Importance of Standardized Terminology in Healthcare Information Systems

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Importance of Standardized Terminology in Healthcare Information Systems

At the completion of this session, the learner will:

• Identify at least four reasons for using a standardized terminology in health care

• Describe the best practices in developing standardized terminologies: capturing semantics and syntax

• Describe the benefits of using a standardized terminology in documenting patient response

• Describe the Learning Health System
In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purposes of comparison.

If they could be obtained they would enable us to decide many other questions besides the ones alluded to.

They would show the subscribers how their money was being spent, what amount of good was really being done with it, or whether the money was not doing mischief rather than good.
The IOM “Digital Infrastructure” Report

Digital Infrastructure for the Learning Health System: The Foundation for Continuous Improvement in Health and Health Care

“Health and health care are going digital. ...Progress in computational science, information technology, and biomedical and health research methods have made it possible to foresee the emergence of a learning health system which enables both the seamless and efficient delivery of best care practices and the real-time generation and application of new knowledge.”

(p. 1)

Context for the use of standardized terminologies

Clinical Standards
Information Standards
Terminology Standards
Technical Standards
Standards for Security and Confidentiality

receiving

recording

comparing

exchanging

Courtesy of Anne Casey, MSc, RSCN
Why Care about Terminology Standards?

“If information in multiple locations is to be searched, shared, and synthesized when needed, we will need…common vocabularies for personal, clinical and public health information”

National Committee on Vital and Health Statistics (NCVHS) 2000
Structured Terminology
A Foundation to Achieve

- Knowledge integration of evidence-based guidelines
- Documentation flexibility
- Care Coordination
- Quality measurement
- Nursing visibility
- Knowledge discovery

Agency for Healthcare Research and Quality, Prospects for Care Coordination Measurement Using Electronic Data Sources, AHRQ Publication No. 12-0014-EF, March 2012
Importance of Using a Standardized Terminology

• Documentation of clinical detail over time (problems, interventions, outcomes)
• Structuring data entry (with flexibility of expression—novice to expert)
• Retrieval of coded data using multiple attributes and at different levels of specificity than originally coded
• Decision support (common links to clinical knowledge bases)
• Shared understanding across the continuum of care (different clinicians, different sites of care, different languages, different systems)
Importance of Using a Standardized Terminology

• Identifying and monitoring health needs and outcomes by pooling data from multiple sources
• Auditing the quality of service and benchmarking
• Supporting research activities
• Enabling reporting of externally-specified health statistics—both clinical and educational
• Identifying individuals in need of proactive intervention
The Goal of Semantic Interoperability: Sharing Data

Ability of two or more clinicians, sites of care, healthcare systems, or countries to exchange and apply health information in a meaningful way for the patient.

*The Tower of Babel*
by Pieter Bruegel the Elder (1563)
Thoughts on Developing Terminologies:
Ambiguity, Precision, and Grammar

...One less than 100 glass, narrow-necked containers of alcoholic beverages brewed from barley & hops on the room-dividing structure — one less than 100 glass, narrow-necked containers of alcoholic beverages brewed from barley & hops. Take one down, pass it around...

THE LEXICON FAMILY SINGERS
ON A ROAD TRIP
Terms and Concepts: Getting the Meaning of the Terminology

• Terms are words used to refer to a concept
  • When a concept has more than one term, we call that a synonym
• The next slide shows that a single term may refer to many different concepts
  • Context helps us know how to interpret a term
  • If you don’t know the context errors can occur
• Sometimes the concept may be right but the term is wrong or there is a translation error
  • The second slide illustrates this problem
• Agreement on relevant terms and concepts in healthcare is a challenge
- Well behaved (the child was good)
- Of a favorable character or tendency
- Commercially sound
- Conforming to a standard
- Containing less fat and being less tender than higher grades (used in grading beef)
- Pleasant, satisfactory, deserving of respect

- Synonyms: auspicious, skillful, excellent, just, honest, kind, virtuous, healthful
The concept he is thinking of is Leader, the translation is in error.
Cimino's Desiderata: Getting the Structure of the Terminology

Content
• To most users "What can be said" is more important than "how it can be said". Omissions are readily noticed and timely, formal and explicit methods for plugging gaps are required.

Concept orientation
• The unit of symbolic processing is the concept and each concept in the vocabulary should have a single, coherent meaning.

Concept permanence
• A concept's meaning cannot change and it cannot be deleted from the vocabulary.

Meaningless concept identifier
• Concepts typically have unique identifiers (codes) and these should be non-hierarchical (see code-dependence) to allow for later relocation and for multiple classification.

Polyhierarchy
• Multiple classification
Cimino's Desiderata

Formal definitions
• Semantic definitions of concepts, for example, *Streptococcal tonsillitis* = *Infection of tonsil caused by streptococcus.*

No residual categories
• Traditional classifications have rubrics that include *NOS, NEC, Unspecified, Other* whose meaning may change over time as new concepts are added to the vocabulary. These are not appropriate for recording data in an electronic health record.

Multiple granularities
• Different users require different levels of expressivity. A general (family) practitioner might use *myocardial infarction* whilst a surgeon may record *acute anteroseptal myocardial infarction.*

Multiple consistent views
• Although there may be multiple views of the hierarchy required to support different functional requirements and levels of detail, these must be consistent
Cimino's Desiderata

Representing context
• There is a crucial relationship between concepts within the vocabulary and the context in which they are used. Cimino defines 3 types of knowledge:
  – Definitional - how concepts define one another
  – Assertional - how concepts combine
  – Contextual - how concepts are used

Graceful evolution
• Vocabularies must be designed to allow for evolution and change, to incorporate new advances in healthcare and to correct errors.

Recognize redundancy
• Where the same information can be expressed in different ways, a mechanism for recognizing equivalence is required.
Thoughts on Selecting and Using Terminologies

“I can remember when all we needed was someone who could carve and someone who could sew.”

1986 Sidney Harris
Enter Once, Use Many

- Selection of terminology
- Implications for design of forms, orders, decision support, storage
- Workflow analysis is critical—for context
- Organizing data for use in reports and clinical decision making

“And so you just threw everything together? ... Mathews, a posse is something you have to organize.”
Best Practices for Terminology Selection: Getting the Right Terminology for Use

- What is the purpose for using the terminology?
- What do we need to know about how to attach concepts to research and evidence?
- May need more than one terminology to capture all context and semantics needed in patient care delivery.
- Terminology is the building block for patient safety, quality improvement, and evidence-based practice.

DIWK framework. Reprinted with permission from Nelson.
Secondary Uses of Data

Secondary use of health data can

• Enhance health care experiences for individuals
• Expand knowledge about disease and appropriate treatments
• Strengthen understanding about the effectiveness and efficiency of our health care systems
• Generate quality metrics
• Support public health and security goals
• Aid businesses in meeting the needs of their customers
National Database of Nursing Quality Indicators® (NDNQI®)

- Mission is to aid the registered nurse in patient safety and quality improvement efforts by providing research-based national comparative data on nursing care and the relationship to patient outcomes

- Proprietary database of the American Nurses Association. The database collects and evaluates unit-specific nurse-sensitive data from over 1800 hospitals in the United States

- Nursing-sensitive indicators reflect the structure, process, and outcomes of nursing care

- Moving to become compliant with NQF’s eMeasure initiative
  - Requires the use of standardized terminologies

www.nursingquality.org
Discussion Questions

1. Describe five reasons why using a standardized terminology is important.
2. Differentiate between terms and concepts.
3. Define data, information, knowledge and wisdom.
4. Describe the need for secondary use of data or data repurposed.
5. How does the use of standardize terminology support research?
6. How does the use of standardize terminology support quality assurance?
7. How does the use of standardize terminology support interoperability of EHR information?
8. Discuss the rationale for mapping standardized terminology to the components of quality measures.
9. Discuss the purposes underlying the US Learning Health System.
10. How does using a standardized terminology make Nursing visible?
Teaching Methods and Strategies

1. Lecture
2. Discussion Board—see previous questions
3. White papers concerning secondary use of data
4. Reflection paper on how the Learning Health System applies to local and the student’s own practice
5. Slide presentation on the importance of using standardized terminology(ies)
6. Data aggregation exercise from a paper record or just the screens of an EHR—develop a report of the frequency and incidence of a clinical event, have the student note the time involved, if there were difficulties in knowing what data was the same
Questions?