



Take a Deep Breath: Spirometry in Primary Care

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Interest in office spirometry has increased in the last 10 years, as it is suggested that lung function is now a measure of global health.¹ In fact, lung function changes over time help identify coronary artery disease, stroke, and lung cancer, not to mention obstructive and restrictive lung disease.

Spirometry is a simple test that allows primary care physicians to not only diagnose and assess obstructive and restrictive disease, but also to fol-

low the progress of identified diseases (Figures 1 to 4).

Screening spirometry is good preventative medicine for at-risk patients. Repeat spirometry over time becomes part of the regular "checkup" and is a tool for tracing the course of the disease, as well as a guide for medical intervention. For example, a spirometry test of a patient who has smoked 20 packs/year for the past 45 years may lead to an

Simon's Presentation

Simon, 54, is an industrial painter with a 45 pack/year history of smoking. He presents with persistent cough and shortness of breath following an upper respiratory infection three months ago.

Paint fumes now bother him, particularly oil-based formulations.

Investigation:

Screening blood work was normal. A chest X-ray suggested some bilateral scarring, particularly in the bases.

Office spirometry:

- Weight: 190 lbs. (87 kg)
- Height: 72 in. (180 cm)



	<u>Normal</u>	<u>Observed</u>	<u>% Predicted</u>	<u>Post-bronchodilator</u>
FVC	4.8	2.98	62	3.10
FEV ₁	3.65	1.65	45	1.78
Fev ₁ /FVC(%)	76	55		

FVC: Forced vital capacity

FEV₁: Forced expiratory volume in one second

Interpretation:

Moderate airway obstruction with a slight bronchodilator response.

What would you do for Simon? For more, go to page 122.

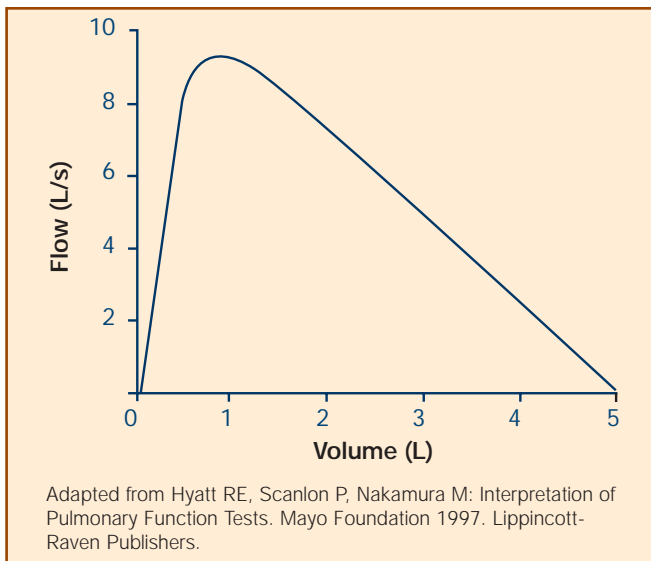


Figure 1. Normal spirogram with good effort.

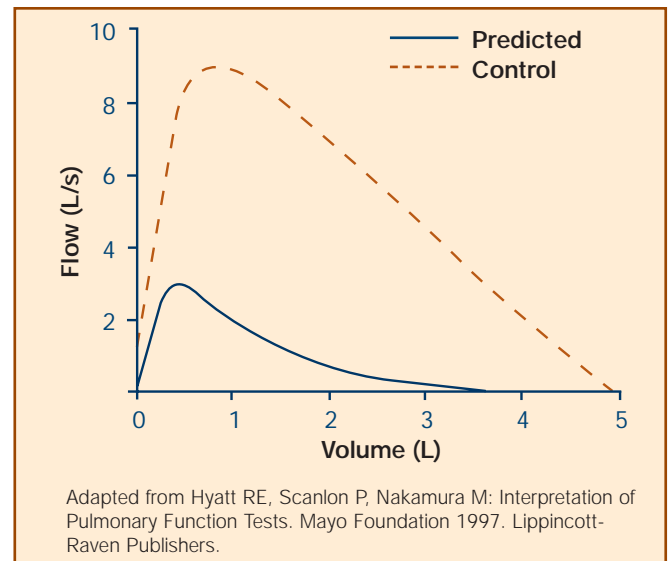


Figure 2. Example of COPD with low peak flow and delayed expiration; volume is low.

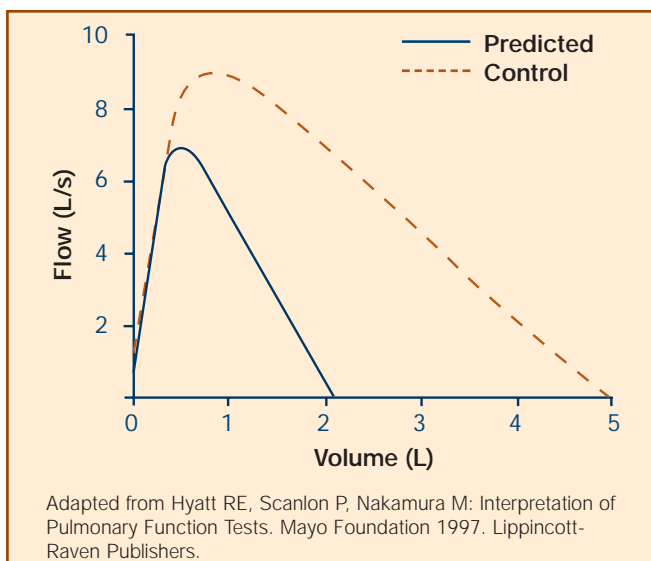


Figure 3. Restrictive disease detected on spirogram with narrow loop and rapid exhalation.

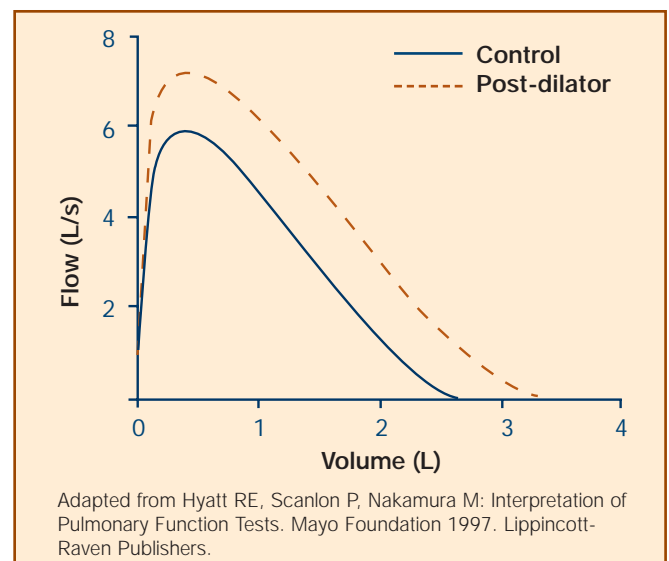


Figure 4. Asthma with reversible component.

early diagnosis of chronic obstructive pulmonary disease (COPD), which allows the physician to initiate therapy and promote smoking cessation.

How does it stack up?

Office spirometry is much more effective than the peak flow meters used for following asthma management. A peak flow meter measures expiratory effort, typically through

short blows with maximum effort. Therefore, the test:

- does not measure small airways,
- is effort-dependent, and
- is subsequently less accurate than a spirometer.

On the other hand, the parameters recorded through spirometry include forced vital capacity



Followup on Simon

What would be your course of action?

- Refer for full lung function to assess lung volumes and single breath diffusion (D_LCO).
- Start on a bronchodilator.
- Institute a smoking cessation program.
- Review work environment and other possible exposures.

Answer: All of the above

Followup plan:

Repeat spirometry in six weeks, and consider referral:

- to a respiratory rehabilitation program if available; if not, initiate education of patient and family regarding smoking and potential deterioration of current condition;
- for worker's compensation; and
- to a pulmonary specialist.

(FVC) and forced expiratory volume in one second (FEV_1), from which the FEV_1/FVC ratio is derived. These are key measures for diagnostic and treatment decisions.

Are you qualified?

A poorly performed test will result in unacceptable and non-reproducible readings. Therefore, when performing a spirometry test, it is important to use a good technique and quality controls that adhere to American Thoracic Society guidelines.²

The need for training was highlighted by the Eaton study, which revealed very poor performance by untrained physicians.³ According to the New Zealand-based study, only 5.1% of patient tests performed by untrained physicians were acceptable. Interested primary care physicians should seek professional help in applying the skills needed to test properly by completing a training program under the supervision of a pulmonary specialist and well-trained technical staff.

Frequently Asked Questions

1. Why not use a peak flow meter?

This testing tool is selective and beneficial for asthma management, but is only as useful as the patient's effort. For better evaluation, a longer test (*i.e.*, six seconds) is more accurate. With peak flow, there is usually no ongoing quality control, so the results may be inaccurate.

2. Why should spirometry be done at all?

If for no other reason than the early detection of COPD, an illness grossly under diagnosed by primary care physicians. As evidenced by recent work in rehabilitation, an early diagnosis will guarantee the patient a good quality of life.

3. I work in a four-doctor practice. Should we all do office spirometry?

It depends on the individual physician. One or more may wish to take training and provide a useful service to the group. Remember, a commitment is required to provide acceptable and reproducible results.

4. Do I get paid for performing spirometry?

Yes. Provincial paying agencies have a fee code, which includes post-bronchodilator results. If such a service is for private industry, a fee is applicable. Of course, testing must meet provincial standards.



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Take-home message



- Spirometry:
 - is mandatory when screening a smoking population;
 - is a useful diagnostic tool for patients with cough, wheeze, or chest tightness;
 - represents an excellent method to follow a respiratory patient's progress, and
 - is a good workplace assessment tool where exposures are present.

Keeping an ongoing record of results acts as a quality control measure to insure reliability, as a review of test results over time points out if technique is becoming sloppy. Also, using a biologic control is ideal to assess technique and test results. For example, FEV₁, FEV₆ and the FEV₁/FEV₆ ratio accomplishes this goal and thus, are the only parameters needed in a physician's office.

Are there other advantages of spirometry?

Pre-operative spirometry assessments are most useful for the anesthetist and surgeon, particularly if the patient has a history of smoking.

Office spirometry performed in a primary care setting is also useful to monitor the effects of envi-

ronmental or occupational exposure.⁴ In some instances, although most assessments are done in hospital outpatient facilities, pre-operative assessment for surgery requiring anaesthesia may be an important role for the primary care physician.

The continual monitoring for chronic disease (*i.e.*, rheumatoid arthritis, vasculitis, or drug-induced fibrosis) is another important use offered by office spirometry.

Finally, office spirometry serves as a screening test to determine when a patient should be referred to a specialized lung function laboratory.

The competent and appropriate use of office spirometry is a challenge for the primary care physician who wishes to provide the patient with front-line preventative care. CME

References

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