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Knowledge Framework and Nomenclature

HIS Usability

- **Three faces of HIS usability:**

1. **Content**
2. *Functionality*
3. *Look and feel*

Terminology Standards Realities

- **No one single reference terminology is adequate**
  - Different domain strengths for different terminologies
- **External influences on terminology preferences**
  - External endorsements of certain terminologies
  - Market acceptance of certain terminologies
- **External forces that lead to usages of certain code sets in lieu of clinical terminologies**
  - Requirement based on organization policy or procedure
  - Regulatory requirements
  - Billing and reimbursement requirements
  - Patient volume and workflow issues
  - Perception of value
  - Cost

SNOMED CT

- **An increasingly accepted clinical reference terminology globally**
- **Excellent breadth and depth for certain discretized domains:**
  - Disease
  - Finding
  - Body structure
  - Procedure
- **Despite breadth and depth, still not adequate for qualitative clinical documentation in a comprehensive manner**
  - Need to be complemented by other reference terminologies that cover certain domains better or are better or preferred standards
- **Cost is a barrier to adoption**

LOINC

- An increasingly accepted clinical reference terminology globally
- Narrow scope of focus
- No clinically usable description terms
- Lack intermediate concepts that meet clinical expression

Multum

- Comprehensive terminology of medication related concepts
- Support the identification of products
- Support the identification of medication as expressed in an order or prescription
- Critical for CPOE and clinical decision support

CPT-4

- **Most closely approximates the way diagnostic imaging tests are ordered**
- **Physicians tend to order diagnostic imaging tests in ways that are acceptable for reimbursement**
- **Kill two birds with one stone**
  - Clinical documentation and placement of orders
  - Ready for billing processing
- **Pricing is not an issue only because it is mandated and requirement for reimbursement**

ICD-9-CM

- **Already mandated for use to capture diagnostic information**
- **Close enough proxy to actual clinical condition to be usable by clinicians**
- **Data model supports the ability to express the ICD-9-CM description in easier or more clinically intuitive manner**
- **Currently limited use of data**
  - Not able to move providers away from the use despite the limitations in the information
- **Kill two birds with one stone**
  - Clinical documentation of diagnosis and problems
  - Ready for billing processing

Standard Clinical Vocabulary

- **What it enables or should enable**
  - Definitional knowledge
    - *Dictionary of terms to support flexibility and specificity of clinical expression*
    - *Concepts that define meaning through semantic relationships*
  - Clinical decision support
  - Reporting and analysis
  - Categorization of data

Standard Clinical Vocabulary

What it does not solve

- Out-of-the-box usability
- End-user compliance with the precise and accurate usage of concepts as defined by the source
- Aggregation and comparison of clinical data with reliability and validity based on concept mapping alone

Standard Clinical Vocabulary

- **The clinician selection or declaration of a concept is done in the context of all available alternate choices at that time**
  - The dependencies are:
    - *Terminology: what are the concepts available for selection for that specific domain*
    - *Version of terminology: what concepts are available may be time or version dependent, changing over time*
    - *Clinical ambiguity*
- **End-user actions:**
  - Revert to free text
  - Select the closest relevant concept, which may consist of:
    - *A more general concept*
    - *An ambiguous concept, such as "others" or "not otherwise specified"*

Example

- **The clinician documents a clinical diagnosis using the concept of anemia, when there are many more specific anemia concepts**
  - This is all the clinician know about the patient diagnostically in regards to the anemia
  - This is all the clinician wants to declare in the diagnosis module, relying on other data points to further refine/define the anemia to a greater degree of specificity (e.g. iron, ferritin, TIBC, folate, etc.)
    - *Fully described Dx=anemia, plus a low iron on laboratory test*

User and Usability Realities

- **End-user variables:**
  - Ambiguity of expression
  - Convenience of expression
  - Laziness
  - Disassociation between the definitions of concepts and the way end-user express or apply the concepts

Usability Strategies

- **Control of expression**
  - Pre-defined canonical choices to ensure standardization of data capture
  - Constraining choices in itself brings risks to the validity and reliability of the structured data
  - Constraint often pose usability challenges
- **Compositional flexibility:**
  - Freedom of ad lib composition of available reference concepts
  - End-user and context dependent