Respiratory Therapists Should Offer Spirometry Expertise to Local Primary Care Providers

Drug companies are now spending tens of millions of dollars each year in the United States for asthma and COPD awareness campaigns as well as direct-to-consumer advertising for their inhalers. Short asthma and COPD screener symptom questionnaires are found in magazines, Internet sites, and doctors' offices, urging people to "see your doctor" if you have risk factors.[1,2] The majority of primary care providers then ask about respiratory symptoms and smoking, then make a diagnosis of asthma or COPD and prescribe inhalers without any tests to confirm airway disease. That is, they make no attempt to confirm the O (obstructive) in COPD. If the patient reports feeling better after using the inhaler(s), the drugs are usually refilled for the rest of the patient's life.

Sometimes the situation is no better when spirometry *is* performed with these patients, because the results are inaccurate or interpreted incorrectly. In your community, probably more spirometry tests are done by primary care providers than by respiratory therapists in pulmonary function test (PFT) laboratories. For more than a decade the National Lung Health Education Program (NLHEP) has urged family physicians to buy and use office spirometers.[3] Inhaler manufacturers have purchased tens of thousands of office spirometers and given them to primary care practitioners, after 1 to 16 hours of spirometry education and training. The results have been almost universally disappointing. Of the 1 in 5 primary care physicians who continue to use spirometers, fewer than 1 in 3 patients with an indication for spirometry get tested[4]; only 1 or 2 spirometry tests are done per week[5]; post-bronchodilator spirometry is rarely done; and only about half of the spirometry tests meet the quality goals.[6]

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Office spirometry is widely promoted by our colleagues in Australia and New Zealand. In this issue of RESPIRATORY CARE, investigators from Australia report on the quality of spirometry tests done by 12 general practices over 1 year, following 2 days of initial training done by experienced respiratory scientists, with follow-up on-site visits with reviews and brief retraining at 5, 7, and 9 months.[7] They found that many of the sites had done no spirometry tests; only 40% of the tests done during the first 5 months met the quality goals; but that the number and quality of tests improved after each site visit. They conclude that spirometry training courses, no matter how rigorous, are inadequate: continuous review of and feedback regarding the quality of office spirometry tests are necessary to improve and maintain competency and minimize error rates (also known as a continuous-quality-improvement program).

Spirometry skills can't be learnt from a book. Good spirometry skills develop most efficiently during an "on the job" apprenticeship. The student first watches the mentor quickly obtain athletic-like breathing maneuvers from a variety of patients. The mentor must stress the importance of a dramatic demonstration of the correct breathing maneuvers, followed by enthusiastic coaching. The patient's body language during each of the 3 phases of the forced-vital-capacity maneuver tells what went wrong and how to improve the next maneuver. Recognition of flow-volume and volume-time patterns confirms the type of error. After several patients the roles are reversed and the mentor "watches over the shoulder" of the student as she tries to get good efforts from patients. The mentor patiently provides feedback to the student after each maneuver. Unfortunately, most spirometry courses spend more than half the time on dry lectures, and perhaps 2 hours on a "hands-on" workshop where students test each other.[8] Continual review of and feedback regarding spirometry quality is necessary, until the skills become permanent.

The American Association for Respiratory Care is working to improve the quality of spirometry tests done outside of a PFT laboratory. Respiratory therapists and physicians working with the NLHEP check the features of office spirometers to see if they provide automatic quality checks and quality grades (A through F), and then appropriate interpretations using only FEV_1, forced vital capacity (or its surrogate, FEV_6), and the ratio.[3] Four office spirometers have been approved by this program so far. The American Association for Respiratory Care developed an inexpensive, performance-based spirometry "certificate" for the staff of primary care practitioners.[9] The Internet-based exam is similar to the asthma educators' exam, but because effective spirometry requires active coaching and the recognition of each patient's "body language" while performing the

athletic-like breathing maneuvers, dozens of 10-second video clips are utilized for the exam. Applicants are required to submit a letter from the physician who supervises their work, along with tracings from 10 spirometry tests they have done.

You can improve this situation of poor quality and low rates of spirometry testing in your community. Learn how to perform good quality spirometry tests and then take the Certified Pulmonary Function Technologist (CPFT) exam. Get acquainted with local primary care providers and offer either to provide a continuous-quality-improvement program for their staff who perform spirometry, or offer to provide spirometry testing (including a post-bronchodilator test when the pre-bronchodilator test is abnormal) at their clinic once per month.[7] An efficient COPD case-finding program starts with FEV_1 measurement.[10] Adult smokers with an FEV_1 below 70% of predicted are referred for pre-bronchodilator and post-bronchodilator diagnostic-quality spirometry. Of course, normal spirometry does not rule out mild asthma in patients with asthma-like symptoms.

The American Thoracic Society's spirometry quality goals[11] were set so that 90% of patients could meet each of them when tested by an experienced pulmonary function technologist.[12] In practice, an average of 80% of adult participants in research studies meet all of these goals.[13] However, it remains unclear how often tests that do not meet these goals actually cause a misclassification of the interpretation category. Tests with suboptimal quality are most likely to cause misclassification when the results are near the lower limit of the normal range thresholds. So less confidence should be placed in tests with poor quality that are borderline or mildly "abnormal." Respiratory therapists who perform spirometry must express this uncertainty to the physician who ordered the test. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines for spirometry interpretation cause very high rates of misclassification.[14,15] The NLHEP office spirometry guidelines[3] require only 2 acceptable maneuvers that match closely as good quality, while the American Thoracic Society's spirometry quality goals[11] require 3 acceptable maneuvers, and the highest 2 FEV_1 values must match within 150 mL. Studies have not been published that estimate how often the *lack* of an additional acceptable maneuver changes interpretations. Providers who use spirometry results for patient management must learn to accept uncertainty. Sometimes the post-test probability of disease remains the same as the pre-test probability.

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