

## **Spring 2013 Objectives**

### **What is Biomedical Informatics?**

As a result of participating in this activity, learners will be able to:

1. Have a basic understanding of the components of medical informatics
2. Be able to characterize these components as technologies, concepts and skills

### **Database and Terminology Principles**

As a result of participating in this activity, learners will be able to:

1. Understand the historical evolution of computerized data handling methods
2. Understand the process of entity-relationship database design, including principles of normalized relational models
3. Be able to model simple normalized relational databases
4. Understand motivations and issues related to high-quality controlled terminologies
5. Understand the "desiderata" for controlled biomedical terminologies
6. Appreciate the complexities and advantages of reuse of clinical data coded with controlled terminologies

### **Clinical Informatics**

As a result of participating in this activity, learners will be able to:

1. Determine where the clinical information systems that they use or see in their work practice fit on the spectrum of HIMSS capability.
2. Consider and analyze the merits of standard EHR modules, especially in the context of HITECH's "meaningful use" standards.
3. Anticipate ways that clinical decision support enhances the utility of the EHR in clinical practice.
4. Gain sufficient expertise in clinical informatics basic theory to engage in a material way with the course's workshop project.

### **Semantic MEDLINE**

As a result of participating in this activity, learners will be able to:

1. Appreciate the need for an advanced biomedical information management application such as Semantic MEDLINE
2. Have a basic understanding of the components of Semantic MEDLINE
  - a. Information retrieval
  - b. Automatic summarization
  - c. Language processing
  - d. Knowledge visualization
3. Understand (through real scenarios) how Semantic MEDLINE supports enhanced access to the biomedical literature and literature-based discovery

### **Standard Terminologies**

As a result of participating in this activity, learners will be able to:

1. Gain familiarity with currently available standard terminologies
2. Gain experience with coding clinical cases with available standard terminologies

### **Mathematical Modeling**

As a result of participating in this activity, learners will be able to:

- 1) understand the goals of mathematical modeling in biomedicine

- 2) state the law of large numbers and appreciate how probability makes predictions about random processes
- 3) have a basic understanding of Markov models, specifically the concepts of transition matrices and stationary distributions

### **Informatics Methods**

As a result of participating in this activity, learners will be able to:

1. Understand and reason about several methodologies in common use in biomedical informatics, both from the clinical as well as the biomedical literature perspective.
2. Identify in their practice domain where these technologies are manifest, and be able to pinpoint how their practice might be improved through a more thoughtful application of these technologies.
3. Integrate their understanding of these technologies in the remaining lecture of the course.

### **Clinical Decision Support**

As a result of participating in this activity, learners will be able to:

1. explain uses and benefits of Clinical Decision Support (CDS) and Clinical Knowledge Management (CKM)
2. describe the main components of a CDS system
3. describe the different modalities of CDS
4. describe CKM processes and associated tools
5. outline important challenges and opportunities related to CDS and CKM

### **Evening Workshop on Mathematical Modeling**

As a result of participating in this activity, learners will be able to:

- 1) apply this knowledge to understanding of models for phylogeny, cancer biology, and gene annotation

### **Genetics, Genomics and Why**

As a result of participating in this activity, learners will be able to:

1. Have a basic understanding of the issues involved in genetics and genomics data
2. Have a basic understanding of the roles of Bioinformatics in the field of Biomedical Informatics
3. Relate genomics issues to the Informatics issues of providing healthcare via EMRs
4. Consider the relationships of consumer health informatics issues and genomics issues

### **Clinical Research Informatics**

As a result of participating in this activity, learners will be able to:

1. Understand the regulatory context, information security and privacy applied to research data
2. Be aware of specialized information technologies, such as the Clinical Trials Management Systems (CTMS), REDCap, and i2b2, that are useful for clinical research
3. Understand systems integration needed to improve clinical research workflows and data flows
4. Understand the role of research data repositories (data warehouses)
5. Have access to curriculum materials for teaching this topic to healthcare professionals
6. Be aware of the overall informatics context of assistance by the research community

## **Evaluation**

As a result of participating in this activity, learners will be able to:

1. Appreciate the need for evaluation
2. Recognize why evaluation in medical informatics can be difficult
3. Understand how evaluation research questions can guide selection of methods
4. Describe the relationship between the different approaches to evaluation
5. Understand the relationship between stage of system design and evaluation approach.

## **Computerized Provider Order Entry**

As a result of participating in this activity, learners will be able to:

1. To provide an overview of the motivation behind care provider order entry (CPOE) in both inpatient and ambulatory settings
2. To introduce the functionality provided in typical CPOE systems
3. To address some challenges to idealized CPOE and how these challenges are being addressed with current research and potentially mitigated with future developments

## **The EHR and Translational Research**

As a result of participating in this activity, learners will be able to:

1. develop a critical understanding of EHR as a key translational research resource.
2. Characterize the challenges of transforming data into useful knowledge.
3. Identify the important factors that influence EHR use for research including: data quality issues, security & compliance (HIPAA, IRB), non-structured data issues (molecular, imaging, text), governance, workflows.
4. Understand the EHR as a research subject recruitment tool

## **Infobuttons**

As a result of participating in this activity, learners will be able to:

1. Characterize clinician information needs
2. Understand how information resources can be integrated into clinical information systems
3. Gain familiarity with the [HL7](#) infobutton standard
4. Gain experience with creating Infobutton manager knowledge bases and the librarian Infobutton Tailoring Environment (LITE)

## **Human-Computer Interaction**

As a result of participating in this activity, learners will be able to:

1. Define Human Computer Interaction (HCI) and list two of the alternate names for the field.
2. Explain why HCI is critical in the development and deployment of Informatics systems, and cite an example of what can happen if HCI is not applied correctly.
3. Describe how HCI techniques could be applied in on project they are currently working on.
4. Describe at least two major emergent trends in HCI related to biomedicine.

## **Evening Workshop on Electronic Health Records**

As a result of participating in this activity, learners will be able to:

1. Demonstrate basic competency in general HIT system use
2. Identify characteristics of an effective HIT system
3. Identify usability constraints & explain the impact of HIT usability on user satisfaction, adoption, and workarounds in error rates or unintended consequences.
4. Explain the concept of facilitated error in HIT.
5. Suggest HIT-enabled solutions/strategies to enhance patient involvement in health and healthcare

## **National Health IT Agenda and Meaningful Use**

As a result of participating in this activity, learners will be able to:

1. Define the concept of "meaningful use" and explain how it aligns with improvement in the quality, safety, and efficiency of health care.
2. Explain why adoption, certification, and health information exchange are key components of the national health IT agenda--and describe the programs in place to achieve these goals.
3. Describe the challenges to achieving nationwide health information exchange, and how these challenges are being addressed.

## **Consumer Health Informatics**

As a result of participating in this activity, learners will be able to:

1. Have an understanding of topics in consumer health informatics
2. Have an appreciation for current issues in health information access and utilization
3. Have gained insight into the problems of health literacy
4. Have an appreciation for the impact of consumer health informatics applications

## **Telehealth**

At the completion of the session, the participant will:

1. Understand telemedicine as an information process
2. Understand the technical, regulatory and societal impediments to the utilization of telemedicine
3. Be familiar with advanced networking concepts and the relevance of advanced networks to healthcare delivery
4. Be familiar with NLM and other programs that demonstrate the relevance of advanced networking technology to telemedicine and healthcare delivery
5. Gain an appreciation of future telehealth directions and the challenges and opportunities they represent

## **Research Issues in Biomedical Informatics**

As a result of participating in this activity, learners will be able to:

1. Understand the some important but unanswered research questions in bio-medical informatics.
2. Have an understanding of consumer health information access issues.
3. Have pointers to useful resources in digital library research.