

What is pulse oximetry?

Oxygen is carried around the body attached to a protein called haemoglobin, found in red blood cells and delivered to our tissues in blood vessels called arteries. Pulse oximetry is a relatively cheap, simple technique to measure how much of the haemoglobin in arterial blood has oxygen attached to it.

It is a measure of how well the body's heart and lungs are providing oxygen to our bodies.

It can be used to help assess a resident who has become more breathless or confused. Pulse oximetry is often called the "fifth vital sign". Along with frequency of the patient's breath, his or her temperature, pulse rate and blood pressure it can give an indication how ill a person is and whether they might need admission to hospital.

In some chronic conditions (for example Chronic Obstructive Pulmonary Disease(COPD) or sometimes other lung or heart conditions) the oxygen levels that are measured can vary. Pulse oximetry can provide valuable information to carers and clinicians and knowing the result when a resident is well or appears stable is very useful. When the resident becomes unwell it provides useful information if there is a change in oxygen levels measured. (Lower oxygen levels suggest the heart and lungs are finding it harder to get oxygen to other parts of the body).

How are pulse oximeters used?

The vast majority of pulse oximeters used in care homes involve a clip probe which fits over the finger. Inside the device, on one side of the finger, there are 2 beams of light ;one infrared, one red and on the other side of the finger 2 light sensors. The machine works out how much of each beam of light is allowed through to the sensor by the blood in the finger and from this works out how much of the blood in the arteries is saturated with oxygen.

The readout is as a number: The number indicates how much blood is saturated with oxygen. Many sensors will also record the pulse rate which shows how quickly the blood is carried around the patient's body.

How to carry out pulse oximetry

Choose a finger on which to place the probe. The ring, middle or forefinger are best. Ideally the finger should be clear of dirt, Warm, and nail varnish free.

Nail varnish can alter the reading by 2%, but do not spend a lot of time removing nail varnish if the patient is unwell. Tell the doctor, nurse or ambulance crew that the reading was taken with nail varnish on.

The hand should be placed on a flat, firm surface such as the bedside table or the arm of a chair to reduce movements which can affect the reading.

Insert the finger into the probe until the end of the finger reaches the finger stop and wait until the numbers have become steady or a steady green light is shown, usually taking about 30 seconds. (This may vary according to the machine so it is important to check how your pulse oximeter works).

Note down the oxygen saturation reading and pulse rate in the patient's records

Take the probe off the finger and clean it (see below under maintenance)

Why can't I get a steady reading?

- Check that the probe is in the correct position, so try moving it around on the same finger or try a different finger, make sure that the finger is clean of dirt and preferably of nail varnish.
- If possible warm up the hands if they are cold.
- Darken the room, as bright light can affect the readings
- Check the battery on the probe and consider using a different probe (if available)

If the patient shakes, the pulse rate is irregular, or if the patient has poor local circulation in their fingers or poor general circulation due to severe shock or very low body temperature) the probe might not work.

What is a normal reading?

In otherwise healthy adults the oxygen saturation should be more than 95%, but in patients with chronic lung disease (such as COPD) or heart disease the level may be 92% or less, so it is a good idea to check the oxygen saturation of new residents when they are well and record it in the notes. If they are under 95%, speak to their clinician.

Pulse Oximetry and the unwell patient.

Patients may develop low oxygen saturations when they become seriously unwell due to lung problems such as pneumonia, COVID-19 infection or COPD. Heart problems (such as a heart attack) can also cause drop in saturation. Elderly patients with low oxygen saturations often present with new onset confusion or breathlessness, so if you are concerned about a patient and need urgent medical advice ring the patient's usual GP Surgery in normal hours or 111 out of hours.

Useful information to record and pass onto healthcare professionals are the patient's past medical history and medication, a brief history of the current illness, whether the patient is confused, looks blue or is fighting for breath, or breathing more rapidly than usual.

If possible check and record the patient's temperature, pulse oximetry level, and the previously recorded baseline level when stable, pulse rate as shown on pulse oximeter, and if possible, the patient's breaths per minute and pulse.

An oxygen saturation of less than 95% in a previously stable patient is a cause for concern. An oxygen saturation of less than 92% should trigger consideration for urgent hospital admission, except in patients with known COPD or if they usually have low saturations.

Please remember that pulse oximetry is only an aid to assessing how seriously ill a patient is. NHS England have produced a very useful table of 'red flag' signs to look out for, irrespective

of pulse oximetry results, which warrant calling an ambulance. The table can be seen on this slide.

Care of the pulse oximeter

Refer to the manufacturers leaflet for detailed advice, but in general the probe should be cleaned inside and out between each patient with a soft cloth and warm water, detergent or a 10% bleach 90% warm water solution. Liquid should not be poured into the sensor or the probe immersed in liquid.

Training

Care home management should ensure that all staff who will be using pulse oximetry have been trained on how to carry out pulse oximetry, how to record the results, what to do if a reading cannot be obtained, how to recognise if a result is normal or abnormal and how to act on an abnormal result and how to take care of the pulse oximeter