

# Research focus in medical informatics in Saudi Arabia

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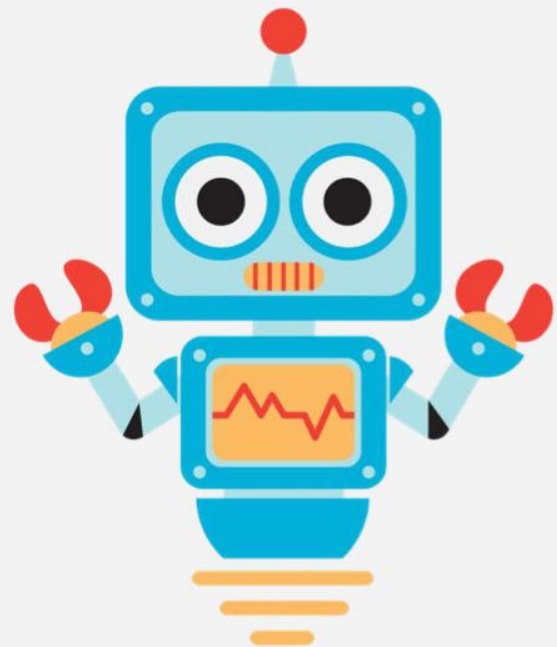
Maha barakah

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# Outline

1. Definition
2. Knowledge management
3. Why Knowledge management in Healthcare
4. Examples of research in medical informatics:
  - Evidence based medicine
  - Medical records
  - Tele-health
  - Students
  - Public health
5. What is next?
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# Definitions

## 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. [The Doctor like this definition](#)
- "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). [This definition focuses in technology more.](#)

-Medical informatics isn't about info. technology or info. system, it's about data, info, knowledge.

-Medical informatics is a new field, however academically & scientifically has been their for a few decades.



### Data:

the raw or basic material for info and knowledge, and it has no meaning by itself.

- "data are numbers, words or images that have yet to be organised or analysed to answer a specific question" (Audit Commission, 2007).
- What makes numbers, words and images all data? rawness. No exact meaning or context.

### Information:

- Information is the result of processing, manipulating and/or organising data or combinations of data to answer question.



# Definitions

## Knowledge

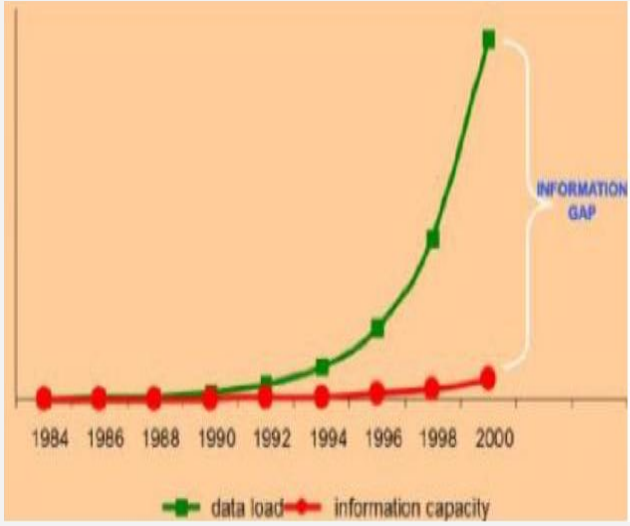
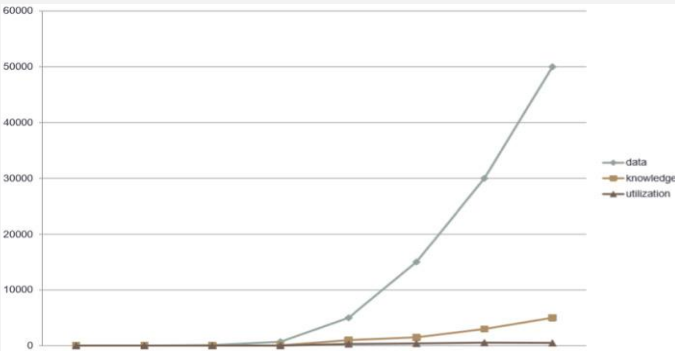
- Data, information and knowledge are often used interchangeably, however, they are not the same.
- Data, in itself is not knowledge, nor is information. Data is without a meaningful relation to anything else” (Bellinger, 2004).
- “Knowledge is the full utilization of information and data, with the potential of people's skills, competencies,.....(Grey, 2009\*7)
- Knowledge Involves interpreting information received, adding relevance and context to clarify the insights the information contains” (Audit Commission, 2007)
- Knowledge: is the understanding and interpretation of information and its settings within a meaningful context.
- There are numerous theories existence regarding not only the creation of knowledge, but also the different types of knowledge that exist. Skipped by doctor.
- Cook and Brown (1999) define four types of knowledge: individual/explicit; individual/tacit; group/explicit; group/tacit. Skipped by doctor.

<b>Environment public health KM</b>			
	Data	Information	Knowledge
<b>Asthma</b>	Number of hospital visits due to asthma	Asthma case data organized by geographic location, population, etc.	Understanding of the times and places to alert asthma patients due to risks posed by air quality
<b>Air Quality</b>	Ambient air quality monitoring data	Air quality measurements organized by geographic location and time.	

If we look at asthma for example:  
 1) The NO. of hospital visits have no meaning by itse.  
 2) Process it by location, population, gender & time > so we have information.  
 3) Interpretation of info give knowledge & show us how time & gender are related to asthma risk factors & prognosis.



# Why Knowledge in Healthcare

Flood of Information	Data – knowledge – utilization
<ul style="list-style-type: none"> <li>Huge gap in data acquisition and information knowledge capacity</li> </ul> 	<ul style="list-style-type: none"> <li>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 <u>right knowledge was applied</u>.</li> <li>The <u>under-utilization</u> of healthcare knowledge contributes to improper clinical decisions, medical errors, under-utilization of resources and raise in healthcare delivery costs</li> </ul> 

## Flood of information:

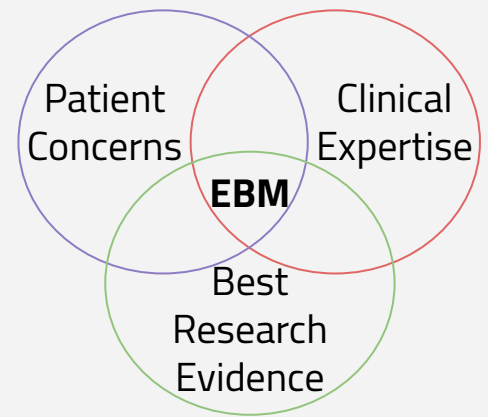
- 1) We've 2 curves, the green curve represents increased in No & amount of data from Pt file or other resources. While the red curve represents how much we're analyzing & getting useful info out of these data.

## Data – knowledge - utilization

- 1) Here we've 2 curves also, the gray one show the accumulation of data with time. While the brown one shows how much we're doing interpretation.
- 2) There's a gap cuz we're having data, info & knowledge but we're doing the minimal utilization.
- 3) The informatics comes & try to fill these gap by using data, info & knowledge for CDSS, Pt safety, researches & medical services.



# Examples of research in medical informatics:



## Evidence based medicine (EBM)

- The current practice is looking mainly to expertise not to Pt.
- EBM works on the level of info & knowledge..

Definition	History of EBM
Evidence based medicine (EBM) is the integration of best research evidence with clinical expertise and patient values.	The name of EBM appeared in 1992 by group led by Gordon Guyatt at McMaster University in Canada. Since then the number of articles about evidence based practice has grown exponentially from one publication in 1992 to about 1000 in 1998 and international interest has led to the development of six evidence based journals that summarize the most relevant studies in clinical practice and have a combined worldwide circulation of over 175000.

Literature Searching	
<p><b>Main benefits:</b></p> <p>Can improve the treatment of medical inpatients, even those already receiving evidence-based treatment.</p>	<p><b>Example of a research:</b></p> <ul style="list-style-type: none"> <li>• Random sample of 146 inpatients cared for by 33 internal medicine attending physicians.</li> <li>• After physicians committed to a specific diagnosis and treatment plan, investigators performed standardized literature searches and provided the search results to the attending physicians.</li> <li>• Attending physicians changed treatment for 23 (18%) of the 130 eligible patients as a result of the literature searches.</li> </ul>

- what's the difference between EBM & practice?!
- Practice isn't refer to the latest medicine.
- The researches are coming from different tools like; up to date & BMG.
- Literature is the previous researches about specific question.
- The Question based on Hx that we collected from patients & clinical expertise.
- We believe that literature is more important & accurate decision.
- In literature we search for knowledge NOT data.
- When you've a Pt, you can't go to literature for 2-3h, but you can use the structured based medicine that gives the most relevant answer for your question > But the question must be written in a good way.



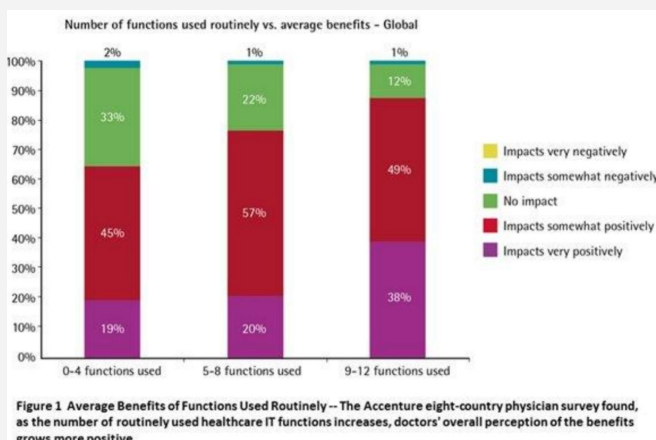
# Examples of research in medical informatics:

## Medical Records (The Accenture study)

Objective	Methodology
<p>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.</p>	<p>By Jim Burke, Managing Director, Accenture UK Health Industry Published Friday, 3 February 2012 –.            Research among more than 3,700 doctors in eight countries reveals ripe opportunities to accelerate broad healthcare IT initiatives, according to a new survey from Accenture</p>

### Findings

- The findings clearly show that the broadest, fastest path to integrated, effective health practices requires outreach, education and changing mindsets.
- Results showed that physicians who are routine users of a wider range of healthcare IT functions have a more positive attitude towards 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:
  - a)** better access, quality data for clinical research (70.9%). Quality of handwriting description.
  - b)** improved coordination of care (69.1 %) by sharing your knowledge/opinion/ data with others.
  - c)** reduction in medical errors (66 %).
  - d)** 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 main challenge of moving from paper to electronic records is **Resistance** of professionals.
- If the student use the traditional database (books), he’ll face problems if the doctor ask him to use electronic database (blackboard).
- The graph shows: the more you use the more positive impact you get.

## Veterans Health (tele-health)

- Veterans Health, which runs the largest and one of the most cost-effective healthcare systems in the United States.
- The VA has been employing tele-health tools for more than 11 years. "The VA is absolutely a pioneer in the use of telehealth," They published a study linking telehealth and 17,000 VA patients with chronic disease that showed a tremendous impact – **nearly a 20 % reduction in hospital admissions.**"

## Student examples

### 1) Wireless in healthcare:

Mobility is addicting , once you use it you can't live without it.



### Conclusion

- Healthcare professionals **acceptance** seems to be one of the keys to success for this new industry .
- We may **dream** of delivering healthcare without being forced to use network cables or **tripping** over computer wires .

- Try to see the impact of using wireless on mobile application.
- Since 2010, the mobile application became one of the main sectors in mobile health.

## 2) Towered electronic health record

### BARRIERS AND ISSUES

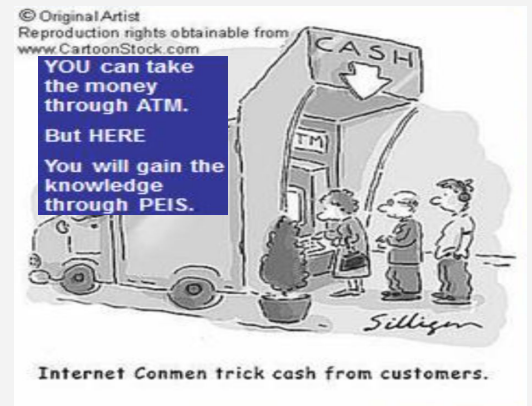
Many players and many approaches	Lack of a health network architecture
<p>while the expansion of health care providers and services has been a factor behind the call for EHRs and improved sharing of health information , it also means that their implementation requires support from many stakeholders . An individual may now receive care from several physicians and other providers at once . Policies to govern the implementation and use of EHRs will therefore require the support of many different provider groups .</p>	<p>Privacy issue :</p> <ul style="list-style-type: none"> <li>★ What information should be included in the EHR?</li> <li>★ Who should have access to the EHR? Which information in the EHR and under what circumstances should the EHR be shared with other health providers? How will a patient be able to access his or her own EHR?</li> <li>★ In what instances can the information in an EHR be used for secondary purposes ( eg , research , administration )? When is consent from the patient required?</li> </ul>



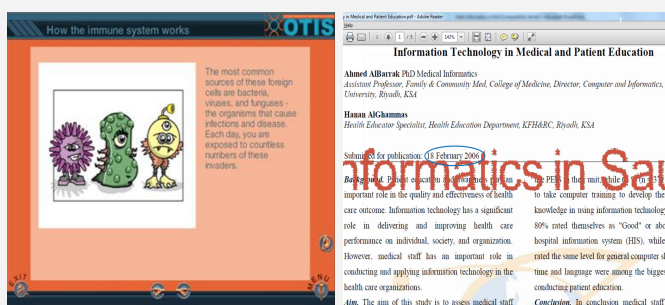
## Examples of Literature Searching (from students)

### ❖ methods:

- ★ A total of 60 medical staff from different specialty ( Physician - 21 , Nurses = 25 , Health Educator = 8 , others = 6 ; Total N = 60 , Female = 33 , Male = 27 ) responded to the study questionnaire in KFSH & RC . )
- ★ The questionnaire was designed in six sections .



### Information Technology in Medical and Patient Education



### Barriers of conducting patient education in %

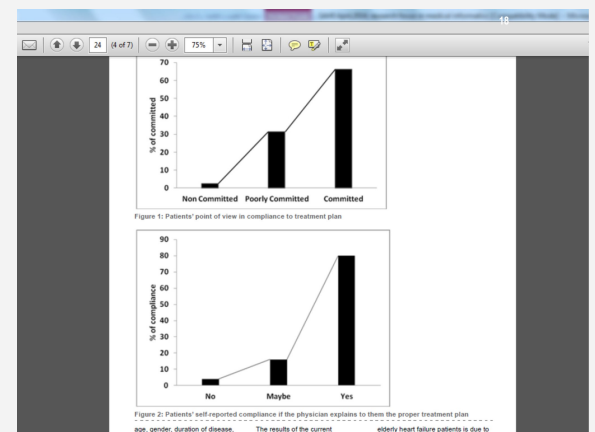
Barriers	%
Language barrier	18.3
Lack of time	23.3
Lack of plans for educational activities	8.3
Lack of financial resources	8.3
Uncooperative patient	11.7
All of the above	28.3
Other	1.7

### ❖ In conclusion

In conclusion medical staff had a very positive attitude towards applying patient education information system . However , the language barrier and lack of time were considered as the biggest barriers for conducting patient education . Accordingly the results showed that there is a significant need for computer training .

### ❖ Software selection

Remember that the end **GOAL** is not just to buy hardware and software . Rather , it is to buy **successful** , Well - installed system that effectively **meets the needs** of the organization .



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ORIGINAL ARTICLE

**Evaluating factors affecting the implementation of evidence based medicine in primary healthcare centers in Dubai**

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**KEYWORDS** Evidence based medicine

**Abstract** Objectives: To assess the current evidence based medicine (EBM) knowledge, attitude and perceptions of physicians at Dubai Primary Health Care Sector (PHCS). Further to evaluate



# Examples of Literature Searching (from students)

Assessment of skills and attitude of dental students and interns toward e-learning in KSU

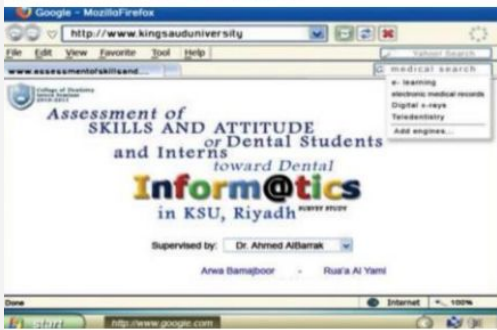
## Assessment of Skills and Attitude of Dental Students and Interns toward e-learning in KSU

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Incidence of prescribing errors among handwritten prescription and electronic prescription system

## Incidence of Prescribing Errors Among Handwritten Prescriptions and Electronic Prescription System

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### ORIGINAL ARTICLE Assessment of legibility and completeness of handwritten and electronic prescriptions

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Keywords: Abstract Objective: To assess the legibility and completeness of handwritten prescriptions and



Academic satisfaction among traditional and problem based learning medical students

## Academic satisfaction among traditional and problem based learning medical students

A comparative study

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### ABSTRACT

الإعداد: لقيم لزمنا الأكلادي والأهمية الأكلادية عند طلاب التعليم الطبي التقليدي والتعليم الطبي القائم على حل المشكلات والتقييم مرفق الأقسام في التعليم الطبي من وجهة نظر الطلاب.  
الطريقة: أجريت دراسة مقطعية في كلية الطب، جامعة الملك سعود، الرياض، المملكة العربية السعودية. شارك طلاب الطب التقليدي  
Methods: A cross sectional study was conducted at the College of Medicine, King Saud University, Riyadh Kingdom of Saudi Arabia from May to June 2011. The survey questionnaires were self-administered and consisted of mainly 6 sections: teaching, learning supervision, course organization, informatics technology (IT) facilities, and development of skills.  
Results: A total of 92/111 (male: 66/71, 79%); female:

## Relationship between Patients' Understanding of Treatment Plan and Medication Compliance

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# Questions

**1- "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" is the definition of which of the following?**

- A) Medical Informatics
- B) Health Information System
- C) Clinical Decision Support System
- D) Simulation Centre

**2- Which of the following is the result of processing, manipulating and/or organizing data to answer a question?**

- A- Knowledge
- B- Clinical trial
- C- Information
- D- Research

**3- Which of the following is NOT a data?**

- A- 40
- B- 3/6/2015
- C- 120 over 80
- D- epidemiology of obesity in SA

**4- "Analyzed data that have been suitably curated and organised so that they have meaning" is the definition of which of the following?**

- A) Database
- B) Information
- C) Knowledge
- D) Clinical datum

**5- "Interpreting information received, adding relevance and context to clarify the insights of the information contains". The statement above describe which of the following?**

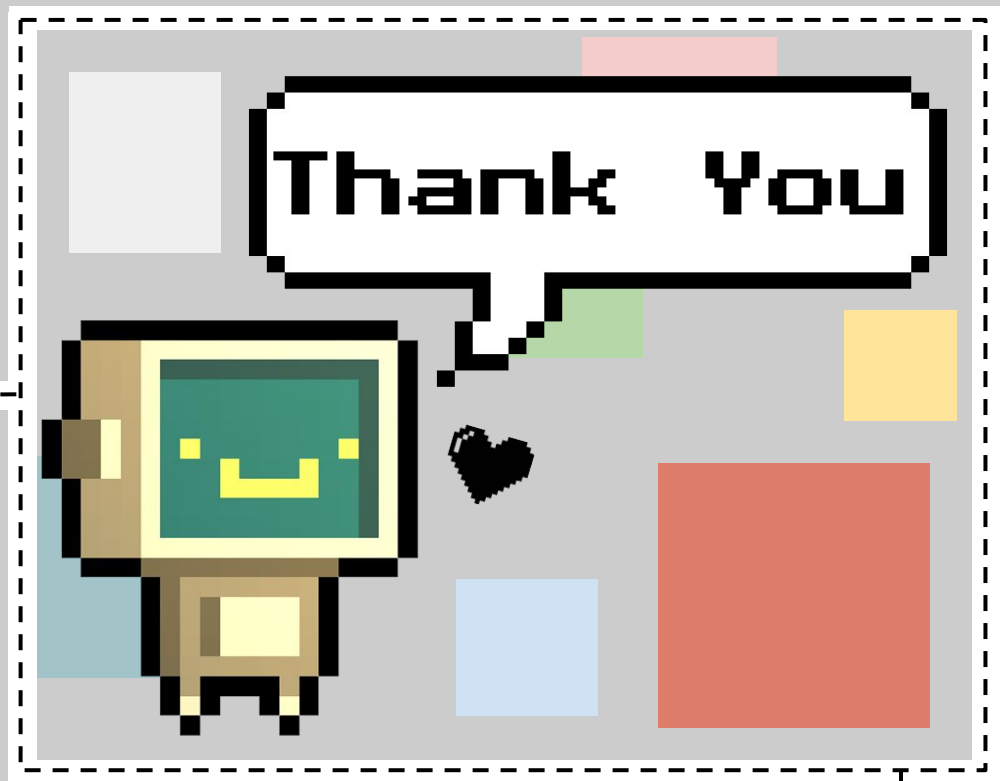
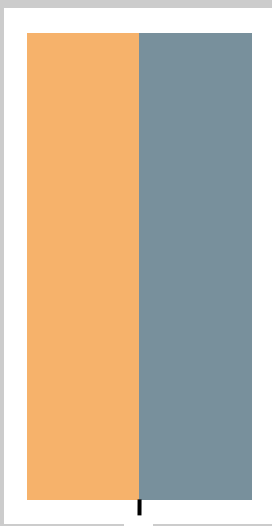
- A. Knowledge
- B. Information
- C. Bioinformatics
- D. Data

**6- "Integration of best research evidence with clinical expertise and patient values" is a definition of?**

- A- Medical informatics
- B- Evidence based medicine
- C- knowledge
- D- Literature Searching



1-A  
2-C  
3-D  
4-B  
5-A  
6-B



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