Controlled Medical Vocabulary Supporting the Interoperability Decision Support at the Point-of-Care

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Overview

- Major trends in public health
- Relationship of stages of intervention
- Information cycle in electronic health systems
- IMO’s approach to interoperability
Optimize Efficiency Interoperability

- Use of Control Medical Vocabulary (CMV)
- Share the Continue-of-Care Records (CCR)
- Support the Standard for communication like HL7

Interconnect Physicians supporting patient-centric Decision Support.

Transform Clinical Information Systems through Standards like HL7, SNOMED

Empower Patients

Improve Population Health by proactive reporting

President’s Health IT Strategic Plan and our role as IT Vendor
Major Trends In Healthcare

- Shift from acute to chronic diseases
- Aging population
  - Increasing prevalence of chronic degenerative diseases
  - Multiple coexisting morbidities
- Understanding the clinicians user
- Interoperability
- Emerging technology
  - Communications “Tele-health”
  - Speech Recognitions and NLP
  - Prospective reporting tools (Business Intelligence)
Where is the Industry Focus? Where should the Focus be?

- Industry focus is “Reactive”
  - Institution-centric document management
  - Retrospective classification and coding
  - No controlled medical vocabulary (CMV)
  - No continuum-of-care record (CCR) and Interoperability

- We need to be “Proactive”
  - Community-centric information management “interoperability”
  - Real-time coding and classification at point-of-service
  - Deliver CCR using CMV
What is the Challenge?

• Moving from electronic image to text
• Classification of the stored document
• Extraction and distribution of the continuum-of-care record (CCR) / care record summary (CRS)
• Management of data over time
• Extracting the meaning through NLP
• Supporting information cycle-of-care system
Understanding the Challenges of Clinicians and their Patients
Relationship of Stage of Intervention to Healthcare Costs: An Empirical View

Elias A. Zerhouni, M.D. Director, National Institutes of Health (NIH)
Treat Disease with Multiple Interventions

Elias A. Zerhouni, M.D. Director, National Institutes of Health (NIH) Modified.
Early Preemption/Prevention of Disease

Percentage of Optimal Life Expectancy

Elias A. Zerhouni, M.D. Director, National Institutes of Health (NIH) Modified.
Understanding of Clinical Decision Support

- History
- Physical
- Assessment
- Plan 1
- Plan 2
- Plan 3
- Plan 4
- Orientation
- Interim Hx & Px
- Assessment
- Plan 1
- Plan 2
- Plan 3
- Orientation
- Interim Hx & Px
- Assessment
- Plan 1
- Plan 2
- Plan 1
- Orientation
- Interim Hx & Px
- Assessment
- Plan 1
- Diagnosis/Stable or Cured

Kim Meyers, MD, The TEPR Conference iEMR Intelligent Electronic Medical Record “Clinical Documentation Challenge” 2005

INTELLIGENT MEDICAL OBJECTS, INC.
Diagnostic and Management

Visits

Disease Burden

Preclinical

Tolerable

Intolerable

Diagnostic Intervention

Management Intervention

Stabilization/Resolution

1 2 3 4 5 6
Prepare IT for the Transformation of Medical Decision Support in the 21st Century

20th Century

1. Treatment for disease and loss of function
2. Measure quality with financial coding systems (ICD, CPT, HCPCS, NDC.)
3. Molecular basis of disease not well-understood
4. Rewards based on activities from single visits
5. Expensive; not cost-effective

21st Century

1. Intervene before symptoms appear and preserve normal function for as long as possible
2. Measure outcome and quality using Clinical terminology (SNOMED CT, RxNorm, Loinc)
3. Molecular basis understood; detect patients at risk
4. Reward and based on outcome over time (pay for performance)
5. Increased cost-effectiveness and improved quality of life
Today’s Standards

- ICD-9-CM Reimbursement
- CPT Reimbursement
- HL7 V2.x Messaging, demographics, etc.
- HL7 CDA Text reports
- HL7-IHE Care record summary (CRS) (CCR)
- SNOMED CT Reference terminology for clinical data
- NCPDP Pharmacy, ePrescribing
- NDF-RT/RxNorm Medications
IMO Problem Solving Solution
Vocabulary (Dx, Tx, Rx)
Top Down Approach

- Personal Health Terminology (PHT) is an Interface Terminology with Mapping to:
  - **Dx**: ICD9-CM → SNOMED-CT
  - **Tx**: CPT /HCPC → SNOMED-CT
  - **Rx**: Lexi-Comp, FDB, Multum, MediSpan, NDC and NCPDP → RxNorm
Information Cycle In Electronic Medical Systems

PHT

Data Capture

Data Repository
Data Warehouse

Knowledge Management

Knowledge Delivery

Data Analysis
Modeling the Data to Support Portable Patient File (PPF)
Complexity of Biological Networks
MD thought process while caring for patient.
Central Meta Dictionary
Supporting PPF
Harvesting New Technologies

- Tele-Health
- Speech Recognition (SP)
- Natural Language Parsing (NLP)
- Prospective Business intelligence Reporting
Tele-Health Devices

- Panasonic Tele-Homecare System
- Avidcare Home Health Monitor
- Blood Pressure and Modem
- Glucometer and Uplink
Using Tele-Health in EMR Work Flow
Using: Speech Recognition (SR) & National Language Parsing (NLP)

- SR is helping us remove the need for paper.
- Current NLP technology is helping us in classification and to extract the continuum-of-care record (CCR).
- SR and NLP can not help us with management of data over time.
- NLP can extract the meaning, but an expert is needed to validate the meaning.
- Good implementation of SR and NLP need to be at point of service to support the Information cycle-of-care system.
On Demand in Context Speech Recognition using Dictaphone
Speech Recognition and NLP within Target Application “iEMR”
Simple and Dynamic Grammar using IMO Enhanced Rx Vocabulary

Medication example.
result   -> @Title [','] [[@Strength @Unit] [@Intake] [@Form] [@Route]] [@Frequency] [@Comment];
@Title   -> string {* sql 'select "IMOMED" SOURCE, MED_LEXICALIMO_CODE CODE, NAME TITLE from knowledge.MED_LEXICALIMO where name like upper("@%") and rownum < 20 order by name ' *};
@Form    -> Dictionary('MED FORM');
@Strength -> (number [ '/' number]) | real;
@Unit    -> Dictionary('MED UNIT');
@Intake  -> (number [ '/' number]) | real;
@Route   -> Dictionary('MED ROUTE');
@Frequency -> Dictionary('MED FREQ');
@Comment -> string {* eos *};
Vocabulary to Drive the BI Using IMO Enhanced Vocabulary

Time

Dx

Rx

Tx
Interoperability And Controlled Medical Vocabularies
Supporting Interoperability

Application

Interface Terms

Reference Terms

Data Layer

Communication Layer

NO Terminology
NO Interoperability at the Application Level

Reference Terms

Data Layer

IMO PHT

SNOMED CT
Conclusions

• These are exciting times, don’t get lost in technology.
• Support Decision-Support by performing automatic coding at point-of-care with CMV.
• It is all in the dictionaries. Make sure they are maintained and up-to-date.
• Be aware of changes in terminology, but always think of ROI for your user.
• Don’t forget “It is all about delivery of good care.”