Asthma Diagnosis and Management Algorithm for Primary Care

**Patient Presents with Asthma Symptoms** (cough, dyspnea, chest tightness, wheezing, reduced physical activity, nocturnal symptoms/wakings)

Please see appendix for abbreviations listed in this algorithm


**Preschoolers - Children 5-15 yrs of age (Spirometry not possible)**

Children aged 5–15 years who present with typical (8 days/month) asthma-like symptoms or recurrent (22) exacerbations showing all of the following:

1. **Airflow Obstruction:**
   - Temporarily documented by a trained HCP using stethoscope (preferred)
   - Patient report wheezing (alternative)
2. **Reversibility of airflow obstruction**
   - Documented response to SABA (+/- oral steroids) by a trained physician or HCP during acute exacerbation
3. **Parental report of symptomatic response to a 3 month therapeutic trial of medium dose ICS with SABA as needed (alternative)**
4. **No clinical suspicion of alternate diagnosis**

Children 5 yrs to 11yrs

1. **Alternative: Spirometry showing reversible airway obstruction:**
   - FEV₁/IC ratio = LLN (approx. < 0.80-0.90) based on age, sex, height and ethnicity
   - And 21%±2% or min 200 mL change in FEV₁ post bronchodilator or after course of controller therapy
2. **Alternative: Improvement in PEF**:
   - 90% min (min 20% post bronchodilator or after course of controller therapy) or diurnal variation <8% (based on 2 times/day readings)
3. **Alternative: Positive Challenge Test (if spirometry inconclusive):** Methacholine challenge testing or Exercise challenge

**Asthma Not Confirmed**

**Consider**

- Was testing done when patient was not exposed to any triggers or asymptomatic? (If yes, consider repeat testing when patient exposed or consider methacholine and/or exercise challenge test) or allergy testing
- Differential diagnosis: examples include COPD, CF, IPI, VCD, GERD, CHF, primary ciliary dyskinesia, infectious sinusitis, upper airway narrowing, bronchiectasis, pers, foreign-body inhalation, aspiration, pneumonia, atelectasis, tuberculosis, eosinophilic esophagitis, immune dysfunction, swallowing problem, pulmonary edema (2)

**Pharmacological (Baseline Maintenance Therapy):**

Based on the CTS 2012 Asthma Management continuum (3) and the 2015 CTS Asthma guidelines for preschoolers (2), to determine medication needed to achieve control (baseline maintenance therapy)

**Adjust therapy to achieve control and maintain control and prevent future risk:**

1. **All should be on a reliever on demand: SABA**
2. **Still Uncontrolled (refer to “Review Control” table): Add regular controller therapy (ICs are the first-line controller for all ages)
3. **Still Uncontrolled:**
   - Children (1-5 yrs and 6-11yrs): increase low dose ICS to medium dose ICS
   - Adults and children ≥12 yrs: add LABA if on ICS (ideally in the same inhaler device)
4. **Still Uncontrolled:**
   - Children (1-5yrs): referral to asthma specialist
   - Children (6-11yr): add LABA or LTRA
   - Children and children ≥12 y/s: Add LABA or LTRA
5. **Still Uncontrolled:**
   - Refer to specialist, consider adding prednisone

**Pharmacological (Asthma Exacerbation):**

**Daytime symptoms (cough, wheeze, chest tightness): 4 days/week**

- Need a reliever: < 4 doses/week (prophylactic doses should be included if weekly)
- **Night time symptoms:** < 1 night/week
- Physical activity: normal
- **Asthma exacerbations within the last 12 months:** Mite, influenza

- **Highest PEF - Lowest PEF**

<table>
<thead>
<tr>
<th>Formula</th>
<th>X 100</th>
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<tr>
<td>Sputum eosinophils</td>
<td>&lt; 2.3%</td>
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**Non-Pharmacological (Education):**

- Refer to Certified Asthma/Respiratory Educator, if available
- Discuss asthma pathophysiology, triggers, comorbidities, inhaler technique, reliever vs. controller, medication safety and side effects, adherence, asthma control
- Smoking cessation counselling when appropriate
- Create and review written ASTHMA ACTION PLAN (instruction for when there is loss of control): Note: After reviewing control, it is determined that the patient is uncontrolled on their baseline maintenance therapy, they are the yellow zone and the CTS 2012 recommended controller step-up therapy should be started
- Prevention of exacerbations: environmental control (i.e. work, home and school environment), tobacco smoke exposure, environmental triggers, irritant triggers, instant triggers, vaccination (influenza), immunotherapy

### Management

**Asthma Confirmed**

**Patient Assessment**

- Infant triggers (especially colds in children)
- Relevant co-morbidities (i.e., sinusitis, rhinitis, GERD, obesity)
- Work-related triggers
- Special considerations (i.e., adherence, cultural issues, financial issues, lack of support)

**Consider:**

- Not central of diagnosis
- Spumon eosinophil monitoring
- Difficulty in determining baseline medication regimen
- Severe asthma requiring alternate therapy
- Recent ER/hospital admission or recurring exacerbations (≥2 for preschoolers (2))

**Consider a follow-up:**

- Regularly reassess control (every 3-4 months for preschoolers(2)), inhaler technique, adherence, triggers, comorbidities, spirometry or PEF
- Review medication regimen and consider modifying maintenance therapy (consider stepping down add-on therapy or decrease ICS dose if asthma is well controlled between visits)

**Appendix:**

- **Acronym**
  - BUD: Budesonide
  - BLD: Budesonide/Fluticasone
  - CFT: Cystic Fibrosis
  - CFH: Congestive Heart Failure
  - ER: Emergency room
  - FORM: Formoterol
  - GERD: Gastroesophageal Reflux Disorder
  - HCP: Health Care professional
  - ICS: Inhaled Corticosteroid
  - ID: Idiopathic Pulmonary Fibrosis
  - LABA: Long-Acting Beta-Agonist
  - LTRA: Leukotriene-Receptor Antagonist
  - MOM: Mometasone
  - PEP: Peak Expiratory Flow
  - SABA: Short Acting Beta-Agonist
  - NSAID/ASA: Nonsteroidal anti-inflammatories
  - VCD: Vocal Cord Dysfunction

- **Definitions**
  - EPE: Eosinophils present in the air expired in the first second of the FVC (used to assess airflow properties of airways)
  - MVV: Maximum volume of air that can be expirated forcefully and completely after complete inspiration
  - LLN (Lower Limit of Normal): the value below the 5th percentile for the normal population (8)

**Alphabetical Acronym Index**:

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**CTs guidelines for Preschoolers (2):**

- Please refer to latest CTS guidelines for detailed diagnosis algorithm for preschoolers
- Spirometry is the preferred method of documenting airflow limitation (12)
- The ICS/LABA, in a formulation approved for use as a reliever for 12 years of age and older (BUD/FORM), may be considered as a reliever in individuals with moderate asthma and poor control despite fixed-dose maintenance ICS/LABA combination or for exacerbation prone individuals with undocumented asthma despite high dose maintenance ICS of or ICS/LABA
- Spirometry is the preferred objective measure to help objectively assess asthma control (9)

### Endorsed by:

[www.on.lung.ca/PCAP](http://www.on.lung.ca/PCAP)

Algorithm and reference available at: [http://www.on.lung.ca/PCAP](http://www.on.lung.ca/PCAP)

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