

TABLE 2. Therapeutic trial for documenting reversibility of airflow obstruction

Child presentation	Agent	Dose	Doses/day	Time to reassessment
Signs of airflow obstruction (preferred)				
Mild clinical findings or exacerbation [‡]	Inhaled salbutamol	≥4 puffs [†]	1st dose	30 min
Moderate or severe exacerbation [‡]	Inhaled salbutamol	≥4 puffs [†]	2–3 doses within 60 min	60 min
	Oral corticosteroids [¶] Prednisone/prednisolone(oral) Dexamethasone	1–2 mg/kg (maximum 50 mg) [¶] 0.15–0.60 mg/kg (maximum 10 mg) [¶]	1st dose 1st dose	3 h to 4 h 3 h to 4 h
No signs of airflow obstruction (alternative)				
Mild intermittent symptoms or exacerbations	Inhaled salbutamol	2 puffs every 4 h to 6 h	As needed	30 min
Frequent symptoms ^{‡‡} or moderate or severe exacerbations ^{§§}	Inhaled salbutamol	2 puffs every 4 h to 6 h	As needed	30 min
	Daily inhaled corticosteroids			
	Beclomethasone dipropionate	100 µg	Twice daily	3 months ^{‡‡}
	Ciclesonide	200 µg	Daily	3 months ^{‡‡}
	Fluticasone propionate	100–125 µg	Twice daily	3 months ^{‡‡}

Medications listed in shaded area are not approved for use in this age group by Health Canada with the exception of beclomethasone dipropionate approved for use in children ≥5 years of age. Budesonide is not included because it is not available as a metered-dose inhaler in Canada.

^{‡,‡‡,§§} See matching symbols in the legend of figure 1;

[†] Dosage according to age- or weight specific emergency treatment protocol;[‡]

[¶] Oral prednisone (or prednisolone) for three to five days. Oral dexamethasone may be given either at a dose of 0.15 mg/kg to 0.3 mg/kg as the first dose of a subsequent two- to four-day course of prednisone or at a dose of 0.6 mg/kg as part of a one- or two-day course;

^{‡‡} With reassessment at 6 weeks to ensure adherence to asthma medication and diary completion.

KEY MESSAGES

- 7. In children one to five years of age with recurrent (≥2) episodes of asthma-like symptoms **and wheezing** on presentation, direct observation of improvement with inhaled bronchodilator (with or without oral corticosteroids) by a physician or trained health care practitioner confirms the diagnosis (preferred diagnostic method).
- 8. Children one to five years of age with recurrent (≥2) episodes of asthma-like symptoms, **no wheezing** on presentation, **frequent symptoms** or any **moderate or severe exacerbation** warrant a three-month therapeutic trial with a medium daily dose of ICS (with as-needed SABA). Clear consistent improvement in the frequency and severity of symptoms and/or exacerbations confirms the diagnosis (alternative diagnostic method).
- 9. Children one to five years of age with recurrent (≥2) episodes of asthma-like symptoms, **no wheezing** on presentation, **infrequent symptoms**, and **mild exacerbations** can be monitored and re-assessed by a health care practitioner when symptomatic. Alternatively, a therapeutic trial with as-needed SABA is suggested. Convincing parental report of a rapid and repeatedly observed response to SABA suggests the diagnosis (weaker alternative diagnostic method).

Definition of abbreviations and terms

SABA, short-acting β2-agonists; ICS, inhaled corticosteroids; LTRA, leukotriene receptor antagonists; OCS, oral corticosteroids

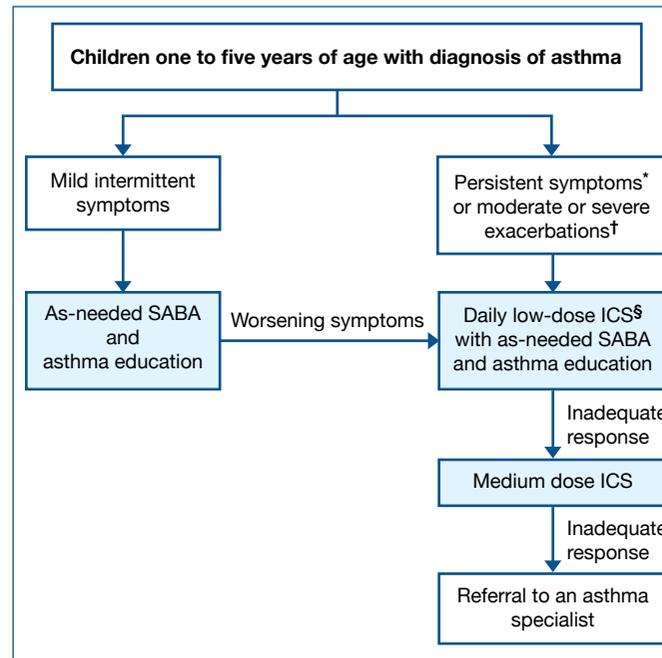
KEY MESSAGES

- 10. To adequately interpret a therapeutic trial, clinicians should ascertain adherence to asthma therapy, inhalation technique and parental report of monitored symptoms, at an appropriately timed medical reassessment.
- 11. Referral to an asthma specialist is recommended in children one to five years of age with diagnostic uncertainty, suspicion of comorbidity, poor symptom and exacerbation control despite ICS at daily doses of 200 µg to 250 µg, a life-threatening event (requiring intensive care admission and/or intubation) and/or for allergy testing to assess the possible role of environmental allergens.
- 12. Daily ICS at the lowest effective dose is the preferred first-line management for asthma once the diagnosis is confirmed and control has been achieved.

Bibliography

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- Ducharme FM, Chalut D, Plotnick L, et al. The pediatric respiratory assessment measure: a valid clinical score for assessing acute asthma severity from toddlers to teenagers. *J Pediatr* 2008;152(4):476–80.
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FIGURE 2. Treatment algorithm for preschoolers with asthma



* Symptoms occurring ≥8 days/month, ≥8 days/month with use of inhaled short-acting β2-agonists (SABA), ≥1 night awakening due to symptoms/month, any exercise limitation/month or any absence from usual activities to asthma symptoms;

[†] Episodes requiring rescue oral corticosteroids or hospital admission

[§] ICS are more effective than LTRA.

TABLE 3. Inhaled corticosteroid (ICS) dosing categories* in children one to five years of age

CORTICOSTEROID (TRADE NAME)	Daily ICS dose, micrograms (mcg) [†]	
	LOW	MEDIUM
Beclomethasone (QVAR [®])	100	200
Ciclesonide (Alvesco [®])	100	200
Fluticasone (Flovent [®])	100-125 [§]	200-250

* Proposed dosing categories are based on a combination of approximate dose equivalency as well as safety and efficacy data rather than the available product formulations. Medications listed in shaded area are not approved for use in this age group by Health Canada with the exception of beclomethasone dipropionate approved for use in children ≥5 years of age. Budesonide is not included because it is not available as a metered-dose inhaler in Canada.

[†] Reported as the total daily dose to be administered twice daily, except for ciclesonide which is licensed for once daily dosing in Canada.

[§] Fluticasone is not licensed for once daily dosing in Canada.

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KEY MESSAGES ON THE DIAGNOSIS AND MANAGEMENT OF

Asthma in Preschoolers
 From a Canadian Thoracic Society and Canadian Pediatric Society Position Paper



Diagnosis and management of asthma in preschoolers (One to five years of age)

In school-age children and adults, guidelines recommend the use of lung function tests, primarily spirometry, to confirm the diagnosis of asthma. In children <6 years of age, the forced expiratory manoeuvre required for spirometry is difficult to perform, and alternative lung function tests for preschoolers are limited to a few pediatric academic settings or are insufficiently specific. We offer a pragmatic approach to confirm the diagnosis of asthma in children one to five years of age as well as initial management strategies.^{1,2}

Once diagnosed, all children should receive asthma education including environmental control and a written self-management plan. Inhaled medications should be administered by metered-dose inhaler (MDI) with an age-appropriate valved spacer.

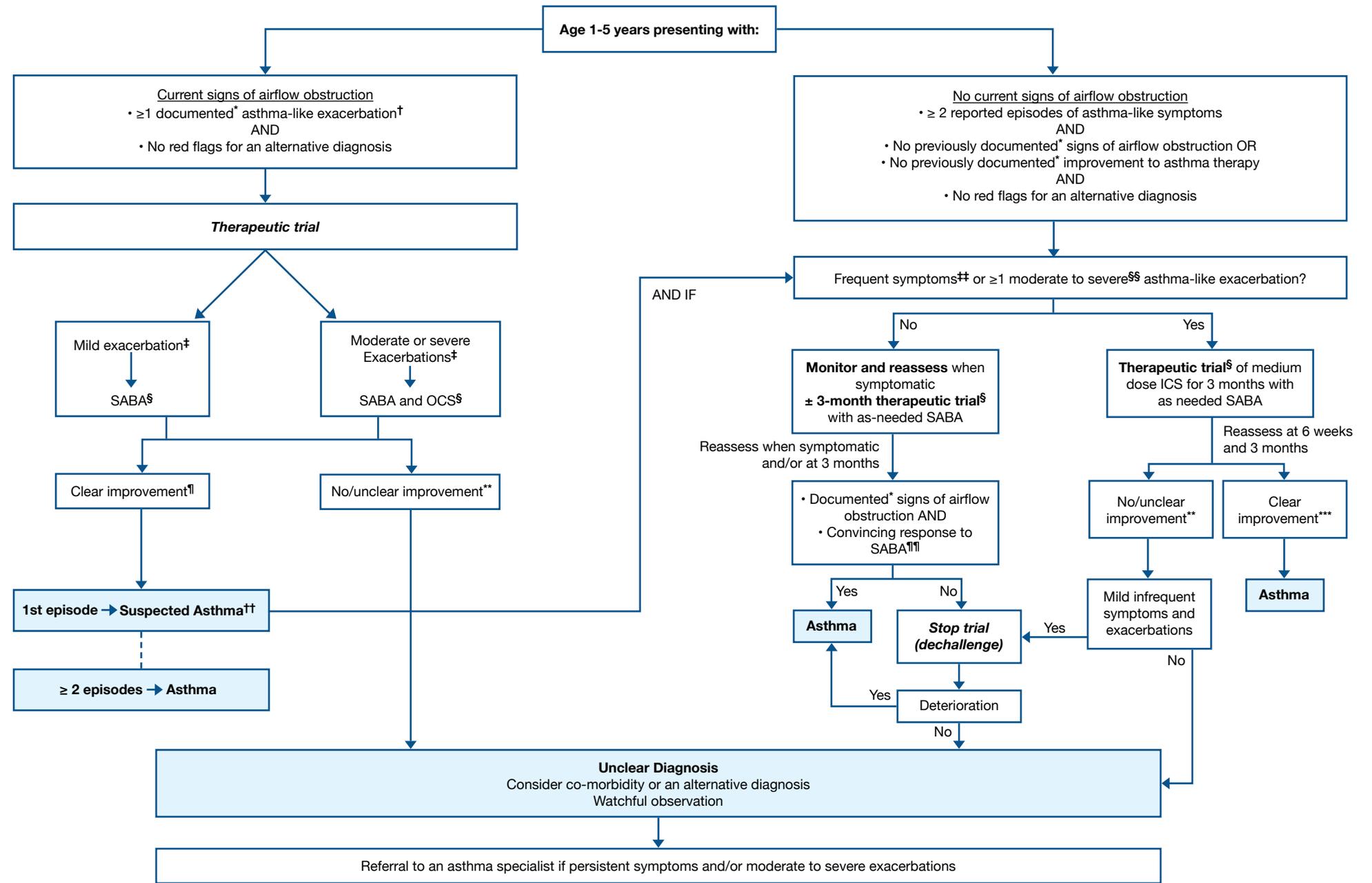
TABLE 1. Operational diagnostic criteria for asthma in children one to five years of age

1. Documentation of airflow obstruction	
Preferred	Documented wheezing and other signs of airflow obstruction by physician or trained health care practitioner
Alternative	Convincing parental report of wheezing or other symptoms of airflow obstruction
2. Documentation of reversibility of airflow obstruction	
Preferred	Documented improvement in signs of airflow obstruction to SABA ± oral corticosteroids* by physician or trained health care practitioner
Alternative	Convincing parental report of symptomatic response to a 3-month trial of a medium dose of ICS (with as-needed SABA)*
Alternative	Convincing parental report of symptomatic response to SABA
3. No clinical evidence of an alternative diagnosis	

*See Table 2 for dosing

KEY MESSAGES
1. Terms such as 'bronchospasm', 'reactive airway disease', 'wheezy bronchitis' and 'happy wheezer' should be abandoned.
2. Recurrent preschool wheezing can be associated with substantial morbidity and may impact long-term health.
3. Asthma can be diagnosed in children one to five years of age.
4. The diagnosis of asthma requires documentation of signs or symptoms of airflow obstruction, reversibility of obstruction (improvement in these signs or symptoms with asthma therapy) and no clinical suspicion of an alternative diagnosis.
5. Bronchiolitis usually presents as the first episode of wheezing in a child <1 year of age.
6. The diagnosis of asthma should be considered in children one to five years of age with recurrent asthma-like symptoms or exacerbations, even if triggered by viral infections.

FIGURE 1. Diagnosis algorithm for children one to five years of age



* Documentation by a health care practitioner;

† Episodes of wheezing with/without difficulty breathing;

‡ Severity of signs may be based on national guidelines for severity assessment or on the Pediatric Respiratory Assessment Measure (PRAM) score;^{3,4}

§ See Table 2 for dosing;

¶ Based on marked improvement in signs of airflow obstruction before and after therapy or a reduction of ≥3 points on the PRAM score;³

** A conclusive therapeutic trial hinges on adequate dose of asthma medication, adequate inhalation technique, diligent documentation of the signs and/or symptoms, and timely medical reassessment;

†† The diagnosis of asthma is based on recurrent (≥2) episodes of asthma-like exacerbations (documented signs) and/or symptoms. In case of a first occurrence of exacerbation with no previous asthma-like symptoms, the diagnosis of asthma is suspected and can be confirmed with re-occurrence of asthma-like symptoms or exacerbations with response to asthma therapy;

‡‡ ≥8 days/month with asthma-like symptoms;

§§ Episodes requiring rescue oral corticosteroids (OCS) or a hospital admission;

¶¶ In this age group, the accuracy of parental report may be unreliable. Documentation of airflow obstruction and reversibility when symptomatic, by a health care practitioner, is preferred;

*** Reduction of approximately 50% in the number of exacerbations requiring oral corticosteroids, with a shorter duration and severity of exacerbations and fewer symptoms between exacerbations.