Slide 1

Networking and Health Information Exchange

Unit 6a
EHR Functional Model Standards

Slide 2

Unit 6 Objectives

- Analyze fundamental structure and components of data (e.g., standards-based data elements, terminology, templates, and archetypes)
- Explain the relevance of health data interchange standards (specifically HL7 v2.x and HL7 v3.0) for data mobility for health records.

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Unit 6 Objectives continued

- Explain the relevance of document and imaging standards (specifically CDA, CCD, CCR, and DICOM) for data mobility for health records
- Explain the relevance of medical device standards (specifically IEEE 110-73 series) for data mobility for health records

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Unit 6 Objectives continued

- Explain the concept of profiling and the role of IHE in defining profiles.

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What is an EHR?

- Many definitions – why?
- What is its form and format?
- What is its purpose?
- Who is it for?

Slide 6

What is an EHR?

- Also Known As
  - Automated Medical Record
  - Computerized Medical Record
  - Computer-based Medical Record
  - Electronic Medical Record
  - Electronic Health Record
- It's NOT
  - Data Warehouse
  - Clinical Data Repository

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Institute of Medicine (IOM) Definition (1991, 1997)

The patient record is:

- principal repository for data concerning a patient's health care
- affects virtually everyone associated with providing, receiving, auditing, regulating or reimbursing health care services

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IOM Definition (1991, 1997)

- A computer-based patient record is an electronic patient record that resides in a system specifically designed to support users by providing accessibility to complete and accurate data, alerts, reminders, clinical decision support systems, links to medical knowledge, and other aids.

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Expanding the Definition

- Different groups have expanded on these earlier definitions of the EHR
- Groups include ISO, CEN, IOM, ASTM, and others
- Common understanding is important for sharing and aggregating of clinical data

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ISO EHR Standards

- ISO TR 20514
  - EHR Definition, Scope and Context
- ISO TS 18308
  - Requirements for an Electronic Health Record Reference Architecture
- ISO IS 13606-1
  - EHR Communication- Part 1: Reference Model

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ISO TR 20514

- Describes a pragmatic classification of electronic health records
- Provides simple definitions for the main categories of EHR
- Provides supporting descriptions of the characteristics of EHRs and record systems
- Defines the set of components that form the mechanism by which patient records are created, used, stored, and retrieved.

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EHR Architecture

- A model of the generic features necessary in any EHR in order that the record may be communicable, complete, a useful and effective ethical-legal record of care, and may maintain integrity across systems, countries and time.
- The architecture does not prescribe or dictate what anyone stores in their health records. Nor does it prescribe or dictate how any EHR system is implemented. It places no restrictions on the types of data which can appear in the record, including those which have no counterpart in paper records.

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CW1

ISO TS 18308 Scope

- Assemble and collate a set of clinical and technical requirements for an electronic health record reference architecture that supports using, sharing, and exchanging electronic health records across different health sectors, different countries, and different models for health care delivery.

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ISO TS 18308 Scope

- Does not define functional requirements for an EHR System but rather "… a set of clinical and technical requirements for a record architecture that supports using, sharing, and exchanging electronic health records across different health sectors, different countries, and different models for health care delivery."

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ISO 13606

- Considers the EHR to be the persistent longitudinal and multi-enterprise record of health and care provision relating to a single subject of care, created and stored in one or more physical systems in order to inform the subject's future health care and to provide a medico-legal record of care that has been provided.

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ISO 13606

- Goal: define a rigorous and stable information architecture for communicating part or all of the EHR of a single subject of care.
  - Preserve original clinical meaning intended by author
  - Reflect the confidentiality of that data as intended by the author and patient

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ISO 13606

- Not intended to specify internal architecture or database design.
- Supports a dual model approach
  - Reference model – represents the generic properties of health record information
  - Archetype Model – a formal expression of a distinct, domain-level concept, expressed in the form of constraints on data whose instances conform to the reference model

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ISO 13606

- Assumes a hierarchical structure as base for EHR architecture
- Top level is an EHR Extract that can contain part or all of an EHR

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ISO 13606 Hierarchical Structure

- EHR EXTRACT – is a hierarchy of folders
- FOLDER – contains compositions
  - Compartment relating to care provider for a single condition over a fixed period of time
- COMPOSITION – contains nested sections
  - Set of information committed to EHR by one agent as a result of single encounter

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ISO 13606 Hierarchical Structure

- SECTION – contains entries
  - Data under one clinical heading such as lab data
- ENTRY – contains elements and clusters
  - Result of one observation
- CLUSTER – contains elements
  - Means of organizing nested data structures such as a time series
- ELEMENT
  - Leaf node containing a single data value

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ASTM EHR Standards

- **E 1239** Standard Guide for Description of Reservation/Registration-Admission, Discharge, Transfer (R-ADT) Systems for Automated Patient Care Information Systems
- **E 1384** Standard Guide for Content and Structure of the Electronic Health Record
- **E 1633** Standard Specification for the Coded Values Used in the Electronic Health Record

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ASTM EHR Standards

- **E 1715** Standard Practice for an Object-Oriented Model for Registration, Admitting, Discharge, and Transfer (RADT) Functions in Computer Based Patient Record Systems
- **E 1744** Standard Guide for a View of Emergency Medical Care in the Computerized Patient Record
- **E 1769** Guide for Properties of Electronic Health Records and Record System

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ASTM E 1769

•" … an assemblage of technical, administrative, operational, communication and computer-based automated functions organized to accept, process, store, transmit, and retrieve electronic clinical information for various purposes. - such as assistance in healthcare delivery and evaluation. It provides practitioner reminders and alerts, and it facilitates access to expert knowledge bases. The operative EHRS shall permit authorized healthcare staff to enter, verify, manage, process, transmit, retrieve, view or print, or a combination thereof any or all of the EHR data. The EHRS shall permit the algorithmic creation of longitudinal electronic healthcare files. The EHRS shall permit authorized users access to EHR data for purposes such as clinical, educational, administrative, financial, quality improvement, utilization review, policy formation, and research as defined in the authorization agreement with each legitimate user. The EHRS shall protect the data from unauthorized access."

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HL7 EHR Standards

- EHR-FM Release 1
- HL7 EHR Behavioral Health Functional Profile, Release 1
- HL7 EHR Child Health Functional Model, Release 1