



## The oxygen concentrator

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**(Mains GS 3 : Science and Technology: Recent developments and their applications and effects in everyday life)**

### Context:

- With the demand for medical oxygen continuing unabated and several States struggling to keep pace with demand, the oxygen concentrator has emerged as a sought after device.
- Unlike medical oxygen sourced from industrial units, which are supplied via cylinders, concentrators are devices that can be operated at home.

### When is an oxygen concentrator needed?

- When blood saturation levels drop below 94%, it could be a sign of respiratory distress.
- Usually this merits hospitalisation, but due to the surge in **COVID-19** cases and oxygen beds in short supply, the device could help those whose saturation levels range between 88-92 if they can't access hospital services.
- Any lower would require more intensive oxygenation and any higher would mean that an improvement in lung function can obviate the need for such a device.

What does a concentrator do?

- An oxygen concentrator takes in air and separates the oxygen and delivers it into a person via a nasal cannula.
- Air is 79% nitrogen and 21% oxygen and a concentrator that works by plugging into a source of electricity delivers air that is upto 95% oxygen.
- In respiratory infections that causes oxygen saturation levels to dip below 90%, having an external device supply pure oxygen eases the burden on the lungs.
- However in cases of severe respiratory distress, it may be necessary to provide oxygen that is almost 99% pure and an oxygen concentrator is not up to that job.

### How does it work?

- A concentrator consists of a compressor and sieve bed filter.
- The former squeezes atmospheric air and also adjusts the pressure at which is delivered.
- The sieve bed is made of a material called Zeolite that separates the nitrogen.
- There are two sieve beds that work to both release oxygen into a tank that's connected to the cannula as well as release the separated nitrogen and form a continuous loop that keeps producing fresh oxygen.

### **Are all concentrators the same?**

- These products come with a variety of specifications.
- There are those with varying oxygen outputs. For COVID-19 patients, a device with a 5L-10 L output is recommended.
- What's important though is that it delivers air that contains at least 90% pure oxygen. The cost of these devices can range from ₹40,000-₹90,000.
- There are also pulse and continuous flow concentrators where the latter delivers oxygen at a constant rate and the other uses a sensor to deliver a puff of oxygen when a user is about to inhale.

Covid19