Slide 1

### Health Management Information Systems

Unit 1
What is Health Informatics?

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Slide 2

### Objectives

- Define information management, information technology and informatics.
- Explain the basic theoretical concept that underlies informatics practice.
- Define the meaning of biomedical and health informatics as a field of study.
- Describe the biomedical informatics areas of applications.
- Summarize the informatics drivers and trends.

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Slide 3

### Information management

- Information management
  - Collection and management of information
  - One or more sources
  - Distribution to one or more audiences

http://en.wikipedia.org/wiki/Information_management

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Slide 4

### Information technology

- Information technology
  - Any technology
  - Assists in the
    - Production
    - Manipulation
    - Storage
    - Communication, and/or
    - Dissemination of information.

http://en.wikipedia.org/wiki/Information_technology

Slide 5

### Informatics

- The science of information
  - Information = data with meaning
- Definition based on
  - Data, information, knowledge

Bernstam E., Smith J., Johnson T. What is biomedical Informatics. [Internet]. Journal of Biomedical Informatics; 2009 February [cited 2010 June 22]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19683067

Slide 6

### Data, information, knowledge, wisdom hierarchy

- Data – symbols, facts, measurements
- Information – data processed to be useful; provides the who, what, when, where
- Knowledge – application of data and information; provides the how
- Wisdom – evaluated understanding; provides the why

Rowley, J. The wisdom hierarchy: representations of the DIKW hierarchy. Journal of Information Science http://antonietta.philo.unibo.it/IUcorso2007-08/mdidattici/rowleydikw.pdf
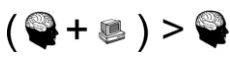
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## DIKW

- DIKW is the proposed structuring of data, information, knowledge and wisdom in an information hierarchy where each layer adds certain attributes over and above the previous one

http://www.reference.com/browse/DIKW

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Slide 8

## Fundamental theorem of informatics

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A "Fundamental Theorem" of informatics.
J Am Med Inform Assoc. 2009 Mar–Apr; 16(2): 169–170.
doi: 10.1197/jamia.M3092.

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Slide 9

## Application domains for informatics

- Any area of human endeavor supportable by information technology
  - Such as
    - Entertainment
    - Law and law enforcement
    - Other fields where computer technology interfaces with people

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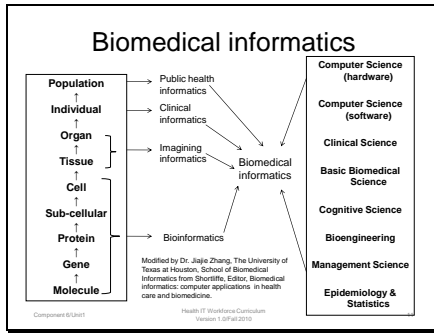_____
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Slide 10

## Biomedical and health informatics

- AMIA - "Biomedical and health informatics has to do with all aspects of understanding and promoting the effective organization, analysis, management, and use of information in health care."
- Shortliffe - "the scientific field that deals with biomedical information, data, and knowledge – their storage, retrieval, and optimal use for problem solving and decision making."
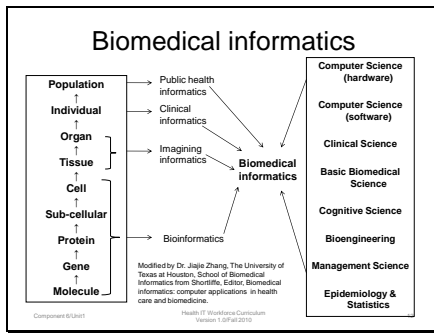
https://www.amia.org/informatics
Shortliffe, E., Biomedical informatics: computer applications in health care and biomedicine

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Slide 11

## Biomedical informatics

Population
↑
Individual
↑
Organ
↑
Tissue
↑
Cell
↑
Sub-cellular
↑
Protein
↑
Gene
↑
Molecule

Public health informatics
Clinical informatics
Imagining informatics
Biomedical informatics
Bioinformatics

Computer Science (hardware)
Computer Science (software)
Clinical Science
Basic Biomedical Science
Cognitive Science
Bioengineering
Management Science
Epidemiology & Statistics

Modified by Dr. Jiajie Zhang, The University of Texas at Houston, School of Biomedical Informatics from Shortliffe, Editor, Biomedical informatics: computer applications in health care and biomedicine.

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Slide 12

## Biomedical informatics

Population
↑
Individual
↑
Organ
↑
Tissue
↑
Cell
↑
Sub-cellular
↑
Protein
↑
Gene
↑
Molecule

Public health informatics
Clinical informatics
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Bioinformatics

Computer Science (hardware)
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Slide 13



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Slide 15



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Slide 16

### Biomedical informatics

Population
↑
Individual
↑
Organ
↑
Tissue
↑
Cell
↑
Sub-cellular
↑
Protein
↑
Gene
↑
Molecule

Imagining informatics → Biomedical informatics

**Examples:**
CT scanner
Picture archiving and communication systems (PACS)

Modified by Dr. Jiajie Zhang, The University of Texas at Houston, School of Biomedical Informatics from Shortliffe, Editor, Biomedical informatics: computer applications in health care and biomedicine.

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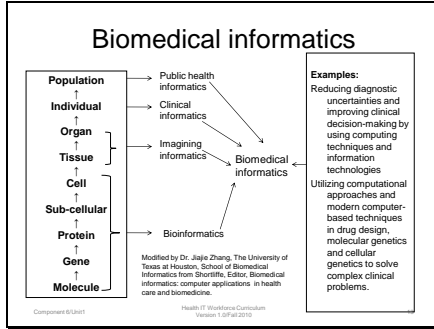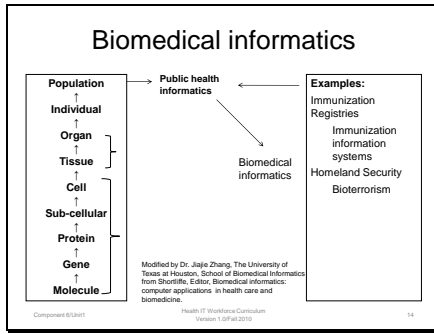
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Slide 17

### Biomedical informatics

Population
↑
Individual
↑
Organ
↑
Tissue
↑
Cell
↑
Sub-cellular
↑
Protein
↑
Gene
↑
Molecule

Bioinformatics ← **Example**
Genomic sequencing

Biomedical informatics

Modified by Dr. Jiajie Zhang, The University of Texas at Houston, School of Biomedical Informatics from Shortliffe, Editor, Biomedical informatics: computer applications in health care and biomedicine.

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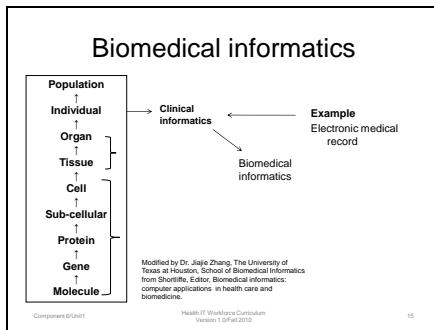_____

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Slide 18

### Biomedical informatics

Biomedical informatics

Computer Science (hardware)
Computer Science (software)
Clinical Science
Basic Biomedical Science
Cognitive Science
Bioengineering
Management Science
Epidemiology & Statistics

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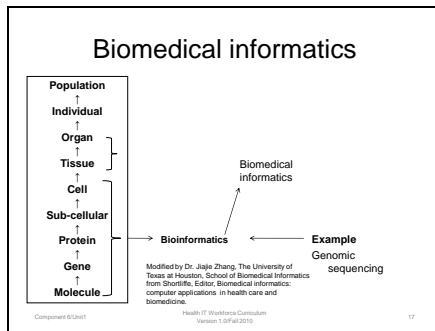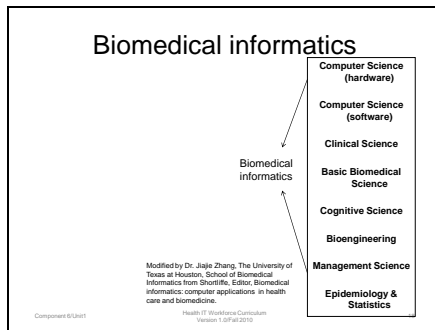
Slide 19

## Current drivers

- ARRA
  - American Recovery and Reinvestment Act
  - $19.2 billion for health IT
- HITECH
  - Health Information Technology for Economic and Clinical Health
  - Includes the health information communication and technology provisions.

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## Current trends in health informatics

- eHealth
- Electronic medical records
- Electronic health records
- Health information exchange

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## eHealth

- WHO definition
  - Use of information and communication technologies for health
- HIMSS definition
  - Application of the Internet/other technologies in the healthcare industry

World Health Organization. http://www.who.int/topics/ehealth/en/
HIMSS. http://www.himss.org/content/files/ehealth_whitepaper.pdf

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### Electronic medical record (EMR)

- Electronic record of health-related information on an individual
  – within one health care organization

Defining Key Health Information Technology Terms
http://healthit.hhs.gov/portal/server.pt/gateway/PTARGS_0_10741_848133_0_0_18/10_2_hit_terms.pdf

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### Electronic health record (EHR)

- Electronic record of health-related information on an individual
  – across more than one health care organization

Defining Key Health Information Technology Terms
http://healthit.hhs.gov/portal/server.pt/gateway/PTARGS_0_10741_848133_0_0_18/10_2_hit_terms.pdf

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### Health information exchange (HIE)

- Electronic movement of health-related information among organizations

Defining Key Health Information Technology Terms
http://healthit.hhs.gov/portal/server.pt/gateway/PTARGS_0_10741_848133_0_0_18/10_2_hit_terms.pdf

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