the event or condition was discovered or intercepted, and the actual or potential outcome of the involved patient(s).
- Answer the specific questions as best you can.
- Be sure to include the names, dosage forms, and dose/strength of all involved products. For product-specific concerns (e.g., labeling and packaging risks), please include the manufacturer.
- Share your recommendations for error prevention.
- If possible, submit associated materials (e.g., photographs of products, containers, labels, de-identified prescription orders) that help support the report being submitted.

Please complete the form below and click on the "Submit Report" button to report an error or hazard to the ISMP National Vaccine Errors Reporting Program.

If you want to report a non-preventable adverse reaction to a vaccine product, please visit the US Department of Health and Human Services Vaccine Adverse Event Reporting System (VAERS) (http://vaers.hhs.gov).

Event Detail Questions

* indicates a required field

1. **Report submission type (select one):** *

- Error occurred and reached the patient
- Error occurred but did NOT reach the patient
- Hazardous condition (no error, but situation warrants concern)

2. **Event date:** (MM/DD/YYYY) *

3. **Vaccine(s) involved in the event:** *

Complete this form and then click the button below to include vaccine product information.

STEP 1 -Search by:

Brand name Generic name

STEP 2 - Specify vaccine information

Brand name: *

* indicates a required field

1. Report submission type (select one): *

- Error occurred and reached the patient
- Error occurred but did NOT reach the patient
- Hazardous condition (no error, but situation warrants concern)

2. Event date: (MM/DD/YYYY) *

3. Vaccine(s) involved in the event: *

Complete this form and then click the button below to include vaccine product information.

STEP 1 -Search by:
Brand name Generic name

STEP 2 - Specify vaccine information

Brand name: *
Select brand name

Generic name: *
Select Generic name

Manufacturer: *
Select Manufacturer name

FDA.gov

Dosage (optional):

Lot# (optional):

Expiration date (optional):

NDC (optional):

STEP 3 - Click button to include vaccine with report

Include above vaccine information with report

Vaccines included with this report

Brand name	Generic name	Manufacturer	
No Vaccines have been added			

Conclusion

- Regardless of the many advances to increase patient safety and reduce harm ME and ADE persists.
- To err is human.
- Pharmacists are in the front line on medication management
- Safe medication use requires an integrated approach.

References

- Breuker, Cyril et al. Patients with diabetes are at high risk of serious medication errors at hospital: Interest of clinical pharmacist intervention to improve healthcare. European Journal of Internal Medicine , Volume 38 , 38 – 45.
- Bulloch, Marilyn N. and Jacqueline L Olin. “Instruments for evaluating medication use and prescribing in older adults.” *Journal of the American Pharmacists Association : JAPhA* 54 5 (2014): 530-7.
- Crea, Kathryn A.. "Medication Misadventures II: Medication and Patient Safety." *Drug Information: A Guide for Pharmacists, 6e* Eds. Patrick M. Malone, et al. New York, NY: McGraw-Hill.
- Harkanen, M. Medication administration errors and mortality: Incidents reported in England and Wales between 2007–2016. Available online Research in Social and Administrative Pharmacy
- Hadlandsmyth, K, et al. Associations between initial opioid exposure and the likelihood for long-term use. Journal of the American Pharmacists Association. 2019; 59(1), 17 – 22.
- Herndon, CM. Balancing risk and access to opioid: the pharmacist’s role. Pharmacy Today. 2017; 23(4), 63-74.
- Institute of Safe Medication Practices. https://www.ismp.org/resources/safety-enhancements-every-hospital-must-consider-wake-another-tragic-neuromuscular

Refernces

- Keers,RN, Williams, SD, et al. Causes of medication administration errors in hospitals: a systematic review of quantitative and qualitative evidence. Drug Saf, 36 (2013), pp. 1045-1067
- Kwan JL, Lo L, Sampson M, Shojania KG. Medication reconciliation during transitions of care as a patient safety strategy: a systematic review. Annals of Internal Medicine 2013; 158(5 Part 2): 397-403.
- Lavan AH, Gallagher PF, O'Mahony D. Methods to reduce prescribing errors in elderly patients with multimorbidity. *Clin Interv Aging*. 2016;11:857-66. Published 2016 Jun 23. doi:10.2147/CIA.S80280
- Word Health Organization. J.K. Aronson; Medication errors: what they are, how they happen, and how to avoid them, *QJM: An International Journal of Medicine*, Volume 102, Issue 8, 1 August 2009, Pages 513–521, https://doi.org/10.1093/qjmed/hcp052
- WHO. Medication Without Harm. WHO's third global patient safety challenge http://www.who.int/patientsafety/medication-safety/en/2018

  Accessed 6th Jun 2018.
- https://www.ismp.org/resources/safety-enhancements-every-hospital-must-consider-wake-another-tragic-neuromuscular
- *Knowledge of dosing directions among current users of acetaminophen-containing medications. Am Pharm Assoc.* 2018; 58: 499–504