Slide 1

Curriculum Development
Centers Program

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

Component 9 - Networking and Health Information Exchange

Unit 4-4 - Basic Health Data Standards

This material was developed by Duke University, funded by the Department of Health and Human Services, Office of the National Coordinator for Health Information Technology under Award Number IU24OC000024.

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Slide 2

Unit 4-4 Objectives

- Understand data elements
  - Attributes of data elements
- Understand contribution of master meta-dictionary of data elements to semantic interoperability

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Slide 3

A Data Element Is …

- The atomic unit of data that is finely grained and has a precise meaning
- 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.
- What 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
- Enables interoperability among disparate sites

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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 and for query sets

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Slide 8

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 will 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 (1/3)

- 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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Slide 12

List of Attributes (2/3)

- 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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Slide 13

List of Attributes (3/3)

- 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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Slide 14

Administrative Attributes

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

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Slide 15

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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Slide 16

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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Slide 17

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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Slide 18

Data Element Details

Sex

PREV   Search   NEXT

[Relational and Representational Attributes]   [Administrative Attributes]   [Data Collection Issues]   [Data Element Links]

Identifying and Definitional Attributes
Data Element ID : NHMG 000149 Version No : 2
Type : Data Element
Status : Current
01-JUL-98
Definition : The sex of the person.
Context : Required for analyses of service utilization, needs for services and epidemiological studies.
Synonymous Name and context : Gender
Dictionary ID : P4

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Slide 19

Relational and Representational Attributes

Datatype : Numeric
Representational Form : Code
Representation Layout : N
Minimum Size : 1
Maximum Size : 1
Data Domain : • 1 Male
• 2 Female
• 3 Indeterminate
• 9 Not stated / inadequately described

Guide for Use : An indeterminate sex category may be necessary for situations such as the classification of perinatal statistics when it is not possible for the sex to be determined.

Verification Rules : For the provision of State and Territory hospital data to Commonwealth agencies this field must be consistent with diagnosis and procedure codes, for records grouped in Major Diagnostic Categories 12, 13 and 14, for valid grouping, otherwise resulting in a fatal error for sex conflicts. For other Major Diagnostic Categories, sex conflicts result in a warning error.

Related Data References : • is used in the derivation of Diagnosis related group NHIMG 000042 vers 1
• supersedes previous data element Sex NHIMG 000149 vers 1

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Slide 20

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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Slide 21

caBIG

The cancer Biomedical Informatics Grid® (caBIG®) initiative, overseen by the National Cancer Institute Center for Biomedical Informatics and Information Technology (CBIIT), was conceived to address the needs of all constituencies in the cancer community—researchers, clinicians, patients—to share data and knowledge, simplify collaboration, speed research to get diagnostics and therapeutics from bench to bedside faster and more cost-effectively, and ultimately realize the potential of Personalized Medicine. caBIG® also addresses a critical problem facing both basic and clinical researchers today— an explosion of data that requires new approaches for collection, management, and analysis. Although initially focused on cancer research and care, caBIG® technology is widely applicable to other therapeutic areas.

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Slide 22

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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Slide 23

Clinical Data Interchange Standards Consortium (CDISC)

- Study Data Tabulation Model – data elements used for clinical trials
- Operational Data Model (ODM)
- The Clinical Data Acquisition Standards Harmonization (CDASH)
- Uses NCI's caDSR

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Slide 24

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 B

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Slide 25

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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