

8- Patient Safety

- Done by: Ali Omar, Hatem Alndah, Moayad ahmed and Abdullah Almunyif
- Team leader: Moaid Alyousef
- Revised by: Basel almeflh
- References: 436 Doctor's Slides and notes , E.H. Shortliffe and Marsden

Content

- Medical informatics
- Patient safety definitions, imperatives and current issues
- Medical errors and adverse events
- Error types
- Human errors
- The impact of health informatics on patient safety
- CPOE Benefits



This slide from doctor's slides



This slide from the book

Color index

- Doctor's notes
- Extra information and further explanation
- Important
- Main titles
- Subtitles

Medical informatics



"Medical informatics is a rapidly developing scientific field that deals with the storage, retrieval, and optimal use of biomedical information, data, and knowledge for problem solving and decision making."

Blois, M.S., and E.H. Shortliffe. in Medical Informatics: Computer Applications in Health Care, 1990, p. 20.

"Medical informatics is the application of computers, communications and information technology and systems to all fields of medicine - medical care, medical education and medical research."

definition by MF Collen (MEDINFO '80, Tokyo, later extended

Define SAFETY in healthcare?

Patient Safety defined as; The prevention of **errors** and **adverse effects** to patients associated with health care. world health organization.

Freedom from accidental injury due to medical care, or medical errors. IOM, 2000

The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare. Vincent, 2011



Errors vs. Adverse Effects

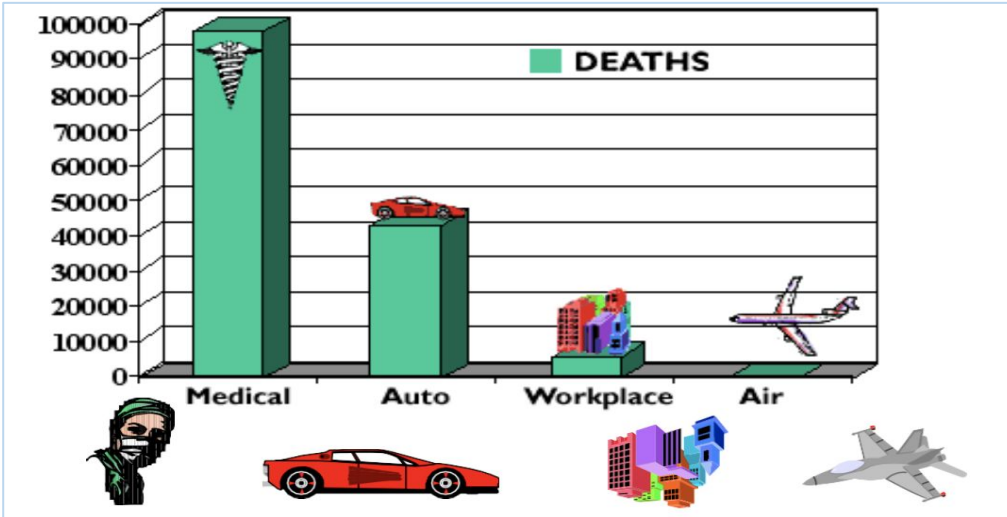
A 67 year old patient is prescribed Nonsteroidal anti-inflammatory drugs – NSAID for osteoarthritis pain, and is admitted 4 weeks later with GI hemorrhage.

- This is an adverse event, even though the prescribing decision was not erroneous. Recording it as a patient safety issue is honest, as the patient was harmed by medical care
 - Being less tolerant of threats to patient safety such as this may lead to more recommendations to take precautionary action (such as guidance regarding co-prescription of proton pump inhibitors - PPIs for all older people given an NSAID).
- **Errors:** prescribing Nonsteroidal antiinflammatory drugs – NSAID without considering patient condition (age) which require co-prescription of proton pump inhibitors – PPIs.
 - **Adverse Effects:** GI hemorrhage

Err is Human;

- The Institute of Medicine (IOM) study “To Err is Human; Building a Safer Healthcare System”
- Adverse events occur in **2.9 to 3.7%** of all hospitalizations
- **44,000 to 98,000 patients** dies a year as a result of medical errors
- Source at <http://books.nap.edu/openbook.php?isbn=0309068371> ▪ **note :(268.6 deaths per day)**
- Institute of Medicine (IOM) estimated that around **98,000 patients** die each year as a consequence of preventable errors. Likewise, a study of two UK hospitals found that **11%** of admitted patients experienced adverse events of which **48%** of these events were most likely preventable if the **right knowledge was applied.**
- The **under-utilization** of healthcare data- information - knowledge contributes to improper clinical decisions, medical errors, under-utilization of resources and raise in healthcare delivery costs

Annual Accidental Deaths



medical errors are 1st – 5th most common cause of death in the world
The difference is that RTA are numbers while Medical errors are estimates (underreported) Pressure ulcers are considered a direct error

◆ 3rd leading cause of Death in USA ?

Medical Errors, 1200 per day / **50** per hour

- The total number of Americans dying prematurely from medical errors was about **400,000 per year** * This number highly increasing since the 90s
- The **epidemic of patient harm in hospitals** must be taken more seriously if it is to be curtailed**
- **One in 5** patients discharged from the hospital end up sicker within 30 days and **half** are medication related
- **One of 10** inpatients suffers as a result of a mistake with medications cause significant injury or death

Preventable medical errors cost the US \$17 to \$ **29** billion dollars a year ***

*Office of the Inspector General (OIG) of the Department of Health and Human Services

** Journal of Patient Safety: September 2013 - Volume 9 - Issue 3 - p 122–128 / doi: 10.1097/PTS.0b013e3182948a69

*** Source: Safe Practices for Better Healthcare Why Implement Practices to Improve Safety at http://www.qualityforum.org/News_And_Resources/Press_Kits/Safe_Practices_for_Better_Healthcare.a_spx



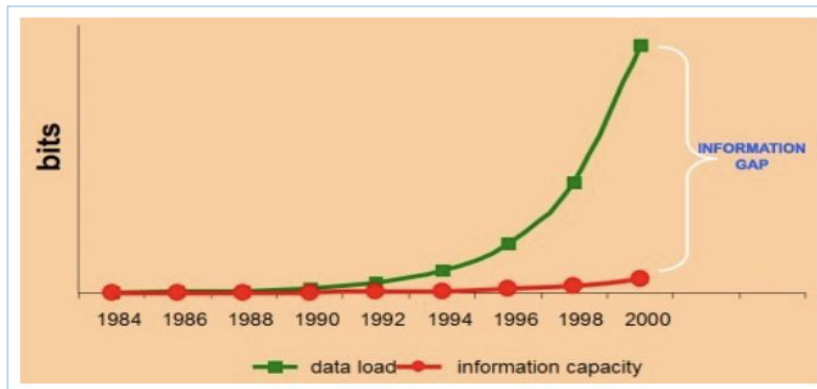
- “Modern healthcare is the most complex human activity there is, due to interpersonal relationships between many different clinicians with different expertise and interests, and we haven’t figured out how to make that work well. We have come to a full stop against a complex environment that resists accepting change on the scale clearly required” *
- Lucian Leape, MD Founder of the Modern Patient Safety Movement Adjunct professor of health policy at Harvard University "Error in Medicine," published in JAMA, 1994

Safety Issues

- Medication errors
- Failure to rescue
- Readmissions
- Falls
- Pressure ulcer
- Sentinel events
- Hospital acquired infections
- Under reported incidents

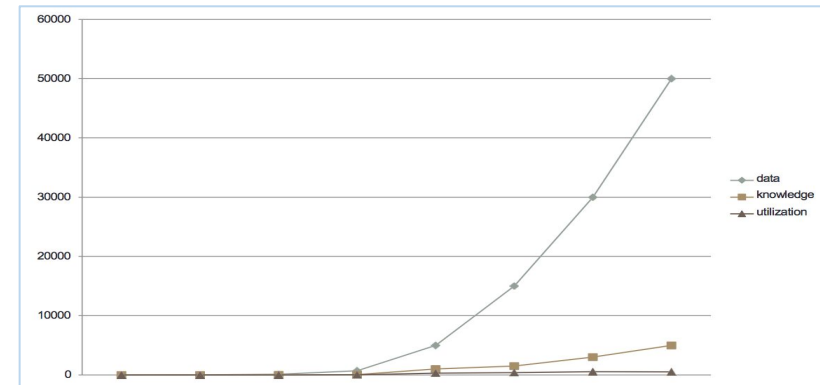
Flood of Information

- Huge gap in data acquisition and information → knowledge capacity
- System can process data into information and knowledge. The amount of knowledge is huge therefore, it is not always utilized .



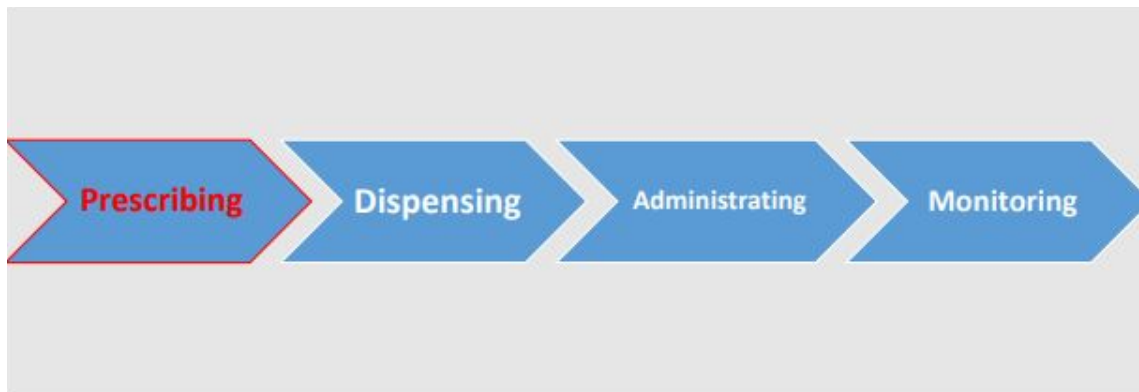
Data – knowledge -utilization

- A US study showed that healthcare is the biggest producer of data in the world.





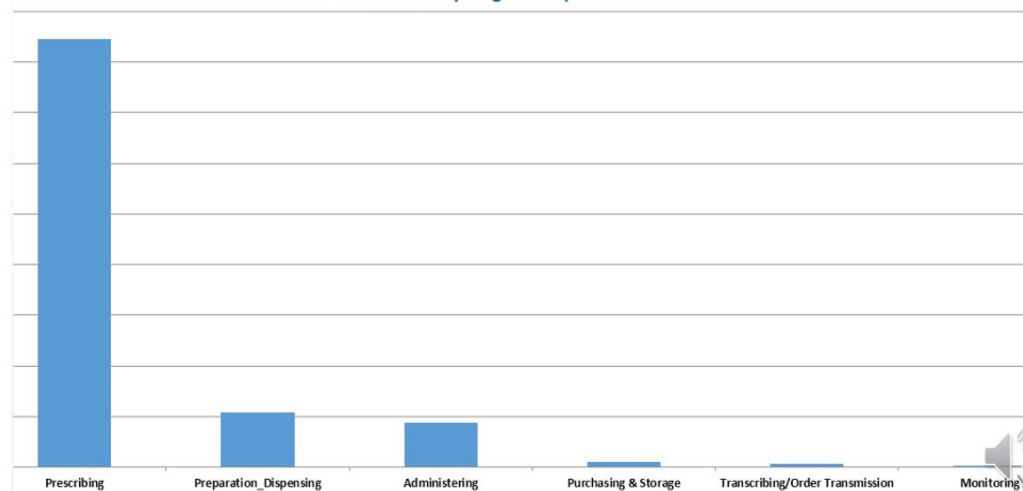
i.e. Medication process



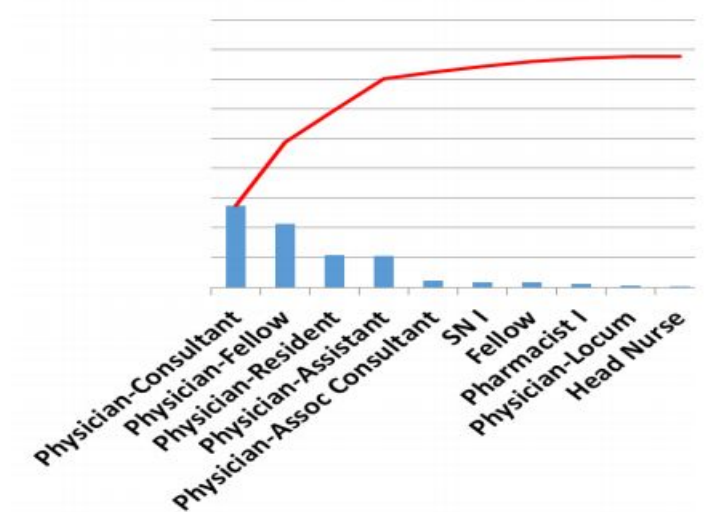
Medication errors (MEs) are common and considered one of the highest risk factors that threaten patients in hospitals. The majority of these errors are considered common during prescribing medication stage (Shulman et al, 2005).

Where did it happened?

Medication by stage Example



Who did it?



note the higher the rank the greater rate of error



- Incompetent people are, at most, 1% of the problem.
- The other 99% are good people trying to do a good job who make very simple mistakes
- It's the processes that set them up to make these mistakes.

Error types



Contributing factors

- Lack of communication
- Lack of coordination
- Inadequate staffing
- IPP / standards not followed
- Insecure access of patient information
- Lack of knowledge
- Failure to follow up
- Lack of proper check
- Improper assessment / reassessment
- No / inadequate resources or supplies
- Look alike medications
- Illegible handwriting



CPOE Benefits

- ≥50% of none-intercepted serious MEs rate decreased significantly (Bates et al, 1998).
- 81% reduction of medication errors (Bates et al, 1999).
- Decreased patients LOS (Rothschild, 2004).
- Improves medication reconciliation process (Vira et al, 2006).
- Improves the prescribers' compliance (Cunningham et al, 2008).
- Decreases mortality rate by 20% per month (Longhurst et al, 2010).
- Improves patients satisfaction (Spalding et al, 2011).

CPOE Impact

- Facilitates 22 new types of medication errors (Koppel et al, 2005).
- Lack of information systems compatibility, configuration and usability with end users (Colpaert and Decruyenaere, 2009; Rothschild, 2004).
- A significant increase of mortality rates post CPOE (Han et al, 2005).

Informatics Benefits

1. Tracking system
2. Effective communication and coordination
3. Prompt alerts and notifications
4. Decision support system
5. Manage data and store information
6. Secured access and defined privileges
7. Protocol guided and standardized practices
8. Accessible documentations
9. Legible orders, requests, and reports
10. Integrated care delivery
11. Support Lean processes toward more efficient workflows
12. Facilitate productivity measurements and monitoring
13. Reduce medication errors
14. Shortened length of patients' hospitalisation due to effective enhancement of antimicrobial management .
15. Reinforce clinicians compliance on evidence-based practices.



Barriers to technology implementation

- Cost (36%)
- Difficulties in proving quantifiable benefits and ROI (32%)
- Vendors inability to provide satisfactory products or services (27%)
- Lack of standardization with integration and interfaces. (HL7, NAHIT)
- Level of system evolution needed to meet growing demand on technology advancements
- People **people inability to use the technology**

What Medical Informatics tools can?

- Improve communication
- Make knowledge more readily accessible
- Assist with calculations
- Perform checks in real time
- Assist with monitoring
- Provide decision support
- Require key pieces of information (dose, e.g.)

The Accenture study



- The Accenture survey asked physicians about the extent to which they used 12 different “functions” of EMR and HIS— such as electronic entry of patient notes, electronic referrals, electronic ordering and prescribing and communicating with other physicians or patients via secure email.
- The results showed that physicians who are routine users of a wider range of healthcare IT functions have a more positive attitude towards the these technologies. On average across all the countries, as physicians start to use more “functions” —the more positive they are about the benefits

Majority of doctors surveyed believe that healthcare IT does provide some common top benefits, including:

- • better access, quality data for clinical research (70.9%),
- • improved coordination of care (69.1 %)
- • reduction in medical errors (66 %).
- • average score of 61 %,
- • In England, physicians perceived other healthcare IT benefits to include: increased speed of access to health services to patients (55.3 %), reduced number of unnecessary interventions and procedures (52 %).

The Accenture study



Table 1: Assessment of Handwritten Prescriptions completeness

Information assessed	No. of prescription with omission (%)
Patient name	0 (0.0%)
Hospital no.	0 (0.0%)
Sex	64 (32.2%)
Age	132 (66.3%)
National ID	171 (85.9%)
Diagnosis	39 (19.6%)
Generic name	85 (42.7%)
Frequency	3 (1.5%)
Dose	20 (10.1%)
Duration	2 (1.0%)
Route of administration	29 (14.6%)
physician's name	12 (6.0%)
Extension and bleep	25 (12.6%)
physician's signature	7 (3.5%)
Date	12 (6.0%)
Clinic name	1 (0.5%)
Total of prescriptions were evaluated: 199 (100%)	

Table 2: Assessment of Handwritten Prescriptions Legibility

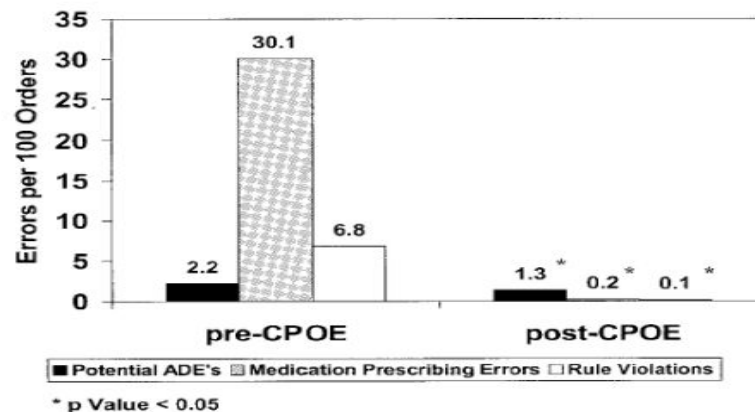
Scale*	No. of prescription (%)		% of average scale
	Pharmacist A	Pharmacist B	
1	195 (98.0%)	156 (78.4%)	88.2
2	3 (1.5%)	27 (13.6%)	7.5
3	1 (0.5%)	16 (8.0%)	4.3
Total	199 (100%)	199 (100%)	100%
Total of illegible and partially illegible ¹	4 (2.0%)	43 (21.6%)	11.8%

*1- Legible, 2- legible with effort, 3- illegible
 ^ pharmacist 1- expert
 ~ pharmacist2- new
¹scale of 2 and 3



Example CPOE reduce errors

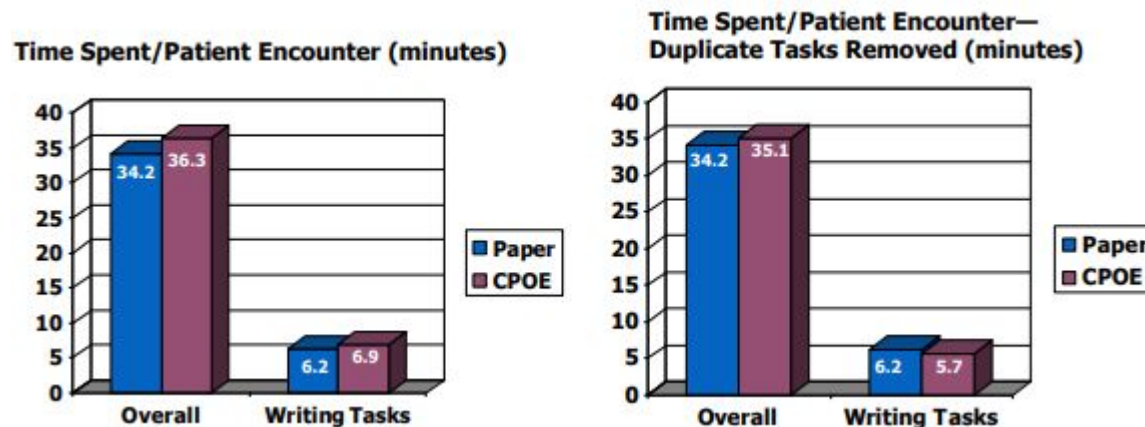
- Potts studied ADE rates in 13,828 medication orders before/after CPOE implementation at Vanderbilt Children's PICU:



Potts AL, Barr FE, et al. Pediatrics. 2004 Jan;113(1 Pt 1):59-63.

Does CPOE Take More Time?

Evidence shows that CPOE adds less than one minute to the time physicians spent writing orders and overall only added 1-2 minutes per patient encounter. As physicians gained experience with the system, the time for orders actually decreased.



Healthcare



- The healthcare industry is different from, other industries. We are talking about healing and dealing with human.
- NOT a process based, and can't just apply systems and global optimization techniques in the traditional, industrial engineering sense to the healthcare industry.
- Health is something that is very difficult to measure nor to quantify
- “the science and technologies involved in healthcare -- the knowledge, skills, care interventions, devices and drugs – have advanced more rapidly than our ability to deliver them safely, effectively, and efficiently” • IOM. 2001. Crossing the Quality Chasm: A New Health System for the 21st Century.

“Modern healthcare is the most complex human activity there is, due to interpersonal relationships between many different clinicians with different expertise and interests, and we haven't figured out how to make that work well. We have come to a full stop against a complex environment that resists accepting change on the scale clearly required” Lucian Leape, MD Founder of the Modern Patient Safety Movement Adjunct professor of health policy at Harvard University "Error in Medicine," published in JAMA, 1994

Informatics Limitations

- Facilitate errors due to inappropriate / poor designing of systems customisations and automations of processes
- Resistance to change.
- Under developed IT infrastructure
- Inadequate hardware logistics
- Limited funds.
- Lack of visionary leaders.
- Limited studies on the benefits of informatics on patient safety.



Technology adds new concerns

- Poor designed systems due to lack of proper planning and early involvement of clinicians
- Inflexible processes
- Changes in workflows
- Ease of use and interface with the various technologies
- Power outage + no backups
- Risk adjustment
- Overload data and system slowness

Dr Watson the IBM's supercomputer

- The computer can analyze about 200 million pages of data in less than three seconds, which could allow physician to more accurately diagnose and treat complex cases. Physicians could, for example, use Watson to consult medical records and the latest research findings for recommendations on treatment.
 - FDA Approved?



Just a Culture Principles

- **Values** and expectations-what is important to the organization
- **System** design and continual redesign of system and address processes and systems so it does not happen to someone else
 - Coaching and open environment
- **Peer to peer** coaching where helping one another to stay safe and make sure things are being done correctly
 - Just culture algorithms can help
- Patient safety needs to be viewed as a **strategic** priority
- The entire hospital needs to be focused on patient safety if a culture of safety is to be established

Dekker S. Just Culture: Balancing Safety and Accountability. Burlington, VT: Ashgate Publishing;; 2008. Marx D. Patient Safety and the Just Culture: A Primer for Health Care Executives. New York, NY: Trustees of Columbia University;; 2001

Examples:

- Having a patient safety **plan**
- Doing an **annual** report card, use **trigger** tools
- Have a patient safety committee
- Many also have separate medication management committee from safety committee (more **attention**)
- **Education** for staff to make sure they know near misses must be included in definition of medical error
- Doing patient safety walkabout **rounds** by senior leaders



Key success of a Culture of Safety

- **Acknowledgment** of the high-risk nature of an hospital's activities and the determination to achieve consistently safe operations
- A **blame-free** environment where individuals are able to report errors or near misses without fear of reprimand or punishment
- **Encouragement** of collaboration across ranks and disciplines to seek solutions to patient safety problems
- Organizational **commitment** and resources to address safety concerns

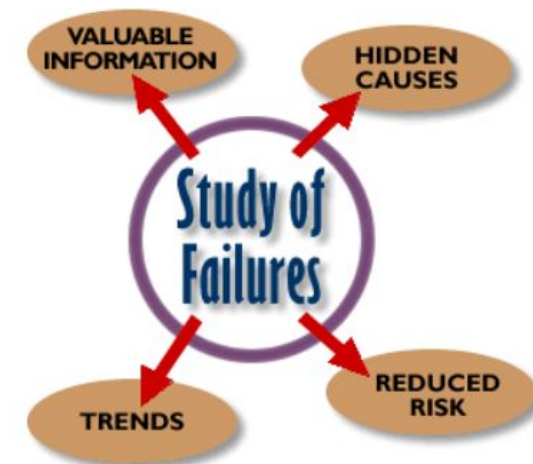
Event 'Management'

- Prevent failure but if you can't,
- Make failure visible and
- Prevent adverse effects of failure or
- Mitigate the adverse effects
- Learn from all events

Errors Provide Useful Information

- We can learn more from our failures than from success
- Our processes can be improved when studied

“Give me a fruitful error anytime, full of seeds, bursting with its own corrections. You can keep your sterile truth to yourself.” Vilfred Pareto





Which patients are most at risk of medication error?

- patients on **multiple** medications
- patients with **another** condition, e.g. renal impairment, pregnancy
- patients who **cannot communicate** well
- patients who have **more than one doctor**
- patients who do not take an **active role** in their own medication use
- **children** and babies (dose calculations required)

Systems Process Changes Structure, Environment, and People

- Simplification
- Standardization
- Process design includes prompts
- Elimination of sound/look-alikes
- Environment/product improvements
- Training
- Teamwork
- Communication



Select Resources for Patient Safety Information

- Agency for Healthcare Research and Quality www.ahrq.gov
- Institute of Medicine of the National Academies www.iom.edu
- The Joint Commission www.jointcommission.org
- Institute for Safe Medication Practices www.ismp.org
- National Patient Safety Foundation <http://npsf.org/>
- JCAHO “Speak Up” program <http://www.jcaho.org/general+public/patient+safety/speak+up/index.htm>

Take Home Messages

- Safety is everyone's job!
- Learn from previous errors
- Report incidents to learn not to blame.
- Errors are not only human related but the majority are system failure!
- Technology has been designed by human factors!!

Question

1- Which of the following is an example of preventable adverse event?

- A. Blurry CT scan. B. Cancellation of an appointment. C. Food allergy. D. Prescribing wrong dosage.

answer d

2- If a pregnant lady is prescribed a pregnancy-contraindicated medication but she did not have complications, which type of error did the physician make?

- a. Intercepted adverse event b. Near-miss event c. Potentially adverse event d. Preventable adverse event

answer b

3- which of the following considered as Contributing factors

- A. Failure to follow up B. Standardization C. Changes in workflows D. Tracking system

answer A

4- Which of the following patients at risk of medication error?

- A. patients who have more than one doctor
B. patients who can communicate well
C. patients on multiple medications
D. patients who take an active role in their own medication use

answer c

يتمنى لكم فريق العمل كل التوفيق و النجاح.
في الاسفل رابط التقييم للعمل ساعدنا لتطوير العمل و ايضا التقييم يعتمد عليه في اختيار
افضل فريق .



Your Opinion Matter