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
  - 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?
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

WVP Health Authority (NextGen)
Salem, OR

Wishard Hospital
Indianapolis, IN

UMDNJ (GE)
Newark, NJ

PHS

CDS Consortium

Wishard Hospital
Indianapolis, IN

WVP Health Authority (NextGen)
Salem, OR

Kaiser Roseville
UC Davis

Kaiser Sacramento

Kaiser San Rafael

Kaiser San Francisco

California

Children’s Hospital
Colorado

Cincinnati Children’s
Nationwide Children’s
Ohio

PECARN TBI CDS
Knowledge Management Portal
**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?

<table>
<thead>
<tr>
<th>CDSC Values</th>
<th>Status</th>
<th>Healthcare Service Providers</th>
<th>Payers</th>
<th>EHR Vendors</th>
<th>Content Vendors</th>
<th>Community</th>
<th>HIT</th>
<th>Government and Non-profit Foundations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Cloud-based CDS services</td>
<td>Ready</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  KM Portal</td>
<td>Ready*</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
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<td>Ready*</td>
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<td>X</td>
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<tr>
<td>4  Education and consulting</td>
<td>Ready*</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5  CDS interventions library</td>
<td>In progress</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

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

End-user Fee Sharing -No Services

KM Portal

Clinical Focus Area

Knowledge Management and Knowledge Engineering Artifact

Knowledge Vendor

HIT Vendor

End-user, Customer Maintenance Fee -No Sharing -No Service Implementation

Existing Content

New Content

Services KM Cost
- Service implementation maintenance fees (KM and Services)

Services KM Customized Content
- Service implementation
  - Base fee
  - Maintenance fees (KM and Services)

Services Only
- Costs
- Service implementation
  - Maintenance fee

(1) - Base Knowledge Management (KM) Content
(2) - KM Maintenance Fee
(3) - Clinical CDS Installation Fee
(4) - Content Maintenance Fee
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

[Image of logos from various organizations]
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

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)

Tools For Guideline Implementers

IMPLEMENTATION TOOLKIT

- Project methodology
- Sample work plans/checklists
- Design documents/forms
- Lessons Learned/Dos-Dont’s
- 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

**GLIA**
An instrument to identify obstacles to successful implementation

**eGLIA**
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**

Tools For Guideline Implementers

**Implement**
Facilitates appraisal and consensus development

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## Who Are The Customers?

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<th>Informatics</th>
<th>Guideline Implementers</th>
<th>End-Users</th>
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<tbody>
<tr>
<td>Professional societies and other organizations that create medical guidelines and policies</td>
<td>Knowledge experts engaged in transforming narrative guidelines into structured knowledge specifications for implementation as CDS in EMRs</td>
<td>Project Leaders and other personnel responsible for managing the design, integration, and implementation of CDS delivery projects</td>
<td>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)</td>
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## What Can Be Delivered To The Customers?

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## Steps, Challenges And Barriers?

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How Should We Communicate Availability And Sources?

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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
**Notifications**

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

**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: 317-423-5555) or Brian Dixon (email: bdixon@regenstrief.org) (phone: 317-423-5582)
**Orders and Documentation**

- **Problems**:
  - Headache (784.0)
  - 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**:
  - Acetaminophen 120 mg/5 mL
  - Acetaminophen 160 mg
  - Acetaminophen 300-30 mg
  - Amiodarone 10 mg
  - Amoxicillin 250 mg
  - Aspirin 500 mg
  - Benazepril SR 5 mg
  - Benzylpenicillin 5 MG

- **Allergies**:
  - None

**Recent Orders**

<table>
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<tr>
<th>Date</th>
<th>Order Name</th>
<th>Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-Jan-2012</td>
<td>Benazepril</td>
<td>STAFF ONE D, STAFF ONE D</td>
</tr>
<tr>
<td>19-Jan-2012</td>
<td>Acetamin/Pain 120</td>
<td>DEV MD, STAFF ONE D</td>
</tr>
<tr>
<td>25-Dec-2011</td>
<td>Acetaminophen</td>
<td>SIMPSON, HOMER</td>
</tr>
<tr>
<td>13-Dec-2011</td>
<td>Lisinopril</td>
<td>DEV MD, STAFF ONE D</td>
</tr>
<tr>
<td>13-Dec-2011</td>
<td>Amoxicilllin</td>
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**Prevention/Recommendations**

- Diabetic patient with renal disease, consider starting angiotensin-converting enzyme inhibitor (ACE-I).
- Start ACE-I.
- Refer to cardiology.
- Refer to endocrinologist.

**TO-DO's**

- Diabetic patient is due for foot exam (recommended yearly).
- Refer to podiatrist.
- Diabetic patient is due for ophthalmologic exam (recommended yearly).
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
Preemie/GLIDES Slides

Pediatric Research Consortium (PeRC)  
Center for Biomedical Informatics  
The Children’s Hospital of Philadelphia
Guideline Translation Process

Clinical Knowledge Source Document

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"
ruleFlowGroup "rsv-risk-eligibility"
when
Sp: Patient()
$chron: RSVChronicLungDisease()
$season: RSVSeason($startSeason: startDate, $endSeason: endDate > ($p.getBirthDate()));
$age: $ageMonthsStart($age: Integer($intValue < 24) from $sp.ageMonthsAt($startSeason: startDate, $months: Days(1))
exists ($pres: Prescription($endDate == null || endDate >= ($startSeason: startDate, $months: Months(6)), $pharmClass matches "(? ism)\."b (? :diuretics?)
corticosteroids? oxygen? antiasthmatics?\"b.* \\b generic matches "(? ism)\."b (? :oxygen?)\"b.* from $sp.getPrescriptions())
then
RSVEligibleCandidate fact = new
RSVEligibleCandidate();
fact.setStartDate($startSeason);
fact.setDoses(1); Math.min(5, $sp.ageMonthsAt($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
# Criteria 1. Infants with CLD (Page 4, Column 1, Paragraph 3) - Conditional  1.1 Infants with CLD
# Infants with CLD <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 D 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.*\b\") || $generic matches "(?ism).\b(?:oxygen)\b.*\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);
Our nurses can spend up to 20 hours per patient managing insurance approval, dose ordering and scheduling.
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
Criteria: chronic lung disease on treatment; gestational age 30 weeks
Yes

Will submit for approval?

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

<table>
<thead>
<tr>
<th>Dose</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>11/1/11 - 11/10/11</td>
<td>11/29/11 - 12/4/11</td>
<td>1/8/12 - 1/18/12</td>
<td>2/10/12 - 2/20/12</td>
<td>3/11/12 - 3/21/12</td>
</tr>
<tr>
<td>Status</td>
<td>Given</td>
<td>Given</td>
<td>Scheduled</td>
<td>No appointment</td>
<td>No appointment</td>
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<tr>
<td>Date</td>
<td>11/4/11</td>
<td>12/14/11</td>
<td>1/16/12</td>
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<tr>
<td>Weight Estimate</td>
<td>4.769 kg</td>
<td>5.101 kg</td>
<td>5.377 kg</td>
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<tr>
<td>Order</td>
<td>Received</td>
<td>Received</td>
<td>Ordered</td>
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Comments:

Close
# RSV Patient List

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<tr>
<th>Patient Name</th>
<th>MRN</th>
<th>DOE</th>
<th>Eligibility</th>
<th>Status</th>
<th>Last Dose</th>
<th>Next Dose</th>
<th>Distributor</th>
<th>RSV Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>Does not meet AAP criteria for Palivizumab</td>
<td>Approval Denied</td>
<td></td>
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<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>Does not meet AAP criteria for Palivizumab</td>
<td>Approved</td>
<td>Given - 2/13/12</td>
<td>No appointment due 3/9/12 - 3/19/12 (ordered)</td>
<td>Acros Pharmacy</td>
<td></td>
</tr>
<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>gestational age 23 weeks</td>
<td>Approved</td>
<td>Given - 2/3/12</td>
<td>No appointment due 2/28/12 - 3/2/12 (ordered)</td>
<td>Acros Pharmacy</td>
<td>Authorization number 000185935 for questions 404-434-6217</td>
</tr>
<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>gestational age 23 weeks</td>
<td>Approved</td>
<td>Given - 2/3/12</td>
<td>No appointment due 2/28/12 - 3/2/12 (ordered)</td>
<td>Acros Pharmacy</td>
<td></td>
</tr>
<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>Does not meet AAP criteria for Palivizumab</td>
<td>Approved</td>
<td>Given - 2/12/12</td>
<td>No appointment due 1/27/12 - 2/1/12 (ordered)</td>
<td>Acros Pharmacy</td>
<td></td>
</tr>
<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>Does not meet AAP criteria for Palivizumab</td>
<td>Approved</td>
<td>Given - 2/12/12</td>
<td>No appointment due 1/27/12 - 2/1/12 (ordered)</td>
<td>Acros Pharmacy</td>
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<tr>
<td>RSV2011</td>
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<td></td>
<td>congenital heart disease on medications</td>
<td>Approved</td>
<td>Given - 2/13/12</td>
<td>None in range 3/9/12 - 3/19/12 (ordered)</td>
<td>Acros Pharmacy</td>
<td></td>
</tr>
<tr>
<td>RSV2011</td>
<td></td>
<td></td>
<td>congenital heart disease on medications</td>
<td>Approved</td>
<td>Given - 2/3/12</td>
<td>No appointment due 2/20/12 - 2/3/12 (ordered)</td>
<td>Acros Specialty Pharmacy</td>
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<td>RSV2011</td>
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<td>chronic lung disease on medications</td>
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<td>Scheduled 3/15/12</td>
<td>Acros Specialty Pharmacy</td>
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</table>
# RSV for Physicians

**Preemie Assistant**

<table>
<thead>
<tr>
<th>Summary</th>
<th>Status</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Issue</strong></td>
<td><strong>Status</strong></td>
<td><strong>Resources</strong></td>
</tr>
<tr>
<td>Growth</td>
<td>Weight loss</td>
<td><a href="#">Growth &amp; Nutrition Calculator</a></td>
</tr>
<tr>
<td>Nutrition</td>
<td>Continue preterm formula or breast milk. No purees or cereal until 4-6 months corrected age (approximately in 6 weeks)</td>
<td></td>
</tr>
<tr>
<td>Development</td>
<td>Not documented, use 2 month checklist today</td>
<td></td>
</tr>
<tr>
<td>BP</td>
<td>Check blood pressure Nov 2011</td>
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</tr>
<tr>
<td>RSV</td>
<td>Eligible for 5 doses of Palivizumab: gestational age 28 weeks</td>
<td><a href="#">RSV and Synagis</a></td>
</tr>
<tr>
<td>NICU History</td>
<td>Abstracted</td>
<td><a href="#">Open birth history</a></td>
</tr>
</tbody>
</table>

[Preemie Education Materials](#)
Questions?
Long-Term Deliverables for Lasting Impact and Synchronization Efforts

Discussion
Recap and Next Steps
Thank You!