Improving the Management of Asthma to Improve Patient Adherence and Outcomes

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Asthma Remains a Serious Health Risk in the US

Every day in America approximately ...

- 63,000 people miss school or work due to asthma
- 5,000 people visit the emergency room due to asthma
- 1,300 people are admitted to the hospital due to asthma
- 10 people die from asthma

### Components of Severity

**Symptoms**
- <2 days/week
- 2-6 days/week
- >6 days/week

**Nighttime awakenings**
- <2x/month
- 2-6x/month
- >6x/month

**Short-acting beta-agonist use for symptom control**
- <2 days/week
- 2-6 days/week
- >6 days/week

**Interference with normal activity**
- None
- Minor limitation
- Some limitation
- Extremely limited

**Long function**
- FEV1 <60% predicted
- FEV1/FVC reduced >5%
- FEV1 >60% but <80% predicted
- FEV1/FVC reduced 5%

**Lung function**
- FEV1 >80% predicted
- FEV1/FVC normal

### Risk

**Exacerbations requiring OSC**
- 0-1/year
- >2/year

Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV1.

### Recommended Step for Initiating Therapy

**Step 1**
- Standard therapeutic regimen

**Step 2**
- Consider short course of systemic corticosteroids

**Step 3**
- Step 4 or 5

**Step 4 or 5**
- and consider short course of systemic corticosteroids

In 2-4 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.

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### Classifying Severity & Initiating Treatment in Patients ≥ 12 Years Not Currently Taking Long-Term Controllers

**Classification of Asthma Severity**

<table>
<thead>
<tr>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
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### Classification of Asthma Control

- **Well-Controlled**: Symptoms <2 days/week, Nighttime awakenings <2x/month, Interference with normal activity None, FEV1 >80% predicted
- **Not Well-Controlled**: Symptoms ≥2 days/week, Nighttime awakenings ≥2x/month, Interference with normal activity Some limitation, FEV1 <80% predicted
- **Very Poorly Controlled**: Symptoms ≥2 days/week, Nighttime awakenings ≥2x/month, Interference with normal activity Extremely limited, FEV1 <60% predicted

### Assessing Asthma Control and Adjusting Therapy in Patients ≥12 Years of Age

- **Components of Control**
  - **Symptoms**: <2 days/week
  - **Nighttime awakenings**: <2x/month
  - **Interference with normal activity**: None
  - **SABA use**: <2 days/week
  - **FEV1 or peak flow**: >80% predicted/ personal best
  - **ATAQ**: 0
  - **ACQ**: ≤0.75
  - **ACT**: ≥20

- **Risk**
  - **Exacerbations requiring OSC**: 0-1 per year

### Evaluation

- **Progressive loss of lung function**: Evaluation requires long-term follow-up care.
- **Treatment-related AEs**: Medication side effects vary in intensity.
Stepwise Approach for Managing Asthma in Youths ≥12 Years and Adults

**Intermittent**

**Step 1**
Preferred: SABA PRN

Alternative: Cromolyn, Nedocromil, LTRA, or Theophylline

**Step 2**
Preferred: Low-Dose ICS

Alternative: Low-dose ICS + LABA

Alternative: Medium-Dose ICS and either LTRA, Theophylline, or Zileuton

**Step 3**
Preferred: Medium-Dose ICS OR Low-dose ICS + LABA

Alternative: Medium-Dose ICS and either LTRA, Theophylline, or Zileuton

**Step 4**
Preferred: High-Dose ICS + LABA

**Step 5**
Preferred: High-Dose ICS + LABA

AND Consider Omalizumab For Patients Who Have Allergies

**Step 6**
Preferred: High-Dose ICS + LABA + Oral Corticosteroid

AND Consider Omalizumab For Patients Who Have Allergies

**Persistent Asthma: Daily Medication**

**Step 1**
Preferred: SABA PRN

**Step 2**
Preferred: Low-Dose ICS

Alternative: Low-dose ICS + LABA

Alternative: Medium-Dose ICS and either LTRA, Theophylline, or Zileuton

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**Overview**

- Introduction
- Diagnosis of asthma
- Determining severity and initiating treatment
- Determining control and adjusting treatment
- Uncontrolled asthma
- Non-adherence
- Case study

Patient Education and Environmental Care

Assess control: Step UP if needed or DOWN if possible
Definitions

- FEV-1
- FVC
- FEV-1 / FVC
- EPR-3
- Severity
- Control
  - Impairment
  - Risk

EPR-3
Why do we need guidelines?
Unmet Needs in Asthma

- 25 million asthmatics in the U.S.
- 2 million emergency room visits
- 500,000 hospitalizations
- 3,800 deaths per year
- Annual cost = $56 billion
Goals of Asthma Therapy

- Prevent chronic symptoms (day, night, and with exertion)
- Minimize need for rescue inhaler (<2 days a week)
- Maintain (near) "normal" pulmonary function
- Maintain normal activity levels (including exercise and attendance at work or school)
- Meet patients' and families' expectations
- Prevent recurrent exacerbations
- Minimize ED visits and hospitalizations
- Prevent progressive loss of lung function
- Provide optimal therapy with minimal adverse effects

Goals of Asthma Therapy

- Control of daily and nocturnal symptoms
  - 30% of asthmatics report nocturnal awakenings at least once per week
- Prevention of exacerbations
  - 32% of children required ER visits
  - 41% of patients had unscheduled visits
Reasons for Treatment Failure

- Many reasons
- Lack of access to quality care
- Lack of adherence to recommendations
- Optimal meds not being prescribed
- A small subset of patients remain poorly controlled despite optimal therapy

Diagnosis of Asthma
Symptoms

- Dyspnea
- Cough
- Wheeze
- Chest tightness

Assess Triggers

- Allergens
- Infections
- Irritants
- Change of seasons
- Exercise
- GERD
- Medications
- Sulfites
Differential Diagnosis

- COPD
- CHF
- VCD
- UAO
- VHD
- ASD
- Pulmonary embolus

Spirometric Testing

- Spirometry pre and post bronchodilator
- Mannitol challenge test
- Exercise test
**Spirometry**

**Spirometric Diagnosis of Asthma**

- FEV-1 / FVC < 70% (varies with age)
- FEV-1 determines severity
  - > 80% - mild
  - 60-79% - moderate
  - < 60% - severe
- Assess reversibility
Determining Severity

Initiating Treatment

Classifying Severity & Initiating Treatment in Patients ≥ 12 Years Not Currently Taking Long-Term Controllers

Components of Severity

<table>
<thead>
<tr>
<th>Classification of Asthma Severity (Youths ≥12 of Age and Adults)</th>
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<tbody>
<tr>
<td>Persistent</td>
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<td>Intermittent</td>
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**Components of Severity**

- **Impairment**
  - Normal FEV1/FVC: 8-19 yr 95%
  - 20-39 yr 90%
  - 40-59 yr 75%
  - 60-80 yr 70%

- **Symptoms**
  - s2 days/week
  - >2 days/week but not daily
  - >1x/week but not nightly
  - Throughout the day

- **Nighttime awakenings**
  - <2x/month
  - 2-4x/month
  - >1x/week but not nightly
  - Often 7x/week

- **Short-acting beta2-agonist use for symptom control**
  - s2 days/week
  - >2 days/week but not daily
  - >1x/week but not nightly
  - Throughout the day

- **Interference with normal activity**
  - None
  - Minor limitation
  - Some limitation
  - Extremely limited

- **Lung function**
  - FEV1 <60% predicted
  - FEV1/FVC reduced >5%
  - FEV1 >60% but <80% predicted
  - FEV1/FVC normal
  - FEV1 <80% predicted
  - FEV1/FVC normal
  - FEV1/FVC reduced 5%
  - FEV1/FVC normal

- **Exacerbations requiring CSC**
  - ≤0.2/year
  - >0.2/year

**Step 3**

- Consider severity and intervals since last exacerbate.
- Frequency and severity may fluctuate over time for patients in any severity category.
- Relative annual risk of exacerbations may be related to FEV1.

**Step 4 or 5**

- and consider short course of systemic corticosteroids
- If 24 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.

Patients not on a controller are classified as having “mild persistent” asthma if they have any **ONE** of the following:

- Albuterol use >2 days/week, not daily
- Asthma symptoms >2 days/week, not daily
- Nighttime awakenings 3-4x/month (> 2x/month)
- Minor limitation of normal activity
- FEV1 >80% of predicted

*Based on NIH asthma guidelines for initiating therapy in patients ≥12 years.


### Stepwise Approach for Managing Asthma in Youths ≥12 Years and Adults

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<th>Persistent Asthma: Daily Medication</th>
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**Patient Education and Environmental Care**
### Classifying Severity & Initiating Treatment in Patients ≥ 12 Years Not Currently Taking Long-Term Controllers

#### Components of Severity

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<tr>
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<th>Persistent</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>Mild</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>62 days/week</td>
<td>&lt;24 hours/week</td>
</tr>
<tr>
<td>None</td>
<td>24 days/week</td>
<td>&lt;4 hours/week</td>
</tr>
<tr>
<td>None</td>
<td>2 days/week</td>
<td>&lt;2 hours/week</td>
</tr>
<tr>
<td>None</td>
<td>0-1 day/week</td>
<td>0-1x/day</td>
</tr>
</tbody>
</table>

#### Impairment

**Normal FEV₁/FVC:
- 0-19 p < 85%**
- 20-29 p < 75%
- 30-39 p < 65%
- 40-59 p < 55%
- 60-80 p < 45%
- 80-85 p < 35%
- 85-90 p < 25%
- 90-95 p < 15%
- 95-100 p < 5%

<table>
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<tr>
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<th>Persistent</th>
<th>Severe</th>
</tr>
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<tbody>
<tr>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Minor</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Some</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Extremely</td>
<td>None</td>
<td>None</td>
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</tbody>
</table>

#### Long Function

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<th>Intermittent</th>
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<th>Severe</th>
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</thead>
<tbody>
<tr>
<td>None</td>
<td>FEV₁: &lt;60% predicted</td>
<td>FEV₁: &lt;60% predicted</td>
</tr>
<tr>
<td>Minor</td>
<td>FEV₁: &lt;80% predicted</td>
<td>FEV₁: &lt;80% predicted</td>
</tr>
<tr>
<td>Some</td>
<td>FEV₁: &lt;90% predicted</td>
<td>FEV₁: &lt;90% predicted</td>
</tr>
<tr>
<td>Extremely</td>
<td>FEV₁: &lt;100% predicted</td>
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</table>

#### Risk

<table>
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<tr>
<th>Intermittent</th>
<th>Persistent</th>
<th>Severe</th>
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<tbody>
<tr>
<td>0-1/year</td>
<td>&gt;2/year</td>
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Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV₁.

### Stepwise Approach for Managing Asthma in Youths ≥12 Years and Adults

#### Intermittent

**Step 1 Preferred:** SABA PRN

**Step 2 Preferred:** Medium-Dose ICS OR Low-dose ICS + LABA

**Alternative:** Cromolyn, Nedocromil, LTRA, or Theophylline

#### Persistent Asthma: Daily Medication

**Step 3 Preferred:** Medium-Dose ICS and either LTRA, Theophylline, or Zileuton

**Alternative:** Low-Dose ICS and either LTRA, Theophylline, or Zileuton

**Step 4 Preferred:** High-Dose ICS + LABA

**Step 5 Preferred:** High-Dose ICS + LABA AND Consider Omalizumab For Patients Who Have Allergies

**Step 6 Preferred:** High-Dose ICS + LABA + Oral Corticosteroid AND Consider Omalizumab For Patients Who Have Allergies

### Patient Education and Environmental Care

Follow-up Visit

• 2-6 weeks after initiation of treatment
• Evaluate level of control
• Adjust therapy

Determining Control

Adjusting Treatment
Management Based on Control

For Children Older Than 5 Years, Adolescents and Adults

<table>
<thead>
<tr>
<th>Level of Control</th>
<th>Treatment Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled</td>
<td>Maintain and find lowest controlling step</td>
</tr>
<tr>
<td>Partly controlled</td>
<td>Consider stepping up to gain control</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>Step up until controlled</td>
</tr>
<tr>
<td>Exacerbation</td>
<td>Treat as exacerbation</td>
</tr>
</tbody>
</table>

How Can Asthma Control Be Measured?

- Inflammation? Direct or indirect?
- Lung function?
- Daytime symptoms?
- Nighttime awakenings?
- Utilization of healthcare resources?
- Functional status?
- Missed work and/or school?
- Patient self-report of control?
- Use of “quick relief” inhaler and/or nebulizer?
Asthma Control Test™ (ACT)

1. In the past 4 weeks, how much of the time did your asthma keep you from getting as much done at work, school or at home?

   - All of the time 1  
   - Most of the time 2  
   - Some of the time 3  
   - A little of the time 4  
   - None of the time 5

2. During the past 4 weeks, how often have you had shortness of breath?

   - More than once a day 1  
   - Once a day 2  
   - 3 to 6 times a week 3  
   - Once or before a week 4  
   - Not at all 5

3. During the past 4 weeks, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night, or earlier than usual in the morning?

   - 4 or more nights a week 1  
   - 2 or 3 nights a week 2  
   - Once a week 3  
   - Once or twice 4  
   - Not at all 5

4. During the past 4 weeks, how often have you used your rescue inhaler or nebulizer medication (such as albuterol)?

   - 3 or more times per day 1  
   - 1 or 2 times per day 2  
   - 2 or 3 times per week 3  
   - Once a week or less 4  
   - Not at all 5

5. How would you rate your asthma control during the past 4 weeks?

   - Not controlled at all 1  
   - Poorly controlled 2  
   - Somewhat controlled 3  
   - Well controlled 4  
   - Completely controlled 5

Asthma Control Test is a trademark of QualityMetric Incorporated. Copyright 2002, QualityMetric Incorporated.

Assessing Asthma Control and Adjusting Therapy in Patients ≥12 Years of Age

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<th>Components of Control</th>
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<td></td>
<td>Well-Controlled</td>
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<tr>
<td>Impairment</td>
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</tr>
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<td>Symptoms</td>
<td>&lt;=2 days/week</td>
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<td>&lt;=2x/month</td>
</tr>
<tr>
<td>Interference with</td>
<td>None</td>
</tr>
<tr>
<td>normal activity</td>
<td></td>
</tr>
<tr>
<td>SABA use</td>
<td>&lt;=2 days/week</td>
</tr>
<tr>
<td>FEV1 or peak flow</td>
<td>&gt;80% predicted/</td>
</tr>
<tr>
<td></td>
<td>personal best</td>
</tr>
<tr>
<td>ATAA</td>
<td>0</td>
</tr>
<tr>
<td>ACQ</td>
<td>&lt;=0.75</td>
</tr>
<tr>
<td>ACT</td>
<td>&gt;=20</td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Exacerbations</td>
<td>&lt;=1 per year</td>
</tr>
<tr>
<td>OSC</td>
<td></td>
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<tr>
<td>Progressive loss of</td>
<td></td>
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<tr>
<td>lung function</td>
<td></td>
</tr>
<tr>
<td>Treatment-related</td>
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Stepwise Approach for Managing Asthma in Youths ≥12 Years and Adults

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### Persistent Asthma: Daily Medication

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### EPR 3 Recommendations for Spirometry

- Spirometry should be performed:
  - Initial assessment
  - After treatment is initiated and symptoms have stabilized
  - With progressive or prolonged loss of asthma control
  - At least every 1 to 2 years
  - May be indicated more often depending on clinical severity and treatment response
EPR3 Recommendations for Allergy Testing

• Allergy testing indicated for patients with persistent asthma
  – Skin testing or in-vitro testing
  – Assess clinical significance

EPR3 Recommendations: Specialist Referral

• Referral to a specialist
  – Referral to an asthma specialist at Step 4 care or higher
  – Consider referral if patient requires Step 3 care
Reflux

- Common asthma trigger
- Diet control
- Lifestyle
- Medications

Allergic Rhinitis and Sinusitis

- “One airway”
- Assess based on symptoms and objective testing
- Treat appropriately
Exercise-Induced Asthma

- 85% of asthmatics
- Pre-treat with albuterol 15-30 minutes before exercise
- Appropriate warm-up
- Avoid exercise in cold weather

Asthma and Pregnancy

- 1/3 worse 1/3 better 1/3 unchanged
- Maintaining adequate control is crucial
- Any medication can be used if needed to maintain control
- Budesonide preferred
- Control reflux in 3rd trimester
- Education Education Education
Patient Education

- Essential for optimal management
- Partnership with patient / family
- Who educates?
  - MD
  - RN
  - RT
  - Pharmacist
  - School
  - Home environmental training
  - Handouts
  - Online

Components of an Education Program

- Basic facts about asthma
- Goals of asthma management
- Medications / side effects
- Inhaler technique
- Need for adherence / risks of suboptimal treatment
Components of an Education Program

- Environmental control measures
- Early recognition and management of worsening symptoms
- Action plan
- When and where to seek care
- Need for regular follow-up

Uncontrolled Asthma
Reasons for Treatment Failure

- Lack of access to quality care
- Non-adherence
- Optimal meds not being prescribed
- Underestimation of severity
  Overestimation of control
- Inadequate environmental control
- Stress and depression
- Cultural issues

Uncontrolled Asthma

- Confirm proper diagnosis
- Confirm proper treatment
- Confirm adherence
- Confirm technique
- Assess for allergies
- Consider unsuspected triggers
  - Meds (including eyedrops)
  - Pets
  - Mold
Uncontrolled Asthma

- Confirm environmental control
- Consider occult GERD
- Consider occult sinus disease
- Check IgE to screen for ABPA

Are patients in the US achieving asthma control on their current therapy?
41% of Patients With Asthma Were “Not Well Controlled”

“Not well controlled asthma” was based on a score of ≤19 on the Asthma Control Test™ in a Community-Based Survey

Of those uncontrolled:

25% were using only a short-acting beta₂-agonist

85% considered their asthma somewhat or completely controlled
NIH Guidelines: Monitor Use of Short-Acting Beta$_2$-agonists As a Marker of Asthma Control

- “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.”
- Daily albuterol use is a marker of poorly controlled asthma

EIB = exercise-induced bronchospasm.


How Much Rescue Medication Are Asthma Patients Using?

- Most albuterol inhalers have 200 puffs per canister, equaling 100 doses*
- 4 canisters per year could equal daily albuterol use

\[
\text{Year} = 1 \text{ Dose of Albuterol Daily}
\]

* Calculation for canister containing 200 inhalations with patient using 2 inhalations per dose. Additional puffs may be required for priming of the canister.
Non-adherence

Magnitude of the Problem

Average # of prescription refills for ICS in the US:

4
Non-adherence / Patient Outcomes
ICS non-adherence and risk of death

Rate ratio of asthma death
Number of canisters of ICS per year

Adapted from Suissa S. et al. J Allergy Clin Immunol 2001;107:937-944

Non-adherence / Patient Outcomes
SABA overuse and risk of death

<table>
<thead>
<tr>
<th>SABA Use</th>
<th>Cases</th>
<th>Controls</th>
<th>Adjusted RR* (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3 Rx</td>
<td>2</td>
<td>443</td>
<td>Reference</td>
</tr>
<tr>
<td>3-6 Rx</td>
<td>2</td>
<td>188</td>
<td>3.4 (0.4, 29.1)</td>
</tr>
<tr>
<td>7-12 Rx</td>
<td>11</td>
<td>157</td>
<td>16.2 (2.6, 101.3)</td>
</tr>
<tr>
<td>≥13 Rx</td>
<td>28</td>
<td>72</td>
<td>51.6 (7.9, 344.6)</td>
</tr>
</tbody>
</table>

Reasons for Non-adherence

- Cost
- Inadequate education
- Fear of side effects (steroid phobia)
- Fear of dependency
- Cultural / family issues
- Depression

Improving Adherence

- No single strategy found to be effective
- Comprehensive interventions combining multiple strategies may be effective
Improving Adherence

- Tailor educational goals and messages to individual patients
- Self management programs
- Direct physician to patient discussion
- Feedback of adherence rates

Encouraging Adherence

- Optimal frequency unknown
- Repetition is important
- Open communication
- Open-ended questions
  - What worries you most about your asthma?
- Identify an asthma “partner”
Encouraging Adherence

• Underestimation of severity and overestimation of control associated with decreased adherence
• Inform patients “where they stand”

Encouraging Adherence

• Impact of stress, family disruption, anxiety and depression
• Use tools to formally assess
• Consider use of support groups
Encouraging Adherence

- Action plans need to:
  - Be simple to follow
  - Minimize # and frequency of meds
  - Dosing needs to fit patient’s routine
  - Consider affordability

Health Literacy

- 25% of people can’t read and understand basic written material
- 5th grade level or below
- Tailored education can overcome health illiteracy
Language Barrier

• If Spanish is the preferred language
  – 40% more likely to be nonadherent

Ethno-Cultural Factors

• Minorities often accept suboptimal control of asthma
• African Americans more likely to report distrust of health care system
Ethno-Cultural Factors

• >50% of low income/high risk, predominantly minorities believe “no symptoms, no asthma”
• Adherence 33% less in this group
• Adequate education may improve this

Ethno-Cultural Factors

• Latinos often classify diseases as “hot” or “cold”
• Asthma is “cold”, amenable to “hot” treatment
• Recommending taking meds with hot tea or water improves adherence
Ethno-Cultural Factors

• Dominicans believe medication overused in US
• Prefer folk remedy – “Zumos”

Ethno-Cultural Factors

• Be aware of potential barriers posed by ethno-cultural beliefs
• “In your community, what does having asthma mean?”
• Try to incorporate harmless or potentially beneficial remedies
Case Study

- 35 year old female
- Asthma for 15 years
- On albuterol prn only
- Minimal symptoms for years and rarely required albuterol
- Past 6 months – worsening symptoms requiring daily albuterol
Case Study

- Shortness of breath daily
- Nighttime awakening 3x/month
- Difficulty climbing 2 flights or carrying laundry
- Very limited with daily exercise
- FEV-1/FVC = 60%
- FEV-1 = 72%

Case Study

- Allergy skin tests positive to grass, dust mites and cats
- No allergic rhinitis symptoms
- No reflux symptoms
- Has had a cat for 3 years
### Classifying Severity & Initiating Treatment in Patients ≥ 12 Years Not Currently Taking Long-Term Controllers

#### Components of Severity

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Persistent</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-acting beta-agonist use for symptom control</td>
<td>≤ 2 days/week</td>
<td>≥ 2 days/week</td>
<td>Daily</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤ 2 times/month</td>
<td>&gt; 2 times/month</td>
<td>Occasionally</td>
</tr>
<tr>
<td>Lung function</td>
<td>FEV1 &lt; 60% predicted</td>
<td>FEV1 &lt; 80% predicted</td>
<td>FEV1/FVC reduced &gt; 20%</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Minor limitation</td>
<td>Severe limitation</td>
</tr>
</tbody>
</table>

#### Risk

<table>
<thead>
<tr>
<th>Exacerbations requiring OCS</th>
<th>≤ 2/year</th>
<th>≥ 2/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations multiplied by FEV1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Recommended Step for Initiating Therapy

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4 or 5</th>
<th>Step 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preferred:</td>
<td>Preferred:</td>
<td>Preferred:</td>
<td>Preferred:</td>
<td>Preferred:</td>
</tr>
<tr>
<td>SABA PRN</td>
<td>Low-Dose ICS</td>
<td>Medium-Dose ICS OR Low-dose ICS + LABA</td>
<td>High-Dose ICS + LABA</td>
<td>High-Dose ICS + LABA + Oral Corticosteroid</td>
</tr>
<tr>
<td>Cromolyn, Nedocromil, LTRA, or Theophylline</td>
<td>Low-Dose ICS and either LTRA, Theophylline, or Zileuton</td>
<td>Medium-Dose ICS and either LTRA, Theophylline, or Zileuton</td>
<td>Consider Omalizumab For Patients Who Have Allergies</td>
<td>Consider Omalizumab For Patients Who Have Allergies</td>
</tr>
</tbody>
</table>

#### Stepwise Approach for Managing Asthma in Youths ≥12 Years and Adults

### Intermittent

**Step 1** Preferred: SABA PRN

**Step 2** Preferred: Low-Dose ICS

**Step 3** Preferred: Medium-Dose ICS OR Low-dose ICS + LABA

**Step 4** Preferred: High-Dose ICS + LABA

**Step 5** Preferred: High-Dose ICS + LABA + Oral Corticosteroid

**Step 6** Preferred: High-Dose ICS + LABA + Oral Corticosteroid

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Case Study

• Additional recommendations
  – Albuterol pre-exercise
  – Dust mite avoidance strategies
  – Cat dander avoidance strategies
  – Discuss implications for pregnancy
  – Additional asthma education
  – Review social and ethno-cultural issues

Case Study

• 3 month follow-up visit
• Still daily dyspnea
• Nocturnal symptoms every night
• Using albuterol 2-3x/day
• Trouble walking from parking lot at work (level)
• Unable to exercise despite pretreatment with albuterol
Case Study

• Adherent with medication regimen
• Inhaler technique acceptable
• Using dust covers on mattress and pillow
• Not using hepa-filter vacuum
• Cat still in house but not in bedroom and being washed weekly

Case Study

• New onset acid reflux symptoms
• FEV-1 = 65%
• ACT score = 14
• IgE = 320
### Assessing Asthma Control and Adjusting Therapy in Patients ≥12 Years of Age

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Classification of Asthma Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well-Controlled</td>
</tr>
<tr>
<td>Impairment</td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤2x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>SABA use</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>FEV₁ or peak flow</td>
<td>≥80% predicted/ personal best</td>
</tr>
<tr>
<td>ATAQ</td>
<td>≤0.75</td>
</tr>
<tr>
<td>ACQ</td>
<td></td>
</tr>
<tr>
<td>ACT</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td>Exacerbations requiring OCS</td>
</tr>
<tr>
<td></td>
<td>Consider severity and interval since last exacerbation</td>
</tr>
</tbody>
</table>

### Stepwise Approach for Managing Asthma in Youths ≥12 Years and Adults

**Intermittent**

**Step 1**
- Preferred: SABA PRN

**Step 2**
- Preferred: Low-Dose ICS
- Alternative: Cromolyn, Nedocromil, LTRA, or Theophylline

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

**Step 4**
- Preferred: Medium-Dose ICS + LABA

**Step 5**
- Preferred: High-Dose ICS + LABA AND Omalizumab
- Consider Omalizumab For Patients Who Have Allergies

**Step 6**
- Preferred: High-Dose ICS + LABA + Oral Corticosteroid AND Omalizumab
- Consider Omalizumab For Patients Who Have Allergies

**Persistent Asthma: Daily Medication**

**Step 1**
- Preferred: SABA PRN

**Step 2**
- Preferred: Low-Dose ICS

**Step 3**
- Preferred: Medium-Dose ICS OR Low-dose ICS + LABA

**Step 4**
- Preferred: Medium-Dose ICS + LABA

**Step 5**
- Preferred: High-Dose ICS + LABA

**Step 6**
- Preferred: High-Dose ICS + LABA + Oral Corticosteroid

**Patient Education and Environmental Care**

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**Notes:**
- Risk: Progressive loss of lung function, Medication side effects vary in intensity.
Case Study

• Intensify dust mite avoidance
• Intensify cat dander avoidance
• Treat reflux
  – Medication
  – Diet / lifestyle
• Schedule follow-up

Thank You