Pulmonary Function Testing Newsletter August 2025

Featured Courses: **Spirometry Refresher (NIOSH-approved):**
September 23, 2025
Interpretation of Spirometry - Beyond the Numbers:
September 24, 2025

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Upcoming Spirometry Course Schedule

Spirometry Refresher (NIOSH-approved):
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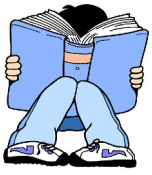
Interpretation of Spirometry - Beyond the Numbers:
Sept 25, 2024

Spirometry Refresher Reminder

If your last NIOSH-approved spirometry training course was taken in **2020**, you're due for a refresher in **2025**. Currently, a 7-month grace period is in effect to renew your NIOSH Spirometry certificate. Therefore, re-certification must be completed within 5 years and 7 months of your previous course date.

Reader Questions:

Note: Due to time restrictions, Dr. McKay may not respond to all reader questions. However, selected questions and answers will be published in future newsletters.



Can Nurses Interpret Spirometry Results?

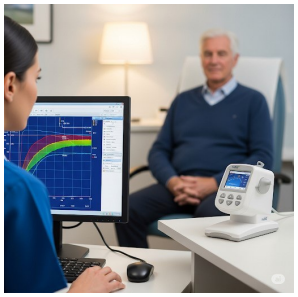
I'm often asked if health professionals are permitted to screen spirometry test results to determine if they're abnormal. Recently, a registered nurse from Ohio asked a more specific question regarding whether or not registered nurses can determine if physician review is needed. Below is the actual question with my response and additional comments extending beyond Ohio.

Question:

"Do you know if RN's are allowed to follow an algorithm to determine who needs an MD follow up for results that do not read out as normal?"

Answer:

In Ohio, registered nurses (RNs) are permitted to use interpretive algorithms to determine whether a physician needs to follow up on spirometry test results that fall outside the normal range.



The Ohio Board of Nursing provides a Decision-Making Model to assist RNs in determining whether a specific task falls within their scope of practice. This model guides nurses to assess whether a task is appropriate based on their knowledge, skills, and the clinical setting.

My understanding is if a RN is competent in using a spirometry interpretive algorithm and if it aligns with established protocols and guidelines, then they can determine if the results are abnormal and need physician follow-up. Therefore, training on the use of an acceptable spirometry algorithm is important.

However, the authority for registered nurses to use interpretative spirometry algorithms varies. Therefore, RNs in other states need to consult with their state's

Board of Nursing to determine the extent of their authority in using interpretative algorithms and making decisions regarding physician follow-up.

In the context of workplace screening in Kentucky, it's my understanding registered nurses who are appropriately trained and competent may also use an interpretive algorithm to identify abnormal spirometry results and refer those cases to a physician for follow-up.

I'm not aware of any OSHA regulations that explicitly prohibit registered nurses (RNs) from screening spirometry results for abnormal findings, provided they are acting within the scope of their state licensure and under appropriate clinical protocols. For example, let's look at the **OSHA Asbestos Standard** (29 CFR 1910.1001). Spirometry testing is required as part of the medical surveillance program for workers exposed to asbestos above the permissible exposure limit. However, OSHA does **not** explicitly require a physician interpret spirometry results. Instead, the standard refers to a "licensed physician" being responsible for the overall medical evaluation, but it does not prohibit registered nurses (RNs) or other licensed health professionals from screening or flagging abnormal spirometry results for physician review. Once again, training on the proper use of an acceptable spirometry algorithm is important for the nurse or other health professional to recognize abnormal results..

Why Accurate Spirometry Interpretation Demands More Than a Computer Algorithm

Many spirometry devices used in workplace and primary care settings rely on outdated, opaque algorithms that often fail to meet current clinical guidelines. These computerized interpretations rarely disclose their source or date, overlook test quality, and reduce complex respiratory patterns to simplistic labels like "obstructive" or "restrictive." Worse, they seldom indicate the direction or magnitude of error when results are suboptimal. That's why it's critical for health professionals to go beyond merely accepting a computer-generated statement.

NIOSH-approved spirometry training programs focus on testing technique, calibration checks, and criteria for acceptability and repeatability-not interpretation. While they offer limited exposure to basic patterns, they do not equip attendees to recognize the wide range of abnormal results that may require physician follow-up. This gap underscores the need for specialized training in interpretation.

Recognizing Change Over Time: A Vital Skill in Occupational Health

Interpreting spirometry isn't just about identifying whether a result falls within the normal range. In occupational and other settings where repeated testing occurs, recognizing meaningful changes over time is essential. Subtle shifts can signal emerging health issues long before symptoms appear. In my view, nurses and other health professionals who handle spirometry must receive targeted training to interpret results accurately and detect potentially significant changes. This isn't optional-it's a matter of protecting long-term respiratory health.

Summary:

RNs can screen spirometry results for abnormalities and refer them for physician review or similarly credentialed provider, as long as this is consistent with their state's scope of practice and employer protocols. They should not, however, provide a diagnosis unless specifically authorized and trained to do so. Proper training regarding spirometry interpretation is critical.

Spirometry Interpretation

Join us September 24, 2025 for our 1-day Interpretation of Spirometry course.

For details go to: www.DrMcKay.com

Can an Occ Doc Administer Spirometry Tests?

In a recent post in the AIHA Catalyst (June 11, 2025) a question was asked as to who is permitted to administer spirometry tests for compliance with OSHA's Silica Dust Standard. Another question asked if it's permissible for a person who's successfully completed a NIOSH-approved training program, train another person to administer these tests on their behalf. Since these are common questions, I decided to share OSHA's 2018 response to similar questions.

Question:

"Are board certified occupational medicine physicians able to perform spirometry testing under the silica standards?"

OSHA Reply:

"The silica standards specifically require that PFT be administered by a technician who holds a current certificate from a National Institute for Occupational Safety and Health (NIOSH)-approved spirometry course. Under the silica standards, any medical personnel (e.g., physicians, physician assistants, nurses) who administers PFTs is viewed as a technician. Therefore, anyone who administers PFTs under the silica standards must hold a current certificate from a NIOSH-approved spirometry course regardless of other certifications, experience, or education."

Metered-Dose Inhalers: Good or Bad?

An article in the Feb 27, 2025 edition of the *New England Journal of Medicine* by Drs Feldman & Furie describe the moral trade-offs for using inhaler medications. While these medications are vital for patients with asthma and COPD, they continue to be damaging to the environment and according to the authors, "can worsen the very diseases that inhalers are designed to treat". Metered-dose inhalers (MDIs) contain hydrofluoroalkanes (HFAs), which reportedly have more than 1000 times the global warming potential of carbon dioxide. In the United Kingdom, they account for approximately 3% of the carbon footprint. In the U.S., they are responsible for the equivalent of "550,000 cars on the road each year".

You may recall that HFA-based inhalers replaced the more dangerous chlorofluorocarbon (CFC) inhalers may years ago, yet the FHA-based inhalers are still problematic. Within the category of HFA-inhalers, those containing HFA-134 are less damaging than those containing HFA-227. Dry-powder and soft-mist inhalers are considered to be safer for the environment, but are less commonly prescribed due to higher costs, less likely to be covered by insurance, and are not suitable for some patients (young children & frail adults who lack sufficient inspiratory force). The authors note that politics can also come into play. In addition to issues of reimbursement and out-of-pocket costs, patent rights are involved. The authors make the case that tobacco companies owning patent rights to these medications, continue to profit from inhaler medications, which are used for treatment of diseases they helped to cause. The solution to the inhaler dilemma is complex.

To gain a better understanding of the problem and potential solutions, read the article by Drs Feldman & Furie (*New England Journal of Medicine*, Feb 27, 2025: DOI: 10.1056/NEJMp2412383).

Pneumonia and PFTs

Respiratory infections occur when the body's defense systems are compromised, such as when microorganisms overwhelm pulmonary defense mechanism. Highly infectious microorganisms are commonly referred to as "virulent". Infection of the upper respiratory system can cause rhinitis or laryngitis. Infection of the bronchi causes bronchitis. Infection of the deeper alveolar spaces with overproduction of purulent material results in pneumonia.

Pneumonia can be caused by exposure bacteria, viruses, and fungi, which can occur in community, workplace, and hospital settings. Hospital-acquired pneumonia is generally defined as occurring more than 48 hours after hospital admission (also referred to as nosocomial pneumonia).

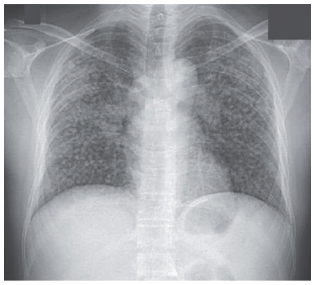
Bacterial pneumonia is the most common type of pneumonia with streptococcus being the most common bacterial organism. Viruses cause about a third of pneumonia cases and may lead to the development of bacterial pneumonia. Legionella is an example of a bacterial pneumonia. Coccidiodomucosis (valley fever) and Histoplasmosis are fungal.

Common symptoms of pneumonia include sharp or stabbing pain when coughing, frequent, productive cough, fatigue, fever and chills, gastrointestinal issues (nausea, vomiting, diarrhea), shortness of breath and increased work of breathing. These symptoms increase as pneumonia progresses in severity and may lead to cyanosis, hypoxemia, confusion and tachycardia.

Diagnosis is primarily based on clinical signs and symptoms along with radiographic evidence (chest x-ray). Pulmonary function testing is **not** the primary diagnostic tool. While spirometry is not diagnostic, it can be used to assess severity and for monitoring progression/recovery. Other pulmonary function tests such as diffusion capacity and lung volumes play a potentially supporting role, but are **not** primary diagnostic tools.

Idiopathic Pulmonary Fibrosis & Occupation

Idiopathic pulmonary fibrosis (IPF), is a progressive lung disease characterized by scarring and worsening lung function, with a median survival of 3–5 years after diagnosis. Typically, the disease presents with unexplained, progressive shortness of breath, often accompanied by a nonproductive cough, decreasing lung function on spirometry and radiographic abnormalities on chest x-ray and high-resolution computed tomography (CT). It has been estimated that 21% of IPF deaths might be attributable to occupational exposures. This estimate does not include known causes of pulmonary fibrosis from asbestos, silica dust, etc. Although the etiology of IPF remains unknown, studies have indicated associations with cigarette smoking, genetic mutations, and viral infections (Epstein-Barr virus and hepatitis C). Workplace exposures to



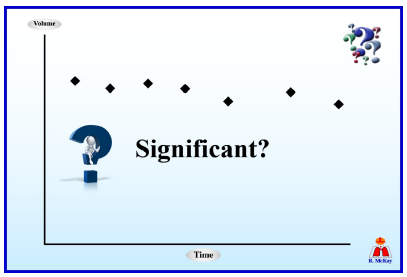
pesticides, wood dust (pine) and metal dust (brass, lead, and steel) have also been associated with IPF.

Recently, an article published in the MMWR provided IPF mortality information among U.S. residents for the years 2020 - 2022. During this period, a total of 67,843 deaths with IPF were identified as an underlying (38,869) or a contributing (28,974) cause among those aged 15 years and older. The MMWR report provides data by industry and occupation. Estimates of elevated IPF mortality among ever-employed persons in certain industries and occupations suggest areas where targeted studies might be able to identify causative workplace exposures. Once identified, prevention (i.e., elimination, substitution, engineering controls, administrative controls, and personal protective equipment such as **respirators**) could be used to reduce or eliminate exposures to potentially causative work hazards. In addition, since cigarette smoking is strongly suspected as a cause of IPF, smoke-free workplaces and tobacco cessation programs could help to reduce or IPF mortality.

To read the MMWR report and to see numbers for specific industries and occupations for IPF, use the following URL:
https://www.cdc.gov/mmwr/volumes/74/wr/pdfs/mm7407a1-H.pdf
Or, Click Here

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.



Tobacco Use Among US Adults

The March 6, 2025 issue of the MMWR provided updated data on current tobacco use in the United States over a 7-year period (2017 -2023). The report describes current trends in the use of commercial tobacco products, including combustible & smokeless tobacco products, and e-cigarettes. If you're interested in detailed numbers stratified by age, type of tobacco use, trends, etc., this article is for you. Total numbers for any tobacco use for 2023 was estimated as 48,590,000 persons, representing approximately 15-19% of the U.S. population. Estimated number of those exclusively smoking cigarettes and no other types of tobacco products was 19,790,000 persons. 10,120,000 persons exclusively used e-cigarettes.

In brief, compared to 2017, they reported a decrease in number of adults who currently exclusively smoke cigarettes by approximately 6.8 million persons. Unfortunately, this was offset by an increase in the number who currently use e-cigarettes exclusively (approximately 7.2 million). This increase was primarily driven by increases among adults aged 18–24 and 25–44 years (approximately 2.3 million and 3.9 million, respectively), leading to no net change in overall current adult tobacco product use.

To read the Mar 6, 2025 MMWR report use the following URL:
https://www.cdc.gov/mmwr/volumes/74/wr/pdfs/mm7407a3-H.pdf
Or, Click Here

Remaining 2025 Spirometry Training Course Schedule

The University of Cincinnati is pleased to announce the remaining training course schedule that may be of interest to you or your staff. They are:

NIOSH-Approved Spirometry (initial course):
Sept 9-11, 2025 (Wait List only)
Nov 11-13, 2025

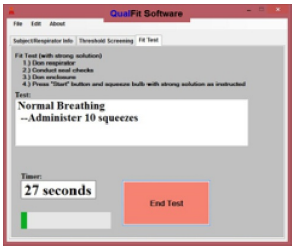
Spirometry Refresher (NIOSH-approved):
September 23, 2025
Also available online

Interpretation of Spirometry - Beyond the Numbers:
Sept 25, 2024

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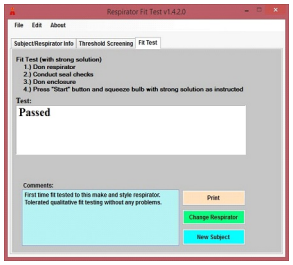
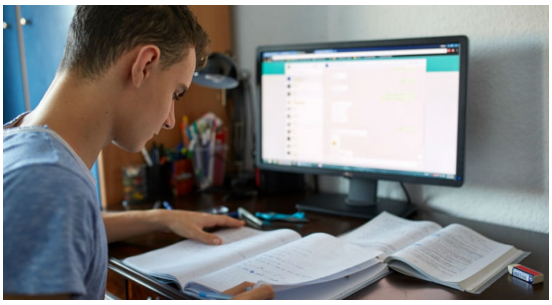
Final screen indicating test passed and operator comments. Includes option to print now or later, change to a different respirator, or select a new subject.



Online Spirometry Training Programs



Online Spirometry Refresher (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

In-person Training opportunities

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:
September 23, 2025

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 course is ideal for health professionals who desire comprehensive training specific to interpretation of spirometry tests. Several interpretative strategies will be discussed including those published in 2022 by the American Thoracic Society (ATS) & European Respiratory Society (ERS). Other strategies (Gold-Hardie, NLHEP, NICE, ACOEM and others will be briefly presented. Unfortunately, the 2022 ATS/ERS guidelines have omissions and inconsistencies between the text, figures and tables. Since the revised McKay Spirometry Interpretation Algorithm© is consistent with ATS/ERS guidelines, but without omissions and inconsistencies, it will be used throughout the course. Regardless of the method selected, practice problems will illustrate common spirometry patterns including; upper, central & lower airway obstruction, restrictive, mixed and those caused by sub-maximal inspiration or expiration. Students will learn when unacceptable maneuvers still have usable information for interpretation purposes. Examples of poorly administered and improperly performed tests will be used to help students recognize poor subject effort, poor technique, and other factors that alter interpretation. This class will clarify **FEV1Q**, **PRISm**, and **dysanaptic** parameters and patterns. Students will also learn how to recognize the magnitude and direction of error introduced, when less than acceptable (i.e., usable) results are obtained.

A variety of methods will be presented to identify potentially significant change in lung function. This information is very helpful in regards to identifying persons with true lung disease versus variability in the test. At the conclusion of this course, students will be capable of recognizing acceptable spirometry maneuvers and will learn how to interpret test results while decreasing the false positive and false negative rate of obstructive and restrictive lung disease patterns. This course is a "**must**" for persons who want a greater understanding 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 date is: September 24, 2025

2025 Respirator Training Schedule
Class size is limited. If interested, submit a registration request early. Payment is not required to submit a registration request, but space is assigned when payment is received. To submit a request or for additional information, go to: www.DrMcKay.com

Overview of Respiratory Protection:
October 28
Fit Testing Workshop (2-day):
October 29-30
Respirator Selection & Cartridge Change Out Schedules
May 2026 Dates to be determined
Fit Testing Refresher & Advanced Topics
May 2026 Dates to be determined

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To be Added to our Newsletter:
To be added to our Newsletter, go to www.DrMcKay.com
There is no cost to subscribe. Your email address is NOT given to any other source. Newsletters are sent 3 - 4 times per year.

If you Receive Duplicate Newsletters:
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.

I 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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