



# **GLIDES PROJECT**

## **GuideLines Into DEcision Support**

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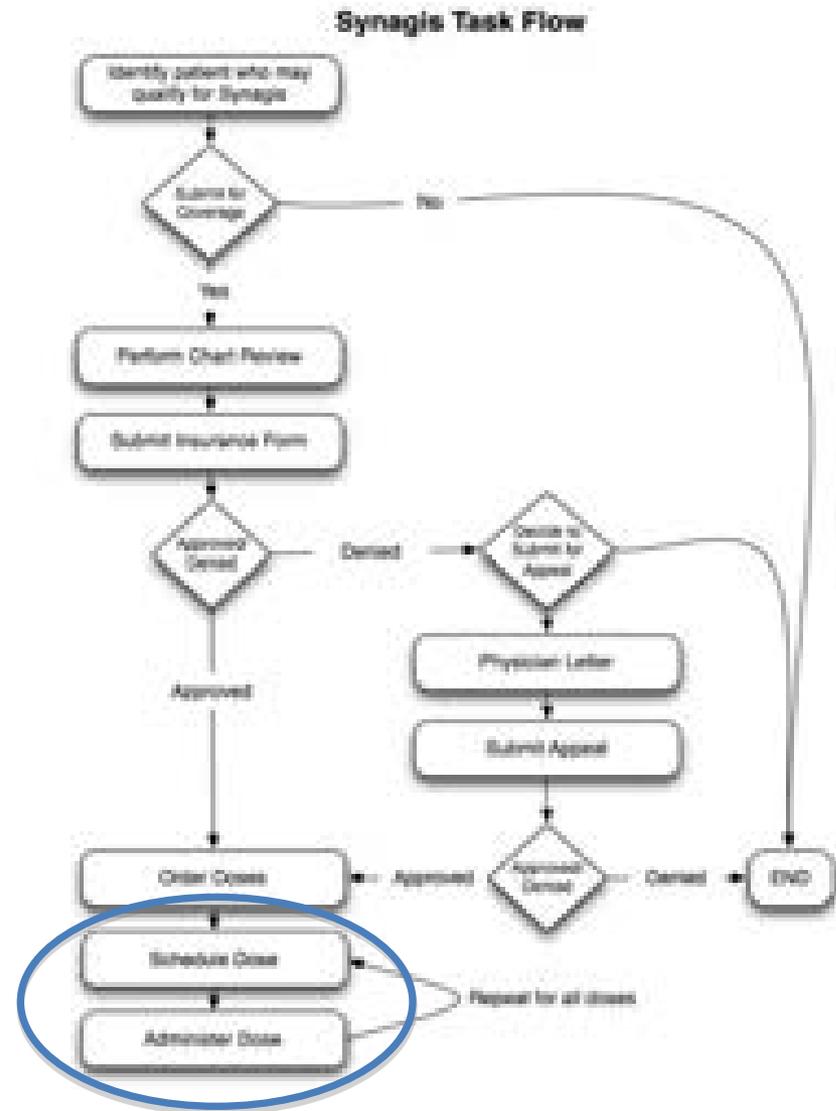
# Usability and Access

**CHOP: Scenario-based design and test**  
Center for Biomedical Informatics (CBMi)  
Dean Karavite  
Robert Grundmeier, MD

**Yale: iPad tool for patient-centered data capture**

# Requirements: Understanding Our Users

- Study Representative Users
  - Contextual Inquiry, Shadow, Interview, Survey...
  - Utilize EMR data
- Define their task flow
  - Develop Use Cases
- Use cases as the foundation of the entire development process
  - Design to the use cases
  - Usability test via use cases
  - System test via use cases
  - Guide questions in post deployment surveys...





# Use Case Styles/Formats

## Formal/Detailed

<b>Use Case ID:</b>	5.0
<b>Use Case Title:</b>	Synagis: Subsequent dose scheduling
<b>Precondition(s):</b>	Use Case 3.0 Patient Approved for Synagis Use Case 4.0 Patient has Dose 1
<b>Primary Actor:</b>	Nurse, "The User"
<b>Additional Actor(s):</b>	Patient Parent/Guardian
<b>Primary Use Case - Sequence of actions:</b>	User identifies date of previous dose Calculate recommended date range for next dose Access patient schedule If patient has no future scheduled encounters Call Patient Parent/Guardian Schedule encounter during range Record in System
<b>Alternate Use Case(s):</b>	5.1 Patient has future encounter scheduled during recommended range 5.2 Patient has future encounter scheduled, but not during recommended range

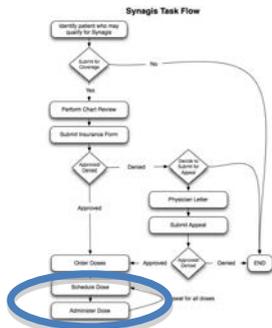
## Informal/Scenario

*A patient has received their first dose of Synagis.*

*The nurse calculates the date range for the next dose.*

*The nurse checks the schedule to see if the patient has an appointment scheduled during the date range. Nothing is scheduled.*

*The nurse calls the patient's parent/guardian to schedule a visit during the date range to administer the injection.*



# Use Case Validation

- Present use cases to end users
  - Scenario based format, simple diagrams...
- Determine use case accuracy
  - “Is this what you do/would like to do?”
- Stratify use cases
  - How important is it?
  - How frequently is it encountered?
  - How satisfied are users with the current process?

Use Case	Importance	Frequency	Current Satisfaction
Use Case 1	High	Low	Low
Use Case 2	High	High	Low
Use Case 3	Low	High	Med
Use Case 4	Low	Low	Med
Use Case 5	Low	High	High

# Design to the Use Cases

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

Home Schedule In Basket Chart Encounter Tel Enc Change PCP Login Ctxt Secure Patient Lists Help Links Print Log Out

Home Smith Joey

Smith, Joey 5 month old Male MRN: 123456789 Allergies/Rxn NKDA PCP Robert Grundmeier, MD INSURANCE Keystone MRO PHR Inactive

8/15/2011 visit with Robert Grundmeier, MD for Office Visit

Images Admin Asthma GP Open Orders Print AVS Preview AVS FYI Scans Benefits Inquiry Media Manager Change PCP More

Best Practice Care Assistant

**Premature Infant Assistant**

Chronological Age: 5 months Gestational Age: 30 5/7 weeks  
Corrected Age: 3 months Birth Weight: 1.686 kg

RSV and Synagis  Patient is Candidate for Palivizumab (Synagis)

Criteria: Chronological Age < 24 months, Chronic Lung Disease (CLD), Bronchodilator

Will submit for approval?  Yes  No

Insurance Provider:  Synagis Distributor:

View AAP Policy Statement... Run Chart Review...

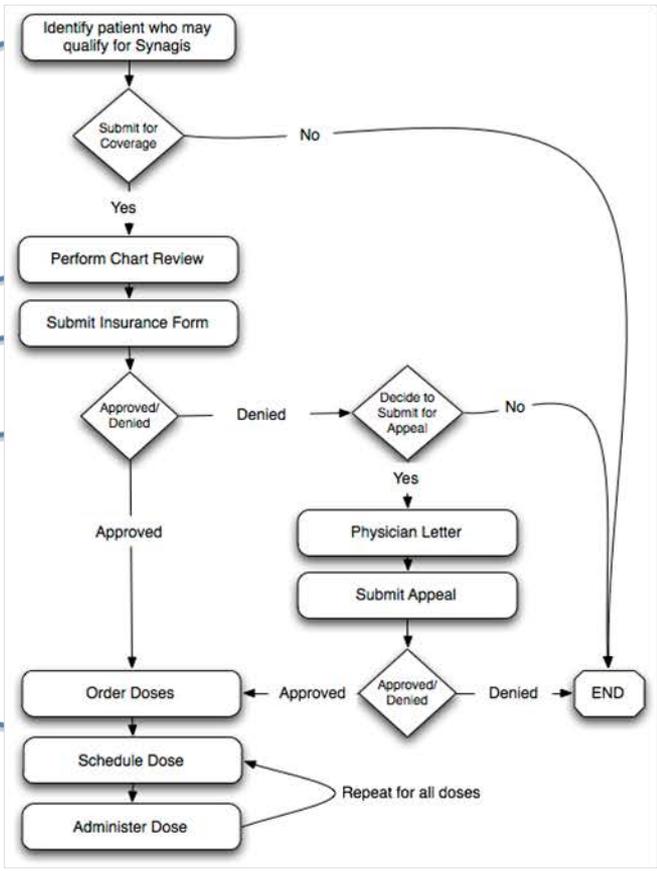
Initial Submission Date:  Will appeal?  Yes  No

Initial Submission Response:  Appeal Submission Date:  Appeal Submission Response:

Doses approved:

Dose:	1	2	3	4	5
Date Range:	11/1 - 11/7	12/7 - 12/14	1/5 - 1/12	2/3 - 2/10	3/3 - 3/10
Status:	Given				
Date:	11/4/11	No Appt.			
Weight Estimate:	2.8 kg	3.1 kg			
Order:	<input type="text" value="Received"/>	<input type="text" value="Ordered"/>	<input type="text" value="Select..."/>	<input type="text" value="Select..."/>	<input type="text" value="Select..."/>

Comments:



# Validate Use Case Based Designs

- Develop sequential dynamic mockups that represent each step in a use case / series of use cases
- “Walkthrough” these mockups with end users
  - Collect subjective and objective data from users
  - Will almost certainly discover new use case details in the process
- Iterate, iterate, iterate

Home **Smith Joey**

**Smith, Joey**      5 month old      MRN: 123456789      Allergies/Rxn      PCP      INSURANCE      PHR  
 Male      DOB: 7/12/2011      NKDA      Robert Grundmeier, MD      Keystone HMO      Inactive

- Snap Shot
- Chart Review
- Flowsheets
- Doc Flowsheets
- Problem List
- History
- Letters
- Demographics
- Growth Chart
- Results Review
- Medications
- Allergies/Rxn
- Enter/Edit Result
- Audiogram
- Patient Files
- Order Entry
- Immunizations
- Visit Navigator**

8/15/2011 visit with Robert Grundmeier, MD for Office Visit  
 Images Admin Asthma CP Open ORDers Print AVS Preview AVS FYI Scans Benefits Inquiry Media Manager Change PCP More

- Best Practice
- Care Assistant**
- Allergy Sclpt
- Allergies/Rxn
- Chief Complaint
- Vitals
- Rev Flowsheet
- Nursing Notes
- Order Reconciliation
- Verify Rx Benefits
- Reconcile Dispen...
- Disclaimer
- Progress Notes
- History
- SmartSets
- Dx and Orders
- Pt Instructions
- LOS
- Follow-up
- Close Encounter

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Snap Shot 8/15/2011 visit with Robert Grundmeier, MD for Office Visit

Chart Review Images Admin Asthma CP Open ORDers Print AVS Preview AVS FYI Scans Benefits Inquiry Media Manager Change PCP More

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Comments:



Schedule in EMR as any other appointment (Well Visit or Nurse Visit)

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Status:	Given	Scheduled			
Date:	11/4/11	12/10/11 9:00a			
Weight Estimate:	2.8 kg	3.1 kg			
Order:	<input type="text" value="Received"/>	<input type="text" value="Ordered"/>	<input style="background-color: #f0f0f0;" type="text" value="Select..."/>	<input style="background-color: #f0f0f0;" type="text" value="Select..."/>	<input style="background-color: #f0f0f0;" type="text" value="Select..."/>

Comments:

# Challenges with Use Cases

- Difficult to have everyone think in terms of use cases
  - Mockups/UI designs are more accessible
- Difficult to develop and maintain (if highly detailed)
- Difficult to provide as a deliverable that developers can actually work from

# Improving Usability and Accessibility of Decision Support With iPad

Rick Shiffman

# Case 1: Yale Pulmonology

- With input from 2 pediatric pulmonologists, we developed CDS for chronic management of asthma based on newly released NHLBI guidelines
  - Assist assessment and documentation of control, severity, impairment, and risk
  - Facilitate choice and ordering of appropriate pharmacologic interventions
  - Provide patient handout and med authorization form for school
- Direct observation demonstrated that CDS templates were used for documentation at end-of-session (Lomotan, et al)

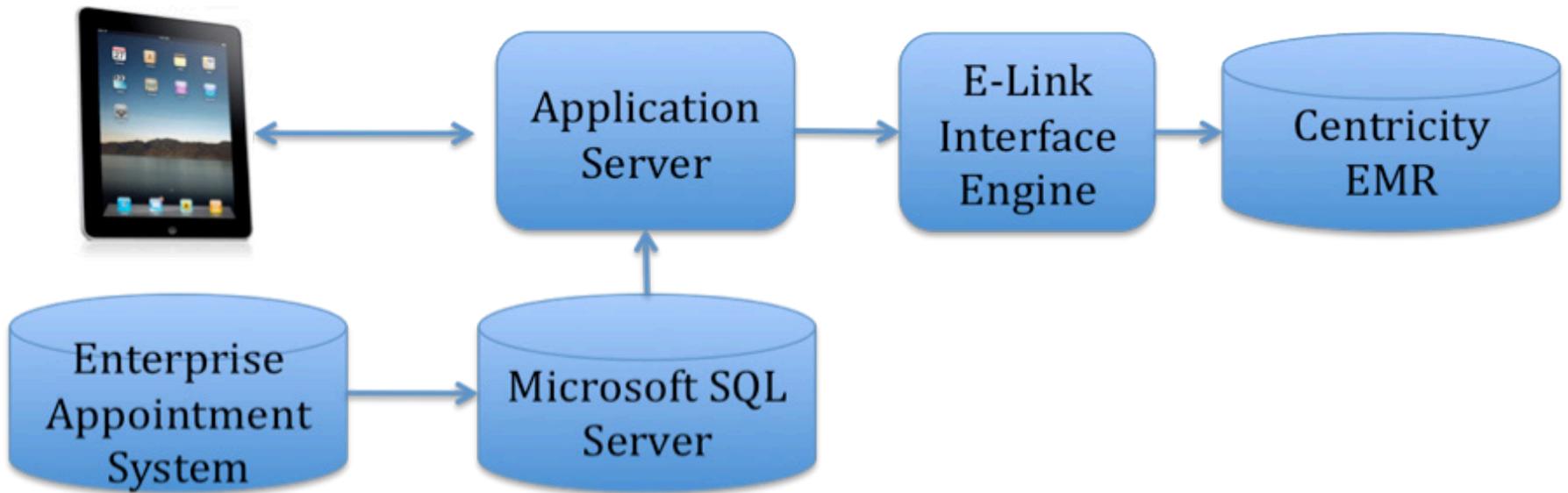
# Reasons

- Specialty: Experts don't need DS, patients more complex
- Workflow: Habit
- Social: Adverse effect on clinician-patient relationship
- Technical: Warm-up time, noisy fans
- ...

# Facilitation of Decision Support Avoidance

- Patient's interim history collected on paper form completed by patients in waiting room
- Physicians jotted notes on form in exam room
- Transcribed data into EHR at end of session

# Architecture



# Registrar selects patient, language

iPad 9:25 AM 95%

## Today's Patients - 4/14/11

Select Patient

Jim Jones

Language to use:

English

Spanish

Go To History

# Parent/patient completes interim history

## In the Past Month...

How often has your child had cough due to asthma?

- None  **2 days per week or less**  More than 2 days per week  Daily  Not Sure

How often has your child had wheezing?

- None**  2 days per week or less  More than 2 days per week  Daily  Not Sure

How often has your child had chest tightness or chest pain?

- None  **2 days per week or less**  More than 2 days per week  Daily  Not Sure

How often has your child had shortness of breath or trouble breathing?

- None  **2 days per week or less**  More than 2 days per week  Daily  Not Sure



Visit Type

- Well Child
- Asthma

CLASSIFYING COMPONENTS OF ASTHMA SEVERITY AND INITIATING TREATMENT

Is patient currently on controller medication?  yes  no  
 Has this patients severity been classified?  yes  no

Assessment for:  Control  Severity

----- Persistent -----

Impairment	----- Intermittent -----	Mild	Moderate	Severe
<input checked="" type="checkbox"/> HPI	<input type="radio"/> None	<input type="radio"/> <=2 days/wk	<input type="radio"/> >2 days/wk	<input checked="" type="radio"/> Daily
<input checked="" type="checkbox"/> Cntrl/Sev	<input type="radio"/> None	<input type="radio"/> <=2 days/wk	<input checked="" type="radio"/> >2 days/wk	<input type="radio"/> Daily
<input checked="" type="checkbox"/> Inhaler/Env	<input type="radio"/> None	<input checked="" type="radio"/> <=2 days/wk	<input type="radio"/> >2 days/wk	<input type="radio"/> Daily
<input checked="" type="checkbox"/> PE	<input type="radio"/> None	<input checked="" type="radio"/> <=2 days/wk	<input type="radio"/> >2 days/wk	<input type="radio"/> Daily
<input checked="" type="checkbox"/> Asmt	<input checked="" type="radio"/> None	<input type="radio"/> <=2x/month	<input type="radio"/> 3-4x/month	<input type="radio"/> >1x/wk
<input checked="" type="checkbox"/> Tx Plan	<input type="radio"/> None	<input type="radio"/> <-----	<input type="radio"/> Mild	<input checked="" type="radio"/> Moderate
<input checked="" type="checkbox"/> Action Plan	<input checked="" type="radio"/> None	<input type="radio"/> <=2 days/wk	<input type="radio"/> >2 days/wk but not	<input type="radio"/> Daily
<input checked="" type="checkbox"/> Asmt/Plan	<input type="radio"/> None	<input type="radio"/> <=2 days/wk	<input type="radio"/> >2 days/wk but not	<input type="radio"/> Several times per
Lung Function	<input type="radio"/> FEV1>80% predicted	<input type="radio"/> <-----	<input type="radio"/> <-----	<input checked="" type="radio"/> FEV1=60-80% predicted
FEV1 or peak flow	<input type="radio"/> >85%	<input type="radio"/> <-----	<input checked="" type="radio"/> >80%	<input type="radio"/> =75-80%
FEV1/FVC				<input type="radio"/> <75%

**Impairment Classification: Moderate**

Risk	0	1 in last year	2 in last year	3 in last year	>=4 in last year
Acute/ ER visit(s) due to asthma	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospitalizations due to asthma	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exacerbations requiring oral systemic corticosteroids	<input checked="" type="radio"/> 0-1/year			<input type="radio"/> >=2/year	

AND  for persistent asthma

Treatment-related adverse effects	Medication Adverse Effect	Comments
	<input type="checkbox"/> Thrush <input type="checkbox"/> Palpitations <input type="checkbox"/> Jitteriness <input type="checkbox"/> Sleep Disturbances <input type="checkbox"/> Decreased Growth <input type="checkbox"/> Other	

**Risk Classification: Low**  
**Asthma Severity Classification: Moderate Persistent**

Prev Form (Ctrl+PgUp)

Next Form (Ctrl+PgDn)

Close

Visit Type <input type="checkbox"/> Well Child <input checked="" type="checkbox"/> Asthma	<b>Decision Support - Today</b>	<b>Control Classification</b>	<b>Severity Classification</b>
	Severity Class: Moderate Persistent Impairment: Moderate Risk: Low	Control Class: Impairment: Risk: Previous Step:	Severity Class:

<input type="checkbox"/> HPI <input type="checkbox"/> Cntrl/Sev <input type="checkbox"/> Inhaler/Env <input type="checkbox"/> PE <input type="checkbox"/> Asmt <input type="checkbox"/> Tx Plan <input type="checkbox"/> Action Plan <input type="checkbox"/> Asmt/Plan	<b>Provider Assessment - Today</b>		
	Current level of control is: <input checked="" type="radio"/> Well Controlled <input type="radio"/> Not Well Controlled <input type="radio"/> Very Poorly Controlled		
	Inhaler Technique: <input type="radio"/> Correct <input type="radio"/> Incorrect <input checked="" type="radio"/> N/A		
	Adherence: <input checked="" type="radio"/> N/A <input type="radio"/> Good <input type="radio"/> Fair <input type="radio"/> Poor		
	Environmental Control: <input checked="" type="radio"/> Adequate <input type="radio"/> Inadequate <input type="radio"/> N/A		

**Advice**

Severity Classification: Moderate Persistent Recommended therapy is Step 3 or 4

--- Regular follow up every 1 - 6 months ---

Intermittent Asthma	Persistent Asthma: Daily Medication
<input type="radio"/> Step 1 <input type="radio"/> Step 2 <input checked="" type="radio"/> Step 3 <input type="radio"/> Step 4 <input type="radio"/> Step 5 <input type="radio"/> Step 6	
Step Comments/Reason for Step Change:	

Preferred: SABA PRN	Preferred: Low-dose ICS  Alternative: Cromolyn,LTRA, Nedocromil  Consider consultation	Preferred: Low-dose ICS+ either LABA, LTRA, or COMBO  OR  Medium-dose ICS  Consult Asthma Specialist	Preferred: Medium-dose ICS+LABA, or COMBO  Alternative:  Medium-dose ICS+LTRA  Consult Asthma Specialist	Preferred: High-dose ICS+LABA, or COMBO  Alternative:  High-dose ICS+LTRA  Consult Asthma Specialist	Preferred: High-dose ICS+LABA, or COMBO+ oral systemic corticosteroid  Alternative:  High-dose ICS+ LTRA +  oral systemic corticosteroid  Consult Asthma Specialist
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