

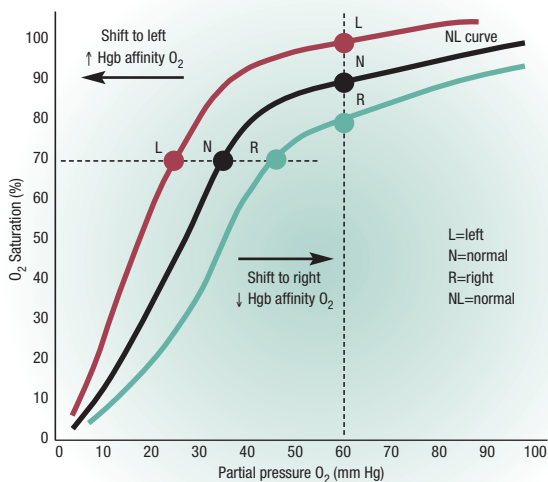
Is my patient getting enough oxygen?

That drop in the SpO_2 really threw me a curve!



Q: I know how important it is for my patients to be adequately oxygenated, but I'm not sure what guidelines to follow when monitoring oxygen saturation. Is it true I should be concerned that my patient is getting into trouble if her pulse oximetry reading falls below 90%?—S.R., FLA.

A: Yes, you should: A pulse oximetry reading below 90% is bad news. Why? Oxygen is transported to the tissues in two ways: either bound to hemoglobin (97%) or dissolved in plasma (3%). The oxygen saturation of hemoglobin is reported as the SpO_2 (pulse oximetry reading) or the SaO_2 (percentage of arterial oxygen saturation); normal is above 94%.



The partial pressure of oxygen (PaO_2) reflects the oxygen dissolved in plasma, with normal ranging from 80 to 100 mm Hg. The SpO_2 and SaO_2 values are closely correlated, so a drop in the SpO_2 means your patient isn't getting enough oxygen.

You need to regularly check your patient's SpO_2 and keep a close eye on her clinical condition to avert problems. If her SpO_2 drops too low, she won't have any reserve oxygen left to compensate for tissue demands. Our bodies can do only so much to compensate for increasing oxygen needs. Serious incidents like bronchospasm or aspiration will reduce oxygen intake, and cardiac arrhythmia will

reduce oxygen delivery, resulting in hypoxia. As you monitor the patient's SpO_2 , watch for signs of increasing hypoxia, such as changes in skin color, increasing tachycardia, hypertension, restlessness, and disorientation.

Ahead of the curve

The oxyhemoglobin dissociation curve is one way you can determine if your patient is at risk for hypoxia. That's because it shows us the relationship between the SaO_2 and PaO_2 , illustrating normal, relatively safe, and dangerously low oxygen levels.

Here's what happens: Carbon dioxide, hydrogen ion concentration, temperature, and 2,3-diphosphoglycerate can affect your patient's SaO_2 . If any of these factors rises, more oxygen is released to the tissues at the same PaO_2 level, resulting in a shift of the curve to the right. Similarly, if any of these factors drops, less oxygen is released to the tissues while remaining at the same PaO_2 , resulting in a shift of the curve to the left.

If your patient's PaO_2 drops from 100 to 80 mm Hg because of lung or heart disease, SaO_2 remains close to maximum levels and tissue will not suffer from hypoxia. But when the arterial blood is exposed to greater tissue demands for oxygen, the hemoglobin gives up large quantities of oxygen for tissue use.

The goal is to deliver most of the patient's oxygen supply via the hemoglobin. By closely monitoring the SpO_2 , assessing the clinical condition, and following the oxyhemoglobin dissociation curve, you can help prevent your patient from becoming hypoxic. ■

Learn more about it

Smeltzer, S., and Bare, B.: *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 10th edition. Philadelphia, Pa., Lippincott Williams & Wilkins, 2004.