Health Literacy
Asthma Action Plans
Asthma Case Studies

Webinar for
Michigan Center for Clinical Systems Improvement (Mi-CCSI)

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Overview

- Key Educational Messages
  - Health Literacy
  - Cultural Competency
- Asthma Action Plans
- Case Studies
Patient Education

The goal of all patient education is to help patients take the actions needed to control their asthma.
Key Educational Messages

Teach and reinforce at every opportunity these messages:

- Basic facts about asthma
  - Differences between the airways of those with and without asthma
  - Role of inflammation
  - What happens to the airways during an asthma attack
Key Educational Messages

- Role of Medications
  - Long-term control
    - Prevent symptoms, often by reducing inflammation
    - Must be taken daily
    - Do not expect them to provide quick relief
  - Quick-relief
    - SABAs relax airway muscles to provide quick relief
    - Do not expect them to provide long-term control
    - Using SABAs > 2 times/week indicates the need for starting or increasing long-term control
Key Educational Messages

- Patient Skills
  - Taking medications correctly
    - Inhaler technique and use of devices
  - Identifying and avoiding environmental exposures
    - Allergens
    - Irritants – including smoke
  - Self-monitoring
    - Assess level of control
    - Monitor symptoms + PEF
    - Recognizes early symptoms of worsening asthma
Key Educational Messages

Patient Skills (cont.)

– Using a written asthma action plan to know when and how to:
  ▪ Take daily actions to control asthma
  ▪ Adjust medications in response to worsening asthma

– Seeking medical care as appropriate
Simple Education??

- Basic facts about asthma
  - 3 items

- Role of medications
  - 2 items
  - Each with 3 sub-items

- Patient skills
  - 5 items
    - 8 sub-items with several sub-items

= 22 items!
How to approach education when there are many Items?

“Chunking”
- Basic facts about asthma
  - Differences between the airways of those with and without asthma
  - Role of inflammation
  - What happens to the airways during an asthma attack
- Build on life experiences
- Use problem-based learning
- Focus on “need to know”
- Deliver important messages up front and repeat at the end of the visit/call
How to approach education when concepts are complex?

- Orient to discernable human anatomy
- Use analogies
  - Titanic
  - Burn on skin
  - Airbag/seatbelt
- Relate to other life experiences
  - Diabetes, hypertension are “silent” but damage is occurring
What is Health Literacy?

- The ability to read, understand, and effectively use basic medical instructions and information. Low health literacy can affect anyone of any age, ethnicity, background or education level.

- People with low health literacy:
  - Often less likely to comply with prescribed treatment and self-care regimens
  - Fail to seek preventive care and are at higher (more than double) risk for hospitalization
What is Health Literacy?

- People with low health literacy:
  - Remain in the hospital nearly two days longer than adults with higher health literacy
  - Often require additional care that results in annual health care costs that are four times higher than those with higher literacy skills.
What health literacy is NOT…

Health literacy is NOT…

• Plain Language. Plain language is a technique for communicating clearly. It is one tool for improving health literacy.

• Cultural Competency. Cultural competency is the ability of professionals to work cross-culturally. It can contribute to health literacy by improving communication and building trust.
Health Literacy and Social Demands

- Health literacy is a function of individuals’ skills and social demands
- Sophisticated vocabulary
  - Legal jargon
  - Medical jargon
- Conceptual understanding of risks and benefits
- Use of scales and measures
- Decision making under unusual circumstances
- Comfort with asking questions (question authority)
- Offer informed consent

The Harvard School of Public Health: Health Literacy Studies Web Site.
http://www.hsph.harvard.edu/healthliteracy.
Why is Health Literacy Important?

- You may not know which patients have low health literacy because:
  - They are often embarrassed or ashamed to admit they have difficulty understanding health information and instructions.
  - They are using well-practiced coping mechanisms that effectively mask their problem.

- The average American reads at the 8th-9th grade level; however, health information is usually written at a higher reading level.
Why is Health Literacy Important?

- Most patients - regardless of their reading or language skills - prefer medical information that is simple and easy to understand.

- Additional factors that may hinder understanding include:
  - Intimidation, fear, vulnerability
  - Extenuating stress within the patient's family
  - Multiple health conditions to understand and treat
Why Is Health Literacy Important?

Health literacy is important because it affects people’s ability to:

- Navigate the healthcare system, including locating providers and services and filling out forms
- Share personal and health information with providers
- Engage in self-care and chronic disease management
- Adopt health-promoting behaviors, such as exercising and eating a healthy diet, taking daily medications
- Act on health-related news and announcements

These intermediate outcomes impact:

- Health outcomes
- Healthcare costs
- Quality of care
Measuring Health Literacy

- Health literacy is a new component of the 2003 National Assessment of Adult Literacy
  - First large-scale national assessment in the U.S.
  - National representative sample of more than 19,000 adults aged 16 and older in the United States
  - Contained health literacy component to establish baseline
Measuring Health Literacy

- Tasks used to measure health literacy were organized around three domains:
  - **Clinical**: Filling out a patient form
  - **Prevention**: Following guidelines for age-appropriate preventive health services
  - **Navigation of the healthcare system**: Understanding what a health insurance plan will pay for
Measuring Health Literacy

- **Proficient**: Can perform complex and challenging literacy activities.
- **Intermediate**: Can perform moderately challenging literacy activities.
- **Basic**: Can perform simple everyday literacy activities.
- **Below Basic**: Can perform no more than the most simple and concrete literacy activities.
- **Nonliterate in English**: Unable to complete a minimum number of screening tasks or could not be tested because did not speak English or Spanish.
Difficulty of Selected Health Literacy Tasks

**Below Basic**
- Circle the date of a medical appointment on a hospital appointment slip. (101)

**Basic**
- Give two reasons a person should be tested for a specific disease, based on information in a clearly written pamphlet. (202)

**Intermediate**
- Determine what time a person can take a prescription medication, based on information on the drug label that relates the timing of medication to eating. (253)

**Proficient**
- Calculate an employee’s share of health insurance costs for a year, using a table. (382)

Source: National Center for Education Statistics, Institute for Education Sciences
The Bottom Line

- Only 12 percent of adults have Proficient health literacy. In other words, nearly 9 out of 10 adults may lack the skills needed to manage their health and prevent disease.

- Fourteen percent of adults (30 million people) have Below Basic health literacy. These adults are more likely to report their health as poor (42 percent) and are more likely to lack health insurance (28 percent) than adults with Proficient health literacy.
Health Literacy and Health Outcomes

- Persons with limited health literacy skills have:
  - Higher utilization of treatment services
    - Hospitalization
    - Emergency services
  - Lower utilization of preventive services
- Higher utilization of treatment services results in higher healthcare costs.
Health Literacy and Shame

- People with limited health literacy often report feeling a sense of shame about their skill level.

- Individuals with poor literacy skills are often uncomfortable about being unable to read well, and they develop strategies to compensate.
Health Literacy Barriers

- **Foreign language**: Some words have several meanings – trigger, peak flow, scale, environment, normal, symptoms

- **Reading labels**: we rarely say “pass the sodium”

- **Informed Consent**: “I have discussed the likelihood of major risks or complications from this procedure (if applicable) but not limited to…”

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<td>Sugars 4g</td>
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<tr>
<td>Protein 25g</td>
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</table>
Health Literacy Barriers

- **Reading instructions:** “take one teaspoon by mouth”… can everyone recognize a teaspoon?

- **Pictures as tools?** One interpretation: “After exposure to radiation, it is important to consider that you may have mutated to gigantic dimensions; so watch your head…”
Health Literacy: What Can We Do?

Ask Me 3

- **Ask Me 3** promotes three simple but essential questions that patients should ask their providers in every health care interaction. Providers should always encourage their patients to understand the answers to:

1. What is my main problem?
2. What do I need to do?
3. Why is it important for me to do this?

Health Literacy: What Can We Do?

Teach Back Method

- Explain
- Assess
- Clarify
- Understanding
‘Teach Back’ For Patients with Diabetes

Audio taped visits – 74 patients, 38 physicians

- Patients recalled < 50% of new concepts
- Physicians assess recall 13% of time
- When physicians used “teach back,” the patient was 9X more likely to HbA1c levels below the mean
- Visits that assess recall were not longer

Schillinger, D. Arch Int Med., 2003
Begin with a Small Test of Change

- Use Teach Back with your last patient of the day
- See how it may disrupt your usual routine
- Record the number of times you identified misunderstandings
- Expand to 2 patients per day
- Begin to share with your colleagues
Please remember…

- According to the Institute of Medicine, nearly half of all American adults --90 million people-- have difficulty understanding and using health information.

- Everyone in the United States is susceptible regardless of age, race, education or income.

- Low health literacy costs the health system as much as $58 billion a year.
Asthma Action Plans
The Expert Panel recommends that clinicians provide to all patients who have asthma a written asthma action plan that includes instructions for
(1) daily management and
(2) recognizing and handling worsening asthma, including adjustment of dose of medications.
Written action plans are particularly recommended for patients who have
– moderate or severe persistent asthma,
– a history of severe exacerbations, or
– poorly controlled asthma.
NHLBI Asthma Guidelines (2007)

- Written asthma action plans may be based on PEF measurements or symptoms or both, depending on the preference of the patient and clinician.
- A peak-flow-based plan may be particularly useful for patients who have difficulty perceiving signs of worsening asthma.
Asthma Action Plans

- Green Zone
- Yellow Zone
- Red Zone

# Asthma Action Plan

<table>
<thead>
<tr>
<th>Name</th>
<th>Date</th>
<th>Doctor</th>
<th>Medical Record #</th>
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</table>

<table>
<thead>
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<th>Doctor's Office Phone #: Day</th>
<th>Night/Weekend</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Emergency Contact</th>
<th>Doctor's Signature</th>
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## GO

You have **all** of these:
- Breathing is good
- No cough or wheeze
- Sleep through the night
- Can work and play

Peak flow from ___ to ___

## CAUTION

You have **any** of these:
- First signs of a cold
- Exposure to known trigger
- Cough
  - Mild wheeze
  - Coughing at night
- Tight chest

Peak flow from ___ to ___

## DANGER

Your asthma is getting worse fast:
- Medicine is not helping
- Breathing is hard and fast
- Nose opens wide
- Ribs show
- Can’t talk well

Peak flow reading below ___

The Colors of a traffic light will help you use your asthma medicines.

**Green means Go Zone!**
Use preventive medicine.

**Yellow Means Caution Zone!**
Add quick-relief medicine.

**Red means Danger Zone!**
Get help from a doctor.

**Personal Best Peak Flow**

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## Use these daily preventive anti-inflammatory medicines:

<table>
<thead>
<tr>
<th>MEDICINE</th>
<th>HOW MUCH</th>
<th>HOW OFTEN/WHEN</th>
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<tbody>
<tr>
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</table>

For asthma with exercise, take:

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## Continue with green zone medicine and add:

<table>
<thead>
<tr>
<th>MEDICINE</th>
<th>HOW MUCH</th>
<th>HOW OFTEN/WHEN</th>
</tr>
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**CALL YOUR PRIMARY CARE PROVIDER.**

## Take these medicines and call your doctor now.

<table>
<thead>
<tr>
<th>MEDICINE</th>
<th>HOW MUCH</th>
<th>HOW OFTEN/WHEN</th>
</tr>
</thead>
<tbody>
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</table>

**GET HELP FROM A DOCTOR NOW!** Do not be afraid of causing a fuss. Your doctor will want to see you right away. It’s important! If you cannot contact your doctor, go directly to the emergency room. **DO NOT WAIT.**

Make an appointment with your primary care provider within two days of an ER visit or hospitalization.
Asthma Action Plans

- Green Zone
- Yellow Zone
- Red Zone
Green Zone

- List expectations for Well Controlled Asthma
  - Can list Peak Flow Meter Range (above 80%)
- List Controller Medication
- List Potential Triggers
“Rules of 2”

- Daytime symptoms > twice a week
- Night-time symptoms > twice a month
- Refill short-acting beta-agonist (SABA) inhaler > twice a year
“Rules of 2” - Expanded

- One or two bad days
- Daytime symptoms > twice a week
- Short-acting bronchodilator > twice a week
- Night-time symptoms > twice a month
- Need two or more SABA canisters in 1 year
- Need oral steroids two or more times in 1 year
# ASTHMA ACTION PLAN

**Name:**

**DOB:**

**Date:**

---

**GREEN ZONE**

*(Doing Well)*

- **STEP 1.** Monitor to see if your asthma is Well Controlled
  - Daytime symptoms: Less than or 2 times per week
  - Night-time symptoms: Less than or 2 times per month
  - Quick relief inhaler use: Less than 2 times per week
  - Oral steroid use: Less than 2 times in 12 months
  - Peak flow meter: _____ more than 80% normal

---

**YELLOW ZONE**

*(Think in 2's)*

- **STEP 1.** Monitor to see if your asthma is Not Well Controlled
  - Daytime symptoms: More than 2 times per week
  - Night-time symptoms: More than 2 times per month
  - Quick relief inhaler use: More than 2 times per week
  - Catch a cold: Within 1 - 2 days of viral infection
  - Peak flow meter: _____ only 50 - 80% normal

**Symptoms can include:**
- shortness of breath
- chest tightness
- wheezing
- cough

*If not controlled, make medication changes*  
*Go to Step 2*

- **STEP 2.** Use quick relief medication for fast improvement:
  - usual doses: 2 puffs or one neb every 4 hours as needed
  - higher doses: can use 2 - 4 - 6 puffs OR one neb every 20 minutes up to 3 times (up to 1 hour) then try to extend to every 4 hours

  If using higher doses and no better, then seek help — contact doctor, or go to the emergency room, or call 911!

- **STEP 3.** Even if better - change controller med:

---

**RED ZONE**

*(Danger Signs)*

- **STEP 1.** Monitor for severe symptoms
  - Cannot walk or talk or do activities due to breathing
  - Cannot sleep due to breathing
  - Lips or fingernails are blue
  - Peak flow meter: _____ less than 50% normal

- **STEP 2.** Use quick relief medication for fast improvement:
  - Can use 2 - 4 - 6 - 8 puffs or one neb every 20 minutes up to 3 times.

- **STEP 3.** Add oral steroid - Prednisone (______mg tablet)
  - _____ tablets = _____ mg once a day for _____ days

- **STEP 4.** Contact doctor, or go to the emergency room, or call 911!

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Template by  
Asthma Network of West Michigan  
Practitioner Name (please print)  
Phone Number  
Signature
Asthma Action Plans

- Green Zone
- Yellow Zone
- Red Zone
Red Zone

- List Severe Signs and Symptoms
- List Peak Flow Meter drop of 50% or more
- Use Quick Relief Medication
- Consider Oral Steroid
- List emergency contacts (doctor or ER or 911)
Short-Acting Beta-Agonist

Dosages for asthma exacerbations (MDI):
– Usual 2 puffs every 4 hours if needed
– Child 4-8 puffs every 20 minutes for 3 doses then every 1-4 hours as needed
– Adult 4-8 puffs every 20 minutes for 3 doses then every 1-4 hours as needed
Oral Corticosteroid

Prednisone

- Child range: 1-2 mg/kg/day for 3 to 10 days
  common: 1 mg/kg a day for 5-10 days

- Adult range: 40-80 mg/day for 5 to 10 days
  common: 40 mg a day for 5-10 days
Asthma Action Plans

But . . .

- Would like to avoid ER
- Would like to avoid oral steroids
Asthma Action Plans

- Green Zone
- Yellow Zone
- Red Zone
Yellow Zone

- Recognize Early Warning Signs (Step 1)
- Use Quick Relief Medication (Step 2)
- Escalate Controller Medication (Step 3)
- Add Oral Steroid if necessary (Step 4)
Recognize Early Warning Signs

- **Gradual Worsening**
  - exceeding the Rules of 2

- **Acute Worsening**
  - within 1 to 2 days if severe
  - first sign of viral infection

- **Peak Flow Meter Readings drop 20%**
Asthma Action Plans

- Assess/recognize early warning signs (Step 1)
- Quick Relief Medication (Step 2)
  - usually 2 puffs every 4 hours if needed
  - can use 4 to 8 puffs
  - can be every 20 minutes up to 1 hour (3 doses)
  - try to space to every 1 to 4 hours thereafter
    - In mild-to-moderate exacerbations, inhaler/spacer is as effective as nebulized therapy with appropriate administration technique and coaching by trained personnel.
Asthma Action Plans

- Controller Medication (Step 3)
  - if not already on inhaled steroid . . .
  - add inhaled steroid (medium to high dose) for 1 to 2 weeks
Asthma Action Plans

- Controller Medication (Step 3)
- if already on inhaled steroid . . .
- can increase inhaled steroid
  - double dose?
  - triple dose?
  - quadruple dose?
Asthma Action Plans - Review

- Doubling dose of inhaled steroid
  - typical clinical strategy
  - studies do not show this improves outcomes
  - are study designs flawed? Intervene too late?

- Quadrupling dose of inhaled steroid
  - studies indicate this can be effective
  - but should intervene early
Asthma Action Plans

- At least triple ICS dose
- Consider quadrupling dose of inhaled steroid
- Notes one study quintupled dose of ICS
- Increasing ICS and adding oral steroid is best
Asthma Action Plans - Review

- Quick reliever PRN (Step 2) – can use escalated doses

- Inhaled steroid dose (Step 3): Double / Triple / Quadruple / Quintuple

- Can proceed to oral steroids (Step 4) if not improving
ASTHMA ACTION PLAN
EXAMPLES
## ASTHMA ACTION PLAN

### GREEN ZONE

**(Doing Well)**

- **STEP 1.** Monitor to see if your asthma is **Well Controlled**
  - Daytime symptoms: Less than or 2 times per week
  - Night-time symptoms: Less than or 2 times per month
  - Quick relief inhaler use: Less than or 2 times per week
  - Oral steroid use: Less than 2 times in 12 months
  - Peak flow meter: ___ more than 80% normal

### YELLOW ZONE

**(Think in 2’s)**

- **STEP 1.** Monitor to see if your asthma is **Not Well Controlled**
  - Daytime symptoms: More than 2 times per week
  - Night-time symptoms: More than 2 times per month
  - Quick relief inhaler use: More than 2 times per week
  - Catch a cold: Within 1 - 2 days of viral infection
  - Peak flow meter: ___ only 50 - 80% normal

  **Symptoms can include:**
  - shortness of breath
  - chest tightness
  - wheezing
  - cough

  **If not controlled, make medication changes *****
  Go to Step 2

### RED ZONE

**(Danger Signs)**

- **STEP 1.** Monitor for severe symptoms
  - Cannot walk or talk or do activities due to breathing
  - Cannot sleep due to breathing
  - Lips or fingernails are blue
  - Peak flow meter: ___ less than 50% normal

- **STEP 2.** Use quick relief medication for fast improvement:

  **Short-acting Bronchodilator**

  - usual doses: 2 puffs or one neb every 4 hours as needed
  - higher doses: can use 2 - 4 - 6 puffs OR one neb every 20 minutes up to 3 times (up to 1 hour) then try to extend to every 4 hours
  - If using higher doses and no better, then seek help — contact doctor, or go to the emergency room, or call 911!

- **STEP 3.** Even if better - change controller med:
  - Inhaled Steroid (Beclomethasone)
    - 4 puffs — twice a day (For 1 - 2 weeks)

- **STEP 4.** If no improvement in 1 - 2 days:
  - Consider adding oral steroid ... Call Office
  - Prednisone (___ mg tablet) take with food
  - ___ tablets = ___ mg once a day for ___ days

- **STEP 2.** Use quick relief medication for fast improvement:

  **Short-acting Bronchodilator**

  Can use 2 - 4 - 6 - 8 puffs or one neb every 20 minutes up to 3 times.

- **STEP 3.** Add oral steroid - Prednisone (___ mg tablet)
  - ___ tablets = ___ mg once

- **STEP 4.** Contact doctor, or go to the emergency room, or call 911!
# Asthma Action Plan

**Name:**

**DOB:**

**Date:**

**Green Zone**

**Doing Well**

- **STEP 1.** Monitor to see if your asthma is Well Controlled
  - Daytime symptoms: Less than or 2 times per week
  - Night-time symptoms: Less than or 2 times per month
  - Quick relief inhaler use: Less than or 2 times per week
  - Oral steroid use: Less than 2 times in 12 months
  - Peak flow meter: More than 80% normal

**Yellow Zone**

**Think in 2’s**

- **STEP 1.** Monitor to see if your asthma is Not Well Controlled
  - Daytime symptoms: More than 2 times per week
  - Night-time symptoms: More than 2 times per month
  - Quick relief inhaler use: More than 2 times per week
  - Catch a cold: Within 1 - 2 days of viral infection
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  Symptoms can include:
  - Shortness of breath
  - Chest tightness
  - Wheezing
  - Cough

  **Note:** If not controlled, make medication changes.

- **STEP 2.** Use quick relief medication for fast improvement:
  - Usual doses: 2 puffs or one neb every 4 hours as needed
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- **STEP 3.** Even if better - change controller med:
  - Inhaled Steroid
  - 4 puffs = 2 to 4 times a day (for 1 - 2 weeks)

- **STEP 4.** If no improvement in 1 - 2 days:
  - Consider adding oral steroid ... OR ... Call Office
  - Prednisone (__) mg tablet(s) - take with food
  - 4 tablets = 40 mg once a day for 5 days

**Red Zone**

**Danger Signs**

- **STEP 1.** Monitor for severe symptoms
  - Cannot walk or talk or do activities due to breathing
  - Cannot sleep due to breathing
  - Lips or fingernails are blue
  - Peak flow meter: Less than 50% normal

- **STEP 2.** Use quick relief medication for fast improvement:
  - Short-acting Bronchodilator
  - Can use 2 - 4 - 6 - 8 puffs or one neb every 20 minutes up to 3 times.

- **STEP 3.** Add oral steroid - Prednisone (__) mg tablet(s)
  - 60 tablets = 600 mg once

- **STEP 4.** Contact doctor, or go to the emergency room, or call 911!
# ASTHMA ACTION PLAN

**Name:**

**DOB:**

**Date:**

---

**GREEN ZONE**

(Doing Well)

- **STEP 1.** Monitor to see if your asthma is Well Controlled
  - Daytime symptoms: Less than or 2 times per week
  - Night-time symptoms: Less than or 2 times per month
  - Quick relief inhaler use: Less than or 2 times per week
  - Oral steroid use: Less than 2 times in 12 months
  - Peak flow meter: more than 80% normal

- **STEP 2.** Use your controller medication every day
  - **Inhaled Steroid/Long-Acting BD**
    - 2 puffs - twice a day

---

**YELLOW ZONE**

(Think in 2’s)

- **STEP 1.** Monitor to see if your asthma is Not Well Controlled
  - Daytime symptoms: More than 2 times per week
  - Night-time symptoms: More than 2 times per month
  - Quick relief inhaler use: More than 2 times per week
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Symptoms can include:
- shortness of breath
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- cough

***** If not controlled, make medication changes *****
Go to Step 2

- **STEP 2.** Use quick relief medication for fast improvement:
  - **Short-acting Bronchodilator**
    - usual doses: 2 puffs or one neb every 4 hours as needed
    - higher doses: can use 2 - 4 - 6 puffs OR one neb every 20 minutes up to 3 times (up to 1 hour) then try to extend to every 4 hours

    If using higher doses and no better, then seek help — contact doctor, or go to the emergency room, or call 911!

- **STEP 3.** Even if better - change controller med:
  - continue **Inhaled Steroid/Long-Acting BD**
  - add **Inhaled Steroid** (for 1 - 2 weeks)
    - 2 puffs - 2 to 4 times a day

- **STEP 4.** If no improvement in 1 - 2 days:
  Consider adding oral steroid ... OR ... Call Office

  - Prednisone (10 mg tablet) - take with food
  - 4 tablets = 40 mg once a day for 5 days

---

**RED ZONE**

(Danger Signs)

- **STEP 1.** Monitor for severe symptoms
  - Cannot walk or talk or do activities due to breathing
  - Cannot sleep due to breathing
  - Lips or fingernails are blue
  - Peak flow meter: less than 50% normal

- **STEP 2.** Use quick relief medication for fast improvement:
  - **Short-acting Bronchodilator**

  Can use 2 - 4 - 6 - 8 puffs or one neb every 20 minutes up to 3 times.

- **STEP 3.** Add oral steroid - Prednisone (10 mg tablet)

  6 tablets = 60 mg once

- **STEP 4.** Contact doctor, or go to the emergency room, or call 911!
Asthma Action Plans are important . . . but should be part of a broader asthma education effort.

Every patient is different . . . Asthma Action Plans will be different . . . and may change over time.

How much should patients self-manage?
CASE STUDIES
Tyler

- Tyler is a two year old with a history of wheezing, frequent cough, and three emergency room visits for worsened respiratory symptoms last winter.
- At the first two emergency room visits, Tyler was treated with an antibiotic.
- At the last visit, he also was treated with albuterol.
- He was hospitalized in March with bronchiolitis which was culture-positive for infection with RSV (respiratory syncytial virus).
Tyler

- At discharge, Tyler's mother was provided with a nebulizer and was instructed to give him inhaled albuterol four times daily until the cough resolved. He was also given a 5-day course of oral steroids.
- Three months later, Tyler's cough has returned.
- He has just experienced another ER visit and is completing another course of oral steroids.
In children of this age it may be difficult to diagnose viral-induced wheezing.

Under-diagnosis of asthma is a common problem in children who wheeze only when they have a respiratory infection.

Often these children are misdiagnosed as having pneumonia, bronchitis, or bronchiolitis and receive antibiotics, but this is not the appropriate treatment.
High risk children (under age 3) who:

- have had ≥ 4 wheezing episodes in the past year that lasted more than one day and affected sleep are significantly more likely to have persistent asthma after the age of 5 if they have either (1) of the following:

  **One major criteria**
  - Parent with asthma
  - Physician diagnosis of atopic dermatitis
  - Evidence of sensitization to aeroallergens

  **OR**

  **Two minor criteria**
  - Evidence of sensitization to foods
  - ≥4 percent blood eosinophilia
  - Wheezing apart from colds

Asthma Predictive Index (API)

- Birth cohort followed through 13 years of age
- 76% of children diagnosed with asthma after 6 years of age had a positive asthma predictive index before 3 years of age.
- 97% of children who did not have asthma after 6 years of age had a negative asthma predictive index before 3 years of age.

Most asthma clinicians believe that a step-wise approach to treatment is the most effective.

The NHLBI guidelines recommend that patients <5 y/o with persistent asthma be treated with an inhaled anti-inflammatory medication routinely/daily and also receive a short-acting beta-agonist on an as needed basis.

Corticosteroids are the first line of treatment for persistent asthma.

Every child with asthma should have a prescription for a short-acting beta-agonist for use as needed.
# Asthma Diagnosis Tool

Consider the diagnosis of asthma if the patient states any of the following:

- Family history of asthma, allergies, or eczema
- Symptoms occur seasonally
- Symptoms when near chemicals, dusts, fumes at work
- Symptoms worsened by URI lasting longer than ten days, smoke, allergens, or exercise

**AND SPIROMETRY DEMONSTRATES OBSTRUCTION AND/OR REVERSIBILITY BY AN INCREASE IN FEV₁ OF 12% OR MORE AFTER BRONCHODILATOR.**

Rule out co-morbid conditions. If in doubt, consult with an asthma specialist.

## Highest Level of Checked Box = Severe Level

### Follow Severity Level Down to Find Treatment Step ➔ See Treatment Stepwise Approach

<table>
<thead>
<tr>
<th>Intermittent</th>
<th>Mild Persistent</th>
<th>Moderate Persistent</th>
<th>Severe Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms:</strong></td>
<td><strong>Symptoms:</strong></td>
<td><strong>Symptoms:</strong></td>
<td><strong>Symptoms:</strong></td>
</tr>
<tr>
<td>Less than 2x/week</td>
<td>More than 2x/week, not daily</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime Awakenings:</td>
<td>Nighttime Awakenings:</td>
<td>Nighttime Awakenings:</td>
<td>Nighttime Awakenings:</td>
</tr>
<tr>
<td>Less than 2x/month</td>
<td>About 1x/week, not nightly</td>
<td>About 1x/week, not nightly</td>
<td>More than 1x/week, often nightly</td>
</tr>
<tr>
<td>Interference w/Normal Activity:</td>
<td>Interference w/Normal Activity:</td>
<td>Interference w/Normal Activity:</td>
<td>Interference w/Normal Activity:</td>
</tr>
<tr>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>Short-Acting B₂-Agonist Use:</td>
<td>Short-Acting B₂-Agonist Use:</td>
<td>Short-Acting B₂-Agonist Use:</td>
<td>Short-Acting B₂-Agonist Use:</td>
</tr>
<tr>
<td>Less than 2days/week</td>
<td>More than 2 days/week but not daily or more than 1x/day</td>
<td>Daily</td>
<td>Several times/day</td>
</tr>
<tr>
<td><strong>Lung Function:</strong></td>
<td><strong>Lung Function:</strong></td>
<td><strong>Lung Function:</strong></td>
<td><strong>Lung Function:</strong></td>
</tr>
<tr>
<td>FEV₁ more than 80% pred.</td>
<td>FEV₁ more than 80% pred.</td>
<td>FEV₁ 60-80% pred.</td>
<td>FEV₁ less than 60% pred.</td>
</tr>
</tbody>
</table>

### Exacerbations Requiring Oral Steroids:
- All ages: 0-1/year
- Exacerbations of any severity may occur in patients in any severity category. Frequency and severity may fluctuate over time.

### Risk Factors:
- Age 0-4: more than 2 in 6 months or more than 4 wheezing episodes/year; last more than 1 day

### Treatment Step:
- **All ages: Step 1**
- **All ages: Step 2**
- **All Ages: Step 3**: consider short course oral steroids option
- **Age 0-4**: Step 3; short course oral steroids option
- **Age 5-11**: Step 3; Step 4 short course oral steroids option
- **Age 12+**: Step 4 or 5; short course oral steroids option

### Treatment for Persistent Asthma:
- Daily inhaled steroids (see treatment stepwise approach)
- Assess response within 2-6 weeks

### For All Patients with Asthma:
- Rescue medication for all ages; all severity levels: Short-acting B₂-agonist PRN. Treatment intensity depends on symptom severity.
- Provide written Asthma Action Plan
- Identify & avoid triggers
- Flu vaccine recommended annually, pneumococcal vaccine for adults
- Review correct device technique each visit

Reference: National Heart, Lung, and Blood Institute’s Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma 2007, NIH Publication 07-4051. This tool was adapted from Washington Asthma Initiative materials.
# Stepwise Approach to Managing Asthma

## Intermittent Asthma

**Persistent Asthma: Daily Medication**

- **Step up** as indicated although address possible poor adherence to medication. Re-assess in 2 to 6 weeks.

- **Step down** if well controlled and re-assess in 3 months. If very stable then assess control every 3 to 6 months.

All LABAs and combination agents containing LABAs have a black box warning.

### Step 1 (all ages)

- **(Short-acting beta-agonist)** (e.g. albuterol, etc.)
- If used more than 2 days per week (other than for exercise) consider inadequate control and the need to step up treatment.

### Step 2

- **ALL AGES**
  - Preferred: Low-dose inhaled steroid
  - Alternative: Leukotriene blocker or cromolyn

- **AGE 0-4 YRS**
  - Consider referral (especially if diagnosis is in doubt)

- **AGE 5-11 YRS**
  - Low-dose inhaled steroid + long-acting beta agonist or leukotriene blocker or Medium-dose inhaled steroid

- **AGE 0-4 YRS**
  - Medium-dose inhaled steroid + refmal

### Step 3

- **AGE 12+ YRS**
  - Preferred: Medium-dose inhaled steroid + long-acting beta agonist
  - Alternative: Medium-dose inhaled steroid + leukotriene blocker

### Step 4

- **AGE 12+ YRS**
  - High-dose inhaled steroid + long-acting beta agonist
  - Alternative: Medium-dose inhaled steroid + leukotriene blocker

### Step 5

- **AGE 5-11 YRS**
  - Preferred: Medium-dose inhaled steroid + long-acting beta agonist
  - Alternative: Medium-dose inhaled steroid + leukotriene blocker

- **AGE 5-11 YRS**
  - Same as 12+ yrs

### Step 6

- **AGE 12+ YRS**
  - High-dose inhaled steroid + oral steroid
  - And— Consider omalizumab if allergic

- **AGE 5-11 YRS**
  - High-dose inhaled steroid + oral steroid
  - Alternative: High-dose inhaled steroid + leukotriene blocker + oral steroid

**RESOLVE MEDICATION:** Short-acting beta-agonist (e.g. albuterol) as needed for symptoms. Treatment intensity depends on symptom severity. Frequent or increasing use of rescue medication may indicate inadequate control and the need to step up treatment.

Consult with asthma specialist.
Tyler

- Everyone who cares for Tyler needs to receive instructions, demonstration and return demonstration addressing how, when and which medicines are to be provided to him.
- Develop an asthma action plan that is shared with all of his caregivers.
- Review inhaler/spacer technique (with face mask) and oral rinse.
What are the long-term effects of daily medication on growth and puberty?

- The long-term effects of daily medication on growth and puberty are still being studied but we know that under-treatment or poorly treated asthma itself may suppress growth.
- Treatment with corticosteroids both oral and inhaled have been shown to impact growth.
Questions - Tyler

- The goals of asthma therapy are to have patients be on the lowest possible dose of the least number of medications.
- Controlling asthma is the primary goal.
- Most asthma experts believe if treatment is initiated early and at the appropriate doses, growth and puberty will not be significantly impacted.
- The potential small risk of adverse effects on linear growth from the use of inhaled steroids is well balanced by their efficacy.
Sharona is a 15-year-old high school sophomore with asthma.

Sharona was well, with the "usual colds," until the age of six. She then began having more lower respiratory tract illnesses.

Though she improved during the spring and summer, she developed sneezing, coughing, along with chest tightness, shortness of breath with exercise, and wheezing 4 to 5 days a week in the early fall.

These symptoms persist through the winter months.
Sharona

- Sharona uses an albuterol inhaler at least twice a day, when she "needs" it.

- She has an inhaler that she was supposed to use 2 times a day which was prescribed by her previous doctor, but she "forgets" to use it.

- Sharona tells you that her albuterol inhaler "works" and the other didn't when she used it.

- She used to participate in sports at school but quit because she "got too tired."

- Sharona admits that she is awakened by coughing two nights a week and more often if her family uses their fireplace.
In addition, she coughs when she visits her girlfriend's house where there is a cat.

ACT score is 17. Sharona’s asthma is “Not Well Controlled.”

Both her daytime symptoms and nighttime symptoms, as well as ACT score, fall into that category.

She, like all patients with asthma, should be assigned to the category that demonstrates the most severe findings.

Her asthma is triggered by seasonal allergen exposure and possibly by other perennial allergens, which need to be more precisely identified.
<table>
<thead>
<tr>
<th>WELL CONTROLLED</th>
<th>NOT WELL CONTROLLED</th>
<th>VERY POORLY CONTROLLED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SYMPTOMS:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ 2/day/week or less, not more than once per day</td>
<td>☐ More than 2 days/week or multiple times on 2 days/week or less</td>
<td>☐ Throughout the day</td>
</tr>
<tr>
<td><strong>NIGHTTIME AWAKENINGS:</strong></td>
<td>☐ No more than once/month</td>
<td>☐ Ages 0-4: More than once/month</td>
</tr>
<tr>
<td>☐ No more than once/month</td>
<td>☐ Ages 5-11: 2 times/month or more</td>
<td>☐ Ages 0-4: More than once/week</td>
</tr>
<tr>
<td><strong>INTERFERENCE WITH NORMAL ACTIVITY:</strong></td>
<td>☐ None</td>
<td>☐ Ages 5-11: 2 times/week or more</td>
</tr>
<tr>
<td>☐ None</td>
<td>☐ Age 12 &amp; over: 1-3 times/week</td>
<td>☐ Age 12 &amp; over: 4 times/week or more</td>
</tr>
<tr>
<td><strong>SHORT-ACTING B2-AGONIST USE:</strong></td>
<td>☐ 2 days/week or less</td>
<td>☐ Extremely limited</td>
</tr>
<tr>
<td>☐ 2 days/week or less</td>
<td>☐ Some limitation</td>
<td>☐ Several times/day</td>
</tr>
<tr>
<td><strong>FEV1 OR PEAK FLOW:</strong></td>
<td>☐ Age 5 &amp; over: More than 80% predicted, personal best</td>
<td>☐ FEV1 or PEAK FLOW:</td>
</tr>
<tr>
<td>☐ Age 5 &amp; over: More than 80% predicted, personal best</td>
<td>☐ FEV1 or PEAK FLOW:</td>
<td>☐ Age 5 &amp; over: Less than 60% predicted, personal best</td>
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<tr>
<td><strong>FEV1/FVC:</strong></td>
<td>☐ Age 5 &amp; over: 60-80% predicted/personal best</td>
<td>☐ FEV1/FVC:</td>
</tr>
<tr>
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<td>☐ Age 5 &amp; over: less than 75%</td>
<td>☐ Age 5 &amp; over:</td>
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<tr>
<td><strong>ACT SCORE:</strong></td>
<td>☐ 16-19</td>
<td>☐ 15 or less</td>
</tr>
<tr>
<td>☐ 20 or more</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RISK**

<table>
<thead>
<tr>
<th>EXACERBATIONS REQUIRING ORAL STEROIDS</th>
<th>EXACERBATIONS REQUIRING ORAL STEROIDS</th>
<th>EXACERBATIONS REQUIRING ORAL STEROIDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ All ages: 0-1/year</td>
<td>☐ Age 0-4: 2-3/year</td>
<td>☐ Age 0-4: More than 3/year</td>
</tr>
<tr>
<td>☐ Age 5 &amp; over: More than 2/year; consider severity</td>
<td>☐ Age 5 &amp; over: More than 2/year; consider severity</td>
<td>☐ Age 5 &amp; over: More than 2/year; consider severity</td>
</tr>
</tbody>
</table>

**TREATMENT STEP**

- Maintain current step
- ☐ Check adherence & environmental control
- Step up 1 step and assess response in 2-6 weeks
- ☐ Check adherence & environmental control
- Consider short course of oral corticosteroids
- Consider comorbid conditions
- Step up 1-2 steps and assess response in 2 weeks
- For side effects, consider alternative treatment options
- Rescue medication for all ages, all severity/control levels: Short-acting B2-agonist PRN. Treatment intensity depends on symptom severity.
- Provide written Asthma Action Plan; review/update
- Spirometry annually for age 5 & over
- Ru vaccine recommended annually, pneumococcal vaccine for adults
- Consider referral to a specialist if not well controlled within 3-6 months using stepwise approach OR 2 or more ED visits or hospitalizations for asthma in a year.

Reference: National Heart, Lung, and Blood Institute’s Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma 2007, NIH Publication 07-4051. This tool was adapted from Washington Asthma Initiative materials.
**STEPWISE APPROACH TO MANAGING ASTHMA**

**Persistent Asthma: Daily Medication**

- **Step up** as indicated although address possible poor adherence to medication. Re-assess in 2 to 6 weeks.
- **Step down** if well controlled and re-assess in 3 months. If very stable then assess control every 3 to 6 months.

*All LABAs and combination agents containing LABAs have a black box warning.*

### Intermittent Asthma

#### STEP 1 (all ages)
- **Short-acting beta-agonist (e.g., albuterol as needed)**
- If used more than 2 days per week (other than for rescue) consider inadequate control and the need to step up treatment.

#### STEP 2
- **AGE 0-4 YRS**
  - Consider referral (especially if diagnosis is in doubt).

#### STEP 3
- **AGE 0-4 YRS**
  - Medium-dose inhaled steroid + leukotriene blocker + referral
- **AGE 4-11 YRS**
  - Medium-dose inhaled steroid + leukotriene blocker
- **AGE 12+ YRS**
  - High-dose inhaled steroid + long-acting beta agonist + oral steroid

#### STEP 4
- **AGE 0-4 YRS**
  - Medium-dose inhaled steroid + either long-acting beta-agonist or leukotriene blocker
- **AGE 4-11 YRS**
  - Medium-dose inhaled steroid + either long-acting beta-agonist or leukotriene blocker
- **AGE 12+ YRS**
  - High-dose inhaled steroid + leukotriene blocker + oral steroid

#### STEP 5
- **AGE 0-4 YRS**
  - Medium-dose inhaled steroid + either long-acting beta-agonist or leukotriene blocker
- **AGE 4-11 YRS**
  - Medium-dose inhaled steroid + either long-acting beta-agonist or leukotriene blocker
- **AGE 12+ YRS**
  - High-dose inhaled steroid + leukotriene blocker + oral steroid

#### STEP 6
- **AGE 12+ YRS**
  - High-dose inhaled steroid + long-acting beta agonist + oral steroid
  - And—Consider omalizumab if allergies

**RESOLUTION MEDICATION**
- Short-acting beta-agonist (e.g., albuterol) as needed for symptoms. Treatment intensity depends on symptom severity. Frequent or increasing use of rescue medication may indicate inadequate control and the need to step up treatment.
Will I have to take this medication for the rest of my life? Will I get addicted?

- Asthma is a disease that comes and goes, but it cannot be cured.
- By treating asthma aggressively with anti-inflammatory therapy, it may be prevented from getting worse.
- Current recommendations are that therapy should be reduced once symptoms come under control, so we will continually attempt to lower your dose and possibly even stop your medications once control is achieved.
Questions - Sharona

- In many children with asthma, asthma can improve as they get older, so in general, we would expect your asthma to improve over time.

- Asthma medications are not addicting and taking them does not make your asthma worse or more dependent on taking medication.

- Once the medications reduce the inflammation in your airways, you will likely need less medication.
I've heard that steroids are bad for me.

- Any drugs are bad for you if taken in excessive doses, however, the steroids you may be referring to are systemic corticosteroids or steroids used for muscle building.
- The inhaled corticosteroids avoid systemic effects by directing the anti-inflammatory effect to the lungs.
- Once absorbed from the lungs, they are quickly broken down and inactivated. If taken in very large doses they can produce bad effects.
- Using a spacer device will decrease the amount of drug that is swallowed with each dose and also reduce systemic activity.
Sharona

- She is non-adherent, possibly related to her age, and she has a poor understanding of asthma and its management.
- Non-allergic triggers also appear to present such as smoke exposure.
- Based upon the NHLBI guidelines, consider referral for consultation to an allergy/asthma specialist, which can help improve care through appropriate testing to identify allergens and other environmental factors that worsen Sharona's asthma.
Questions?

- Call: 616-685-1432
- E-mail: meyersok@mercyhealth.com