Pulmonary Function Testing Newsletter October 2026

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Nov 10-12, 2026 (space available)
Mar 23-25, 2027 (tentative date)

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Aug 24, 2027 (tentative date)

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Beyond the Numbers:
Aug 25, 2027 (tentative date)

2026 Respirator Training Schedule

Overview of Respiratory Protection:
October 27, 2026
Fit Testing Workshop (2-day):
October 28-29, 2026

For information about **QualFit™** Software© for qualitative respirator fit testing with sweet and/or bitter agents, go to www.QualFit.net

To submit a registration request, go to www.DrMcKay.com
or , email info@drmckay.com and ask for a training course registration request form

Exercise Testing Limitations

A 2026 ERS Technical Standard published in the *Eur Respir J* set out to do for cardiopulmonary exercise testing (CPET) what the Global Lung Function Initiative has done for spirometry: that is to develop broadly applicable reference equations across ages. The task force collected CPET data from 5,956 healthy individuals, ages 6 to 83 years, from 17 sites across Europe, Asia, and North and South America. The focus was on two common peak exercise outcomes: peak oxygen uptake (VO2 peak), and peak work rate. Despite the size and international scope of the dataset, the investigators found so much variability between individuals and between testing sites that they could not create reliable global reference values or lower limits of normal for these CPET outcomes. Important sources of variability included geographic region, type of metabolic cart, testing equipment, exercise protocol, and how peak values were averaged and reported.



For those of us more familiar with spirometry, this is an important lesson. In spirometry, reference equations work reasonably well because measurements such as FEV1 and FVC are relatively standardized, and the expected spread around the predicted value is much narrower. CPET is different. A person's VO2 peak reflects not only lung function, but also cardiac function, muscle conditioning, habitual physical activity, motivation, symptom limitation, equipment performance, and how the test is conducted and analyzed. In this study, the coefficient of variation for

VO2 peak ranged from 16.5% to 26.3%, which was greater than the variability usually seen with resting pulmonary function tests such as spirometry or diffusing capacity. This wide spread means that a "normal range" can become so broad that it is less useful for judging whether an individual patient's exercise capacity is truly low. The authors also noted that commonly used shortcuts, such as 80% predicted or fixed cutoffs such as 17.5 mL/kg/min, may not align well with statistically derived lower limits of normal and may lead to misclassification.

The task force concluded that current CPET reference values have significant limitations, especially when used to classify an individual patient as normal or abnormal. Rather than relying heavily on a single percent predicted value or lower limit of normal, CPET interpretation should be integrated with symptoms, clinical history, test quality, and other diagnostic findings. The authors call for future prospective studies using strictly standardized CPET protocols, rigorous calibration and quality control, competent operators, consistent methods for determining peak values, and centralized data analysis. Until that happens, CPET interpretation remains less straightforward than spirometry interpretation. The key takeaway for pulmonary function professionals is that CPET is powerful, but current predicted values are not yet as mature or reliable as spirometry reference equations.

For additional information, go to the source:

Radtke T, Chávez L, Duggan L, et al. ERS technical standard on reference values for cardiopulmonary exercise testing: summary report and a call for action. *Eur Respir J* 2026; 67:2502463 [DOI: 10.1183/13993003.02463-2025].

Can Blood Proteins Help Explain Lung Function?

A 2026 study by Lee and colleagues looked at whether proteins measured in the blood are associated with routine spirometry results, specifically FEV1, FVC, and the FEV1/FVC ratio. The term "circulating proteomic landscape" simply means the pattern of many different proteins found in the bloodstream. These proteins can reflect inflammation, tissue injury, metabolism, immune activity, lung development, and airway or lung tissue remodeling. In this study, researchers measured 4,693 circulating proteins in 20,823 adults and found 1,055 proteins that were significantly associated with at least one spirometry measure. Many of these proteins had not previously been linked to lung function, which suggests that blood proteins may help researchers better understand why some people have lower FEV1, lower FVC, or airflow obstruction. However, this does not mean protein testing is ready for routine pulmonary function interpretation. Most of these proteins are probably markers of lung health or disease activity rather than proven causes of abnormal spirometry.

For those of us who administer or interpret spirometry tests, the study is helpful because it connects familiar measurements, such as FEV1 and FVC, with underlying biology. Genetic studies look at inherited DNA differences, while epigenetic studies often look at chemical changes that affect how genes behave and may be influenced by aging, smoking, environment, or disease. Proteomic studies are different because they measure proteins, which are closer to what is happening in the body at the time of testing. Some proteins found in this study may reflect general inflammation, such as C-reactive protein (CRP), while others may be more directly related to lung tissue, airway remodeling, vascular regulation, or COPD-related processes. The authors found that 179 of the lung function-associated proteins were related to COPD in their data, reinforcing the idea that **spirometry results reflect more than mechanics alone**. They may also reflect measurable biological processes occurring in the lungs and throughout the body.

The ancestry findings in this study are especially important when thinking about predicted values for FEV1 and FVC. The study included adults of European, African, and Asian ancestry. More associations were detected in the European ancestry group, but that group was much larger, with 14,737 participants compared with about 3,041 African ancestry and 3,045 Asian ancestry participants. Among the protein associations found in African and Asian ancestry groups, most were also seen in the European ancestry results, and the overall direction and size of the associations were highly similar across ancestry groups. Only 18 associations were considered ancestry-specific. Therefore, this study does not show that differences in circulating proteins clearly explain the differences in spirometric predicted values sometimes observed among healthy European, African, and Asian populations. A cautious takeaway is that some proteins may eventually help explain part of the biological variation in FEV1 and FVC, but this study mostly supports shared biological pathways across ancestry groups rather than separate ancestry-specific mechanisms. In other words, proteomics may become one tool for understanding "normal" lung function variation, but it does not yet provide a clear explanation for race or ethnicity-based differences in spirometry reference equations.

For additional information, go to the source:

Lee M, Austin TR, Lee Y, et al. Circulating proteomic landscape of lung function. *Eur Respir J* 2026; 67: 2501528 [DOI: 10.1183/13993003.01528-2025].

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Spirometry Interpretation Comments

From the perspective of someone who routinely reviews spirometry reports from many different organizations, it's clear to me that the majority of reports are inadequate. Most common reasons are:

1) tracings are too small, and
2) belief that 3 tracings are adequate to interpret testing correctly.

The majority of spirometry guidelines suggest that printing 3 best tracings are sufficient. However, these are **minimal** guidelines. This may be adequate in a large scale pulmonary function laboratory with highly trained and experienced operators. However, the majority of spirometry tests are conducted by persons with minimal training using testing equipment configured to meet minimum spirometry standards. Persons who interpret spirometry tests are at the mercy of poorly trained individuals and how their testing equipment is configured. They look at, and interpret only what they see. Because they don't see a complete picture, they rely more on numbers and computer interpretation. However, it's what they don't see that may provide a more comprehensive understanding of lung function. Perhaps, future spirometry guidelines will realize the many pitfalls of printing just the 3 best maneuvers.

Ask yourself the following question. What's more important?

Looking at a 1-page report because its simple and convenient or looking at a report that provides a comprehensive picture of the entire testing session?

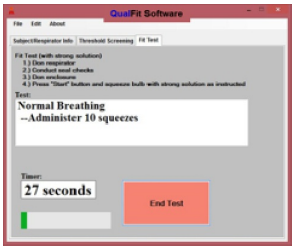
Evaluating Change in Spirometry?

Are you curious if spirometry tests on a worker or patient have a significant change in lung function? Need an expert opinion? Calculations using percent change and other methods are notorious for producing false positive and false negative results. Most methods lack reliable criteria to distinguish true change from normal aging and/or variability. Calculating FEV_1Q has serious limitations and lacks a recognized endpoint. If you have five (5) or more test dates, Dr. McKay can perform an expert independent analysis using multiple models, rather than relying on a single model. A straightforward answer, along with tabular and graphic displays, are included with a simple to read report and expert opinion. Depending upon available data, analysis can include calculations evaluating potential for peripheral airway collapse, not detectable using FEV_1 alone. For additional details, email Dr. McKay at roy@drmckay.com and request additional information.

QualFit® Software©

An easier, more accurate, and defendable way to administer respirator fit tests using sweet or bitter fit test methods.

QualFit® software© automates and records qualitative respirator fit testing using Saccharin and/or Bitrex aerosol solutions. The software prompts the operator to deliver the aerosol solution with the correct number of squeezes for each exercise, at the proper time, and in the proper order. This improves fit testing accuracy. The software displays the current exercise in progress,



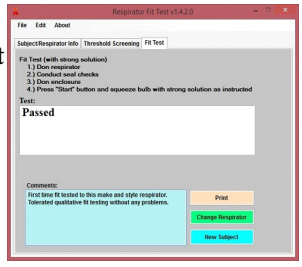
automates the timing sequence and calculates the number of squeezes to be administered, based on threshold screening results. Visual and audible prompts allow the operator to focus their attention on the respirator wearer. The entire procedure becomes less frustrating for the operator and subject being tested. The software tracks each step of the fit testing procedure required in mandatory Appendix A of the OSHA Respirator Standard. **QualFit®** software improves the quality and efficiency of respirator fit testing. An OSHA compliant report can be printed or electronically saved. The employer benefits by knowing the test procedure was properly administered and provides written documentation for compliance with record keeping requirements specified in paragraph "m" of the OSHA standard. The employee benefits by knowing a standardized procedure was followed, rather than what often appears to be a random procedure.

QualFit® - Making Respirator Fit Testing Simple

For Information visit: www.QualFit.net
To place a secure online credit card order visit: https://qualfit-software.square.site/

The name (mark) **QualFit®** is registered with the U.S. Patent & Trademark Office.
QualFit® Software© is registered with the U.S. Copyright Office June 13, 2021.

Final screen indicating test passed and operator comments. Includes option to print now or later, change to a different respirator, or select a new subject.



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OSHA News

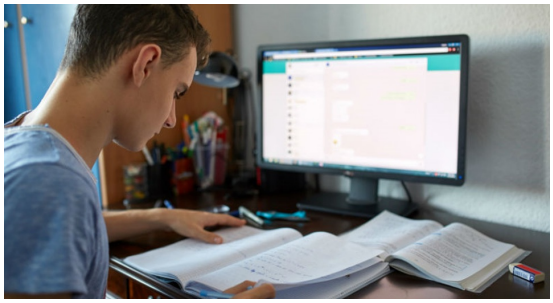
"OSHA recommends that all persons conducting occupational spirometry testing successfully complete an initial **NIOSH-approved spirometry course** and maintain that certification over time. Some OSHA standards specifically require that health personnel who are not licensed physicians complete a spirometry training course if they test workers covered under those standards."
Source: OSHA publication 3637-03 2013.



2026 Respirator Training Schedule
To submit a request or for additional information, go to: www.DrMcKay.com

Overview of Respiratory Protection:
October 27, 2026
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October 28-29, 2026

Online Spirometry Training Courses



Online Spirometry REFRESHER Training (NIOSH-approved):

This online, self-paced course fulfills requirements for NIOSH-Approved Spirometry **Refresher** training necessary for compliance with some OSHA standards. Course content was developed by Dr. McKay (University of Cincinnati) and includes the most recent changes to ATS-ERS spirometry standards. Upon successful completion of this course, students will receive a NIOSH-Approved Spirometry **Refresher** training certificate.

To receive a course brochure, email Roy@DrMcKay.com or Click Here

Click here for information, fees or to submit a registration request

For a brief 2 minute Video Description:
https://youtu.be/uu8UQ0j-S9E

Online Fundamentals of Spirometry:

This interactive online, self-paced course is designed to teach essential spirometry testing procedures consistent with current ATS-ERS spirometry guidelines. It includes; terminology, how to administer a test, testing technique, acceptability/repeatability criteria, how to read tracings, and much more. This course is designed for persons who plan to conduct spirometry testing in an office, clinical and some occupational health settings. It can help prepare respiratory therapists taking the RPFT exam and occupational health nurses taking the COHN exam. It is **not** a replacement for persons who need a NIOSH-approved spirometry training certificate.
To receive a course brochure, email Roy@DrMcKay.com or Click Here

Click here for information, fees, or to submit a registration request

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In-person Training opportunities



NIOSH-Approved Spirometry Training

This 3-day "initial" training course is designed for persons who need to learn how to administer spirometry testing according to the most recent 2019 ATS/ERS guidelines. This "hands-on" training covers all aspects of spirometry testing and uses a combination of lecture, hands-on training and small group problem solving sessions.

Next NIOSH-approved Spirometry course dates:
Nov 10-12, 2026 (space available)
Mar 23-25, 2027 (tentative date)

Certificates for persons that successfully complete all training requirements will indicate 22 contact hours with 2.2 CEUs from the University of Cincinnati.

Spirometry Refresher NIOSH-approved

Refresher training is **required every 5-years** for testing technicians who wish to maintain their current NIOSH-approved training status. Refresher training is also recommended by the American Thoracic Society (ATS), European Respiratory Society, and other organizations. This one-day course will be given by Roy McKay, Ph.D., a contributing author to the previous ATS/ERS Spirometry standard used worldwide. This Refresher course reviews the most recent spirometry testing guidelines, spirometry patterns (flow & volume), methods to improve testing technique, occupational surveillance concerns, and basic spirometry patterns. Examples of acceptable or usable, and unacceptable tracings will be shown to help the student recognize if the tracing has usable versus acceptable information. This course is also an excellent way to obtain answers to questions not foreseen during initial training and maintain your NIOSH-approved certification status.

Partial Listing of Course Topics

* Changes to spirometry standards.
* Definitions & Significance of:
  FVC, FEV_1, $FEF_{25-75\%}$.
* Review and improve proper test procedures and subject preparation.
* Recognition of unacceptable maneuver performance.
* How to identify an improperly performed test.
* How to use the Flow - Volume display to improve test performance.
* How to use Peak Flow to evaluate subject effort.
* How to recognize obstructive & restrictive patterns.
* Recognition of artifacts that impact patient test results (e.g., zeroing errors, sub-maximal effort, etc.)
* Methods you can use to improve test quality.
* Understanding the display and equipment recorder requirements of the ATS/ERS.

Note: Our refresher class is not a repeat of initial spirometry training. It's specifically designed to meet the needs of students who have previously attended a spirometry training program in the past.

Our next in-person Spirometry **Refresher** class will be held:
August 24, 2027 (tentative date)

For additional information, visit our web site at:
www.DrMcKay.com

Certificates for persons that successfully complete all training requirements will indicate 7.5 contact hours with 0.75 CEUs from the University of Cincinnati.

Interpretation of Spirometry: Beyond the Numbers

This annual, 1-day comprehensive course is designed for health professionals who want to **master** the art and science of spirometry interpretation. If you've ever wondered why relying on the "three best tracings" leads to errors, or how to spot subtle patterns others miss, this course is for you.

You'll explore **multiple interpretative strategies**, including the 2022 ATS/ERS guidelines, while uncovering their omissions and inconsistencies. We'll also review other approaches (Gold-Hardie, NLHEP, NICE, ACOEM) and the most recent revision to **Dr. McKay's Spirometry Interpretation Algorithm© 2024**, the only comprehensive algorithm consistent with spirometry guidelines.

Through **hands-on practice problems**, you'll learn to identify and understand patterns such as:
Upper, central, lower, early and small airway obstruction
Restrictive and mixed disorders
Artifacts from sub-maximal effort

We'll show you **when to ignore misleading measurements**, how to extract usable data from imperfect maneuvers, and how to recognize poor

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technique or subject effort. You'll also gain clarity on concepts like **FEV1Q, PRISm, SADI, and dysanaptic patterns**. Practical methods to identify potentially significant change in lung function will be presented. This information is helpful in regards to identifying persons with true lung disease versus variability in the test. By the end of the day, you'll be equipped to:

- Reduce false positives and negatives in diagnosing obstructive, restrictive, and other patterns
- Interpret spirometry with confidence - even when results aren't perfect
- Apply strategies that improve clinical decision-making

This course is a must for anyone seeking a deeper understanding and practical mastery of spirometry interpretation.

Objectives:

- Recognize important components of spirometry standards that impact interpretation of results.
- Interpret spirometry graphs as to the type of pattern.
- Recognize conditions that affect spirometry results.
- Identify errors in test procedures or testing equipment that may affect results.
- Recognize factors that cause miss-classification of spirometry patterns (i.e., obstructive to normal, etc.).
- Recognize potentially significant change in spirometry testing.
- Understand new concepts including **FEV1*Q*** and **PRISm**.

All students attending this program will receive a copy of Dr. McKay's Spirometry Interpretation Algorithm©

Students who materially participate and attend the entire training program will receive a training certificate from the University of Cincinnati (Sponsor & Accreditor) indicating 7.5 Contact hours (0.75 CEUs).

For a complete listing of course content, please visit: www.DrMcKay.com

Next course is: August 25, 2027 (tentative date)

Informal Spirometry Training

Want to improve spirometry training at your workplace? We offer a variety of on-site, informal training programs that vary from 4 - 7 hours in length.

If interested, send an email to info@DrMcKay.com

To Be Removed from email List:

If you wish to be removed from this list, send the email address you wish to have removed to info@DrMcKay.com

To be Added to our Newsletter:

To be added to our Newsletter, go to www.DrMcKay.com

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Email us with the address to remove if newsletters are coming to multiple addresses. If duplicates are being received at the same email address, let us know to retain one of the addresses.

Thank you for your continuing support. Students attending our programs help support our graduate training programs and research projects.
We hope to see you at a future training course.

Roy McKay, Ph.D.
Course Director
University of Cincinnati
www.DrMcKay.com

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