

India's oxygen woes easing

As India battles a horrific surge of the coronavirus, a spot of good news has emerged: New Delhi said it has received enough medical oxygen supply for it to distribute the excess to other states. This comes as many parts of the country are still experiencing shortages of vital resources such as hospital beds, oxygen and medicine.

THE CHALLENGES



- Liquid oxygen is pale blue, with a temperature of approximately minus 183 deg C.



- It is a cryogenic gas that can be stored and transported only in special cylinders and tankers.



- Due to high flammability, tankers travel below 40kmh and only in the day.



- India's oxygen plants are in the east and south, but demand is mainly in the north. Transport takes over 18 hours.



- An inadequate health budget (<2% of GDP) leaves the industry unprepared to deal with the sudden surge of patients.

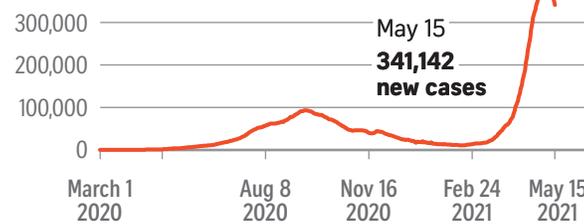
CURRENT SITUATION IN INDIA

24,684,077 confirmed cases
270,284 total deaths

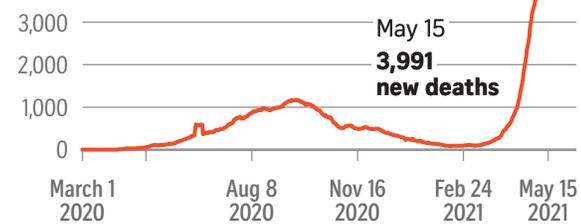
NOTE: Figures as at May 17, 2021.

3% fully vaccinated

Cases per day in India (7-day rolling average)

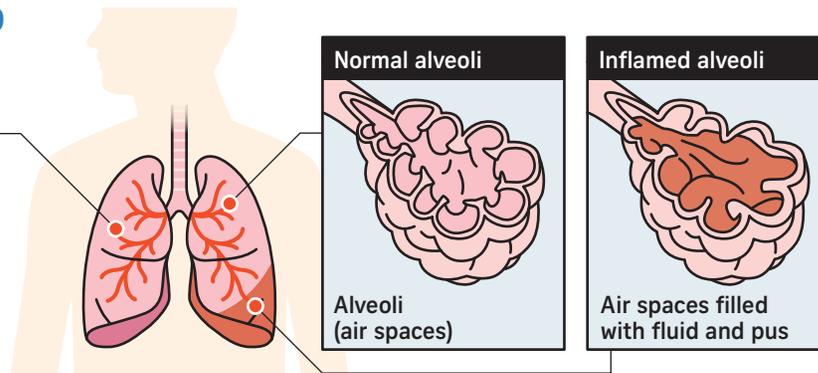


Deaths per day in India (7-day rolling average)



HOW COVID-19 AFFECTS RESPIRATION

- Covid-19 affects the respiratory system by infecting respiratory epithelial cells (which facilitate gas exchange) lining the respiratory tract.



- To fight off the infection, the body's immune system releases cells that trigger inflammation, causing pneumonia (build-up of fluids in the alveoli – air sacs).

- This impairs the diffusion of oxygen through the lung membrane, leading to hypoxemia (low oxygen levels in the blood).

- The lack of oxygen can result in tissue damage in various organs, potentially leading to multiple organ failure and death.

HOW OXYGEN HELPS

In severe pneumonia, oxygen therapy can relieve hypoxaemia, allowing time for the infection to clear and the lungs to heal.

MEASURING OXYGEN LEVELS

- Oxygen saturation in blood is measured using a pulse oximeter – a small device that is clamped on the finger.
- Small beams of light pass through the blood and measure changes in light absorption in oxygenated and deoxygenated blood. The process is painless.



WHEN IS OXYGEN NEEDED?

- A normal level of oxygen in blood is **94%-98%** at rest for people without chronic lung disease.

- Patients with chronic lung disease often have a degree of hypoxaemia with saturation rates of **88% to 92%**.

- Walk test: After a patient's oxygen level is measured, he is made to walk for six minutes. If oxygen levels fall by over 3%, oxygen may be needed.

STORAGE AND USAGE OF OXYGEN

Oxygen intake

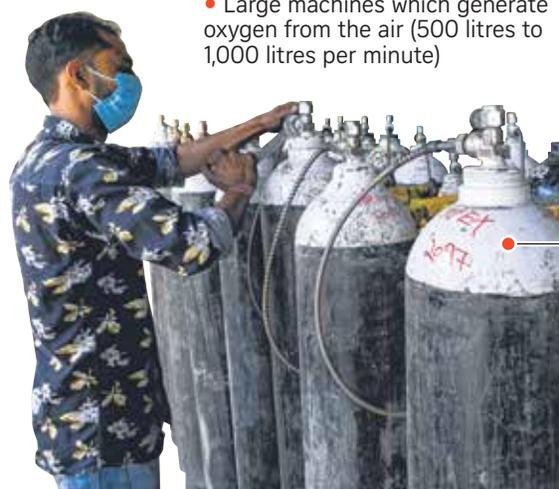
Average adult: Around 480ml per minute

Covid-19 patient: 1 litre to over 40 litres per minute



Oxygen generator

- Large machines which generate oxygen from the air (500 litres to 1,000 litres per minute)



Oxygen cylinders

- Can support one person for 24 to 72 hours, depending on the severity of hypoxaemia and how much oxygen the person needs.
- Severe Covid-19 cases often have hypoxaemia for over a week, and a cylinder would run out.



Oxygen concentrator

- Small bedside machines which take in atmospheric air and filter out nitrogen (78% of air) leaving near pure oxygen (90%-95%) which is delivered into a patient via a nasal tube.
- The continuous source of oxygen drawn from the air eradicates the need for refilling. However, the machine requires a reliable power supply, as well as maintenance.
- It can dispense up to 10 litres of oxygen per minute and is suitable for mild and moderate cases.
- Critically ill patients sometimes need over 40 litres per minute.

INTERNATIONAL AID

- Governments and private groups worldwide are pledging help to tide India through the terrible crisis.
- This is the first time India has accepted large-scale international humanitarian aid since the 2004 tsunami.

Oxygen concentrators

China	Over 21,500
Singapore	Over 7,500
United States	1,700
Hong Kong	800
Ireland	700
Britain	495
Japan	300
Taiwan	150
Romania	80
Thailand	15
WHO	4,000

Oxygen generating plants

Germany	24
Russia	20
France	8

Containers and tanks

United States	1,100 cylinders
Taiwan	500 cylinders
Singapore	8 tanks and over 250 cylinders
Thailand	100 cylinders
Romania	75 cylinders
United Arab Emirates	6 containers

Liquid oxygen

Portugal	20,000 litres a week
France	Five containers
Saudi Arabia	80 tonnes

Ventilators and respirators

China	5,000
Britain	1,200
United Arab Emirates	Over 630
Singapore	Over 500
Australia	500
Ireland	365
Japan	300
Germany	120
Sweden	120
Russia	75
Luxembourg	58
France	28

NOTE: Figures as at May 17, 2021.