

Emergency consultation on medical oxygen in COVID-19

There is a deadly shortage of pressurized oxygen in several low-resource settings where the COVID-19 pandemic is raging. This requires a rapid and pragmatic response focusing on optimizing existing oxygen systems, potential alternative oxygen sources, and oxygen-saving treatment strategies for patients with severe COVID-19. Longer-term investment in sustainable quality supply systems is urgently needed. There is excellent guidance and advice available from several sources (see reference list below), particularly on medium-term (i.e., weeks) and longer-term (i.e., months) approaches and solutions. The recommendations we are sharing are for the immediate term – i.e., right now.

The recommendations below focus on immediate action that could save lives in the context of limited medical oxygen supply

Simple measures can save lives:

- Prioritize low-flow devices above high-flow devices.*
- Use the correct oxygen interface, i.e., the one that best fits a patient's individual need.*
- Monitor oxygen saturation and assess the patient regularly, and set lower targets for starting and finishing supplemental oxygen.**
- Reduce leaks and wastage to save a lot of oxygen.

* Prioritize oxygen concentrators delivering >10L/min, generators and simple devices such as stand-alone Bilevel Positive Airway Pressure (BIPAP) machines over more sophisticated equipment such as ventilators. Prioritize oxygen devices that work on lower-flows such as nasal prongs, face masks and non-rebreather masks, stand-alone BIPAP devices over high-flow systems such as high-flow nasal oxygen (HFNO)/non-invasive ventilation (NIV).

** 2 to 4 hourly monitoring of oxygen saturation and pulse rates is essential for hospitalized patients (more frequent monitoring is needed in sicker patients), so invest in pulse-oximeters. Note that in dark-skinned patients, oximeters can overestimate oxygen saturations at low values.

Oxygen sources

1. Basic oxygen provision via low-flow devices is likely to save far more lives than high-flow devices or invasive mechanical ventilation in severe COVID-19 and should be prioritised in low-resource settings.
2. With shortage of pressurized oxygen, oxygen concentrators with sufficient capacity ($\geq 10\text{L}/\text{min}$) are an important alternative, provided power supply is ensured (e.g., with a back-up generator or large batteries).

Oxygen delivery

3. Accurate pulse-oximetry is an essential monitoring tool in severe COVID-19.
4. Low oxygen saturation is never an indication for endotracheal intubation **on its own**. Oxygen saturations of 90% are often well tolerated and can be accepted in patients with severe COVID-19.

Oxygen conservation

5. Close fitting non-rebreather masks supplied by an oxygen flow of 10 to 15 L/min increase FiO₂ efficiently. This is often sufficient in COVID-19 patients. In contrast, HFNO always uses large amounts of oxygen.
6. Awake prone positioning, applying positive end-expiratory pressure (PEEP) by means of continuous positive airway pressure (CPAP) or NIV, and simple, nurse-led, physiotherapy are important in the management of the hypoxic COVID-19 patient.
7. Biomedical engineering support to manage supply, ensure optimal performance, deal with leaks, and reduce fire hazards is invaluable and needs strengthening in low-resource settings.

Information sources on emergency medical supply and conservation:

[Gasping for Air: The deadly shortages in medical oxygen for COVID-19 patients - MSF](#)

[Oxygen Supply & Delivery FAQ – Open Critical Care](#)

[Improving Hospital Oxygen Systems for COVID-19 in Low-Resource Settings: Lessons From the Field](#)

[Oxygen Conservation Strategies During COVID-19 Surges](#)

[WHO's Science in 5 on COVID-19: Medical Oxygen](#)