

TerranearPMC Safety Share

Week of April 18, 2016– Pulmonary Function Tests

Pulmonary Function Tests – one of the fundamental measures of any fit-for-duty evaluation in a medical surveillance program; especially when assigned to work at a site where hazardous materials will be handled or merely encountered. For those who are not familiar with a Pulmonary Function Test or PFT, this is an evaluation process of a person's lung function where the patient is required to rigorously exhale into a hollow tube. Even though there are sensors in the tube, there is no resistance in the tube so one's lungs can be quickly depleted of air within seconds. As an example, try blowing through the cardboard roller found in the center of a typical roll of toilet paper and see how long your air supply lasts.....not long at all. Yet, this test demands that the patient keep on blowing air, as empty as the lungs may be, expelling any remains of air within the deepest regions of the lungs. Many times this process is referred to as getting the air from your toes. It is not unusual for a patient to be caught off-guard and find himself/herself completely depleted before the test is over causing the patient to pass out! This is why many times the patient is asked to be seated; even though a greater amount of air can be drawn into the lungs by standing. It is during the PFT that the medical technician needs to use careful judgement and assess each individual so that a patient, should they pass out, will not fall and get hurt (one can only imagine the complexity of a workers comp case!).

OK, so we completed this uncomfortable process. Before we can breathe a sigh of relief, we are then asked to repeat it; not just once but sometimes up to four times!

For those of us that are all too familiar with the PFT, we understand that this test evaluates a person's lung capacity and therefore can be a very useful assessment tool. But what exactly does the PFT measure and why are we required to perform this process multiple times? The fact is, PFTs evaluate different attributes of our lungs' ability, such as how much air your lungs can hold, how quickly you can move air in and out of your lungs, and how well your lungs put oxygen into the circulatory system while removing carbon dioxide. These tests can diagnose lung diseases, measure the severity of lung problems, and check to see how well treatment for a lung disease is working. Some of the more prevalent lung functions are: vital capacity, forced vital capacity, and forced expiratory volume. Below is a brief description of these various lung functions:

Forced vital capacity (FVC). This measures the amount of air you can exhale with force after you inhale as deeply as possible.

Slow Vital Capacity (SVC) is the maximum volume of air which can be exhaled or inspired in a slow/steady maneuver.

Forced expiratory volume (FEV). This measures the amount of air you can exhale with force in one breath. The amount of air you exhale may be measured at 1 second (FEV1), 2 seconds (FEV2), or 3 seconds (FEV3). If a person's "FEV1 divided by FVC" is less than 0.7 or 70%, there is a



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concern that there is some type of lung obstruction which can indicate occupational as well as non-occupational health concerns: most notably, chronic obstructive pulmonary disease or COPD.

Vital Capacity (VC) is the largest of the volumes from either a forced (FVC) or a slow (SVC) maneuver. Even with a normal lung function, a VC that measures less than what is expected (based on age and size of the individual), a substandard VC can indicate an inadequate air supply necessary to support a person's normal oxygen demand. This could be a limiting factor for an individual where certain tasks would require a high physical demand. An example would be a work task that would require wearing a respirator. This is because a person with a limiting VC would not be physically capable to function appropriately, due to their "compromised" breathing ability: even though their lung function performance is "normal."

The results of dynamic PFT tests place patients in 1 of 3 categories:

1. normal lung function
2. obstructive disease
3. restrictive disease

The first condition would not warrant any restriction regarding respirator use. Because the 2nd and 3rd conditions represent medical concerns, especially for respirator use, the examining medical professional may prohibit the use of respirators or extreme physical demand. However, there have been a number of circumstances where, in the case of respirator use, physicians may allow the use of air supplying respirators as these units do not cause increased breathing resistance while drawing air (i.e. inhalation). Should this be the case, it would be typical for an employee's fit-for-duty evaluation form to have a remark stating that the employee may only wear a powered air purifying respirator or airline respirator. This information is very important and should be evaluated by the company's S&H department. Depending upon a project's specific requirements, persons with a compromised lung capacity may need to be reassigned to tasks that would not require such taxing physical demands and therefore, avoid a serious workplace incident

Patriotism is supporting your country all the time, and your government when it deserves it.

Mark Twain

