

Pulse Oximetry

Definition of Terms

Apnea – Refers to periods of time when a person stops breathing.

Capillaries – Very small blood vessels close to the surface of the skin.

COPD – Chronic Obstructive Pulmonary Disease. An umbrella term used to describe progressive diseases of the lungs including emphysema, bronchitis, and asthma.

Hemoglobin – An iron rich protein in red blood cells that carries oxygen throughout the body.

Non-invasive – A procedure that does not cause a break in the skin or contact with body mucosa or an internal body cavity; does not require making an incision (cut) into the body or removing any body tissue.

O₂ saturation (Oxygen Saturation) - The percentage of oxygen bound to hemoglobin in the blood. Normal oxygen saturation levels as detected with pulse oximetry are 95% or higher. Oxygen saturations below 92% are generally abnormal and require a call to the appropriate health care professional (HCP)

Oxygenation – The process by which oxygen increases within the body. It may require the use of oxygen therapy.

Pulse oximeter – A clip-on device or adhesive wrap placed on the finger used to monitor the percentage of oxygen in the person's blood. Follow the manufacturer's instructions for which finger / site to use.



Radial Pulse – Pulse found on the thumb side of the wrist.

Sleep Apnea – Refers to periods of time that the person stops breathing while asleep. During these periods of time, the oxygen level can drop significantly, depriving vital organs of adequate oxygen needed to maintain healthy functioning.

SpO₂ - Stands for peripheral capillary oxygen saturation obtained by pulse oximetry. Normal SpO₂ readings are 95% or higher. Oxygen saturations below 92% are generally abnormal and require a call to the appropriate health care professional (HCP), unless individual specific orders say something different.

What is pulse oximetry?

It is a non-invasive method for monitoring the amount of oxygen in the person's blood. Pulse oximetry may be used to **monitor the oxygen level in persons with sleep apnea, COPD, or who are on oxygen therapy.**

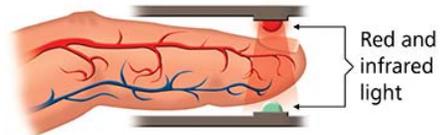
Why is pulse oximetry used?

Since activity increases the body's need for oxygen, pulse oximetry may be used on an as needed (PRN) basis during the course of an activity to determine if the oxygen level drops below 92%. Because oxygen levels often drop during sleep apnea, pulse oximetry may be used to determine if the person maintains adequate levels of oxygen while sleeping.

Use of pulse oximetry in people receiving oxygen therapy helps the doctor determine if the amount of oxygen being delivered is too little or too much. **At rest, blood oxygen should be at least 92% or higher. In healthy people, the oxygen level runs between 95-100%.**

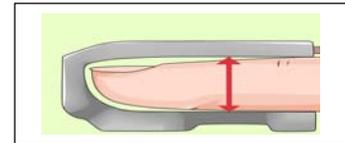
How does a pulse oximeter work?

The oximeter is designed to measure the amount of oxygen in the person's blood by shining two beams of light into capillaries in the finger. The light beams reflect the amount of oxygen in the blood.



What are the risks of using pulse oximetry?

There are minimal risks to the person. It's important to place the oximeter correctly on the finger to ensure an accurate reading. Room light can alter readings, so make sure the clip or wrap does not allow external light to enter. If the person looks okay, but the reading is low, check the radial pulse to see if the pulse rate matches the rate on the pulse oximeter. Reposition the probe to get a more accurate reading. An accurate reading is important for the person to get the right care.



Care and Storage of Pulse Oximeter

- ◀ Keep the battery charged at all times.
- ◀ Keep the probe clean. Dirt and dust can block light emitted by the oximeter, leading to a faulty reading. Clean the probe with a damp paper towel to remove dirt; use an alcohol swab to remove germs from the probe.
- ◀ Store the oximeter where it won't get moved around or accidentally dropped or damaged.
- ◀ Disconnect all wires properly.

WARNING:

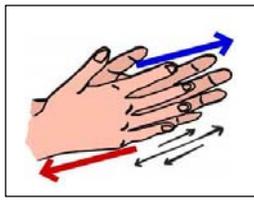
If the person has any breathing difficulties or has decreased alertness, get medical help immediately even though the oximeter reading might be in the normal range.

Are there any issues that should be considered when using pulse oximetry?

- ◄ **Smoking** affects the oxygen levels in the blood. A higher level of oxygen may be reported than is actually present because smoking increases carbon monoxide in the blood and the oximeter does not distinguish between oxygen and carbon monoxide.
- ◄ **Dark nail polish and artificial nails** can interfere with the oximeter's ability to accurately detect the level of oxygen in the blood. Remove nail polish before using oximeter.
- ◄ **Dark pigment** on the finger can alter the strength of the light beam through the finger.
- ◄ **Cold hands** can decrease the flow of blood to the capillaries in the finger. **Warm the hands** before applying the oximeter to the finger.
- ◄ **Dirt on the hands** can interfere with the functioning of the oximeter. Wash hands before using the oximeter.
- ◄ **Bright light** can interfere with getting an accurate reading. Do not use the oximeter in sunlight and turn bright lights away from the oximeter.
- ◄ **Moving around** while the oximeter is measuring your oxygen level can cause an inaccurate reading. Sit still while oximeter is reading your oxygen level.
- ◄ **Improper fit of oximeter** will give an inaccurate reading.
- ◄ **If you want to get an "off oxygen" SpO₂ for a person who has been on oxygen**, the person must be taken off oxygen for at least 15 minutes before an "off oxygen" reading is taken.
- ◄ **The home oximeter** reading should be checked during a doctor's appointment. Take the person's oximeter to the doctor's appointment to check its accuracy against the readings obtained in the doctor's office.



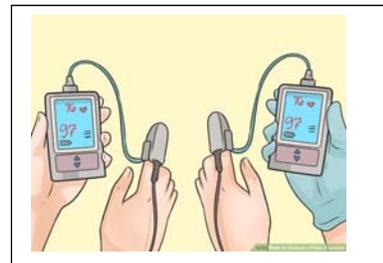
Remove Nail Polish



Warm cold hands



Wash person's hands to remove dirt



Check your readings against readings of doctor's device

Universal Precautions

It is not necessary to wear gloves when measuring oxygen levels using a pulse oximeter.

Be sure to wash your hands before and after the procedure. Be sure to use an alcohol swab on the finger probe to kill any germs on the probe after every use.

Checklist for Monitoring Pulse Oximetry

Procedure Steps

- _____ 1. Choose a sensor appropriate to the person's age, size and weight, and the desired location.
- _____ 2. If the person is allergic to adhesive, uses a clip-on probe sensor.
- _____ 3. Clean and dry the site.
- _____ 4. If using an adhesive wrap, remove the protective backing and wrap around appropriate finger.
- _____ 5. When attaching the probe, make sure that the photo-detector and light-emitting diodes on the probe sensor face each other.
- _____ 6. Connect the sensor probe and turn it on.
- _____ 7. Wait 10-30 seconds until the digital display stops changing and then read the numbers.
- _____ 8. Remove the probe sensor and turn off the oximeter when monitoring is no longer necessary.
- _____ 9. Document results and report any out of range findings to a HCP (health care professional).

(Adapted from FA Davis Co. 2007. Wilkinson & VanLeuven. Procedure Checklist for Fundamentals of Nursing.)

Trainee name: _____ Date: _____

_____ Instructor initials Instructor Name _____

Comments: