

## **Objectives Evaluation:**

### **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

### **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.

### **Vocabularies and Terminologies**

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

1. Understand motivations and issues related to high-quality controlled terminologies
2. Understand the "desiderata" for controlled biomedical terminologies
3. Gain familiarity with currently available standard terminologies
4. Appreciate the complexities and advantages of reuse of clinical data coded with controlled terminologies

### **Vista**

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

### **Biomedical 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.

### **Knowledge Management and Infobuttons**

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

1. Understand the motivation for clinical knowledge management
2. Describe the importance of knowledge management for clinical decision support

3. Describe clinical knowledge management processes and associated tools
4. Understand clinicians' knowledge needs
5. Understand how information resources can be integrated into clinical information systems
6. Interact with an Infobutton Manager

### **Clinical Decision Support and Computerized Provider Order Entry**

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

1. Define CDS and CPOE
2. Explain the rationale for implementing CDS and CPOE
3. Describe common functionality of CDS and CPOE
4. Describe current adoption of CDS and CPOE in U.S.
5. Describe best practices for CDS and CPOE implementation
6. Discuss challenges and potential solutions to improving care through CDS and CPOE
7. Practically apply the knowledge gained to support care improvement initiatives

### **Human-Computer Interface**

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.

### **Informatics-enabled Quality and Value Improvement**

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

1. Articulate the need for quality and value improvement (QVI)
2. Describe common approaches to QVI
3. Describe the potential role of informatics in QVI
4. Describe best practices for the use of informatics to support QVI
5. Discuss challenges and potential solutions to using informatics to support QVI
6. Practically apply the knowledge gained to support QVI initiatives

### **Meaningful Use**

At the completion of the session, participants will:

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.

### **Natural Language Processing Resources at the NLM**

At the completion of the session, the participant will be able to:

1. Have a basic understanding of the Unified Medical Language System (UMLS)
  - a. Metathesaurus
  - b. Semantic Network
  - c. Specialist LEXICON
2. Gain exposure to the UMLS Terminology Services interface (UTS)

3. Have a basic understanding and gain exposure to the natural language processing tools and resources developed at NLM
  - a. MetaMap
  - b. SemRep

## **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. Outline methods for evaluation of the sociotechnical issues related to informatics interventions
6. Review and discuss a case and determine what needs to be addressed in terms of evaluation.

## **Population and Public Health Informatics**

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

1. Describe the mission of public health and opportunities for improvement using informatics
2. Describe how the legal framework for public health operations and how it influences the design constraints of public health informatics applications
3. Understand how informatics applications support public health response to outbreaks and epidemics
4. Discuss options for support of public health through meaningful use regulations
5. Understand the role of cloud computing and distributed computing in address problems with public health information systems

## **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)

## **Big Data and the Cloud**

At the completion of the session, the participant will:

1. Understand what is meant by “Big Data”, why it is an informatics problem and how the problem manifests itself in health research and health practice
2. Understand what is meant by “the Cloud”, why it is looked upon as an IT solution, and how it may fit into health research and health practice.
3. Gain an appreciation for the relationship between the Big Data problem and the Cloud solution.

## **Genetics/Genomics and Informatics**

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

## **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

## **Telemedicine**

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

## **Disaster Informatics**

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

1. Understand the NLM's Disaster Information Management Research Center (DIMRC) activities and disaster research programs
2. Be able to access, operate and understand web based and downloadable tools to guide first responders and first receivers
3. Understand how disparate information sources can be applied as solutions for specific problems
4. Learn and understand how hospital partnerships and informatics tools can be created to successfully respond to a large scale disaster
5. Understand how a network of Disaster Information Specialists can supply and support information and communication needs for disaster preparedness and response
6. Understand how to apply informatics to "boots on the ground" activities.

## **Research Issues in Biomedical Informatics**

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

1. Understand 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.

