ACCESS TO MEDICAL OXYGEN VIRTUAL ROUNDTABLE

Wednesday, 9 December, 2020
11:00-12:30amET

REPORT

Credit: ONG-AGIS, Côte d'Ivoire

Co-hosted by the **Every Breath Counts Coalition** and the **Access to Medicine Foundation**

I. OVERVIEW

On 9 December 2020, the **Every Breath Counts Coalition** and the **Access to Medicine Foundation** co-hosted a second virtual roundtable to explore concrete opportunities to increase access to medical oxygen in low- and middle-income countries (LMICs) in the context of COVID-19 and the broader achievement of the **Sustainable Development Goals** (SDGs).

The organizations in attendance included representatives from leading medical gas companies, corporate investors,[1] multilateral development banks, donor governments and UN agencies and NGOs (see Table 1). The objectives of the second roundtable were to introduce new stakeholders to the conversation and to discuss a proposal for partnership in select LMICs presented by a subset of stakeholders who attended the first roundtable.

Following the first roundtable, this group engaged in a series of bilateral discussions to further advance the conversation and agreed to work together to close medical oxygen gaps in health facilities in a group of LMICs with high and rising confirmed COVID-19 cases counts and corresponding needs for medical oxygen.[2] The parties acknowledge that COVID-19 has created a window of opportunity to accelerate access to medical oxygen and that the time is right to accelerate the development of specific collaborations in critical geographies (see the Partnership Proposal in Appendix A).

During the second dialogue, three major requirements for effective public-private partnerships that were identified in the partnership proposal were explored, including the need for:

a) accurate and timely data on gaps in access to medical oxygen by LMIC health facility;
b) financing and other support for national and sub-national LMIC ministries of health as oxygen "buyers"; and
c) risk-reduction strategies to increase the supply of affordable medical oxygen from medical gas companies (e.g., pooled procurement, volume guarantees, political risk and breach of contract protections, UN/NGO support with engagement in LMICs etc.).

To make progress on these issues, Anu Rames from BNP Paribas offered to coordinate the drafting of a position paper that would offer solutions in each of these areas. The position paper will be shared with roundtable attendees in early 2021.

Participants agreed to continue the conversation in the coming months and to report back at a third dialogue, which will be held in February 2021, and which will include decision-makers from national and regional health and development authorities in LMICs. The purpose of this third dialogue would be to explore whether a subset of east African LMIC governments is interested in joining forces in a regional alliance to procure medical oxygen with support from health and development agencies to help strengthen national pulse oximetry and oxygen policies, procurement and contracting, training of healthcare and biomedical staff, and data collection and monitoring.

The Every Breath Counts Coalition and the Access to Medicine Foundation will explore hosting this third dialogue under the auspices of the African Union and Africa CDC, potentially as part of the lead up to the **Africa Health Agenda International Conference** (AHAIC) in March 2021, where the **AHAIC Commissioners** will present their report on the State of Universal Health Coverage (UHC) in Africa.

[1] All corporate investors present had signed the **Access to Medicine Index Investor Statement** and committed to using the research of the Access to Medicine Foundation in their investment analysis and engagements with companies.
[2] See the **COVID-19 Oxygen Needs Tracker** which measures daily oxygen needs (cubic meters and number of large cylinders) and three month trend for all LMICs.

II. UPDATE

During this session, major milestones in oxygen access since the first roundtable in September were summarized, including:

- US Government investment of $US18 million for **oxygen**, including oxygen generation plants, in several LMICs via USAID and distribution of more than 8,000 **ventilators** to support the COVID-19 response in LMICs
- WHO and UNICEF procurement of **multiple oxygen plants** in several LMICs and procurement of more than 30,000 oxygen concentrators and more that 50,000 pulse oximeters to support the COVID-19 response in LMICs
- WHO hosting of four technical consultations on oxygen access in LMICs
- WHO announcement of revisions to the **International Pharmacopeia** to change the medical oxygen purity requirement from "not less than 99.5%" to "not less than 90%"
- UK government support for an "**Oxygen Co-Lab**" to improve access to quality, cost-effective oxygen concentrators in LMICs
- Unitaid announcement of a second **Explore grant** for oxygen concentrator innovation
- Skoll Foundation support for an **Oxygen Hub** to support oxygen plants in Nigeria, Kenya and Ethiopia
- PATH, CHAI and Every Breath Counts launch of the **COVID-19 Oxygen Needs Tracker**, which measures the daily oxygen need in LMICs
- **ACT-Accelerator** Health System Connector mobilized $US361 million ($US200 million from Global Fund and $US160 million from Germany, France and Kuwait to WHO) out of a $US9 billion target to support COVID-19-related PPE, oxygen and health system strengthening in LMICs
- Emerging oxygen initiatives in response to the pandemic, including **ONG-AGIS** in Cote d'Ivoire, **Partners in Health/Build Health International** in Lesotho, and more
- Major statements of support for action on oxygen, including from Dr John Nkengasong and Peter Piot in **Global Health NOW**, Kevin Watkins and Adamu Isah in **BMJ Global Health** and Ray Chambers in **LinkedIn**.

Despite these milestones, massive gaps in access to oxygen remain and LMICs continue to report oxygen shortages that are costing lives, most recently in **Uganda** and **Pakistan**. The need for public-private partnerships with the strong support of LMIC governments, companies and development partners remains strong and will continue as the pandemic enters a "second wave" in many LMICs, especially across Africa.

III. NEW STAKEHOLDERS

While attendance from companies and corporate investors was lower for the second dialogue, several new global health actors joined the conversation, including:

Amref Health Africa: increases sustainable health access to communities in Africa by improving human resources for health, health services delivery and investments in health. Amref is a 501(c)(3) nonprofit organization registered with the US Internal Revenue Service.

MedAccess: uses **innovative finance tools** to secure lower prices and sustainable supply of medical products for people in LMICs. MedAccess is an independent company wholly owned by the **UK's CDC Group plc**.

MEDIGHAM (International Association of Manufacturers of Medical Gas for Hospital Generators): represents the on-site production of medical gases industry in order to ensure the continuous improvement of the safety of patients, the security of installations and environmental protection. MEDIGHAM® is a not-for-profit organization funded by membership fees, public or private grants and subsidies in accordance with French regulations and laws.

Resolve to Save Lives: helps governments and civil society implement scalable, proven strategies to save 100 million lives from cardiovascular disease and to prevent epidemics in LMICs. Resolve to Save Lives is a 501(c)(3)

initiative of **Vital Strategies** with support from **Bloomberg Philanthropies**, the **Bill & Melinda Gates Foundation**, and Gates Philanthropy Partners, which is funded with support from the **Chan Zuckerberg Foundation**.

Save the Children UK: helps children in over 100 countries stay safe, healthy and learning, tackling big problems like pneumonia, hunger and protecting children in war. The ambition is that by 2030 no child dies from preventable causes before their fifth birthday, all children learn from a quality basic education, and violence against children is no longer tolerated. Save the Children is a registered charity in the UK.

Swasth: democratizes access to quality, affordable primary care in India, leveraging digital technology, fully adopting national health standards, and ensuring interoperability. Swasth is a consortium of physicians, professionals and entrepreneurs representing hospitals, health tech players, pharmacies and investment Funds who have pooled their time, intellect, IP and financial resources to help India leapfrog and provide quality healthcare using best in class digital technologies. Swasth is a not-for-profit initiative registered under Section 8 of the India Companies Act, with financial support from **ACT (Action COVID-19 Team) Grants**.

Table 1: Access to Medical Oxygen Roundtable Participants (*new attendees)

Companies	Corporate Investors	Global Health Agencies
Afrox (Linde Group)	BNP Paribas	Amref Health Africa*
Air Liquide	LGIM	Bill & Melinda Gates Foundation
BOC Kenya (Linde Group)	Nomura Asset Management	Clinton Health Access Initiative (CHAI)
Novartis		International Finance Corporation (IFC)
PCI Gases		MedAccess*
MEDIGHAM*		PATH
		Resolve to Save Lives*
		Save the Children*
		Swasth*
		UNICEF
		USAID
		WHO (observing)*

III. DISCUSSION

During this session, participants explored three critical issues that will need to be addressed to advance impactful public-private partnerships that would increase medical oxygen access in LMICs, including:

a) All-party data access

Several participants underscored the urgent need for accurate and timely data on gaps in access to medical oxygen in LMICs, preferably at the health facility level. This is vital information for governments to understand what they

need to procure and how much it will cost, and for companies to mobilize to meet that need and estimate their own costs and potential returns. For companies, determining the total cost of delivering medical oxygen per patient per year in different settings (e.g., urban vs rural, primary healthcare facility vs tertiary hospital) is an essential starting point. This calculation should include the total cost of building, transporting, installing, training and maintaining the entire medical oxygen system per facility and data collection should be standardized across facilities to enable regional and national aggregation. Without the data to make calculations like this, public-private partnerships cannot move forward.

Several NGOs noted that some ministries of health do have data on oxygen access gaps by facility which they have compiled for the COVID-19 response using various survey instruments including the **WHO Biomedical Equipment Inventory Tool**. Some ministries of health have actually circulated the results of these surveys including Kenya and Ethiopia (these are hosted on the **Every Breath Counts website**). NGOs may also be able to share the results of other national surveys, with the permission of health ministries. A priority for dialogue #3 would be to directly invite ministries of health to share this data with roundtable participants for the purposes of estimating and costing national and regional medical oxygen access strategies.

UN agencies and NGOs have also produced several tools to help governments and other parties calculate the costs of medical oxygen, including the **UNICEF Oxygen System Planning Tool**, the **PATH Total Cost of Ownership Tool** and the **WSFA Oxygen Supply and Demand Calculator**. Teams are available at each of these organizations to help government and industry use these tools.

In addition to data on medical oxygen gaps, participants agreed that it will be important to set targets and key performance indicators so that all parties know exactly what the goals of partnership are and how progress will be measured. For example, if a goal is to ensure that all public health facilities in a given region have a reliable, affordable medical oxygen supply, how will that be measured? If a goal is long-term government to company contracts, competitively tendered, price-transparent, and publicly monitored, how will the effectiveness of such contracts be measured? Despite the lack of oxygen targets in global health goals (e.g., the SDGs), several LMICs already have national oxygen strategies or roadmaps with specific national goals and targets, and these should be adopted widely by all stakeholders.

With respect to estimating the impact of partnerships, there are also tools to estimate "lives saved" from increasing access to medical oxygen. A common tool used in the public health community is the **Lives Saved Tool**, or LiST, which will soon include both pulse oximetry and oxygen, enabling estimates of the number of deaths prevented in specific LMICs for given increases in access to pulse oximetry and medical oxygen. The LiST tool is managed by Johns Hopkins University and support is available to governments and industry in its use.

b) LMIC financing support

Participants acknowledged that the "missing piece" in discussions to date had been LMIC governments as the buyers of medical oxygen for their own health systems. Without national health insurance schemes that cover medical oxygen, it was acknowledged that many LMIC governments will need financial support to procure oxygen at the quantities required to meet all the needs of their populations (COVID-19 and other). Support could include loans and/or grants from institutions like the World Bank, donor governments and private donors, as well as access to innovative financing solutions provided by groups like **MedAccess** and supported by specific partnerships with NGOs, many of which already exist. Participants agreed that strong statements of support from LMIC governments are a necessary precursor for any further action at scale.

One specific idea is to engage a group of LMIC governments to work together to procure medical oxygen, aligning national policies, plans and procurement processes supported by innovative finance tools (e.g., pooled funding, demand aggregation, advance purchase agreements, volume guarantees etc.) To accelerate this process, the international agencies responsible for the global COVID-19 response could signal to LMIC governments that support will be available to help them close oxygen gaps as part of the Access to COVID-19 Tools Accelerator (ACT-A) platform. Oxygen is currently included as part of the Health System Connector (pillar number 4) of ACT-A, which is co-chaired by the Global Fund and the World Bank, but to date no investment case for oxygen has been released and no new initiatives have been announced. It is a missed opportunity if ACT-A cannot be mobilized to offer

financial support directly to LMIC governments for large-scale, long-term medical oxygen solutions that serve the entire health system.

In addition to aligning LMIC oxygen support with the urgent needs of COVID-19, several attendees argued that new medical oxygen initiatives should also serve other LMIC health priorities, especially child survival given the saliency of the child survival movement and the achievement of Sustainable Development Goal 3.2 in most LMICs. NGOs have already been successful at supporting countries to add oxygen to Essential Medicines Lists for Children and UNICEF, CHAI and PATH have all emerged as key players in oxygen access during COVID-19, working closely with ministries of health, including to ensure that COVID-19 pulse oximetry and oxygen support is eventually redeployed to serve populations who need oxygen to survive, especially newborns and children.

Another approach is to position oxygen as vital piece of healthcare infrastructure; as an essential "**utility**" that can accelerate mortality reductions across the entire health systems, simultaneously reducing maternal, newborn and child deaths, communicable and non-communicable disease deaths, as well as deaths from accidents and injuries. The big push towards primary healthcare (PHC) in LMICs may also be relevant here, as the wide availability of pulse oximetry and oxygen at lower levels of health systems could be a game-changer in terms of faster diagnosis and mortality reductions. Positioning access to oxygen as a critical part of progress to PHC, and Universal Health Coverage (UHC) - the means by which LMIC governments will pay for population healthcare - deserves further attention.

In addition to financing support, participants noted that many LMIC governments may require support from UN and NGO partners for a range of oxygen-related activities, including the development of national oxygen policies, scale-up plans, regulations, procurement processes, contract designs and monitoring systems. Helping to train healthcare workers and biomedical engineers to operate and maintain oxygen equipment is also a role that NGOs and professional associations could play. The trusted relationships many NGOs and professional associations share with LMIC ministries of health suggests they are well-positioned to play this role at the invitation of governments. In addition, companies may also wish to work directly with specific NGOs on the issues above.

c) Corporate incentives and risk reduction

There was general agreement that medical gas companies perceive significant risks in investing to close access to medical oxygen gaps in LMIC health systems and will need access to various incentives and risk-reduction tools to increase their investments. Incentives and risk-reduction strategies that reduce the cost of investing, that guarantee demand at sufficient levels, and that offer protections in the case of breach of contract, regulatory uncertainty and political instability will be particularly attractive. Currently, there is a lack of transparency on the level of risk in supplying medical oxygen in LMICs and a first step is quantifying risks.

Development finance institutions including the International Finance Corporation, the **US Government Development Finance Corporation Health Prosperity Fund**, MedAcccess and other groups are now able to offer a suite of risk-reduction strategies to companies providing healthcare in LMICs, including several new tools offered to help companies respond to COVID-19. These include **equity financing** (direct equity and support for investment funds), **debt financing** (direct loans and guarantees), **risk insurance** coverage against losses due to currency inconvertibility, government interference and political violence and reinsurance to increase underwriting capacity, and **technical assistance** to attract and support private investment. Together these development finance institutions have access to billions of dollars for healthcare infrastructure in LMICs.

Several attendees mentioned other areas where such support to companies had ensured a robust, predictable supply of affordable products over time - vaccines, contraceptives, malaria bed nets and HIV/AIDs medicines for example. MedAccess's **volume guarantee** with **Hologic** to increase access to high-quality viral load testing for HIV and hepatitis and diagnostic testing for HPV on its Panther platform was cited as a strong example of what was possible. Development finance institutions were particularly interested in exploring solutions that consolidated oxygen demand by pooling procurement across several countries and argued that this would be an attractive opportunity for both governments and development finance institutions as it has the potential to reduce prices, mitigate risks and deliver large deal sizes. What is needed urgently is a signal of strong interest from the public sector in LMICs for this type of proposal.

While medical gas companies have yet to take advantage of these new development finance tools to reduce the risk of LMIC investments, they have drawn attention to the conditions that would enable more investment in medical oxygen (see Table 2). They have also stated that while returns will initially be low, they should rise over time as the offering and supply chain improves and real, sustainable value is created as economies rebound after the pandemic. Companies appreciate that they will need to innovate both oxygen technologies and business models to succeed in LMICs and that different models will be needed in urban and rural areas given the very different health facilities that exist in each. Where large hospitals can install their own plants, or regional oxygen plants can serve several major hospitals, in rural areas and towns small hospitals and health facilities will need bespoke solutions, including solar-powered technologies and oxygen concentrators. Despite the challenges of answering these questions, companies acknowledge that there are many opportunities to "leapfrog" outdated business models and technologies, especially by using new digital tools, in low-resource settings.

Companies also acknowledge that partnerships with UN agencies and NGOs do reduce risks and that they are particularly interested in "nesting" their access to oxygen programs within existing health and medical initiatives, such as maternal/newborn survival, childhood pneumonia, non-communicable disease (e.g., COPD), safe surgery and reductions in road traffic injuries. LMIC governments also have relationships with several UN agencies and NGOs on access to medical oxygen (e.g., Amref/Kenya, CHAI/Ethiopia, PATH/Zambia, UNICEF/Malawi etc.) and strengthening these relationships will be vital to effective public-private partnerships.

Table 2: Essential pre-conditions to close access to medical oxygen gaps
1. Governments and health ministries that prioritize medical oxygen for the entire healthcare system
2. Well-specified national government medical oxygen demand forecasts and regulations
3. Reliable and price-competitive power sources
4. Reliable and price-competitive transportation pathways
5. Business environment that encourages competition and rewards innovation
6. Five to 10 year oxygen delivery contracts with transparent procurement and contracting and remedies for breach
7. Trained healthcare staff and biomedical engineers at all levels of the health system
8. Backup for medical oxygen machinery that fails and access to spare parts
9. Strong medical programs and partnerships with UN/NGOs that can "nest" access to oxygen programs
10. Emergency solutions where markets don't function (e.g., medical oxygen programs in humanitarian settings)

(d) Next Steps

To make further progress on the issues raised by all parties, Anu Rames from BNP Paribas offered to coordinate the drafting of a position paper which would aim to bring more transparency to investment risks and mitigating factors and which would address: (a) how to evaluate risk and risk mitigation instruments, (b) the merits of various corporate financing options (e.g., volume commitments, multi-country pooled procurement, concessional loans, equity etc.), (c) the sweet spot for target deal size, (d) a methodology on how to determine oxygen need in target geographies, and (e) expected returns across various financing tranches. It will also be critical to engage more of the leading medical gas companies in the dialogue moving forward.

IV. PROPOSAL FOR DIALOGUE #3

Participants agreed to pursue a third dialogue in 2021 that would engage several African ministries of health and related government decision-makers to explore regional procurement of medical oxygen to close access to oxygen gaps in health facilities for COVID-19 and beyond. The position paper that Anu Rames is leading would inform the dialogue.

The proposal is for the Every Breath Counts Coalition and the Access to Medicine Foundation to partner with the African Union and/or Africa CDC to invite the six governments of the **East African Community** (EAC) - Kenya, Tanzania, Burundi, Uganda, Rwanda and South Sudan - to a virtual roundtable in February 2021 to explore regional procurement of medical oxygen and alignment of medical oxygen policies, regulations, data collection and training of healthcare workers and biomedical engineers.

The roundtable would enable health ministry decision-makers to present their national goals and plans with respect to medical oxygen access for COVID-19 and beyond, and explore whether a multi-country alliance would enable them to accelerate achievement of those goals. Specific countries could present their national oxygen scale-up plans (e.g., Ethiopia), the access to medical oxygen facility data they have collected during the pandemic (e.g., Kenya), and successful access to oxygen partnerships with NGOs (e.g., Rwanda).

Companies could then present their approaches to close access to oxygen gaps in the region and outline examples of their own best practices in Africa (e.g., Air Liquide/UNICEF/Senegal, BOC Kenya/Amref/Kenya, Afrox/USAID/ South Africa etc.). Companies could raise the specific conditions that would be most conducive to increasing investments in medical oxygen in the region in ways that align with government access to oxygen plans.

Other actors could then present the various support they can provide to governments and companies to facilitate both regional procurement and successful implementation of increased supply of medical oxygen to health facilities in the region. For example, ACT-A leaders and development finance institutions could offer financial support and risk reduction tools, UN agencies and NGOs could offer grants and technical assistance to strengthen policy development, program design and healthcare worker and biomedical engineer training. This would also be an opportunity to engage the emerging African medical supplies procurement platforms, such as the African Medical Supplies Platform, who are offering governments new ways to purchase oxygen-related technologies such as pulse oximeters, concentrators, ventilators etc, and new private sector oxygen initiatives such as the **Oxygen Hub** which is active in east Africa (e.g., Ethiopia and Kenya).

The roundtable could culminate in a specific announcement from the African Union, Africa CDC and EAC health leaders to pursue a new regional approach to closing medical oxygen gaps. This announcement could feed into the African Health Agenda International Conference (AHAIC) which is being held in early March and where the AHAIC Commissioners will present a report on the State of Universal Health Coverage in Africa.

CO-HOSTS

The independent **Access to Medicine Foundation** *(est. 2003) stimulates and guides pharmaceutical companies to do more for the people living in low- and middle-income countries without access to medicine. The Foundation unleashes the power of other stakeholders (e.g., investors) to motivate and guide companies to take action through a unique model of engagement, highlighting best practices, and bringing together like-minded people from industry, global health, policy worlds, investors to create a culture of access to medicine.*

The **Every Breath Counts Coalition** *(est. 2017) is a public-private partnership representing United Nations and multilateral health agencies, donor governments and foundations, companies, non-government organizations (NGOs) and academic institutions, supporting low and middle-income countries to reduce deaths from pneumonia, especially among children and including from COVID-19. The Coalition is committed to engaging the world's leading suppliers of medical oxygen in the access to oxygen agenda in the context of COVID-19 and the Sustainable Development Goals.*

APPENDIX A

DRAFT PROPOSAL TO FORM PUBLIC-PRIVATE PARTNERSHIPS TO ADVANCE ACCESS TO OXYGEN IN SELECT LMICS

December 2020

On 25 September 2020, the **Every Breath Counts Coalition** and the **Access to Medicine Foundation** co-hosted a first-of its-kind virtual roundtable to explore opportunities to increase access to medical oxygen in low and middle-income countries (LMICs) in the context of COVID-19 and the broader achievement of the **Sustainable Development Goals** (SDGs). The organizations in attendance included select representatives from leading medical gas companies, corporate investors, multilateral development banks, UN agencies and NGOs.

The discussion generated 10 key actions required of stakeholders to improve access to medical oxygen, including:

1. All LMIC governments should list oxygen as an essential medicine on relevant national lists, develop national medical oxygen policies with specific targets and increase domestic health spending on medical oxygen for the health sector so that they are not totally reliant on external financing;
2. Corporate investors should communicate to medical gas company boards and executive leaders that access to medical oxygen is a material issue for investors and an area where they would like to see progress;
3. Companies should develop access to medical oxygen strategies with key performance indicators (KPIs) for broadening access in LMICs and monitor and report progress in annual reports as part of corporate "sustainability" agendas;
4. Global health agencies should work directly with LMIC governments (e.g., Ministries of Health) to develop national medical oxygen policies/plans and help to quantify and cost the gaps in access to medical oxygen in LMIC health systems;
5. Development banks (e.g., World Bank, DFC, AfDB/ADB etc) should support LMIC governments and companies to finance oxygen capital infrastructure using all of the instruments at their disposal, including debt, equity, guarantees, innovative financing mechanisms and traditional grants and explore regional pooled procurement strategies to increase demand and reduce costs;
6. Global health donors (e.g., USAID, the Bill & Melinda Gates Foundation, Unitaid) should support LMIC governments to expand the use of oxygen-related diagnostic tools and therapies and train healthcare staff (including biomedical engineers) to install, operate and maintain the equipment promoting the long-term sustainability of new investments and initiatives;
7. Companies and global health agencies should invest in innovations that reduce the cost of oxygen in LMICs, stimulating demand, as the current high prices of medical oxygen have been cited by many stakeholders as a key barrier to access;
8. All stakeholders should strike more partnerships to close oxygen access gaps, including company-to-company (e.g., medical gas/pharmaceutical/mining), company-government, company-NGO (e.g., CHAI, PATH), company-development finance institution (e.g., DFC), and other permutations;
9. The Every Breath Counts Coalition should advocate robustly for action on all of the 10 themes identified in this report and offer a "neutral"platform for stakeholders to meet, share information, build partnerships and execute programs; and
10. The Access to Medicine Foundation should report on company case studies and leverage stakeholders (e.g., investors, governments, companies etc) to collaborate to close medical oxygen access gaps in low-resource settings.

Subsequent to the roundtable, a group of participants continued the discussion and have agreed to form partnerships to advance the ten actions above in select LMICs with a high need for medical oxygen from both COVID-19 and other causes, among both adults and children.

These stakeholders include (in alphabetical order) Air Liquide, BOC Kenya, the Clinton Health Access Initiative (CHAI), Nomura Asset Management and PATH. They have agreed to work together to close medical oxygen gaps in government health facilities in a group of countries including, but not limited to: (in order of confirmed COVID-19 cases according to the WHO): South Africa, Ethiopia, Kenya, Uganda, Ghana and Senegal. The selection of countries is also informed by the **COVID-19 Oxygen Needs Tracker** which measures daily oxygen needs (cubic meters and number of large cylinders) and three month trend for all LMICs. The Every Breath Counts Coalition, the Access to Medicine Foundation and Novartis will also contribute to the partnerships. Each party agrees to advance a specific action/s in one or more of the focus countries, summarized below:

Partner	Action (number refers to the "Ten Actions" agreed at the first roundtable)
Access to Medicine Foundation	10. Report on company case studies and leverage stakeholders (e.g., investors, governments, companies) to collaborate to close medical oxygen access gaps in focus countries
Air Liquide	3. Develop access to medical oxygen strategies with KPIs and report progress in annual reports as part of corporate "sustainability" agendas 7. Invest in innovations that reduce the cost of oxygen in LMICs, stimulating demand, as the current high prices of medical oxygen have been cited by many stakeholders as a key barrier to access
BOC	3. Develop access to medical oxygen strategies with KPIs and report progress in annual reports as part of corporate "sustainability" agendas 7. Invest in innovations that reduce the cost of oxygen in LMICs, stimulating demand, as the current high prices of medical oxygen have been cited by many stakeholders as a key barrier to access
CHAI	1. Oxygen listed as essential medicine in national government policies/plans 4. Support development of national medical oxygen policies/plans and help to quantify and cost the gaps in access to medical oxygen in LMIC health systems 6. Support governments to expand the use of oxygen-related diagnostic tools and therapies and train healthcare staff (including biomedical engineers) to install, operate and maintain the equipment promoting the long-term sustainability of new investments and initiatives
Every Breath Counts	9. Provide a "neutral"platform for stakeholders to meet, share data, build partnerships and execute programs, set performance targets for the partnerships and measure progress, ensure transparency and accountability
Development Finance Institution/s (TBC)	5. Finance oxygen capital infrastructure using all of the instruments at their disposal, including debt, equity, guarantees, innovative financing mechanisms and traditional grants and explore regional pooled procurement strategies to increase demand and reduce costs
Nomura Asset Management	2. Communicate to medical gas company boards and executive leaders that access to medical oxygen is a material issue
Novartis	8. Strike more partnerships to close oxygen access gaps, including company-to-company (e.g., medical gas/pharmaceutical/mining) and share best practices access to medicines policies, programs and measurement indicators

Partner	Action (number refers to the "Ten Actions" agreed at the first roundtable)
PATH	1. Oxygen listed as essential medicine in national government policies/plans 4. Support development of national medical oxygen policies/plans and help to and cost the gaps in access to medical oxygen in LMIC health systems 6. Support governments to expand the use of oxygen-related diagnostic tools and therapies and train healthcare staff (including biomedical engineers) to install, operate and maintain the equipment promoting the long-term sustainability of new investments and initiatives

The parties acknowledge that COVID-19 has created a window of opportunity to accelerate access to medical oxygen and that the time is right to accelerate the development of specific collaborations in critical geographies.

On 23 October 2020, Dr Tedros, the Director-General of the World Health Organization (WHO), stated that the pandemic has increased the demand for medical oxygen "exponentially" to around 1.2 million large cylinders every day but that most LMICs have just 5 to 20% of the medical oxygen they need. He outlined the ways in which the WHO was supporting countries by distributing more than 40,000 pulse oximeters and 30,000 oxygen concentrators to 121 countries and also helping the governments of Somalia, South Sudan and Chad build oxygen plants. He said that,"incentivizing the business sector to change its model is key to ensuring sustainable oxygen in low and middle-income countries". and called for innovations that reduced the cost of oxygen provision, including solar-powered oxygen, co-location of oxygen plants with health facilities to reduce transport costs and improved training of healthcare workers and biomedical engineers.

The parties also raised several critical questions that need to be the subject of further dialogue before concrete partnerships can be finalized, including:

1) **Targets and KPIs**: how to establish common targets and KPIs so all parties know exactly what the goals of each partnership are and how progress will be measured? For example, if the goal is to ensure that all public health facilities in a given region have a reliable, affordable medical oxygen supply, how will that be measured? If the end goal is long-term government to company contracts, competitively tendered, price-transparent, and publicly monitored, how will the effectiveness of such contracts be measured?

2) **Data Access**: how to access to data on medical oxygen needs, defined as the gap between health system needs and current oxygen coverage, in each country? As many governments have collected this data for COVID-19, it could inform partnerships if governments are willing to make it publicly available, supported by global health agencies and NGOs, if necessary.

3) **Business Models**: how to develop new business models that work in low-resource settings? It is likely that different models will be needed in urban and rural areas given the very different health facilities that exist in each. Where large hospitals can install their own plants, or regional oxygen plants can serve several major hospitals, in rural areas and towns small hospitals and health facilities will need bespoke solutions, including solar-powered technologies and oxygen concentrators. What is the right mix of liquid oxygen piped to bedside, plants/cylinders and/or concentrators in different settings? What is the total cost of delivering medical oxygen per person per year, including the cost of installing, training staff and maintaining the equipment in these different settings? Despite the challenges of answering these questions, there are many opportunities to "leapfrog" outdated business models and technologies, especially by using new digital tools, in low-resource settings.

4) **Innovation**: how to innovate in ways that reduce the cost and improve access to medical oxygen in low-resource settings? The medical gas industry has a history of increasing access to medical oxygen in high-income countries through innovations in both business models and technology. Beginning in the 1980s, the development of the home healthcare market for oxygen dramatically broadened access for millions of people with COPD in high-income countries. New technologies improved the quality of life for patients, increasing life expectancy and reducing the costs associated with hospital care. Home healthcare is now a major, profitable business for the

industry. Technology innovations that increase access to stable, affordable energy sources and the supply of trained healthcare professionals and skilled engineers should be possible in low-resource settings and the companies who develop them will have a competitive advantage in these emerging markets.

5) **Financing**: how to address the lack of public funding for oxygen in most low-resource settings? As LMIC governments are establishing universal health coverage systems, international development banks and donors will need to bridge the financing gap by helping governments finance medical oxygen for their healthcare systems with loans and/or grants. In this environment, oxygen company returns will initially be low, but should rise over time as the offering and supply chain improves and real, sustainable value is created as economies rebound after the pandemic. Other ways governments can be supported by global development actors are via volume guarantees that ensure robust, predictable demand over time. Companies should also explore the development financing opportunities now available to encourage investments in healthcare solutions that help LMICs respond effectively to COVID-19.

6) **Risk reduction**: how to reduce the risk of doing business in low-resource settings? Companies may need support to function in complicated and fragmented regulatory environments and uncertain political environments where lack of clarity on legal remedies for breach of contract can deter private sector investment.

7) **Market segmentation**: how to segment the market for medical oxygen in low-resource settings? One approach is to divide the market by patient population, (1) maternal/newborn (e.g., childbirth/respiratory distress syndrome), (2) child (e.g., pneumonia), (3) adult communicable diseases (e.g., malaria), (4) adult non-communicable disease (e.g., COPD), and (5) surgery/trauma (e.g., road traffic injuries). Companies may need to partner with specific global health agencies or initiatives in these different health areas to have impact.

8) **Communications**: how to communicate the partnership in the public arena? How will these medical oxygen partnerships be presented - as LMIC government initiatives, as government to company initiatives, as multi-country global health initiatives with a common brand (e.g., Every Breath Counts), as distinct company/NGO partnerships, or other? While a variety of partnership models are likely, a common approach to communication needs to be agreed.

The partners above welcome the involvement of other stakeholders with a strong commitment to access to medical oxygen in public health facilities and the capacity to advance one or more of the ten actions in the countries listed. It is vital that each country has a set of partners representing companies, investors, development finance institutions, the UN and NGOs. In future dialogues it will be important to engage LMIC governments, hospitals and healthcare facilities in the specifics of the partnerships.

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