ADOPTION LESSONS LEARNED FROM THE SUBSPECIALTY CLINIC
Yale Pediatric Pulmonology

- First site for implementation
- "Fully" electronic
- Nine clinical providers
- Approximately 1800 visits/year for asthma
- Key members of clinical staff involved throughout design and implementation processes
### GLIDES

**Asthma Severity and Treatment: GLIDES**

**CLASSIFYING COMPONENTS OF ASTHMA SEVERITY AND INITIATING TREATMENT**

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td>None</td>
<td>Daily</td>
<td>All Day</td>
<td></td>
</tr>
<tr>
<td>Wheezing</td>
<td>None</td>
<td>Daily</td>
<td>All Day</td>
<td></td>
</tr>
<tr>
<td>Chest tightness</td>
<td>None</td>
<td>Daily</td>
<td>All Day</td>
<td></td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>None</td>
<td>Daily</td>
<td>All Day</td>
<td></td>
</tr>
<tr>
<td>Nighttime awaking</td>
<td>None</td>
<td>Daily</td>
<td>All Day</td>
<td></td>
</tr>
</tbody>
</table>

**SABA use (not for EoE)**

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in school/ play/work activities</td>
<td>None</td>
<td>Mild</td>
<td>Moderate</td>
<td>Severe</td>
</tr>
<tr>
<td>Lung function</td>
<td>FEV1 (predicted)</td>
<td>&gt;80%</td>
<td>&gt;75-80%</td>
<td>&gt;75</td>
</tr>
</tbody>
</table>

**Risk**

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute/Exacerbations due to asthma</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Hospitalizations due to asthma</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Exacerbations requiring oral systemic corticosteroids**

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1/year</td>
<td>&gt;=2 exacerbations in last year</td>
<td>AND Risk Factors for persistent asthma</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Treatment-related adverse effects**

<table>
<thead>
<tr>
<th>Medication Adverse Effect</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throat</td>
<td>Irritations</td>
</tr>
<tr>
<td>Rash</td>
<td>Cheeks</td>
</tr>
<tr>
<td>Sleep Disturbance</td>
<td>cyanotic</td>
</tr>
</tbody>
</table>

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**Asthma Steps and Plan: GLIDES**

**Recommended Step for Asthma Management**

*** Based on recorded symptoms the NHLBI Guideline step 2 is recommended. ***

**Intermittent Asthma**

- **Step 1**: Preferred: Low-dose ICS
- **Alternative**: Cromolyn, LABA, Naloxone

**Persistent Asthma Daily Medication**

- **Step 2**: Preferred: Medium-dose ICS + LABA
- **Alternative**: High-dose ICS + LABA

- **Step 3**: Preferred: Medium-dose ICS + LABA
- **Alternative**: High-dose ICS + LABA + Oral systemic corticosteroid

- **Step 4**: Preferred: High-dose ICS + LABA
- **Alternative**: High-dose ICS + LABA + Oral systemic corticosteroid

- **Step 5**: Preferred: Medium-dose ICS + LABA
- **Alternative**: Medium-dose ICS + LABA

- **Step 6**: Preferred: High-dose ICS + LABA
- **Alternative**: High-dose ICS + LABA + Oral systemic corticosteroid

**Patient Education and Environmental Control at Each Step**

- **Quick-Relief Medication for All Patients**
  - SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: 2-4 doses at 30-minute interval as needed. Short course of oral systemic corticosteroids may be needed.
  - Caution: Increasing use of SABA or use of >2 days a week for symptom relief (not prevention of EoE) generally indicates inadequate control and the need to step up treatment.

<table>
<thead>
<tr>
<th>Comments/Reason for variance:</th>
</tr>
</thead>
</table>

**Steps**

- CC
- Med Hx
- ROS
- Exams on Hx
- Family Hx
- Phys Exam
- Treat Plan
- Test
- Prescrip
- Assessment

**Assessment**

- Close
Electronic Data

• 445 visits for asthma in first five months
• 55 new patient visits
  – CDS triggered in 43/55 (78.2%)
• 390 return patient visits
  – CDS triggered in 354/390 (90.8%)
• Overall, clinicians entered enough structured data to trigger CDS in 397/445 (89.2%) of cases
Direct Observation

• None of the clinicians used the computer in the exam room
  – Note: we performed a usage survey early in the design process, but this did not identify the extent of the problem

• During clinic, clinicians used smart forms in conference rooms to:
  – Review medications
  – Generate asthma action plans
  – Print prescriptions

• After clinic, clinicians used smart forms to:
  – Document
  – Create letters to referring physicians
Qualitative Evaluation

• Performed semi-structured interviews of all nine clinicians
• Reviewed transcripts in teams
• Developed coding framework using “grounded” approach
• Generated themes using qualitative data analysis software (NVivo 8)
Qualitative Results

• Factors contributing to low use
  – Clinical
  – Social
  – Technical
  – Workflow-related

• Themes
  – Computer use during general medical care
  – Computer use in a subspecialty setting
General Medical Care

• Clinical
  – “I don't like it. [The computer] doesn't have to make decisions - I'm the one who should make the decisions. Because . . . it's not like one plus one equals two. It's different. We're dealing with human beings . . . I think that I just got used to me thinking instead [of the computer].” (Fellow)
Subspecialty Care

• Clinical
  – “[Using the ‘smart forms’] is not possible in our setting...because our history-taking is complicated. It's long. People come with charts and studies...It just isn't like a well child visit. It can never be like a well child visit. Where, you know, you ask questions by rote, and sometimes the answers are by rote.” (Attending)
Subspecialty Care

• Clinical
  – “[EPR-3] is based on expert opinion, and that's very clearly stated. So I think that, keeping that in mind, we have expertise, too, so I think that our expert opinion counts as well.” (Attending)
Subspecialty Care

- Clinical
  - “And so should I get an IgE and a RAST test or maybe send you to Allergy [clinic] to get skin prick testing done, and see if you qualify for immune therapy or [omalizumab] therapy? So those are the kinds of tools that specialists would need, which is not something that pediatricians would need. Because which pediatrician is gonna start thinking about [omalizumab] for an asthmatic in their office? They're not gonna do that. It's actually not even their job to do that.” (Attending)
General Medical Care

• Workflow-related
  – “[I take notes] on paper. The [Interval History forms] that we were using before the electronic system came about. We still have the paper forms there because the nurses record vital signs on those paper forms. And so . . . they help to guide me through the questioning process. I'm able to take notes just as you would normally.” (Attending)
Subspecialty Care

• Workflow-related
  – “There are times when the patient has left and I've thought about [the ‘smart forms’]. Actually as I'm typing the letter, because that's when you formulate your thoughts and try to put things on to paper. So that the person who has sent you the patient has some idea of what it is you were thinking and what you want to do. And suddenly you realize, you know, I just didn't ask this.” (Attending)
General Medical Care

• Social
  – “I don't know how the computer can actually be part of the doctor-patient relationship in a natural and intuitive way. It actually cannot be. I mean I can tell you that the current system does not serve that purpose.” (Attending)
Subspecialty Care

• Social
  – “I feel they come to the specialist because they want to hear from the specialist not from their own pediatrician.” (Attending)
  – “I need a five-minute visit to feel like a half an hour. But a half an hour visit while I'm documenting in front of them is going to make them feel like I haven't paid attention to them at all.” (Attending)
Lessons Learned

- Subspecialty environments may require unique considerations
  - Subject matter expertise
  - Cognitive workflow split between patient care and communication to referring providers
  - Different patient expectations
Lessons Confirmed

• End user involvement is critical but insufficient
• Separating computer use from CDS use is not straightforward
• Usability testing or more formal evaluation (e.g., direct observation) earlier in the process may have been helpful