

Everything you need to know about Pulse Oximeters

As part of our series on remote monitoring (checking your own health data at home instead of your healthcare professional checking it for you in person), this article is going to look at the benefits of checking oxygen levels with a pulse oximeter specifically.



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How does a pulse oximeter work?

First, a quick note on how this device (frequently called a 'sats probe' in medical circles) works. Essentially, it shines a laser through the tip of your finger and measures the amount of light coming through the other side.

The amount of light that gets through varies depending on how much oxygen there is in the blood. This is because the type of haemoglobin (molecule that carries oxygen) that *has* oxygen attached absorbs different wavelengths of light compared to haemoglobin that does *not* have oxygen attached.

The light detector has sensors for the different types of light and so can calculate what percentage of the haemoglobin in the blood has oxygen attached. This is also known as 'oxygen saturations' with a maximum being 100%.

Do I need a pulse oximeter?

For most people, monitoring your oxygen levels isn't something that needs to be done on any sort of a regular basis. However, having a pulse oximeter can come in very handy when someone has an infection. In the context of an infection, low oxygen levels may suggest that our body is struggling to cope. It may be that we should have an assessment and tests at this point.

We might also need extra support in the form of intravenous treatments (fluids, antibiotics, etc), and/or extra oxygen delivery via a facemask or nasal prongs.

Sometimes our oxygen levels can drop due to an infection even before we become aware of any symptoms to suggest a breathing problem, a condition referred to as 'silent hypoxia' (hypoxia meaning low blood oxygen levels)¹.

Monitoring your oxygen levels when you are unwell (in particular if you have any symptoms suggestive of Covid-19), allows you can be ahead of the curve on the off chance that things take a turn for the worse and medical attention is needed.

By being prompted to get medical attention sooner than you might otherwise, you may then be able to prevent the infection from getting to a more dangerous stage.

This is especially true for those who are at increased risk of having a more severe Covid-19 infection, such as those in a mature age group, or with certain underlying medical conditions that can cause complications.

Additionally, with the trend of many consultations now happening remotely, it can be very useful to have a device at home that will tell you your oxygen levels so that you can pass this information on during your appointment.

This may help the clinician in their decision making and may result in potentially avoiding an unnecessary trip to the GP surgery or A&E department to have oxygen levels checked.

Or it may help confirm that a face-to-face appointment really is needed and give you peace of mind that you are doing the right thing during any long waits to be seen.

An extra benefit of pulse oximeters in this instance is also how they also show a heart rate. Unless you have another device which can give an

accurate reading at home, or you have had a lot of practice doing this yourself, it can sometimes be hard to assess your own heart rate at home by manually counting your pulse.

Reporting your heart rate during a remote consultation may also help the clinician in a similar way, and thereby also make the interaction more useful for you.

There are other instances when having a pulse oximeter may also be useful, such for people with chronic lung conditions who are asked to monitor oxygen levels by their specialist.

What does my blood oxygen level reading mean?

[Normal oxygen saturation levels](#) depend on whether or not you have conditions that can affect your usual baseline, such as lung disease, as well as what altitude you are at, if abroad! As a rule of thumb though, levels at about 96% and above are considered 'normal' for most people.

Of course, it shouldn't be taken as a blanket reassurance, as depending on symptoms or activity level, further medical attention may still be appropriate.



For those who don't have lung disease and are expected to have normal oxygen levels, NHS advice is to seek emergency medical attention if levels fall to 92% or below by ringing 999 or attending your local A&E department.

Also, if levels drop to 93% or 94% or keep being lower than normal, it's best to seek urgent medical attention by contacting your GP or NHS 111.

For more complete advice on using pulse oximeters in a Covid-19 infection, and other things to watch out for, you can read the full NHS guide [here](#)².

Are Pulse Oximeters accurate?

We talked at the beginning of the article how the pulse oximeter works by shining a light through your body and measuring what gets through on the other side.

Referring back to this mechanism can explain why some physical factors can affect the readings that we see. For example, nail varnish will reduce the amount of light getting through. Cold fingers result in less blood flowing through, which can make readings look artificially low.

A really important factor to be aware of is that readings may also be affected by pigmentation in Black and Brown skin^{3,4}. This has been noticed particularly when oxygen levels are somewhat low.

At these times, the readings showing may potentially be an overestimation of true oxygen levels in people with darker skin. This is an issue with all pulse oximeters around the world and is due to the way they are all designed to work through measuring light absorption.

While this is a complex process to redesign, at Kinetik, we are aware of the issue and are committed to supplying products that people of all skin colours can rely on.

All of the pulse oximeters at Kinetik meet the latest ISO directives and are also listed on the Scotland Excel Framework, and so can be trusted to be as reliable as any other pulse oximeters available.

NHS England advises people with darker skin who are using a pulse oximeter to monitor a Covid-19 infection to be on alert for any changes in readings as a prompt for getting medical attention, and not just to look out for a single low reading⁵.

I hope this has been a helpful article highlighting the important uses and potential limitations with pulse oximeters. As always, for any pressing health concerns, please do ensure you get appropriate medical care and attention as outlined above and in the [NHS pulse oximeter guide](#)².

References

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