



Clinical Decision Support Technical Expert Panel Meeting

- March 7, 2012
- 3:00 PM - 5:00 PM Eastern Time
- Facilitator: Scott Finley

Agenda



- Welcome & Introductions
- Review of December's TEP Meeting
- From demonstrations to standard practice - part 2:
who are the CDS customers and what do they want?
CDSC
 - CDSC
 - GLIDES
- From the voice of the customer:
 - Regenstrief
 - The Children's Hospital of Philadelphia
- Recap & Next Steps




Welcome

3



Review Of December's TEP Meeting

4



From demonstrations to standard practice - part 2: who are the CDS customers and what do they want?

5

From demonstrations to standard practice - part 2:



From Demonstration to Standard Practice

Part 2: Who are the CDS customers and what do they want?

Blackford Middleton, MD, MPH, MSc

Principal Investigator

March 7, 2012



Agenda

1. Who are the CDSC customers?
2. What CDSC has to offer to the customers?
3. Will the products be ready for the customers? If not, what is needed?
4. What are the steps, challenges, and barriers involved in developing products ready for consumption?
5. How should we communicate availability and sources of products?

CDSC Customers

1. Healthcare service providers
 - Large institutions (hospitals and systems)
 - Small institutions (private practices)
2. Payers
3. EHR and content vendors



Other Stakeholders

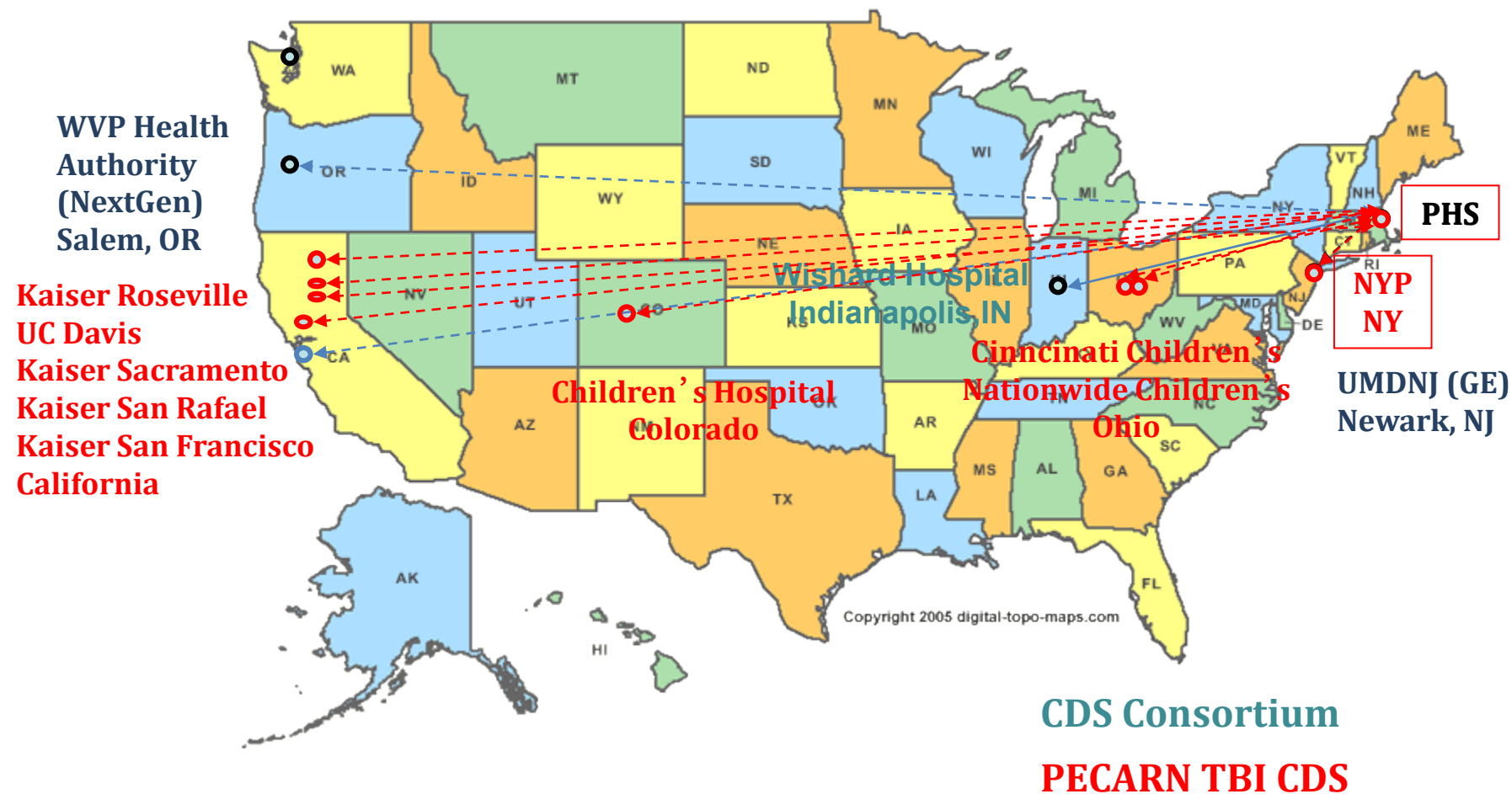
1. HIT community (guidelines developers, specialty societies)
2. Government and non-profit foundations, fulfilling their mission and supporting CDS requirements

CDSC Products, Services, Value

- Cloud-based CDS services (prototypes, pilots, clinical trial support, production support)
- KM Portal for knowledge sharing and collaboration
- *In vivo* R&D lab
- Education and consulting (consulting, site assessments, recommendations, and training)
 - Best practices for KM and CDS
 - Organization and governance
 - Policy and standards
- CDS Interventions library

Cloud-Based CDS Services

Toward a National Knowledge Sharing Service



Knowledge Management Portal

The screenshot shows a web browser window displaying the CDS Knowledge Management Portal. The browser's address bar shows the URL <http://stage-cdsportal.partners.org/CDSCSearch.aspx>. The page features a navigation menu with links: Home, About the Portal, About the Consortium, FAQ, Glossary, Terms of Use, and Contact Us. The main content area is titled "Search Term :" and includes a search input field, a "Search" button, and a "Clear Selection" button. Below the search bar is a "Hide Advanced Search" button. The search criteria are organized into two columns of dropdown menus:

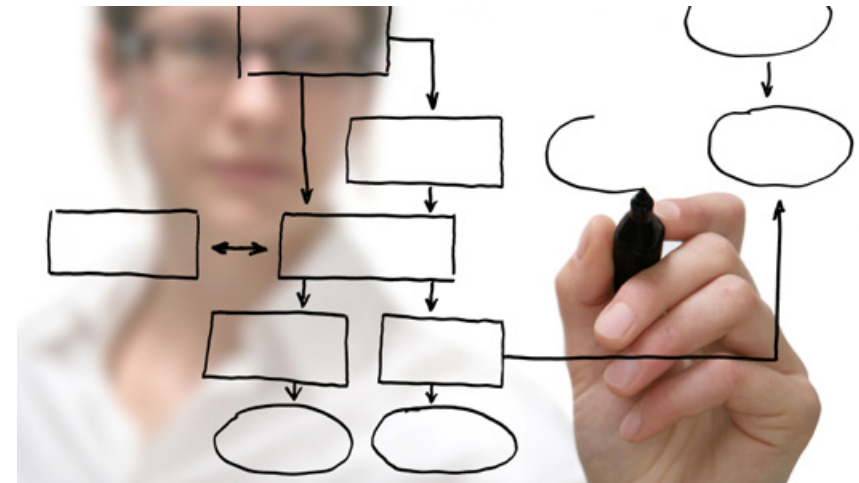
- Specification Level:**
 - All Levels
 - Level 1 - Unstructured
 - Level 2 - Semi-Structured
- Contributing Entity:**
 - All Contributing Entities
 - GE Healthcare
 - Kaiser Permanente Northwest
- Content Type:**
 - Alert
 - All Content Types
 - Definition/Dictionaries
- Clinical Domain:**
 - Aerospace Medicine
 - All Clinical Domain
 - Allergy and Immunology
 - Anesthesiology
 - Audiology
 - Chiropractic Medicine
- Intended Recipient Role:**
 - All Roles
 - Nurse
 - Patient
- Clinical Information System:**
 - All Clinical Info Systems
 - GE
 - Meditech
- Patient Population:**
 - Adolescent
 - Adult
 - All Patient Population

At the bottom right, there are fields for "Date From:" and "Date To:" with dropdown arrows.

In Vivo R&D Lab

CDS Consortium provides an *In Vivo* laboratory for research and analysis in fields of collaborative clinical knowledge engineering and CDS.

- Pre-competitive setting
- Unique collaborative environment
- Various stakeholders



Education and Consulting

Education:

- Educational lectures
- Tutorials
- Courses

Consultation:

- Consult all types of entities on CDS strategy and architecture
- CDS governance design
- KM and CDS best practices for design and implementation

Other:

- Site assessments
- Recommendations
- Trainings



CDS Interventions Library

Methodologies:

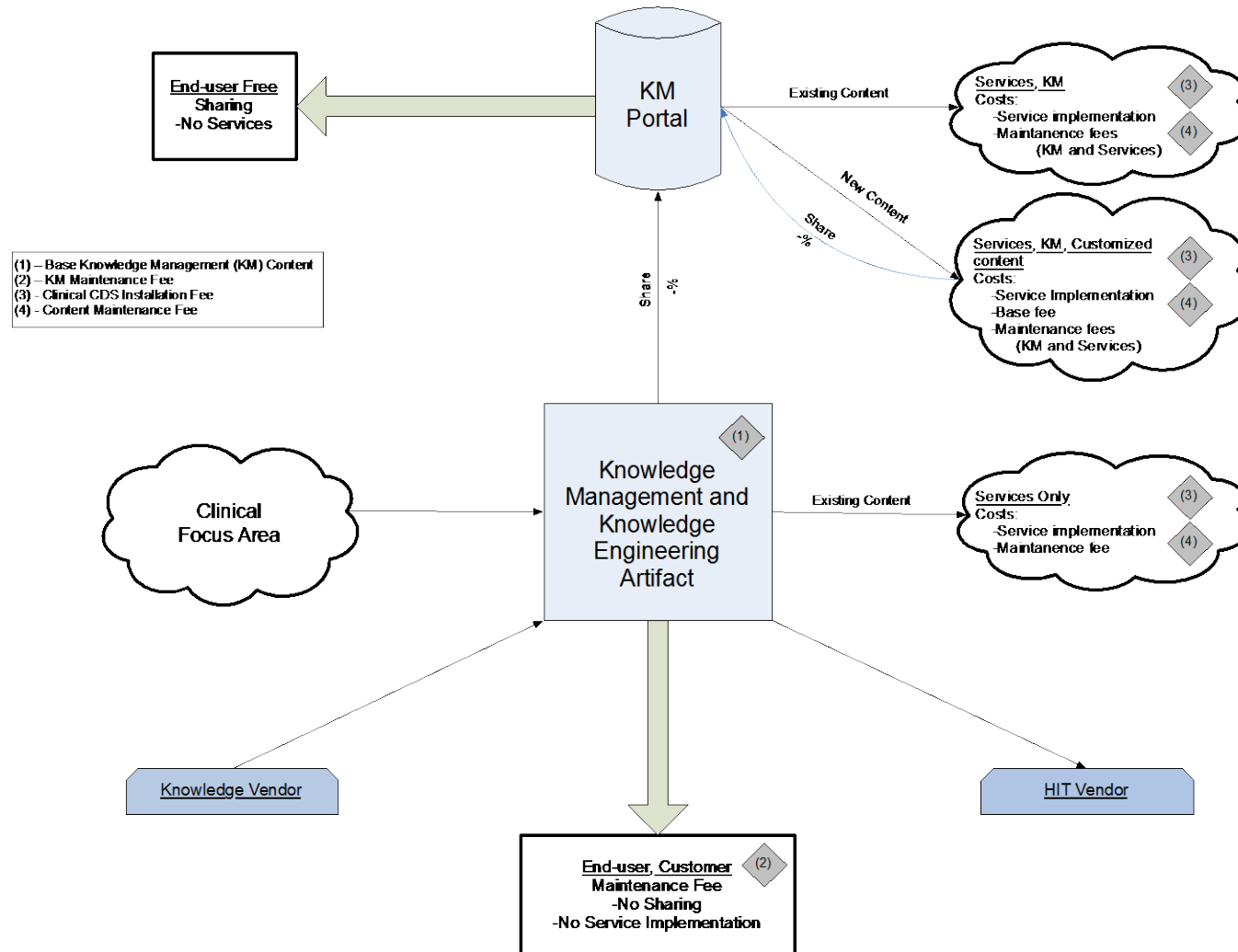
- Measuring effectiveness of CDS intervention
- CDS development processes
- Measuring impact on healthcare delivery performance

Will the products be ready for the customers? If not, what is needed?

	CDSC Values	Status	Healthcare Service Providers	Payers	EHR Vendors	Content Vendors	HIT Community	Government and Non-profit Foundations
1	Cloud-based CDS services	Ready	X		X	X		
2	KM Portal	Ready*	X			X	X	
3	<i>In vivo</i> R&D lab	Ready*	X		X	X	X	X
4	Education and consulting	Ready*	X	X	X	X	X	X
5	CDS interventions library	In progress		X			X	X

* Ready, and could be increased/extended/taken to the production level

CDS Consortium Channels



What are the steps, challenges, and barriers involved in developing products ready for consumption?

- Funding
- Legal issues
- Human capital issues

Funding

After OY3 ends, what are the options?

- Sustainability model
 - Set of various revenue models/approaches
 - Continued federal funding
- Dismiss the CDSC
 - Look for next round of funding when such becomes available

Political and Institutional Questions

- Who owns CDSC?
- Who is responsible for CDSC?
- Who supports it?
- What if it goes down?

Challenges

- We operate in an environment in which our customers expect results – and we need results – in a relatively short period of time
 - HITECH Act gives us a timeframe for those expectations
 - The Super Committee does the same through their charge of reducing Medicare spending
 - Your patients want more affordable and high quality care
- Needs must be met or critical momentum may be lost

Challenges (cont.)

- Economic policy
- Privacy and security policy
- Technical solutions
- Governance

How should we communicate availability and sources of products?

- Website
- AHRQ
- TEP
- Marketing
- Scientific conferences and meetings
- Other?

Acknowledgements

Principal Investigator: Blackford Middleton, MD, MPH, MSc

CDSC Team Leads:

Research Management Team: Lana Tsurikova, MSc, MA

KMLA/Recommendations: Dean F. Sittig, PhD

Knowledge Translation and Specification: Aziz Boxwala, PhD

KM Portal: Tonya Hongsermeier, MD, MBA

CDS Services: Howard Goldberg, MD

CDS Demonstrations: Adam Wright, PhD

CDS Dashboards: Jonathan Einbinder, MD

Evaluation: David Bates, MD, MSc

Content Governance Committee: Saverio Maviglia, MD, MSc



Discussion

Thank You!

From demonstrations to standard practice - part 2:





Technical Expert Panel Teleconference

March 2012

GLIDES PROJECT

GuideLines Into DEcision Support

sponsored by
The Agency for Healthcare Research and Quality



Yale School of Medicine



GEISINGER



American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™



American
Urological
Association



ALLIANCE OF CHICAGO
Community Health Services, L3C



American Society of Clinical Oncology

Today

- From demonstrations to standard practice:
 1. Can what has been developed be delivered to the customers?
 2. Who are the customers? What do they want?
 3. Will the products be ready for the customers?
 4. What are the steps, challenges, and barriers involved in developing products ready for consumption?
 5. How should we communicate availability and sources of products?
- Voice of a Customer (CDS implementer)
 - Dr. Robert Grundmeier, CHOP

GuideLines Into Decision Support: GLIDES Tools to Take CDS to a National Scale

Tools For Guideline Developers

Tools For Guideline Implementers

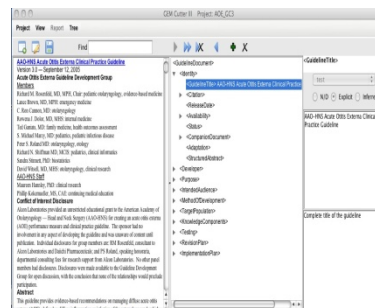
GEM



- Guideline Elements Model
- Knowledge model for guideline documents
 - XML-base
- ANSI standard (ASTM E2210-06)

GEM CUTTER

- Parses guideline text into chunks compatible with the Guideline Elements Model schema
- Preserves “audit” trail

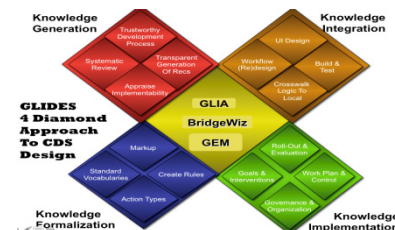


EXTRACTOR

- Creates reports and extracts information to be used as inputs to the CDS design process (logic specifications)

IMPLEMENTATION TOOLKIT

- Project methodology
- Sample work plans/checklists
- Design documents/forms
- Lessons Learned/Dos-Don'ts
- CDS System Examples



OPERATIONAL CDS SYSTEMS/DESIGNS

Asthma Control

Obesity Counseling

Premie Support

Low Back Pain

Patient Centered Data Capture

GuideLines Into Decision Support: GLIDES Tools to Take CDS to a National Scale

Tools For Guideline Developers

BRIDGE-Wiz



A tool for guideline authors to improve clarity, transparency, and validity

Balance

What type of activity do you propose? PRE

Based on the PRESCRIBE action type, select a verb: start

Start what? metformin as first-line

VERB WHAT

Decidable

Would the guideline's intended audience consistently determine whether each condition has been satisfied? If not, rewrite the condition.

Condition

newly diagnosed with type 2 diabetes, i.e., not previously treated

Recommendation Authors Should Be Explicit About

- **WHEN** {under what circumstances}
- **WHO** {in the Intended Audience}
 - **Ought** to {with what level of obligation}
- **DO WHAT**
- **{To WHOM}** {which members of the target population}
 - **HOW**
 - **WHY**

GLIA



An instrument to identify obstacles to successful implementation

eGLIA



Number of complete appraisals

Cell background: Green: final report complete, Red: final report partially done, Grey: no final report decisions

eGLIA General Instructions Selection page Summary Log out

Generate report for Screening for gonorrhea, version 2

Generate GLIA report for global dimension

Rec	Decisability	Executability	Workflow	Format	Measures	Validity	Innovation	Flexibility	Comprehensibility
1									
2									
3									
4									
5									

Facilitates appraisal and consensus development

Pin color: Blue = discuss, Green = no need for discussion, Pink = No completed appraisals

Tools For Guideline Implementers

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Is there Equilibrium or a preponderance of Benefits or Risks, Harms, and Costs?

Equilibrium
Preponderance of Risks, Harms, Costs
Preponderance of Benefit

Benefits:
Lower High A1c
Target A1c sustained longer
Less early deterioration of blood glucose
Lower chance of weight gain
Improved insulin

SMBG
Possible metabolic decompensation if Type 1 is misdiagnosed and treated as Type 2
Potential risk of lactic acidosis in setting of ketosis or significant dehydration

Would the guideline's intended audience consistently determine whether each condition has been satisfied? If not, rewrite the condition.

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2	edit	edit	edit	edit	edit	edit	edit	edit	edit
3	edit	edit	edit	edit	edit	edit	edit	edit	edit
4	edit	edit	edit	edit	edit	edit	edit	edit	edit
5	edit	edit	edit	edit	edit	edit	edit	edit	edit

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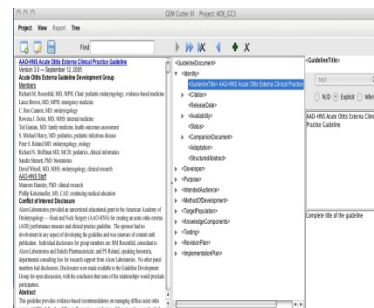
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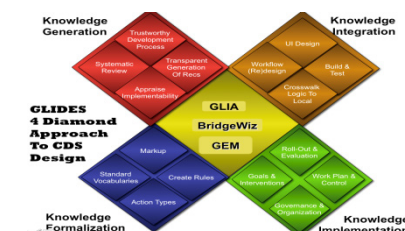


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OPERATIONAL CDS SYSTEMS/DESIGNS

Asthma Control

Obesity Counseling

Premie Support

Low Back Pain

Patient Centered Data Capture



Who Are The Customers?

Guideline Developers

Informaticians

Guideline Implementers

End-Users

Who Are The Customers?

Professional societies and other organizations that create medical guidelines and policies

Knowledge experts engaged in transforming narrative guidelines into structured knowledge specifications for implementation as CDS in EMRs

Project Leaders and other personnel responsible for managing the design, integration, and implementation of CDS delivery projects

Clinicians who are interested in using those CDS systems created by GLIDES (Alliance of Chicago is using Yale's Asthma CDS, Geisinger may use CHOP's Premie CDS)



What Can Be Delivered To The Customers?

Guideline Developers

Informaticians

Guideline Implementers

End-Users

What Can Be Delivered?

Guideline authoring
tool: BridgeWiz

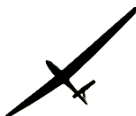
Implementability
appraisal tool: eGLIA

Knowledge
transformation and
specification tools:
GEM, GEM Cutter
and related tools
(Version III)

Methodology, lessons
learned, design
forms, templates and
examples: Four
Diamonds Model

CDS for Asthma,
Obesity, Low Back
Pain, Premie Support

Patient-Centered Data
Collection



Will The Products Be Ready For The Customers?

Guideline Developers		Informaticians	Guideline Implementers	End-Users
Will The Products Be Ready?	Yes – Available now, final release planned for OY3	Yes – Available now, final release now in process of re-standardization	Artifacts repository will be delivered in OY3. Discussion underway with AHRQ on which multi-media technologies to use	Alliance currently implementing Yale Asthma CDS. Geisinger may implement CHOP Premie solution in 2012



Steps, Challenges And Barriers?

Guideline Developers

Informaticians

Guideline Implementers

End-Users

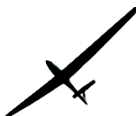
Next Steps

Improved distribution and deployment platform (Web-based, training material)

Improved distribution/ deployment platform (downloading, training material)

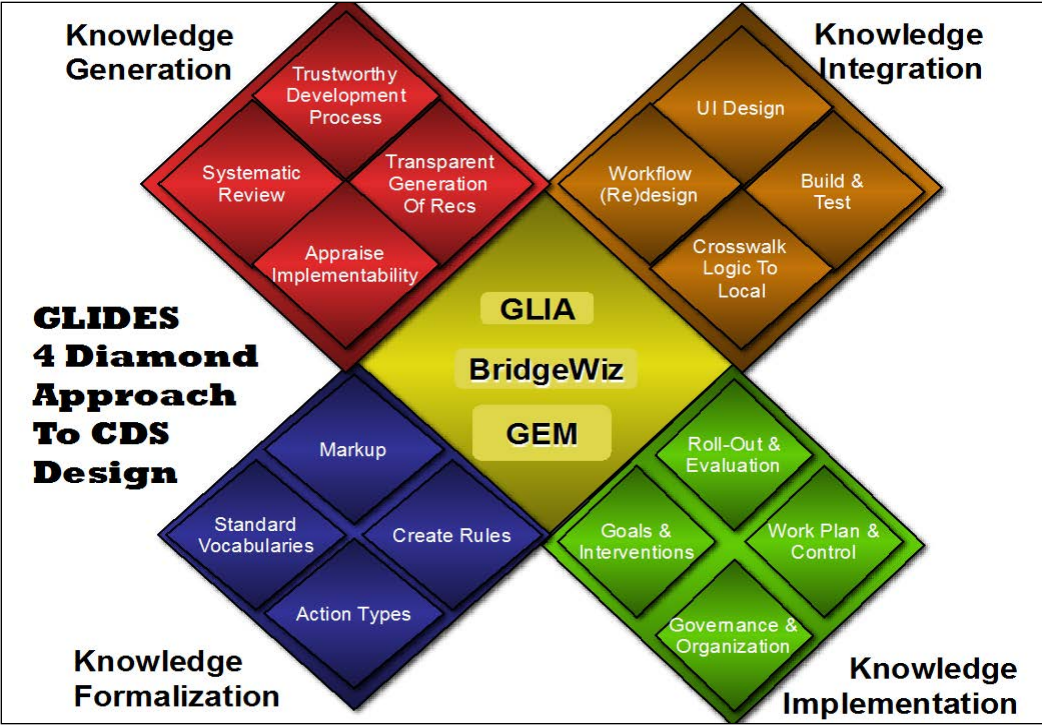
Construct automated, web-based repository (OY3)

Deciding whether to make these products more broadly/formally available?



How Should We Communicate Availability And Sources?

Guideline Developers		Informaticians		Guideline Implementers	End-Users
How To Communicate?	Deployment platform	Deployment platform	Dissemination platform	Informal (at present)	





From Demonstration To Standard Practice

	Guideline Developers	Informaticians	Guideline Implementers	End-Users
What Can Be Delivered?	Guideline authoring tool: BridgeWiz Implementability appraisal tools: GLIDE/eGLIA	Knowledge transformation and specification tools: GEM, GEM Cutter and related tools (Version III)	Methodology, lessons learned, design forms, templates and examples: Four Diamonds Model	CDS for Asthma, Obesity, Low Back Pain, Premie Support Patient-Centered Data Collection
Will The Products Be Ready?	Yes – Available now, final release planned for OY3	Yes – Available now, final release now in process of re-standardization	Artifacts repository will be delivered in OY3. Discussion underway with AHRQ on which multi-media technologies to use	Alliance currently implementing Yale Asthma CDS. Geisinger may implement CHOP Premie solution in 2012
Next Steps	Improved distribution and deployment platform (downloading, training material)	Improved distribution/ deployment platform (downloading, training material)	Construct automated, web-based repository (OY3)	Deciding whether to make these products more broadly/formally available?
How To Communicate?	Deployment platform	Deployment platform	Dissemination platform	Informal (at present)



From the voice of the customer

38

From the voice of the customer



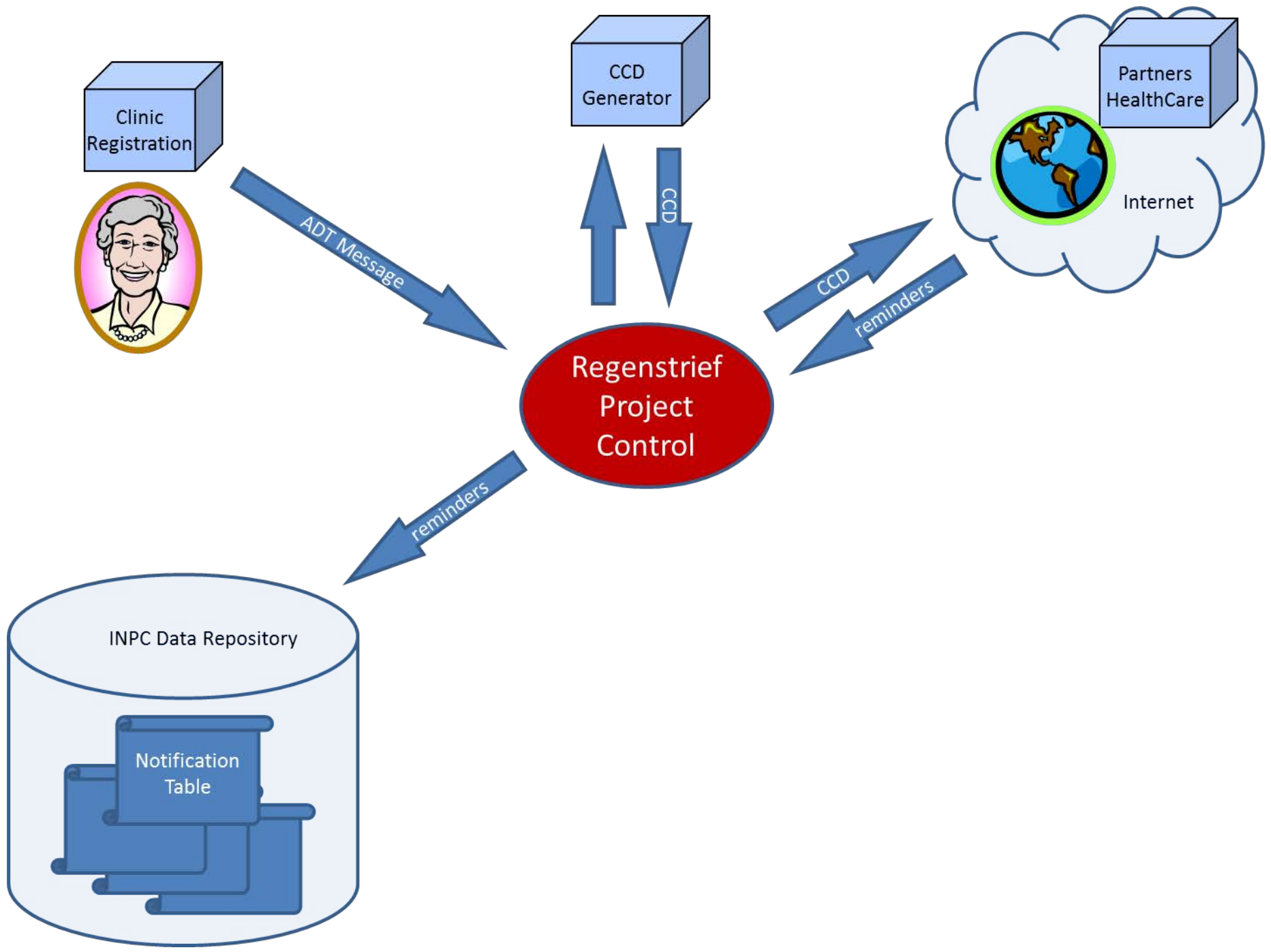
Integration of CDSC Decision Support Reminders Into the Regenstrief CareWeb Order Entry Process

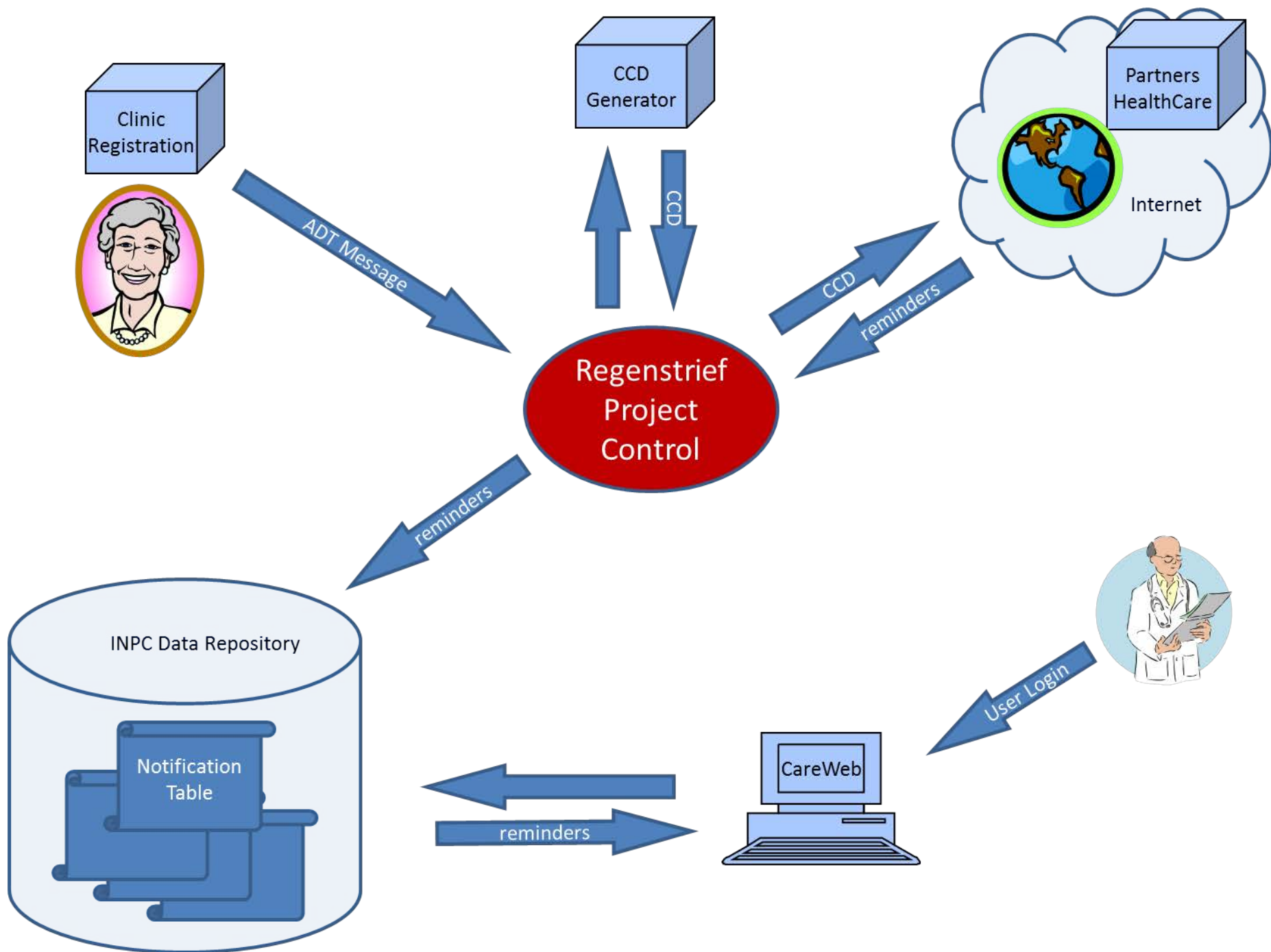
Linus Simonaitis, Brian Dixon, Jon Duke
March 7, 2012



Regenstrief Medical Informatics

*The **Source** for Medical Informatics*





Welcome to G3! - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Welcome to G3!

172.30.192.11 https://172.30.192.11/CareWeb/Wishard/

Google

JIRA tickets CDSC Portal

Welcome to G3! Relay Health External Resources Leave Feedback Help

INPC Change Password Logout

Change DOB SIMONAITIS, LINAS at MED4

Inbox Dashboard Order Entry View Chart Relay Health Settings Administration

Notifications Pending Notes

Notifications

New... Process View

				Patient	Subject	Delivered
					Diabetic patient is due for ophthalmologic exam (recommended yearly).	03-Oct-2011 08:11
					Diabetic patient is due for foot exam (recommended yearly).	03-Oct-2011 08:11
					Diabetic patient is due for urine microalbumin/creatinine ratio measurement (recommended yearly).	03-Oct-2011 08:11
					Diabetic patient is overdue for HgbA1c measurement (recommended every 6 months).	03-Oct-2011 08:11

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Notifications New... Process View

			Patient	Subject	Delivered
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<input checked="" type="checkbox"/>	<input type="checkbox"/>			Diabetic patient is overdue for HgbA1c measurement (recommended every 6 months).	03-Oct-2011 08:11

Sender: USER, CARERULE

Priority: low

Viewed:

Info Only: true

Can Delete: true

Can Forward: true

Diabetic patient is overdue for HgbA1c measurement (recommended every 6 months).
Order HgbA1c now.

DISCLAIMER

Message:

This decision support reminder may be inaccurate or based on incomplete data. The clinician should always use proper judgment while taking care of the patient, and should disregard this reminder if it seems clinically inappropriate. This decision support reminder is provided by the Clinical Decision Support Consortium as a component of a research contract. It is based on the recommendations of the United States Preventive Services Task Force. The decision support reminder cannot be used as the sole basis of any diagnosis or medical action; any action taken by the clinician in response to the decision support reminder is solely at the clinician's discretion and responsibility. ECRS is to be used as a supplement to other clinical decision support methods, including without limitation, the medical judgment of the clinician. ECRS DOES NOT SERVE AS A REPLACEMENT FOR A CLINICIAN'S JUDGMENT OR CLINICAL DIAGNOSIS. For any questions please contact: Linas Simonaitis (email: lsimonaitis@regenstrief.org) (phone: 317-423-5535) or Brian Dixon (email: bdixon@regenstrief.org) (phone: 317-423-5582)

TRIAL, PAT (9993) [Change](#) DOB: 25-Jun-1965 (46 yrs) Female

SIMONAITIS, LINAS at REGENSTRIEF_HITS_2

[Inbox](#) [Dashboard](#) [Order Entry](#) [View Chart](#) [Orderset Builder](#) [Relay Health](#) [Settings](#)

Orders and Documentation

- Release Orders
- Quick Orders
- Phone Encounter
- Other Documentation

Chart

- View/Print Orders
- All Results
- Labs
- Imaging
- Provider Notes
- Admission/Discharge
- Cardiology Studies
- G.I. Studies
- Pathology
- Other Results

Patient Profile

- Preferred Pharmacy CVS #08685 #5391
- Demographics
- Appointment History

Problems

headache (784.0)
hyperlipidemia (272.4)
hypertension (401.9)
hypothyroidism (244.9)
migraine headache (346.90)
Mitral Valve C to D Interval
nausea with vomiting (787.01)
neck pain (723.1)
None of the Above/Not Doc/UTD
Dysphagia

Medications

Acetamin/Cod EI 120.0-12.0 MG/5ML
Acetaminophen 160 MG
Acetaminophen W/Cod 300-30 MG
Amitriptyline 10 MG
Amoxicillin 250 MG
Aspirin 500 MG
Aspirin/Dipyridamole SR
BEER 10 %
Benazepril 5 MG
Chlorhexidine Supp

Allergies

no known drug allergies

Recent Orders

Date	Order Name	Provider
18-Jan-2012	Benazepril	DEV MD, DR STAFF ONE D
18-Jan-2012	Acetamin/Cod EI	DEV MD, DR STAFF ONE D
28-Dec-2011	Acetaminophen	SIMPSON, HOMER
19-Dec-2011	Lisinopril	DEV MD, DR STAFF ONE D
19-Dec-2011	Amoxicillin	DEV MD, DR STAFF ONE D

Prevention/Recommendations

Diabetic Patient with renal disease, consider starting angiotensin-converting enzyme inhibitor (ACE-I).

Start ACE-I.

[CDSC Reminder: please see disclaimer.](#)

Diabetic patient is due for foot exam (recommended yearly).

Refer to Podiatrist.

[CDSC Reminder: please see disclaimer.](#)

Diabetic patient is due for ophthalmologic exam (recommended yearly).

TO-DO's

Alert Manager - no alerts

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None of the Above/Not Doc/UTD
Bacillus anthracis

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[CDSC Reminder: please see disclaimer.](#)

Diabetic patient is due for ophthalmologic exam (recommended yearly).

Refer to Ophthalmologist.

Refer to Optometrist.

[CDSC Reminder: please see disclaimer.](#)

From the voice of the customer



The Children's Hospital *of* Philadelphia®
RESEARCH INSTITUTE

Preemie/GLIDES Slides

Pediatric Research Consortium (PeRC)
Center for Biomedical Informatics
The Children's Hospital of Philadelphia

Guideline Translation Process

Clinical Knowledge Source Document



Policy Statement—Modified Recommendations for Use of Palivizumab for Prevention of Respiratory Syncytial Virus Infections

abstract

Palivizumab was licensed in June 1998 by the US Food and Drug Administration for prevention of serious lower respiratory tract disease caused by respiratory syncytial virus (RSV) in pediatric patients who are at increased risk of severe disease. Safety and efficacy have been established for infants born at or before 32 weeks' gestation with or without chronic lung disease of prematurity and for infants and children with hemodynamically significant heart disease. The American Academy of Pediatrics and its Board of Directors, at the request of the American Academy of Pediatrics, its affiliates have been requested through a policy statement by the Board of Directors. The American Academy of Pediatrics has neither endorsed nor disavowed any commercial statement in the development of the content of this publication.

summary

1. Recommendations for initiation and termination of prophylaxis are modified to reflect current descriptions from the Centers for Disease Control and Prevention (CDC) regarding RSV disease in children who are at increased risk of serious RSV lower respiratory tract disease. RSV recommendations for immunoprophylaxis have been updated in an effort to ensure optimal balance of benefit and cost from this expensive intervention. This statement updates and replaces the 2003 AAP statement and the 2005 Red Book and is consistent with the 2009 Red Book recommendations. Pediatrics 2009; 124:1000.

Identify Text in Source Document

"Infants with CLD: Palivizumab prophylaxis may be considered for infants and children younger than 24 months with CLD who receive medical therapy (supplemental oxygen, bronchodilator, diuretic or chronic corticosteroid therapy) for CLD within 6 months before the start of the RSV season. These infants and young children should receive a maximum of 5 doses."

Translate Text into Simple Boolean Logic*

```
IF
{
  (Chronological Age < 24 Months)
  AND
  (Chronic Lung Disease = TRUE)
  AND
  (Receives Medical Therapy = TRUE)
  AND
  (Onset of RSV <= 6 Months)
}
THEN
{
  May benefit from prophylaxis
  Receive a maximum of 5 doses
}
```

Transpose Logic into Rules Engine Code **

```
rule "Eligible for 5 doses due to chronic lung disease"
ruleflow-group "rsv-risk-eligibility"
when
  $p: Patient()
  $clcd: RSVChronicLungDisease()
  RSVSeason($startSeason: startDate, $endSeason:
    endDate > ($p.getBirthDate()))
  $ageMonthsStart: Integer(intValue < 24) from
    $p.ageMonthsAt ($startSeason.minusDays(1))
  exists (Prescription(endDate == null || endDate >=
    ($startSeason.minusMonths(6)), pharmClass
    matches "(?ism).*\ \b (?diuretics?)
    corticosteroids?|oxygen|antiasthmatics?)\\b.*" ||
    generic matches "(?ism).*\\b(?oxygen?)\\b.*")
    from $p.getPrescriptions())
then
  RSVEligibleCandidate fact = new
    RSVEligibleCandidate();
  fact.setStartDate($startSeason);
  fact.setDoses((int)Math.min(5,
    $p.ageMonthsAt($endSeason)
    + 1)); fact.setReason("chronic lung disease on
    treatment"); insert(fact);
end
```

* Using GEMCutter 2.5 created by the GLIDES Project at Yale School of Medicine: <http://gem.med.yale.edu/glides/>

** Using DROOLS <http://www.jboss.org/drools>

- Guidelines Into Decision Support (GLIDES) <http://gem.med.yale.edu/glides/default.htm>

GEM Cutter 2.5.5

Project View Report Tree

Find All

Scaling 75 Rotation 0

Recommendations for infants and children with CHD, CLD, or preterm birth (before 32 weeks' gestation) still are appropriate. Alaska Native infants in southwestern Alaska experience not only higher RSV hospitalization rates but also a longer RSV season. Pediatricians in this area of Alaska may wish to use CDC-generated RSV hospitalization data to assist in determining the onset and offset of the RSV season for the appropriate timing of palivizumab administration¹⁹ (BII).

Infants and children with CHD, CLD, or birth before 32 weeks' 0 days' gestation who initiate palivizumab prophylaxis after start of the RSV season will not require all 5 doses (Table 2) (AII).

Eligibility Criteria for Prophylaxis of Infants and Young Children at High Risk

- Infants with CLD. Palivizumab prophylaxis may be considered for infants and children younger than 24 months with CLD who receive medical therapy (supplemental oxygen, bronchodilator, diuretic, or chronic corticosteroid therapy) on or within 6 months before the start of the RSV season. These infants and young children should receive a maximum of 5 doses. Patients with the most severe CLD who continue to require medical therapy may benefit from prophylaxis during a second RSV season. Data are limited
- neonatologists, pediatric intensivists, pulmonologists, or infectious disease specialists (AI).
- Infants born before 32 weeks' gestation (≤ 31 weeks 6 days): Infants in this category may benefit from RSV prophylaxis even if they do not have CLD. For these infants, major risk factors to consider include gestational age and chronologic age at the start of the RSV season. Infants born at 28 weeks' gestation or earlier may benefit from prophylaxis during the RSV season whenever that occurs during the first 12 months of life. Infants born at 29 to 32 weeks' gestation (≤ 31 weeks 6 days) may benefit most from prophylaxis up to 6 months of age. However, once an infant qualifies for initiation of prophylaxis at the start of the RSV season, administration should continue throughout the season and not stop when the infant reaches either 6 or 12 months of age. A maximum of 5 monthly doses are recommended for infants in this category (AII).
- Infants born at 32 to less than 35 weeks' gestation (defined as 32 weeks 0 days through 34 weeks 6 days): Numerous factors have been proposed as increasing the risk of acquiring RSV infection among infants in this gestational-age group. Other factors have been associated with an increased risk of severe dis-
- study of infants born at 33 through 35 weeks' gestation revealed that multiple risk factors needed to be present before a significant increase in hospitalization risk was seen.²⁰ In addition, available data do not enable definition of a subgroup of infants who are at risk of prolonged hospitalization and admission to the ICU. Therefore, although current recommendations were designed to be consistent with the US Food and Drug Administration approval for marketing of palivizumab for the prevention of serious RSV lower respiratory track disease, they specifically target infants in this group with consistently identified risk factors for RSV hospitalization during the period of greatest risk, which is the first 3 months of life.²¹⁻²⁶ Palivizumab prophylaxis should be limited to infants in this group at greatest risk of hospitalization attributable to RSV, namely infants younger than 3 months of age at the start of the RSV season and infants born during the RSV season who are likely to have an increased risk of exposure to RSV. Epidemiologic data suggest that RSV infection is more likely to occur and more likely to lead to hospitalization for infants in this gestational-age group when at least 1 of the following 2 risk factors is present:

<GuidelineDocument>

- <Identity>
- <Developer>
- <Purpose> Prevention of serious lower respiratory tract
- <IntendedAudience>
- <MethodOfDevelopment>
- <TargetPopulation>
- <KnowledgeComponents> Eligibility Criteria for Prophylaxis
 - <Recommendation> * Criteria 1. Infants with CLD (F)
 - <Conditional> 1.1 Infants with CLD
 - <DecisionVariable> Chronological Age
 - <DecisionVariable> CLD
 - <DecisionVariable> Receives medical therapy
 - <DecisionVariable> Onset of RSV
 - <Action> Immunoprophylaxis 5 doses
 - <Reason> The primary benefit of immunoprophylaxis is to prevent RSV infection.
 - <EvidenceQuality> A - Good evidence to support recommendation
 - <RecommendationStrength> I - Evidence from high quality research
 - <Flexibility>
 - <Logic> If (Chronological Age < 24 months) AND (CLD = TRUE) AND (Receives medical therapy = TRUE) AND (Onset of RSV <= 6 months) Then May benefit from prophylaxis Receive a maximum of 5 doses
 - <Cost> Economic 7 analyses have failed to show a cost benefit
 - <Linkage>
 - <Reference> No references cited in this section
 - <Certainty>
 - <Goal>
 - <Conditional> 1.2 Severe CLD
 - <Imperative>
 - <Recommendation> * Criteria 2. Infants Gestational age 29 to 32 weeks
 - <Recommendation> * Criteria 3. Infants Gestational age 33 to 35 weeks
 - <Recommendation> * Criteria 4. Infants with congenital heart disease
 - <Recommendation> * Criteria 5. Infants and children with chronic lung disease
 - <Recommendation> * Criteria 6. Immunocompromised
 - <Recommendation> * Criteria 7. Patients with cystic fibrosis
 - <Recommendation> * Criteria 8. Special situations
 - <Definition>
 - <Algorithm>
 - <ResearchAgenda>
 - <BackgroundInformation>

Boolean operators that indicate how directives are to be combined

4 AMERICAN ACADEMY OF PEDIATRICS

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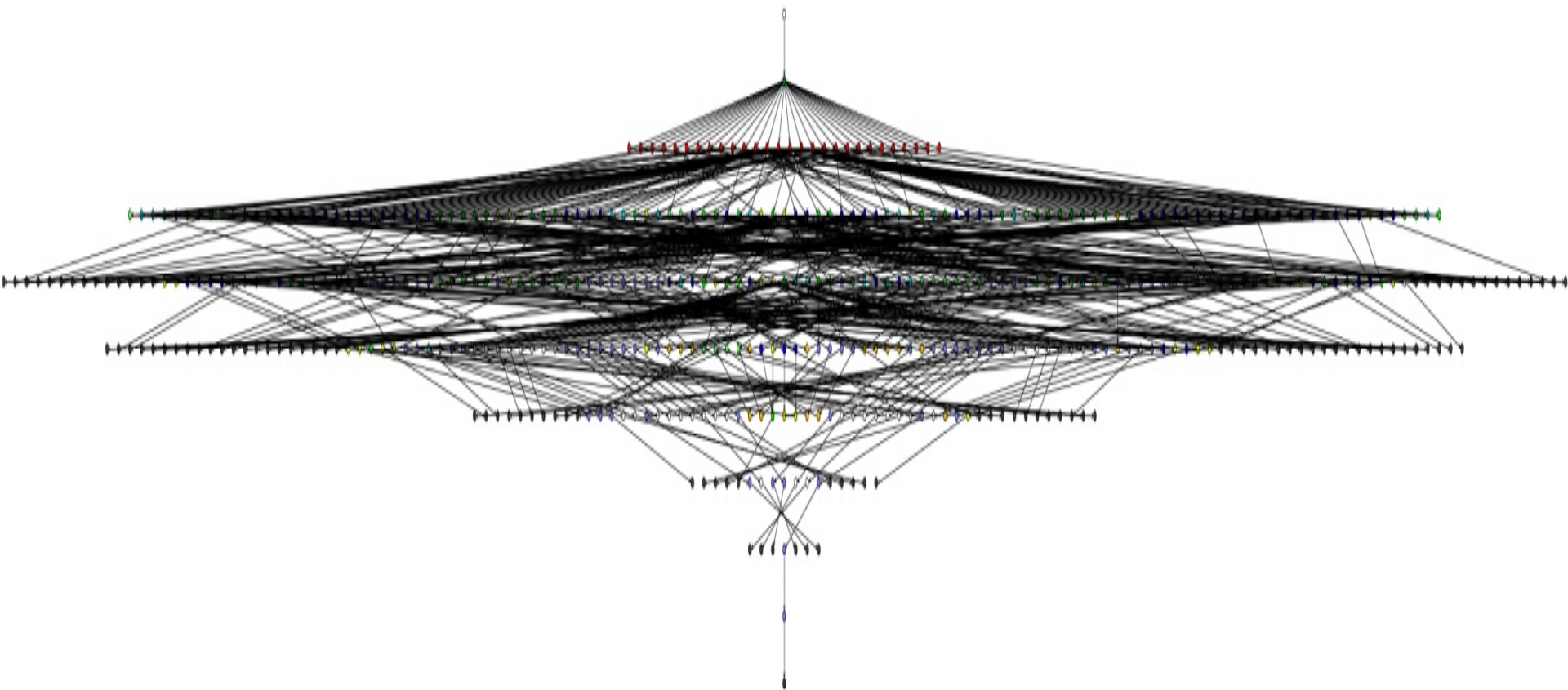
Rules Engine

```

# Criteria 1. Infants with CLD (Page 4, Column 1, Paragraph 3) - Conditional| - 1.1 Infants with CLD
# Infants with CLDz <24 mo (at start of season)
# who received medical therapy (O2, inhaled meds or diuretics)
# for CLD within 6 mo prior to start of season 0 should receive up to up to 5 doses
rule "Eligible for 5 doses due to chronic lung disease"
  ruleflow-group "rsv-risk-eligibility"
  when
    # find patients with chronic lung disease as a risk factor
    $p: Patient()
    $cldz: RSVChronicLungDisease()
    # determine the start date for the relevant RSV season. be sure patient was born before the season end
    RSVSeason($startSeason: startDate, $endSeason: endDate > ($p.getBirthDate()))
    # check to make sure age < 24 months at start of season
    # TODO: clarify, if child reaches 24 months during season is immunization stopped
    $ageMonthsStart: Integer(intValue < 24) from $p.ageMonthsAt($startSeason.minusDays(1))
    # check to see if at least one prescription related to chronic lung disease was active
    # within the 6 month period preceding the season
    # qualifying prescriptions: supplemental oxygen, bronchodilator, diuretic or chronic corticosteroid therapy
    exists (Prescription(endDate = null || endDate >= ($startSeason.minusMonths(6)),
      pharmClass matches "(?ism).*\\b(?:diuretics?|corticosteroids?|oxygen|antiasthmatics?)\\b.*" ||
generic matches "(?ism).*\\b(?:oxygen?)\\b.*")
      from $p.getPrescriptions())
  then
    # eligible for 5 doses
    RSVELigibleCandidate fact = new RSVELigibleCandidate();
    fact.setStartDate($startSeason);
    # calculate patient age in months at the end of the season to determine maximum doses possible
    fact.setDoses((int)Math.min(5, $p.ageMonthsAt($endSeason) + 1));
    fact.setReason("chronic lung disease on treatment");
    insert(fact);
  end

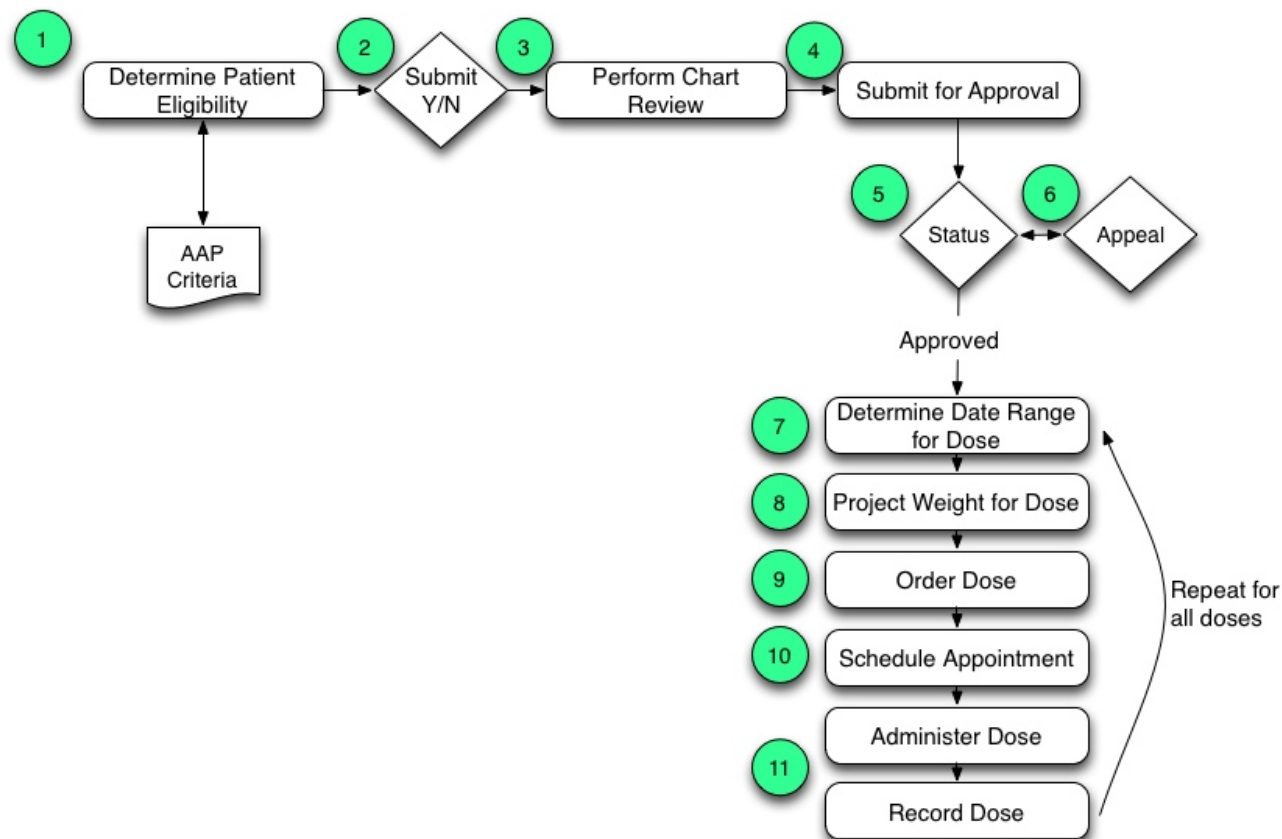
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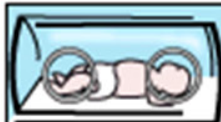

RSV Rules Visualized



Our nurses can spend up to 20 hours per patient managing insurance approval, dose ordering and scheduling.

RSV Workflow





Preemie Assistant

Chronological Age: 8 months
Corrected Age: 5 months

Gestational Age: 30 weeks
Birth Weight: 1.899 kg

1 **SV and Synagis** ✓ Patient is candidate for 5 doses of Synagis (Salivizumab)

Criteria: chronic lung disease on treatment;
gestational age 30 weeks

3 [View AAP Policy Statement...](#)

4 [Run Chart Review...](#)

2 Will submit for approval? Yes

Insurance Provider KMHP

Synagis Distributor ACRO

Initial Submission Date 10/04/2011

6 Will submit for appeal? Yes

5 Initial Submission Response Denied

Appeal Submission Date 10/14/2011

Appeal Submission Response Approved


Doses Approved 5


Dose	1	2	3	4	5
7 Date Range:	11/1/11 - 11/10/11	11/29/11 - 12/4/11	1/8/12 - 1/18/12	2/10/12 - 2/20/12	3/11/12 - 3/21/12
8 Status:	Given	Given	Scheduled	No appointment	No appointment
8 Date:	11/4/11	11/2/14/11	1/6/12		
Weight Estimate:			4.769 kg	5.101 kg	5.377 kg
9 Order:	Received	Received	Ordered		

Comments:


Close


RSV Assistant for Nurses

	Premie Assistant	Chronological Age: 8 months	Gestational Age: 30 weeks
		Corrected Age: 5 months	Birth Weight: 1.899 kg

RSV and Synagis  Patient is candidate for 5 dose(s) Palivizumab (Synagis)

Criteria: chronic lung disease on treatment;
gestational age 30 weeks

 [View AAP Policy Statement...](#)

 [Run Chart Review...](#)

Will submit for approval?

Insurance Provider

Synagis Distributor

Initial Submission Date

Initial Submission Response

Will submit for appeal?

Appeal Submission Date

Appeal Submission Response

Doses Approved

Dose	1	2	3	4	5
Date Range:	11/1/11 - 11/10/11	11/29/11 - 12/4/11	1/8/12 - 1/18/12	2/10/12 - 2/20/12	3/11/12 - 3/21/12
Status:	Given	Given	Scheduled	No appointment	No appointment
Date:	11/4/11	12/14/11	1/16/12		
Weight Estimate:			4.769 kg	5.101 kg	5.377 kg
Order:	<input type="text" value="Received"/>	<input type="text" value="Received"/>	<input type="text" value="Ordered"/>	<input type="text"/>	<input type="text"/>

Comments:

RSV Patient List

Desktop Action Patient Care Scheduling Reg/ADT Reports Report Mgmt Tools Help

Home Schedule In Basket Chart Encounter Tel Enc Login Cxt Secure Change PCP Scheduling LINKS Send Print Log Out

Home

Patient Lists Close X









Create Properties Remove Add Patient Copy Paste Open Chart Letter Tel. Enc Orders Enc Change PCP

RSV 2011 (28 Patients) as of 0949

Patient Name	MRN	DOB	Eligibility	Status	Last Dose	Next Dose	Distributor	RSV Comment
RSV 2011			Does not meet AAP criteria for Palivizumab	Appeal Denied				
RSV 2011			Does not meet AAP criteria for Palivizumab	Approved	Given - 2/13/12	No appointment due 3/9/12 - 3/19/12 (ordered)	Acro Pharmacy	
RSV 2011			gestational age 29 weeks	Approved	Given - 2/3/12	No appointment due 2/28/12 - 3/9/12 (ordered)	Acro	authorization number 000183835 for questions 484-494-8217
RSV 2011			gestational age 29 weeks	Approved	Given - 2/3/12	No appointment due 2/28/12 - 3/9/12 (ordered)	acro	
RSV 2011			Does not meet AAP criteria for Palivizumab	Approved	Given - 1/2/12	No appointment due 1/27/12 - 2/1/12	acro	acro 484-494-8217
RSV 2011			Does not meet AAP criteria for Palivizumab	Approved	Given - 1/2/12	No appointment due 1/27/12 - 2/1/12	acro	acro 484-494-8217
RSV 2011			congenital heart disease on medications	Approved	Given - 2/13/12	None in range 3/9/12 - 3/19/12 (ordered)	acro	acro 484-494-8217
RSV 2011			congenital heart disease on medications	Approved	Given - 2/3/12	No appointment due 2/28/12 - 3/9/12 (ordered)	Aetna Specialty Pharmacy	866-782-2779 aetna specialty pharmacy
RSV 2011			chronic lung disease on	Approved	Given - 2/15/12	Scheduled 3/15/12	aetna specialty	

Staff Message, Pt Reminder 9:52 AM

RSV for Physicians

	Premie Assistant	Chronological Age: 5 months Corrected Age: 2 months	Gestational Age: 28 weeks Birth Weight: 1.681 kg
Summary			
<u>Issue</u>	<u>Status</u>	<u>Resources</u>	
 Growth	Weight loss	 Growth & Nutrition Calculator...	
Nutrition	Continue preterm formula or breast milk. No purees or cereal until 4-6 months corrected age (approximately in 6 weeks)		
 Development	Not documented, use 2 month checklist today		
BP	Check blood pressure Nov 2011		
 RSV	Eligible for 5 doses of Palivizumab: gestational age 28 weeks	 RSV and Synagis...	
NICU History	Abstracted	 Open birth history...	
 Premie Education Materials			

CBMi

Center
for Biomedical
Informatics

Questions?

Long-Term Deliverables for Lasting Impact and Synchronization Efforts



Discussion

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Recap and Next Steps

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Thank You!