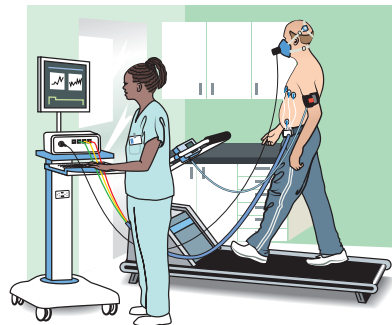


# Cardiopulmonary Exercise Testing (CPET)

Cardiopulmonary exercise testing (CPET or CPEX), also referred to as a  $\text{VO}_2$  (oxygen consumption) test, is a specialized type of stress test or exercise test that measures your exercise ability. Information about the heart and lungs is collected to understand if the body's response to exercise is normal or abnormal.



## Why am I being asked to perform this test?

There are many common reasons CPET is performed including to:

- determine a cause of unexplained shortness of breath
- assess exercise capacity
- assess your risk for a planned surgical procedure

In people who have known heart or lung disease, a CPET may be done to:

- check the severity of respiratory disease (such as chronic obstructive lung disease, pulmonary vascular disease, cystic fibrosis, and others)
- determine how much of a limit in exercise is due to the heart or the lungs in people who have both heart and lung disease
- help define how much impairment or disability a person has to help guide what he or she can do in a rehabilitation program or to get an exercise prescription
- define the response to treatments
- see if advanced treatments like heart transplantation should be considered to help with congestive heart failure (CHF)

Sometimes CPET is done as a part of a research study.

## Are there reasons why I might not be able to perform a CPET?

There are several including:

- musculoskeletal conditions preventing a person from being able to walk or run on a treadmill or pedal a stationary bike

- an acute medical illness or poorly controlled chronic medical condition
- a recent heart attack (within 30 days)
- severely low oxygen levels
- severely high blood pressure
- uncontrolled heart rhythm or heart rate problems

Let the lab know if there has been a recent change in your health status such as acute infection or injury that may prevent exercising.

## How do I prepare for testing?

You should receive instructions from your healthcare provider or the pulmonary laboratory where the test is being performed. These instructions may vary slightly between labs. Here are some common instructions:

- Wear comfortable clothing that you can exercise in, including shoes that you can walk/run or bike in.
- Do not exercise on the day of the test.
- Eat lightly the day of the test. Do not eat 3-4 hours (or more) before the test.
- Try to avoid drinking caffeine on the day of the test.
- Do not smoke or vape on the day of the test.
- Bring a list of your medications with you. It is usually recommended that you take all of your usual medications on the day of the test, although sometimes you may be asked to stop any inhalers prior to testing.

## What can I expect during testing?

The testing will start with pulmonary function tests (PFTs), including spirometry and sometimes

additional tests. For more information about spirometry and lung function testing, see the ATS Patient Information Series fact sheet at [www.thoracic.org](http://www.thoracic.org).

Then you prepare for the exercise portion of the test. The lab staff will place monitors on you to watch your heart and breathing during exercise. You will have EKG leads (wires attached to stickers) on the chest. A blood pressure cuff will be placed on the upper arm. You will wear a pulse oximeter (measures the saturation of oxygen to your blood) on your finger, or sometimes on the ear or forehead. You will wear a mouthpiece or a mask that is strapped to the head during testing and you will breathe through a flow meter with tubing attached. This is a device that measures how deeply and fast you breathe, in addition to the oxygen and carbon dioxide that flow in and out.

Your healthcare provider may want an arterial blood gas sample prior to and during exercise. This is obtained by either puncturing the artery in the wrist with a small needle, or placing a catheter (IV tubing) into the artery so blood can be drawn during exercise without multiple needle sticks. When this is done the blood pressure is directly measured from the artery and you will not need to wear a blood pressure cuff.

Depending on the goals of the test and any musculoskeletal problems you may have, the doctor supervising your test will choose a treadmill or stationary bike for exercise. You will then be given instructions based on the exercise you will perform. For the first 2-3 minutes, information is collected while you are at rest.

At this point you will be instructed not to talk for the remainder of the test as this can interfere with the information collected. The staff will tell you how to signal if you have a problem or need to interrupt the testing.

Next a warm-up will begin. This is a walk on the treadmill or free cycling on the bike (no resistance on the pedals). After a 2-3 minute warm-up, the exercise portion of the test will begin.

Depending on the test protocol, you may walk at a faster pace or run on the treadmill while the incline is increased. On the bike, the pedaling resistance will be increased, making it harder for you to maintain the proper pace. The goal is for the exercise to become

progressively harder until the point that you are no longer able to continue, with the entire exercise period generally lasting 8-12 minutes. It is important that you make your best effort to exercise as hard as you can even if you feel uncomfortable to figure out what might be limiting your ability to exercise.

The staff supervising your test may talk to you during testing with some encouragement or reminders about what to do. When you can no longer continue because of exhaustion the test is over but you will continue to slowly walk or cycle the bike as part of a cool down period. After the cool down you will be able to sit down, get a drink of water, and the equipment will be removed.

You may be monitored for a short period of time after exercise and if an arterial catheter is in place this will be removed with pressure held for several minutes before a bandage is placed.

### When will I get my test results?

During the test, the information describing your heart and lungs responses to exercise is collected continuously and is generally averaged over 20-30 second intervals. Thus, there are large amounts of data and these tests take time for the staff and doctor to review. Be sure you ask when you can expect to learn the results from your test. Your healthcare provider may want you to come into the office to review the findings.

**Authors:** Thomas W. DeCato MD, Hans Haverkamp PhD, Matthew J. Hegewald MD

**Reviewers:** Marianna Sockrider MD, DrPH, David Kaminsky MD

### Other Resources:

#### American Thoracic Society

- [www.thoracic.org/patients/](http://www.thoracic.org/patients/)
  - Lung function testing
  - Arterial blood gas testing
  - Pulse oximetry

#### Association for Respiratory Technology & Physiology (ARTP) United Kingdom

- <http://www.artp.org.uk/en/patient/exercise/CPET.cfm>

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