

Asthma control in Canada remains suboptimal: The Reality of Asthma Control (TRAC) study

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BACKGROUND: Two Canadian studies showed that 55% of patients with asthma had daily symptoms (in 1996) and that 57% of patients suffered from poorly controlled asthma (in 1999).

OBJECTIVES: To assess the state of asthma control of adult Canadians, and asthma knowledge and practices of Canadian physicians actively involved in the care of patients with asthma.

METHODS: Telephone interviews were conducted with adults 18 to 54 years of age who had been diagnosed with asthma at least six months before the survey, who did not have chronic obstructive pulmonary disease and who had a smoking history of fewer than 20 pack-years. Physicians were surveyed by telephone and mail. The surveys took place between April and August 2004.

RESULTS: Almost all (97%) of the 893 patients believed that they had controlled asthma; however, only 47% had controlled disease according to symptom-based guideline criteria. Just 39% of 463 physicians based their treatment recommendations on the Canadian asthma guidelines most or all of the time, despite having a high awareness of them. Only 11% of patients had written action plans, and one-half of patients with action plans did not use them regularly. Almost three-quarters of patients expressed concerns about taking inhaled corticosteroids.

CONCLUSIONS: Since the last major national survey, guideline implementation has not resulted in significant changes in asthma-related morbidity. Effective means of knowledge transfer should be developed and implemented to improve the translation of guideline recommendations into care.

Key Words: Adults; Antiasthmatic agents; Asthma; Canada; Health surveys; Self care

Despite the continued development of improved treatments for asthma, and regularly updated, evidence-based Canadian asthma clinical practice guidelines (1-3), asthma control in Canada remains suboptimal (4). Suboptimal asthma control reduces patients' quality of life (5) and increases the risk of asthma exacerbations and mortality (6,7). In addition, poor asthma control burdens the health care system (8-10). In 1996 (11) and 1999 (4), two Canadian studies took important

Le contrôle de l'asthme au Canada demeure sous-optimal : L'étude TRAC sur la réalité du contrôle de l'asthme

HISTORIQUE : Deux études canadiennes ont révélé que 55 % des patients asthmatiques souffraient de symptômes quotidiens (en 1996) et que 57 % souffraient d'asthme mal contrôlé (en 1999).

OBJECTIFS : Évaluer l'état du contrôle de l'asthme des adultes canadiens, ainsi que les connaissances sur l'asthme et les pratiques des médecins canadiens qui participent activement aux soins des patients asthmatiques.

MÉTHODOLOGIE : Des entrevues téléphoniques ont été menées auprès d'adultes de 18 à 54 ans ayant reçu un diagnostic d'asthme au moins six mois avant l'enquête, ne souffrant pas d'une maladie pulmonaire obstructive chronique et fumant moins de 20 paquets-années. Les médecins ont été sondés par téléphone et par la poste. Les enquêtes ont eu lieu entre avril et août 2004.

RÉSULTATS : Près de la totalité (97 %) des 893 patients pensaient que leur asthme était contrôlé, mais il l'était dans seulement 47 % des cas d'après les critères fondés sur les symptômes des principes directeurs. Seulement 39 % des 463 médecins fondaient presque toujours ou toujours leurs recommandations de traitement sur les principes directeurs du consensus canadien sur l'asthme, même s'ils connaissaient bien ces principes. Seulement 11 % des patients avaient des plans d'action écrits, et la moitié de ceux qui en avaient un ne l'utilisaient pas régulièrement. Près des trois quarts des patients s'inquiétaient de prendre une corticothérapie en aérosol.

CONCLUSIONS : Depuis la dernière grande enquête nationale, l'implantation des principes directeurs n'a pas entraîné de changements significatifs de la morbidité reliée à l'asthme. Il faudrait élaborer et implanter des moyens efficaces de transmission du savoir pour améliorer le transfert des recommandations issues des principes directeurs en milieu clinique.

first steps in determining actual asthma control, which had previously been difficult to determine from crude epidemiological data. The studies showed that 55% of patients had daily symptoms (11) and that 57% of patients suffered from poorly controlled asthma (4), with inadequate control in the latter study defined as the failure to meet at least two of six symptom-control criteria from the Canadian Asthma Consensus Guidelines (1).

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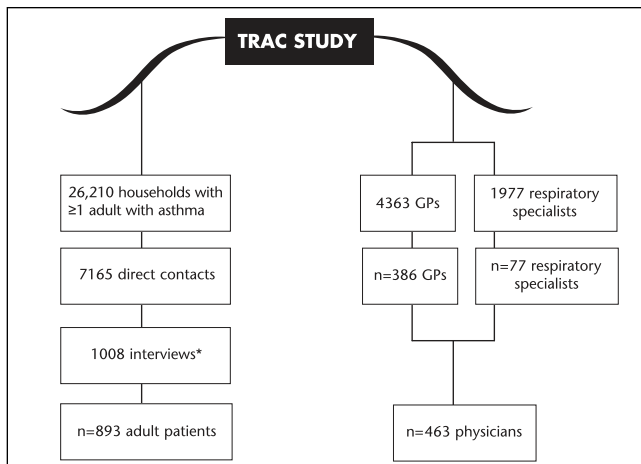


Figure 1 Recruitment and enrollment in The Reality of Asthma Control (TRAC) study. See Table 2 for the derivation of the number of 'direct contacts'. *From this cohort, patients with no physician diagnosis of asthma, a diagnosis within the previous six months or a smoking history of 20 pack-years or more were excluded. GPs Primary care physicians

The Reality of Asthma Control (TRAC) study was undertaken to update and expand on the previous work, and to focus particularly on asthma worsenings and exacerbations, examining how patients and their health care providers actually manage deteriorating asthma. TRAC also evaluated participants' attitudes toward evolving self-management strategies. The study hypothesis was that the degree of asthma control had not changed in recent years despite all efforts to improve care. The present paper reviews the TRAC survey methodology and compares this Canadian asthma experience with the literature, especially with other surveys.

METHODS

The physician and patient surveys were pretested, the Institutional Review Board Services provided ethics approval, and the surveys were conducted between April and August 2004.

The physician survey used a random sample of Canadian primary care and specialist physicians (respirologists or internists who had reported a subspecialty in respirology) who were currently treating patients with asthma. Physicians were excluded from the sample if they said that more than 90% of their patients were younger than 18 years of age. The physician survey was initially designed to be carried out by telephone. Due to the low response rate, a mail-out questionnaire, which took approximately 25 min to complete, was devised. Telephone interviews were conducted with 52 physicians, and the rest mailed their surveys in.

For the patient survey, ICOM Information & Communications Inc (Toronto, Ontario) furnished a national list of households in which at least one person reported having asthma. Patients eligible for inclusion were 18 to 54 years of age, had been diagnosed with asthma by a physician at least six months before enrollment, did not have chronic obstructive pulmonary disease and had a smoking history of fewer than 20 pack-years. Interviews were allocated according to flexible regional quotas, which were increased in the field to increase the number of completed interviews in regions with smaller populations. At least five telephone calls were made to a household before it was classified as 'no answer'. When a household had more than one qualified person, the subject was chosen according to the most recent birthday. The telephone survey

TABLE 1
Regional quota details of the patient survey

Region	Initial quota	First sample (before exclusions)	Final sample (weighted)	Final sample (unweighted)	Margin of error*
Atlantic [†]	98	109	96	93	10.2
Quebec	254	255	218	218	6.6
Ontario [†]	412	362	331	334	5.4
Manitoba/ Saskatchewan [†]	90	100	90	93	10.2
Alberta [†]	64	92	84	84	10.7
British Columbia	92	92	74	76	11.2
Total	1010	1008 [‡]	893	893 [§]	3.3

*Expressed as percentage points, plus or minus; [†]While the survey was in the field, these quotas were modified; specifically, Ontario's allocation was reduced, and allocations for the Atlantic provinces, Manitoba/Saskatchewan and Alberta were increased to a goal of 100 each; [‡]Two and [§]five patients with incomplete surveys were omitted

took approximately 35 min to complete. The final patient sample was weighted by sex to reflect the breakdown of asthma in the Canadian population: 58% women and 42% men (12).

Patients were classified as having controlled or uncontrolled asthma according to their answers to specific survey questions about the six symptom-based criteria of control outlined in the Canadian Asthma Consensus Guidelines (1). The guidelines specify acceptable control as having daytime symptoms fewer than four days per week, night-time symptoms fewer than one night per week, no limitations on physical activity, mild and infrequent exacerbations, no absences from work or school, and fewer than four dosages per week of short-acting beta-2-agonists (SABAs) (1). Patients who failed two or more of the survey's six parameters of control were classified as having uncontrolled asthma. Asthma worsening was defined as a time during the past year when symptoms increased; asthma exacerbation was defined as an episode that required acute care (unscheduled physician visit, emergency department visit or overnight hospitalization in the past year).

Data were analyzed using SPSS (SPSS Inc, USA) and simple descriptive statistics, and Student's *t* test was used for comparisons between groups. The 95% confidence limits were $\pm 3.35\%$ (patient sample) and $\pm 4.6\%$ (physician sample).

RESULTS

Figure 1 shows the number of patients from each group enrolled in the study, and Tables 1 and 2 detail patient recruitment and survey completion results. The mean age of the patients was 39.2 years. Response rates were 7% for the patient survey and 7.3% for the physician survey (3.9% for specialists versus 8.8% for primary care physicians). Most patients were nonsmokers (58% had never smoked) and 12% were current smokers. By highest level of schooling, patients were more educated than the national average (13): 22% had completed high school (versus 14% nationally); 37% had attended community college or trade school (versus 29%), and 35% had attended or graduated from university or a professional school (versus 26%).

Most of the specialists were male (88%), in practice for a mean of 21.8 years, and working in either a solo practice or a hospital setting (76%) in a city (97%). Most of the family physicians were male (78%), in practice for a mean of 21.2 years, and working in either a shared office or solo practice (85%) in a city (77%) or small town (20%).

TABLE 2
Completion results for the patient survey

	n (%)*
Total dialed sample	26,210 (100)
Household not eligible	9885 (38)
Nonresidential/not in service	2484 (9)
Language barrier	137 (1)
Subtotal	12,506 (48)
New base (26,210 – 12,506)	13,704 (100)
No answer/line busy/ respondent not available	6539 (48)
Refusals	6128 (45)
Mid-interview refusals	29 (<1)
Excluded interviews†	115 (1)
Subtotal	12,811 (93)
Net completions (13,704 – 12,811)	893 (7)
Completion rate (893/[13,704 – 6539])	12%

*Direct contacts used in Figure 1 is derived from the number in the 'new base' minus the number in the category of no answer/line busy/respondent not available (13,704 – 6539 = 7165 patients). *Percentages may not add up to 100 due to rounding; †See Table 1 for regional quotas

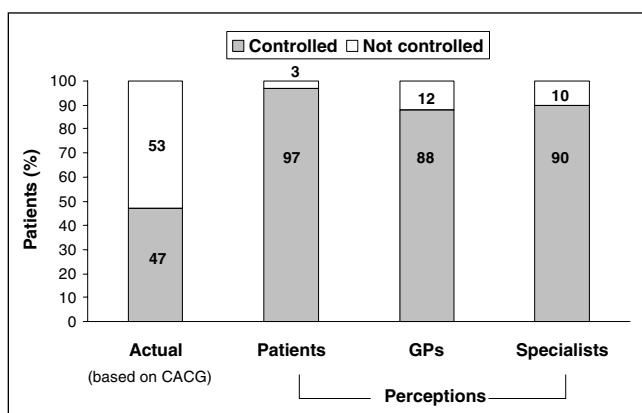


Figure 2) Uncontrolled asthma in Canada. According to the objective criteria of the Canadian Asthma Consensus Guidelines (CACG) (1), 53% of 893 patients had uncontrolled asthma; however, only 3% of patients thought that their asthma was uncontrolled. Survey question: "Overall, would you say your asthma is very well controlled, somewhat well controlled, not very well controlled, or not at all controlled?" (the response of 97% includes those who answered very well [59%] and somewhat well [38%] controlled). Specialists (n=77) and primary care physicians (GPs) (n=386) also underestimated the percentage of patients with uncontrolled asthma. Survey question: "Overall, do you feel you are achieving control of your patients' asthma?" (n=463)

Of the 893 asthmatic patients, 53% (n=474) had uncontrolled disease. Both physicians and patients grossly underestimated the magnitude of uncontrolled asthma (Figure 2). When asked to define asthma control, physicians most commonly responded in terms of the frequency or amount of medication used (Figure 3). Patients with uncontrolled asthma were most likely to fail the guideline criteria on the parameter of exacerbations: 81% of patients with uncontrolled disease versus 16% with controlled disease (P<0.01). Patients with uncontrolled asthma were also approximately 10 times more likely than those with controlled disease to have had daytime symptoms four or more days per week, night-time symptoms one or more nights per week, and absences from work or school (all P<0.01; Table 3).

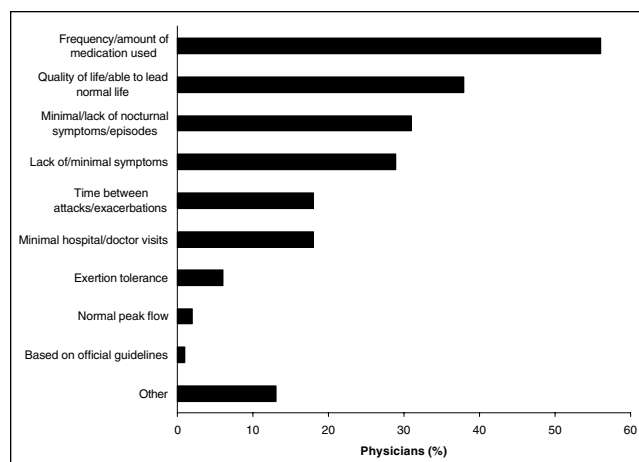


Figure 3) Physicians' definition of asthma control. Survey question: "How do you define control for an asthma patient?" (n=463)

TABLE 3
Patients' scores on six Canadian Asthma Consensus Guidelines (1) parameters of control

Guideline parameter of control	Total patient group (%) (n=893)	Controlled asthma patients (%) (n=418)*	Uncontrolled asthma patients (%) (n=474)*
Daytime symptoms			
<4 days per week	82	97	69
≥4 days per week	18	3	32
Night-time symptoms			
<1 night per week	71	95	50
≥1 night per week	29	5	50
SABA use			
<4 times per week	73	92	57
≥4 times per week	27	8	43
Physical activity			
Did not stop	64	87	44
Stopped	36	13	56
Absenteeism			
No	72	95	51
Yes	28	5	49
Exacerbation			
No	50	84	19
Yes	50	16	81

*The numbers of controlled (n=418) and uncontrolled (n=474) patients omit one of the 893 patients, who could not be classified because of 'don't know' responses or no answer to questions eliciting information about the respondent's asthma control. SABA Short-acting beta-2-agonist

Figure 4 depicts the asthma medication regimens of patients with controlled and uncontrolled asthma. Overall, 29% of patients were taking only inhaled short-acting bronchodilators for asthma, 40% were using inhaled corticosteroid (ICS) maintenance therapy with a quick reliever, and 22% were using a combination of an ICS and a long-acting beta-2-agonist (LABA) in addition to a SABA. Slightly more patients with controlled rather than uncontrolled disease took a bronchodilator alone. Among patients who took an ICS-containing regimen for asthma, most patients, regardless of their self-perceived asthma severity, took a low-dose ICS; the exceptions occurred in some groups with extremely small patient numbers (Table 4). Two-thirds (66%) of patients with uncontrolled asthma were taking an ICS.

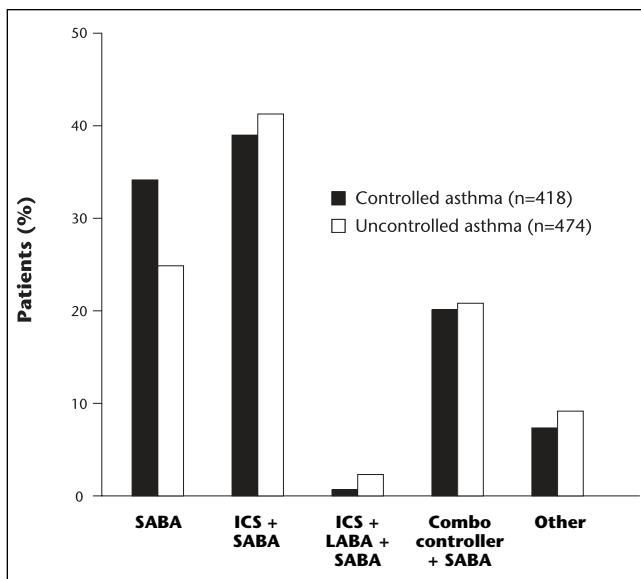


Figure 4) Percentages of patients taking classes of prescription medications for asthma. Combo Combination of an inhaled corticosteroid (ICS) and a long-acting beta-2-agonist (LABA) in a single inhaler. SABA Short-acting beta-2-agonist

Although 90% of physicians reported awareness of the Canadian asthma guidelines, only 6% of both specialists and primary care physicians always used the guidelines, and 33% of both groups based their asthma recommendations on the guidelines 'most of the time'. The majority of physicians (59%) regularly used or recommended an adjustable dosing regimen, with a small but significant difference between primary care physicians and specialists. Compared with 45% of specialists, 62% of primary care physicians favoured an adjustable dosing regimen ($P < 0.001$). Eight of 10 physicians thought it was best to control asthma with the least amount of medication possible, and the majority of patients (88%) wanted to use lower medication doses. Compared with patients with controlled asthma, those with uncontrolled disease were more

likely to have changed their daily maintenance or controller medication on their own to deal with their asthma symptoms without having consulted a health professional (31% versus 18%; $P < 0.01$).

Although 80% of physicians said that they provided verbal action plans and 22% provided written plans, 44% of patients reported having neither. Of those physicians who thought that action plans were important ($n = 442$), 56% thought that the plan should be written. By far the most common reason for not giving a patient a written asthma action plan was a lack of time (59%). Patients with uncontrolled disease were more likely than controlled-disease patients to have an action plan (61% had written, spoken, or both, versus 50%; $P < 0.01$; Figure 5). Among those with an asthma action plan ($n = 496$), 50% did not use it regularly (45% with controlled disease and 54% with uncontrolled disease), even though virtually all patients said that it was easy to follow.

Specialists were more likely than primary care physicians to send patients to a pulmonary function laboratory for spirometry (90% versus 79%, respectively; $P < 0.01$) and to use spirometry to monitor patients' status (75% versus 46%, respectively; $P < 0.01$). However, only 10% of surveyed patients reported having gone to a laboratory for spirometry; in addition, 25% thought that they had undergone spirometry in a doctor's office. The survey asked, "In the past year, has your doctor measured your lung function in his/her office by having you blow forcefully into a measuring machine called a spirometer, or has he/she asked that you go to a laboratory for such measurements?"

Physicians almost unanimously agreed (98% strongly or somewhat agreed) that patients needed more asthma education, and patients concurred (93% with uncontrolled disease versus 95% with controlled disease). Surveyed patients provided several examples of education needs. Although 67% of patients knew of the term 'reliever', only 59% of their reliever examples belonged to the class (Figure 6A), and 24% stated that relievers should be used regularly. Similarly, even though 74% of patients reported familiarity with the term 'controller' (the study classified LABAs and combination medications as controllers), just 63% of their controller examples belonged to

TABLE 4
Inhaled corticosteroid (ICS) dose in three ICS-containing regimens, classified by patients' perception of their asthma severity and an objective classification of control

ICS + SABA (n=317)*	Mild, controlled (%) (n=90)	Mild, uncontrolled (%) (n=82)	Moderate, controlled (%) (n=39)	Moderate, uncontrolled (%) (n=86)	Severe, controlled (%) (n=4)	Severe, uncontrolled (%) (n=14)
Low dose	69	60	59	42	20	40
Moderate dose	18	27	19	30	59	33
High dose	13	13	22	28	20	27
ICS + LABA + SABA (n=17)†	(n=2)	(n=6)	(n=1)	(n=2)	(n=0)	(n=5)
Low dose	50	14	100	50	–	85
Moderate dose	–	28	–	–	–	–
High dose	50	58	–	50	–	15
Combo controller + SABA (n=161)‡	(n=38)	(n=27)	(n=24)	(n=50)	(n=6)	(n=14)
Low dose	91	71	87	68	62	72
Moderate dose	6	23	13	22	–	17
High dose	2	6	–	10	38	11

The Canadian Asthma Consensus Guidelines (3) provide the ICS dose classification (eg, budesonide Turbuhaler, AstraZeneca Canada Inc): low dose, 400 µg/day or less; moderate dose, 401 µg/day to 800 µg/day; and high dose, greater than 800 µg/day. *Two, †one and ‡two patients were omitted because they could not be classified due to 'don't know' responses or no answer to questions eliciting information about the respondents' perception of asthma severity or objective asthma control. Combo Combination of an ICS and a long-acting beta-2-agonist (LABA) in a single inhaler; SABA Short-acting beta-2-agonist

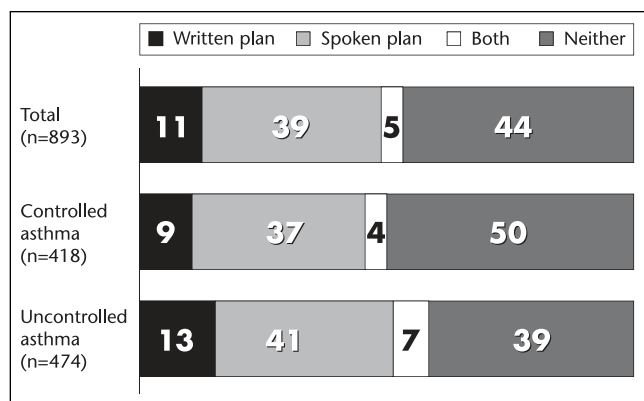


Figure 5) Percentages of patients possessing asthma treatment plans. Survey question: "Do you have an asthma treatment plan that is either written or spoken instructions of what to do if your asthma gets worse?"

the class (Figure 6B), and 26% of patients stated that controllers should be used as needed. The majority of patients were very or somewhat concerned about medication side effects (72% of patients with controlled asthma versus 81% of those with uncontrolled asthma). Almost three-quarters expressed concerns about taking an ICS. This concern was reflected in the desire of 81% of patients to use less ICS over the long term. According to physicians, education and comprehension issues were the main factors (41%) associated with poor adherence. The survey asked, "In your opinion, what factors are most likely to lead to patient noncompliance?" Of the 463 physicians, 21% cited education issues, and 20% cited understanding/comprehension of asthma and its treatment.

DISCUSSION

The asthma of Canadian adults remains poorly controlled, despite the availability of excellent treatments and a framework for their use, namely, the Canadian Clinical Practice Guidelines (1). Although the parameters described here show poor ongoing asthma control in the community, it should be noted that there has been a significant decline in hospitalizations for acute asthma in Canada over the past 20 years (14). A 1999 Canadian asthma study revealed that 57% of patients had poorly controlled disease (4) versus 53% in TRAC. Both studies used the same six asthma control criteria, which were based on the published guidelines. TRAC enrolled adult patients, whereas an earlier Canadian study (4) and a companion American study (8) included responses from parents of children who had asthma. A global survey (North America, Europe and Asia) (15), and studies in the United States (8), Europe (9) and Asia-Pacific (10) have all reported that asthma control fell far below goals (eg, an estimated six million Americans suffer from moderate or severe persistent symptoms) (8) and that patients consistently underestimated their degree of asthma control.

Both physicians and patients in TRAC exhibited knowledge deficits, compounded by a communication gap. This survey clearly shows that both groups had low expectations of symptom control, and patients remained confused about the differences between controller and reliever medications and when to use each type of drug. Because some patients stop treatment when their symptoms improve, they cannot recognize the importance of maintenance therapy to treat the underlying inflammation.

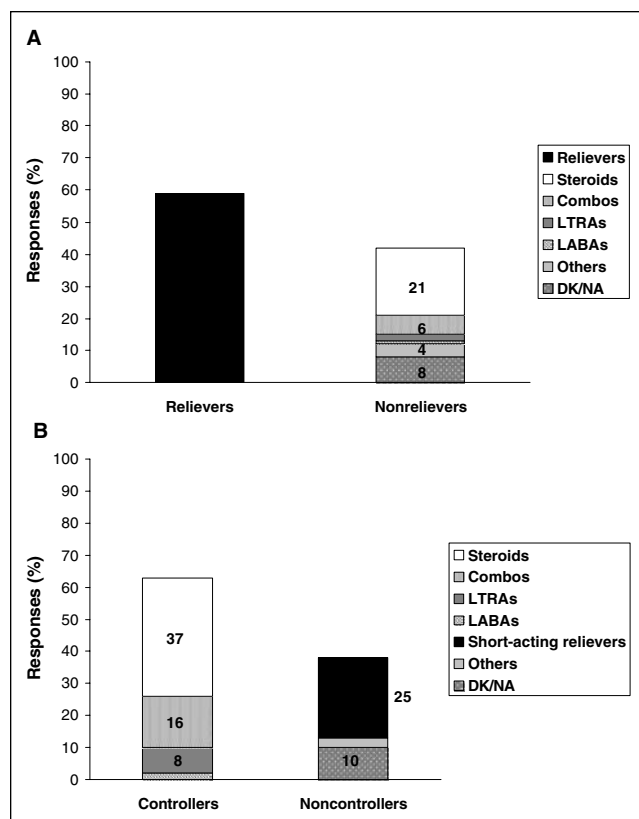


Figure 6) Knowledge of reliever and controller medications in the subsets of patients who had heard of each type of medication (n=594 for relievers; n=661 for controllers). Survey questions: "Have you ever heard of 'reliever'/'controller' medications for asthma?" and "Can you name one or more reliever/controller medications?" (note that respondents were permitted to give more than one answer). The figure categorizes the patients' examples of relievers (A) and controllers (B). Response percentages (of total drug mentions) may not add up to 100 because of rounding. Combos Combination of an inhaled corticosteroid and a long-acting beta-2-agonist (LABA) in a single inhaler; DK Don't know; LTRAs Leukotriene-receptor antagonists; NA No answer

Despite a recent report by Boushey et al (16), which suggested that intermittent ICS may have a role to play in the management of very mild asthma, it is important to realize that the majority of patients with mild-to-moderate persistent asthma require regular anti-inflammatory therapy. This need is well supported by large prospective studies such as the Inhaled Steroid Treatment as Regular Therapy in Early Asthma (START) trial (17), which showed that even in patients with apparently mild disease, severe asthma exacerbations can occur, and that an ICS has a protective role. TRAC found that almost three-quarters of patients were concerned about the side effects of ICS and eight of 10 patients hoped to decrease their ICS usage. These results indicate that some health care professionals are failing to communicate the benefits of an ICS or to put the risks in context. An earlier Canadian national telephone survey revealed the same worries: more than one-half of 603 adults with asthma were very or somewhat concerned about using an ICS regularly, and two-thirds had not discussed their concerns with a health care professional (18). After reassurance, 75% of patients in this study were comfortable with using an ICS (18).

Many studies have attempted to close the gap between patients' knowledge about asthma treatment and actual practice.

Kolbe and colleagues (19,20) used scenarios describing hypothetical asthma exacerbations to assess practical knowledge of asthma self-management. Patients' responses to the scenarios paralleled errors that patients made in real clinical situations, with psychological and socioeconomic factors influencing behaviour (20). Diamond and Chapman (21) demonstrated that a brief assessment and educational intervention in the community pharmacy produced significant 30-day improvements in patient-reported symptoms and self-management. To address educational deficits, physicians may need to understand and implement improved methods of knowledge transfer to patients. Perhaps guidelines should include a section on education techniques for knowledge transfer, and tools for adult learning and patient education. In addition, physicians may need to perform more frequent assessments of how well patients understand educational messages and follow-up with remedial action if indicated. The physicians interviewed for the TRAC survey identified inadequate education and poor comprehension as important factors in noncompliance with controller therapy.

The major goal of physicians' continuing medical education on asthma is to improve medical care through more effective translation of guideline recommendations into practice. Traditional (didactic) continuing education has failed to lead to guideline implementation, and approaches tailored to local factors may be necessary (22). In TRAC, although physicians' awareness of the Canadian asthma guidelines was high, a significant number of physicians ignored them. Guidelines are especially relevant in the assessment of control, when a global question of "How is your asthma?" could elicit an underestimation of the degree of control. In contrast, symptom-specific questions such as "Are you waking at night?" and "How often are you using your rescue medication?" could improve the assessment. Clearly, without an accurate definition of control (TRAC revealed knowledge deficits in this area) and without an accurate definition of the level of control obtained from symptom-specific patient assessment, physicians cannot initiate appropriate therapeutic strategies, particularly if they omit objective tests. The gap between the high spirometry rate according to physicians and the low rate according to patients in TRAC suggests a discrepancy between what physicians report and what really happens.

In addition to falling short in assessing according to guidelines, physicians often did not follow the guidelines for treatment. LABAs were absent from the top prescription drugs patients mentioned, although the guidelines recommend them as an alternative to increased doses of an ICS and as add-on therapy to moderate or higher doses of an ICS to achieve control of persistent asthma symptoms (level I evidence) (1). Many patients in the present study were taking an ICS and a SABA without having had their controller dose adjusted upwards to achieve optimum control. The results of TRAC demonstrate that physicians treated patients with controlled and uncontrolled asthma similarly. This finding suggests that physicians prescribe in a rote fashion, without assessing control and taking it into account when making prescription decisions. Physicians often failed to individualize treatment, especially by instructing their patients about how to adjust their medications in accordance with their symptoms.

Education has fallen short in the value of action plans, the ease of implementing them in practice, and the availability of resources such as asthma education centres. The use of written

action plans was found to be only 2% in a large chart review completed in primary care in Alberta (23). In this study, significantly more patients with uncontrolled asthma had action plans than patients with controlled disease. Perhaps patients with uncontrolled disease received slightly more education and preparation for asthma exacerbations than their well-controlled counterparts. However, their uncontrolled status seemingly contradicts the observations from other studies, including those from a Cochrane meta-analysis (24) that showed that written action plans improve outcomes. However, it should be noted that almost one-half of TRAC patients with uncontrolled asthma and an action plan ignored it. In addition, a written action plan is unlikely to be effective unless it is accompanied not only by verbal instructions but also by regular evaluation of the plan's implementation. The greatest barrier for TRAC physicians to the use of written asthma action plans was the lack of time. To overcome this barrier, asthma educators can provide invaluable support to physicians. A Canadian study increased the number of referrals to asthma education centres 10-fold by implementing a model for automatic referral that targeted patients with acute asthma who presented to emergency departments (25).

The study had some limitations. The low response rate may indicate that patients and physicians who were satisfied with the prevailing situation did not respond. The results do not identify specific education issues that lead to noncompliance, and no data are available on the types or quality of asthma education patients had received (to discern the potential effects of education on patients with controlled versus uncontrolled disease). Because the patient cohort was more educated than the national average, the patient data on confusion about drugs and the need for education likely understate the magnitude of the problems. TRAC's definition of control, with two failed control parameters, is stricter than the definition of the Canadian guidelines, which counts the failure of any single parameter as inadequate control. With the educated patient cohort and the stricter control definition, actual results may again be worse than the present study depicts. Patients may have had trouble remembering an asthma worsening that happened months ago (several survey questions explored specific details of asthma worsenings). To improve the validity of self-reported events that happened up to a year before the study, the study asked patients only about the last worsening. Data on patients who changed medications without consulting a health care professional include patients who changed their medications based on prior instructions. Finally, analyses that group the primary care physicians and specialists in one category bring together somewhat diverse groups and over-represent primary care physicians; the data analysis divided the two groups as much as possible.

CONCLUSIONS

TRAC confirms that asthma control in Canada remains poor, five years after the last large Canadian asthma survey (4). Superior asthma control is based on efficacy of drugs, taken as prescribed. Even being prescribed the 'right' medication does not guarantee its effectiveness, because of patient and physician factors. The patient may not use the medication properly or may have reached a therapeutic plateau and could obtain better control with combination therapy. Other criteria for effectiveness include a proper diagnosis, environmental control, control of postnasal drip and adherence.

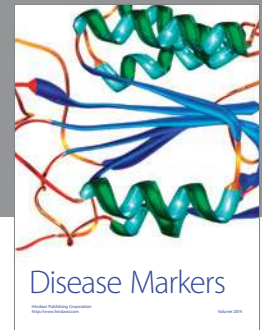
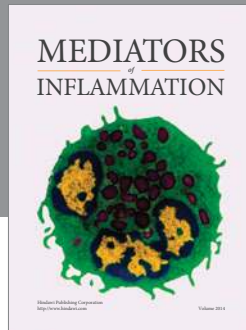
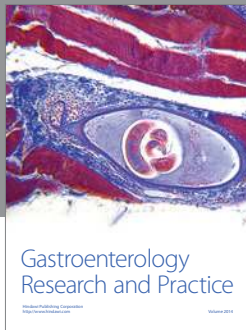
Addressing all of these factors requires a therapeutic alliance between patient and doctor, respect for patients' health beliefs, and clear communication that motivates patients and reinforces progress (26). Future efforts should focus on the best ways to use the well-established, evidence-based framework for the management of asthma to develop and implement multifaceted intervention strategies for both clinicians and patients with asthma.

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