Informatics TeamNotes

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: Ethar alqarni

INFORMATICS

The science concerned with gathering, manipulating, storing, retrieving and classifying recorded information.

What is Medical Informatics?

- ***Medical Informatics comprises the theoretical and practical aspects of information processing and communication, based on knowledge and experience derived from processes in medicine.***

- ***"Intersection of information technology and medicine in health care"*** ***(Gennari 2002)***

HISTORY

- ***Medical informatics began in the 1950s with the growth of devices, and computer applications in medicine.***

- ***Early names of medical informatics included medical computing, medical computer science, computer medicine, medical electronic data processing, medical automatic data processing, medical information processing, medical information science, medical software engineering and medical computer technology.***

HISTORY

- ***The earliest use of computation for medicine was in dental projects in the 1950's at the National Bureau of Standards by Robert Ledley.***

- ***The next step in the mid 1950s was the development of expert systems such as MYCIN and INTERNEST-I.***

HISTORY

- *In France in **1968** university departments established with the title "informatique de medecine "*

- *In the United States in 1996, HIPAA regulations concerning privacy and medical record transmission created the impetus for large numbers of physicians to move towards using EMR software, primarily for the purpose of secure medical billing.*

ORIGIN OF TERM: "MEDICAL INFORMATICS"

***Russian** = informatika **1968** by AI Mikhailov, "Oznovy Informatika" ("Foundation of Informatics")*
structure and properties of scientific information

French** = informatique de medecine **1968
university departments established with this title

English** = first appeared in **1970s
Columbia University changed its name from Medical Information Science to medical informatics

- ***is the intersection of information science, computer science, and health care.***
- ***It deals with the resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in health and biomedicine.***
- ***Health informatics tools include not only computers but also clinical guidelines, formal medical terminologies, and information and communication systems. It is applied to the areas of nursing, clinical care, dentistry, pharmacy, public health and (bio)medical research.***

- *"...the understanding, skills, and tools that enable the sharing and use of information to deliver healthcare and promote health" ---*
- *"...the name of an academic discipline developed and pursued… by a scientific community engaged in advancing and teaching knowledge about the application of information and technologies to healthcare - the place where health, information and computer sciences, psychology, epidemiology, and engineering intersect." British Medical Informatics Society*

- ***"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).**

What does medical informatics focus on?
1. Health care.
2. Medical education
3. Research.

- ***"Medical informatics attempts to provide the theoretical and scientific basis for the application of computer and automated information systems to biomedicine and health affairs . . . medical informatics studies biomedical information, data, and knowledge - their storage, retrieval, and optimal use for problem-solving and decision-making."***

  Lindberg, D.A.B. NLM Long Range Plan. Report of the Board of Regents, 1987, p. 31.

- ***"Medical informatics is a developing body of knowledge and a set of techniques concerning the organizational management of information in support of medical research, education, and patient care.... Medical informatics combines medical science with several technologies and disciplines in the information and computer sciences and provides methodologies by which these can contribute to better use of the medical knowledge base and ultimately to better medical care.“ definition by Asso. of American Medical Colleges (AAMC) 1986.***

- ***"Medical informatics comprises the theoretical and practical aspects of information processing and communication, based on knowledge and experience derived from processes in medical and Healthcare."***

  Van Bemmel, J.H. "The structure of medical informatics" Medical Informatics, 9(1984), p. 175.

- ***"Medical informatics is the application of computer technology to all fields of medicine - medical care, medical teaching, and medical research."***
  Preliminary announcement for the Third World Conference on Medical Informatics, MEDINFO 80, 1977.

- ***Approximately more than third of medical schools in the United States have a department or Units of medical informatics. Others have schools for health informatics and public health***

TELEMEDICINE

- Used for consultation remotely.
- Also for sending radiology images over a distance to be interrupted by physician abroad.
- First use: in military conditions.

is composed of the Greek word τελε (tele) meaning 'far', and medicine. It is therefore the delivery of medicine at a distance. A more extensive definition is that it is the use of modern telecommunication and information technologies for the provision of clinical care to individuals located at a distance and to the transmission of information to provide that care.

TELEHEALTH

- **Telehealth is more comprehensive than T-medicine.**
- used in ageing population that are not able to take care of themselves, can send there condition through a modem to a health care institution to be interpreted and dealt with.

The delivery of health related services, enabled by the innovative use of technology, such as videoconferencing, without the need for travel.

EHEALTH

E- health is more comprehensive than T-Health.
→ because it is not necessary to work on information remotely from a distance.

Also written e-health, is a relatively recent term for healthcare practice which is supported by electronic processes and communication, some people would argue the term is interchangeable with Health Informatics.

TELE-HEALTH OR E-HEALTH

- ***E-health* is *much more than tele-health.***
- ***tele is a limiting factor to the form of technology in health.***
- ***E-health could be at distance or local.***

FROM TELEMEDICINE TO EHEALTH

- ***The practice of telemedicine will become more prominent and will be part of the mainstream of Healthcare;***

- ***It will become increasingly difficult to differentiate telemedicine from many other uses of technology in the delivery of healthcare;***

FROM TELEMEDICINE TO EHEALTH

- E-health is all inclusive and captures the use of Internet technologies and the rise of the information economy. This includes:
  - information technology;
  - telecommunication technology;
  - Data transmission protocols and techniques;

- E-Health is all inclusive and captures all types of Healthcare and Healthcare professionals: it is not limited to medicine and not limited to doctors;

EVIDENCE BASED MEDICINE

Entails a system that provides information on appropriate treatment under certain patient conditions. A healthcare professional can look up whether his/her diagnosis is in line with scientific research. The advantage is that the data can be kept up-to-date.

BIOINFORMATICS

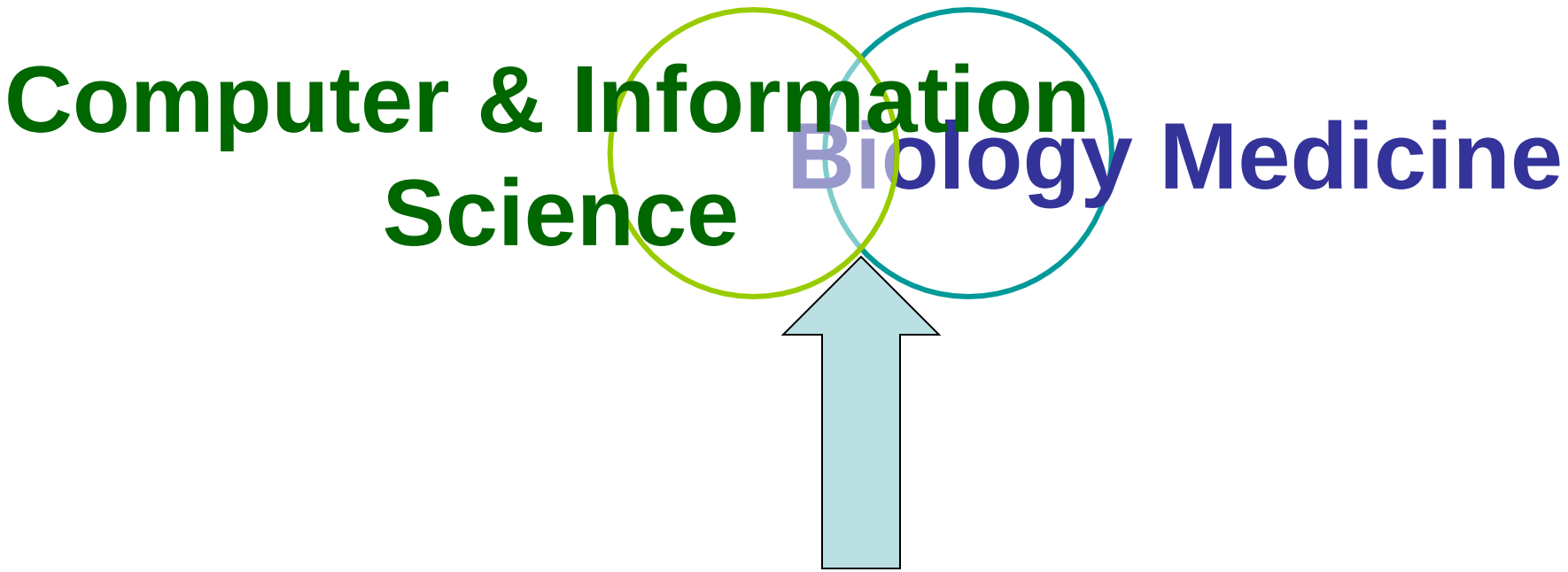
Bioinformatics = **Genomics.**

The collection, organization, and analysis of large amounts of biological data, using computers and databases. Historically, bioinformatics concerned itself with the analysis of the sequences of genes and their products (proteins), but the field has since expanded to the management, processing, analysis, and visualization of large quantities of data from genomics, proteomics, drug screening, and medicinal chemistry. Bioinformatics also includes the integration and "mining" of the ever-expanding databases of information from these disciplines.

ELECTRONIC MEDICAL RECORD (EMR)

A general term describing computer-based patient record systems. It is sometimes extended to include other functions like order entry for medications and tests, amongst other common functions.

BIOMEDICAL INFORMATICS



DENTAL INFORMATICS

Is the name given to the application of information technology to dentistry. It is often considered a subset of Medical Informatics and Biomedical Informatics.

NURSING INFORMATICS

Nursing Informatics is a specialty of Health Informatics (like Medical Informatics, Consumer Health Informatics, and Telehealth) which deals with the support of nursing by information systems in delivery, documentation, administration and evaluation of patient care and prevention of diseases.

CONTINUING MEDICAL EDUCATION (CME)

- ***The science of medicine advances at such a rapid rate that much of what is taught becomes outmoded, and it has become obligatory for physicians to be lifelong learners, both for their own satisfaction and, increasingly, as a formal government requirement to maintain licensure.***
- ***Doctors who practice in rural areas or other more isolated locations may face considerable obstacles to obtain hours for CME.***

Why Continuous medical education is needed ?

1. To be up to date (life-long-learning).
2. For license (governmental requirement).

CONTINUING MEDICAL EDUCATION (CME)

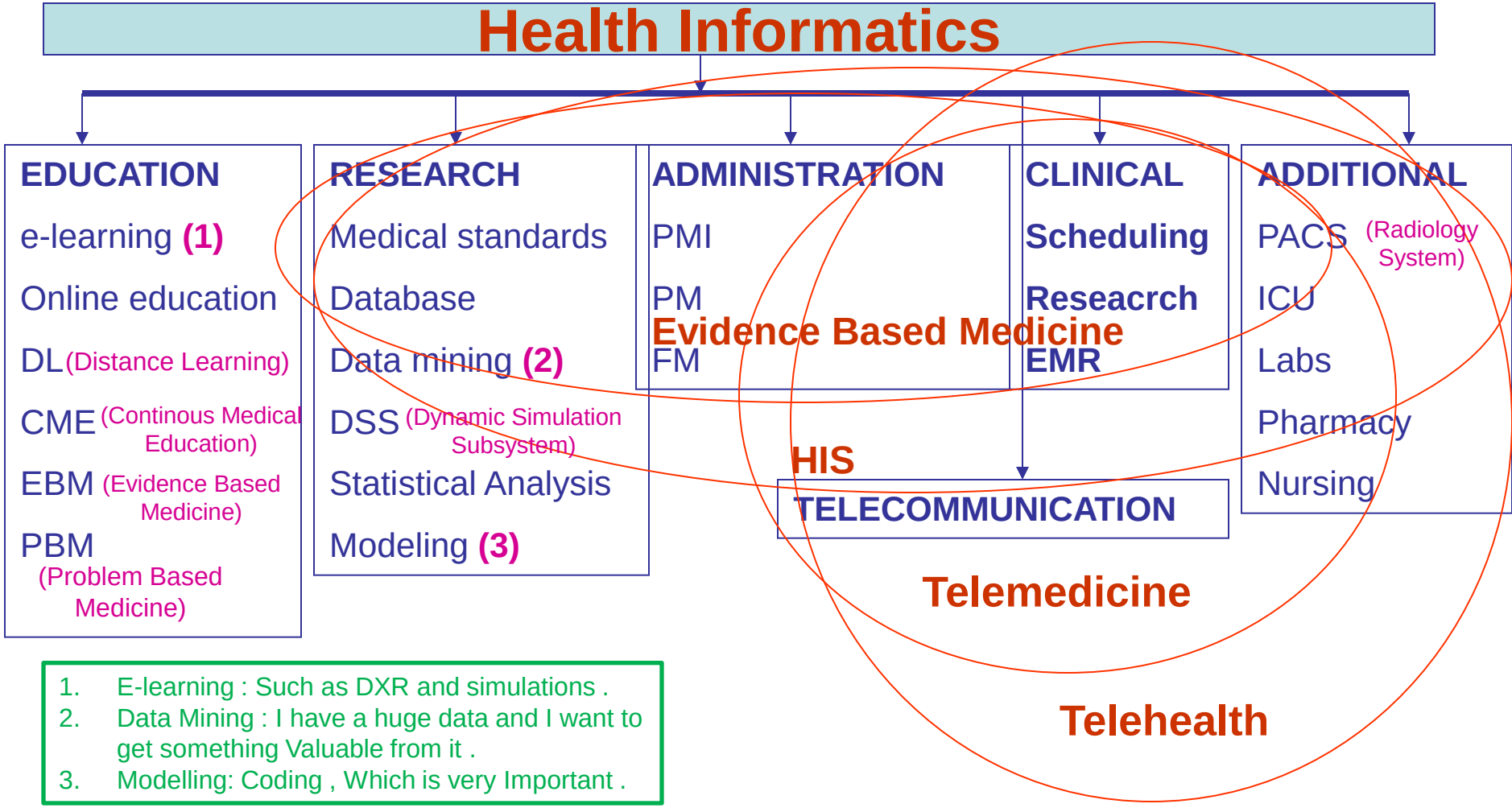
- ***The cost of web-based or online CME is much lower than the cost of traditional CME.***

DISTANCE LEARNING

- ***With aid of telecommunications technologies and internet, distance learning is now widely applied in may universities, eg Open University***

- ***It is now possible to earn university degrees from home, at every level from bachelor's to doctorate.***

Health Informatics



1. E-learning : Such as DXR and simulations .
2. Data Mining : I have a huge data and I want to get something Valuable from it .
3. Modelling: Coding , Which is very Important .

- If you are having patient information + Telecommunication "→ you can practice **Tele-medicine.**
- If you are having patient information + Telecommunication + expanded to involve nurses and pharmacy " → you can practice **T-Health.**
- If you have research tools + clinical evidence " → This is **EBM.**

E-HEALTH COMPONENTS

Summery of e-Health components

1. Digital Format of Medical knowledge.
2. Person wiling to share.
3. Equipment to store, retrieve and process the data.
4. Telecommunication to send data.

Four essential components make the e-health

- Medical knowledge that lends itself to being stored in computer files (digital format);
- People who are willing to share, apply and use this knowledge;
- Data processing equipment to record, store and process this data;
- Telecommunication facilities to transfer (exchange) this data electronically between remote locations.

WHY MEDICAL INFORMATICS FOR HEALTHCARE?

- ***Improve Healthcare quality***
- ***Better data access***
- ***Faster data retrieval and storage***
- ***High quality data***
- ***Support medical and non-medical decision-making***

Summery Benefits Medical informatics

- Better and fast access to data.
- Better data quality.
- Improved coordination of care.
- Reduced Medical errors.
- Reduce un-necessary interventions and procedures.

WHY MEDICAL INFORMATICS FOR HEALTHCARE?

- *Enhance quality assurance*
- *Enhance out-come researches and studying programs*
- *Sharing medical data*
- *Reduce duplication of efforts*
- *Provide unified access to all existing data*

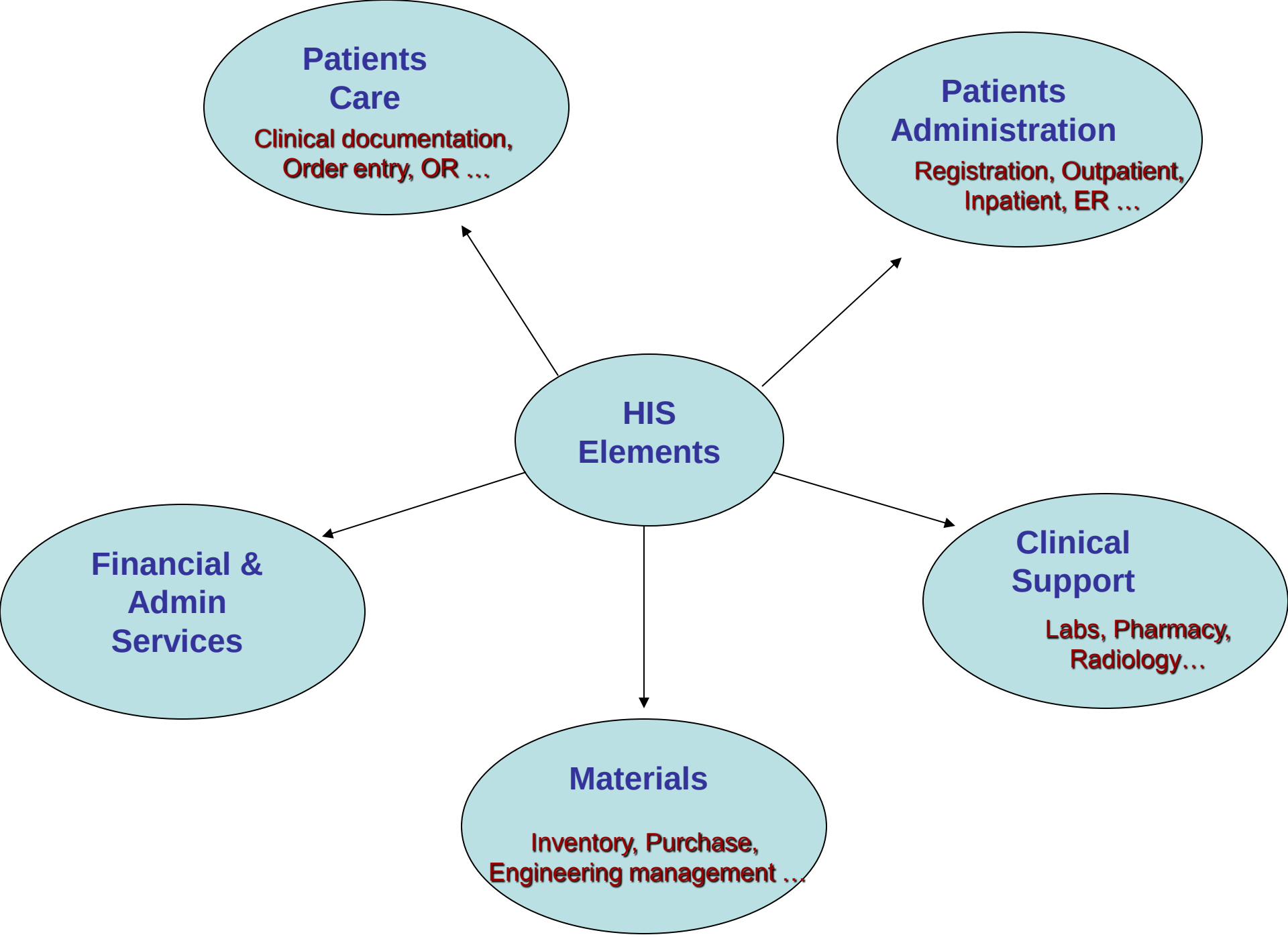
Why Medical Informatics for Healthcare?

- *Increase healthcare organization efficiency*
- *Reducing cost and achieves quality of healthcare*
- *Improve staff productivity*
- *Reduce redundant tests, services and information entry*
- *Manage billing and payment system*
- *Eliminate and reduce errors*

HOSPITAL INFORMATION SYSTEM

HIS: ***is a comprehensive information system dealing with all aspects of information processing in a hospital.***

- ***This encompasses human (and paper-based) information processing as well as data processing machines.***
- ***As an area of Medical Informatics the aim of HIS is to achieve the best possible support of patient care and administration by electronic data processing.***


Patients Care
Clinical documentation, Order entry, OR …
Patients Administration
Registration, Outpatient, Inpatient, ER …
HIS Elements
Financial & Admin Services
Clinical Support
Labs, Pharmacy, Radiology…
Materials
Inventory, Purchase, Engineering management …