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

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Meaningful Use
Business case for the EHR

Medicare Eligible Professional Stages Timeline

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

Maximum Payment by Start Year	2011	2012	2013	2014	2015	2016
2011	1	1	1	2	2	3
$43,720	$18,000	$12,000	$7,840 Reduction ($160)	$3,920 Reduction ($80)	$1,960 Reduction ($40)	
2012		1	1	2	2	3
$43,480		**University of Nebraska**		$7,840 Reduction ($160)	$3,920 Reduction ($80)	$1,960 Reduction ($40)
2013			1	1	2	2
$38,220			$14,700 Reduction ($80)	$11,760 Reduction ($240)	$7,840 Reduction ($160)	$3,920 Reduction ($80)
2014				1	1	2
$23,520				$11,760 Reduction ($240)	$7,840 Reduction ($160)	$3,920 Reduction ($80)

Note: Medicare EHR incentive payments made 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.

Eligible Professional's Guide to Stage 2 of the EHR Incentive Programs 9

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Meaningful Use
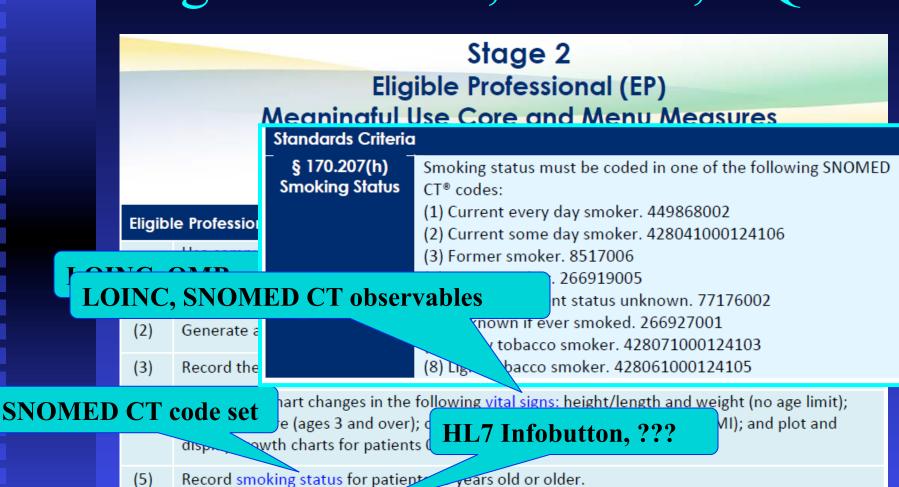# Stage 1: 14 core; 5/10 menu

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

Eligible Professional

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) ___ . 266919005
___ nt status unknown. 77176002
___ known if ever smoked. 266927001
___ y tobacco smoker. 428071000124103
(8) Lig... bacco smoker. 428061000124105

LOINC, SNOMED CT observables

LOINC, OMR...

(2) Generate a...
(3) Record the...

___ hart changes in the following vital signs: height/length and weight (no age limit); ___ e (ages 3 and over); ___ (BMI); and plot and displ... owth charts for patients...

SNOMED CT code set

HL7 Infobutton, ???

(5) Record smoking status for patients... years old or older.

(6) Use clinical decision support to improve performance on high-priority health conditions.

(7) Provide patients the ability to view online, download and transmit their health information within four business days of the information being available to the EP.

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Stage 2

CDA CCD R2(document)

HL7 2.5.1

LOINC

...cal summaries for patients for each office visit.

...ronic health information created or maintained by the Certified EHR Technology through ... 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 f... ...d provide th... **XDR/XDM   CDA CCD R2** ...pecific

HL7 2.5.1

CVX code set

(14) ...patient from another setting of care or prov... ...e or believes an ...hould perform medication reconciliation.

(15) The EP who tra...ns their patient to another setting of care or provider ... care or refers their patient to another p...ider of care should provide a summary care record for each transition of care or referral.

(16) Capability to submit electronic data to immunization registries or immunization information systems except where prohibited, and in accordance with applicable law and practice.

(17) 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

CCD Body Entries

- **"Temperature is 36.9 C"**

```
<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>
```

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Stage 2

SNOMED CT

XDR/XDM   CCD R2

SNOMED CT   LOINC

...e Professional Menu Objectives

(1) ...pability to submit <u>electronic syndromic surveillance data</u> to public health agencies except ...re prohibited, and in accordance with applicable law and practice.

(2) Recor... ...lectronic notes in patient records.

(3) <u>Imaging res...ts</u> consisting of the image itself and any expla... information are accessible through CEHRT.

(4) Record patient <u>family health history</u> as structured dat...

(5) Capability to <u>identify and report cancer cases</u> to a public health central cancer registry, except where prohibited, and in accordance with applicable law and practice.

(6) Capability to <u>identify and report specific cases</u> to a specialized registry (other than a cancer registry), except where prohibited, and in accordance with applicable law and practice.

View or download all of the EP <u>Stage 2 Core and Menu Objectives</u> for Stage 2.

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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

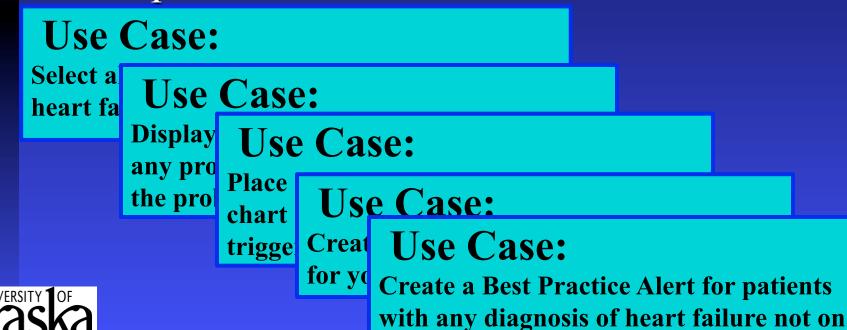- Registries and population management tools

Data Warehousing

- Cogito data warehouse

- GPC: i2b2 research data warehouse

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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

Use Case:

Select a... heart fa...

Use Case:

Display... any pro... the prob...

Use Case:

Place chart trigge...

Use Case:

Creat... for y...

Use Case:

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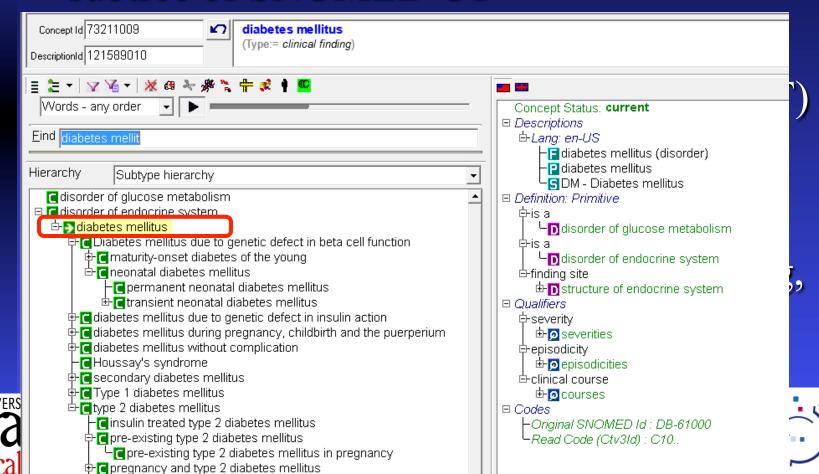
Groupers

- 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
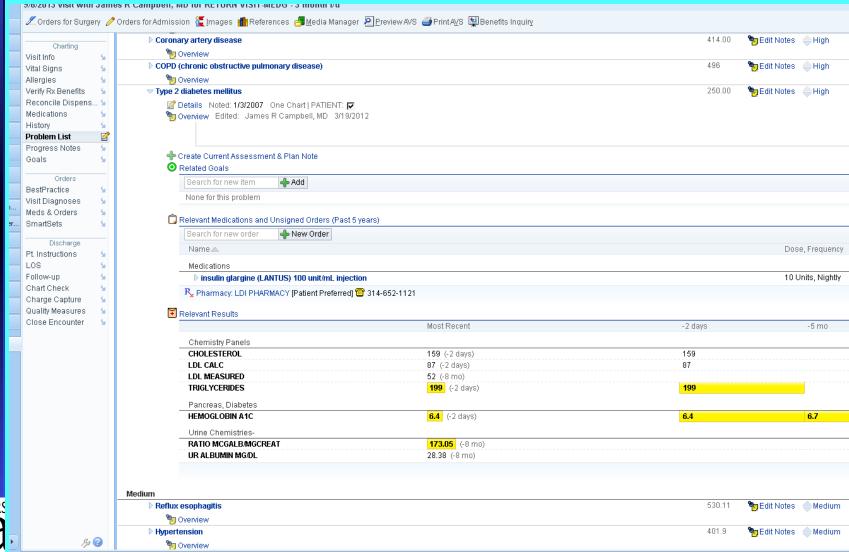
Creating Groupers: Diabetes

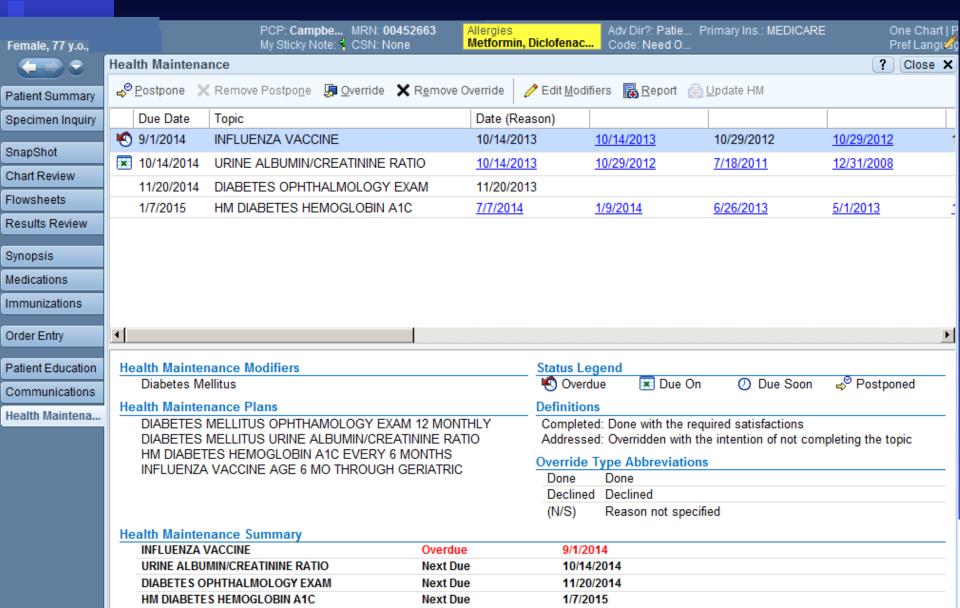- Choose the parent node in a hierarchy subtree of SNOMED CT

Diabetic Problem View

Orders for Surgery | Orders for Admission | Images | References | Media Manager | Preview AVS | Print AVS | Benefits Inquiry

Charting
- Visit Info
- Vital Signs
- Allergies
- Verify Rx Benefits
- Reconcile Dispens...
- Medications
- History
- **Problem List**
- Progress Notes
- Goals

Orders
- BestPractice
- Visit Diagnoses
- Meds & Orders
- SmartSets

Discharge
- Pt. Instructions
- LOS
- Follow-up
- Chart Check
- Charge Capture
- Quality Measures
- Close Encounter

▷ **Coronary artery disease** — 414.00 — Edit Notes — High
   - Overview

▷ **COPD (chronic obstructive pulmonary disease)** — 496 — Edit Notes — High
   - Overview

▽ **Type 2 diabetes mellitus** — 250.00 — Edit Notes — High
   - Details Noted: 1/3/2007 One Chart | PATIENT: ☑
   - Overview Edited: James R Campbell, MD 3/19/2012

   ✚ Create Current Assessment & Plan Note
   ◎ Related Goals

   | Search for new item | Add |
   None for this problem

   📋 Relevant Medications and Unsigned Orders (Past 5 years)

   | Search for new order | New Order |

Name △	Dose, Frequency
Medications	
▷ insulin glargine (LANTUS) 100 unit/mL injection	10 Units, Nightly
Rₓ Pharmacy: LDI PHARMACY [Patient Preferred] ☎ 314-652-1121	

   ⊞ Relevant Results

	Most Recent	-2 days	-5 mo
Chemistry Panels			
CHOLESTEROL	159 (-2 days)	159	
LDL CALC	87 (-2 days)	87	
LDL MEASURED	52 (-8 mo)		
TRIGLYCERIDES	199 (-2 days)	199	
Pancreas, Diabetes			
HEMOGLOBIN A1C	6.4 (-2 days)	6.4	6.7
Urine Chemistries-			
RATIO MCGALB/MGCREAT	173.05 (-8 mo)		
UR ALBUMIN MG/DL	28.38 (-8 mo)		

Medium

▷ **Reflux esophagitis** — 530.11 — Edit Notes — Medium
   - Overview

▷ **Hypertension** — 401.9 — Edit Notes — Medium
   - Overview

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Health Maintenance Alerts

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

My Panel Metrics

	Q2 '12	Q3 '12	Q4 '12	Q1 '13	QTD
ACE Inhibitor or ARB Therapy for LVSD	94 ✓	93 ✓	91 ✓	89 ✓	86 ◆
Diabetes: Hemoglobin A1c Control	76 ✓	74 ✓	72 ◆	73 ✓	72 ◆
Hypertension: Blood Pressure Control	74 ✓	73 ✓	74 ✓	72 ✓	72 ✓
Cervical Cancer Screening	82 ◆	84 ◆	85 ◆	83 ◆	82 ◆
Colorectal Cancer Screening	64 ✓	66 ✓	66 ✓	68 ✓	64 ✓
Breast Cancer Screening	76 ✓	78 ✓	77 ✓	77 ✓	78 ✓
Childhood Immunization Status	88 ✓	88 ✓	89 ✓	90 ✓	89 ✓

System Proficiency

	Q2 '12	Q3 '12	Q4 '12	Q1 '13	QTD
Place Orders Quickly Using a Template	59 ❗	62 ◆	64 ◆	66 ✓	68 ✓
Close Visits the Same Day	98 ✓	95 ✓	96 ✓	97 ✓	99 ✓
Write Your Orders in the Exam Room	92 ✓	89 ✓	86 ✓	88 ✓	86 ✓
Quickly Review Results Messages	89 ◆	87 ◆	87 ◆	85 ◆	80 ❗
Review Allergies	89 ◆	96 ✓	99 ✓	93 ✓	92 ✓

Visit Statistics

	Q2 '12	Q3 '12	Q4 '12	Q1 '13	QTD
Visits	1,506	1,498	1,517	1,489	1,104
New Patients	231	227	225	225	168
Average Wait Time Before Rooming	08m	07m	07m	08m	00m
Average Wait Time for Provider	14m	15m	14m	15m	00m
Work RVUs	6,546	6,466	6,288	6,411	4,824
Charges ($)	113,898	112,509	109,402	111,547	83,929

Report Listing

Meaningful Use Quality Measures

	Q2 '12	Q3 '12	Q4 '12	Q1 '13	QTD
Adult Weight Screening and Follow-Up for Patients 18 to 64 Years of Age	67	66	68	69	68
Adult Weight Screening and Follow-Up for Patients 65 Years of Age and Older	67	72	74	75	75
Hypertension: Blood Pressure Measurement	92	96	94	95	96
Tobacco Cessation Intervention	76	78	79	79	78
Tobacco Use Assessment	89	90	92	91	92

HB AR Summary

	Amount	%	Days
In-House (Unbilled)	18,947,344	12%	4.5
Held for Minimum Days	14,574,880	9%	3.5
✓ Candidate for Billing	11,659,904	7%	2.8
◆ Outstanding Claims	73,238,772	45%	17.6
Claims with Open Denials	5,829,952	4%	1.4
Self-pay	20,404,832	13%	4.9
Outsourced - Self Pay	2,532,519	2%	0.6
Outsourced - Insurance	14,756,318	9%	3.5
Undistributed	115,321	0%	0.0
Credit Balance	-364,372	0%	-0.1
Total AR	161,695,470		38.8
Bad Debt	8,744,928		
External Agency AR	14,545		

AR days calculated using an Average Daily Revenue of 4,169,353

Top Providers By Delinquent Deficiencies

Provider		Count	Cnt Age (d)	Total	Tot Age (d)
Labelle, Susan, MD		28	26.1	38	22.1

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?