Slide 1

Networking and Health
Information Exchange

Unit 4d
Basic Health Data Standards

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Slide 2

Unit 4d Objectives

• Understand data elements; attributes of data elements

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Slide 3

Why data elements?

• The level at which data is created and collected
    – Level that is necessary to define clinical models and
      input for clinical decision making
• Level at which data elements can be precisely,
  uniquely and unambiguously defined that is
  independent of use, location and circumstance.
• Simplifies achieving semantic interoperability
• Essential for computer understandability

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Slide 4

Data elements and terminology

- What is a data element and what is a terminology?
- Is diagnosis a data element or a terminology?

- Any and every concept is a data element

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Slide 5

Data elements

- Each data element assigned a unique code for identification purposes.
- Each data element will be derived to a level of precision to prevent any ambiguity in its meaning and use.
- If uniform agreement cannot be reached for an element, an element will be defined for each agreement with precise definitions to distinguish. Experience in use might ultimately resolve these disagreements.

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Slide 6

Data element set

- Defines at the lowest level the structured components that are contained and used in health care.
- If all data is derived from this master data element set, data can be shared and understood independent of the interchange mechanism
- Can be harmonized across clinical domains
- Permits sites to define the data they collect

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Slide 7

Master data element set

- Enables sites to define what data elements are collected and stored as part of the EHR
- From this master, minimum data sets may be derived for various purposes, for example, a minimum data set defining decision support inputs, reporting quality measures or to a clinical data registry.
- Becomes the basis for interoperability in the interchange of data

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Master data element set

- The MDE set will include categorical terms from high to lower levels. The level of defining these levels will be a development issue. It is most likely that these will be hierarchical.
- Class examples include:
  - Demographic
  - Studies
  - Therapies
  - Problems
  - Physical Examination

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Slide 9

Other uses

- It is likely that most data exchanges between various sites of care will be in a query response mode. A site's database of the data elements collected with make it much easier to define what is available and what is desired.
- Query profiles can be defined from the site's data element set.
- Permits local, dynamic classification sets for various purposes, including medical specialties

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Slide 10

Attributes

- Unique code
- Short name or acronym
- Long name
- Synonyms
- Definition
- Use and purpose, including context
- Category
- Units
- Data type
- Value set
- Mood (state)
- RIM Class
- Linkages to representation sets
- …

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Slide 11

List of attributes (1)

- Code
  - numeric without meaning
  - OID hierarchically assigned
- Name
  - As used in clinical setting
  - Preferred
  - Short name or display name
- Definition
  - Textual
  - Structured

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List of attributes (2)

- Data type
  - Chosen from ISO/HL7/CEN standard
  - Simple or complex
- Units
  - Scientific; ISO
- Value set
  - A set of permissible values
  - Single or multiple
- Synonyms

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List of attributes (3)

- Relationship to other data elements
  - Hierarchical relationships
  - Bidirectional (parent, children)
  - Other linkages (equivalent, opposite)
  - Flags: top level; leaf level
- Classifications (Antihistamine, beta blocker)
- Language

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Administrative attributes

- Owner/caretaker/steward/responsible organization
- Submitting organization
- Registration authority
- Status (active/inactive or deprecated)
- Version
- Date

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Potential issues

- Data elements should not be controversial, since they represent a master set, not a required set.
- Categories and groupings of data elements subject to discussion and debate
- Attribute sets subject to discussion and debate
- Tool sets might evolve in functionality provided
- Early user would be essential to define issues, gaps, unforeseen consequences
- Permanent support, including maintenance and distribution must be defined, including funding

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What is ISO/IEC 11179?

- ISO/IEC 11179 Parts 1-6: Information technology – Specification and Standardization of data elements
  - A metamodel for 'data element' metadata
  - Standard by which to convey semantic, syntactic and lexical meaning
    - Human and machine understandable
    - Unambiguous

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ISO 11179

- Part 1: *Framework for the Specification and Standardization of Data Elements*
- Part 2: *Classification for Data Elements*
- Part 3: **Basic Attributes of Data Elements**
- Part 4: *Rules and Guidelines for the Formulation of Data Definitions*
- Part 5: *Naming and Identification Principles for Data Elements*
- Part 6: *Registration of Data Elements*

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National Cancer Institute

- Cancer Data Standard Repository (caDSR) – registry of common data elements
- Enterprise Vocabulary Service (EVS) – registry of terminology used by CDSR
  - Includes SNOMED CT, MedDRA. VA_NDF-RT, LOINC, HL7, NCI Thesaurus
- Based on ISO 11179
- Tools available
  - CDE Browser, UML Browser, free style search, CDE curation tool, form maker, others

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caBIG

- Vocabularies & Common Data Elements
- Evaluate and integrate systems for vocabulary and ontology content development used throughout caBIG system
- Review process classifies vocabulary into bronze, silver, gold categories with rigid rules for definition
- Stores in caDSR, EVS

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CDISC

- Study Data Tabulation Model – data elements used for clinical trials
- Uses NCI's caDSR
- Operational Data Model (ODM)

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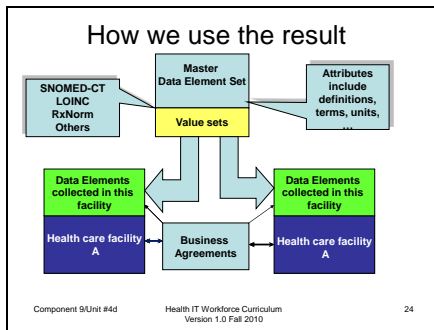   Version 1.0 Fall 2010

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How we use the result

SNOMED-CT LOINC RxNorm Others

Master Data Element Set

Attributes include definitions, terms, units, …

Value sets

Data Elements collected in this facility

Data Elements collected in this facility

Health care facility A

Business Agreements

Health care facility A

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Summary

- Necessary part of semantic interoperability
- Importance of fully defined set of characteristics
- Use 11179 standard as base
- Need global commitment

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