

Clinical Decision Support Consortium: Technical Expert Panel Meeting

July 11, 2008
8:00 am to 3:00 pm
AHRQ Office, Rockville, Maryland

CDS

consortium

AHRQ

PARTNERS
HEALTHCARE



KAISER PERMANENTE

SIEMENS



MASSPRO
Making an Impact

Background and Goals

Background:

- Clinical decision support has been applied to
 - increase quality and patient safety
 - improve adherence to guidelines for prevention and treatment
 - avoid medication errors
- Systematic reviews have shown that CDS can be useful across a variety of clinical purposes and topics

Goals:

To **assess**, **define**, **demonstrate**, and **evaluate** best practices for knowledge management and clinical decision support in healthcare information technology at scale – across multiple ambulatory care settings and EHR technology platforms.

Research Objectives and Member Institutions

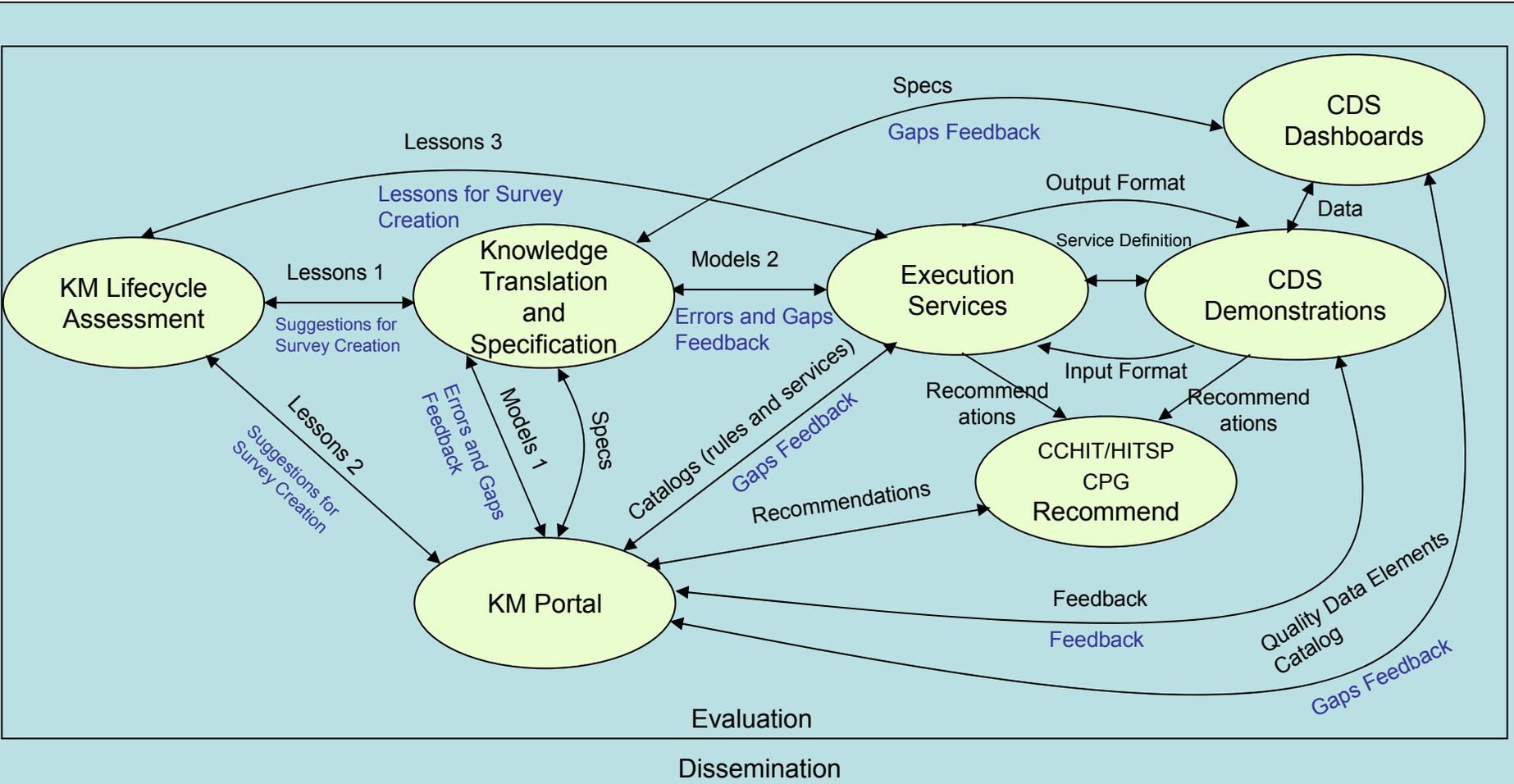
Member Institutions:

Partners HealthCare
Regenstrief Institute
Veterans Health Administration
Kaiser Permanente Center for Health Research
Siemens Medical Solutions/NextGen
GE Healthcare
Masspro

Objectives:

2. Knowledge Specification	3. Knowledge Portal and Repository	4. CDS Public Services and Content
5. Evaluation Process for each CDS Assessment and Research Area		
6. Dissemination Process for each Assessment and Research Area		

Workflow Diagram



Updates To Date

- **KM Lifecycle Assessment:**
 - Completed Knowledge Management and CDS Survey
 - Completed PHS site visit, June 16-19
 - Preparing VA and Regenstrief site visits
- **Knowledge Translation and Specification:** to be following
- **KM Portal:**
 - Delivered eRoom as a collaborative environment for CDSC activities
 - Delivered self-service training module for facilitators and participants
 - Completed conceptual and physical architecture for the Knowledge Portal architecture
- **Vendor Generalization/CCHIT:**
 - developed the guidelines for IP sharing among CDSC members
 - notified CCHIT and HITSP about the CDSC project
 - reviewed the current CCHIT and HITSP requirements and standards for CDS and KM
- **CDS Services Development:**
 - Completed literature review regarding CDS services and content models
 - Decision made to use the PHS Enterprise Clinical Rules Services which is in design phase.

Updates To Date – Cont.

- **CDS Demonstration:**
 - Started communication with LMR team to ensure smooth integration of CSD services
- **CDS Dashboard:**
 - Waiting for more information to become available to start working on specs development
- **CDS Evaluation:** All teams have completed preliminary evaluation plan and set up meetings with CDS Evaluation team lead
- **Joint Information Modeling Working Group:**
 - Completed standard terminologies selection decision support modeling and service development
 - Completed recommendation to use the CCD as the core data exchange framework
 - Presented JIM Final Report Summary document to Steering Committee on June 25th .
 - Official presentation of the CCD model will occur on July 9th at the Research team meeting
 - Official Sign-off is expected to occur on July 23rd at the next Steering Committee Meeting

Timeline Overview

Year I		Year II
Knowledge Management Lifecycle Assessment		
Knowledge Translation and Specification		
Knowledge Portal & Repository		
	CDS Web Services Development	
	Vendor Recommendation/CCHIT	
		Demo Phase 1: LMR
Evaluation		
Dissemination		

Knowledge Translation and Specification Team

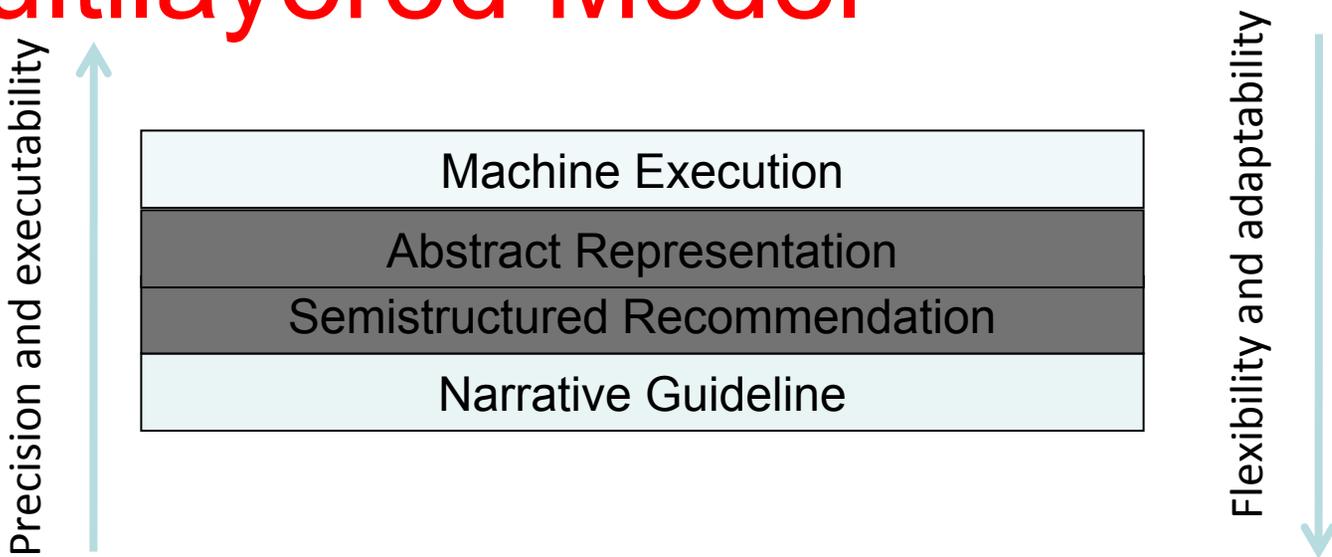
Approach and Progress

Aziz A Boxwala, MD, PhD
Brigham and Women's Hospital
Harvard Medical School

Team's Objectives and Overview

- Our objective is to make recommendations from guidelines easier and faster to implement in any CDS system
 - We are not creating another executable representation format such as GLIF or Arden Syntax
- We intend to use existing or evolving standards where available so as to enhance understanding and minimize barriers to implementation at scale
- A multilayered representation, wherein each layer provides successively more structured knowledge
 - Increasing refinement in successive layers for use of knowledge in different CDS tool types and different organizations

Multilayered Model



Narrative Recommendation layer

Semi-Structured Recommendation layer

Abstract Representation layer

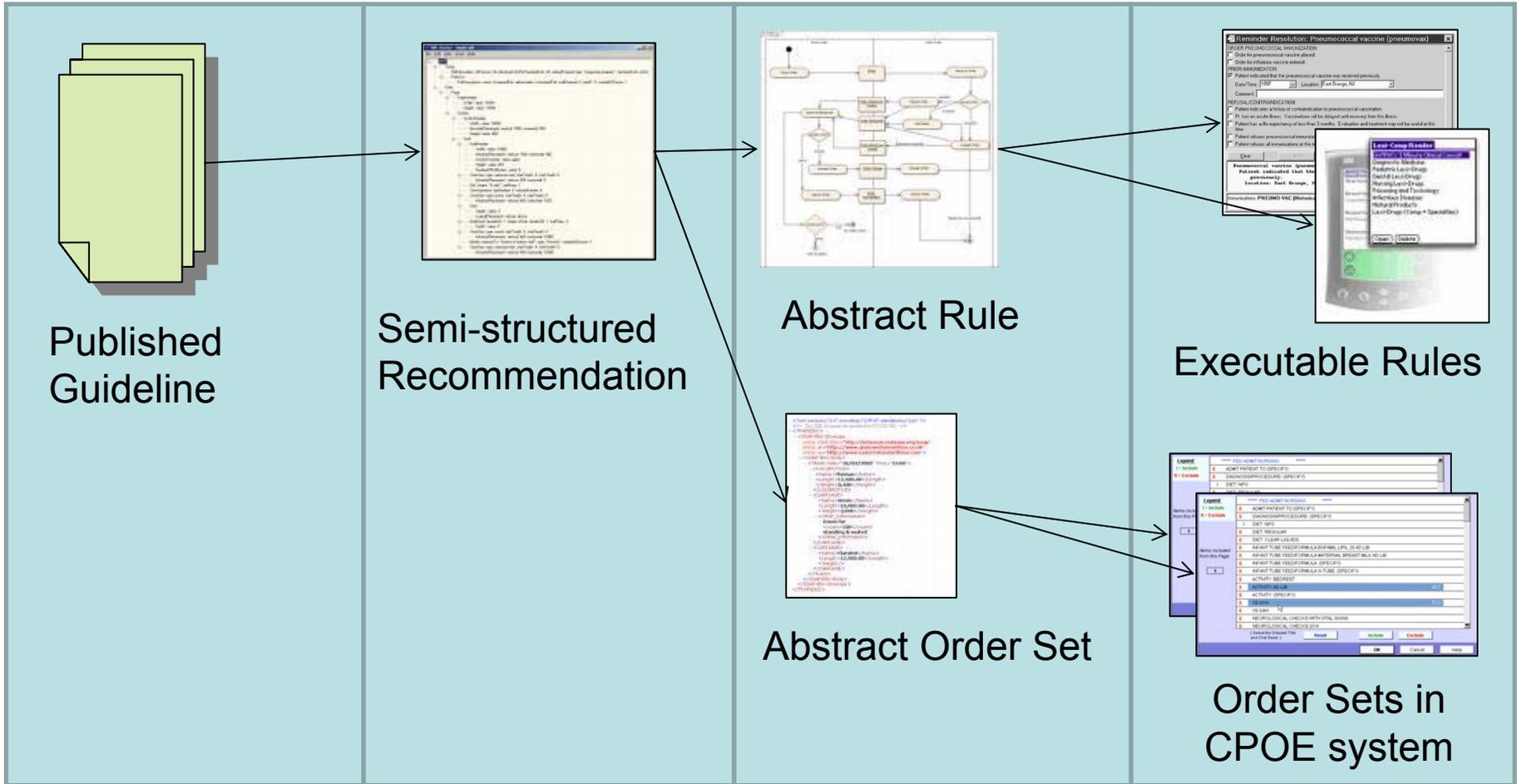
Machine Executable layer

Knowledge encoded in a format that can be rapidly integrated into a CDS tool on a specific HIT platform

E.g., rule could be encoded in Arden Syntax

A recommendation could have several different artifacts created in this layer, one for each of the different HIT platforms

Knowledge Artifacts by Layer



Knowledge Artifacts Examples

<p>Published Guideline</p>	<p>Sem</p>	<p>Meta data</p>	<p>knowledge:</p> <p>data:</p> <p>BPRecordedInLastYear := read last{table='RES', code='12345-0'}</p>
<p>Narrow</p> <p>Screening for High Blood Pressure in Adults: A Recommendation from the U.S. Preventive Services Task Force (USPSTF) recommends that adults aged 18 years and older who do not have high blood pressure be screened for high blood pressure.</p> <p>The U.S. Preventive Services Task Force (USPSTF) recommends that adults aged 18 years and older who do not have high blood pressure be screened for high blood pressure. (This is a grade B recommendation.)</p>	<p>Developed by: U.S. Preventive Services Task Force</p> <p>Strength: Grade B</p> <p>Clinical Scenario: Patient with blood pressure not recorded in the last year.</p>	<p>Logic:</p> <p>Let BPLoincCode = read last{table='RES', code='12345-0'}; if (adult is false) then conclude false; if (BPRecordedInLastYear is null) then conclude true; else if (BPLoincCode is not null) then conclude true; else conclude false;</p> <p>Action:</p> <p>Write 'Patient has not had a blood pressure screening in the last year' at PCPemail; and code = BPLoincCode</p>	<p>Arden Syntax Rule</p> <p>knowledge:</p> <p>data:</p> <p>BPRecordedInLastYear := read last{table='RES', code='12345-0'}</p> <p>PCPemail := read {...};</p> <p>logic:</p> <p>if (adult is false) then Factory.CodedValue("LOINC", ...)</p> <p>conclude false;</p> <p>if (BPRecordedInLastYear is null) then conclude true;</p> <p>else if (BPLoincCode is not null) then conclude true; else conclude false;</p> <p>Action:</p> <p>Write 'Patient has not had a blood pressure screening in the last year' at PCPemail; and code = BPLoincCode</p>

Why Multilayered Representation?

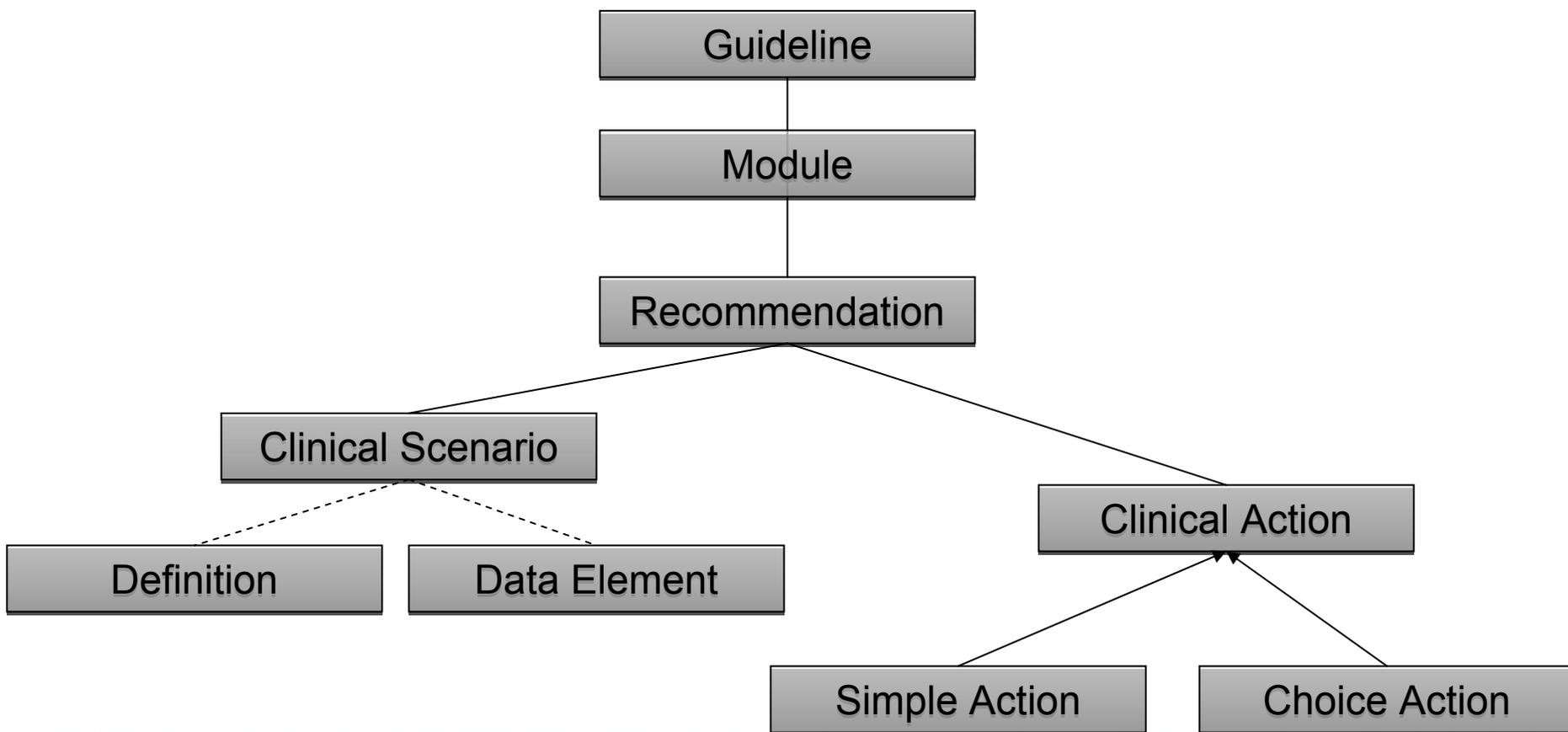
- Allows us to balance between the competing requirements for flexibility in representation for various environments and the ability to deliver precise, executable knowledge that can be rapidly implemented
 - For those who can use an available Machine Executable level knowledge artifact, this approach provides for rapid implementation of the guideline
 - For others, it might be more appropriate to use an artifact from the Semistructured Recommendation or Abstract layers, to create rapidly their own executable knowledge. They can then submit the latter to the KM portal for inclusion as a Machine Executable artifact
- Provides a path to achieve logical consistency from the narrative guideline to the execution layer

Semi-structured Recommendation Layer

- The purpose of this layer is to serve as a communication between the subject matter expert and knowledge engineers who will design and implement the clinical decision support logic
- Organizes and encapsulates the knowledge of a recommendation
- The semi-structured recommendation models a decision at a point-in-time
 - It does not model a temporal series of decisions and activities
- Design criteria for this layer
 - Keep the model simple for usability
 - Allow for reduction (not necessarily elimination) of ambiguity in the knowledge
 - Ensure reusability of knowledge

Semi-structured

Recommendation Model



Model Overview

- Guideline is a collection of Recommendations
- Recommendations can be grouped into Modules
- Guideline, Recommendation, and Module can have associated Metadata
- Recommendation consists of
 - A Clinical Scenario to which the recommendation applies
 - A Clinical Action that is recommended
- Definition is a term and its meaning in terms of clinical data
- Clinical Scenarios, Clinical Actions, Definitions are reusable building blocks

Metadata Model

- The metadata model combines elements
 - Mostly from GEM (Shiffman)
 - Detailed, multifaceted metadata model
 - Excludes GEM's knowledge components
 - Dublin Core (W3C's metadata standard)
 - Standard for describing any type of resource
 - Limits on extensibility
 - MeSH is an accepted coding scheme

Use of Standards

Action and Information models apply to semi-structured layer, abstract layer, and machine execution layers

- Patient data
 - HL7 Clinical Statements as constrained by the HITSP CCD implementation guide
- Recommended clinical actions
 - We are evaluating pertinent aspects of the HL7 Order Set Specification (draft)
- Metadata
 - GEM
 - MeSH
- Outcome metrics model
 - Derived from the AMA metrics model
- Abstract layer - Considering use of GELLO for expression syntax
- Execution layer - Can support knowledge representation standards such as Arden Syntax and decision-support service standards such as those being drafted in HL7

Summary and Status

- We are developing a multilayered knowledge representation model
 - A draft of the semi-structured recommendation layer is complete
 - We are incorporating existing standards where possible
 - Began collaboration with KM Portal team
 - Completed first draft of CDSC quality metrics
- The multilayered model will be implemented within the KM portal
- The CDS web service implementation will utilize the same standards

Issues, Problems, Barriers

- Knowledge engineering at scale
- Implementation at collaborating organizations (we are not sure everyone will go with level 4)
- Reaching out for CCHIT to deliver recommendations. What is the ideal process and result
- IP Sharing issue
- When can we expand the CDSC Consortium?
- Aligning our approach with National standards
- How do we prioritize CDS focus areas, e.g. what are the top 200 rules, what are CDS performance measures.
- How do we acknowledge CDS limitations
- How do we engage knowledge vendors
- How do these related efforts converge (CDSC, GLIDES, Morningside)

Dissemination Channels

<p>DOQ-IT University</p>	<p>E-learning tool developed by Masspro to deliver the best practices determined by the Consortium</p>
<p>CIRD Website http://www.partners.org/cird/StaffPrj.asp?cBox=CurrProj&prAb=ACDSC</p>	<p>Maintained on the Partners CIRD website, and provides a detailed description of the study</p>
<p>AHRQ Website http://healthit.ahrq.gov/portal/server.pt?open=512&objID=654&&PageID=13665&mode=2&in_hi_userid=3882&cached=true</p>	<p>Maintained on the AHRQ website, and gives a brief description of the study. Will be linked to CIRD website.</p>

Dissemination Channels, Cont.

<p>Clinical Practice Guideline (CPG) developers community</p>	<p>CDSC will consult various experts for guidance on clinical guidelines</p>
<p>KM Portal</p>	<p>Will deliver a working KM Portal and broad range of knowledge on best practices that will be published on KM Portal</p>
<p>Conferences and Annual Meetings</p>	<p>Will submit manuscripts and abstracts to upcoming conferences</p>
<p>CCHIT/HITSP Recommendations</p>	<p>Vendor Generalization/CCHIT team will present initial recommendations to CCHIT and HITSP in January, 2009</p>