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

Review Of December's TEP Meeting

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

AHRQ National Resource Center for Health Information Technology

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care www.ahrq.gov

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

PARTNERS HEALTHCARE
UTHealth The University of Texas Health Science Center at Houston
OREGON HEALTH & SCIENCE UNIVERSITY OHSU
KAISER PERMANENTE
SIEMENS
MAYO CLINIC
DUODECIM Medical Publications Ltd.
GE Healthcare
accenture
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MITRE
NEXTGEN HEALTHCARE
BWH MGH 1811 VE RI TAS
UMDNJ University of Medicine & Dentistry of New Jersey
UC San Diego
WVP HEALTH AUTHORITY
PHILIPS sense and simplicity
Wolters Kluwer Health

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

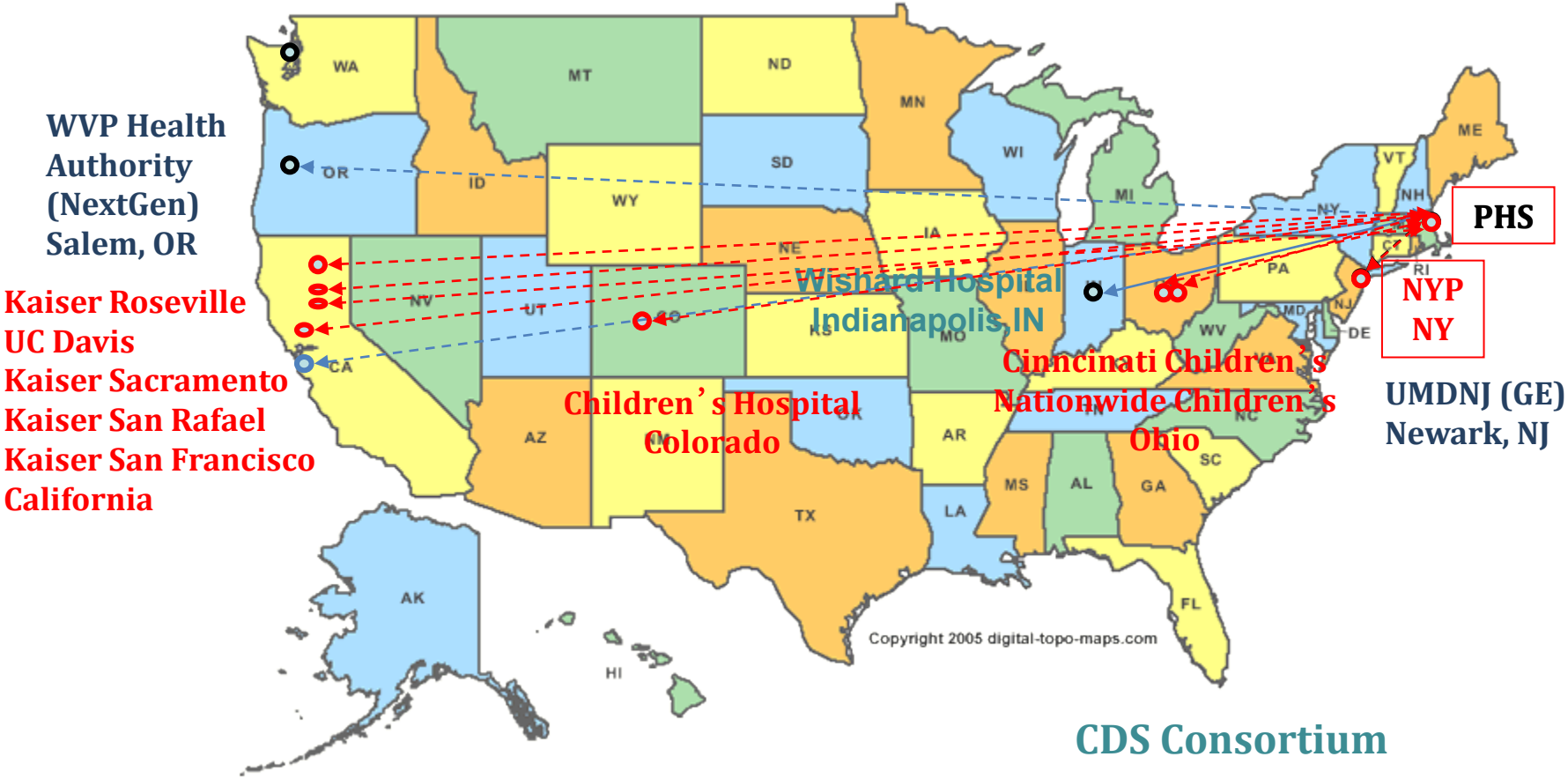
1. HIT community (guidelines developers, specialty societies)
2. Government and non-profit foundations, fulfilling their mission and supporting CDS requirements

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



CDS Consortium

PECARN TBI CDS

Knowledge Management Portal

File Edit View Favorites Tools Help

Back Search Favorites

Address http://stage-cdsportal.partners.org/CDSCSearch.aspx

Google Search Sidewiki Bookmarks Check Translate Tonya....

CDS consortium **Knowledge Management Portal** AHRQ

Home | About the Portal | About the Consortium | FAQ | Glossary | Terms of Use | Contact Us

Search Term :

Search | Clear Selection

Hide Advanced Search

Specification Level:
- All Levels
- Level 1 - Unstructured
- Level 2 - Semi-Structured

Intended Recipient Role:
- All Roles
- Nurse
- Patient

Contributing Entity:
- All Contributing Entities
- GE Healthcare
- Kaiser Permanente Northwest

Clinical Information System:
- All Clinical Info Systems
- GE
- Meditech

Content Type:
- Alert
- All Content Types
- Definition/Dictionaries

Patient Population:
- Adolescent
- Adult
- All Patient Population

Clinical Domain:
- Aerospace Medicine
- All Clinical Domain
- Allergy and Immunology
- Anesthesiology
- Audiology
- Chiropractic Medicine

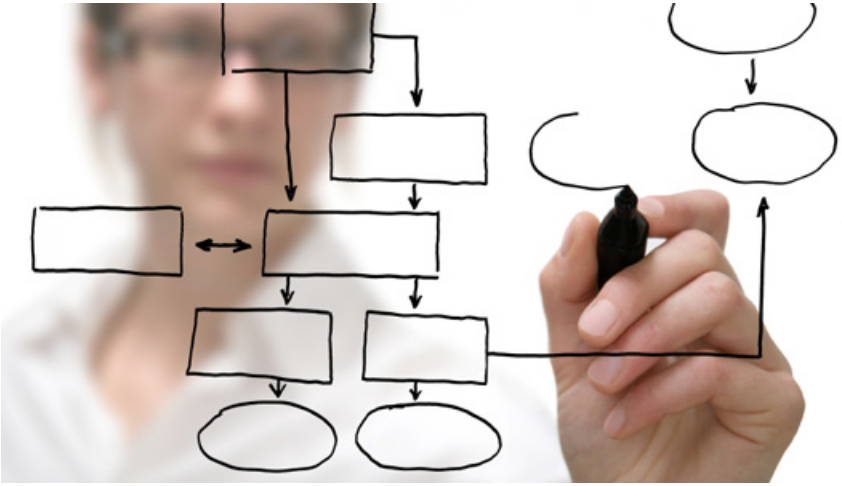
Date From: **Date To:**

Done Local intranet

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:

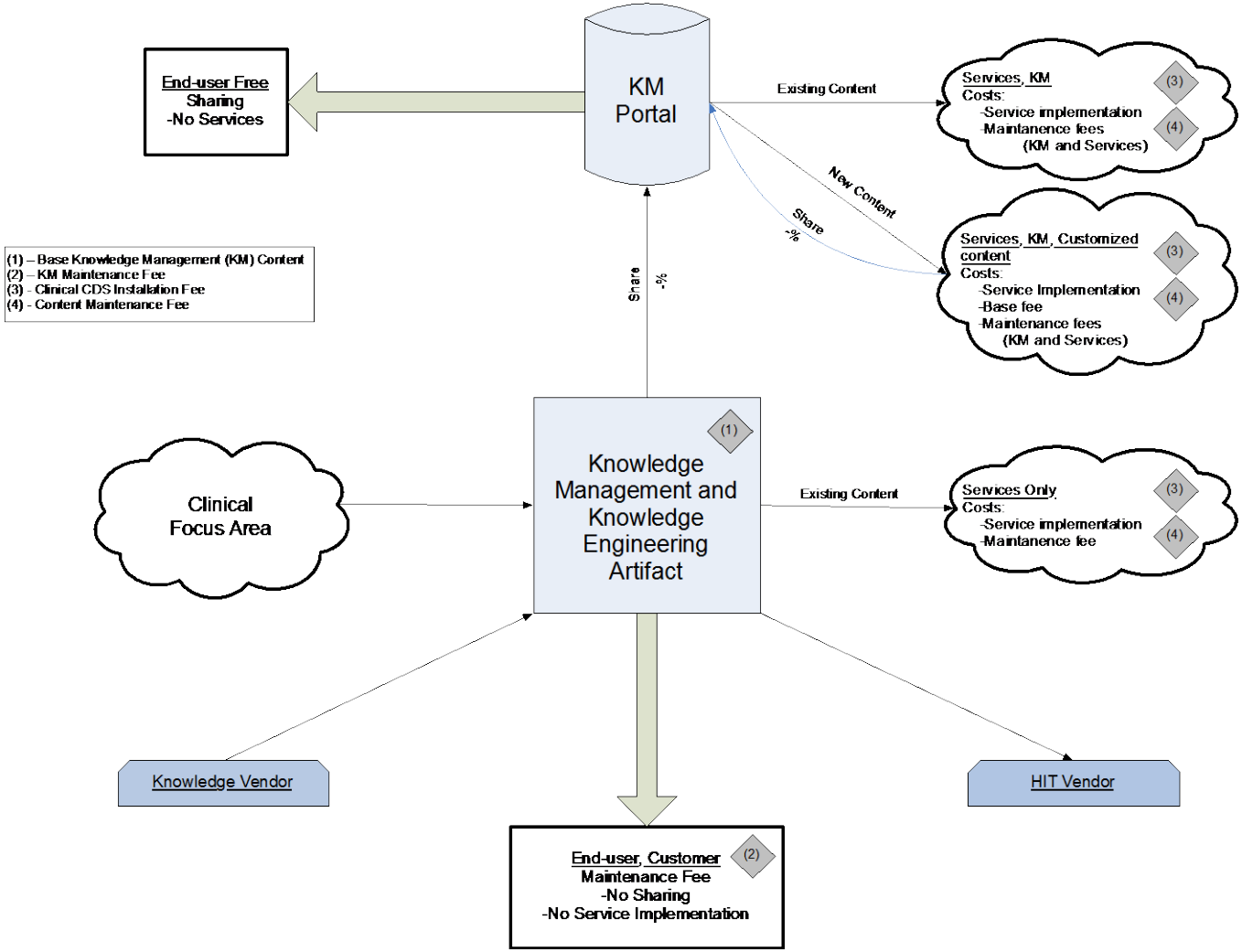
- Measuring effectiveness of CDS intervention
- CDS development processes
- Measuring impact on healthcare delivery performance

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	*In vivo* 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

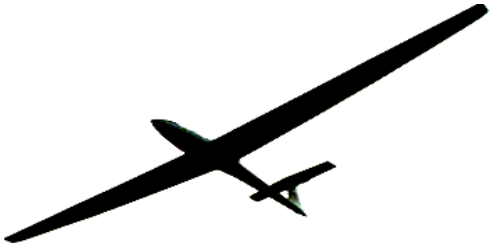
Content Governance Committee: Saverio Maviglia, MD, MSc

AHRQ #HHSA290200810010 http://www.partners.org/cird/cdsc/

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

Nemours.

The Children's Hospital of Philadelphia®

GEISINGER

ECRI Institute

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

American Urological Association

ALLIANCE OF CHICAGO
Community Health Services, L3C

ASCO®
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

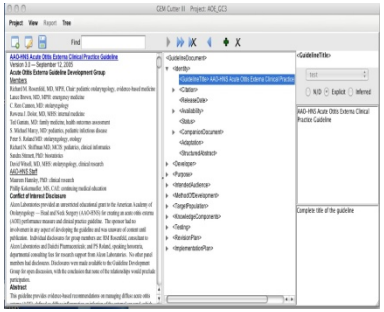
Tools For Guideline Implementers

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

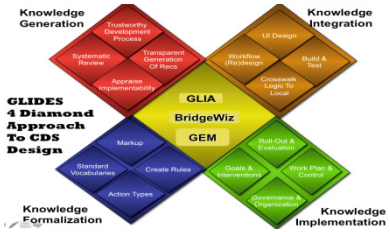


EXTRACTOR

- 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

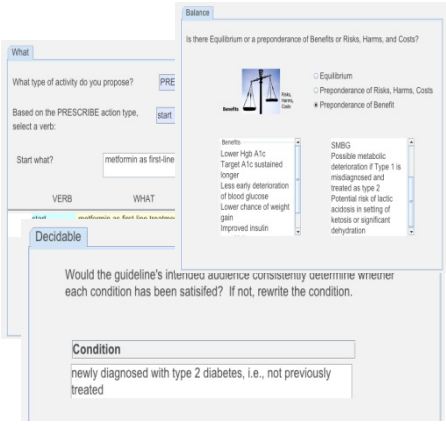
- Asthma Control
- Obesity Counseling
- Premie Support
- Low Back Pain
- Patient Centered Data Capture

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



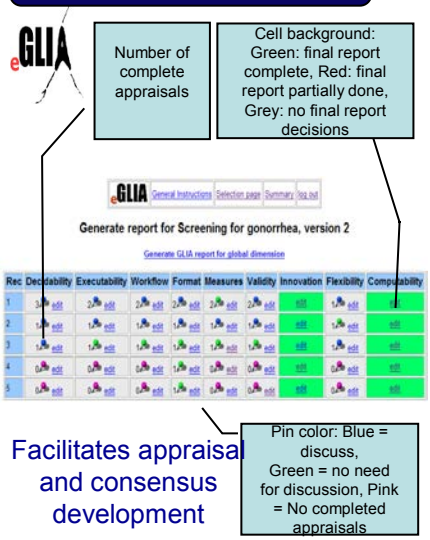
Recommendation Authors Should Be Explicit About

- **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



Facilitates appraisal and consensus development

Tools For Guideline Implementers

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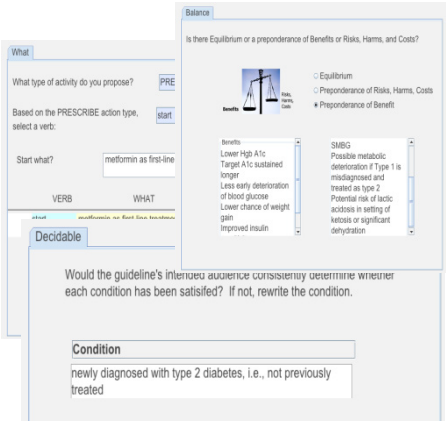

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GLIA

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

Facilitates appraisal and consensus development

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

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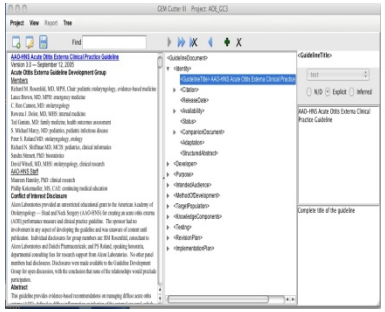

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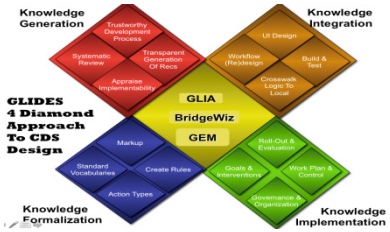

OPERATIONAL CDS SYSTEMS/DESIGNS

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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?

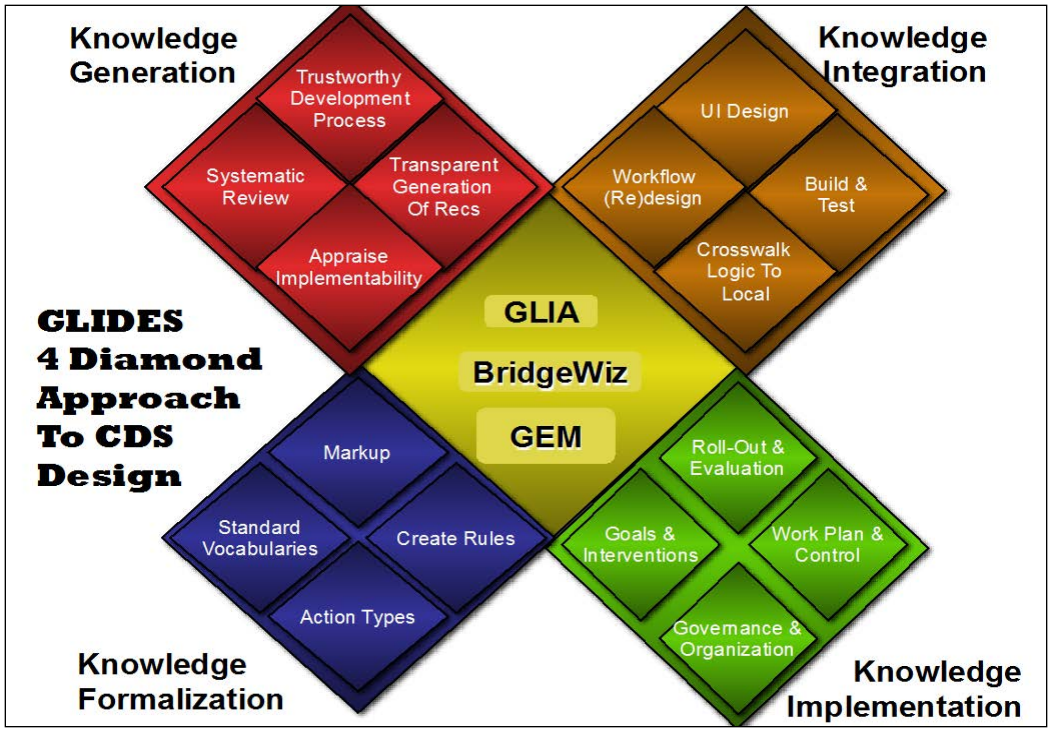
	Guideline Developers	Informaticians	Guideline Implementers	End-Users
Will The Products Be Ready?	Yes – Available now, final release planned for OY3	Yes – Available now, final release now in process of re-standardization	Artifacts repository will be delivered in OY3. Discussion underway with AHRQ on which 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

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From the voice of the customer

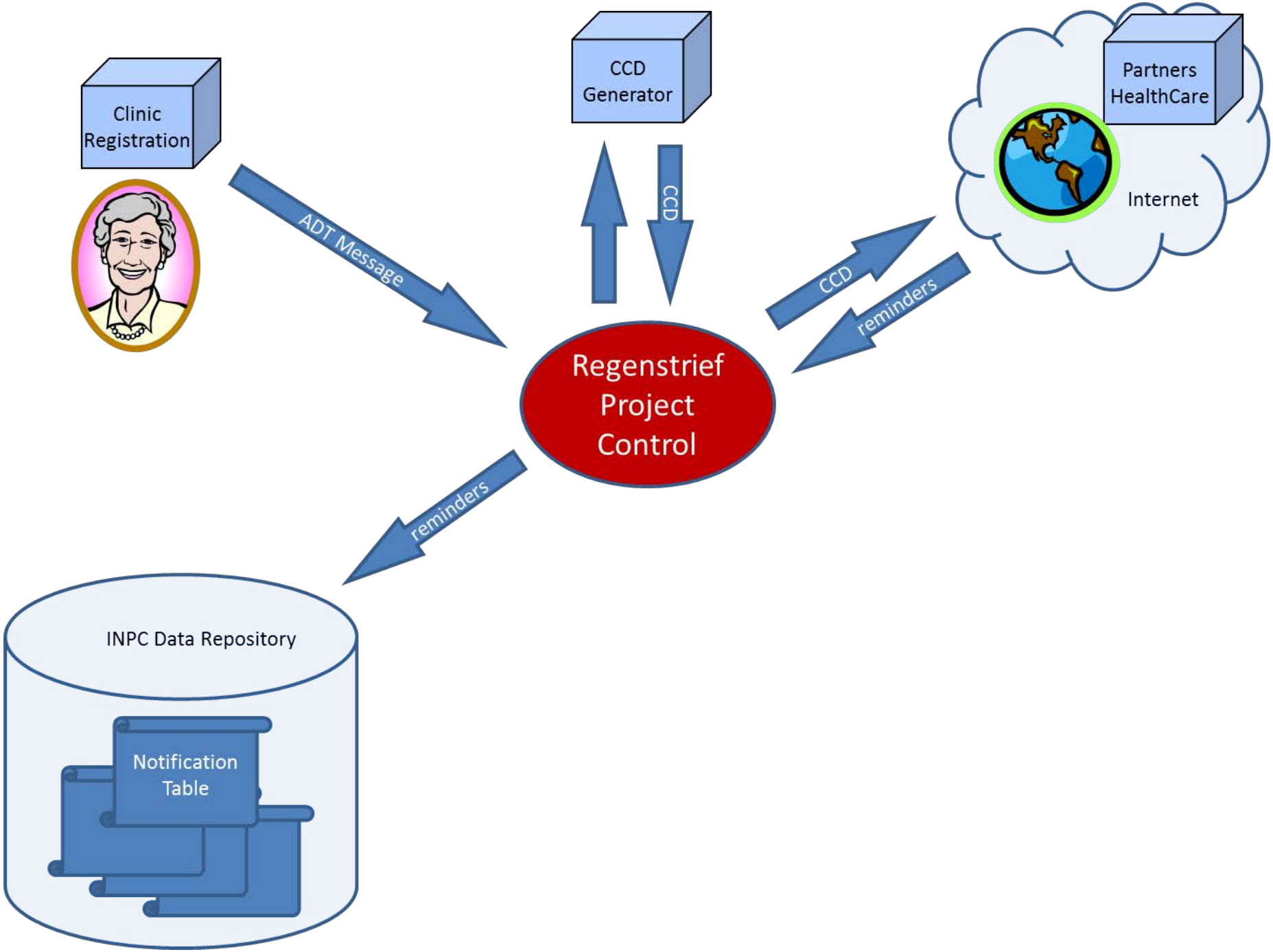
From the voice of the customer

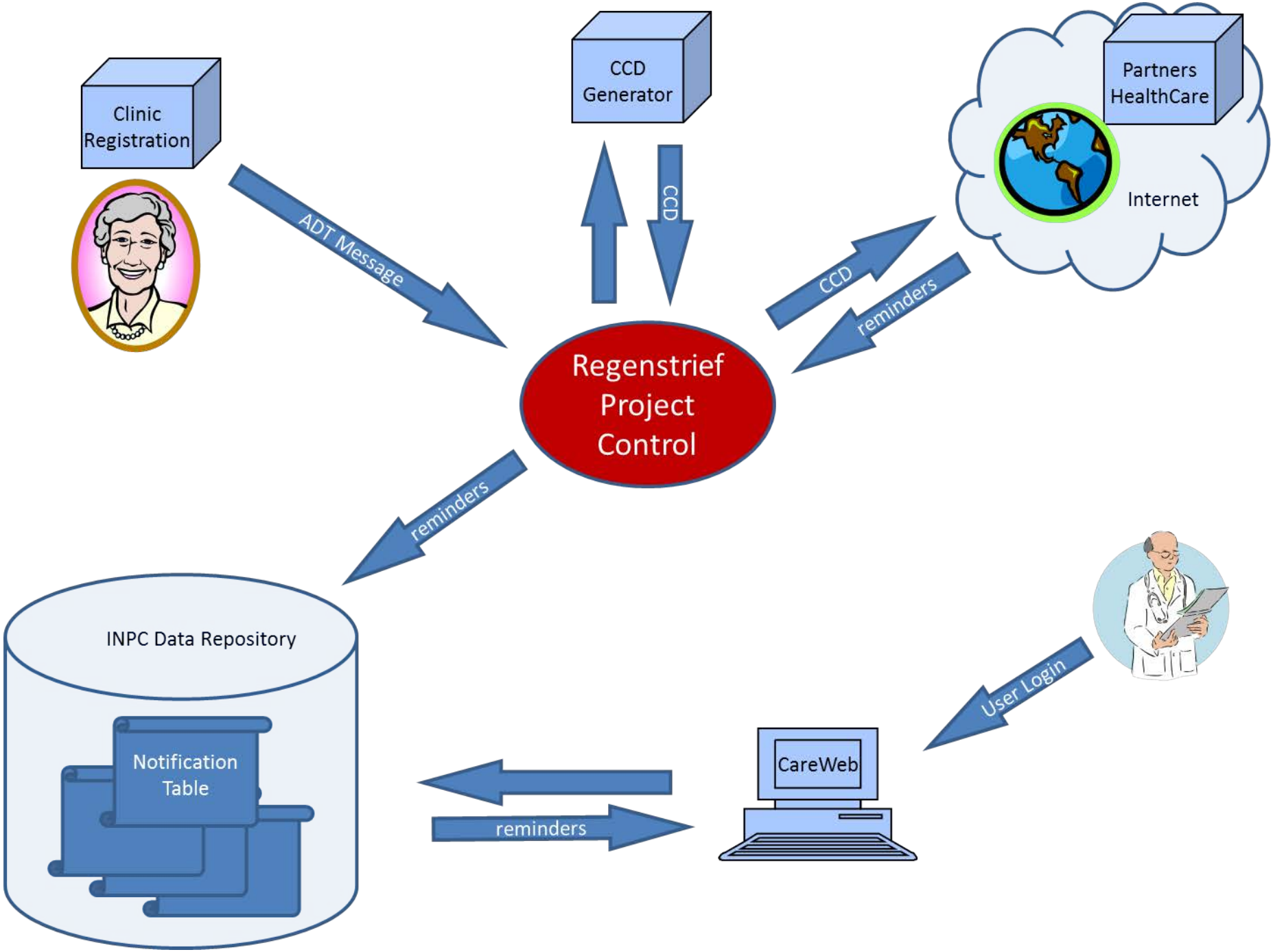
Integration of CDSC Decision Support Reminders Into the Regenstrief CareWeb Order Entry Process

Linas Simonaitis, Brian Dixon, Jon Duke

March 7, 2012

Regenstrief Medical Informatics
The Source for Medical Informatics


Clinic Registration
ADT Message
CCD Generator
CCD
Partners HealthCare
Internet
CCD
reminders
Regenstrief Project Control
reminders
INPC Data Repository
Notification Table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CareWeb
User Login

Welcome to G3! - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Welcome to G3!

172.30.192.11 https://172.30.192.11/CareWebWishard/

JIRA tickets CDSC Portal

Welcome to G3! Relay Health External Resources Leave Feedback Help

INPC Change Password Logout

[redacted] Change DOB: [redacted]

SIMONAITIS, LINAS at MED4

Inbox Dashboard Order Entry View Chart Relay Health Settings Administration

Notifications
Pending Notes

Notifications [redacted]

New... Process View

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

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Sender: USER, CARERULE
Priority: low
Viewed:
Info Only: true
Can Delete: true
Can Forward: true

Message:

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

DISCLAIMER
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)

G3 3.17.0.BUILD-SNAPSHOT - Mozilla Firefox

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G3 3.17.0.BUILD-SNAPSHOT

regenstrief.org https://app-devel.regenstrief.org/CareWebWishard/

JIRA tickets CDSC Portal

G3 3.17.0.BUILD-SNAPSHOT | Relay Health | External Resources | Leave Feedback | Help | Development Change Password Logout

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

Medications

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

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 El	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

G3 3.17.0.BUILD-SNAPSHOT - Mozilla Firefox

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- Acetamnphn W/Cod 300-30 MG
- Amitriptyline 10 MG
- Amoxicillin 250 MG
- Aspirin 500 MG
- Aspirin/Dipyridamole SR
- BEER 10 %
- Benazepril 5 MG

Allergies

no known drug allergies

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18-Jan-2012	Acetamin/Cod El	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

G3 3.17.0.BUILD-SNAPSHOT - Mozilla Firefox

File Edit View History Bookmarks Tools Help

G3 3.17.0.BUILD-SNAPSHOT

regenstrief.org https://app-devel.regenstrief.org/CareWebWishard/

JIRA tickets CDSC Portal

G3 3.17.0.BUILD-SNAPSHOT | Relay Health | External Resources | Leave Feedback | Help | Development Change Password Logout

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)

Recent Orders

Date	Order Name	Provider
18-Jan-2012	Benazepril	DEV MD, DR

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).

Refer to Ophthalmologist.

Refer to Optometrist.

CDSC Reminder: please see disclaimer.

From the voice of the customer

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Preemie/GLIDES Slides

Pediatric Research Consortium (PeRC)

Center for Biomedical Informatics

The Children's Hospital of Philadelphia

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Guideline Translation Process

Clinical Knowledge Source Document

American Academy of Pediatrics

FROM THE AMERICAN ACADEMY OF PEDIATRICS

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

abstract

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()
    $cldz: RSVChronicLungDisease()
    RSVSeason($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

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GEMCutter 2.5

- 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 administration[13] (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) (AI).

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) for CLD 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 (AI).
- 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.[21-28] 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:

4 AMERICAN ACADEMY OF PEDIATRICS

Page 5 of 10

Logic

<GuidelineDocument>
- <Identity>
- <Developer>
- <Purpose> Prevention of serious lower respiratory tract
- <IntendedAudience>
- <MethodOfDevelopment>
- <TargetPopulation>
- <KnowledgeComponents> Eligibility Criteria for Prophy
  - <Recommendation> * Criteria 1. Infants with CLD (F
    - <Conditional> 1.1 Infants with CLD
      - <DecisionVariable> Chronological Age
      - <DecisionVariable> CLD
      - <DecisionVariable> Receives medical therap
      - <DecisionVariable> Onset of RSV
      - <Action> Immunoprophylaxis5 doses
      - <Reason> The primary benefit of immuno pr
      - <EvidenceQuality> A - Good evidence to sup
      - <RecommendationStrength> I - Evidence fro
      - <Flexibility>
      - <Logic> If (Chronological Age < 24 months) A
      - <Cost> Economic 7 analyses have failed to c
      - <Linkage>
      - <Reference> No references cited in this sect
      - <Certainty>
      - <Goal>
    - <Conditional> 1.2 Severe CLD
    - <Imperative>
  - <Recommendation> * Criteria 2. Infants Gestationa
  - <Recommendation> * Criteria 3. Infants Gestationa
  - <Recommendation> * Criteria 4. Infants with conge
  - <Recommendation> * Criteria 5. Infants and childre
  - <Recommendation> * Criteria 6. Immunocomprom
  - <Recommendation> * Criteria 7. Patients with cystic
  - <Recommendation> * Criteria 8. Special situations
- <Definition>
- <Algorithm>
- <ResearchAgenda>
- <BackgroundInformation>
- <Testing>

<Logic>

test

N/D Explicit Inferred

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

Boolean operators that indicate how directives are to be combined

start _Archive GEMCutter_255 GEM Cutter 2.5.5 100% 1:56 PM

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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 Ð 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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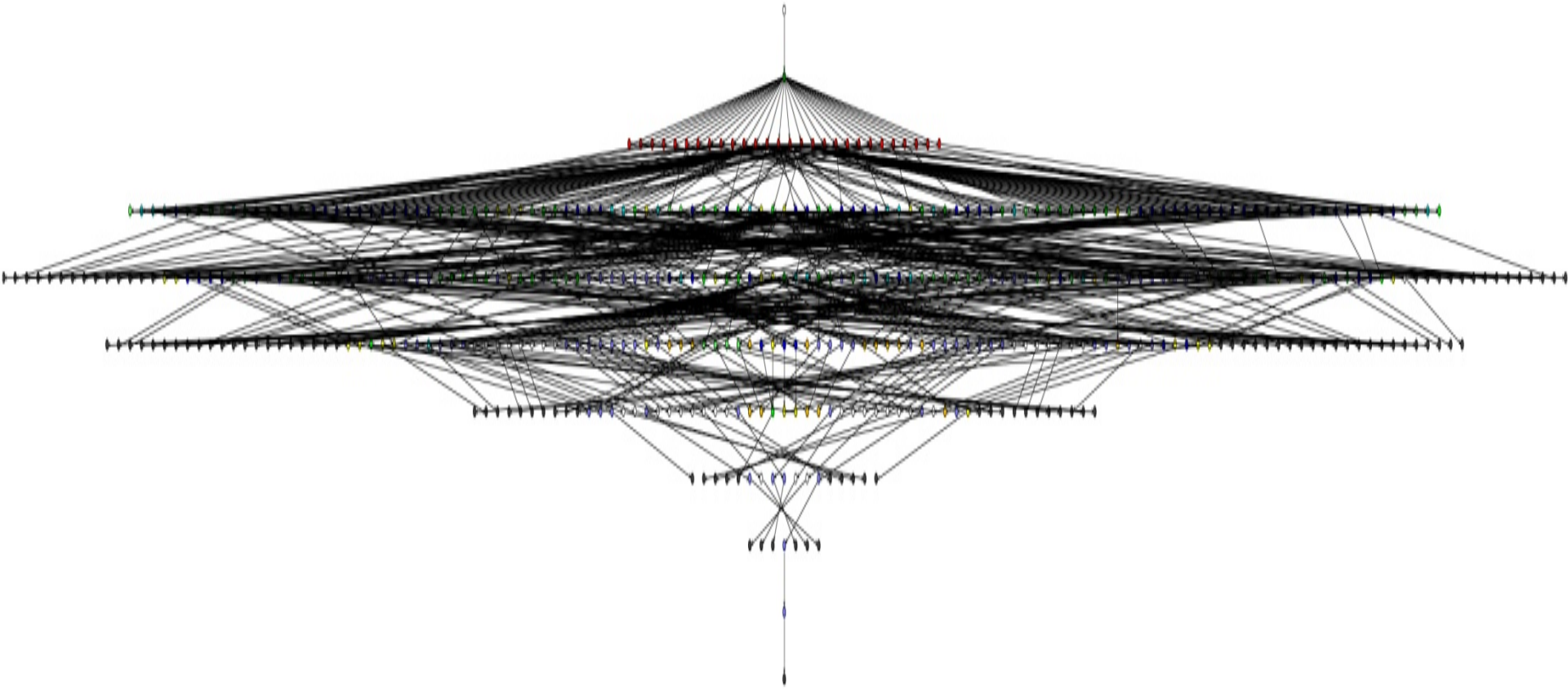
RSV Rules Visualized



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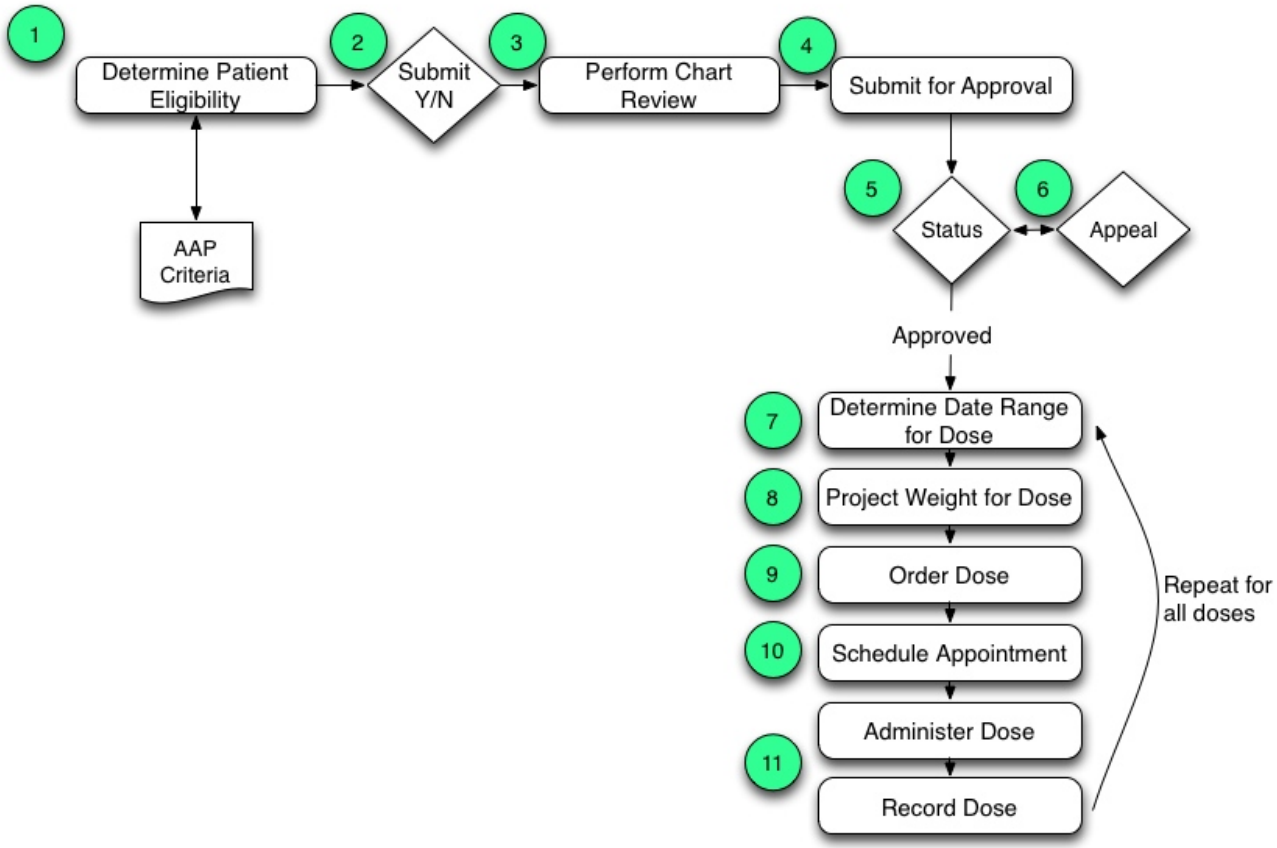
RSV Workflow

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



Preemie Assistant

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

1 **RSV and Synagis** ✔ Patient is candidate for 5 doses of Palivizumab (Synagis)

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

3 View AAP Policy Statement...

Run Chart Review...

2 Will submit for approval? Yes

Insurance Provider: KMHP

Synagis Distributor: ACRO

4 Initial Submission Date: 10/04/2011

5 Initial Submission Response: Denied

6 Will submit for appeal? Yes

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
Status:	Given	Given	Scheduled	No appointment	No appointment
8 Date:	11/4/11	11 12/14/11	10 1/16/12		
Weight Estimate:			4.769 kg	5.101 kg	5.377 kg
9 Order:	Received	Received	Ordered		

Comments:

Close

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RSV Assistant for Nurses

Preemie Assistant

Chronological Age: 8 months
Corrected Age: 5 months
Gestational Age: 30 weeks
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? Yes

Insurance Provider: KMHP

Synagis Distributor: ACRO

Initial Submission Date: 10/04/2011

Initial Submission Response: Denied

Will submit for appeal? Yes

Appeal Submission Date: 10/14/2011

Appeal Submission Response: Approved

Doses Approved: 5

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:	Received	Received	Ordered		

Comments:

Close

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RSV Patient List

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

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

Home

Patient Lists

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
			Does not meet AAP criteria for Palivizumab	Appeal Denied				
			Does not meet AAP criteria for Palivizumab	Approved	Given - 2/13/12	No appointment, due 3/9/12 - 3/19/12 (ordered)	Acro Pharmacy	
			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
			gestational age 29 weeks	Approved	Given - 2/3/12	No appointment, due 2/28/12 - 3/9/12 (ordered)	acro	
			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
			Does not meet AAP criteria for Palivizumab	Approved	Given - 1/2/12	No appointment, due 1/27/12 - 2/1/12		acro 484-494-8217
			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
			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
			chronic lung disease on	Approved	Given - 2/15/12	Scheduled 3/15/12	aetna specialty	

RSV 2011
RSV Test Patients 2011
Test
Shared Patient Lists
System Lists

Staff Message, Pt Reminder 9:52 AM

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RSV for Physicians

Preemie Assistant

Chronological Age: 5 months
Corrected Age: 2 months
Gestational Age: 28 weeks
Birth Weight: 1.681 kg

Summary

Issue	Status	Resources
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...

Preemie Education Materials

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Questions?

Long-Term Deliverables for Lasting Impact and Synchronization Efforts

Discussion

Recap and Next Steps

Thank You!