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Curriculum Development
Centers Program

Awardee of The Office of the National Coordinator for
Health Information Technology

Networking and Health Information Exchange

Unit 4-5
Basic Health Data Standards

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Slide 2

Unit 4-5 Objectives

- Explain how
  - Data structures can be built from basic data components
  - Templates and archetypes facilitate networking and information interchange

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Slide 3

Building Data Structures

- Starting with well-defined, finely-grained data elements, it is useful to build data structures for consistency in content, collection, and presentation.
- Structures permit binding related data components into a single structure.
- This concept is familiar because we see it on paper forms.
  - Examples include person names and addresses as well as many health data components.
- The scope ranges from simple compound elements to data collection protocols.

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Slide 4

Compound Data Elements

- Attributes similar to data elements
- Examples include blood pressure, heart murmur, titers
- Expressed as
  - Templates (HL7)
  - Archetypes (openEHR)
  - Common Message Element Type (CMET)
  - Clinical Statement
- Use XML syntax

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Slide 5

Complex Data Elements

- Attributes similar to data elements
- Examples include drug sensitivity, microbiology results, body mass index, pulmonary functional tests
- May include description logic and mathematical calculations
- May invoke an action

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Common Message Element Type

- Administrative complex data elements defined by groups within HL7.
  - Examples include person names, addresses, telephone numbers, etc.
- Support international variations
- Reusable components
- Can be reused without redefining the data object

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What Is An HL7 Template?

- Formally, an HL7 Template is a registered set of constraints on a balloted HL7 static model.
- HL7 balloted static models are all derived from the HL7 Reference Information Model.
- Templates are used in the HL7 standards Clinical Document Architecture.

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Types of Constraints

- HL7 Templates constrain both structure and content
- Structural constraints further restrict model elements such as cardinality, new class clones derived from balloted class clones, their attributes, relationships and HL7 data-types
- Non-structural constraints include valid value set expressions and conditional constraints affecting more than one model element
- Object Constraint Language may be used to define constraints on the model

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Document Templates

- Applied to the CDA schema to produce a desired level of information structure and content for a particular purpose
  – A particular type of document

- Various templates structures may be use as document templates

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Atomic Concept Definition Templates

- A template applied to part of a static model that specifies the structure and permitted coding to completely define a particular clinical concept
- Atomic concept definition templates are designed to be reusable in many different contexts
- The stereotypical example is Blood Pressure, composed of two numerical measures with optional additional information about patient positioning, cuff size, etc.

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Computed Measures Templates

- A template applied to an observation that has multiple components.
- The constraints apply to the content and relationships of the components, but also describe the computational algorithm that derives a computed measure from the component measures

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How Are Templates Created?

- Different approaches have been used
  - A static model derived from a balloted static model using the HL7 Design tools
  - Derive and then hand refine a static model schema
  - New tools that start with a balloted static model and add constraints
  - Schematron may be use to validate business rules
    - Rule-based validation language

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Archetypes

- Archetype denotes a model defining some domain concept, expressed using constraints on instance structures of an underlying reference model
- Uses Archetype Description Language
  – Similar to XML
  – Easily redefined in XML

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Detail Clinical Model

- Combines knowledge, data specification, and terminology
- Conceptual specification of the semantics of discrete structured clinical information
- Defines data elements and attributes, including the possible values
- Provides unambiguous detail that cross clinical; permits consistent use of medical data ; is reusable

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DCM Template Examples

- Apgar Score
- Barthel Index
- Blood Pressure
- Body Height
- Body Temperature
- Body Weight
- Glasgow Coma Score
- Pulse Rate
- Respiration

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Summary

- This subunit provided a short look at data structures.
  - Unfortunately there are multiple groups creating these structures, using different approaches.
  - If the content is good, a mapping tool can bring harmony and receive benefit from both groups.
- Data structures provide another level of consistency, reusability, and data sharing

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