



Clinical Decision Support Technical Expert Panel Meeting

- November 8, 2010
- 2:30 PM - 4:30 PM Eastern Time
- Facilitator: Scott Finley

Agenda



- Welcome
- Review of September's TEP Meeting
- Contractors' Status Reports & Discussion
 - CDSC
 - GLIDES
- CDS and Meaningful Use - Looking ahead to stages 2 and 3: Lessons for the Nation
 - CDSC
 - GLIDES
- Discussion
- Recap & Next Steps



Welcome



Review Of September's TEP Meeting

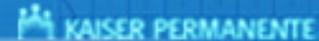
Status Reports



Clinical Decision Support Consortium Technical Expert Panel Teleconference

CDS Consortium Update Report

November 8, 2010



Agenda

- Status Update (10 mins)
 - Accomplishments
 - Next Steps
 - Challenges
 - Questions
- CDSC Findings and Lessons (10 mins)
- Discussion: CDS and Meaningful Use Stages 2 and 3

Accomplishments



ACCOMPLISHMENTS:

Task 1. Program Management

Subtask 1.1 Submitted draft Work Plan to Agency for Healthcare Research and Quality (AHRQ) (8/9/2010)

Subtask 1.2 Submitted draft Project Plan to AHRQ (8/9/2010)

Subtask 1.3 Attended in-person meeting with AHRQ (9/1/2010)

Subtask 1.4 Submitted final Work Plan to AHRQ (9/29/2010)

ACCOMPLISHMENTS:

Task 2. Implementation

Subtask 2.1 Demonstration of Clinical Decision Support (CDS) service at two organizations

- CDS Services (Services) team:
 - Continued work with Regenstrief Institute (RI) regarding the integration with Enterprise Clinical Rules Service (ECRS) and Quality Assurance (QA) testing with a sampling of RI's test patient Continuity of Care Documents (CCDs).
 - Continued working on the support model with the various Partners HealthCare Systems (PHS) Information Systems (IS) collaboration teams.
 - Continued supporting ECRS in Longitudinal Medical Record (LMR) trial clinics.
 - Resumed work on the Service Sharing Agreement.
 - Obtained connectivity from RI to PHS through the PHS firewall using Secure Socket Layer (SSL) and continued to investigate why Security Assertion Markup Language solution (SAML) is not working.

ACCOMPLISHMENTS:

Task 2. Implementation (cont.)

Subtask 2.2 Other implementation projects

- Knowledge Translation Specification (KTS) team:
 - Continued mapping of CDSC metadata model to Guideline Elements Model (GEM).
 - Started development of automated translation tool for converting GEM guidelines to CDSC Level 2 (L2) recommendations.
 - Started research on the structure of order sets.
- Knowledge Management Portal (KM Portal) team continued ongoing management of KM Portal and support for users.
- Dashboards team:
 - Granted access to the CDS Provider and Developers Dashboard.
 - Continued work on the CDS Dashboard Specification.
- Content Governance Committee (CGC) developed 75% of editorial policy content.

ACCOMPLISHMENTS:

Task 3. Evaluation

Subtask 3.1 Submitted draft Evaluation Plan to AHRQ (8/23/2010)

Subtask 3.2 Submitted final Evaluation Plan to AHRQ (9/29/2010)

Subtask 3.3 Conduct evaluation activities as specified in the final Evaluation Plan

- KM Portal team:
 - Developed and distributed Portal User Assessment.
 - Continued data collection for analysis.
- Services team began work on creating the services evaluation database and loading performance data into the database.
- Demonstration team:
 - Continued data collection at PHS and reviewing demonstration data through the Dashboard.
 - Coordinated with Services team on plans for evaluation and data management.
 - Worked with RI on demonstration plans with a focus on clinic selection.

ACCOMPLISHMENTS:

Task 3. Evaluation (cont.)

- Dashboard team:
 - Sent out dissemination letter to providers informing them that the CDS Dashboard Provider View is available for use in Report Center.
 - Continued work on getting the dissemination letter out for the Developers View of the CDS Dashboard.
- Evaluation team:
 - Assisted CDSC teams with finalizing OY1 evaluation tasks.
 - Prepared the final Evaluation Plan.

Summary CDSC usage statistics

KM Portal Statistics	
Total CDSC documents uploaded:	35
Unique IP addresses accessing site:	37
Most viewed document:	2010 PHS L4 Coronary Artery Disease SNOMED Classification Subset

CDS Services Statistics	
Total calls:	97,312
Average calls per day:	3,067
Average performance:*	2,768

**Average performance equals the average successful calls per day*

Statistics provided are raw data only. No analysis is provided, including comparison with previous data.

CDS Dashboards Total Usage summary statistics	
Provider View:	<p>142 times by 73 unique people (mainly physicians but also nurses, NPs and quality staff)</p> <p>48 people used it once</p> <p>11 people used it twice</p> <p>6 people used it three times</p> <p>8 people used it four or more times</p>
Designer View:	<p>only once, and by a physician who's not affiliated with CDSC</p>

ACCOMPLISHMENTS:

Task 4. Meeting with Technical Expert Panel

Subtask 4.1 In-Person Technical Expert Panel (TEP) Meeting

- Principal Investigator and Program Manager attended in-person TEP meeting in Washington, DC, September 1 – 2, 2010.
- Knowledge Management Lifecycle Assessment (KMLA) and Recommendation Team Lead presented results at TEP meeting.
- KTS Team Lead presented results at TEP meeting.

Subtask 4.2 TEP Teleconference

- Prepared and submitted materials.

ACCOMPLISHMENTS:

Task 5. Dissemination

Subtask 5.1 Submitted draft Dissemination Plan to AHRQ (9/29/2010)

Subtask 5.2 Submitted final Dissemination Plan to AHRQ (10/18/2010)

Subtask 5.3 Carry out dissemination activities as described in final Dissemination Plan

- Research management Team (RMT) built database for all CDSC dissemination products.
- CGC completed paper “Definition of a Metadata Model for a Multi-Layered Clinical Practice Guideline Representation Framework”, and submitted to International Journal of Functional Informatics and Personalized Medicine.
- Recommendations team:
 - Completed paper on combined recommendations for Journal of Biomedical Informatics (JBI).
 - Presented talk and poster at MEDINFO 2010 meeting in South Africa.

Next Steps



Next Steps Summary

Task 2. Implementation

- RMT continue working on the Service Sharing Agreement and facilitating research activities across all CDSC teams.
- KTS team continue research on order set models, and the development of a tool to transform GEM to CDSC specifications.
- Services team begin testing with RI, and start analysis of performance data.
- Dashboard team continue work on the CDS Dashboard Specification.
- CGC continue development of editorial policy content.
- RI demonstration team demonstrate connectivity between RI and the web service at PHS and start testing with test patients.

Task 3. Evaluation

- KMLA team continue planning visit to PHS in November/December 2010.
- KM Portal team start preparing draft initial summary of eRoom evaluation.
- Demonstration team continue data collection and working with RI.

Task 5. Dissemination

- Attend and present at American Medical Informatics Association (AMIA).

Challenges



CHALLENGES:

Task 2. Implementation

- Services team:
 - Completion of infrastructure and security requirements at both PHS and RI.
 - Preparation of Service Sharing Agreement.
- Demonstration team: Rollout of the RI CareWeb application was postponed in the Wishard clinics.
- RI Demonstration team: Technical challenges during testing of SAML framework.
- KM team: Lack of comprehensive crosswalks for procedure codes (SNOMED to / from CPT).

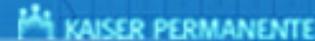
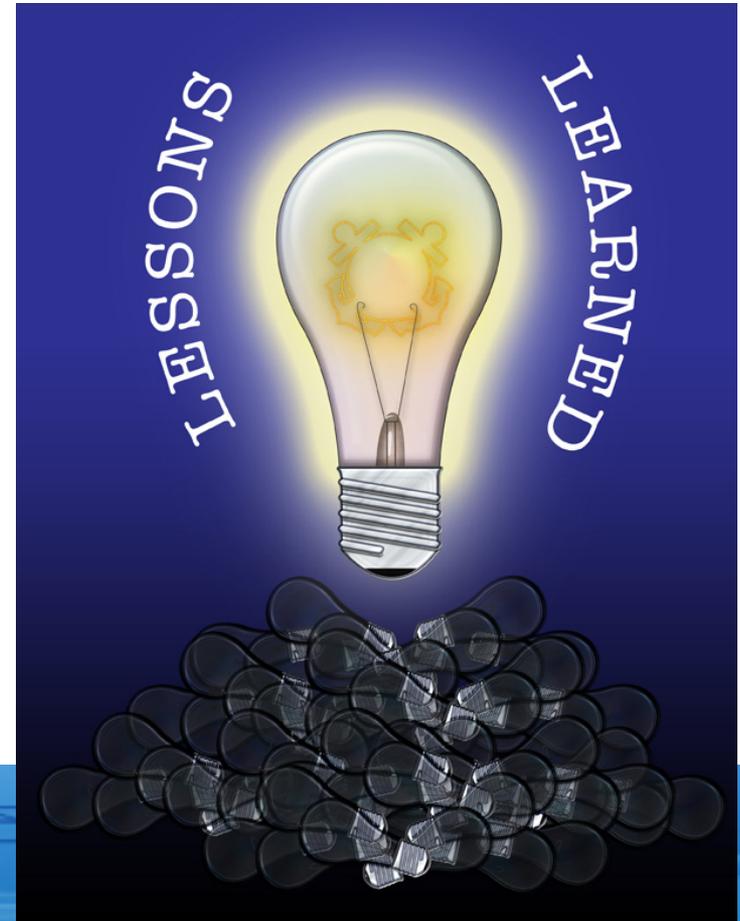
CHALLENGES:

Task 3. Evaluation

CDS Demonstration team:

- Process of identifying practices for the RI demonstration.
- Uncertainty about the schedule and order in which the CareWeb notes module will be rolled out at Wishard.
- Clinic selection will remain fluid until details are worked out.
- Currently one clinic has been identified and there are firm plans to roll out there.
- The schedule for further clinics is to be determined.

CDSC Findings, Lessons, and Questions



Implementation findings

KM team should be included in the services implementation discussions early on due to significant amount of preparation work that each external CDSC member must do prior to integrating with the CDSC content.

RI Demonstration team:

- Open communication and documentation are critical to development and integration of a new component.
- Laborious processes:
 - Creating test patients, specially when there is not an interface in place for entering test patients.
 - comparing and mapping of terms.
- The work regarding access and connection is completed by a team separate from the team implementing the service.
- Workflow and integration is a customized decision.
- Evaluation criteria should be clear from the very beginning.
- The cost for legal agreements.

Questions to TEP



- Stage 1 Meaningful Use (MU) only requires a single CDS rule. Where do you expect MU criteria to expand the use of CDS in Stages 2 and 3?
- As CDS researchers, what technologies should we study or develop to help lay groundwork for MU Stages 2 and 3?
- To what extent should we tie our CDS efforts to particular qualities measures included in MU?

Status Reports





GLIDES Update

TEP Teleconference, November 2010

GLIDES PROJECT

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Contents

- Recap Of Year 3 Goals and Timeline
- Project Status
- CDS and Meaningful Use – Looking ahead to Stages 2 and 3: Lessons for the Nation

Year 3 Goals

- Using systematic and replicable processes
 - Continue to design, develop, implement, and demonstrate guideline-based clinical decision support
 - Focus on new guidelines and implementation partnerships
 - Enhance and improve the CDS already produced at Yale and Nemours
- Recognizing the critical importance of transparently developed and clearly stated guideline recommendations for effective implementation, work closely with guideline developers to provide tools and guidance to improve guideline development and reporting processes
- Update the Guideline Elements Model and increase GEM adoption nationally and internationally
- Continue evaluation of both existing and newly developed CDS implementations
- Disseminate the findings and lessons learned via a variety of modalities

Project Timeline

Knowledge Transformation (KT)	
Asthma	
Obesity	

Implementation I	
Asthma	Yale Specialty

Implementation II	
Obesity	Yale PC Delaware PC
Asthma	Nemours Florida Sites

Implementation III	
Asthma	Yale Primary Care
	Nemours Delaware

Geisinger Implementation		
KT	Design	Build
Adult Low Back Pain		

CHOP Implementation	
KT	Design
Medical Home – Preterm Infants	

AAO-HNS	
BridgeWiz – Sudden Hearing Loss	

AAP	
BridgeWiz – AOM, Fever, Sinusitis	
Evidence Report, Performance	

GEM/GLIA Development	
Literature Review	New Release

ECRI	
Guideline Mark-Up, GEM Cutting	Plan For NGC Delivery

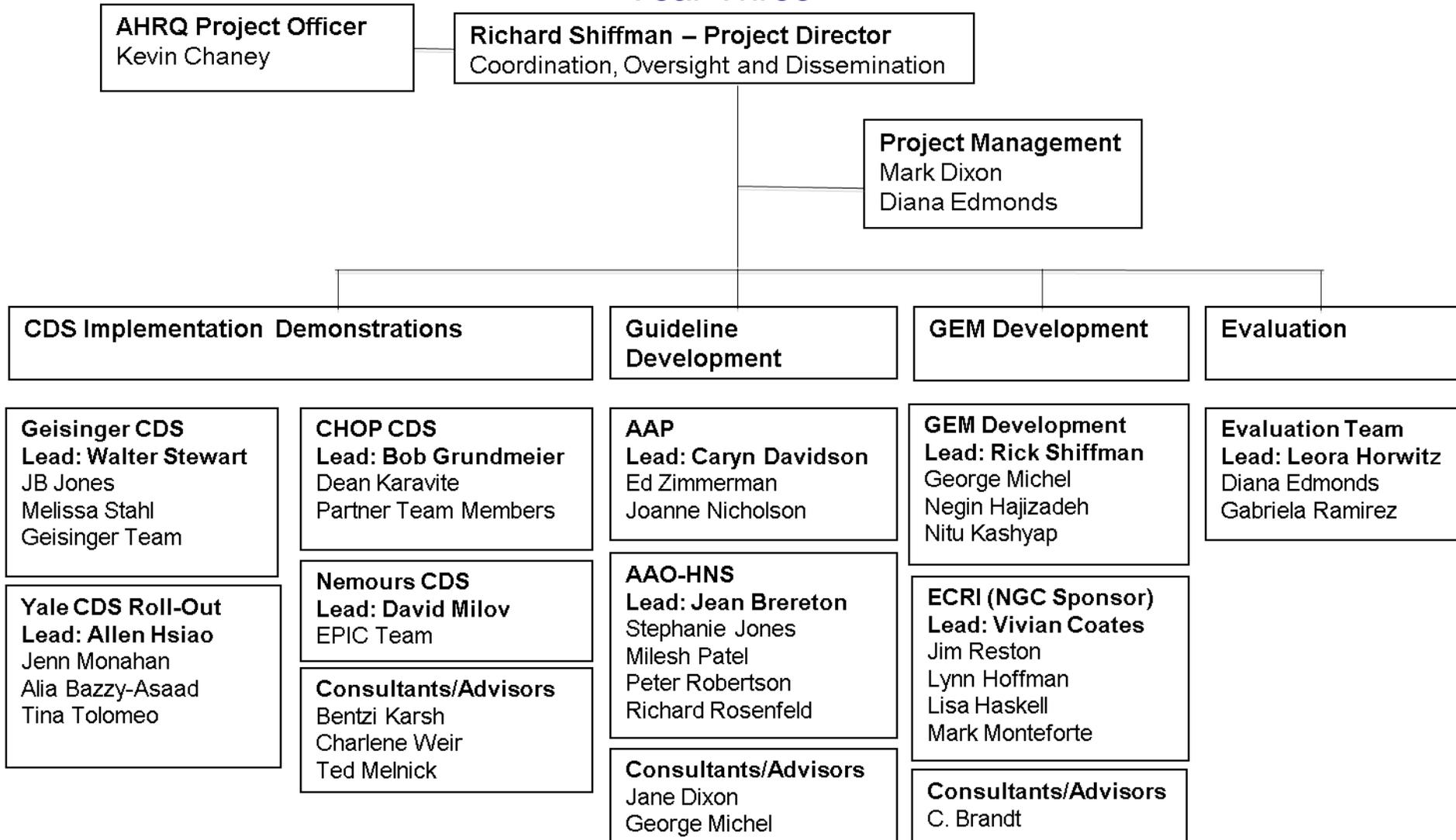
Evaluation and Dissemination

Years One-Two CDS Implementation Projects
Feb 2008 – Jan 2010

Years Three CDS Projects
Mar 2010 – Apr 2011

GLIDES Project Organization

Year Three



Implementation Work

- Continuing Yale “iPad kiosk” pilot
 - Collect data directly from patients for Asthma CDS
- CHOP
 - Selection of AAP Clinical Reports and Policy Statements finalized
 - Retinopathy of Prematurity (ROP)
 - Hearing Detection and Intervention (Hearing)
 - Synagis for RSV.
 - GEM knowledge “transformation” is complete
 - DROOLS rules engine selected as repository/implementation space for “GEMified” guidelines (<http://jboss.org/drools/>)
 - Commenced user-centered design activities

Implementation Work

- Geisinger
 - ICSI Adult Low Back Pain guideline transformed using GEM Cutter into XML outputs
 - The extractor tool was used to transform the guideline into decision variables and actions and directives
 - Table created outlining recommendations, decision variables, actions/directives, data source and what actions in the care process
 - Also reviewing options for rules engines that will integrate with EPIC
- Considering working with collaborators and EPIC to define optimal technical distribution mechanism for CDS through the EPIC EHR

Guideline Development

- Demonstrating and integrating Bridge-Wiz and GLIA tools into current guideline development processes
- AAP
 - Work continues on the Fever In Infants Under 3 Months Guideline
 - “Mega Meeting” scheduled for December 10-11
 - Evidence Working Group, Partners for Policy Implementation
 - Measurement Interest Group, Quality Innovation Network, Select AAP leadership
 - Design an updated, cohesive process for developing clinical guidelines that will reflect implementation considerations
- AAO-HNS
 - Organizing meetings in December, January for Sudden Hearing Loss and other guideline development

GEM Improvement

- Completed systematic GEM literature review
 - Analysis is nearing completion, focusing on how GEM was used, or why GEM was rejected
- Developing a Vision Statement for a future GEM release
- Potential concepts/requirements for “GEM III”
 - Backward compatibility
 - Variable sources (expressed needs, BRIDGE-Wiz, eRec, NGC, etc)
 - New sub-elements versus attributes
 - GEM Cutter improvements
 - Repeated markup of same text in RTF
 - Drag-and-drop conditionals and imperatives to preserve original order
 - New XSL Transforms for ECRI’s expanded abstraction process

GEM Improvement

- GLIA improvements
 - Collected requests
 - Improved efficiency (ask questions only once)
 - Improved clarity (language, examples, reordering of items)
- ECRI
 - Continue to process guidelines using GEM Cutter
 - Defined Abstraction Rules and Inclusion Criteria
 - AAO- HNS Hoarseness (Dysphonia) guideline was abstracted
 - Crosswalk between NGC Template and GEM
 - Conference call with Silverchair (ECRI Institute's IT subcontractor for NGC/NQMC) to introduce GEM and plan for potential modifications of the NGC website to accommodate GEM-parsed guideline content
- Robert Jenders (National Library of Medicine and the NIH's Clinical Research Center)
 - Exploring automated transformation of GEM-ified documents to Arden Syntax

Evaluation and Dissemination

- Evaluation at Yale and Nemours is ongoing
- Evaluation and Dissemination Plans submitted
- Papers in process/in press
 - Lomotan: deontics (in press, QSHC)
 - Lomotan: (qualitative evaluation of subspecialty use of CDS)
 - Horwitz: (evaluation of congruence of CDS and specialist decision-making)
 - Shiffman: BRIDGE-Wiz application
- HITSP Final recommendations
- Presentations

Presentations

- Guidelines International Network Annual Meeting
- American Thoracic Society
- AAP Acute Otitis Media Guideline Panel
- AAP Sinusitis Guideline Panel
- AAP Obstructive Sleep Apnea Guideline Panel
- AAP Steering Committee on Quality Improvement

- Participation
 - Institute of Medicine Panel on Standards for Developing Trustworthy Guidelines (AHRQ-funded)
 - Improving Guidelines for Multimorbid Patients Conference (AHRQ-funded)



CDS and Meaningful Use - Looking ahead to stages 2 and 3: Lessons for the Nation

CDS and Meaningful Use



Clinical Decision Support Consortium Technical Expert Panel Teleconference

Looking ahead to stages 2 and 3: Lessons for the Nation

Blackford Middleton, MD, MPH, MSc

November 8, 2010

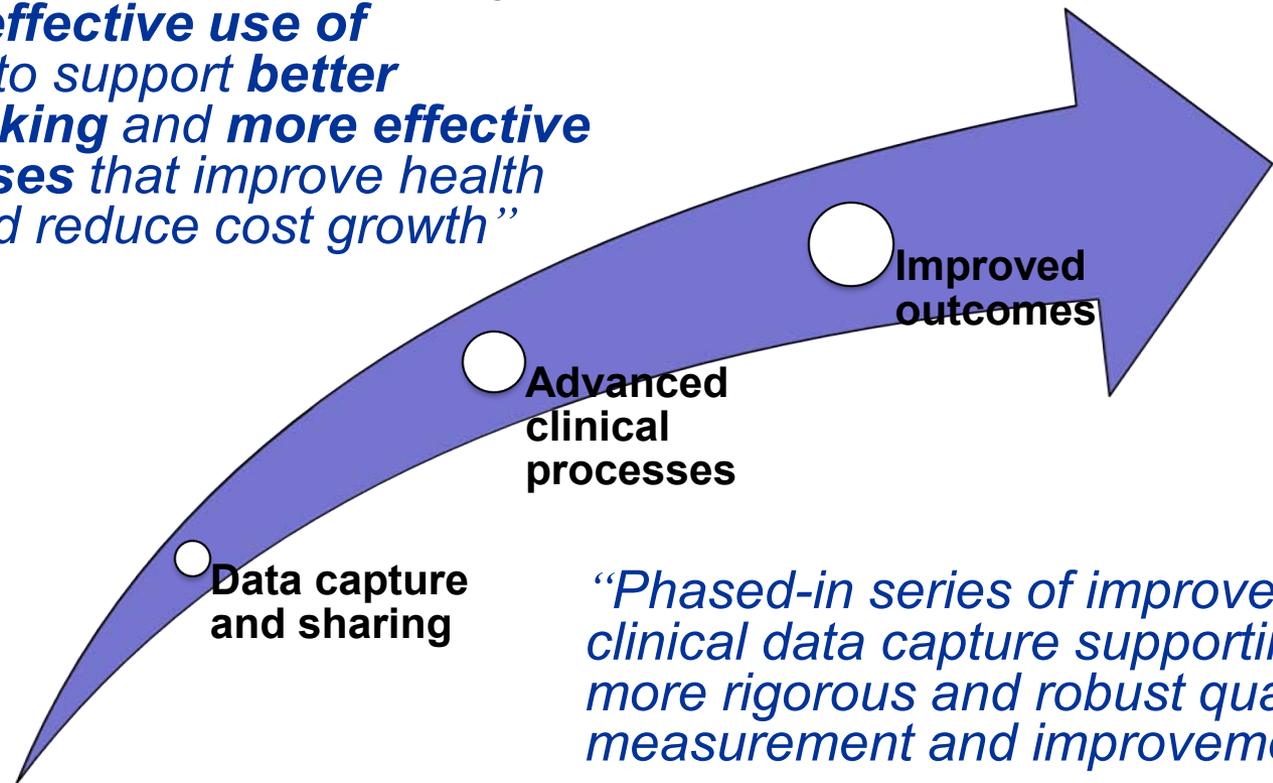
Meaningful Use



Bending the Curve Towards Transformed Health

Achieving Meaningful Use of Health Data

*“These goals can be achieved only through **the effective use of information** to support **better decision-making** and **more effective care processes** that improve health outcomes and reduce cost growth”*



“Phased-in series of improved clinical data capture supporting more rigorous and robust quality measurement and improvement.”

Highlights

- Final rules are more relaxed than proposed rules.
- Reduced number of criteria, new concept of Core and Menu Sets
 - Core Set: 15 EP, 14 Hospital.
 - Menu Set: 10 total, select 5.
 - All 10 Menu will be Core Stage 2.
- Lowered MU thresholds on many measures (80% to 50%).
- Fewer clinical quality measures:
 - 6 EP (3 core, and 3 a la carte from list of 38); 15 hospital.
- Removed administrative simplification requirements (electronic eligibility checking and claims submission); deferred to Stage 2.

Highlights (cont.)

- Added 2 optional requirements: Advance directives, and patient-specific educational resources.
- Privacy and Security: Accounting of disclosures for TPO now optional; relaxed encryption requirements.
- Hospital-based EPs with >90% of services in Inpatient (POS 21) or ED (POS 23) settings still excluded; however **9 Core/3Menu hospital measures** include ED patients in the denominator.
- No discussion in Final Rule regarding possible directions past 2014/FFY14 (Stage 3).
- Stage 2 discussions are already underway, expect NPRM this fall with Final Rule end of 2011.

Core Set

Requirement (changes)	EPs and Hospitals	Change
1. Use CPOE for medication orders entered directly by any licensed health care professional who can enter orders into the Medical Record per state, local and professional guidelines	More than 30% of patients with at least 1 medication in their med list have at least one medication order entered through CPOE	Who can enter; MU threshold decreased for EPs, increased for hospitals
2. Implement drug-drug and drug-allergy interaction checks	The EP/Hospital has enabled this functionality for the entire reporting period	Drug-formulary checking in Menu Set
3. Generate and transmit permissible prescriptions electronically (EPs only)	More than 40% (down from 75%)	MU threshold
4. Record demographics (preferred language, gender, race, ethnicity, DOB) and date and preliminary cause of death (hospital only)	More than 50% (down from 80%)	MU threshold
5. Maintain up-to-date problem/diagnosis list	More than 80% of patients have at least one entry as structured data	None
6. Maintain active medication list	More than 80% of patients have at least one entry as structured data	None
7. Maintain active medication allergy list	More than 80% of patients have at least one entry as structured data	None
8. Record and chart changes in vital signs	More than 50% (down from 80%)	MU threshold

Core Set (cont.)

Requirement (changes)	EPs and Hospitals	Change
9. Record smoking status for patients 13 years old or older	More than 50% (down from 80%)	MU threshold
10. Implement one clinical decision support rule related to specialty (EP) or high clinical priority (EP or hospital) and track compliance	Enable the capability Reduced # of rules from 5 to 1	Scope
11. Report clinical quality measures to CMS	6 EP, 15 Hospital measures For 2011, provide numerator/denominator through attestation; for 2012 electronic	Reduced # of measures
12. Provide Patients with an electronic copy of their health information upon request. Includes diagnostic test results, problem list, medication list, medication allergies, procedures, and discharge summary (hospital only)	More than 50% (down from 80%) Provide within 3 business days (not 48 hours)	MU threshold; Turnaround time
13. Provide patients with electronic copy of discharge instructions (hospital only)	More than 50% (down from 80%)	MU threshold
14. Provide clinical summaries for patients for each office visit (EP only)	More than 50% (down from 80%)	MU threshold
15. Capability to exchange key clinical information among providers of care and patient authorized entities	Perform at least one test	No change
16. Protect electronic health information	Conduct security risk analysis and implement security updates as needed	No change

Menu Set

Criteria	Final Rule
1. Drug-formulary checks in eRx	Now specifies internal or external formulary, for entire reporting period
2. Incorporate lab results as structured data in EHR	40%, reduced from 50%
3. Perform medication reconciliation between care settings	50%, reduced from 80%
4. Provide summary of care record for patients referred or transferred	50%, reduced from 80%
5. Perform 1 test of submission to immunization registry, where registry exists	No change
6. Perform 1 test of electronic syndromic surveillance submission to public health agency, where exists	No change
7. Record advance directives for patients 65 or older, in the inpatient setting (POS 21) (hospital only)	Proposed last summer, deleted from NPRM, brought back. 50% threshold
8. Generate lists of patients by specific condition	Generate at least one report
9. Send reminders to patients per patient preference for preventive/follow up care (EP only)	20% of patients 65 or older or 5 and younger
10. Provide patients with electronic access to health info	More than 10% who request it, within 4 business days, subject to EP's discretion to withhold certain information

Vocabulary

- **Problem List:**
 - Standard - The code set specified at 45 CFR 162.1002(a)(1) for the indicated conditions (i.e. ICD9-CM).
 - Standard - International Health Terminology Standards Development Organization (IHTSDO) Systematized Nomenclature of Medicine Clinical Terms (SNOMED CT®) July 2009 version.
- **Race/Ethnicity**
 - Standard - The Office of Management and Budget Standards for Maintaining, Collecting, and Presenting Federal Data on Race and Ethnicity, Statistical Policy Directive No. 15, October 30, 1997.

Vocabulary (cont.)

- **Procedures**
 - Standard - The code set specified at 45 CFR 162.1002(a)(2). (2) Standard. The code set specified at 45 CFR 162.1002(a)(5) (i.e. CPT-4).
- **Labs**
 - Standard - Logical Observation Identifiers Names and Codes (LOINC®) version 2.27.
- **Medications**
 - Any source vocabulary that is included in RxNorm, a standardized nomenclature for clinical drugs produced by the United States National Library of Medicine.

Looking Forward: 2013 Objectives

- **Improve quality, safety, efficiency**
 - Evidence based order sets
 - Clinical documentation recorded (inpatient)
 - Clinical decision support at point of care
 - Manage chronic conditions using patient lists and decision support
 - Report to external disease registry
- **Engage patients and families**
 - Offer secure patient-provider messaging
 - Access to patient-specific educational resources
 - Record patient preferences
 - Documentation of family medical history
 - Upload data from home monitoring devices

Looking Forward: 2013 Objectives (cont.)

- **Coordinate care**
 - Medication reconciliation at each transition of care
 - Produce electronic summary of care at each transition
 - Retrieve and act on electronic prescription fill data
- **Improve population and public health**
 - Receive immunization histories from registries
 - Receive public health alerts
 - Electronic syndromic surveillance data sent to public health agencies
- **Ensure privacy and security protection**
 - Use summary or de-identified data when reporting data for population health purposes

Looking Forward: 2015 Objectives

- **Improve quality, safety, and efficiency**
 - Achieve minimal levels of performance on quality, safety, and efficiency measures
 - Implement clinical decision support for national high priority conditions
 - Achieve medical device interoperability
 - Provide multimedia support (e.g., x-rays)
- **Engage patients and families**
 - Provide access for all patients to PHR populated in real time with data from EHR
 - Provide patients with access to self-management tools
 - Capture electronic reporting on experience of care
- **Coordinate care**
 - Access comprehensive patient data from all available sources

Looking Forward: 2015 Objectives (cont.)

- **Improve population and public health**
 - Use epidemiologic data derived from EHRs
 - Automate real-time surveillance
 - Provide clinical dashboards
 - Generate dynamic and ad hoc quality reports
- **Ensure privacy and security protection**
 - Provide patients with accounting of treatment, payment, and health care operations disclosures
 - Protect sensitive health information

MU: Implications for CDS

- We're on the right track...
- Cover all main CDS intervention types
 - Alerts/reminders, order sets, Infobuttons, Data display, documentation templates
- Standardize key building blocks
 - Order catalogue/controlled codes and terminology, workflow insertion points/functionality, CDS performance reporting
- Standardize 'knowledge interface'
 - knowledge-API (NHIN Exchange/Connect)

Prior Recommendations

1. Define Standard Triggers
2. Define Standard Input Data
3. Define Standard Interventions
4. Define Standard Offered Choices
5. Use CCD standard
6. Specify Relevant Controlled Vocabularies
7. Define Logical Rules
8. Provide appropriate inference
9. Allow Selective Filtering
10. Support CDS experimentation
11. Support Commercially available CDS
12. Log the Results (performance monitoring, audit)
13. Provide tailoring capabilities
14. Support CDS Standards (Infobutton)
15. Allow human-readable inspection of underlying logic
16. Provide a Usable interface
17. Allow import/export of logic
18. Allow services-based CDS
19. Identify preferred means of CDS expression

Sittig DF *et al.* A set of preliminary standards recommended for achieving a national repository of clinical decision support interventions. AMIA Annu Symp Proc. 2009 Nov 14;2009:614-8. HHS29020080010 CDS Consortium

CDS and Meaningful Use





GLIDES

Looking ahead to stages 2 and 3:
Lessons for the Nation

GLIDES PROJECT

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Timeline for Stages 2 and 3

- Meaningful Use Workgroup plan to
 - Present a draft of Stages 2 and 3 requirements to the HIT Policy Committee by 11/19
 - Update/finalize draft by March 2011
- HIT Policy Committee will make final recommendations for ONC by Q3 11
- CMS aim to release notice of proposed rulemaking on Stages 2 and 3 by Q4 11

Original CDS Criteria in MU (Tang 2009)

- 2011
 - Capture coded data (probs, meds, allergies, etc)
 - CPOE, including eRX
 - Implement drug-drug, drug-allergy, drug-formulary
 - Implement ONE CDS rule
 - Send patient reminders
 - Perform med reconciliations at transitions of care

Original CDS Criteria in MU (Tang 2009)

- 2013
 - CPOE for all orders
 - Use evidence-based order sets
 - Provide CDS at point of care
 - Manage chronic conditions
 - Conduct closed-loop med management (IP)
- 2015
 - Implement additional CDS for national health priorities

Issues

- What is the right progression for CDS? Progressive adoption or big bang?

Progressive adoption!

- Different bars for different practices?
 - Dr. Blumenthal (10/25): “Policy Committee might think about creating separate paths to meaningful use for various classes of providers when crafting the rules for Stages 2 and 3 of the federal EMR incentive program.”
- Standards for knowledge representation need to be selected and promoted

Stage 2 and 3 CDS Goals

- Focus on infrastructure and interoperability
- Sustain Stage 1 focus on measuring adherence to the rule
- Expand to more rules
- Require implementation of more complex CDS beyond simple alerts
- Focus on high-priority conditions (but whose priorities?)
 - Adult vs pediatric, primary care vs subspecialty, inpatient vs ambulatory
- Introduce outcomes orientation (beyond process)

Lessons Learned from GLIDES

- More robust CDS requires a variety of modalities to solve different problems, eg:
 - Relevant information display, prompted data capture (templates), Infobuttons, order facilitators, calculator, etc.)
 - Vendors need to improve CDS functionality (ref Adam Wright, JAMIA)
 - Tools to facilitate form design by end-users
 - Enable Code-Behind-Forms to permit more complex data capture and logic to be programmed locally
 - CDS designers must leverage EHR technical strengths and design around EHR limitations

Lessons Learned from GLIDES

- Guideline authoring can be standardized (BRIDGE-Wiz) to improve the knowledge on which DS is based (quality, transparency, clarity)
- An intermediate knowledge representation (between raw and computable knowledge) can make the transformation process systematic and replicable
- Local factors are critical for effective implementation
 - Integration with current or redesigned clinical workflow
 - Consider users' *needs* carefully (identification of quality gaps)

Lessons Learned from GLIDES

- Effective implementation planning is key to adoption and adherence
 - Standalone guideline implementation projects do not work well
 - Must be part of a broader and well-supported quality improvement effort
 - Integrate Meaningful Use requirements with Maintenance of Certification requirements
 - Consider incentives, feedback loops
 - Need guideline “champions” on the ground
 - Performance measurement must be integrated

Lessons Learned from GLIDES

- Need to include evaluation of adherence and outcomes in CDS design “up front”
 - Access to appropriate/granular data is key challenge
 - Even simple needs, such as access to date/timestamp information, can be challenging
 - Shift of focus from adoption to outcome requires extended evaluation timeline and new tactics
- Existing CDS may need to be rehabilitated
 - Organizations that have already implemented CDS for high-priority conditions, some of these systems may need to be redesigned to meet meaningful use criteria

CDS and Meaningful Use



Discussion



Recap and Next Steps



Thank You!