Intermountain Health Care (IHC)

NCVHS Presentation

May 21, 2003

Agenda

- Background – vocabulary use at IHC
- NDDF Plus use
- LOINC use

Intermountain Health Care (IHC)

- Integrated Health Care Network
  - 21 acute care hospitals
    - 20-520 licensed beds
    - 2,634 total beds
  - 25 free-standing clinics
  - Physician Division
  - Health Insurance

Software Support

- Central Data Repository (CDR)
  - Single storage for all hospitals, clinics, etc.
- Enterprise Data Warehouse (EDW)
  - Designed for population analysis, outcomes measures
- Healthcare Data Dictionary (HDD)

Vocabulary at IHC

- Purposes
  - Original Premise: computers can support clinicians with decision support - HELP System (1975)
    - Encoded all patient data to facilitate decision support

Vocabulary at IHC

- Purposes
  - Robust data dictionary to support clinical and financial processes
    - Comprehensive
    - Up to date
  - Interoperability
    - Communication with vendor-supplied department systems (e.g. laboratory systems, etc.)
    - Communication to outside agencies

Healthcare Data Dictionary (HDD)

- Non-Hierarchical Concept Identifier
  - Sequentially assigned concept ID with no inherent meaning
- Multiple “Surface Forms”
  - Synonyms
  - Example: trade versus generic names
- Multiple Relationships
  - Support for multiple hierarchies and domains

Vocabulary at IHC

- Healthcare Data Dictionary (HDD)
  - Manual creation of concepts
  - Import of available vocabularies
    - Used to create / update concepts
    - Maintenance of external identifiers as Surface Forms
  - Import and create relationship to manually created concepts

IHC Use of NDDF Plus

- History
  - NDDF customer since 1987
  - Used to create concepts in PTXT
  - Used to create concepts in HDD

IHC Use of NDDF Plus

- Imported Dictionary Concepts
  - Ingredients
  - Routes
  - Dosage forms
  - Dispensable medications
  - Medication products
  - Therapeutic relationships
  - Allergen and cross-sensitivity groups

IHC Use of NDDF Plus

- Associated Knowledge Bases
  - **Drug-Drug Interactions**
  - **Drug-Food Interactions**
  - **IV Incompatibilities**
  - **Patient Education Monographs**
  - **Pricing**
  - Dosage Checking
  - Side Effects
  - Disease Contraindications
  - Indications
  - Precautions (geriatric, pediatric, pregnancy, lactation)
  - Duplicate Therapy
  - Physician Order Entry Module – common full orders

IHC Use of NDDF Plus

- Vocabulary-Supported Processes
  - Allergy entry and checking
  - Medication ordering with decision support
  - Medication dispensing
  - Pharmacy department system
  - Medication charting
  - Respiratory therapy charting
  - Microbiology sensitivity patterns
  - Patient education
  - Clinician education (via link to Micromedex)

NDDF Plus Strengths

- Adoption of recognized good vocabulary practices
  - Numeric identifiers without inherent meaning – "dumb numbers"
  - Domains and hierarchies expressed as relationships
- Differentiation between permanent (storable) concepts and transitory concepts
  - Permanent: MedID, RMID, HICSEQ, AGID, etc.
  - Transitory: HIC, etc.

NDDF Plus Strengths

- Multiple therapeutic classifications
- “Primitive” versus “Composite” concepts
- Knowledge bases
- Experienced supplier
  - Market share
  - Service experience

	NDDF Plus Definition										RxNorm	
Concept	ID Name	Generic ingredient	Combo of generic ingredients	Generic, Trade, or Both names	Strength / Units	Route	Form	Package	Manufacturer	Count (Sept2002)	Count - VANDF load (Nov 2002)	ID Name
Primitives												
FDB Class (for HIC1-3)	**FDBClassID**	X								829		
Ingredient code (HIC 4&6)	**HICSeqNo**	X								7,878	3,972	Ingredients
Drug Name	**MNID**		X	B						32,993		
Coded units [NA]	**[NA]**											
Route	**RTID**					X				36		
Form	**DFID**						X			127		
Generic Dose Form	**genDFID**						X			221		
Composite Primitives												
Ingredient Code List	**HICL**		X							4,427		
Ingredient / Strength Concept	**[NA]**	X			X						10,178	Components
Composite Concepts				Name		(Strn)		Form				
			HICL	Type	MNID		RTID	DFID	gDF			
Clinical Concepts												
Routed Generic Drug	**RTgenID**		X	G			X			5,490		
Routed, Formed Generic Drug	**RtDFgenID**		X	G			X		X	7,988		
Generic code sequence no.	**GCNSeqNo**		X	G		X	X		X	12,928	11,345	Clinical Drug or "Finished Dosage Form"
Name Concepts												
Routed Drug	**RMID**		X	B	X		X			34,763		
Routed, Formed Drug	**RDFMID**		X	B	X		X	X		40,451		
Orderable Drug	**[NA]**											
Dispensable Drug	**MEDID**		X	B	X	X	X	X		52,246		
Packaged drug [NA]	**[NA]**		X	B		X	X	X		X		
NDC concepts	**PMID**		X	T	X	X	X	X		X	104,011	87,565	Packaged Drugs
Other Concepts												
Allergen Group	**AGID**									495		
Allergen Cross Sensitivity Grp	**ASXID**									447		

NDDF Plus Weaknesses

- Units: numeric identifier for units
- Ingredient strengths
- Concentration Units:
  - Composite units (e.g., “mg/5ml”, “mg/ml”, etc)
- Orderable medication concept
  - Use: dispensing, charting, billing
  - Common Dosage Unit (e.g., ml vs. drops)
- Packaged Drug concept
  - available packages without regard to manufacturer

Orderable Drug Concept

- Ordering event process versus interoperability or communication
- Orderables versus Dispensables
  - Strength versus administered dose
  - Setting effect (i.e., in-patient versus out-patient)
  - Combination versus single ingredient medications

POE Orderables

Service	Type of Med	Ordering Concepts
Administered Meds (i.e., in-patient)	Unit Dose Dispensed	**RDFMID, MEDID**
		Motrin (Ibuprofen), Oral Tab
		Motrin (Ibuprofen) 400 mgm, Oral Tab
	Package Dispensed	**MEDID**
		Hydrocortisone 1%, Topical Cream
		Garamycin 0.3%, Opth Solution
Prescriptions (i.e., out-patient)	Unit Dose Dispensed	**MEDID**
		Motrin (Ibuprofen) 400 mgm, Oral Tab
	Package Dispensed	**PMID**
		Hydrocortisone 1%, Topical Cream, 15gm tube
		Garamycin 0.3%, Opth Solution, 5 ml

RxNorm Example

Ingredients	Components
sulfamethoxazole	sulfamethoxazole 800 mg
trimethoprim	trimethoprim 160 mg

Dose Form

Oral Tablet

RxNorm

sulfamethoxazole 800 mg/trimethoprim 160 mg oral tablet

NDDF Overall Assessment

- Stable and consistent source of vocabulary and knowledge bases
- Experienced supplier
  - Good client base
  - Mature product
  - Mature service organization
- Missing concepts either being addressed or in evaluation

IHC Use of LOINC

- History
  - LOINC collaborator since inception (1996)
  - Not used in PTXT vocabulary
  - Used in HDD vocabulary

IHC Use of LOINC

- HDD concepts
  - Used to create concepts in HDD
    - Laboratory LOINC concepts
    - LOINC code surface forms
  - Used as Surface Forms to manually created concepts
    - Clinical LOINC

IHC Use of LOINC

- Processes
  - Interface codes to foreign lab system (ARUP)
  - Laboratory results
  - Laboratory orders
  - Clinical observations

LOINC Strengths

- Defined uniqueness criteria
  - Component (analyte)
  - Property measured
  - Timing
  - Type of sample
  - Type of scale
  - Method to result (where applicable)
- Name is definitional

LOINC Strengths

- Vocabulary tools
  - Browser program
  - Matching tools
- Coverage for lab concepts
- Good short names (Lab LOINC)
- Responsiveness for new concepts
- Adoption of Lab LOINC concepts
- Free use

LOINC Weaknesses

- Names are definitional
- Volunteer content generation
- Clinical LOINC coverage not comprehensive
- No legal values for coded result values
  - (e.g., urine color)
- Panels
  - Computable links between LOINC panels and LOINC results
- Flat and single hierarchy (“Classes”)

LOINC Overall Assessment

- IHC is a significant contributor to LOINC
- Requires further development
- Has proven useful in the marketplace
  - Commercial lab systems
  - Communication between systems
- IHC endorses the use for both Lab and Clinical LOINC

General Recommendations

- Phased adoption
- Adopt vocabularies that are
  - Well established
  - Most critical for communication and population analysis

General Recommendations

- Suggested Domains
  - Patient problems and diagnoses
  - Body locations
  - Medications
  - Lab tests and results
  - Clinical findings and results