



## **A Brief Introduction to Medical Informatics (for Biomedical Engineers)**

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10<sup>th</sup> April 2007

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### **Today's presentation**

- 01: What is Medical Informatics
- 02: Medical Informatics in Biomedical Engineering

## 01• What is Medical Informatics

### Defining the Definition

- The definition of Medical Informatics is highly dynamic due to the rapid developments in both medicine and technology.
- There are various definition on Medical Informatics, the three most common ones are;
  1. ***The application of computers, communications and information technology and systems to all fields of medicine - medical care, medical education and medical research.***

*MF Collen, MEDINFO '80, Tokyo*

## Defining the Definition (cont')

2. *The branch of science concerned with the use of computers and communication technology to acquire, store, analyze, communicate, and display medical information and knowledge to facilitate understanding and improve the accuracy, timeliness, and reliability of decision-making.*

*Warner, Sorenson and Bouhaddou,  
Knowledge Engineering in Health Informatics, 1997*

3. *The science underlying the acquisition, maintenance, retrieval, and application of biomedical knowledge and information to improve patient care, education, research and administration*

*Charles Friedman,  
Center for Biomedical Informatics*

## Why Medical Informatics?

- Main objective for healthcare facilities to implement Healthcare / Clinical Information Systems is to **reduce errors**

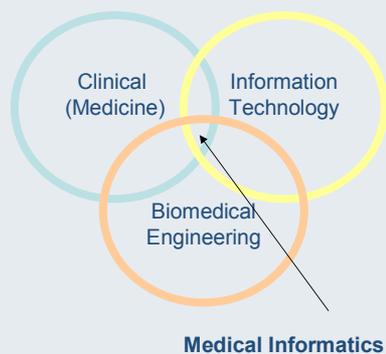
Order entry systems	Clinical decision support systems
<ul style="list-style-type: none"><li>• Reduce medication errors</li><li>• Detect potential drug interactions</li></ul>	<ul style="list-style-type: none"><li>• Improve drug dosing</li><li>• Improve preventive care</li><li>• Not diagnosis</li></ul>

## 02• Medical Informatics in Biomedical Engineering

### The Correlation - Why Does it Matter?

- Common question posed by Medical Devices Service Engineer :  
“I’m not an IT professional, how does this matter to me?”
- “The science underlying the **acquisition**, maintenance, retrieval, and application of biomedical knowledge and information to improve patient care, education, research and administration”

Charles Friedman,  
Center for Biomedical Informatics



## The Correlation - Why Does it Matter? (cont')

- Modern medical equipment are really computers
- **Medical Imaging** and **Patient Monitoring** equipment are good examples of computer based medical devices are heavily dependent on computers
- Adoption of computers into medical devices does **not** constitute to medical informatics in biomedical engineering



## Biomedical Engineering

- The application of **engineering principles** and **techniques** to the medical field. It combines the design and problem solving expertise of engineering with the medical expertise of physicians to help improve patient health care and the quality of life of healthy individuals.
- (Some) Disciplines within Biomedical Engineering

Bioinstrumentation	Biomaterials	Biomechanics	Clinical Engineering*
Medical Imaging*	Orthopedic surgery	Rehabilitation Engineering	Cellular, tissue and genetic engineering *

Source : Biomedical Engineering Society

## Medical Informatics in Biomedical Engineering

- Most significant aspect of medical informatics in biomedical engineering - **Standards** on transfer of medical data between medical devices and/or to computer systems
- Notable examples of Standards

### DICOM

- Developed by the American College of Radiology (ACR) and National Electrical Manufacturers Association (NEMA)
- Defines the connectivity and communication protocols of medical imaging devices

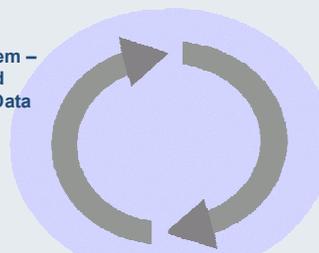
### DataCaptor middleware

- Solution from Capsule Technologies for the instrument (clinical devices) interfaces
- Includes Laboratory instruments, infusion pumps, anesthesia machines, vital signs monitors, respirators and EEGs

## Medical Informatics in Biomedical Engineering (cont')

- *The science underlying the **acquisition, maintenance, retrieval, and application** of biomedical knowledge and information to improve patient care, education, research and administration.*

Clinical Information System –  
Storage, Retrieval and  
processing of Patient's Data

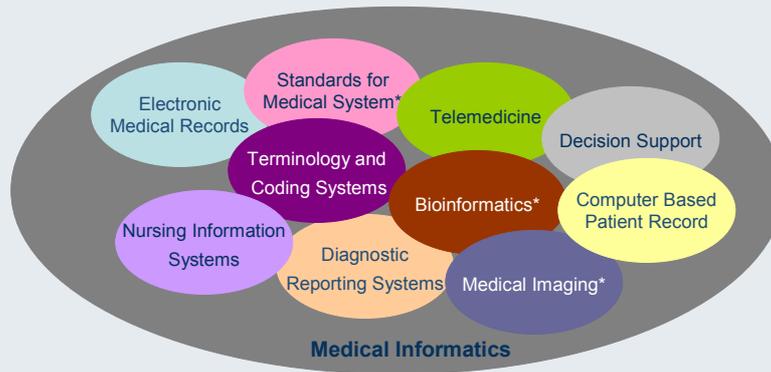


Clinician –  
Use of Patient's Data  
for diagnosis

Medical Devices -  
Acquisition of  
Patient's Data

## Medical Informatics

- Other areas of Medical Informatics includes (but not limited to)



## Questions?



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