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Agenda item 9

Area for Intervention: Improving access to innovations in sustainable oxygen production, distribution, and supply

Programmatic Priorities: Respond to global health emergencies - Improve child survival with triage and treatment tools – Women & children's health: Improve access to better tools for safe pregnancy and birth for women and newborns

Strategic Objectives: Accelerate the introduction and adoption of key health products.
(Create system conditions for sustainable and equitable access)

For Information For Review and Advice For Decision

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1. Purpose and context of this document

This Area for Intervention (Afi), submitted for Executive Board endorsement, outlines opportunities for accelerating access to medical oxygen by introducing production and distribution technologies. It also emphasizes piloting innovative technologies and exploring novel business models to maintain and build upon the products and investments developed during the COVID-19 pandemic. The approach focuses on two main strategies: first, the adoption of advanced production and distribution technologies to improve the supply chain efficiency; and second, the exploration and pilot testing of innovative technologies alongside novel business models. The Afi is intended to complement other documents that articulate the global response to medical oxygen needs, such as the Global Oxygen Alliance (GO2AL) strategy¹ and Unitaid's *Medical Oxygen Innovation Landscape* – see Section 4 for more detail. The purpose of this document is to provide an overview of the relevance of medical oxygen interventions to Unitaid's strategy, potential opportunities for Unitaid considering developments in the product landscape and stakeholder ecosystem, prioritization analysis, and proposed way forward.

2. Introduction

Medical oxygen is a critical medicine used globally. It is used to treat many health conditions and is listed as an essential medicine by the World Health Organization (WHO). The COVID-19 pandemic highlighted the importance of improving access to respiratory care equipment and oxygen usage worldwide.

Access to medical oxygen is limited by operational constraints, high costs, inefficient distribution in remote areas, inadequate training for healthcare workers, and low levels of product innovation.

Medical oxygen is crucial for treating hypoxemia – low levels of oxygen in the blood – which is a symptom of a wide range of health conditions such as pneumonia and chronic obstructive pulmonary disease (COPD). In May 2023, the World Health Assembly unanimously adopted on Resolution WHA76.3 "Increasing Access to Medical Oxygen"². This resolution urges governments, the WHO, and related organizations to make oxygen systems a basic part of Universal Health Coverage (UHC) and undertake efforts to pandemic prevention, preparedness, and response (PPPR)³.

Oxygen access supports seven of the nine health-related Sustainable Development Goals (SDGs), including universal health coverage (UHC), primary healthcare (PHC), and specialized care across reproductive, maternal, new-born, and child health (RMNCH), as well as chronic and infectious diseases. Despite its importance, low- and middle-income countries (LMICs) face significant access challenges. These barriers were highlighted and exacerbated during the COVID-19 pandemic, revealing inequities at every stage of the medical oxygen value chain, from production and to patient delivery.

The global medical oxygen market, estimated at USD 8.98 billion in 2022, is expected to see significant growth by 2028⁴. Despite this growth, disparities between LMICs and high-income countries (HICs) are likely to persist without further investment. A recent review found that medical oxygen has the potential to reduce overall child mortality among hospitalized children by 25%, and that investing in oxygen infrastructure is as cost-effective as vaccination.⁵ Despite its needs, WHO surveys show that less than half of healthcare facilities

¹ Global Oxygen Alliance Strategy: executive summary 2024-2030. https://globaloxygenalliance.org/wp-content/uploads/2023/09/GO2AL_StrategyExeSummary_2024-2030-v3.pdf [Accessed 26 March 2024]

² WHO (2023). 76 World Health Assembly Resolution on Increasing Access to Medical Oxygen. World Health Organization. https://apps.who.int/gb/ebwha/pdf_files/WHA76/A76_R3-en.pdf [Accessed 26 March 2024]

³ WHO (2023). 76 World Health Assembly Resolution on Increasing Access to Medical Oxygen. World Health Organization. Accessed at: https://apps.who.int/gb/ebwha/pdf_files/WHA76/A76_R3-en.pdf

⁴ *Medical Oxygen Market- Global Industry Size, Share, Trends, Opportunity, and Forecast, 2018-2028 Segmented By Form (Liquid Oxygen, Compressed Oxygen, Oxygen Gas Mixture), By Delivery Mode (Tanks/Pipeline, Cylinder, Others), By Application, By End User, By Region*

⁵ Lam F, Stegmüller A, Chou VB, Graham HR. Oxygen systems strengthening as an intervention to prevent childhood deaths due to pneumonia in low-resource settings: systematic review, meta-analysis and cost-effectiveness. *BMJ Glob Health*. 2021 Dec;6(12):e007468. doi: 10.1136/bmjgh-2021-007468. PMID: 34930758; PMCID: PMC8689120.

in LMICs have reliable oxygen access.⁶ A study in sub-Saharan Africa found only 43% of facilities had both continuous power and oxygen.⁷

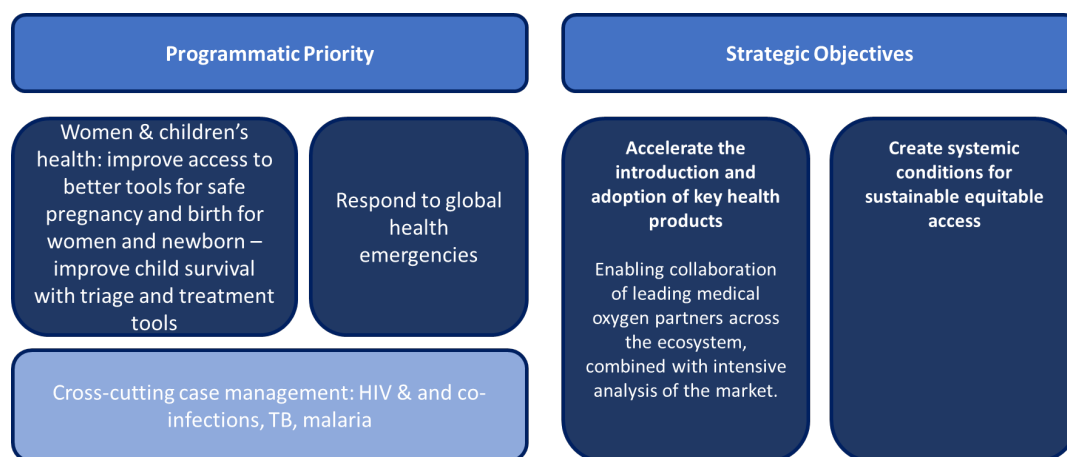
Throughout the COVID-19 pandemic, nearly US\$ 1 billion was mobilized towards enhancing oxygen infrastructure, including the development of plants and equipment. In this context, Unitaid played a relevant role by collaborating with global partners such as the Global Fund, USAID, WHO, and UNICEF. Through its leadership of the ACT-A Oxygen Emergency Taskforce and its direct investments, Unitaid not only influenced the oxygen market but also expanded manufacturing capabilities, achieved price reductions, and supported countries in evaluating their oxygen requirements. With an investment of US\$ 82 million in 11 projects across 51 countries, Unitaid made substantial contributions to the medical oxygen supply chain, improving access to liquid oxygen (LOX) in areas with limited resources and upgrading oxygen delivery systems.

Post-pandemic, the ACT-A Oxygen Emergency Taskforce evolved into the Global Oxygen Alliance (GO2AL), with Unitaid continuing to co-lead with the Global Fund. GO2AL's mission is to secure sustainable and long-term access to medical oxygen by advocating for systemic enhancements and supporting nations in building sustainable health oxygen infrastructures.

However, the sustainability of these investments demands the **development and implementation of more efficient delivery models**. Furthermore, there is an essential need for increasing the uptake of **production and distribution technologies and innovations** to address maintenance, supply, and power challenges effectively. Adopting this dual strategy is vital for ensuring the availability of medical oxygen that are tailored to meet patient needs and for maximizing the impact of existing and new products.

Considering the acute barriers hindering the uptake of medical oxygen, Unitaid has identified opportunities to enable improved access to existing products and innovations that would support multiple programmatic priorities (Figure 1). Unitaid is well positioned to apply strategies and experience from its pulse-oximetry portfolio and COVID-19 efforts, to deploy complementary investments that fill some of the most critical gaps impeding medical oxygen uptake globally.

Figure 1: Medical oxygen's potential to support Unitaid's strategy and portfolio⁸



Following the COVID-19 pandemic, Unitaid's medical oxygen portfolio is shifting from emergency response to ensuring ongoing, reliable access to oxygen – thereby enhancing women's and children's health and increasing pandemic preparedness. Countries and partners are actively preparing for future health crises by improving oxygen supplies and focusing on liquid oxygen infrastructure for both immediate and future needs.

⁶ Oxygen. Geneva: World Health Organization; 2023 https://www.who.int/health-topics/oxygen#tab=tab_1 [Accessed 26 March 2024]

⁷ Mangipudi S, Leather A, Seedat A, Davies J. Oxygen availability in sub-Saharan African countries: a call for data to inform service delivery. *Lancet Glob Health*. 2020;8(9):E1123-E1124

⁸ Unitaid Strategic Objective 3 (Foster inclusive and demand-driven partnerships for innovation) is not reflected as it relates to medium-term opportunities that will arise as products with a strong fit with Unitaid's mandate are nearer market entry.

This includes making oxygen available in critical care areas like maternity wards and neonatal units to reduce preventable deaths from conditions like pneumonia, which is a major cause of mortality in children under five.

Following an analysis of possible interventions, their potential impact and fit for Unitaid (using the prioritization framework), the Secretariat proposes to position this opportunity as a priority for 2025 funding in the baseline Investment Plan, with potential further interventions in subsequent years depending on pipeline advances.

3. Public health challenge and key access issues

Why medical oxygen? Medical oxygen is essential for treating a wide range of health conditions and is recognized as an essential medicine by the WHO⁹. Despite its importance, access to medical oxygen remains a challenge, particularly in LMICs, due to long-standing underinvestment. The COVID-19 pandemic highlighted this gap in oxygen access, leading to preventable deaths in many LMICs. In response, the World Health Assembly in May 2023 unanimously adopted by 194 Member States a resolution to enhance access to medical oxygen, emphasizing its role in strengthening health systems and achieving health-related SDGs¹⁰.

Medical oxygen is produced using three main methods:

(1) Oxygen concentrators that generate oxygen from the air next to the patients' bed;

(2) Pressure Swing Adsorption (PSA) and Vacuum Pressure Adsorption (VPSA) plants, which are large systems that can supply oxygen to entire healthcare facilities or fill cylinders; and

(3) Air Separation Units that produce Liquid Oxygen (LOX), suitable for wide distribution across regions or countries. LOX, although not producible on-site at healthcare facilities, stands out for its efficient storage, reliable supply, and cost-effectiveness, making it particularly beneficial in emergencies and for areas far from production sites. It is user-friendly, highly reliable, and meets the World Health Organization's purity standards for medical oxygen. Despite these benefits, the preference during the COVID-19 pandemic leaned towards PSA plants and concentrators due to their immediate availability.

A comprehensive oxygen supply system, which includes production, distribution, and infrastructure, supported by policies and management, is crucial for ensuring consistent and safe oxygen access. The effective integration of these elements, along with a strategic approach to adopting suitable oxygen production methods, is essential for healthcare facilities, especially those with high demand, to maintain a stable and resilient oxygen supply.

In sub-Saharan Africa, the urgent need for medical oxygen is highlighted by the high number of respiratory-related deaths, a situation aggravated by the pandemic that laid bare the frailties of health systems in LMICs.¹¹ These challenges are multifaceted, spanning logistical, infrastructural, and human resources constraints, further intensified by the oxygen market's increased demand from non-medical industries. This competition not only drives up prices but also constrains healthcare access, highlighting the urgent need to fortify oxygen supply systems, for both pandemic preparedness and overall health security enhancement.

Investing in medical oxygen is crucial due to its vital role in treating diverse health conditions. The COVID-19 pandemic highlighted severe disparities in oxygen availability, particularly in LMICs, where many facilities could not meet demand, resulting in preventable deaths. Investment in oxygen

⁹ The World Health Organization (WHO). WHO Model List of Essential Medicines - 23rd list, 2023

¹⁰ WHO (2023). 76 World Health Assembly Resolution on Increasing Access to Medical Oxygen. World Health Organization. https://apps.who.int/gb/ebwha/pdf_files/WHA76/A76_R3-en.pdf [Accessed 26 March 2024]

¹¹ Annual deaths across SSA from various respiratory-related conditions. <https://transformativetechologies.org/wp-content/uploads/2021/01/ClosingO2GapinSSA.pdf> [Accessed 31 January 2024]
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innovations and infrastructure is not only a high-return intervention but fundamental for global health security and sustainable development.

Critical access issues limit use in LMICs. Despite the urgent and growing need for oxygen in LMICs, there is a substantial global disparity in oxygen consumption. The average per capita consumption of oxygen in sub-Saharan Africa is ten times lower than in the US and EU.¹² This significant gap emphasizes the pronounced differences in access to medical oxygen between HICs and LMICs, underscoring the challenge of meeting demand for oxygen in limited-resource settings.

The access barriers affecting medical oxygen include:

- **Quality:** Maintaining the quality of respiratory care equipment poses a significant challenge. Traditional methods of quality assurance, such as specific procurement practices or rigorous regulatory standards, may not be feasible everywhere. Moreover, the purity of oxygen depends heavily on the consistent and proper maintenance of the equipment used to produce it.
- **Affordability:** In low-income regions, the expense of oxygen, particularly liquid oxygen (LOX), increases due to large infrastructure investments, market consolidation, and transportation costs. This places a financial burden on healthcare facilities needing to supply crucial oxygen therapies.
- **Supply and Delivery:** Ensuring a consistent and efficient oxygen supply is essential, yet gaps in availability, notably in remote locations and low-resource settings, frequently lead to reliance on the less efficient exchange of oxygen cylinders. The lack of medical gas piping systems further complicates this issue, limiting the ability to provide direct and reliable oxygen delivery. Additionally, challenges in obtaining spare parts can result in the underutilization of oxygen resources, intensifying the difficulties faced in supply and delivery processes.
- **Demand and Adoption:** There are significant challenges utilizing existing products due to operating constraints, such as maintenance and power requirements and challenges. Improved technologies, that potentially would solve these issues, have been slow to reach the market, and there are not always pathways to adoption.
- **Innovation and Availability:** The dominant technologies, particularly for production and distribution, were developed in the 1970s and have not experienced significant innovation since then. Introducing innovative solutions such as solar-powered systems and products requiring less maintenance could greatly enhance access.

4. Potential opportunities to increase access to oxygen

Unitaid has identified key opportunities for enhancing access to medical oxygen in LMICs, focusing on overcoming the challenges associated with the maintenance of production units like PSA plants and the complexities of installing medical gas pipelines. These challenges have notably limited oxygen availability in many areas. Recognizing the urgent need to support and improve upon these existing technologies, particularly in the wake of extensive deployment during the pandemic, Unitaid can support strategic investments in innovative business models. Such investments aim not only to increase the efficiency of current systems but also to facilitate the introduction and adoption of new and more effective technologies.

Product Innovation: Unitaid sees significant potential in investing in both existing and emerging technologies nearing market readiness or in advanced development stages (Figure 2). This strategy includes broadening the use of high-capacity production technologies, such as expanding liquid oxygen access, and introducing new innovations not yet tested in LMICs. Also, there is potential in adapting oxygen piping systems from high-income countries and improving the designs of smaller-scale production units and oxygen concentrators. By

¹² Institute for Transformative Technologies. *Closing the Medical Oxygen Gap in Sub-Saharan Africa*. January 2021. <https://transformativetechnologies.org/wp-content/uploads/2021/01/ClosingO2GapinSSA.pdf> [Accessed 31 January 2024] unitaid.org

bringing these technologies and innovations to LMICs, Unitaid aims to speed up their adoption and scaling, breaking down long-standing barriers to oxygen access and driving sustainable improvements in healthcare systems.

Business Models: Improved business models offer opportunities to sustain existing products through new approaches – such as umbrella management agreements or batched service level agreements- while potentially incorporating elements of more established models such as Oxygen as a Service (OaaS). Testing these models would enable a blueprint for the private sector to support respiratory care products in a scalable manner.

Figure 2: Oxygen Investment Opportunities



Product innovation

Unitaid is well-equipped to support advancements in the field of oxygen supply, concentrating on improving existing high-capacity production technologies like Liquid Oxygen (LOX) and making distribution methods more efficient with better piping systems. This includes funding for modular, solid-state oxygen systems that simplify maintenance, and supporting of energy-efficient, solar-powered production units to enhance the resilience and sustainability of oxygen supply chains.



Sustaining business models

New approaches are needed to sustain large-scale procurements during the COVID-19 pandemic. Unitaid can invest in alternative business models to catalyze private sector engagement and sustain critical oxygen products.



Enabling element

- Support partnership; Global Oxygen Alliance

5. Partner engagement

Unitaid has been active in the medical oxygen ecosystem since first investing in this space in 2019, prior to the pandemic. As part of response efforts to COVID-19, Unitaid led the *Oxygen Emergency Taskforce of the Access to COVID-19 Tools Accelerator (ACT-A)*, which involved close coordination with multilateral organizations, donors, and implementers, mobilizing over 1 billion USD. As both an early investor in access to oxygen and leader of the Oxygen Emergency Taskforce, Unitaid had the opportunity to become deeply familiar with the gaps in the oxygen ecosystem and articulate its comparative advantage in relation to them. Finally, the Oxygen Emergency Taskforce evolved into the **GO2AL, the Oxygen Alliance including more than 20 health partners and representatives from civil society and affected communities. Co-chaired by Unitaid and the Global Fund, GO2AL aims to convert the investments made during the pandemic into lives saved, including financing to expand production across geographies, lowering the price of oxygen, and providing technical support to governments.** The future likelihood of high-risk pathogens causing respiratory infections necessitating medical oxygen underscores the need to urgently invest in scalable, sustainable access to oxygen in LMICs.



This Area for Intervention represents an articulation of a post-COVID-19 strategy for Unitaid's investments in oxygen. It is the result of engagement with partners cultivated based on years of work in this space through the Oxygen Emergency Taskforce and currently with GO2AL, as well as Unitaid's longstanding investments in oxygen and related health tools. The Afl also benefits from detailed research articulating pipeline product and business model innovations in the medical oxygen space, which are summarized in the forthcoming *Unitaid Medical Oxygen Innovation Landscape*.

Since September 2023, Unitaid has met with partner organizations to receive input on the gaps in oxygen access that require the most urgent investments. **This has included detailed conversations and exercises with WHO, Unicef, GO2AL, USAID, the Bill and Melinda Gates Foundation, CHAI, PATH, Build Health International, Partners in Health, Oxygen CoLab, as well as private sector entities representing industry.**

Consultations with partner organizations have demonstrated a strong interest and support for Unitaid's involvement in the oxygen sector and its ongoing commitment to future investments. Stakeholders highlighted a critical gap in oxygen availability, emphasizing the necessity for sustainable delivery models to preserve pandemic-era investments and the urgent need for innovation in respiratory care technologies to overcome supply, maintenance, and power issues. **From these discussions, Unitaid identified approximately 30 distinct challenges in oxygen access by late-2023, alongside 70 potential investment opportunities to bridge these gaps.** These opportunities were evaluated for their potential impact and alignment with Unitaid's comparative advantage and ability to add unique value. Following this thorough analysis and ongoing dialogue with our partners, a strategic selection of complementary investments has been integrated into this Afl, aiming to address the identified challenges effectively and sustainably.

6. Opportunities for Unitaid investment

The recognition of medical oxygen as a crucial healthcare component and essential medicine for various conditions has significantly increased, particularly highlighted by the COVID-19 pandemic. This period brought to the forefront innovations in respiratory care and underscored the vast disparities in access to medical oxygen. Unitaid's proactive investments in the oxygen supply chain, both prior to and during the pandemic, were critical in ensuring medical oxygen remained a priority in healthcare. Continuing and expanding upon the momentum of these investments and partnerships, established since 2020, is vital for catalysing the introduction of diverse solutions and ensuring sustained and wider access to medical oxygen as a key part of patient care.

The investment opportunities identified as priorities are designed to complement Unitaid's ongoing efforts in oxygen supply and support each other by identifying new business models to sustain existing products and investing in advancements in production and distribution. These proposed investments represent significant opportunities that align well with Unitaid's comparative advantage in driving product and business model innovation with a high potential for scale. This positions Unitaid to lead new opportunities in oxygen for LMICs, moving from immediate responses to the COVID-19 pandemic to tackling long-standing inequities in access.

6.1 Technology innovations in oxygen production and distribution

Oxygen systems in LMICs have been utilizing the same technologies for decades, which carry considerable design drawbacks, impeding access to medical oxygen. The COVID-19 pandemic ushered in a wave of novel innovations and highlighted the challenges of using existing technologies. **Unitaid is well-positioned to support market-shaping interventions and pilots for promising production and distribution technologies that have the potential to significantly expand oxygen access in the near future.** In some cases, innovations developed in the past few years have been designed specifically for LMIC contexts, while in others, new use cases have been articulated for products that were originally designed and used in HICs. These products share a common gap: they have not been widely tested or piloted in healthcare facilities in under-resourced settings. **Investments to understand how these products perform in real-world contexts sit squarely within Unitaid's comparative advantage and complement recent interventions in the liquid oxygen market.**

Market-shaping interventions and piloting oxygen innovations for production and distribution involve a multi-pronged approach including operational research to better understand performance and cost-effectiveness, identifying models for firms to adopt and scale products, and supply-side interventions to ensure affordable and available product in the future. **These complementary investments are needed to accelerate adoption of new products and generate demand for their use across diverse contexts.**

- **Production:** The expansion of medical oxygen access has faced challenges due to the limitations of traditional production technologies, which typically require substantial energy and frequent maintenance, and do not possess the necessary durability for effective use in LMICs. Investing in both existing and new production technologies offers an opportunity to significantly improve the methods and locations of oxygen delivery. Strategic market interventions are essential in this transformation, particularly in **increasing access to liquid oxygen, and through the development of modular, solid-state oxygen systems and the testing of energy-efficient, solar-powered production units.** These technological developments are expected to reduce the maintenance requirements associated with conventional PSA plants, providing a more resilient solution suitable for the unique challenges of LMICs.
- **Distribution:** In many LMICs, oxygen distribution is both expensive and logistically challenging. Although medical gas pipeline systems (MGPS) represent the ideal solution for patient care, numerous facilities depend on cylinder distribution system. The installation of pipelines can be intricate and risky, with the potential risk of introducing contaminants into the oxygen supply if not done correctly. **The introduction of new, flexible piping solutions and innovative installation techniques could greatly lessen the costs and complexities linked to oxygen distribution within hospitals, thereby addressing a critical obstacle to oxygen access.**

6.2 Improved business models to sustain oxygen investments

Operating and managing respiratory care equipment is a constant challenge in LMICs. Historically, business models for the provision of medical oxygen have focused on industry-centred bulk supply agreements, or directly purchasing respiratory care equipment. **New approaches are needed to sustain large-scale procurements during the COVID-19 pandemic. Unitaid can invest in alternative business models to catalyse private sector engagement and sustain critical oxygen products.**

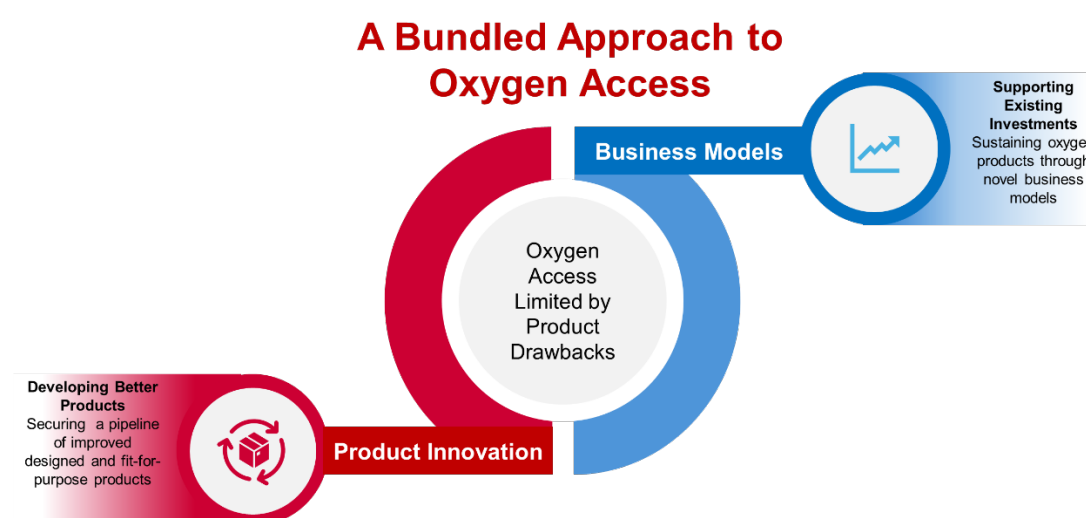
Adopting business models specifically designed for the healthcare sector and the intricate oxygen ecosystem can lead to substantial improvements in the oxygen market. Models like Oxygen as a Service are currently being tested in sub-Saharan Africa and India, yet these alone may not fully address the high volume of equipment, particularly those acquired in large quantities during the COVID-19 pandemic, already present in health facilities. **There is a clear need and growing momentum for exploring business strategies that consider the post-pandemic landscape, where many products risk becoming obsolete without timely and effective intervention.**

There are a broad number of specific interventions that could be considered under this investment opportunity. They share an element in common: transferring some level of management, servicing, or operations of oxygen equipment to the private sector. These models could incorporate elements of Oxygen as a Service interventions. For example, a non-exhaustive list of business models to pilot could include:

- *Umbrella management agreements*: Pilot contracts for private sector firms to operate and maintain products across a region or country.
- *Batched service level agreements*: One provider covers all service agreements in a region, while providing training to government technicians.
- *Sale or lease-back programs*: Governments sell or lease products to the private sector and provide a guaranteed offtake.

Exploring various business models, potentially integrating aspects of Oxygen as a Service, could clarify the role of the private sector in managing respiratory care products effectively, allowing for successful strategies to be implemented widely. Such pilot programs would permit Unitaid partners to identify the most effective approaches tailored to diverse types of healthcare facilities. Given the complexities of health systems and the fact that a single model may not suit all contexts, this strategy acknowledges the need for adaptable solutions within a country. **Investing to determine the viability and applicability of these business models in different contexts, alongside product innovations, emphasizes the importance of extending the use of existing oxygen equipment while gradually introducing enhanced products. This approach ensures a balanced focus on both innovation and the optimal utilization of current products.**

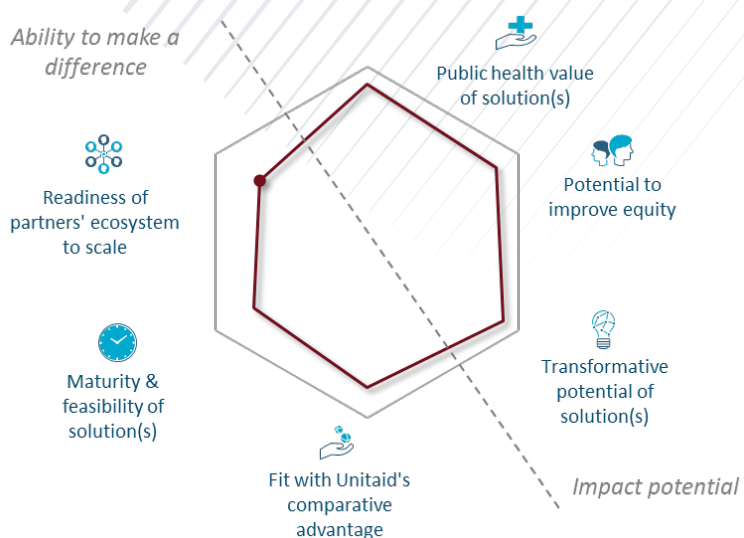
Figure 3: Approach to the investment opportunities.



7. Assessment of the opportunity

7.1 Impact potential, including the public health value of the solution, the potential to improve equity and the transformative potential of the solution

Unitaid interventions in oxygen demonstrate strong public health value, with oxygen contributing to seven out of nine SDG health goals¹³. An investment would target a large unmet need for medical oxygen, which is often the result of inadequate products and delivery models. Paediatric pneumonia, a leading cause of death in children under 5, contributes to approximately 8.5 million hypoxemia cases annually in LMICs. Yet, less than one in five children hospitalized with severe pneumonia and hypoxemia receive the oxygen therapy they require. This investment seeks to address this broad public health gap, which would benefit patients with respiratory conditions, but also many other health conditions, and vulnerable groups such as pregnant women and children.



Improving access to oxygen through these interventions has a great potential to improve equity. In aggregate, the investment seeks to expand oxygen provision to lower levels of care and underserved populations by ensuring that products are both appropriately designed and adequately supported to meet their needs. The solutions proposed target some of the most significant gaps in access to medical oxygen in LMICs, where oxygen consumption can be 10 times lower than in the US/EU. These investments will disproportionately benefit children, who bear the brunt of pneumonia mortality worldwide. Improving oxygen systems can reduce in-hospital deaths from childhood pneumonia by 50% and hospital-level improvements to oxygen and pulse oximetry systems have been shown to be feasible, highly cost-effective and largely sustainable in LMIC settings^{14, 15}.

The transformative potential of this investment is high. The production and distribution innovations represent the first significant technology advances for oxygen in decades. These products carry the potential to address persistent issues that have impeded access for millions of patients. Launching novel business models would harness provide sector actors to sustain critical investments in respiratory care products over the long-term.

7.2 Ability to make a difference, including fit Unitaid's comparative advantage, maturity and feasibility of the solution and readiness of partner ecosystem

This opportunity reflects a fit with Unitaid's comparative advantage, piloting late-stage product innovations to catalyse adoption and uptake, while testing business models to improve equitable oxygen access. Unitaid has led efforts to increase access to oxygen since 2019, including catalyzing investments during COVID-19 and founding GO2AL. This investment would capitalize on Unitaid's experience in oxygen, as well as the organization's strength bringing innovations to market.

The investment would build on existing innovations with strong track records. In some cases, products have already received regulatory approval from relevant SRAs and have been used widely in HICs. Due to the low level of innovation in oxygen broadly, some products are only developed by one supplier and may require a broadening of the manufacturer base.

¹³ Availability of oxygen is essential for seven of the nine SDG health goals - 3.1, 3.2, 3.3, 3.4, 3.6, 3.8 and 3.9.

¹⁴ Lam F, Stegmuller A, Chou VB, et al. Oxygen systems strengthening as an intervention to prevent childhood deaths due to pneumonia in low-resource settings: systematic review, meta-analysis and costeffectiveness. *BMJ Global Health* 2021;6:e007468. doi:10.1136/bmjgh-2021-007468

¹⁵ : Graham HR, Bakare AA, Ayede AI, et al. Cost-effectiveness and sustainability of improved hospital oxygen systems in Nigeria. *BMJ Global Health* 2022;7:e009278. doi:10.1136/bmjgh-2022-009278.

A Unitaid intervention aimed at expanding access to oxygen would leverage the network of partners. This approach aligns closely with the World Health Organization's Resolution on "Increasing Access to Medical Oxygen," which advocates for innovative strategies to enhance oxygen availability. By tapping into this ecosystem, Unitaid, through GO2AL can catalyze a coordinated effort that combines technical expertise, financial resources, and policy support to drive meaningful improvements in oxygen access. This collaborative framework not only amplifies the impact of Unitaid's investments but also ensures that efforts are in sync with global health priorities, making strides towards universal health coverage and strengthening health systems.

7.3 Risk

In assessing the risks associated with these opportunities, it is relevant to weigh them against the urgency of the situation and the pressing need for innovative technologies and methods of delivery. The strategic risks are low, given the high priority of oxygen on the agenda of key global health stakeholders like the WHO, which has explicitly called for interventions of this nature. These investments align with Unitaid's areas of strength and build on existing initiatives, such as investments in Liquid Oxygen (LOX), reinforcing its strategic positioning and increasing the likely impact of those interventions.

The landscape for these opportunities is marked by potential partners and a supportive ecosystem, coupled with opportunities to forge ground-breaking partnerships with entities like development finance institutions. However, the adaptation of products not originally designed for LMICs presents a risk in their effectiveness in these settings. This investment aims to specifically evaluate and adapt these technologies for optimal performance in resource-constrained environments.

The sustained success of improving access to medical oxygen fundamentally depends on an effective procurement strategy. Without clear commitments from international procurement entities and Ministries of Health to procure these essential products, the ability to scale and extend the impact of these investments could be at risk. This emphasizes the importance of a proactive approach in determining viable business models appropriate for the setting, establishing robust partnerships and gaining the required support for sustainability. Active efforts are in place to navigate this challenge, recognizing that conventional approaches to scale might need creative adaptation and new development in this specific context.