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The error of not measuring asthma

According to national and global health statistics, we are facing an asthma epidemic. The most recent epidemiologic data suggest that 300 million people worldwide have asthma, and the global burden is projected to increase by another 100 million cases by 2025.[1] However, there is evidence that the magnitude of the problem may be overestimated. In this issue of *CMAJ*,[2] Aaron and colleagues show, in a prospectively recruited cohort reasonably representative of the Canadian population, that up to one-third of patients who have received a diagnosis of asthma actually have no evidence of the disease after rigorous testing and withdrawal of asthma medications.

To understand these results in the proper context, we must remember where we have come from in our clinical approach to asthma. Asthma can kill, yet virtually all asthma deaths are potentially preventable. Canada has reduced asthma mortality by more than 70% over the last 20 years and now boasts one of the lowest asthma death rates in the world.[1] Yet 287 Canadians died of asthma in 2003,[3] most likely unnecessarily. Moreover, asthma is responsible for a large burden of disability, similar in magnitude to that of diabetes.[1] A majority of Canadians with asthma have not achieved disease control,[4] despite many highly effective asthma medications that should allow most patients to maintain good control of their asthma most or all of the time. This is largely because the use of asthma medications still falls well below the level recommended by evidence-based guidelines.[5]

The findings by Aaron and colleagues therefore must not be interpreted as a reason to lower the suspicion of asthma when faced with patients with unexplained respiratory symptoms. Instead, the authors highlight a major problem in our system of asthma care: rather than just being overdiagnosed, asthma is misdiagnosed. Asthma misdiagnosis in patients with persistent or recurrent symptoms has important and potentially serious consequences to both patients and the health care system. Symptoms assumed to be due to asthma may instead signify another medical condition that thereby goes undiagnosed and untreated. Asthma and chronic obstructive pulmonary disease are routinely confused clinically in adults and can only be reliably distinguished with objective testing.[6] In children aged 6 or more years, testing can distinguish asthma from symptoms of recurrent infections due to an immunodeficiency or cystic fibrosis. Conversely, patients with atypical or poorly perceived symptoms of their asthma may be particularly likely to receive insufficient treatment if evaluated without objective testing. Yet these patients are often most at risk of disease instability. Because asthma is a chronic disease, the consequences of misdiagnosis may extend for many years.

The frequency of misdiagnosis is especially striking given that objective measurements of lung function can accurately diagnose most cases of asthma. The most basic form of such testing is spirometry, which measures the rate and volume of airflow through the lungs while patients are coached to exhale a full breath as rapidly as possible. A decrease in the flow rate indicates an obstructive lung disease, of which asthma is by far the most common type. An improvement in the flow rate after the patient is given a short-acting bronchodilator confirms the diagnosis of asthma. Although full-scale pulmonary function laboratories perform more elaborate testing using expensive and complex equipment, spirometry can be performed with acceptable accuracy using portable equipment that can be set up in any physician's office at an up-front cost of a few thousand dollars.

Despite this, nearly half of patients with physician-diagnosed asthma have never undergone spirometry.[4] Many more have never received the more specific testing required to distinguish asthma from other obstructive lung diseases. Without such testing, clinical diagnosis of asthma, even by asthma specialists, is incorrect for about one-third of patients[6] because asthma symptoms are similar to those of many other respiratory conditions. Since the vast majority of asthma patients are diagnosed and managed by their family doctor, the responsibility to ensure the diagnosis is accurate often falls to primary care physicians.

Failure to make the diagnosis of asthma objectively is unacceptable. A physician who attempted to manage hypertension without measuring blood pressure or to manage hypercholesterolemia without measuring serum cholesterol levels would not be considered to be maintaining an adequate standard of care. Treating asthma without having performed at least spirometry is no different. Although interpreting spirometry results requires more skill than using a blood pressure cuff or ordering a blood test, reading an electrocardiogram requires similar skill and training, yet is a routine test for any primary care physician. There is no good reason for spirometry not to be equally routine in a primary care practice. Physicians who do not use spirometry for their asthma patients should not be managing asthma, yet primary care physicians cannot avoid managing this very common disease.

Barriers to the utilization of pulmonary function testing do exist. Access to laboratories that perform pulmonary function testing is limited. In fact, provincial governments restrict the number of licences, which generally prevents new laboratories from opening. Like many other health care resources, access to pulmonary function testing also varies by geographic region. Thus, hospital-based laboratories often have long waiting lists, although a few make spirometry available on a walk-in basis. Even when testing is done, time needed for interpretation may delay results from reaching the ordering physician.

Consequently, to ensure patients receive adequate and timely access to care, primary care physicians cannot rely exclusively on tertiary care laboratories run by specialists. Instead, most need to make testing available in their own offices. Although it is feasible for primary care physicians to perform

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Box 1: How to avoid barriers to obtaining pulmonary function testing

- Know where local pulmonary function laboratories are located and the length of the waiting lists.
- Patients are more likely to go for testing if their appointment at a pulmonary function laboratory is booked while they are at your office.
- Ask laboratories to fax the uninterpreted results so that you can begin to interpret the results without having to wait for the official report.
- Participation in a mentor system in which primary care physicians have access to an expert colleague for help with difficult spirometry interpretations can be a useful support tool.
- Proper testing techniques can be reinforced through participation in continuing education programs.

spirometry in an outpatient setting,[7] the equipment requires an initial capital investment and regular calibration, and training is required to perform the test and interpret the results. Moreover, reimbursement for spirometry testing varies by province: Quebec, Nova Scotia and Newfoundland provide no funding for primary care office-based spirometry, and British Columbia will not pay for spirometry performed on the same day as a primary care office visit for asthma.

Instead of testing, physicians often give treatment to patients with respiratory symptoms empirically and indefinitely. This may be easy, but it may not be good medicine. Substantial numbers of such patients are needlessly exposed to possible adverse outcomes (albeit usually minor) and costs, which can exceed $100 per month for a single medication. Although giving a trial of a therapy as a means of confirming the diagnosis of asthma can be a rational strategy, there must be objective measurement of the treatment response, or the trial will lead to both underdiagnosis and overdiagnosis.

Some physicians recommend that their patients monitor peak expiratory flow at home as an alternative to spirometry. Although it is sometimes possible to confirm the diagnosis of asthma this way, peak flow measurement is an inadequate substitute because it is much cruder and less accurate than spirometry. Peak flow measurement has a role for selected patients in self-monitoring and in identifying occupational exposures that cause asthma, but it cannot replace spirometry as a practice tool.

At a minimum, all patients with suspected asthma must have the diagnosis confirmed by spirometry. When necessary, these patients should be referred for more specialized testing such as methacholine challenge. To meet this standard of care, all physicians who treat asthma must regularly refer patients to a pulmonary function laboratory, have personnel in their own clinic to perform spirometry, or perform spirometry themselves. Barriers to doing so must be, and can be,[7] overcome (Box 1). At the same time, governments must step up and invest in proper asthma management, including licensing more pulmonary function laboratories, so that proper testing is available — and reimbursed — in every practice setting across the country. Finally, patients who have been diagnosed with asthma but who have not had spirometry performed at least once should demand of their physician to know why they have not received this test.

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