

National Committee on Vital and Health Statistics (NCVHS)

Consolidated Health Informatics (CHI) Update

October 11, 2006



U.S. Department of Health and Human Services
Office of the National Coordinator
for Health Information Technology



Federal Health Architecture
ROADMAP FOR FEDERAL HEALTH



Agenda

- **Standards Work Groups Update**
 - CHI Disability Recommendation
- **Questions**



- **Disability Recommendation**
 - **Participants**
 - **Scope**
 - **Background**
 - **Recommendation Process and Endorsement Dates**
 - **Standards Adoption Recommendation**
 - ❖ **LOINC**
 - ❖ **ICF / SNOMED and CHI endorsed vocabularies**
 - ❖ **HL7 Messaging**
 - **Recommendation**
 - ❖ **Conditions**
 - ❖ **Benefits**
 - ❖ **Considerations**





CHI Disability Work Group Participants

● Disability Work Group

– Participants:

❖ **Co Chairs:** Dr. Laurence Desi, SSA
Jennie Harvell, ASPE

❖ **Members:** HHS - ASPE, CMS, NLM, CDC, IHS
SSA
RRB
VA - VHA, VBA
DOD
DOL
DOS



– Scope

- ❖ **Functioning and Disability Content and related Assessment Instruments**

– Background

❖ **Builds on CHI Phase I:**

- » Gaps in domain vocabularies (ICF and SNOMED)
- » NCVHS recommended considering standardizing with:
 - LOINC
 - Semantics terminology

❖ **Leverages and Analysis:**

- » ASPE/CMS MDS Standardization Project
- » Clinical LOINC RFC efforts
- » Work Group Use Case analysis
- » ICF/SNOMED pilot mapping





Recommendation Process

– Recommendation Process and Endorsement Dates

- ❖ **Conducted recommended analysis and developed the Functioning and Disability Standard Adoption Recommendation Report 7-2005 through 9-2006**
- ❖ **Presented the Recommendations Report to CHI on 9-6-06**
- ❖ **Report vetting through CHI federal agencies**
 - » **Motion to endorse and send the Recommendation Report to NCVHS on 10-4-06**
 - » **Distribute Report to NCVHS SSS on 10-5-06**
- ❖ **Present Recommendation to NCVHS SSS 10-11-06**





CHI Functioning and Disability Recommendation

– CHI Standard Adoption Recommendation*:

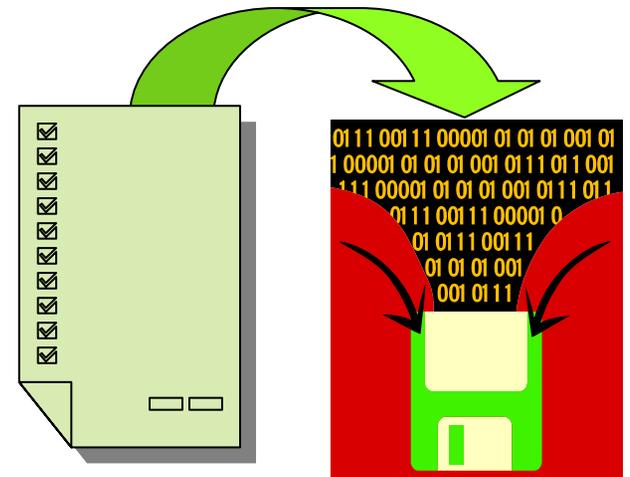
1. LOINC for Question and Answer “format”
2. CHI-endorsed vocabularies for exact and “usefully-related” content (e.g., SNOMED)
 - Identify ICF as a CHI endorsed vocabulary standard for disability content, include ICF in UMLS, and create mappings between SNOMED and ICF
3. HL7 for “Exchange”

* **Conditional Recommendation**



LOINC Components

- **LOINC- for representation of ‘Questions and Answers’**
 - Detail ASPE/CMS funded study
 - Study Results: <http://aspe.hhs.gov/daltcp/reports/2006/MDS-HIT.htm>
 - LOINC-ified Assessments
 - ❖ MDS
 - ❖ RFC
 - ❖ Others not included in CHI Report
- **LOINC Components**
 - Single LOINC code to name Panel, plus
 - Required Elements
 - ❖ Component, Property, Timing, System, Scale, Method
 - Optional Elements
 - ❖ Class, Survey Question Source, Survey Question Text, Answer List, Formula, Comments, Context





MDS LOINC Representation

45981-8 MDS FULL ASSESSMENT FORM: -: PT: ^PATIENT: -:

NAME

Component

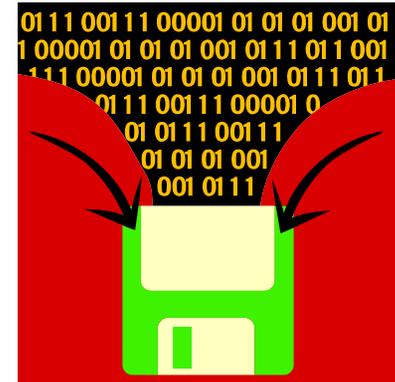
MDS FULL ASSESSMENT FORM - PT ^PATIENT -

BASIC PROPERTIES

Class/Type: PANEL.SURVEY.MDS/Survey

Order vs. Obs.: ORDER

Units Required: N



PANEL CHILDREN

LOINC Component Property Time System Scale Method R/O Datatype Submitters Code

45981-8 MDS FULL ASSESSMENT FORM - PT ^PATIENT -

45982-6 IDENTIFICATION AND BACKGROUND INFORMATION SECTION- PT ^PATIENT -

45965-1 NAME - PT ^PATIENT SET

45394-4 LAST NAME PN PT ^PATIENT NOM TX AA1c

45395-1 NAME SUFFIX PN PT ^PATIENT NOM TX AA1d

45392-8 FIRST NAME PN PT ^PATIENT NOM TX AA1a

45393-6 MIDDLE INITIAL ID PT ^PATIENT NOM MDS TX AA1b

45403-3 ROOM NUMBER LOC PT ^PATIENT NOM TX A2

45983-4 ASSESSMENT REFERENCE DATE - PT ^PATIENT SET

45453-8 DATE OF LAST DAY OF OBSERVATION PERIOD TMSTP PT ^PATIENT QN MDS DT A3a

45454-6 ORIGINAL OR CORRECTED COPY OF FORM NUM PT ^PATIENT ORD MDS NM A3b



Physical RFC Form Section

A. EXERTIONAL LIMITATIONS

None established. (Proceed to section B.)

1. **Occasionally lift and/or carry (including upward pulling)**
(maximum)—when less than one-third of the time or less than 10 pounds, explain the amount (time/pounds) in item 6.

- less than 10 pounds
- 10 pounds
- 20 pounds
- 50 pounds
- 100 pounds or more

2. **Frequently lift and/or carry (including upward pulling)**
(maximum)—when less than two-thirds of the time or less than 10 pounds, explain the amount (time/pounds) in item 6.

- less than 10 pounds
- 10 pounds
- 25 pounds
- 50 pounds or more



RFC LOINC Representation

46643-3 EXERTIONAL LIMITATIONS - PT ^PATIENT SET RFC ASSESSMENT

46644-1 NO EXERTIONAL LIMITATIONS ARB PT ^PATIENT ORD RFC ASSESSMENT

46645-8 OCCASIONALLY LIFT &OR CARRY FIND PT ^PATIENT ORD RFC ASSESSMENT

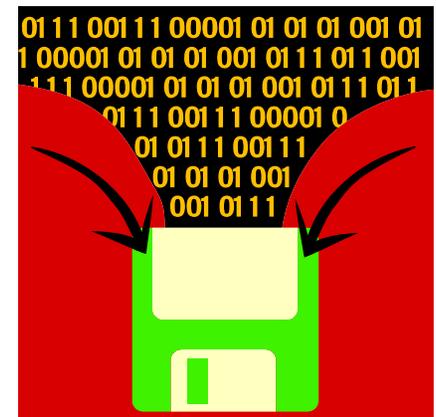
ANSWER LIST: Physical RFC Exertional Limitations / Physical RFC A-1

| SEQ# | Answer Global ID Code System |
|------|------------------------------|
| 0 | 100 pounds or more 5 |
| 1 | less than 10 pounds 1 |
| 2 | 10 pounds 2 |
| 3 | 20 pounds |
| 4 | 50 pounds |

46646-6 FREQUENTLY LIFT &OR CARRY FIND PT ^PATIENT ORD RFC ASSESSMENT

ANSWER LIST: Physical RFC Exertional Limitations / Physical RFC A-2

| SEQ# | Answer Global ID Code System |
|------|------------------------------|
| 1 | less than 10 pounds 1 |
| 2 | 10 pounds 2 |
| 3 | 25 pounds 3 |
| 4 | 50 pounds or more 4 |



Detail RFC LOINC Report is found in Appendix C



Disability and Functioning Vocabularies

- **SNOMED**

- Granular level concepts
- Clinical coverage
- Gaps and overlaps

- **ICF**

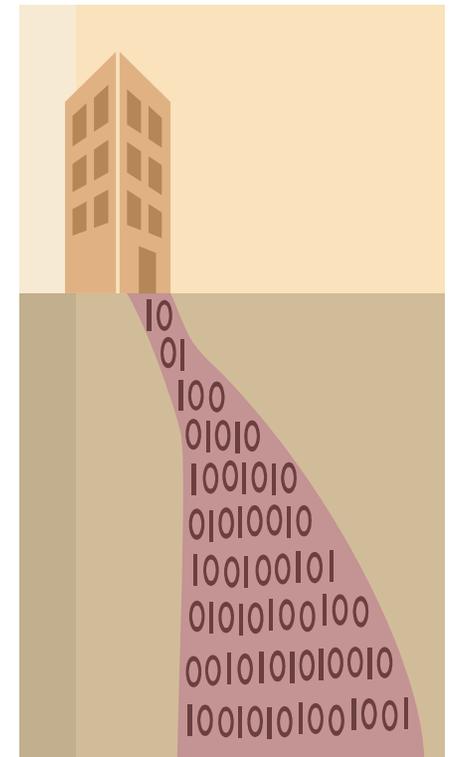
- Higher level concepts
- Benefits and administrative coverage
- Fills some gaps, other gaps and overlaps

- **Federal Partner Concept Assessment**

- SSA Survey and Assessment
- Survey Concept Summary Results **Appendix D**

- **Recommendation**

- Incorporate ICF into the UMLS
- Develop Mappings to enhance overall coverage of the functioning and disability domain
- Pilot Mappings on RFC Use Case **Appendix B**





RFC ICF and SNOMED Mapping

This Spreadsheet demonstrates a proposed ICF-SNOMED Mapping Diagram based on the SSA Residual Physical Functional Capacity Assessment form (RFC) . Red text in cells represents NCHS entries. Green text in cells represents Dr. Laurence Desi's original text from his July 27, 2006 prototype spreadsheet. Blue text in cells represents a synonym match with the RFC Limitation Type.

| RFC Limitation Category | Concept: RFC Limitation Type | ICF Domain and Chapter | ICF Code | ICF Code Short Title | ICF Code Prose Text | UMLS ID | SNOMED-CT Code(s) | SNOMED-CT Explanation |
|---|------------------------------|---|----------|---------------------------------------|---|----------|--------------------------|-------------------------------|
| PHYSICAL RESIDUAL FUNCTIONAL CAPACITY ASSESSMENT | | | | | | | | |
| Exertional Limitations | Lifting | Activities & Participation Ch. 4: Mobility | d430 | Lifting and carrying objects | Raising up an object or taking something from one place to another, such as when lifting a cup | C0565671 | 288330002 | Ability to lift (F) |
| | | Activities & Participation Ch. 4: Mobility | d430 | Lifting | Raising up an object in order to move it from a lower to a higher level, such as when lifting a glass | C0565676 | 288335007 | Difficulty lifting (F) |
| | | Activities & Participation Ch. 4: Mobility | d4308 | Lifting and carrying, other specified | Same as Short Title | C0206244 | 258141001 (258141001) | Lifting, function (OE) |
| | | Activities & Participation Ch. 4: Mobility | d4309 | Lifting and carrying, unspecified | Same as Short Title | C0418139 | 218220002 | Overexertion from lifting (F) |

ICF KEY:

b = Body Functions
 s = Body Structures
 d = Activities & Participation
 e = Environmental Factors

SNOMED-CT KEY:

A = Attribute
 F = Finding
 OE = Observable Entity
 PF = Physical Force
 PO = Physical Object
 QV = Qualifier Value
 S = Substance



CHI Endorsed Vocabularies

CHI Terminology Groupings & Examples of Correlating Items from MDSv2

| CHI Category | An Example MDSv2 section is... | CHI- recommended terminology & terminology examined in this project |
|---|---|---|
| Resident Anatomy | J3 “pain site” (also embedded throughout the MDSv2) | SNOMED-CT |
| Laboratory Result Names | I2 “Infections”: does not explicitly reference lab tests, but provides an example where HIT may use them (HIV, Hepatitis, STDs, UTI) | LOINC |
| Laboratory Result Contents | I2 “Infections”: does not explicitly reference lab tests, but provides an example where HIT may use them (HIV, Hepatitis, STDs, UTI) | SNOMED-CT |
| Resident Demographics | - AA, “Identification Information” (race/ethnicity, gender) -AB “Demographics Information” (language) | HL7v2.4 |
| Diagnosis/Problem List Entries | I1, I3, Diseases/Other Diagnoses (e.g., asthma, depression, diabetes) | SNOMED-CT (CHI-recommended); ICD-9 (supplemental analysis) |
| Non-laboratory Interv and Procedures | Section P: “Special treatments and procedures” (Occupational Therapy, Physical Therapy, medical or nursing procedures (suctioning, ostomy, dialysis, medical evaluation)) | SNOMED-CT |
| Immunizations | NA | HL7v2.3.1+ |
| Units of Measure | Section K6: “Parenteral or Enteral Intake” (e.g., total calories consumed, and average fluid intake (measured in cc’s)) | HL7v2.x+ |
| Laboratory Test Names | NA | LOINC |
| Medications (Clin Drug) | NA | RxNorm SCD |
| Drug Classifications | O4: “Days received the following medication” (e.g., antidepressant, antipsychotic, diuretic) | NDF-RT |
| Drug Dose Form | NA | FDA/CDER tables |
| Medication Ingredients | NA | FDA Established Name/UNII Code |
| Medication Package | NA | FDA/CDER |
| Drug Product | NA | FDA National Drug Codes |
| Nursing Terms | Found throughout the MDS. Including Section V, “Rap problem area” (e.g., falls, communication, psychosocial well-being); J2b.2, “Moderate Pain” | SNOMED-CT |



HL7 Messaging Recommendation

- **Support the transmission of the Functioning and Disability and related Assessment Data**
 - **HL7 Messages**
 - ❖ **OBR/OBX**
 - **HL7 CDA**
 - ❖ **Human readable**
 - ❖ **Machine readable**





HL7 Messaging: Can Send LOINC and associated SNOMED/ICF/CHI Codes

| Field | Meaning | Example |
|-------|--|--|
| OBR-4 | [Optional]: LOINC Code for Instrument / Panel (allows sending of multiple responses) | xxxx-x^Nursing Home Minimum Data Set - MDS2_0v1_3^LN |
| OBX-3 | LOINC code for item + alternate codes | OBX 3 CE xxxx-x^B4^LN^xxx^Ability to make decisions (observable entity)^SNM |
| OBX-5 | Response, allowing for alternate coding systems | OBX 5 CE 2^MODERATELY IMPAIRED-decisions poor, cues/supervision required^L^xxx^Difficulty using decision making strategies (finding)^SNM |
| OBX-3 | LOINC code for item + alternate codes | OBX 3 CE xxxx-x^AC1a^LN |
| OBX-5 | Response, allowing for alternate coding systems | OBX 5 CE 1^Yes^L^xxx^Yes (qualifier value)^SNM |



HL7 CDA XML Coding (machine readable)

```
<section>
<caption>
<caption_cd V="11496-7" S="2.16.840.1.113883.6.1"/>Assessment
</caption>
<list>
<item>
<content>
<content ID="String001">Asthma</content>, with prior smoking
history. Difficulty weaning off steroids. Will try gradual taper.
<coded_entry>
<coded_entry.value ORIGTXT="String001"
V="D2-51000" S="2.16.840.1.113883.6.5"/>
</coded_entry>
</content>
</item>
<item><content>Hypertension, well-controlled.</content></item>
<item><content>Contact dermatitis on finger.</content></item>
</list>
</section>
```

- The HL7 Clinical Data Architecture (CDA) allows for both human readable (text based document) and machine readable documents. The machine readable version is a document markup standard that specifies the structure and semantics of clinical documents for exchange purposes. It subdivides documents into meaningful, tagged chunks of information and provides a template for structuring computably-valid instances of a clinical document.
- The above CDA example,, illustrates concept coding in a CDA document. A sample problem-oriented medical record section has a <caption_cd> element, which provides the LOINC code (**V=code value S=coding system ID**) for the <caption> element value "Assessment". The Assessment record consists of a <list> of three <item> elements, but only the first has coded <content>. A <coded_entry> element provides the **SNOMED International code for "Asthma"**, text marked up by the previous <content> element which assigned it an internal ID="String001"
- The <body> of a CDA document consists of nested <section>, <paragraph>, <list>, <item>, <table> and/or other XML markup elements, as specified by a formal CDA document type description (DTD) developed by HL7. <content> and <coded_entry> elements can be used to markup and encode clinical content from a variety of domains. The **<coded_entry> element inserts codes from HL7-recognized coding schemes into CDA documents**. A <coded_entry.value> element can explicitly reference the original text within the document that is being encoded.
- Vocabulary domains provide the value sets for CDA-required coded attributes, as well as optional <coded_entry> elements. Value sets can be **HL7-specified concepts or defined subsets of recognized external coding systems such as LOINC or SNOMED-CT**. HL7 assigns a unique identifier to each vocabulary domain, and every concept within such a domain must have a unique code.



Recommendation Conditions

– Recommendation Conditions

- ❖ The Federal Government should address the issue of how to most efficiently gain access to needed ***web-based collaboration tools*** to identify “usefully-related” standardized assessment content.
- ❖ The NLM workgroup needs to address and resolve issues related to creating a ***knowledge-base in the UMLS Metathesaurus*** to (i) represent information on assessment forms that is constant (i.e., the questions and answer options) and (ii) link this constant information with usefully-related and exact matching vocabulary content.
- ❖ The National Library of Medicine and the World Health Organization need to complete their negotiations on the conditions under which ***ICF will be incorporated into the UMLS***.

Note: As federal agencies deploy these recommendations in standardizing patient/client assessment instruments and other functioning and disability content, pilot testing may be needed regarding the use of (i) LOINC to represent patient/client assessments, (ii) matching to CHI-endorsed semantic terms, and (iii) HL7 messaging to transmit such standardized assessments.

– Recommendation Benefits:

- ❖ **Enhances the functional and disability domain vocabulary coverage**
- ❖ **Blends the use of existing standards (i.e., content and format) to enable the exchange of functioning and disability information and reuse of assessment content**
- ❖ **Supports the implementation of standards to improve interoperable disability and functioning information and assessments exchange**
- ❖ **Provides a UMLS database to link LOINC and identified content standards from various sources (e.g., SNOMED, ICF, etc.)**
- ❖ **Enables needed analyses (e.g., of questions, answers, and functioning and disability terms within and across instruments and federal agencies)**





Future Considerations

– Future Considerations

- ❖ **Pilot testing of implementation programs required for assessments to link standards with assessment content and format, and disseminate these linkages**
- ❖ **Participate in Clinical LOINC Committee**
- ❖ **Federal software modification to support standardization**
- ❖ **Conduct outreach including interactions with the SDOs and create a Use Case for AHIC and HITSP consideration.**



Questions?



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