Canadian Pediatric Asthma Consensus Guidelines, 2003 (updated to December 2004)

Introduction

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Abstract

Background: Although guidelines for the diagnosis and management of asthma have been published over the last 15 years, there has been little focus on issues relating to asthma in childhood. Since the last revision of the 1999 Canadian asthma consensus report, important new studies, particularly in children, have highlighted the need to incorporate this new information into asthma guidelines.

Objectives: To review the literature on asthma published between January 2000 and June 2003 and to evaluate the influence of new evidence on the recommendations made in the *Canadian Asthma Consensus Report, 1999* and its 2001 update with a major focus on pediatric issues.

Methods: Diagnosis of asthma in young children, prevention strategies, pharmacotherapy, inhalation devices, immunotherapy and asthma education were selected for review by small expert resource groups. In June 2003, the reviews were discussed at a meeting under the auspices of the Canadian Network For Asthma Care and the Canadian Thoracic Society. Data published up to December 2004 were subsequently reviewed by the individual expert resource groups.

Results: This report evaluates early life prevention strategies and focuses on treatment of asthma in children. Emphasis is placed on the importance of an early diagnosis and prevention therapy, the benefits of additional therapy and the essential role of asthma education.

Conclusion: We generally support previous recommendations and focus on new issues, particularly those relevant to children and their families. This guide for asthma management is based on the best available published data and the opinion of health care professionals including asthma experts and educators.

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Although Canadian guidelines for the diagnosis and management of asthma have been published over the last 15 years,[1–4] there has been little focus on issues relevant to asthma in the young child or on prevention strategies. Since the last update of the Canadian guidelines in 2001,[4] important issues and new studies focusing on asthma in early life have highlighted the need to incorporate this new information. Reports pertaining to a number of issues published between 2000 and June 2003 were reviewed initially by small expert resource groups. The results of these reviews were discussed by stakeholders during a 2-day consensus meeting, 27–28 June 2003. A working group with a pediatric focus met under the auspices of the Canadian Network For Asthma Care and an adult asthma group met under the auspices of the Canadian Thoracic Society. On the first day, these groups met separately to discuss specific issues related to pediatric and adult asthma and, on the second day, met jointly to discuss dissemination and implementation of the asthma guidelines. Data published up to December 2004 were subsequently reviewed by the individual expert resource groups. In the opinion of the expert resource groups and the writing committee, these were insufficient to warrant modifying the recommendations approved by the full consensus committee in 2003.

This supplement contains recommendations for prevention, assessment and management of asthma in children and includes background documents supporting them. A level of evidence is assigned to each recommendation based on the strength of the supporting data[5] (Table 1). Background documents for updated recommendations for adults are published in the *Canadian Respiratory Journal*.[6]

Definition of asthma

The definition of asthma remains descriptive and has not changed since the 1999 Canadian asthma consensus guidelines.[3] Asthma is characterized by paroxysmal or persistent symptoms, such as dyspnea, chest tightness, wheez-

ing, sputum production and cough associated with variable airflow limitation and airway hyperresponsiveness to endogenous and exogenous stimuli. Inflammation and its resultant effects on airway structure are considered the main mechanisms leading to the development and persistence of asthma.

General management of asthma

Optimal management of asthma requires adequate evaluation of the patient and his or her environment. Asthma control should be assessed using specific criteria (Table 2).

Table 1: Levels of evidence[5]

Level I	Evidence is based on randomized controlled trials (or meta-analysis of such trials) of adequate size to ensure a low risk of incorporating false-positive or false-negative results.
Level II	Evidence is based on randomized controlled trials that are too small to provide level I evidence. They may show either positive trends that are not statistically significant or no trends and are associated with a high risk of false-negative results.
Level III	Evidence is based on non-randomized controlled or cohort studies, case series, case–control studies or cross-sectional studies.
Level IV	Evidence is based on the opinion of respected authorities or expert committees as indicated in published consensus conferences or guidelines.
Level V	Evidence is based on the opinions of those who have written and reviewed the guidelines, based on their experience, knowledge of the relevant literature and discussion with their peers.

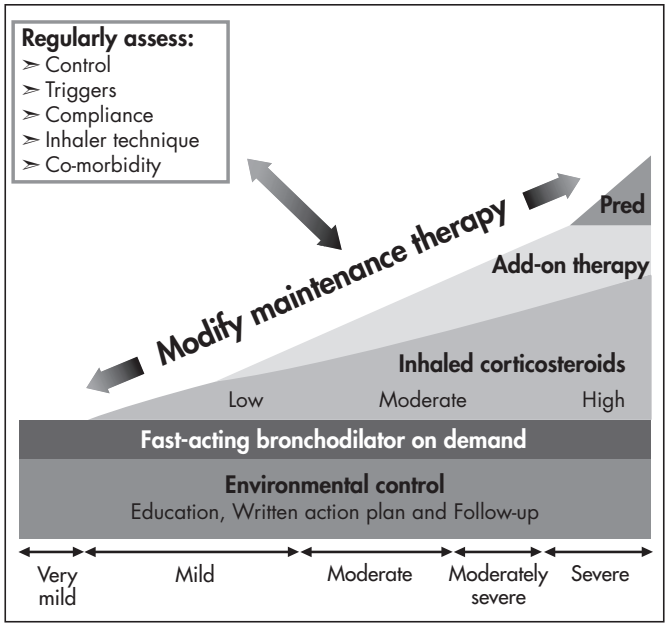

Fig. 1: Continuum of treatments for asthma management. Reprinted with permission from Elsevier (*J Allergy Clin Immunol* 2004;113:650-6).

Asthma severity is more difficult to assess and may only be defined after asthma control is achieved. Asthma control should be assessed at each visit.

If control is inadequate, the reasons should be identified and, if necessary, maintenance therapy should be modified (Fig. 1). Any new treatment should be considered a therapeutic trial and its effectiveness should be re-evaluated after 4–6 weeks.

Inhaled corticosteroids (ICSs) should be introduced as initial maintenance treatment even when the patient reports symptoms fewer than 3 times a week. Although less effective than low-dose ICSs, leukotriene receptor antagonists (LTRAs) are an alternative for patients who cannot or will not use ICSs. If control is inadequate on low-dose ICSs, identify the reasons for poor control and, if indicated, consider additional therapy with long-acting β_2-agonists, or LTRAs. Severe asthma may require additional treatment with systemic steroids. Asthma control and maintenance therapy must be assessed regularly.

If good control has been sustained, consideration should be given to gradually reducing maintenance therapy, with regular reassessments to ensure that adequate control remains. This will allow determination of the minimum therapy needed to maintain acceptable asthma control.

Table 2: Criteria for determining whether asthma is controlled*[3]

Parameter	Frequency or value
Daytime symptoms	<4 days/week
Night-time symptoms	<1 night/week
Physical activity	Normal
Exacerbations	Mild, infrequent
Absent from work or school due to asthma	None
Need for β_2-agonist	<4 doses/week†
FEV_1 or PEF	≥90% of personal best
PEF diurnal variation‡	<10–15%

FEV_1 = forced expiratory volume in 1 s; PEF = peak expiratory flow measured using a portable peak flow meter.
*Introduction of inhaled corticosteroids should be considered early, even in those who report asthma symptoms fewer than 3 times a week and appear to have adequate control based on these criteria.
†May use 1 dose/day to prevent exercise-induced symptoms.
‡Diurnal variation is calculated as the highest PEF minus the lowest divided by the highest PEF multiplied by 100 for morning and night (determined over a 2-week period).

Table 3: Frequent reasons for poor asthma control[4]

- Insufficient patient education, particularly in terms of what asthma is and how it can be controlled
- Insufficient use of objective measurements of airflow obstruction (PEF, FEV_1), leading to over- or underestimation of asthma control
- Misunderstanding regarding the role and side-effects of medications
- Overuse of β_2-agonists
- Insufficient use of anti-inflammatory agents, including intermittent use, inadequate dose, or lack of use
- Inadequate assessment of patient adherence
- Lack of continuity of care

Asthma education is an essential component of asthma care. Poor asthma control is not usually due to a lack of efficacy of the medication, but is more often related to suboptimal use of medication or aggravating factors, comorbidities, poor inhaler technique, poor environmental control or a lack of continuity of care. Suboptimal use of asthma medication may be the result of inappropriate physician recommendation, poor adherence or both, perhaps as a result of undue fear of adverse effects of therapy. In the face of poor asthma control, it is crucial to identify and address the cause (Table 3).

This article has been peer reviewed.

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References

1. Hargreave FE, Dolovich J, Newhouse MT. The assessment and treatment of asthma: a conference report. *J Allergy Clin Immunol* 1990;85(6):1098-111.
2. Ernst P, Fitzgerald J, Spier S. Canadian Asthma Consensus Conference: summary of recommendations. *Can Respir J* 1996;3:89-100.
3. Boulet LP, Becker A, Bérubé D, Beveridge R, Ernst P. Canadian asthma consensus report, 1999. *CMAJ* 1999;161(11 suppl):S1-62.
4. Boulet LP, Bai T, Becker A, Bérubé D, Beveridge R, Bowie DM, et al. What is new since the last (1999) Canadian Asthma Consensus Guidelines? *Can Respir J* 2001;8(suppl A):5-27A.
5. Steering committee on clinical practice guidelines for the care and treatment of breast cancer: a Canadian consensus document. *CMAJ* 1998;158(3 suppl):S1-2.
6. Lemiere C, Bai T, Balter M, Bayliff C, Becker A, Boulet LP, et al. Adult asthma consensus guidelines update 2003. *Can Respir J* 2004;11(suppl A):9-18A.

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