Slide 1

Networking and Health Information Exchange

Unit 5b
Health Data Interchange Standards

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Slide 2

Objectives

- Explain how model-based standards are created
- Define the methodology development framework
- Describe HL7 v3.0 messaging standards
- Discuss other data interchange standards including DICOM

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Slide 3

v3 Messaging Standard

- Based on an object information model, called the Reference Information Model, (RIM). This model is "abstract," that is, it is defined *without regard* to how it is *represented* in a *message* "on the wire" or in a "service architecture" *method* or in a "clinical document." In fact, each of these representations can contain the same "instance" of information.
- Consequently, can be extended incrementally when new clinical information domains need to be added, in a way that doesn't require changing what has already been created.

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Slide 4

Why Cross-Reference to the RIM?

- Domain analysis models support communication within a domain
- Communications between domains requires an abstract, domain-independent model such as the HL7 RIM
- Cross-reference tables build the mappings from the narrow world of the individual domain to the cross-domain interoperability supported by the HL7 RIM

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Slide 5

HL7 V3 Reference Information Model
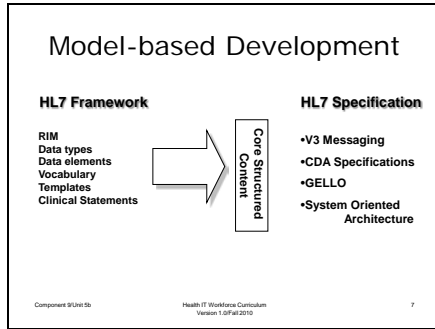
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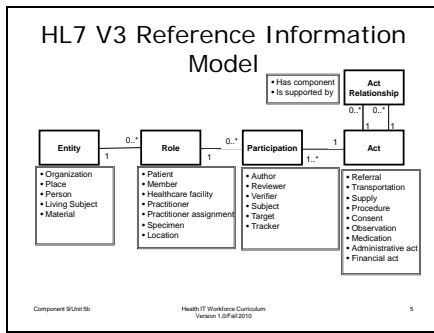
Slide 6
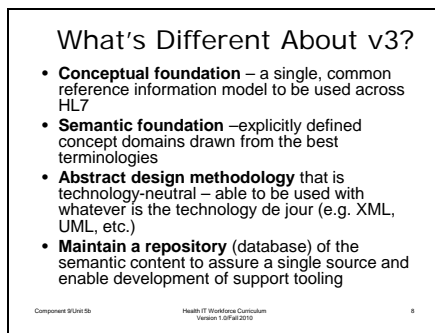
HL7 Development Framework

- Formal methodology for mapping any "local", domain specific system, such as a "laboratory system" in the v3 Reference model.
- Basic concept is that any system can be mapped into a "neutral" and formal UML-based Domain Analysis (DAM) model with the help of domain experts.
- The DAM can then be mapped into the equivalent v3-RIM model.
- Mapping is bi-directional and highlights any changes needed by either the local system or the RIM to create a semantically complete mapping.
- RIM Harmonization process supports a standard way to add new domain requirements to the RIM in a way that doesn't invalidate the previously created models – a feature of object-oriented paradigms.

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Slide 7

Model-based Development

HL7 Framework

RIM
Data types
Data elements
Vocabulary
Templates
Clinical Statements

Core Structured Content

HL7 Specification

•V3 Messaging

•CDA Specifications

•GELLO

•System Oriented Architecture

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Slide 8

What's Different About v3?

- **Conceptual foundation** – a single, common reference information model to be used across HL7
- **Semantic foundation** –explicitly defined concept domains drawn from the best terminologies
- **Abstract design methodology** that is technology-neutral – able to be used with whatever is the technology de jour (e.g. XML, UML, etc.)
- **Maintain a repository** (database) of the semantic content to assure a single source and enable development of support tooling

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Slide 9

HL7 Model Repository

- Data base holding the core of HL7 semantic specifications
  - RIM
  - Storyboards
  - Vocabulary domains
  - Interaction models
  - Message designs
  - Message constraints

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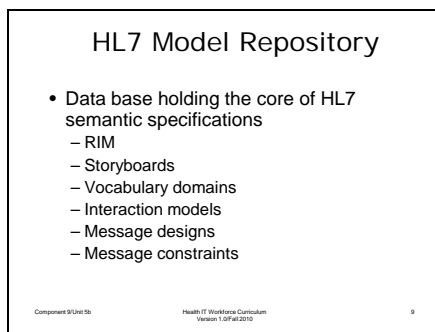
Slide 10

Tool sets

- Permit management of repository content
- Review and browsing of semantic specifications
- Design of abstract information structures based on the RIM for use in messages, templates, documents, etc.
- Publish HL7 specifications and standards
- Support implementation of HL7 standards

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Slide 11

Drivers for V3 Adoption

- Needed to support for large scale integration
- V3 has "built-in" support for Complex Data types supporting
  - "universally unique" instance identifiers for persons, places, organizations, practitioners, URL's, orders, observations, etc.
  - Name data type (persons and organizations)
  - Time and date-related data type forms
  - Codes (binding standard vocabularies to RIM attributes)
- V3's methodology of deriving its models from the RIM also supports semantic interoperability

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Slide 12

Drivers for v3 Adoption

- For implementations requiring large scale integration (city, region, province, nationwide, international), v3 has 'built-in' support
- The need for decision support and rules-based processing requires the v3 model-based semantic interoperability which is available across the many healthcare information domains.

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Slide 13

HL7 Version 3.0

- Use-case Model
- Reference Information Model
- Domain Information Model
- Message Information Model
- Message Object Diagram
- Hierarchical Message Description
- Common Message Element Definition

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Slide 14

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Slide 15

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Slide 16

Common Domains

- Common Message Element Types (CMETS): template structures for complex administrative objects such as address or telephone number
- Shared Messages
- Clinical Statement

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Slide 17

Administrative Management

- Accounting and billing
- Claims and reimbursement
- Patient Administration (DSTU)
- Personnel Management
- Scheduling

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Slide 18

Infrastructure / Messaging

- Transmission
- Message Control
- Query
- Master File / Registry

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Slide 19

Health and Clinical Management

- *Blood, Tissue and Organ
- *Care Provision
- Cardiology DAM
- Clinical Decision Support
- Clinical Document Architecture
- *Clinical Genomics
- *Immunization
- Laboratory
- Materials Management
- *Medical Records

- *Medication
- Observations
- Orders
- *Pharmacy
- Public Health Reporting
- Regulated Products
- Regulated Studies
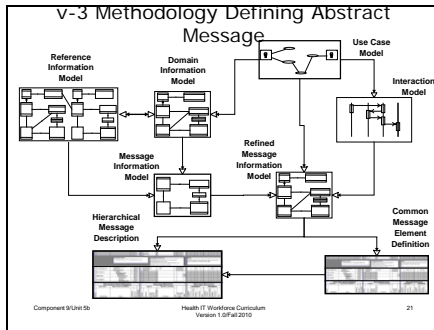- Specimen
- Therapeutic Devices

* DSTU

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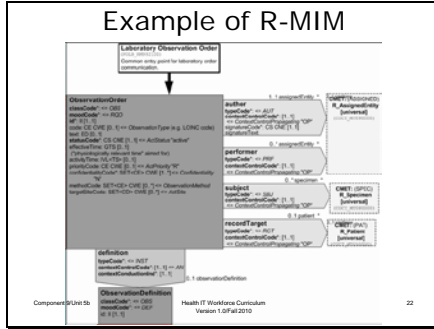_____

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Slide 20

The next series of slides show the process or methodology by which HL7 messages are created.

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Slide 21

V-3 Methodology Defining Abstract Message

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Slide 22

Example of R-MIM

Slide 23

Message instance

Slide 24

v3 Messaging Concerns

- Difficult to implement
- No one understands v3
- Overhead too much
  - 1% of message is payload compared to v2 (delimiters) is about 90-95%
- No one understands what implementation of v3 messaging means
- Need stability, clarity, definition of v3 messaging

Slide 25

What About v3 Messages?

- Some implementers create their own messaging using the HDF process. This is complex and probably not necessary.
- HL7 has begun to build a library of v3 messages, developed by HL7 experts in different areas and clinical domains.
- How many v3 messages are required to support robust EHR, RHIO, NHIN?
- Could we meet data interchange needs with only a few messages with constraint mechanisms?

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Slide 26

Summary

- This subunit introduced the HL7 v3 data interchange standard. This section also introduced an approach to planning for what system you need, the development and use of models, and introduced the concept of a reference information model which becomes the basis for interoperability among heterogeneous systems.

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