



Editorial

Éditorial

**Dr. Anthonisen is Dean
of the Faculty of Medicine,
University of Manitoba,
Winnipeg, Man.**

*This article has been peer
reviewed.*

*Can Med Assoc J 1997;156(2):
202-4.*

Spirometric testing: How much is enough?

Nicholas R. Anthonisen, MD, PhD

Abstract

THE AUTHOR COMMENTS ON THE REPORT by Dr. Benjamin Chan and associates on spirometry utilization rates in Ontario (see pages 169 to 176 of this issue). Their findings indicate that the overall utilization of spirometry in the province is not unreasonably high and may in fact be too low in certain regions and patient groups. The author argues, however, that to a large extent the wrong type of spirometry is being done. Although the wider use of flow studies should be promoted, the utility of flow-volume loops rather than simple spirograms as an office procedure is highly questionable.

Résumé

L'AUTEUR PRÉSENTE DES COMMENTAIRES SUR LE RAPPORT du D^r Benjamin Chan et collègues au sujet des taux d'utilisation de la spirométrie en Ontario (voir pages 169 à 176 du présent numéro). Leurs constatations indiquent que l'utilisation globale de la spirométrie dans la province n'est pas déraisonnable et peut en fait être trop faible dans certaines régions et pour certains groupes de patients. Cependant, l'auteur soutient qu'on utilise dans une grande mesure le mauvais type de spirométrie. Même s'il faudrait promouvoir l'utilisation accrue des tests de spirométrie, l'utilité des tests à boucle débit-volume plutôt que celle du spirogramme simple dans le contexte d'une intervention en cabinet est très douteuse.

In this issue (see pages 169 to 176) Dr. Benjamin Chan and associates report on utilization rates for spirometry (pulmonary flow studies) in Ontario in the fiscal years 1989-90 to 1994-95. Their findings are of interest, although the database on which their study rests has distinct limitations. Expenditures for spirometry and the number of flow studies billed are reported, but not the number of patients tested, the number of studies performed per patient or the patients' diagnoses. Flow studies performed in physicians' offices appear to be aggregated with those performed in hospital laboratories for outpatients. If data showing these distinctions had been available, sharper conclusions could have been drawn about the appropriateness of spirometry utilization; the authors are therefore wise to be cautious in interpreting the policy implications of their results.

In brief, Chan and associates note that in 1994-95 more than 460 000 flow studies were billed in Ontario; this was a substantial increase over the fiscal year 1989-90, but not the year 1991-92. The number of studies peaked in 1992-93, at more than 480 000. The number of physicians who billed for flow studies showed a steadier increase, although there was a slight decline from 1993-94 to 1994-95. Ontario Health Insurance Plan expenditures increased for two reasons: more studies were done, and there was a small but significant shift away from simple spirograms — the measurement of FEV₁ (forced expiratory volume in the first second) and FVC (forced vital capacity) — toward more expensive flow-volume loops. The distribution of testing was uneven. Among general practitioners and family physicians (GP/FPs), a minority carried out most of the studies. Individual internists and pediatricians performed or ordered more studies than individual GP/FPs. Elderly people were tested more often than young people. There were also striking regional variations in utilization, especially within family medicine and general practice.



What are we to make of this? As a specialist in lung diseases I am convinced that spirometry is enormously valuable. It is the gold standard in the diagnosis and assessment of obstructive diseases of the lungs, including asthma and chronic obstructive pulmonary disease (COPD). In patients suspected of having these conditions, spirometry is of far greater value than physical examination of the chest. Therefore, I believe that flow studies should be carried out in the office — any physician's office — when the differential diagnosis includes asthma or COPD and that repeat spirometry for patients with established

asthma or COPD are justified when the physician believes that the patient's status has changed. This view is consistent with current guidelines for the management of these diseases.¹⁻³ When these guidelines are considered in the light of the high prevalence of asthma and COPD, a high utilization rate is justified. For example, in 1988 roughly 3.4% of Manitobans had asthma or COPD,⁴ and this rate is increasing.⁵ Given this prevalence, it is easy to rationalize at least 500 000 studies per year in Ontario.

We may conclude that the overall utilization of spirometry is not unreasonably high in Ontario; it might even be too low. However, overall utilization rates constitute a blunt instrument for health care analysis. What we really need to know is if the right patients are being given the right flow studies. It is this question that Chan and associates try to address by looking at variations by region, age and physician group. One thing clearly emerges from their data: to a surprising extent, the wrong studies are being done. Over 80.0% of studies are not simple spirometry but analyses of the expiratory flow-volume curve. Such analyses are powerful in expert hands and sophisticated laboratories, but their utility as office procedures are highly questionable. They are helpful in the diagnosis of some types of upper airway obstruction, but these conditions are uncommon. Flow-volume loops may be more sensitive than simple spirometry in detecting small airways obstruction, but this sensitivity is to some extent undermined by the poor reproducibility of results and the wide range of normal values. Further, it has not been shown that this increased sensitivity enhances clinical decision-making. Flow-volume loops should probably be carried out only in hospital laboratories as part of an initial workup and should not be repeated more than once a year. It is hard to imagine that as much as half of all flow studies could justifiably involve flow-volume analyses.

**Utilization of spirometry is not
unreasonably high in Ontario
However, overall utilization
rates are a blunt instrument
for health care analysis.**

Other variations in the data reported by Chan and associates lead to less clear conclusions. It is not surprising that the internists and pediatricians who interpret lung-function tests do so for relatively large numbers of patients; presumably, these physicians specialize in lung diseases to some extent. Possibly the same is true of at least some of the GP/FPs who are "high-volume billers." It is heartening to see that the number of physicians in all categories doing flow studies is growing. The increase in the number of tests is due more to an increase in the number of physicians providing spirometry than to an increase in the number of studies per physician. This seems to imply that more patients are being tested.

The fact that many more flow studies were done in patients aged 60–80 years than in younger patients is presumably ascribable to COPD, which has an estimated prevalence rate of about 10% in this age group.⁶ The utilization rate of about 8% for Ontarians in this age group is thus explicable and may well be justifiable. On the other hand, the prevalence of physician-diagnosed asthma among children and young adults is 2% to 3%,⁵ and many of these patients should be tested more than once a year. It may be that flow studies are underutilized in children and young adults. The sharp increases in flow studies noted in children are probably appropriate, given the rising prevalence of respiratory problems in this group.

The striking regional differences in spirometry billings presented by Chan and associates are difficult to interpret. Flow studies may well be underutilized in the three macroregions (Southwest, Northeast and Northwest) that reported the lowest billings; assuming an average of \$27 per test, slightly more than 3 studies were done in 1994–94 per 100 people in the Southwest region, and fewer in the Northeast and Northwest. It seems likely that not all people with asthma and COPD underwent testing in these regions. On the other hand, about 5.8 studies were performed per 100 people in the Central East region, and it is not clear that this was too much. Because of patient movement, rates in macroregions are probably more meaningful than rates in smaller regions, and the data presented by Chan and associates regarding studies done by GP/FPs in areas served by district health councils are especially difficult to interpret. Again, it seems probable that in the many regions where 3 to 4 studies were done per 1000 people,

flow studies are underutilized. Whether they are overutilized in districts such as Metropolitan Toronto, where roughly 26 studies were done by GP/FPs per 1000 people, depends on the number of additional studies done by specialists.

In summary, spirometry is a valuable clinical tool in the diagnosis and assessment of several common diseases and should be promoted. Obviously, testing is best done in physicians' offices. It is likely that flow studies are underutilized in much of Ontario, and it is possible but by no means certain that they are overutilized in other parts of the province, such as Metropolitan Toronto. Flow studies are an obvious target for "health reform": by far the most valuable information are the FEV₁ and FVC as recorded by simple spiograms, and tests that generate more data should be employed much less frequently than is now the case in Ontario.

References

1. Hargreave FE, Dolovich J, Newhouse MT. The assessment and treatment of asthma: a conference report. *J Allergy Clin Immunol* 1990;94:1098-1111.
2. National Asthma Education Program. *Expert panel report: guidelines for the diagnosis and management of asthma*. (NIH pub no 91-3042). Bethesda (MD): US Department of Health and Human Services, 1991.
3. American Thoracic Society. Diagnosis and care of patients with COPD [guidelines]. *Am J Respir Crit Care Med* 1995;152:S77-S120.
4. Manfreda J, Becker AB, Wang PZ, Roos LL, Anthonisen NR. Trends in physician diagnosed asthma prevalence in Manitoba between 1980 and 1990. *Chest* 1993;103:151-7.
5. Erzen D, Roos LL, Manfreda J, Anthonisen NR. Changes in asthma severity in Manitoba. *Chest* 1995;108:16-23.
6. Feinlieb M, Rosenbergg HM, Collins JG, De-lozier JE, Pokras R, Chevarly FM. Trends in COPD morbidity and mortality in the United States. *Am Rev Respir Dis* 1989;140:S9-S18.

Reprint requests to: Dr. Nicholas R. Anthonisen, Office of the Dean, Faculty of Medicine, University of Manitoba, A101 Chown Building, 753 McDermot Ave., Winnipeg MB R3E 0W3; fax 204 783-5358; anthonis@bldghsc.lan1.umanitoba.ca