This care process model (CPM) was created by the Intermountain Healthcare’s Primary Care and Pediatric Specialty Clinical Programs. It summarizes clinical literature and provides expert advice regarding the diagnosis and management of asthma in pediatric and adult patients. This update builds on previous versions of Intermountain’s CPM as well as on the Global Initiative for Asthma (GINA): 2015 Global Strategy for Asthma Management and Prevention. 

**What’s new IN THIS UPDATE?**

Intermountain’s model remains closely aligned with the 2007 EPR-3 guidelines, but includes recent recommendations from the 2015 Global Initiative for Asthma (GINA) 2015 update. In addition to updated information on medication (see pages 6 to 9) and patient and provider tools (see page 16), this 2016 update:

- **Simplifies treatment by streamlining assessment of symptom control and risk.**
  - Includes a 4 question survey simplifies diagnosis of exacerbation and control over a 4-week period.
  - Clarifies risk factors for poor asthma outcomes

- **Provides an improved clinical decision support process,** including an ideal asthma visit for primary care providers and a suggested clinic workflow.

- **Clarifies the recommended minimal inhaled corticosteroid dose required to achieve control of asthma.**

**GOALS & MEASURES**

This CPM is part of a comprehensive care management system for asthma; its overall goal is to help providers deliver the best clinical care in a consistent and integrated way. In pursuit of this goal, we measure the following within the Intermountain system:

- **For all asthma patients:**
  - Controller use
  - Beta-agonist use
  - Spirometry (within previous 2 years)
  - Inpatient admissions and ED visits for asthma

- **For inpatient pediatric patients:**
  - In-hospital use of short-acting beta-agonists, oral steroids, and ipratropium bromide
  - Documentation of patients’ degree of chronic control, medication usage, and stepwise therapy before and after discharge
  - Provision of appropriate patient and family education
ALGORITHM: SUMMARY OF ASTHMA MANAGEMENT

Patient presents with respiratory s/sx suggesting asthma.

- Take medical history. (a)
- Perform physical exam. (b)

Key indicators of asthma? (c)
- If necessary, ORDER ADDITIONAL STUDIES — further pulmonary function testing, bronchoprovocation, chest X-ray, etc. — to rule out alternate diagnoses (e).
- PERFORM Spirometry (d)

Asthma diagnosis? (e)
- no
- yes

Patient already on long-term control medication?
- no
- yes

TREATMENT
- Provide medication, and consult as necessary, using the stepwise approach and medication dosing recommendations tailored to each age group. See page 6.
- Manage asthma triggers. See page 12.
- Assess smoking status in household. See page 10.
- Educate patient and family. See page 16.

Follow up.
- Assess control 2 to 6 weeks after treatment initiation.

Step up or down.
- Adjust therapy as needed based on asthma control.

Assess control and adjust therapy as needed per age group.
- See page 7.
- Continue follow-up. See page 9.

Control is the goal — but not the end — of asthma treatment. Asthma is highly variable over time and therapy may need to be adjusted (stepped up if necessary, stepped down when possible). Monitor asthma control regularly.

Asthma is a common chronic inflammatory disease of the airways characterized by variable and recurring symptoms, reversible airflow obstruction, and bronchospasm. NIH
(a) Medical history.

Address these items:

Symptoms and symptom patterns, including profile of typical exacerbation. Symptoms vary from person to person. Common symptoms include:
- Cough
- Wheezing
- Shortness of breath
- Chest tightness
- Sputum production
- Fatigue and avoidance of physical activity

Common symptom patterns include:
- Symptoms are worse at night or on morning wakening.
- Symptoms are episodic, sometimes seasonal.
- Symptoms occur/worsen in presence of triggers (see right).

Impact of symptoms on patient and family, patient/family perception of disease.

Family and social history. A family history of asthma is a risk factor for asthma.

(b) Physical exam.

Focus on:  

Respiratory tract
- Sounds of wheezing during normal breathing
- Prolonged phase of forced exhalation
- Increased nasal secretion, mucosal swelling, or nasal polyps (nasal polyps are also seen with cystic fibrosis)

Chest
- Hyperexpansion of the thorax

Skin
- Atopic dermatitis, eczema, or any other manifestation of an allergic skin condition

(c) Key indicators of asthma. Presence of multiple indicators increases the probability of asthma. Spirometry is usually needed to establish a diagnosis of asthma.

Consider a diagnosis of asthma and perform spirometry (ages ≥ 5 years) with any of these indicators*:

Expiratory wheezing — high-pitched whistling sounds when breathing out — especially in children. (Lack of wheezing and a normal chest examination do not exclude asthma.)

History of any of the following:
- Cough, worse particularly at night
- Recurrent wheeze
- Recurrent difficulty in breathing
- Recurrent chest tightness

Symptoms occur or worsen at night, awakening the patient

Symptoms occur or worsen in the presence of triggers (see list in (a) above)

*Note: Eczema, hay fever, and a family history of asthma or atopic diseases are often associated with asthma, but they are not key indicators.

(d) Pulmonary Function Testing: spirometry and exhaled nitric oxide (eNO) measurement. See page 16 for outpatient spirometry sites.

Spirometry (FVC, FEV₁, and FEV₁/FVC) and spirometry findings:

Use with all patients age ≥ 5 years:
- At diagnosis: before and after the patient inhales a short-acting bronchodilator (order “spirometry with and without a bronchodilator”)
- To evaluate level of control and response to treatment (order spirometry)
- At least every 1 to 2 years to ensure patients are not losing lung function at an accelerated rate

Note that results are strongly dependent on several factors, particularly the effort/ability of the patient and skill of the technician at each attempt.

Findings of the measures can suggest:
- Airway obstruction: a reduction in the values for both the FEV₁ and the FEV₁/FVC (or FEV₁/FVC) relative to reference or predicted values.
- Significant reversibility: an increase in FEV₁ of >200 mL and ≥12 percent from the baseline measure after inhalation of a short-acting bronchodilator (e.g., albuterol 90 mcg. 2 to 4 puffs). Some studies suggest that an increase >10% from predicted FEV₁, after inhalation of short-acting bronchodilator may be less subject to bias than measuring percent change from baseline and may help differentiate asthma and COPD.

Risk of future exacerbations: measures of this domain of asthma severity differ according to patient’s age. See treatment summaries, pages 4 to 9.

Exhaled nitric oxide testing is an inexpensive and useful complement to spirometry that can be used with patients of all ages:
- To identify lung inflammation (help diagnose asthma)
- To assess whether inhaled corticosteroids will be effective
- To determine whether patient is taking medication

(e) Alternate diagnoses. See EPR-3* for more information on diagnostic challenges and assessing alternate diagnoses. (*See reference list for this CPM.)

Infants and children:

Obstructive airway diseases:
- Allergic rhinitis and sinusitis

Obstructions involving large airways:
- Foreign body in trachea or bronchus
- Vocal cord dysfunction
- Vascular rings or laryngeal webs
- Laryngotracheomalacia, tracheal stenosis, or bronchoptenosis
- Enlarged lymph nodes or tumor

Obstructions involving small airways:
- Viral bronchiolitis or obliterator bronchiolitis
- Cystic fibrosis
- Bronchopulmonary dysplasia
- Heart disease

Other causes:
- Recurrent cough not due to asthma
- Aspiration from swallowing mechanism dysfunction or gastroesophageal reflux

Adults:

Obstructive airway diseases:
- Allergic rhinitis and sinusitis

Obstructions involving large airways:
- Foreign body in trachea or bronchus
- Vocal cord dysfunction
- Vascular rings or laryngeal webs
- Laryngotracheomalacia, tracheal stenosis, or bronchoptenosis
- Enlarged lymph nodes or tumor

Obstructions involving small airways:
- Viral bronchiolitis or obliterator bronchiolitis
- Cystic fibrosis
- Bronchopulmonary dysplasia
- Heart disease

Other causes:
- Recurrent cough not due to asthma
- Aspiration from swallowing mechanism dysfunction or gastroesophageal reflux

(f) Asthma diagnosis: to establish a diagnosis of asthma, the assessment must indicate the following:

1. episodic symptoms of airflow obstruction or airway hyperresponsiveness (a)
2. airflow obstruction is at least partially reversible (d)
3. alternative diagnoses excluded (e)
### ASSESSMENT OF ASTHMA CONTROL

When determining levels of asthma control, the provider must assess both symptom control and the patient’s risk for future flare-ups.

Asthma symptom control in children 5 years and younger is sometimes difficult to define, as the leading source of information is usually from family members and caregivers. Often, they are unaware of, or cannot adequately describe the frequency and intensity of symptoms.

In addition, many children and adolescents with poorly controlled asthma avoid physical activities, so their asthma may appear well-controlled. A thorough assessment is important in this age group as inactivity can lead to poor fitness and obesity.

Dyspnea is often not reported or recognized, and more frequent use of rescue medicines may not always be noticed by parents and caregivers. Parents and caregivers may not understand that certain behaviors, such as irritability, tiredness, and moodiness, often signal poorly controlled asthma. Therefore, the assessment must be conducted with both the child’s and parent’s observations in mind.

#### TABLE 1: GINA assessment of asthma control in children ≤ 5 years

<table>
<thead>
<tr>
<th>Asthma symptom control</th>
<th>Level of asthma symptom control</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the past 4 weeks, has the child had:</td>
<td></td>
</tr>
<tr>
<td>• Daytime asthma symptoms more than a few minutes, more than once per week?</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>• Any activity limitation due to asthma? (Runs or plays less than other children? Tires easily during walks and play?)</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>• Reliever medication needed more than once per week</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>• Any night waking or night coughing due to asthma?</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td></td>
<td>Well controlled</td>
</tr>
<tr>
<td></td>
<td>None of these</td>
</tr>
</tbody>
</table>

#### TABLE 2: GINA assessment of asthma control in children ≥ 6 years, adolescents, and adults

<table>
<thead>
<tr>
<th>Asthma symptom control</th>
<th>Level of asthma symptom control</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the past 4 weeks, has the patient had:</td>
<td></td>
</tr>
<tr>
<td>• Daytime asthma symptoms more than twice/week?</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>• Any night waking due to asthma?</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>• Reliever needed for symptoms more than twice/week, except for during exercise?</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td>• Any activity limitation due to asthma?</td>
<td>Yes ☐ No ☐</td>
</tr>
<tr>
<td></td>
<td>Well controlled</td>
</tr>
<tr>
<td></td>
<td>None of these</td>
</tr>
</tbody>
</table>
PROVIDER GUIDE TO ASTHMA MANAGEMENT

Asthma management workflow

- Review the patient’s health and medication needs over the previous 4 weeks, using the assessment tool on page 4.

- If the patient is assessed as “partly controlled” or “uncontrolled,” identify any risk factors that may be causing the exacerbation, fixed airflow limitation, or side effects. (See list on page 9.)

- Measure lung function. Spirometry is recommended at diagnosis or start of treatment, 3 to 6 months after starting controller medications, and then every 1 to 2 years, or with worsening clinical symptoms. (See page 13.)

- Ascertain the patient’s current treatment step as illustrated on page 6. Ask patient to demonstrate their inhaler technique to determine adherence to best practice. Note side effects, if any.

- Determine whether the patient and/or family or caregiver has a written asthma action plan and if the patient and/or family understands how to use it.

- Discuss the patient’s and/or family’s goals and attitudes concerning asthma management. Determine barriers to compliance, if they exist.

- Review ongoing health concerns, such as gastroesophageal reflex disease (GERD), obesity, obstructive sleep apnea (OSA), depression, anxiety, and rhinosinusitis or rhinitis, as these conditions can exacerbate asthma symptoms, and lead to poor asthma control.

Diagnosis
Symptom control and risk factors (including lung function)
Inhaler technique & adherence
Patient preference

Asthma Medications
Non-pharmacological strategies
Treat modifiable risk factors

RECOMMENDED STEPS FOR ASTHMA OFFICE VISIT

- Assess control and adjust therapy as needed
  - Depending on severity, assess asthma control in 2 to 6 weeks after medication is initiated or stepped up. If no clear benefit is observed in 2 to 6 weeks. If slight improvement (but more needed), wait another 1 to 2 weeks to gauge improvement. If still not ideal, consider adjusting therapy or an alternative diagnosis.
  
  Note that the two domains of severity — impairment and risk — may respond differently to treatment.

- Prescribe or adjust medications according to the stepwise chart on page 6.

- Provide recommended immunizations. Refer to Intermountain’s preventive care guidelines:
  - Children 0 to 10 years
  - Adolescents 11 to 18 years
  - Adults 19 and older

- Manage triggers.
  - Explore any changes to the patient’s environment (tobacco, pets, etc).
  - Have allergy testing on all patients with ongoing asthma.
  - Consider subcutaneous allergen immunotherapy (allergy shots) for patients with allergic asthma treated at steps 2 to 4 on the stepwise chart shown on page 6.

- Educate the patient and family.
  - Use the teach back method to educate all families and patients with asthma. Provide a written asthma action plan. See page 16 for information and resources.
TREATMENT SUMMARY

Provide medication, and consult or refer as necessary

• Initiate therapy based on presenting symptoms.
  
  – **Begin with Step 2** if: a. Level of asthma symptom control is “partly controlled”, or b. Asthma symptoms are infrequent but the patient has one or more risk factors for exacerbation, consider starting with step 2.
  
  – **Begin with Step 3 or 4** if asthma is “uncontrolled”.

  – **If initial asthma presentation is uncontrolled and severe**, especially with an acute exacerbation, consider a short course of oral corticosteroids and begin with step 4 or 5.

• Adjust therapy based on asthma control. (Go up one step if “partly controlled.” Go up one or two steps if “uncontrolled.”)

### Asthma and pregnancy

Asthma is among the most common potentially serious medical problems in pregnant women. If asthma is well controlled during pregnancy, it is not a significant risk to the mother or fetus. However, uncontrolled asthma can cause serious complications to the mother, including high blood pressure, toxemia, premature delivery, and even death in rare circumstances. Uncontrolled asthma can also cause complications for the baby, including risk of stillbirth, fetal growth retardation, premature birth, low birth weight, and a low APGAR score at birth.\(^{1}\)

Most medications, including albuterol, LABAs, inhaled steroids, and even oral steroids, can be used during pregnancy and breastfeeding. OB providers should routinely assess asthma control throughout pregnancy and should consider evaluating women with moderate-to-severe or uncontrolled asthma with serial ultrasounds to monitor fetal growth.
### MEDICATION RECOMMENDATIONS BY AGE GROUP

Teach and reinforce proper technique for nebulizers and other delivery devices. If a mask is used with the nebulizer, make sure that the mask fits snugly against the child’s face; do NOT use the “blow-by” method. For step-by-step instructions and photos, refer the family to pages 42 and 43 of the *Breathing Easier with Asthma* patient booklet.

#### TABLE 3: Medication recommendations, patients 0 to 5 years

<table>
<thead>
<tr>
<th>Inhaled Corticosteroids (ICS)</th>
<th>0 to 5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mild</td>
</tr>
<tr>
<td>fluticasone (Flovent), MDI 44, 110, or 220 mcg</td>
<td>1 to 2 inhalations (44 mcg) twice a day</td>
</tr>
<tr>
<td>budesonide (Pulmicort), respules 0.25 mg/2.0 mL, 0.5 mg/ 2.0 mL, or 1.0 mg/2.0 mL</td>
<td>1 respule (0.25) twice a day</td>
</tr>
</tbody>
</table>

#### TABLE 4: Medication recommendations, patients 6 to 11 years

<table>
<thead>
<tr>
<th>Inhaled Corticosteroids (ICS)</th>
<th>6 to 11 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mild</td>
</tr>
<tr>
<td>fluticasone (Flovent), MDI 44, 110, or 220 mcg</td>
<td>1 to 2 inhalations (44 mcg) twice a day</td>
</tr>
<tr>
<td>fluticasone (Flovent Diskus), DPI 50, 100, 250 mcg</td>
<td>1 inhalation (50 mcg) twice a day</td>
</tr>
<tr>
<td>budesonide (Pulmicort Flexhaler), DPI 90 or 180 mcg</td>
<td>2 inhalations (90 mcg) twice a day or 1 inhalation (180 mcg) twice a day</td>
</tr>
<tr>
<td>budesonide (Pulmicort), respules 0.25 mg/2.0 mL, 0.5 mg/2.0 mL, or 1.0 mg/2.0 mL</td>
<td>1 respule (0.25) twice a day</td>
</tr>
<tr>
<td>beclomethasone (QVAR) MDI 40 or 80 mcg</td>
<td>1 to 2 inhalations (40 mcg) twice a day or 1 inhalation (80 mcg) twice a day</td>
</tr>
<tr>
<td>flunisolide (Aerospan), MDI 80 mcg</td>
<td>1 inhalation (80 mcg) twice a day</td>
</tr>
</tbody>
</table>

#### TABLE 4: Medication recommendations, patients 12 years to adult

<table>
<thead>
<tr>
<th>Inhaled Corticosteroids (ICS)</th>
<th>12 years to adult</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mild</td>
</tr>
<tr>
<td>fluticasone (Flovent), MDI 44, 110, or 220 mcg</td>
<td>1 to 3 inhalations (44 mcg) twice a day or 1 inhalation (110mcg) twice a day</td>
</tr>
<tr>
<td>fluticasone (Flovent Diskus), DPI 50, 100, or 250 mcg</td>
<td>1 inhalation (100 mcg) twice a day</td>
</tr>
<tr>
<td>fluticasone furoate (Arnuity Ellipta), DPI 100 or 200 mcg</td>
<td>1 inhalation (100 mcg) twice a day</td>
</tr>
<tr>
<td>budesonide (Pulmicort Flexhaler), DPI 90 or 180 mcg</td>
<td>12-17 years: 1 inhalation (180 mcg) twice a day 18 + years: 1 inhalation (180 mcg) twice a day</td>
</tr>
<tr>
<td>beclomethasone (QVAR), MDI 40 or 80 mcg</td>
<td>1 to 2 inhalations (40 mcg) twice a day or 1 inhalation (80 mcg) twice a day</td>
</tr>
<tr>
<td>mometasone (Asmanex), DPI 110 or 220 mcg</td>
<td>2 inhalations (110 mcg) once a day or 1 inhalation (220 mcg) once a day</td>
</tr>
<tr>
<td>mometasone (Asmanex), HFA 100 or 200 mcg HFA inhaler</td>
<td>1 inhalation (100 mcg) twice a day</td>
</tr>
<tr>
<td>cicleosonide (Alvesco), MDI 80 or 160 mcg inhaler</td>
<td>1 inhalation (80 mcg) twice a day</td>
</tr>
<tr>
<td>flunisolide (Aerospan), MDI 80 mcg</td>
<td>2 inhalations (80 mcg) twice a day</td>
</tr>
</tbody>
</table>
Medication tables

Asthma medications are grouped into two general categories:

- **Long-term control medications**, used to achieve and maintain control of persistent asthma.
- **Quick-relief medications**, used to treat symptoms and exacerbations.

The table below lists the medications in each category; the table below gives low, medium, and high doses for inhaled corticosteroids, the mainstay of long-term control medication for asthma in all age groups.

### TABLE 6: Medications for long-term control

<table>
<thead>
<tr>
<th>Class</th>
<th>generic (Brand name) medications, delivery method (metered-dose inhaler [MDI], dry-powder inhaler [DPI], nebulizer, oral or injected med.)</th>
<th>tier*</th>
<th>cost†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>inhaled corticosteroids (ICS)</strong></td>
<td><strong>Inhaled corticosteroids are the cornerstone of treatment for patients with persistent asthma.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• fluticasone (Flovent), MDI</td>
<td>2</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>• budesonide (Pulmicort), DPI</td>
<td>2</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>• fluticasone furoate (Arnuity Ellipta), DPI</td>
<td>2</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>• budesonide (Pulmicort), nebulizer respules</td>
<td>1</td>
<td>$$$$$</td>
<td></td>
</tr>
<tr>
<td>• mometasone (Asmanex), DPI, MDI</td>
<td>2</td>
<td>$$$$$</td>
<td></td>
</tr>
<tr>
<td>• beclomethasone (Qvar), MDI</td>
<td>2</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>• ciclesonide (Alvesco), MDI</td>
<td>3</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>• flunisonide (Aerospan), MDI</td>
<td>3</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td><strong>long-acting beta2-agonists (LABAs)</strong></td>
<td>FDA “black box”: LABAs should NOT be used as monotherapy or to treat sudden/worse wheezing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• salmeterol (Serevent), DPI</td>
<td>2</td>
<td>$$$$$</td>
<td></td>
</tr>
<tr>
<td>• formoterol (Foradil), DPI</td>
<td>3</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td><strong>combinations:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ICS + LABA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• budesonide/formoterol (Symbicort), MDI</td>
<td>2</td>
<td>$$$$$</td>
<td></td>
</tr>
<tr>
<td>• mometasone/formoterol (Dulera), DPI</td>
<td>2</td>
<td>$$$$$</td>
<td></td>
</tr>
<tr>
<td>• fluticasone/salmeterol (Advair), DPI, MDI</td>
<td>3</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td>• fluticasone/vilanterol (Breo), DPI</td>
<td>3</td>
<td>$$$$</td>
<td></td>
</tr>
<tr>
<td><strong>leukotriene receptor antagonist (LTRA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• montelukast (Singulair), oral</td>
<td>1</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td><strong>long-acting antimuscarinic (LAMA)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• tiotropium (Spiiva Respimat)</td>
<td>2</td>
<td>$$$$$</td>
<td></td>
</tr>
<tr>
<td><strong>IgE blocker</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• omalizumab (Xolair), injected</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*tier: Tier 1 = $5-$10 copay; Tier 2 = $30 copay to 50% coinsurance; Tier 3 = $50 copay to 50% coinsurance (based on SelectMed benefit design; designs may differ. For the most recent SelectHealth formulary information, visit selecthealth.org or call 801-442-4912 or 800-442-3129.

†cost: Estimated monthly cost based on usual dose. $ = $1 to $25; $5 = $26 to $75; $$$$ = $76 to $150; $$$$$ = $150 to $300; $$$$$$ ≥ $300

### TABLE 7: Medications for quick relief of symptoms, treatment of serious exacerbations

<table>
<thead>
<tr>
<th>Class</th>
<th>generic (Brand name) medications, delivery method (metered-dose inhaler [MDI], dry-powder inhaler [DPI], nebulizer, oral or injected med.)</th>
<th>tier*</th>
<th>cost†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>inhaled short-acting beta2-agonists</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>(SABAs)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• albuterol</td>
<td></td>
<td>1</td>
<td>$</td>
</tr>
<tr>
<td>• Nebulized albuter (Ventolin HFA, ProAir)</td>
<td></td>
<td>2</td>
<td>$</td>
</tr>
<tr>
<td>• Proventil HFA, ProAir RespClick, DPI</td>
<td></td>
<td>3</td>
<td>$$$</td>
</tr>
<tr>
<td>• levalbuterol (Xopenex)</td>
<td></td>
<td>2</td>
<td>$</td>
</tr>
<tr>
<td>• Nebulized levalbuterol (Xopenex HFA)</td>
<td></td>
<td>3</td>
<td>$$$</td>
</tr>
<tr>
<td>• Xopenex respules</td>
<td></td>
<td>3</td>
<td>$$$</td>
</tr>
<tr>
<td><strong>anticholinergics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• ipratropium bromide (Atrovent), MDI</td>
<td></td>
<td>3</td>
<td>$$$$$</td>
</tr>
<tr>
<td><strong>systemic corticosteroids</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• dexamethasone (Decadron), oral</td>
<td></td>
<td>1</td>
<td>$</td>
</tr>
<tr>
<td>• prednisone (Deltasone, Meticorten, Orasone), oral</td>
<td>1</td>
<td>$</td>
<td></td>
</tr>
<tr>
<td>• prednisolone (Oraled, Delta-Cortef), oral</td>
<td>1</td>
<td>$$$</td>
<td></td>
</tr>
<tr>
<td>• methylprednisolone (Medrol, Solu-Medrol), oral</td>
<td>1</td>
<td>$$$</td>
<td></td>
</tr>
</tbody>
</table>

*tier: Tier 1 = $5-$10 copay; Tier 2 = $30 copay to 50% coinsurance; Tier 3 = $50 copay to 50% coinsurance (based on SelectMed benefit design; designs may differ. For the most recent SelectHealth formulary information, visit selecthealth.org or call 801-442-4912 or 800-442-3129.

†cost: Estimated monthly cost based on usual dose. $ = $1 to $25; $5 = $26 to $75; $$$$ = $76 to $150; $$$$$ = $150 to $300; $$$$$$ ≥ $300
FOLLOW-UP

It’s important to see patients for follow-up when they are well — not just when they have a cold, flu, exacerbation, etc. — to determine asthma control. Have allergy testing done on patients with ongoing asthma. Other guidelines and issues include:

• Frequency and timing of follow-up:
  – 2 to 6 weeks: depending on severity, meet with newly treated patients (or with patients whose treatment has been stepped up) to assess control and response to treatment.
  – Every 1 to 6 months: once asthma control is achieved, meet to ensure continued control. Monitor for appropriate growth for those on medium- and high-dose ICS (see “growth retardation” bullet below). Consider 3-month visit intervals if a step-down in therapy is anticipated.
  – At least every 1 to 2 years: with all asthma patients, monitor asthma control, assess lung function with spirometry, update vaccines, and reinforce asthma education. See page 16 for a list of Intermountain sites with outpatient spirometry and asthma education resources.

• Referral to an asthma specialist. Referral to an asthma specialist — usually a fellowship-trained allergist or pulmonologist, or a physician with special training and experience in asthma management — is appropriate in the circumstances listed at right. ACAAI The ACAAI (American College of Allergy, Asthma, and Immunology) recently documented improved care in many settings by allergists. BUN Often these specialists are better able to identify specific triggers and successfully promote adherence to treatment.

• Management of possible complications associated with corticosteroids.
  In general, the potential for adverse effects must be weighed against the risk of uncontrolled asthma. KEL To date, evidence supports the use of inhaled corticosteroids, especially at low and medium doses, even with the risk of these complications:
  – Dysphonia and candidiasis. As prevention, patients should use a spacer with MDI, then rinse the mouth with water and spit the rinse after each set of inhalations.
  – Growth retardation. Growth monitoring of children on ICS (especially if on medium or high doses) is recommended as part of routine asthma follow-up every 3 to 6 months.
  – Osteoporosis. Osteoporosis risk factors should be evaluated in all patients taking steroids. Adults taking medium- to high-dose corticosteroids (from all sources) should have height measured at least once per year. All patients taking continuous systemic corticosteroids should receive preventive therapy for osteoporosis.
  – Cataracts. The use of high-dose ICS (as well as systemic corticosteroids) has been associated with the development of cataracts after many years of use. However, cataracts occur more frequently in patients taking oral corticosteroids, and once the confounding effect of the use of oral corticosteroids is removed, there is no consistent evidence that use of inhaled corticosteroids increases the risk of developing cataracts.

WHEN TO REFER

This CPM recommends referral to a specialist in any of the following circumstances:

• Patient is ages 0 to 5 and is being treated on step 3 or higher; consider consulting with an asthma expert for patients in this age group being treated at step 2.

• Patient is ages 6 to adult and is being treated on step 4 or higher; consider consulting with an asthma expert for patients in this age group being treated at step 3.

• Patient has had a life-threatening exacerbation.

• Patient is not meeting goals of therapy after 3 to 6 months of treatment.

• Patient with chronic asthma has not had allergy testing to evaluate for triggers.

• Signs or symptoms are atypical, or there are problems in differential diagnosis.

• Additional diagnostic testing is indicated (bronchoscopy, etc.).

• Other conditions or factors complicate asthma or its diagnosis (nasal polyps, COPD, history of occupational or environmental trigger, etc.).

• Patient needs additional education and guidance to comply with treatment.
TOBACCO SMOKE AND ASTHMA

Nearly one quarter of adults with asthma who live in developed countries smoke cigarettes. Cigarette smoking and exposure to tobacco smoke are known to cause more severe symptoms and the development of fixed airflow limitations in those with asthma.

For patients who smoke or are exposed to secondhand smoke in the household, workplace, or otherwise, consider the following:

- Consider a higher dose of ICS if asthma is poorly-controlled
- Encourage the patient or family member to quit smoking
- Provide advice and refer to Intermountain’s smoking cessation guide, Quitting Tobacco: Your Journey to Freedom. Other resources include these programs:
  - Way to Quit
    - www.waytoquit.org
    - 1-800-QUIT-NOW
  - Truth Initiative
    - truthinitiative.org
  - Quit for Life
    - www.quitnow.net
  - SmokeFreeTxt
    - http://smokefree.gov/smokefreetxt
- If possible, encourage the patient to seek employment in a location where exposure to smoke, fumes, and inhalants are minimal or non existent. Direct them to Workforce Services of Utah or call 211 for information on additional community resources.

RISK FACTORS FOR POOR ASTHMA OUTCOMES

Assess risk factors at diagnosis and periodically, particularly for patients experiencing exacerbations. Measure FEV₁ at start of treatment, after 3 to 6 months of controller treatment to record the patient’s personal best lung function, then periodically for ongoing risk assessment.

‘Independent’ risk factors are those that are significant after adjustment for the level of symptom control. Poor symptom control and exacerbation risk should not be simply combined numerically, as they may have different causes and may need different treatment strategies.

Potentially modifiable independent risk factors for flare-ups

Having one or more of these risk factors increases the risk of exacerbations, even if symptoms are well-controlled.

- Prior ED visit or hospitalization
- Ever intubated or in intensive care unit for asthma
- One or more severe exacerbation in last 12 months
- Uncontrolled asthma symptoms
- High SABA use (with increased mortality if using more than one 200-dose canister per month)
- Inadequate ICS. (ICS not prescribed, poor adherence, or incorrect inhaler technique)
- Low FEV₁, especially if < 60% predicted
- Major psychological or socioeconomic problems
- Exposures, including tobacco smoke (see sidebar on left), pollution, and poor air quality; allergen exposure if sensitized
- Comorbidities, including obesity, rhinosinusitis, or confirmed food allergy
- Sputum or blood eosinophilia
- Pregnancy

Risk factors for developing fixed airflow limitation

- Lack of ICS treatment
- Exposures, including tobacco smoke (see sidebar on left), pollution and poor air quality, noxious chemicals and/or occupational exposures
- Low initial FEV₁, chronic mucus hypersecretion, sputum or blood eosinophilia

Risk factors for medication side-effects

- Systemic: frequent OCS; long term, high dose and/or potent ICS; also taking P450 inhibitors
- Local: high-dose or potent ICS; poor inhaler technique
**TREATING MODIFIABLE RISK FACTORS**

Consider the following treatment strategies for any patient with one or more risk factors for exacerbation (including poor symptom control):

- Check inhaler technique and adherence frequently
- Ensure patient is prescribed regular ICS-containing controller
- Ensure patient has a written action plan appropriate for their health literacy
- Review more frequently than low-risk patients
- Check inhaler technique and adherence frequently
- Identify any modifiable risk factors.

For any patient with one or more severe exacerbations in the past year:

- Consider alternative controller regimens to reduce exacerbation risk, e.g. ICS/LABA maintenance and reliever regimen
- Consider stepping up treatment if no modifiable risk factors
- Identify any avoidable triggers for exacerbations

For patients with Low FEV1, especially if <60% predicted:

- Consider trial of 3 months’ treatment with high-dose ICS and/or 2 weeks’ OCS
- Exclude other lung disease, e.g. COPD
- Refer to an asthma specialist if no improvement

For adults with a BMI > 30 with or children who have a BMI > 85th percentile:

- Refer patient and family to a registered dietitian nutritionist (RDN) or to Intermountain’s Weigh to Health program for nutritional counseling
- Distinguish asthma symptoms from symptoms due to inactivity and deconditioning, mechanical restriction, and/or sleep apnea.

For patients with additional psychosocial risk factors or suspected mental health conditions:

- Arrange for a mental health assessment
- Help patients distinguish between symptoms of anxiety and asthma and refer to a MHI specialist for education on how to manage panic attacks.

For patients facing socioeconomic challenges:

- Identify and prescribe the most cost-effective ICS-based regimen.
- Connect the patient and family or caregivers with appropriate community resources via the 211 resource line.

Refer patients with confirmed food allergies to an registered dietitian nutritionist for dietary counseling and prescribe injectable epinephrine.

When treating patients with allergies:

- Instruct the patient, family, and/or caregivers on simple avoidance strategies. This is the most cost-effective treatment.
- Consider stepping up controller treatment. The efficacy of allergen immunotherapy in asthma is limited.

For patients with sputum eosinophilia, increase ICS dose, independent of level of symptom control.

---

**OBESITY AND ASTHMA**

While obesity is associated with alterations of lung volume, reduced peripheral airway diameter, and inflammation to a limited degree, the prevalence of sleep-related breathing disorders and GERD are well-documented in individuals with increased BMI.

For these reasons, it is recommended that the provider consult the Lifestyle and Weight Management CPM for Children and Adolescents or the Lifestyle and Weight Management CPM for Adults to determine relevant interventions. It is also recommended to refer to Intermountain’s Weigh to Health program, as appropriate.

**Building your team**

- Find a registered dietitian nutritionist (RDN): [intermountainhealthcare.org/services/nutrition-services/locations/](intermountainhealthcare.org/services/nutrition-services/locations/)
- Primary Children’s Hospital Nutrition Services (801) 662-1601 [intermountainhealthcare.org/locations/primary-childrens-hospital/medical-services/nutrition-services/](intermountainhealthcare.org/locations/primary-childrens-hospital/medical-services/nutrition-services/)
### More on Immunotherapy

For more information on immunotherapy, see *Allergen Immunotherapy: A Practice Parameter*, available online at: www.jcaai.org

This evidence-based primer was written jointly by the AAAAI (American Academy of Allergy, Asthma, and Immunology) and the ACAAI, and was endorsed by the American Academy of Pediatrics.

### Teaching About Triggers

To help your patients identify and avoid their triggers, refer them to the relevant pages in the Breathing Easier booklet or to the individual fact sheet handout on this topic. Both contain a chart of common triggers and tips to avoid them. See page 16 of this CPM for a full list of resources for patient education.

### Assess for GERD

Symptoms of GERD are common in both children and adults with asthma. Studies of both adults and adolescents have shown that treatment of GERD improves symptoms. For this reason, this CPM recommends that for patients with poorly controlled asthma (particularly with nocturnal symptoms), GERD should be investigated even in the absence of suggestive symptoms.

**GERD (Gastroesophageal Reflux Disease)**

**for adults**

**Gastroesophageal Reflux Disease (GERD)**

**for children**

### Trigger Management

Helping patients identify and avoid asthma triggers will go a long way in helping them maintain control of their asthma. Encourage patients to keep a record of their symptoms, noting the dates and times of symptoms as well as where they were and what they were doing. Once triggers have been identified, help your patients take steps to reduce or eliminate them in their environment — at home, at school, or at work.

Note that the response to any of the triggers discussed here will vary greatly from one patient to another — and that patients may not be sensitive to a particular trigger all of the time.

#### Airborne irritants

Airborne irritants include smoke (tobacco or wood), emissions from wood-burning stoves and kerosene heaters, and fumes from chemicals, perfumes, and sprays.

#### Allergens

Most patients with ongoing asthma should have allergy testing. Common allergens are listed in the table below. When allergies are suspected or known asthma triggers, consider:

- Referring to an allergist. See the referral guidelines on page 15.
- Immunotherapy. Consider immunotherapy when:
  - There is clear evidence of an allergic response to an allergen.
  - Symptoms occur all year, or during most of the year.
  - Pharmacologic management has not adequately controlled symptoms.

### Common allergens

| **Animal dander.** Cat and dog allergens (plus those from other furred animals) are significant indoor inducers of asthma. Note that even when the pet is removed, significant reduction in allergens can take months to years. |
| **Pollens.** Pollens from trees, weeds, and grass are usually seasonal. If asthma symptoms are seasonal and primarily better in the winter months, it’s a strong indication that asthma is primarily due to pollens. |
| **Molds.** Patients exposed to molds are 80% more likely to develop asthma symptoms. In many homes, high outdoor mold counts result in high indoor mold counts. Swamp coolers and water damage can also lead to high indoor mold counts. Once infested, parts of the home will likely need to be replaced to get rid of the mold. |
| **Foods and food additives.** Although it’s not common for food allergies to trigger asthma, it does happen — most often in very young children. Usual culprits include eggs, milk, wheat, soy, and peanuts. Also problematic are sulfites in processed foods and drinks (e.g., dried fruits, fruit juices, vegetables, and wines). |
| **Dust mites and cockroaches.** These are not as prevalent in the Intermountain West, as compared with other areas of the country. However, dust mites can thrive in homes that use swamp coolers and/or humidifiers. |
Respiratory infections

Respiratory tract infections — bronchitis, sinusitis, colds, influenza, and other viral illnesses — are common asthma triggers. Also, such illnesses tend to last longer in asthma patients. Improved control of symptoms has been shown to improve asthma without an increase in asthma medications. Pneumococcal vaccines and yearly flu vaccines are helpful preventatives. For pneumococcal vaccination recommendations, see the sidebar at right.

Exercise

A substantial proportion of patients with asthma will experience either shortness of breath, cough, or wheezing in response to exercise. This exercise-induced bronchoconstriction (EIB) can limit participation in sports and activities. Randomized clinical trials show the following:

- Although exercise can result in bronchoconstriction in many asthmatic patients, it does not cause asthma or worsen existing asthma.
- Regular treatment with inhaled corticosteroids may reduce the severity of EIB by more than 50%. Leukotriene receptor antagonists provide long-lasting partial protection against EIB that does not appear to be lost with regular treatment.
- Pre-treatment with an inhaled, short-acting beta-agonist may prevent EIB.
- Prolonged regular use of short- or long-acting beta-agonists, without concomitant use of a controller, can reduce ability to prevent EIB.

Other asthma triggers

The following may also contribute to asthma exacerbations:

- **Medical comorbidities** such as sleep apnea, obesity, and GERD (gastroesophageal reflux disease). See information on GERD in left column.
- **Medications** such as aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), antibiotics, and beta blockers are among the most common medications that cause worsening asthma.
- **Strong emotions and emotional reactions**, for example anger, fear, and stress, as well as crying, laughing, or other reactions that change breathing patterns.
- **Weather conditions**, including both very humid and very dry climates as well as temperature changes.

Asthma and air quality

The Air Quality and Health Team, under the guidance of Intermountain LiVe Well and the Office of the Sustainability, developed the Outdoor Air Quality and Health care process model (CPM) to provide evidence-based guidelines on the health effects of air quality. It is primarily intended to help providers counsel patients about outdoor physical activity when air quality is poor. The Team recommends using the following fact sheets as education for any asthma diagnosis:
SUGGESTED CLINICAL WORKFLOW

Preliminary
- All clinicians to review the Asthma Care Process Model
- All clinicians, care managers, medical assistants, nurses, and health advocates to read and be familiar with the patient education booklet Breathing Easier with Asthma.

Front Desk role
- If patient is reporting shortness of breath, loud wheezing, or severe asthma exacerbation, refer caller to nurse or MD to assist in determining the urgency of the situation.
- When scheduling, give high priority to acute visits for asthma exacerbation. If no same-day appointments are available, the request must be reviewed by the physician.
- Ask the patient to bring their current asthma medications, inhalers, spacer, peak flow meter, and records of home peak flow readings (if using a peak flow meter).
- Give patient or parent the Asthma Control Test (ACT) to fill out while waiting.
- Schedule additional asthma visits per the schedule on page 9.

Triage
- Direct patient to use their Asthma Action Plan to help stabilize their condition.
- Schedule a visit if medications do not relieve the exacerbation, if symptoms are worsening, or if the patient has complicating factors, such as fever, pneumonia, influenza, etc.
- Determine how urgently the patient needs to be seen (immediately or later in the day) and schedule a visit. If no same-day appointments are available, the request must be reviewed by the physician.

Nurse/MA role
- Check and record weight and height on every visit if not done within the last 6 months or if a child is using inhaled corticosteroids.
- Check and record oxygen (O₂) saturation levels, heart rate, respiratory rate, blood pressure, and temperature (if ill).
- Notify physician if O₂ saturation levels are < 88%, or if the patient appears to be in distress.
- Prepare growth chart for visits in pediatric clinic.
- Collect the ACT test from the patient and enter it into the EMR.
- Identify the most recent influenza and/or pneumococcal vaccine.
- Check peak flow before and after albuterol treatment if the patient brought their own or wishes to obtain a peak flow meter. Record peak flow results in the EMR.
- Determine if the patient needs medication refills, a holding chamber, or a peak flow meter.
- Provide the Breathing Easier with Asthma booklet to patient and/or parent if they have not already received one.
- Use teach back technique to educate on MDI and peak flow meter use as needed.

Care Management Team
- Review daily schedules. Identify patients with asthma on problem list. Note date of last PFT’s.
- Complete pre-visit planning. Include last PFT date, asthma bundle data, specialist if any. Notify provider prior to appointment.
- Meet with high risk patients as ordered by physician. Help with identifying triggers, improving compliance with controller medications.
- Use teach back techniques to review and educate patient and family on asthma action plan, MDI use, peak flow meter technique, etc, as ordered by physician.
- Work asthma reports to identify patients overdue for follow up. Calls patients with characteristics listed below; sends reminder postcards if unable to reach by phone.
  - 1 year since last asthma visit
  - ER visit or hospitalization since last visit
  - 2 years since last spirometry / PFTs
  - Low controller reliever ratio or high beta agonist use
SPIROMETRY

Findings from the medical history and physical exam may reveal key indicators for asthma. The presence of multiple key indicators increases the probability of an asthma diagnosis. Yet in most cases, spirometry is also needed to establish a diagnosis of asthma.

Spirometry measures, such as FEV₁, FVC, and FEV₁/FVC ratio play an important role in both the diagnosis and treatment of asthma. Taken before and after the patient inhales a short-acting bronchodilator, such measures help determine whether there is airflow obstruction and whether it is reversible over the short term.

Indications for spirometry

Spirometry should be performed at the following times:

- **At the time of diagnosis**, to confirm a diagnosis or rule out other causes of symptoms.

- **When you want to establish that treatment is optimized** by allowing you to gauge a patient’s response to treatment.

- **At least every 1 to 2 years** to assess control and assure patients are not losing lung function at an accelerated rate.

Spirometry measures

A useful and simple test of spirometry is the measurement of a forced expiration. Measures commonly used in asthma care include the following:

- **FEV₁**: The volume expired in the first second is called the forced expiratory volume in one second (FEV₁).

- **FVC**: The total volume exhaled is the forced vital capacity (FVC).

- **FEV₁/FVC ratio**: This ratio gives the percent of the total breath that is exhaled in one second. A low FEV₁/FVC ratio is the primary indicator of the presence of airway obstruction.

The figure below shows the spirometry record obtained from a 23-year-old healthy male when he inspires maximally and exhales as hard and completely as he can.*

*Tracing and graph reprinted with permission from Baum et al.

SPIROMETRY VS. PEAK FLOW

For diagnostic purposes, **spirometry** is generally recommended over measurement of **peak expiratory flow (PEF)** using a peak flow meter. Results from peak flow meters are highly effort-dependent, and thus more variable than those from spirometry.

In addition, there are no correct normal values available for peak flow meter models sold in the U.S. The values represented by manufacturers are approximate (they will likely be within 20%).

A measurement that is related to the FEV₁ is the **forced expiratory flow, or the FEF**. This is the average flow measured over the middle half of expiration. Generally, the FEF25-75% is closely related to the FEV₁. In children, however, the FEF25-75% is sometimes reduced even when the FEV₁ is normal. Therefore, this test may be helpful in a pediatric population, but is not recommended for adults.
PATIENT AND PROVIDER RESOURCES

These resources are available to Intermountain-employed and affiliated clinicians.

Provider resources

- Asthma topic webpage, available at intermountain.net/clinicalprograms. Access to asthma forms and tools for use in your clinic.
- QuickGuide to Asthma Control: Best Practice Flash Cards. Aligned with this CPM and EPR-3 recommendations present control charts.
- Asthma Questionnaire. Helps clinicians assess asthma control and guides treatment recommendations. (Developed for pediatric inpatients.)
- Guidelines for managing pediatric inpatients hospitalized for acute asthma exacerbations.
- Albuterol treatment
- Albuterol weaning

Patient education

- Breathing Easier with Asthma booklet. Explains asthma, how it’s diagnosed, and what patients can do to control it. In English and Spanish.
- Asthma Action Plan. Available separately as a triplicate form, and also included in the Breathing Easier patient booklet. In English and Spanish.
- Asthma Control Test (ACT). Pediatric and adult version available online and also included in the Breathing Easier patient booklet. In English and Spanish.
- Handouts (Fact Sheets, Let’s Talk About…). Handouts targeting specific asthma education topics such as Inhaled Corticosteroid Use, MDI Technique, Nebulizer Use, and Symptoms and Triggers. See information on GERD and Air Quality on pages 12 and 13. In English and Spanish.

Spirometry and asthma education at Intermountain facilities

<table>
<thead>
<tr>
<th>Site</th>
<th>Outpatient spirometry?</th>
<th>Phone for spirometry</th>
<th>Asthma education?</th>
<th>Phone for asthma education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cassia Regional Medical Center</td>
<td>Yes; 8 &amp; older</td>
<td>208-677-6535</td>
<td>Yes</td>
<td>208-677-6535</td>
</tr>
<tr>
<td>Logan Regional Hospital</td>
<td>Yes; 7 &amp; older</td>
<td>435-716-5386</td>
<td>Yes, Inpatient only</td>
<td>435-716-5386</td>
</tr>
<tr>
<td>McKay-Dee Hospital</td>
<td>Yes; 8 &amp; older</td>
<td>801-387-3075</td>
<td>Yes</td>
<td>801-387-3075</td>
</tr>
<tr>
<td>Salt Lake Clinic</td>
<td>Yes; 5 &amp; older</td>
<td>385-282-2750</td>
<td>Yes</td>
<td>385-282-2750</td>
</tr>
<tr>
<td>LDS Hospital</td>
<td>Yes; 16 &amp; older</td>
<td>801-408-2150</td>
<td>Yes</td>
<td>801-408-2150</td>
</tr>
<tr>
<td>Intermountain Medical Center</td>
<td>Yes; 18 &amp; older</td>
<td>801-507-4000</td>
<td>Yes, Inpatient only</td>
<td>801-507-4634</td>
</tr>
<tr>
<td>Primary Children’s Hospital</td>
<td>Yes; 5 &amp; older</td>
<td>801-662-1765</td>
<td>Yes</td>
<td>801-662-1765</td>
</tr>
<tr>
<td>Riverton Hospital</td>
<td>Yes; 16 &amp; older</td>
<td>801-408-1781</td>
<td>Yes</td>
<td>801-408-1781</td>
</tr>
<tr>
<td>Alta View Hospital</td>
<td>Yes; 16 &amp; older</td>
<td>801-408-1781</td>
<td>Yes</td>
<td>801-408-1781</td>
</tr>
<tr>
<td>American Fork Hospital</td>
<td>Yes; 6 &amp; older</td>
<td>801-855-3593</td>
<td>Yes</td>
<td>801-855-3593</td>
</tr>
<tr>
<td>Utah Valley Regional Medical Center</td>
<td>Yes; 8 &amp; older</td>
<td>801-357-3930</td>
<td>Yes</td>
<td>801-357-3930</td>
</tr>
<tr>
<td>Sanpete Valley Hospital</td>
<td>Yes; 10 &amp; older</td>
<td>425-462-4190</td>
<td>Yes</td>
<td>425-462-4190</td>
</tr>
<tr>
<td>Valley View Medical Center</td>
<td>Yes; 7 &amp; older</td>
<td>435-868-5584</td>
<td>Yes, Inpatient only</td>
<td>435-868-6390</td>
</tr>
<tr>
<td>Dixie Regional Medical Center</td>
<td>Yes; 5 &amp; older</td>
<td>435-251-1650</td>
<td>Yes</td>
<td>435-251-1650</td>
</tr>
</tbody>
</table>

HOW TO ACCESS AND ORDER education materials

Clinicians can access and order all provider and patient education materials from Intermountain’s Online Library and Print Store, iprintstore.org. Call 801-442-3186 for ordering information.

References

For a list of references used in this CPM, see the asthma topic page on intermountain.net/clinicalprograms.