Informatics Team Notes

The following slides are the original lectures. Only notes were added and they're mostly additional information.
431 team notes are in purple color and this year's notes are in green color.

For any mistakes contact informatics team leader
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Notes provided by: Raghad Almotlaq

CDSS: helps you to decide clinically the best way of management (To give or not to give e.g., it'll remind you incase patient's having allergies)
It takes structured coded data from EHR -electronic health records-
According to the most updated clinical guidelines + patient record, the system give you the best decision
Goal: to prevent errors

CDSS – Part I
Medical Errors & Patient Safety

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Credit to Prof. William Hersh for most of the slides in this presentation

الجزيرة

الثلاثاء 25 من محرم 1433هـ 20 ديسمبر (كانون أول) 2011م العدد 14327

أسسها عام 1960م. 1379هـ عبد الله بن

صحيفة يومية
تصدرها مؤسسة الجزيرة

رئيس مجلس الإدارة:

مدير عام المؤسسة:

رئيس التحرير:

شد على الجنين حتى فصل رأسه عن جسده

إيقاف الطبيب المتسبب في وفاة (طفلة شرورة) والتحقيق يطول الفريق الطبي

نجران - علي الربيعان

وجّه وزير الصحة الدكتور عبدالله الربيعان بإيقاف الطبيب الذي باشر وتسبب في (فصل رأس مولودة عن جسدها) أثناء الولادة، التي عُرفت بـ(طفلة شرورة)، وإحالة الموضوع للجنة المخالفات الطبية للبت فيه.

وأشارت مديرية الشؤون الصحية إلى أن الإيقاف جاء بعد تشكيل لجنة طبية عاجلة للتحقيق مع الكوادر الطبية التي باشرت الحالة. وتعود تفاصيل حادثة (طفلة شرورة) إلى أنه عندما حضرت سيدة تبلغ من العمر 18 عاماً وهي حامل في شهرها السادس إلى المستشفى تشتكي من آلام بالبطن تمت معاينتها، واتضح أن وضع الجنين مستعرض، وأن المشيمة أعلى الرحم مع زيادة في السائل الأميني حول الجنين، وتم تشخيص الحالة على أنها إجهاض، وتم إدخال المريضة المستشفى وإبلاغ أخصائي النساء والتوليد وكذلك أخصائي الأطفال، ورأى الفريق إعطاء فرصة للمولود لتعديل وضعه داخل الرحم، وقام أخصائي النساء والتوليد بفحص المريضة، واتضح انفجار جيب المياه، وتبعه نزيف مهبلي، ومن ثم حدثت ولادة تلقائية لجسم وأقدام الجنين، بينما علق الرأس بعنق الرحم، ولم يعد هناك نبض بالحبل السري، بعدها قام الطبيب بالشد على الجنين عند مستوى الكتفين؛ فانفصل رأس الجنين عن باقي جسده. بعد ذلك تمت متابعة حالة الريضة، وتم نقلها للقسم الداخلي لحين خروجها بتاريخ 19-1-1433هـ بعد استقرار حالتها!

الصحة تغرم 11 مستشفى لمخالفتها إدارة النفايات الطبية

الجزيرة - ياسر المعارك

أصدرت لجنة مخالفات المؤسسات الصحية 11 قراراً يشمل عقوبات وغرامات على العديد من المخالفين على المنشآت الصحية الخاصة وفقاً لمواد وأحكام النظام الموحد لإدارة نفايات الرعاية الصحية بالدول الخليجية وقد تنوعت المخالفات ما بين عدم فصل حاويات لنفايات الأدوية الحاده، عدم وجود جهاز الأوتوكلاف، عدم استخدام ملصقات تعريفية كذلك عدم التخلص من النفايات الخطرة بشكل يومي، عدم وجود أكياس بلاستيكية قابلة للمعالجة المبدئية كشف ذلك مدير الصحة المهنية بوزارة الصحة محمد السعد مضيفا أن الغرامات المالية

ضمن أكبر 20 مشغلا عالميا

الاتصالات السعودية تحقق المركز 14

IOM Report

IOM: institute of medicine:

Independent (not governmental) body to improve the health care in USA

* Estimated 48,000-98,000 deaths per year in US due to medical errors

  Randomly selected hospital discharges

  from New York (30,000 cases) and Colorado/Utah (15,000 cases)

* Adverse events occurred in 2.9-3.7% of all hospitalizations

  50% were minor, temporary injuries

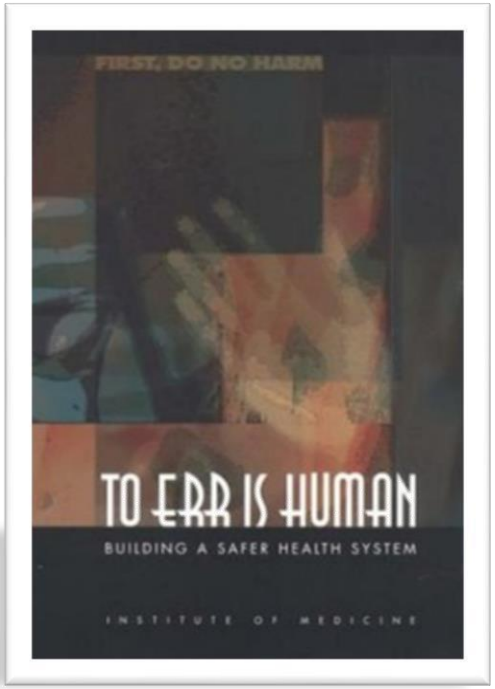
  7-14% resulted in death

  26% resulted in reversible disabling injury

  2.6% resulted in permanent disabling injury

  53-58% were preventable

  28% were due to negligence, i.e., failed to meet reasonable standard of care



Leading causes of death

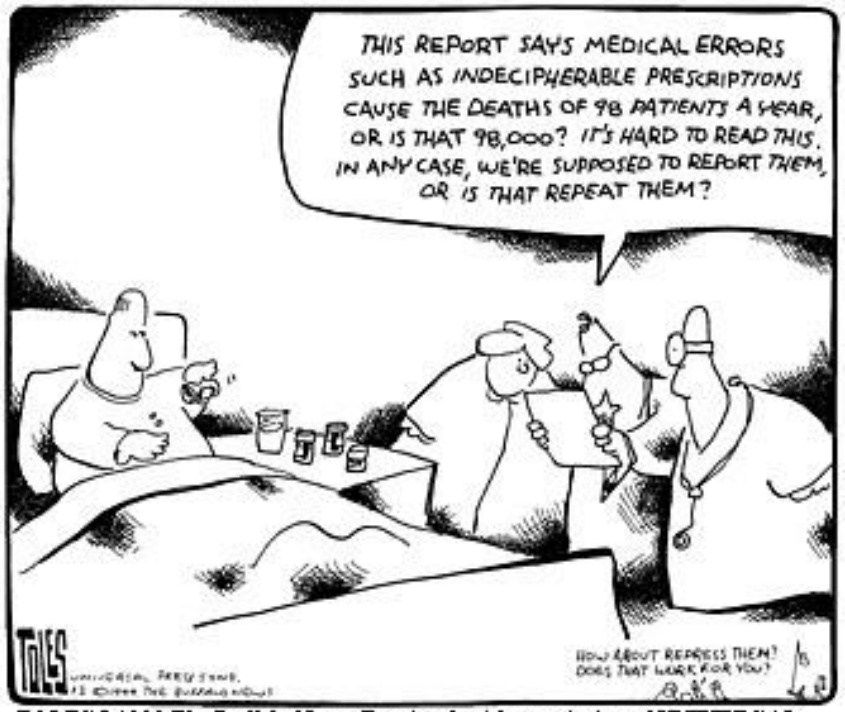
In Saudi Arabia, road traffic accidents rank #1 as the most common cause of death.

LEADING CAUSES OF DEATH[1]

Diseases of the Heart	726,974
Cancer (malignant neoplasms)	539,577
Cerebrovascular Disease	159,791
Chronic Obstructive Pulmonary Disease	109,029
Medical Errors[2]	**44,000–98,000**
Accidents and Adverse Effects (motor vehicle accidents = 43,458; all others = 52,186)	95,644
Pneumonia and Influenza	86,449
Diabetes	62,636
Suicide	30,535
Kidney Disease	25,331
Liver Disease	25,175

SOURCES: 1. Centers for Disease Control and Prevention, 1997. 2. IOM, *To Err Is Human: Building a Safer Health System*, 2000.

(Courtesy, Dan Masys, MD)



Criticism to the IOM report

Some challenged the number

* Reliability and reproducibility for these subjective assessments not measured (Sox, 2000)
* Overstated due to sampling problems and underlying illness (McDonald, 2000)
* In another sample, preventability of death from avoiding error estimated to be much lower (Hayward, 2001)

Means: Treating patients with the least effort as a try to avoid errors caused more problems than adhering to the guidelines (some physicians do that to keep themselves in the safe side)

Others assert the attention was misguided

* Patient safety is one of many problems in health care to address, and should not detract attention from larger health care problems (Woolf, 2004)
* Errors of omission (refuse to treat) (i.e., too little care) is a larger threat to health care quality than errors of commission (to treat) (e.g., medical errors) (Hayward, 2005)

Omission e.g., The doctor should insert a chest tube to save the patient's live but he thinks he might rupture something so he decide not to do it.

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Short report

Doctors' strikes and mortality: A review

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Table 1
Summary of articles assessing mortality during doctors' strikes

Article	Strike location	Strike dates	Strike duration	Participation	Study period	Control period	Findings
James (1979)					Weekly number of deaths during strike (5 weeks) and 2 weeks following strike	Predicted deaths based on means for the preceding 5 years	Mortality declined during strike; deaths avoided: between 55 and 153
Roemer and Schwartz (1979)	Los Angeles County, CA	January 1976–February 1976	5 weeks	≈50% of physicians	Death rates during strike (5 weeks) and 7 weeks following strike	Same periods of the previous 5 years	Mortality declined during strike and increased when elective surgery resumed
Roemer (1981)					Deaths in 2 weeks following strike	Same 2 weeks of the previous year	Death rate after strike was lower than in previous year but there were more surgery deaths among these than in the previous year
Slater and Ever-Hadani (1983)	Jerusalem, Israel	March–June 1983	17 weeks	8000 of 11,000 physicians	Number of deaths pre-strike (2 weeks), during strike (17 weeks) and post-strike (10 weeks)	Same period of the previous year	No difference in mortality
Erceg et al. (2007)	Croatia	January–February 2003	1 month	Majority of physicians in hospitals and polyclinics	Number of deaths pre-strike (1 month), during strike (1 month) and post-strike (1 month)	Same period in 2001, 2002 and 2004	No difference in mortality during the strike period, and no difference in distribution of causes of death
Siegel-Itzkovich	Jerusalem,	March–June 2000	3 months	Physicians in public hospitals	Number of monthly funerals performed during strike	Monthly averages of previous 3 years	Number of funerals decreased
		ay–June 1999	9 days, non-consecutive	All resident physicians except family care physicians in teaching hospitals	Mortality rate in the emergency department on strike days during study period (1 Barcelona hospital studied)	Mortality rates in the emergency department on non-strike days during study period (1 Barcelona hospital studied)	No significant difference in mortality rates in the emergency department

Insurance companies raised the insurance premium. Physicians decide to be on strike إضراب عن التطبيب; the


وزير الصحة يهدي "رهام"
المصابة بالإيدز iPad !

Other sources of medical errors

- **Multi-tasking** and **interruption** (or non-focusing, physicians are busy all the day) (Laxmisan, 2006)
- **Communication deficits**
    * during patient transfer (from ward to ward, usually from ICU to regular ward, poor communication means repetition of mistakes e.g., when the patient develops allergy to some medication) (Kripalani, 2007)
    * and handoffs (endorsement, doctor to doctor shift: when your shift is done you should tell the next doctor everything was done for the patient) (Singh, 2007; Horwitz, 2008)
- **Surgical error**
    * mainly in *routine* operations on *complex* patients (surgeon is skilled and it's an easy surgery, yet it's a complicated case)

  (Regenbogen, 2007)
- Failure to **order** or **follow up on test results** in ambulatory setting (Gandhi, 2006; Whals, 2007)
- **Patient misunderstanding** directions from clinicians (Davis, 2006; Tarn,

2006) http://www.youtube.com/watch?v=21TL94NEzvg

Slide from 431

First source of medical error is
Multi-tasking→ e.g. intern has a lot of things to do.
During patient transfer → referral of patient from hospital to another or in the same hospital especially from ICU to the ward.
If the hospital contain EHR this will solve many problems.
Handoffs= endorsement (for critical cases)
Surgical errors→ e.g. wrong labeling and forget something inside the patient's body→ the team should count.
Failure to follow up→ a patient underwent endoscopy but he did not came to follow up for 2 years. The doctors discover that he has cancer.
Are the medical informatics the solution? It helps a lot

IT sources of error

These are the ones related to

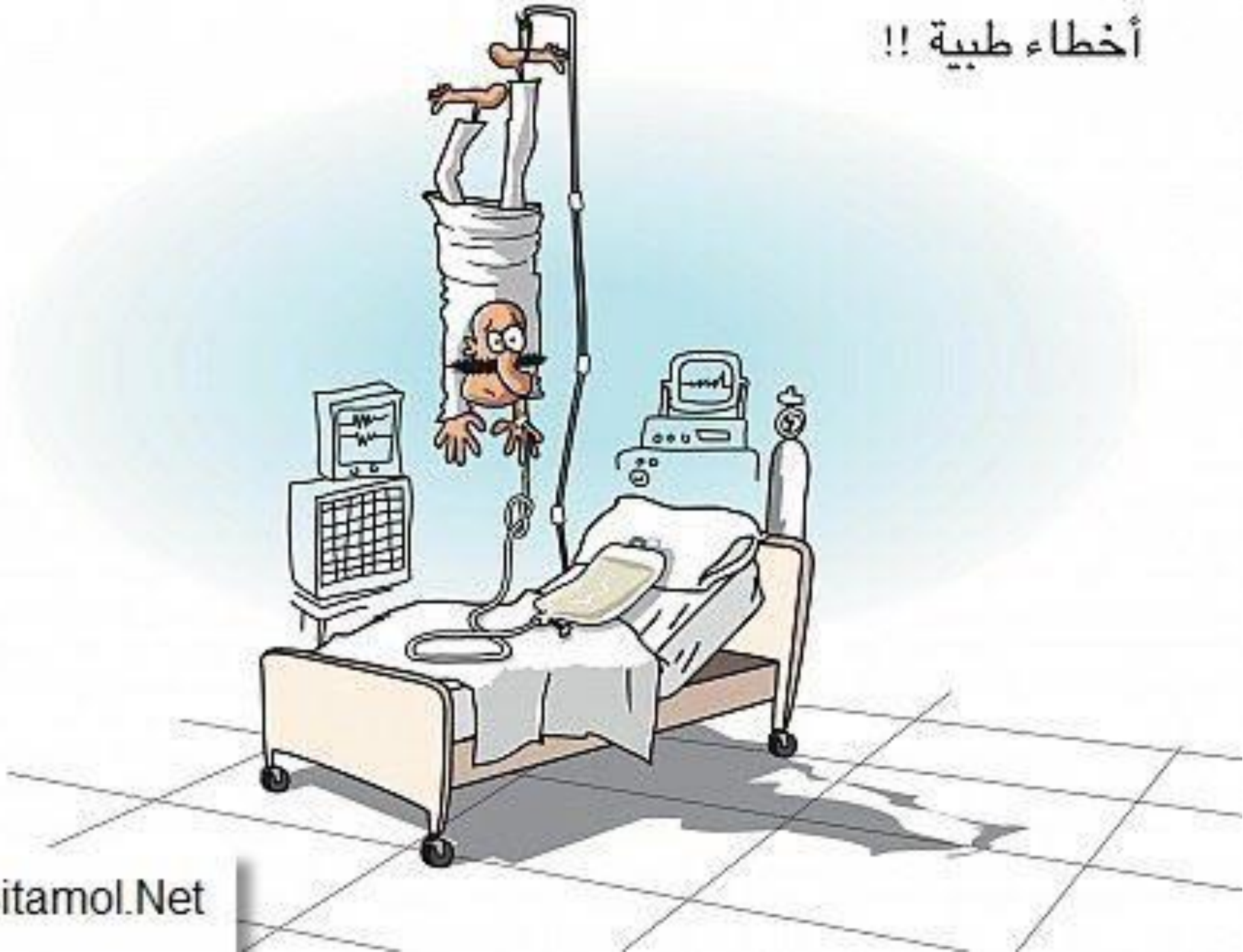
* Wrong bar code on patient –called: systematic error, problem in the system (bar code usually insures safety, how could it cause such mistake? If the patient is already having the wrong bar code → all his management plan will go in the wrong direction) (McDonald, 2006)
* Errors introduced into non-locked fields of Excel spreadsheet (e.g., doses are not fixed in adult patients coming to ER. In excel, they have formulas to calculate the dose, if it's unlocked, anyone can change it → wrong doses) (de Wildt, 2007)
* Joint Commission Sentinel Event Alert (for insurance, accreditation and incredibility) (2008)
  - *Added as one of many safety alerts*
  - *Cite US Pharmacopeia data indicating 25% of all medication errors related to IT, including barcodes, dispensing devices, computer displays and order entry*
  - *Calls for monitoring safety of IT implementation and usage, i.e., cannot assume IT will only improve safety*


نسينا ادوات الجراحة في بطنك..
وراح نضيف ثمنهم على حساب العملية!
عادل السيد

Other sources of error-working conditions

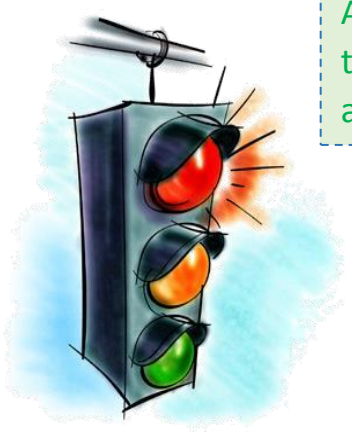
* Increased staffing levels of nurses in hospitals will likely improve patient outcomes (Hickam, 2003)
* Nurses working longer shifts and overtime more likely to make errors (Rogers, 2004)
* Interns made substantially more errors (Landrigan, 2004) and reported more motor vehicle accidents (Barger, 2005) when *working 24+ hour shifts*; reducing such shifts increased sleep and decreased attentional failures (Lockley, 2004)
* A systematic review of other studies assessing work hours on patient safety did not find a benefit for reducing work hours (Fletcher, 2004)

أخطاء طبية !!



Classification of medical errors and AD

MOST important slide! Errors: physician made mistakes. ADE: any new problem a patient develops after the treatment. In exam, you'll have a case & you'll be asked about the type of error.



		Adverse events		No adverse event
		Preventable (non intercepted)	Non preventable	
Errors	Adverse outcome			
	No adverse outcome ("near miss")			
No error				

Red box: error with a preventable ADE e.g., when you give a pregnant women medication contraindicated with pregnancy.

Orange box: error without ADE at all (ربك ستر ☺) physician made an error but fortunately there was no ADE.

Green box: no error but patient develops complications (physician is in safe side)

Slide from 431

Either the doctor comet an error or not.

*If the doctor comet an error and there is adverse event→ preventable adverse event (If the doctor did not comet that error → nothing will happen to the patient).

e.g. drug overdose → patient got renal failure.(medical error "adverse outcome" which can be preventable)

e.g. pregnant lady, the doctor give her isotretinoin (medication for her acne) she had miscarriage.

e.g. the nurse marked the wrong limb (she marked the left instead of the right) so the doctor amputate the normal limb.

*If the doctor comet an error → no adverse event "near miss"

e.g. prescribe overdose medication → nothing happen to the patient "near miss" ربي ستر

e.g. patient allergic to penicillin and the doctor prescribe it to the patient→ nothing happen to the patient .

e.g. in the operation room the doctor notice that the wrong limb was marked. So, he asked to check the MRI then amputate the right limb.

*No error → Adverse events "non preventable" .

e.g. the patient went to a dentist and she told the patient that it is better to extract one of the tooth because under it there is abscess and it might cause a fistula and in the same time there might be nerve injury which could cause paralysis(about 5% risk). The patient agreed to extract the tooth and signed. After the procedure done the patient has muscle paralysis.→ this is not medical error.

-There is no medication without side effects.

-It is better always to give the patients the choice.

Medical Errors and ADEs

* First documented by Bates (1995)
* 6.5 ADEs 5.5 potential ADEs per 100 hospital admissions
  * Of all ADEs:
  * 1% were fatal (non preventable)
  * 12% life-threatening
  * 30% serious
  * 57% significant

It is normal to develop an ADE, there is no medication or even a surgery without ADE; but you should differentiate between cases with errors and other cases.

* 28% of ADEs were associated with error (72% without error!)
* Errors more likely to occur at ***ordering (56%)*** **most common** vs. administration (34%)

5 stages of giving a patient medication: **order or prescribe**, transcription or verification, dispensing, **administration**, monitoring or reporting – follow up –

Slide from 431

*Stages of prescribing a drug in ER or for inpatient:
Ordering> transfer> dispensing in the inpatient pharmacy
"prepare the medication" > administration of the medication.
The errors occur usually during drug ordering → overdose, side effects, drug-drug interactions
Administration errors→ the nurse gives the patient drug through IV instead of giving it IM.

Other documentation of medication errors

* **In ambulatory settings**
  * For elderly patients, 13.8 preventable ADEs per 1000 person-years (Gurwitz, 2003)
* **In a general medicine clinic**
  * 28% of prescriptions contained errors but only 0.2% caused harm (Devine, 2007)
* **In a large teaching hospital**
  * pharmacists identified 62.4 errors per 1,000 medication orders,

31% of which were rated clinically serious (Bobb, 2004)

* **Pediatric patients**
  * 816 harmful outcomes in a voluntary reporting system over five years (Hicks, 2006)
* **In cancer chemotherapy**
  * at least one error in 10% of all prescriptions and in 19% of all patients (Taylor, 200

Related topic “abbreviations”

http://www.jointcommission.org/assets/1/18/Official_Do%20Not%20Use_List_%206_10.pdf

Human error

Two general types of errors (Leape, 1994) Important to differentiate

* **Slips** _ "unconscious glitches in automatic activity" usually due to diversion of attention.
* **Mistakes:**

Slips: You know it is a mistake, but you were lacking attention

1) Rule-based (doctor lacks information, yet he doesn't know about it! He thinks he knows everything ☺) Wrong rule chosen due to misperception or misapplication

2) Knowledge-based (he doesn't know e.g., giving mitphormin for a diabetic patient having renal failure -contraindicated- solution: education) novel situation with no preprogrammed solution; lack of knowledge or misinterpretation of problem

Approach to human error (Reason, 2000) System approach more effective than person approach

* **Person**: Individual blamed, improve by blaming, litigation, retraining, etc. (Individual punishment)
* **System**: Put systems in place to capture and correct human fallibility In most complex systems, system approach more effective (develop the whole system to prevent repetition of the error)

Slide from 431

Slips→ The doctor knows that he should prescribe " e.g. 40 mg of a certain drug" but on that day he was not focusing, multitasking or كان مفهي.
e.g. the doctor knows that he should not give Metformin to diabetic obese patient with impaired renal function, but he forgot to see the results of creatinine and urea of that patient and prescribe the drug (Slips). "In this case we should remind the doctor."
Knowledge-based→ the doctor did not know. "In this case we should train the doctor."
Rule-based→ "جهل مركب" ما يعرف وما يدري أنه ما يعرف ويظن نفسه أنه صح ومتأكد


- أخطاء طبية .. من يتحملها -؟؟؟
؟!!
اتأكد لي بالله من الملف،، أظن أنا قطعنا السليمة

Programs for improving safety

10 Safety Tips for Hospitals (AHRQ, 2007)

* Assess and improve your patient safety culture
* Build teamwork
* Limit shifts for hospital staff, if possible
* Insert chest tubes safely
* Prevent central line-related bloodstream infections
* Make good use of senior ICU nurses
* **Use reliable decision-support tools at the point of care**
* Set up a safety reporting system
* Limit urinary catheter use to 3 days
* Minimize unnecessary interruptions

OBA "previously was incident report"any error reported to quality improvement unit in the hospital. Not to blame the doctor or the staff but to improve the quality of the healthcare and hospital.

King Khalid University Hospital
King Abdul Aziz University Hospital
Riyadh, Kingdom of Saudi Arabia

OCCURRENCE/ VARIANCE REPORT

CONFIDENTIAL	Reference No.: *(For QMD use only)*

Patient ID	File No.:	
	Dept./Ward	
	Sex/ Age	

Incident Time:	Incident Date:	Incident Location/Dept.:		
Person Involved: ❑Patient ❑Staff ❑Visitor/ Watcher ❑Others		SENTINEL EVENT: ❑ YES ❑ NO if yes please specify:		
Name of Person Involved:		Position:	Badge No.:	Dept./ Unit:

Classification of Occurrence/ Variance: (*Please tick the appropriate box*)

Clinical Practice/ Procedure	Medication	Family/ Visitor/ Watcher	Staff/ Employee	Equipment/ Supplies
❑ Documentation ❑ Missing Files ❑ Medical records unavailable ❑ Policy not available ❑ Confidentiality ❑ Procedure/s not followed ❑ Others *(specify)*	**Wrong:** ❑ Drug ❑ Time ❑ Route ❑ Dose ❑ Patient ❑ I.V. not given ❑ I.V. infiltration ❑ Allergic Reaction ❑ Others *(specify)*	❑ Dissatisfaction ❑ Hematoma ❑ Needlestick/ prick ❑ Food Hygiene ❑ Fall ❑ Hosp. Acquired Infection ❑ Others *(specify)*	❑ Infection Control Issues ❑ Infectious Subs. e.g. blood ❑ Needlestick/ prick ❑ Vehicular Accidents ❑ Fall ❑ Policies/ Procedures ❑ Others *(specify)*	❑ Improper Handling ❑ Not available ❑ Missing/damaged ❑ Failure/malfunction ❑ Wrong Equipment ❑ Improper Storage ❑ Others *(specify)*
Safety	**Fire/ Security**	**Behavioral**	**Patient Care**	**Occupational**
❑ Injuries ❑ Electric Shock ❑ Physical assault ❑ Structural ❑ Others *(specify)*	❑ Fire/ Smoke Incident ❑ Property Missing ❑ Unauthorized Entry ❑ False Alarm ❑ Others *(specify)*	❑ Assault ❑ Verbal Aggression ❑ Violent Behavior ❑ Sexual harassment ❑ Others *(specify)*	❑ Assessment ❑ Care Plan ❑ Procedure ❑ Investigation ❑ Others *(specify)*	❑ Disability ❑ Exposure to Hazards ❑ Unconsciousness ❑ Work related Illnesses ❑ Others *(specify)*

Description of Occurrence/ Variance:

Programs for improving safety (cont.)

Institute for Safe Medication Practices (www.ismp.org)

* All medications should be checked for the "five rights" (1999)
  - Right patient
  - Right drug
  - Right time
  - Right dose
  - Right route

5 R's to reduce chance of error

High-Alert Medication List (2007)

What can be done about medical error?

* Better detection to identify causes and solutions, especially through use of EHR data (fixed data) (Sauer, 2007)
* Voluntary reporting systems (even in case of near miss, case should be reported to prevent reoccurrence) (Garbutt, 2008)
* "Systems" approach and thinking (Shortell, 2008)
* Apology (Lazare, 2006)
* Technology
  * Barcoding (Poon, 2006)
  * Computerized decision support (CDS) and computerized provider order entry (CPOE) – *next lecture*

Next slides are from 431 work (all thanks for them)

You should know:

-Sources of medical errors.
-Classification of medical errors and ADEs.
-We should not use abbreviations.

Questions:

A- Which type of error is associated with an adverse event to a drug use, due to a dosage exceeding the maximum dosage?

1-Non-preventable adverse drug event.
2-Preventable adverse drug event.
3-Near miss.

B- What is the correct way to write this biomaterial used in clinical setting based on the Official "Do Not Use List" by the Joint Commission?

1-Calcium Sulfate .
2-CaSulfate.
3-CaSO4

A-2
B-1

C-When a surgeon left scissors in the patient's stomach after surgery, what type of error did he make?

1-Non-preventable adverse drug event.
2-Near miss.
3- Preventable adverse drug event.

D-Which of the following approaches is more effective in minimizing medical errors in most complex medical practice?

1-Patient based.
2-Provider based.
3-System based.

E-When a dentist performed extraction of the wrong tooth, what type of error did he make?

1-Near miss.
2-Potentially adverse event.
3-Preventable adverse event.

C-3
D-3
E-3

F-"Unconscious glitches in automatic activity," usually due to diversion of attention:

1. A Slip.
2. Rule-based mistakes.
3. Knowledge-based mistakes.
4. A fatal mistake.

G--Erroneous algorithm (rule) chosen due to misperception or misapplication:

1. A Slip.
2. Rule-based mistakes.
3. Knowledge-based mistakes.
4. A fatal mistake.

H-A novel situation with no preprogrammed solution; lack of knowledge or misinterpretation of problems:

1. A Slip.
2. Rule-based mistakes.
3. Knowledge-based mistakes.
4. A fatal mistake.

F-1
G-2
H-3

I - In an approach to human error, which of the following has proved to be an effective approach:

1. Blaming the individual.
2. Blaming other team members.
3. Blaming the whole team/system as a whole.
4. Call police.

J- All medications should be checked for the "five rights", which of the following in not included in them:

1. Right patient
2. Right drug
3. Right dose
4. Right Expiration-date

K-Which of the following can be done about medical errors:

1. Use of EHR.
2. Use of voluntary reporting systems.
3. Use of technology and Apology.
4. All of the above.

I-3
J-4
K-4