Meaningful Use Stage 2 Update: Deploying SNOMED CT to provide decision support in the EHR

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Implementation Showcase
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Disclosure

I receive no financial support from any interests vending electronic health records or vocabulary services.
Agenda

- Meaningful Use Stage 2: Overview
- Terminology specifications required MU
- Deployment of SNOMED CT and LOINC for decision support in Epic
- Issues with use of SNOMED CT and LOINC in decision support
### Medicare Eligible Professional Stages Timeline

This is a timeline of participation and payments by stage of meaningful use for Medicare eligible professionals:

<table>
<thead>
<tr>
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<tr>
<td>2011</td>
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<td>$43,720</td>
<td>$18,000</td>
<td>$12,000</td>
<td>$7,840 Reduction ($160)</td>
<td>$3,920 Reduction ($80)</td>
<td>$1,960 Reduction ($40)</td>
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<td>2012</td>
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<tr>
<td>$43,480</td>
<td>$14,700 Reduction ($80)</td>
<td>$7,840 Reduction ($160)</td>
<td>$3,920 Reduction ($80)</td>
<td>$1,960 Reduction ($40)</td>
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<tr>
<td>2013</td>
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<td>1</td>
<td>2</td>
<td>2</td>
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<td>$38,220</td>
<td>$11,760 Reduction ($240)</td>
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<tr>
<td>2014</td>
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<td>$23,520</td>
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<td>$7,840 Reduction ($160)</td>
<td>$3,920 Reduction ($80)</td>
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</table>

Note: Medicare EHR incentive payments are subject to the mandatory reductions in federal spending known as sequestration. This 2% reduction will be applied to any Medicare EHR incentive payment for a reporting period that ends on or after April 1, 2013. If the final day of the reporting period occurs before April 1, 2013, those incentive payments will not be subject to the reduction.

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University of Nebraska
Meaningful Use
Stage 1: 14 core; 5/10 menu

Standards specified:

- Problem list: SNOMED CT or ICD-9-CM
- CPOE decision support: FDB, Medispan
- E-prescribing: NCPDP
- Lab results to PH: LOINC, HL7v2.X
- Summary of care: CCD
- (HIPAA: ICD-9-CM; CPT/HCPCS, CDT)
Stage 2: 17 core; 3 menu; CQMs

Stage 2
Eligible Professional (EP)
Meaningful Use Core and Menu Measures

Standards Criteria

§ 170.207(h) Smoking Status

Smoking status must be coded in one of the following SNOMED CT® codes:
1. Current every day smoker. 449868002
2. Current some day smoker. 428041000124106
3. Former smoker. 8517006
4. Current unknown who never smoked. 266927001
5. Former unknown who never smoked. 77176002
6. Former unknown who ever smoked. 266919005
7. Current unknown who ever smoked. 77176002
8. Light tobacco smoker. 428071000124103
9. Non-smoker. 38452006
10. Never smoked. 38452006

LOINC, SNOMED CT observables

SNOMED CT code set

HL7 Infobutton, ???

(2) Generate a personalized immunization schedule.
(3) Use a clinical decision support system to order medications.
(4) Use a clinical decision support system to order laboratory tests.
(5) Record smoking status for patients who are 12 years old or older.
(6) Use clinical decision support to improve performance on high-priority health conditions.
(7) Provide patients the ability to view, download and transmit their health information within four business days of the information being available to the EP.
<table>
<thead>
<tr>
<th>Stage 2</th>
<th>CDA CCD R2(document)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HL7 2.5.1</td>
<td>LOINC</td>
</tr>
<tr>
<td>HL7 2.5.1</td>
<td>CVX code set</td>
</tr>
</tbody>
</table>

| (9) | Electronic health information created or maintained by the Certified EHR Technology through the implementation of appropriate technical capabilities. |
| (10) | Incorporate **clinical lab-test results** into Certified EHR Technology as structured data. |
| (11) | **Generate lists of patients** by specific conditions to use for quality improvement, reduction of disparities, research, or outreach. |
| (12) | Use clinically relevant information to identify patients who should receive **reminders for preventive/follow-up care** and send these patients the reminders, per patient preference. |
| (13) | Information specific to the patient from another setting of care or provider of care or believes an EP should perform **medication reconciliation**. |
| (14) | The EP who transitions their patient to another setting of care or provider of care or refers their patient to another provider of care should provide a **summary care record** for each transition of care or referral. |
| (15) | Capability to submit **electronic data to immunization registries** or immunization information systems except where prohibited, and in accordance with applicable law and practice. |
| (16) | Use **secure electronic messaging** to communicate with patients on relevant health information. |
CDA HITSP C32: Continuity of Care Document (CCD)

- **Document types and sections:** LOINC
- **Demographics:** LOINC, SNCT Obs, OMB codes
- **Payers**
- **Advance Directives**
- **Support**
- **Functional Status**
- **Problems:** SNCT CF, Ev, Sit
- **Family History:** SNCT CF, Soc
- **Social History:** LOINC, SNCT Obs
- **Allergies:** RxNORM, NDF-RT, SNCT Subs, CF, Pharm, Qual
- **Medications:** RxNORM
- **Medical Equipment**
- **Immunizations:** CVX, MVX
- **Vital Signs:** LOINC, SNCT Obs
- **Results:** LOINC
- **Procedures:** HCPCS, SNCT Proc
- **Encounters**
- **Plan of Care**
“Temperature is 36.9 C”

```xml
<section>
  <code code="8716-3" codeSystem="2.16.840.1.113883.6.1"
    codeSystemName="LOINC"/>
  <title>Vital Signs</title>
  <text>Temperature is 36.9 C</text>
  <entry>
    <observation classCode="OBS" moodCode="EVN">
      <code code="386725007" codeSystem="2.16.840.1.113883.6.96"
        codeSystemName="SNOMED CT" displayName="Body temperature"/>
      <statusCode code="completed"/>
      <effectiveTime value="200004071430"/>
      <value xsi:type="PQ" value="36.9" unit="Cel"/>
    </observation>
  </entry>
</section>
```
Stage 2

### The Professional Menu Objectives

<table>
<thead>
<tr>
<th>Stage 2 Objectives</th>
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</thead>
<tbody>
<tr>
<td>(1) Capability to submit <a href="#">electronic syndromic surveillance data</a> to public health agencies except where prohibited, and in accordance with applicable law and practice.</td>
</tr>
<tr>
<td>(2) Record <a href="#">electronic notes</a> in patient records.</td>
</tr>
<tr>
<td>(3) Imaging results consisting of the image itself and any explanation or information are accessible through CEHRT.</td>
</tr>
<tr>
<td>(4) Record patient <a href="#">family health history</a> as structured data.</td>
</tr>
<tr>
<td>(5) Capability to <a href="#">identify and report cancer cases</a> to a public health central cancer registry, except where prohibited, and in accordance with applicable law and practice.</td>
</tr>
<tr>
<td>(6) Capability to <a href="#">identify and report specific cases</a> to a specialized registry (other than a cancer registry), except where prohibited, and in accordance with applicable law and practice.</td>
</tr>
</tbody>
</table>

View or download all of the EP [Stage 2 Core and Menu Objectives](#) for Stage 2.
MU stage 2 Vocabulary Standards 2014

- SNOMED CT International July 2012 and US extension March 2012
- ICD-*-CM
- LOINC v2.40 or later
- RxNORM vAugust 2012, FDB
- CVX, MVX code set vJuly 11, 2012
- CPT; HCPCS
- ISO languages and country codes
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Reference Standards in Epic

- SNOMED CT: HLX master file supports concept identifiers and descriptions - including US extension - along with subtype (‘IS-A’) relationship; mapping from EDG by third party
- LOINC: LNC master file supports concept identifiers and long name; LRR mapped by site
- RxNORM: mapping to ERX supported by FDB interoperability module includes NDC codes
- ICD-*-CM: mapping provided by IMO third party
- HCPCS: mapped by Epic
- CVX: master table LIM mapped by site
Decision Support in Epic

Epic Grouper technology

- Problem oriented record summaries
- Health maintenance alerts
- Best practice alerts
- Registries and population management tools

Data Warehousing

- Cogito data warehouse
- GPC: i2b2 research data warehouse
Groupers

• Reporting and decision support in Epic can employ vocabulary (SNOMED CT subtypes; ICD-9-CM, FDB, HCPCS) to create groupers

• Compiled into code sets to build decision criteria

Use Case:
Select all patients with problem of congestive heart failure to build a CHF registry

Use Case:
Display problem oriented lab summary if any problem of Hypertension appears on the problem list

Use Case:
Place Health Maintenance alert on the chart of all patients with diabetes to trigger alerts for screening labs

Use Case:
Create a specialty view of the problem list for your oncology physicians

Use Case:
Create a Best Practice Alert for patients with any diagnosis of heart failure not on a beta blocker
Groupers

- SNOMED CT ‘IS-A’ for:
  - Clinical findings, Events, Situations, Social history – problem list
  - Procedures – surgical history
- ICD-9-CM numerical code range for diagnoses or problem list
- FDB for pharmaceutical or treatment class
- NO LOINC – Results or Orders
- SNOMED CT observables - Physical findings are NOT integrated with Clinical LOINC
Creating Groupers: Diabetes

- Choose the parent node in a hierarchy subtree of SNOMED CT
Diabetic Problem View

- **Coronary artery disease**
- **COPD (chronic obstructive pulmonary disease)**
- **Type 2 diabetes mellitus**

Create Current Assessment & Plan Note

Related Goals

Relevant Medications and Unsigned Orders (Past 5 years)

Name: [Details]

Medications:
- Insulin glargine (LANTUS) 100 unit/mL injection

Pharmacy: LDL PHARMACY [Patient Preferred] 314-852-1121

Relevant Results

- **Chemistry Panels**
  - Cholesterol
  - LDL Calc
  - triglycerides

- **Hemoglobin A1c**

- **Urine Chemistries**

- **RBC/PLT COUNTS**

- **Other**

- **Reflex esophagitis**

- **Hypertension**
SNOMED CT, LOINC and Epic

- Epic has integrated the semantics of the SNOMED “Is_a” relationship into reporting and decision support technology for the user community
- Epic has expanded support for US extension in compliance with meaningful use
- Model system components include many pre-compiled Grouper records in standard reports and MU monitoring; build of additional SNOMED concept groupers easy to implement
Decision support use cases NOT supported

- Infectious disease cases by causative organism
- All lab results for a specified procedure regardless of methodology
- All lab results for a specified order panel
- All physical findings which are components of the respiratory exam
Cogito

Radar dashboards
Reporting workbench
Clarity data extract
Data warehouse
SlicerDicer
Greater Plains Collaborative: i2b2
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SNOMED CT and Epic

- Defining relationships and qualifiers need to be deployed in grouper functionality to support full SNOMED CT semantics
- New term submission and extension concept management needs to be negotiated and standardized with Epic research data team
- Procedures under discussion with Epic for fully defining SmartData elements NOT well deployed
- Research data model for Cogito under discussion
SNOMED CT/LOINC: Decision support for Observables

- Integrated and harmonized Observables ontology fully classified needed for Physical findings, Laboratory and Radiology results
- Epic Grouper technology needs to be extended to employ these harmonized semantics
- Informatics community needs to be informed of these developments
Questions?