Increasing access to safe oxygen and maternal, newborn, and child health devices

PATH Market Dynamics Program

The problem

Hypoxemia, insufficient oxygen in the blood, affects millions of people each year suffering from a range of common conditions—including newborn complications, obstetric emergencies, and pneumonia. Globally, at least 13 percent of children admitted to a hospital with severe pneumonia have hypoxemia, corresponding to approximately 1.5 to 2.7 million children requiring oxygen therapy for treatment of pneumonia annually.[1] Further, global estimates suggest that one in five sick newborns has hypoxemia upon admission to a hospital and 15 percent of all pregnant women develop a potentially life-threatening complication, many of whom require treatment with oxygen.[2,3]

Table 1. List of conditions that may require oxygen treatment.

Oxygen is an essential component of robust health systems as it treats a wide-ranging spectrum of conditions. The following is a non-comprehensive list of conditions that may require oxygen therapy:		
Pneumonia	Chronic obstructive pulmonary disease	Birth asphyxia
Sepsis		Shock
Asthma	Eclampsia	Surgical emergencies
Malaria	Postpartum hemorrhage	

Because of the prevalence of hypoxemia, oxygen is one of the 30 high-priority lifesaving medicines for women and children included in the World Health Organization Model List of Essential Medicines.[4] However, evidence suggests that nearly half of hospitals in low- and middle-income countries have inconsistent or no supply of oxygen, and only half have working pulse oximeters[6] to measure the oxygen level in blood—a critical element of safe oxygen delivery.

Unreliable access to safe oxygen, defined as a trained health care worker delivering oxygen from a reliable source using tools like pulse oximetry, is the result of many complex, interlocking market and health system issues. Examples include fragmented demand, which complicates device maintenance and spare parts supply chains due to multiple product variants, and procurement based on the lowest purchase price rather than total cost of ownership, which does not adequately account for ongoing expenses to maintain and operate devices. With funding from the Bill & Melinda Gates Foundation, PATH works to improve access to safe oxygen delivery in close partnership with country stakeholders and industry members.

The project

The increasing access to safe oxygen and maternal, newborn, and child health (MNCH) devices project is a two-year project with three objectives to: (1) provide technical assistance to individual countries scaling access to safe oxygen delivery; (2) engage with global partners to build their capacity in support of oxygen initiatives; and (3) apply learnings from oxygen and pulse oximetry scale-up to inform broader improvements in access to other high-priority MNCH devices. The activities associated with these objectives are outlined in Table 1 (next page).

Provide technical assistance to individual countries scaling access to safe oxygen delivery

The first project objective is focused on providing technical assistance to India, Indonesia, Kenya, Malawi, and Senegal to improve access to oxygen. Efforts in India, Indonesia, and Kenya expand on prior PATH work to understand oxygen systems and policy in these countries. Work in Malawi and Senegal extend project work to two new geographies and increase understanding of the factors that contribute to unreliable access to safe oxygen in low-income countries.

Project activities vary based on individual country needs and priorities identified by each ministry of health (MOH). Some activities are specific to oxygen; others are applicable to a range of medical devices. Examples of project activities include stakeholder coordination, technical assistance to quantify the demand for oxygen, and total cost of ownership estimation to inform budgeting and procurement decisions.

A cylinder-based manifold system in Kenya. Photo: PATH/Lisa Smith.

In Senegal, we are providing technical assistance to a coalition of partners led by the MOH to collect data on the availability of medical devices, including oxygen and pulse oximeters, within all public health facilities. In Kenya, we are assisting the MOH to roll-out a standardized method for tracking facility-level oxygen consumption. Work across the five focus countries will culminate in a toolkit of generalizable resources that will be broadly disseminated to interested parties.

Table 2. Project activities fall into several areas of engagement.

Engage with global partners to build their capacity in support of oxygen initiatives

The second project objective is focused on global engagement with partner organizations. PATH shares insights and experience with global health partners to support other oxygen-related initiatives. Coordination across organizations ensures continuity in efforts and efficient transfer of knowledge resulting in increased global capacity to support countries as they scale access to safe oxygen. We accomplish this in a variety of ways. For example, this work involves close collaboration with the United Nations Children's Fund Supply Division to support technical specification development and country procurement.

We support countries interested in leveraging Global Financing Facility (GFF) investments to increase access to oxygen. PATH works closely with officials in Kenya and Malawi to integrate oxygen and pulse oximetry interventions into investment cases aimed at eliminating preventable deaths and improving the health of mothers, newborns, and children.

Apply learnings from oxygen and pulse oximetry scale-up to inform broader improvements in access to other high-priority MNCH devices

The third project objective is to create a framework for investing in MNCH medical devices based on PATH's experience in oxygen. The purpose of this objective is to apply lessons from scaling access to oxygen and pulse oximetry to expanded use of other priority MNCH devices. PATH is using its understanding of oxygen as a durable medical device to design a prioritization tool for evaluating investment trade-offs between different essential MNCH medical devices. Key attributes included in this framework include:

- The levels of health facilities and services provided.
- Current access to medical devices.
- Total cost of ownership for medical devices including requirements for their sustainable use (e.g., training, maintenance).
- Relative feasibility to scale device access.

The goal is to identify cost-effective deployment strategies that maximize health outcomes by increasing access to priority MNCH medical devices.

Contact us

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