Implementing CDS for the Asthma Guidelines: From Narrative Guideline to Formal CDS

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Exam

### General appearance
- well developed and well nourished
- mouth breathing
- thin
- obese
- in no acute distress

### Cough description
- staccato

### Head
- normocephalic
- dolichocephalic
- with Down’s facies

### Eyes
- infraorbital shiners: present
- conjunctival injection: on the right

### Ears
#### Otoscopy
- otoscopy deferred
- uncooperative
- normal landmarks: R, L
- view obstructed by cerumen: R, L
- pearly grey: R, L
- erythematous: R, L
- amber: R, L

### Middle ear fluid
- Right
- Left
- none: R, L
- clear: R, L
- serous: R, L
- purulent: R, L

### Nose
- discharge: clear
- mucosal color: erythematous
- polyp presence: no
- patency: partially obstructed

### Throat
- tonsil size: small
- post nasal drip: absent
- mucosal cobblestoning: absent

### Neck
- trachea orientation: deviated right
- lymph node palpable: Y, N
- anterior cervical chain: R, L
- posterior cervical chain: R, L
- submandibular: R, L
Assessment

**Diagnostic/imaging**
Asthma has had a chest x-ray performed since the onset of respiratory symptoms. Chest x-ray was reviewed at today's visit and film indicated hyperinflated, and diffuse interstitial changes. Focal opacification present in the right middle lobe.

To review NHLBI stepwise treatment, click here

**Initial severity**
- **Severity**: severe
- **Control**: very poorly controlled

**Guideline assessment** today
- **Severity**: severe
- **Control**: very poorly controlled

**Clinician assessment** today
- **Severity**: severe
- **Control**: very poorly controlled

Accept calculated control?

**Assessment**
Asthma's initial asthma classification is severe. Today's examination indicates her asthma is very poorly controlled.

**Plan**

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### HPI

<table>
<thead>
<tr>
<th>Chest x-ray</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y performed since onset of respiratory symptoms</td>
<td>✔</td>
<td>□</td>
</tr>
</tbody>
</table>

### Past Hx's

<table>
<thead>
<tr>
<th>Chest x-ray reviewed this visit</th>
</tr>
</thead>
<tbody>
<tr>
<td>X-ray reviewed today</td>
</tr>
</tbody>
</table>

### Exam

<table>
<thead>
<tr>
<th>Diagnostic/imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma has had a chest x-ray performed since the onset of respiratory symptoms. Chest x-ray was reviewed at today's visit and film indicated hyperinflated, and diffuse interstitial changes. Focal opacification present in the right middle lobe.</td>
</tr>
</tbody>
</table>

### Medication

<table>
<thead>
<tr>
<th>Focal opacification location</th>
</tr>
</thead>
<tbody>
<tr>
<td>right upper lobe</td>
</tr>
<tr>
<td>left lower lobe</td>
</tr>
<tr>
<td>right middle lobe</td>
</tr>
<tr>
<td>lingula</td>
</tr>
</tbody>
</table>

### Education

<table>
<thead>
<tr>
<th>PFT results</th>
</tr>
</thead>
<tbody>
<tr>
<td>normal</td>
</tr>
<tr>
<td>abnormal</td>
</tr>
<tr>
<td>patient unable to perform reliable test</td>
</tr>
<tr>
<td>normal FEV1 between exacerbations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Restrictive lung disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>moderate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airway obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Airflow obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partially</td>
</tr>
<tr>
<td>Reversible with a bronchodilator</td>
</tr>
<tr>
<td>Unchanged</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FEV1 predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FEV1/FVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>72</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action plan</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accept</td>
<td>Cancel</td>
</tr>
</tbody>
</table>
NHLBI Guidelines

STEPWISE APPROACH FOR MANAGING ASTHMA IN YOUTHS ≥12 YEARS OF AGE

<table>
<thead>
<tr>
<th>Intermittent asthma</th>
<th>Persistent Asthma: Daily Medication Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.</th>
</tr>
</thead>
</table>

**Step 1**
- Preferred: SABA PRN
- Alternative: Cromolyn, LTRA, Nedocromil, Theophylline

**Step 2**
- Preferred: Low-dose ICS + LABA or Medium-dose ICS + LABA
- Alternative: Medium-dose ICS + either LTRA, Theophylline, or Zileuton

**Step 3**
- Preferred: Medium-dose ICS + LABA
- Alternative: Medium-dose ICS + either LTRA, Theophylline, or Zileuton

**Step 4**
- Preferred: High-dose ICS + LABA
- AND
- Consider Omalizumab for patients who have allergies

**Step 5**
- Preferred: High-dose ICS + LABA + Oral systemic corticosteroids
- AND
- Consider Omalizumab for patients who have allergies

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

Patient Education and Environmental Control at Each Step
Steps 2-4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma

Quick-Relief Medication for All Patients
- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.
- Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.
# Action Plan

## Doing Well / Green Zone

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose #</th>
<th>route</th>
<th>Timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmicort Respules 0.5 mg</td>
<td>1</td>
<td>vial</td>
<td>once a day</td>
</tr>
<tr>
<td>Foradil Aerolizer 12 mcg</td>
<td>2</td>
<td>capsule</td>
<td>once a day</td>
</tr>
<tr>
<td>Symbicort 80/4.5</td>
<td>1</td>
<td>puff</td>
<td>twice a day</td>
</tr>
<tr>
<td>Methylprednisolone 4 mg</td>
<td>2</td>
<td>tablet</td>
<td>twice a day</td>
</tr>
<tr>
<td>Xopenex HFA 45 mcg</td>
<td>1</td>
<td>puff</td>
<td></td>
</tr>
</tbody>
</table>

## Getting Worse / Yellow Zone

**Quick relief**
- Albuterol 0.083% (3 mL)
  - Dose: 3
  - Route: vial nebulized
  - Timing: 3 times per day

**Feel better in 20 min - relief lasts 4 hrs, then take**
- Ventolin HFA 90 mcg
  - Dose: 3
  - Route: puff
  - Timing: 3 times a day for 2-3 days

**If not improving start**
- Proventil 90 mcg/metered inhalation
  - Dose: 3
  - Route: puff
  - Timing: 3 times a day for 2-3 days
- Flovent HFA 110 mcg/inhalation
  - Dose: 2
  - Route: puff
  - Timing: 3 times per day

## Medical Alert / Red Zone

**Quick relief**
- Xopenex 1.25 mg
  - Dose: 4
  - Route: vial nebulized
  - Timing: 4 times per day

**Steroid**
- Medrol 8 mg
  - Dose: 1
  - Route: tablet
  - Timing: 2 times per day
No asthma education modules were delivered at today’s visit.
April is a 5 year old female, established patient presenting with asthma.

April has been hospitalized for asthma 2 times. Her last admission was 03/2009. She has not been intubated for asthma. April has been admitted to ICU for asthma. April has had 2 er/urgent care visits for asthma. Her last er/urgent care visit was 03/2009. Steroids have been used 2 times within the last 6 months. The last course of steroids was 03/2009. She has the following asthma symptoms cough, and wheeze. Daytime frequency of asthma symptoms is 3 times per week. Asthma symptoms occur 3 times per day. Nighttime awakening due to asthma symptoms occurs 3 times per month. Parents/patient are unaware of seasonal variation of asthma symptoms. She has used rescue medication 4 days per week. Adherence to medication regime has been good. There are barriers to medication adherence. She has some interference with normal activities due to asthma. School/daycare attendance is affected by asthma. There is exposure to furry pet or birds. There is no exposure to tobacco smoke. April's asthma control test score today was 17.