

## The American Association for Respiratory Care and the National Lung Health Education Program: Assuring Quality in Spirometry

There is no doubt that chronic obstructive pulmonary disease (COPD) is an important disease in the United States. Not only does COPD produce progressive disability and loss of function over many years, it also is very costly to the health care system.<sup>1</sup> The good news is that COPD can be prevented and managed to significantly improve the patient's quality of life and limit the related societal health care costs.<sup>2</sup> The critical prevention strategy is smoking cessation. Even for established disease, however, there is an array of symptom-controlling medications that improve function and outcome. In addition, in hypoxemic patients oxygen improves both quality of life and survival. Pulmonary rehabilitation programs benefit patient function and provide cost-effective disease management. Finally, the recently completed National Emphysema Treatment Trial showed that in selected emphysema patients lung-volume-reduction surgery improves function and survival.<sup>3</sup>

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There is bad news, however, in our efforts to manage the COPD epidemic. Foremost among these is the lack of awareness of COPD by both victims and caregivers. The fact that millions of Americans continue to smoke speaks volumes about the public's denial of the link between cigarette smoking and serious health problems. In addition, access to proper disease management strategies is seriously lacking among many of those afflicted with COPD, often because patients and caregivers are unaware of the many treatment options available.

To address these issues the National Lung Health Education Program (NLHEP) was created with a mission of increasing COPD awareness and education. Recently, the American Association for Respiratory Care (AARC) joined forces with NLHEP in a union that will clearly help accomplish that mission.<sup>4</sup> NLHEP has articulated 2 specific goals.<sup>5</sup> The first is a global educational campaign to raise awareness among patients and health care givers about the impact of COPD and about the various ways to prevent it, detect it, and manage it once it is established. The second goal is a more specific recommendation to use spirometry

as a screening tool to detect airflow obstruction in its early stages. In my view, three issues about the spirometry recommendation raise concern. Fortunately, the AARC is well positioned to address these concerns.

First, the NLHEP recommendation is to use a new type of spirometer, the "office spirometer." These devices would have the same technical specifications as the American Thoracic Society spirometers<sup>6</sup> but instead measure only 6 seconds of expiratory flow and would not have visual analog displays of the expiratory maneuver. In place of those analog signals, automated algorithms assure quality tracings. These devices would thus be less expensive and presumably easier to operate than the diagnostic devices used in a pulmonary function laboratory. It remains to be seen, however, if those automated quality-control algorithms can really replace experienced technicians evaluating spirometric tracings and assure test acceptability and repeatability. Even the recent NLHEP document acknowledges uncertainty about that.<sup>5</sup> A recent assessment of automated office spirometry in New Zealand<sup>7</sup> raised a number of "red flags:" in that trial 55% of the tests performed by clinician office personnel were judged technically inadequate by the investigators. NLHEP has called for studies to assess the appropriateness of these automated spirometers.<sup>5</sup> The AARC should join with NLHEP in doing those studies and developing appropriately automated spirometry systems.

My second concern is related to the first. Specifically, the NLHEP requirements for training of spirometry technicians seem suboptimal in that only an ill-defined, on-the-job type training program is described.<sup>5</sup> That is a marked departure from both American Thoracic Society and AARC recommendations for pulmonary function technicians.<sup>8</sup> The American Thoracic Society recommends at least a year of post-high-school formal training, and the AARC clinical practice guideline further recommends certification as a registered pulmonary function technologist. Suboptimal technician training can substantially limit spirometry quality. The New Zealand office spirometry study<sup>7</sup> involved only on-the-job training<sup>5</sup> and there were large numbers of unacceptable tests. I believe the AARC should take a strong stand in requiring appropriate training and certification of spirometry technicians. As a side note I should also point

out that the New Zealand study also emphasized that interpreters of pulmonary function tests, if not properly trained, can misdiagnose tests up to 50% of the time.<sup>5</sup>

My third and final concern actually challenges the premise of the benefit of screening spirometry—that it will change outcomes. Certainly, spirometry can be very useful in diagnosing or confirming obstructive airway disease, in guiding management strategies, in assessing responses to therapy, and in predicting long-term outcomes,<sup>6</sup> but the role of spirometry with an asymptomatic individual seems less clear. Specifically, in early-stage COPD, when symptoms are not an issue, the only therapy is prevention of further lung injury, through smoking cessation. A key question then becomes: does knowledge of early airway obstruction facilitate smoking cessation? Even NLHEP will agree that the answer to that question is not clear.<sup>5</sup> Several studies have looked at the question and, as the NLHEP documents point out, knowledge of lung disease is not a particularly potent stimulus (and perhaps no stimulus at all) to smoking cessation.<sup>5,9,10</sup> This is testimony to the strength of the tobacco addiction and the difficulty of effecting behavior change when no symptoms are present.

There is also a potential reverse effect from screening spirometry among smokers who have normal spirometry. Such a smoker might conclude, “cigarettes haven’t hurt me,” and thus feel no motivation to quit. As yet there are no research data that such asymptomatic, normal-spirogram smokers actually do say that, but it seems highly plausible that they might, so this is still just a theoretical concern. Better studies on the effect of screening spirometry are clearly warranted, and NLHEP and the AARC should be at the forefront of those studies.

In conclusion, the goals of the AARC and NLHEP to raise COPD awareness and to encourage proper COPD treatment and management are laudable and to be encouraged. Providing optimal medical care and rehabilitation is clearly worthwhile from both the patient’s and a societal perspective. Furthermore, spirometry clearly has a role in the diagnosis and management of COPD. I encourage AARC and NLHEP, however, to examine the concerns I have noted above, to assure that the quality of spirometry is as high as possible and that care is truly cost-effective. In the end it’s the balance between availability and ease of use of a procedure versus trade-offs in sensitivity/speci-

ficity that must be weighed against an outcome benefit. To be useful a screening test must (1) have quality devices and operators to provide optimal sensitivity and specificity to detect disease and (2) significantly alter patient management and/or outcome. The AARC’s new partnership with NLHEP should be put to use to address both of these issues.

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