

Pulmonary Function Standards: A Work in Progress

In this issue of *RESPIRATORY CARE*, a report by Borg and Thompson¹ examines an aspect of the measurement of static lung volumes according to recommendations in the 2005 American Thoracic Society (ATS)/European Respiratory Society (ERS) Standardisation of Lung Function Testing.²⁻⁶ The procedure for measuring absolute lung volumes begins with establishing functional residual capacity, followed by excursions to minimum and maximum lung volume so that residual volume (RV) and total lung capacity (TLC) may be calculated. The standards recommend that, following the measurement of functional residual capacity, the preferred maneuver should consist of first exhaling to RV and subsequently inhaling to TLC. However, an alternate method of first inhaling to TLC and then exhaling to RV is permitted. Borg and Thompson¹ studied the impact of using either the preferred or alternate method of measuring static lung volumes in a clinical setting in patients with normal lung function and patients with varying degrees of air-flow obstruction and restriction.

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Studies such as this one are important in the process of developing and reviewing pulmonary function standards. Expert committees that develop standards use a combination of reviewing and evaluating the best evidence available, and applying the collective experience of the committee members. In areas where research is lacking, expert opinion is used, but such recommendations are not as authoritative as research-based recommendations. While a consensus is reached on the various recommendations, there is not always unanimous agreement, and compromise is a necessary element of developing pulmonary function standards.

It has been almost 8 years since the expert committees met to develop the ATS/ERS standards for pulmonary function testing, which were published as a set of 5 articles in the autumn of 2005.²⁻⁶ Since then the standards have been widely adopted. However, for those seeking excellence in pulmonary function testing, the work to improve our understanding of factors affecting the measurement of pulmonary function and on how to achieve the best possible results continues. Expert committees are always seek-

ing more research to guide the development and revision of standards.

Standardization of lung function testing is largely implemented in discrete steps when new standards are published, and the time between updates can be long. However, standards that are developed from time to time should not limit the quest for continual improvement in the quality of lung function measurements. Standards always lag current technology. The 2005 standards were developed to accommodate lab equipment being used in many centers at that time, which is now well out of date. With today's technology, pulmonary function equipment should be capable of operating with lower error tolerances for flow, volume, and pressure measurements. Grading software for quality control purposes is now available on some commercial systems. The current technical ability to present information about the results of pulmonary function tests in a more meaningful, understandable, and useful format for improved decision-making has barely been tapped. Meeting the standards does not and should not exclude exceeding the standards.

Similarly, for technicians conducting pulmonary function testing, standards should set baseline requirements but should not be a limitation to do even better. The main goal is to motivate and guide the patient through the maneuvers to obtain the best results possible. If a given patient can better perform the RV and TLC excursions by reversing the order, it is important for the technician to have the latitude to make the change and the knowledge of which patients are more likely to achieve better results by going to TLC first.

Pulmonary function standards are not static. They should be questioned. There is always room for improvement in any set of pulmonary function standards. Those aspects of the standards that are based on expert opinion can benefit from studies and randomized controlled trials. Additionally, we can improve upon some of the existing research on which standards were based by expanding previous studies to wider groups of patients to see the impact of various disease processes and phenotypes. Experience with the implementation of new technology that exceeds the standards will lead to new revisions. Improving the quality of pulmonary function measurements is a work in progress.

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