Oxygen therapy through oxygen concentrators

COVID-19 emergency response

unicef
for every child

Supply Division

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"Nowhere is the technology gap more apparent than in the provision of oxygen … Oxygen is seldom available in the poorest countries beyond urban hospitals and private providers. Pulse oximeters, effective and inexpensive diagnostic devices for measuring blood oxygen levels, are similarly unavailable to those who need them most."

*- Henrietta H. Fore, Executive Director of UNICEF and Kevin Watkins, Chief Executive of Save the Children UK**

Overview

The Challenge

Oxygen is a life-saving medical gas for treating respiratory illnesses and managing various health system needs, like emergency obstetric care, surgery and anesthesia for surgery. It's a major component for treating pneumonia, an infection of the lungs which often involves hypoxemia, an abnormally low level of oxygen in the blood, which can be fatal.

COVID-19 causes pneumonia and approximately 15 per cent of COVID-19 patients are classified as 'severe' and require oxygen therapy. However, oxygen is seldom available in the poorest countries beyond urban hospitals and private providers. There are complexities in the procurement, distribution and utilization of appropriate equipment for a large proportion of severely ill children and adults.

Oxygen Concentrators

To support the global response to the pandemic, UNICEF has been distributing oxygen concentrators, devices that take in air from the environment, remove nitrogen, and produce a continuous source of oxygen for delivering oxygen therapy (see video with explanation).

They are available in three sizes: five, eight and ten litres per minute. The commonly recommended flow rates for oxygen from a concentrator through nasal prongs or nasal catheters are 0.5 – 1 L/min for neonates, 1–2 L/min for infants, and 1–4 L/min for older children. The World Health Organization (WHO) recommendation is to initiate oxygen therapy at 5 L/min for adults for COVID-19. Therefore, one concentrator with the appropriate accessories (for example, a flow splitter) can treat multiple patients.

Consumables (such as filters, tubing and nasal cannulas etc.) and other necessary accessories (such as pulse oximeters, flow splitters, and oxygen analysers) are another important part of the oxygen package UNICEF is supplying to countries.

UNICEF Response during COVID-19

Before the COVID-19 pandemic, UNICEF and WHO created technical specifications for oxygen therapy and monitoring equipment that are appropriate for countries and contexts that UNICEF and partners work in.

In the early months of the pandemic, the global demand for oxygen concentrators was greatly surpassing the supply. However, UNICEF Supply Division is currently able to meet the existing demand for the concentrators and is closely monitoring the situation to be ready in case of a second wave of COVID-19 cases.

In total, UNICEF has secured a pipeline of over 17,900 oxygen concentrators. As of 18 August 2020, more than 5,995 have arrived to 65 countries, with more than 4,600 awaiting shipment and the remaining awaiting completion by the manufacturer before going directly to the countries in need.

As UNICEF country offices hand over the products to ministries of health and implementing partners, countries can start addressing the need for oxygen therapy as the needs of the pandemic accelerate.

Budgeting for Oxygen Concentrators

Many countries have identified needs to procure oxygen concentrators as part of their COIVD-19 response but are lacking the necessary resources. An example is Angola with a current need of procuring 105 concentrators. An oxygen concentrator costs approximately US$700 but an additional 30 – 40% should be budgeted for to ensure the concentrators have the essential consumables and accessories required for at least 6 months of use. In addition to the cost of the concentrators, accessories and consumables, overheads including shipping, distribution, installation, training, maintenance and other operating expenses such as electricity can add another 45 – 65% on top of the procured goods. In the case of Angola, to get 105 concentrators installed and effectively treating patients, the total cost could be over US$225,000.

UNICEF is seeking US$10 million to bridge the funding gap for countries like Angola to address needs for oxygen therapy and further bring to scale these life saving products.

Key Figures

Challenges

15% of COVID-19 patients are classified as severe and require oxygen therapy*

800,000 children under 5 years of age are dying from Pneumonia every year.

Approx. **14%** of children with pneumonia require oxygen therapy. Hypoxemia is a major predictor of mortality.

30 million small & sick babies each year need special care at birth, including safely administered oxygen.

Response

17,900 Oxygen Concentrators procured as of 17 August 2020

US$ 13.7m procured biomedical equipment, accessories and consumables

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