

Q&A on *Asthma Control*

Louis-Philippe Boulet, MD, FRCPC

Presented at the World Asthma Organization, and at UBC's 4th Annual Advances in Respiratory and Critical Care Management, 2003

What is asthma control?

According to current guidelines, the main goal of asthma management is to achieve adequate control of the disease's manifestations in order to minimize its consequences.¹ Adequate control also means few (and mostly mild) asthma exacerbations, as well as maintenance of optimal pulmonary function, and normal activity levels, including exercise.² If asthma is well-controlled, asthma mortality and the development of irreversible airway changes should be reduced.

The 1999 Canadian Asthma Report suggested specific criteria for asthma control (Table 1). These criteria have been retained by recent Canadian consensus updates, and are relatively similar to those found in other recent national and international guidelines.^{2,3,4}

The definition of asthma control is, therefore, based primarily on clinical features, such as symptoms, rescue medication needs, and expiratory flows. It is important to distinguish asthma control from asthma severity, which is mostly determined by the maintenance therapy needed to achieve control (Table 2).

How is asthma control assessed?

In clinical practice, asthma control is often assessed qualitatively, using criteria that vary from one physician to another, but based mostly on rescue β 2-agonist need and respiratory symptoms.⁵ Only about 50% of general practitioners use frequency of exac-

Naomi's asthma



Naomi, 20, has had asthma since early childhood. She takes salbutamol (as needed), and fluticasone, 125 mcg, one inhalation twice daily. While she consults to renew her prescriptions, she mentions her asthma is "fine" and stable. However, when checking the asthma control criteria, you find she:

- has asthma symptoms almost every day;
- wakes up at night with respiratory symptoms, once a week;
- uses her salbutamol 5-7 times a week; and
- is limited in her activities.

She has had 2 asthma exacerbations in the last 6 months, one requiring prednisone. She has a cat despite positive allergy skin tests to cats, she smokes irregularly, and is stressed by her new job. Her peak expiratory flow is at 77% of her best value, recorded in the last 2 years.

What should you do about Naomi?

For more on Naomi, please go to page 88.

acerbations, and 10% measured expiratory flows, as control criteria. Asthma control can also be understood or assessed differently by patients and their physicians, and both groups (patients even more so than physicians) often overestimate the adequacy of control as compared to guideline criteria.⁵ Furthermore, some patients may not recognize respi-

Table 1

Criteria for asthma control

<u>Parameters</u>	<u>Frequency or value</u>
Daytime symptoms	< 4 days/week
Nighttime symptoms	< 1 night/week
Physical activity	Normal
Exacerbations	Mild, infrequent
Absenteeism	None
Need for prn β 2-agonist	< 4 doses/week ¹
FEV ₁ ² or PEF ³	> 85% personal best, ideally 90%
PEF diurnal variation ⁴	< 15% diurnal variation

FEV: Forced expiratory volume
prn: As needed

PEF: Peak expiratory flow

- 1: May use one dose per day for prevention of exercise-induced symptoms
- 2: Forced expiratory volume in 1 second
- 3: PEF obtained with a portable peak flow meter
- 4: Diurnal variation is calculated as the highest minus the lowest divided by the highest PEF, multiplied by 100.

Taken from: Boulet LP, Becker AB, Bérubé D, et al: Canadian Asthma Consensus Report, 1999. Canadian Asthma Consensus Group. CMAJ 1999; 161(Suppl 11):S1-62.

ratory symptoms as being caused by their asthma. In all instances, patients should be educated to identify criteria of asthma control, sometimes with the help of peak expiratory flow (PEF) measurements.

Various methods have been developed to quantify asthma control. Simple ones, such as the 30-Second Asthma Test™,⁶ have been promoted, but more

sophisticated methods, using either current guideline parameters, such as the Asthma Control Questionnaire⁷ or the Asthma Control Scoring System,⁸ are available. Others are based on such parameters as degree of airway hyperresponsiveness or induced sputum eosinophils. The usefulness in primary care of these latter methods, which have been proposed for determining treatment needs, remains to be confirmed, but their applicability is limited by the time and resources required to obtain those measures.⁶⁻¹¹ It is possible that, in the future, simple, noninvasive ways to evaluate airway inflammation will be useful adjuncts to clinical and physiologic parameters. These methods will “fine-tune” the treatment to prevent symptoms and exacerbations, while using the minimal medication required.

Is asthma control usually achieved ?

Unfortunately, asthma is not always controlled, and its related morbidity is still unacceptably high. A nationwide study published in 2001 reported 57% of participants had poor asthma control according to Canadian guidelines, although 91% thought they were adequately controlled.¹² Poor control was associated with frequent emergency care use and higher health-related costs. This situation is still common, and poor asthma control has been reported in many countries.¹³⁻¹⁵

Why isn't asthma controlled?

Many explanations have been proposed (Table 3). In rare instances, failure to control asthma is due strictly to the severity of the condition. Most often, however, insufficient control is due to an inappropriate evaluation of asthma severity and control, and inadequate treatment or compliance to treatment. Care



Dr. Boulet is a professor, Université Laval. He is also a respirologist at the Institut de cardiologie et de pneumologie, Hôpital Laval, Quebec City, Quebec.

Table 2

Asthma severity

The primary measure of asthma severity in the treated patient should be the minimum therapy required to achieve acceptable control.

<u>Severity</u>	<u>Symptoms</u>	<u>Treatment required</u>
Very mild	Mild/infrequent	None, or inhaled β_2 -agonist rarely
Mild	Well-controlled	β_2 -agonist occasionally + low-dose ICS
Moderate	Well-controlled	β_2 -agonist + low/moderate-dose ICS \pm additional therapy*
Severe	Well-controlled	β_2 -agonist + high-dose ICS + additional therapy
Very severe	Not well-controlled	β_2 -agonist + high-dose ICS + well-controlled additional therapy + oral glucocorticosteroid

ICS: Inhaled corticosteroid

*A moderate dose is considered between 251-1,000 micrograms of fluticasone or 401-800 micrograms of budesonide

Taken from: Boulet LP, Becker AB, Bérubé D, et al: Canadian Asthma Consensus Report, 1999. Canadian Asthma Consensus Group. CMAJ 1999; 161(Suppl 11):S1-62.

asures, such as avoidance of domestic animals, are often not implemented.²¹

Other important factors associated with poor asthma control are insufficient asthma education among patients and the lack of the use of action plans for the management of exacerbations. In a recently reviewed Cochrane meta-analysis, Gibson et al. showed that self-management education and regular visits led to a reduction of:

- hospital admissions,
- unscheduled visits,
- absenteeism from work or school,
- reduction of nocturnal symptoms, and
- an improvement in expiratory flows.²²

may not be optimal and it has been shown that management is often not in keeping with current recommendations.^{16,17} Furthermore, poor control may be traced to the patient's use of the prescribed treatment; compliance may be poor, or medications may be taken in insufficient quantities, particularly in cases of exacerbations. It is striking that a large number of asthma patients have a poor understanding of their treatment, and no written action plan for managing exacerbations.¹⁶⁻¹⁹

How can asthma control be improved?

Asthma control can be significantly improved through various methods (Table 4). Environmental measures are particularly critical to achieving asthma control, especially among allergic patients.^{3,20} Unfortunately, mea-

Furthermore, for patients with high asthma-related morbidity, introducing a structured asthma education program has proven to be quite effective in reducing subsequent emergency department visits. These patients should be a priority for educational interventions.²³

Asthma treatment is based mainly on inhaled corticosteroids, the best anti-inflammatory treatment for long-term management of asthma. Inhaled corticosteroids should be introduced early in treatment of the disease.²⁴ When inhaled corticosteroids are insufficient to achieve asthma control, an add-on therapy, such as a long-acting β_2 -agonist or a leukotriene receptor antagonist, will help achieve this goal. In all instances, however, triggering factors, compliance to therapy, and possible comorbidities (such as rhinitis or gastroesophageal reflux) should be assessed, as

Table 3

Reasons why asthma is not adequately controlled

- Improper diagnosis
- Inadequate assessment of asthma control
- Non-recognition of asthma symptoms
- Poor compliance to the medication
- Poor inhaler use
- Environmental exposures (e.g., allergens) and smoking
- Insufficient asthma education
- Lack of understanding of medication and preventive measures
- No action plan for management of exacerbations
- Socio-economic problems
- Presence of severe asthma
- Untreated comorbidities
- Lack of continuity of care

What to do with Naomi?

Despite her initial self-assessment of adequate asthma control, she is not controlled, and there are many reasons for this.

Allergen exposure and smoking are important factors to address, and compliance should be checked. Naomi needs educational intervention to assess her understanding of the disease and its treatment, and to explain what she can expect as disease control.

An add-on therapy could be prescribed (long-acting β_2 -agonists, or leukotriene receptor antagonists) if asthma remains uncontrolled, despite our efforts to improve corticosteroid compliance and environmental control.

Adequate followup and monitoring are required.

Table 4

Measures to improve asthma control

General measures

- Patient education
- Initiatives for implementation of asthma guidelines

Environmental measures

- Relevant allergen avoidance
- Stop tobacco smoke exposure

Optimized "controller" medication

- Bronchial anti-inflammatories \pm add-on therapy adapted to individual needs
- Measures to improve compliance

Appropriate medication changes

- Action plans
- Adequate asthma-control monitoring (symptoms \pm PEF)

PEF: Peak expiratory flow

they may significantly affect asthma control. Recent observations have also shown that smoking reduced the efficacy of asthma medications, particularly that of corticosteroids.²⁵ Finally, the benefits of each treatment trial should be properly assessed. Medication needs regular evaluation to ensure the minimum dosing will keep asthma under control. [CME](#)

References

1. Boulet LP: Asthma guidelines and outcomes. in *Middleton's Allergy Principles and Practice*. 6th Edition. Adkinson NF et al. Editors. Mosby. (in press). Sept. 2001.
2. GINA Guidelines Global Initiative for Asthma: Global Strategy for Asthma Management and Prevention NHLBI/WHI Workshop Report.
3. Boulet LP, Becker AB, Bérubé D, et al: Canadian Asthma Consensus Report, 1999. Canadian Asthma Consensus Group. CMAJ 1999; 161(Suppl 11):S1-62.
4. Kaye P, O'Sullivan I: BTS asthma guide. Thorax 2001; 56(8):666.
5. Boulet LP, Phillips R, O'Byrne P, et al: Evaluation of asthma control by physicians and patients: Comparison with current guidelines. Can Respir J 2002; 9(6):417-23.6. www.asthmaguidelines.com/patient_tools.html# (Accessed February 2, 2004)
7. Juniper EF, O'Byrne PM, Guyatt GH, et al: Development and validation of a questionnaire to measure asthma control. Eur Respir J 1999; 14(4):902-7.

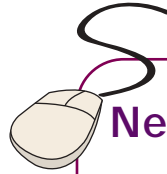
Take-home message



- Asthma can be controlled in most patients by appropriate education, environmental control, and individualized pharmacotherapy.
- Adequate and regular monitoring of asthma control should be carried out to ensure that treatment is regularly optimized.
- An action plan should be available for the management of exacerbations.

8. Boulet LP, Boulet V, Milot J: How should we quantify asthma control? A proposal. *Chest* 2002; 122(6):2217-23.
9. Sont JK, Willems LNA, Bel EH, et al: Clinical control and histopathologic outcome of asthma when using airway hyperresponsiveness as an additional guide to long-term treatment. *Am J Respir Crit Care Med* 1999; 159(4Pt1):1043-51.
10. Green RH, Brightling CE, McKenna S, et al: Asthma exacerbations and sputum eosinophil counts: A randomised controlled trial. *Lancet* 2002; 360(9347):1715-21.
11. Jayaram L, Hussack P, Pizzichini MMM, et al: The LOMA study: Effect on exacerbations in the first year. *Am J Respir Crit Care Med* 2003; 167(7):A976.
12. Chapman KR, Ernst P, Grenville A, et al: Control of asthma in Canada: Failure to achieve guideline targets. *Can Respir J* 2001; 8(Suppl A):35A-40A. www.asthmainamerica.com (Accessed February 2, 2004)
14. Blanc FX, Postel-Vinay N, Boucot I, et al: The AIRE Study: Data analysis of 753 European children with asthma. *Rev Mal Respir* 2002; 19(5Pt1):585-92.
15. Stallberg B, Nystrom Kronander U, Olsson P, et al: Living with asthma in Sweden: The ALMA study. *Respir Med* 2003; 97(7):835-43.
16. Jin R, Choi BC, Chan BT, et al: Physician asthma management practices in Canada. *Can Respir J* 2000; 7(6):456-65.
17. Boulet LP, Thivierge RL, Amesse A, et al: Towards excellence in asthma management (TEAM): A populational disease-management model. *J Asthma* 2002; 39(4):341-50.
18. Boulet LP: Perception of the role and potential side effects of inhaled corticosteroids among asthmatic patients. *Chest* 1998; 113(3):587-92.
19. Haby MM, Powell CV, Oberklaid F, et al: Asthma in children: Gaps between current management and best practice. *J Paediatr Child Health* 2002; 38(3):284-9.
20. Boulet LP, Bai TR, Becker A, et al: What is new since the last (1999) Canadian Asthma Consensus Guidelines? *Can Respir J* 2001; 8(Suppl A):5A-27A.
21. Côté J, Cartier A, Robichaud P, et al: Influence of asthma education on asthma severity, quality of life and environmental control. *Can Respir J* 2000; 7(5):395-400.
22. Gibson PG, Powell H, Coughlan J, et al: Self-management education and regular practitioner review for adults with asthma. *Cochrane Database Syst Rev* 2003; 1:CD001117.
23. Côté J, Bowie DM, Robichaud P, et al: Evaluation of two different educational interventions for adult patients consulting with an acute asthma exacerbation. *Am J Respir Crit Care Med* 2001; 163(6):1415-9.
24. Pauwels RA, Pedersen S, Busse WW, et al: START: Early intervention with budesonide in mild persistent asthma: a randomised, double-blind trial. *Lancet* 2003; 361(9363):1071-6.
25. Chalmers GW, Macleod KJ, Little SA, et al: Influence of cigarette smoking on inhaled corticosteroid treatment in mild asthma. *Thorax* 2002; 57(3):226-30.

Net Readings



1. The Lung Association
www.lung.ca/asthma/
2. The Calgary Allergy Network
www.calgaryallergy.ca/
3. The Asthma Society of Canada
www.asthma.ca
4. Réseau Québécois de l'asthme et de la maladie pulmonaire obstructive chronique
www.rqam.ca
5. Global Initiative for Asthma
www.ginasthma.com