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ACCESS TO MEDICAL OXYGEN VIRTUAL ROUNDTABLE

Wednesday, 9 June, 2021
11:00-12:30amET

REPORT



Credit: The Associated Press, India, April 2021

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

I. OVERVIEW

On 9 June 2021, the **Every Breath Counts Coalition** and the **Access to Medicine Foundation** co-hosted a third roundtable to engage the oxygen industry in the vital work of the **Access to COVID-19 Tools Accelerator (ACT-A) Oxygen Emergency Taskforce**, which was established in February 2021 to help low- and middle-income countries (LMICs) respond to the rapidly rising need for oxygen to treat COVID-19 patients.

Since its launch as part of the therapeutics pillar of the ACT-A, the taskforce, which is co-chaired by Unitaid and Wellcome, has been coordinating the activities of its members¹ to accelerate LMIC access to oxygen financing and support and by advocating for **increased investment** in the multilateral oxygen response. This work builds on the \$US150 million worth of oxygen-related biomedical products and consumables that were delivered to 149 countries in 2020 by the World Health Organization (WHO), UNICEF, and other partners.²

The objective of the third roundtable was to engage the oxygen industry more directly in the work of the taskforce to prevent a repeat of the oxygen crises that have occurred in many LMICs, most recently in India and Nepal. Since the second dialogue on 9 December 2020, the pandemic has continued to cause oxygen shortages and despite the outpouring of international support many countries are still reporting deaths from lack of access to oxygen. At the time of the roundtable, approximately 45 countries were experiencing surging needs for oxygen to treat COVID-19 patients and there were disturbing signs of further oxygen crises emerging across Asia, Latin America, the Middle East, and Africa, where several countries have entered a third wave of the pandemic.³

The goals of the third roundtable were to:

- I. fully brief attendees on ACT-A Oxygen Emergency Taskforce activities;
- II. learn from industry on experiences to date responding to the surge in LMIC oxygen demand and identify barriers and opportunities to deeper engagement with the multilateral pandemic response; and
- III. advance specific options for moving forward together to more effectively respond to the next wave of oxygen shortages to prevent a repeat of the tragedy in India and Nepal.

Organizations in attendance (agenda and speaker biographies are at Appendix A) included representatives from leading medical gas companies, oxygen plant and concentrator manufacturers, industry associations, corporate investors,⁴ donor governments, multilateral development banks, UN and global health agencies, foundations, and NGOs (see Table 1). Industry attendees expressed a strong desire to work more closely with taskforce members to equip LMICs with the supplies and expertise they need to respond more effectively to rising medical oxygen needs. Industry actors all reported dramatic increases in demand during the pandemic and said that with better and more timely forecasts of oxygen needs in LMICs and with adequate and reliable financing so that governments could pay for products and services, it was possible to be better prepared for further shortages and avoid the tragic scenarios that we have seen in too many countries.

¹ Additional ACT-A Oxygen Emergency Taskforce members include the WHO*, Global Fund, the World Bank, UNICEF, UNOPS, Save the Children, Every Breath Counts Coalition, the Clinton Health Access Initiative (CHAI), PATH, the Access to Medicine Foundation, and ELMA Philanthropies. *including WHO Biomedical Consortium members ALIMA, the Gates Foundation, International Medical Corps, MSF, UNDP, UNHCR, USAID, and the World Food Programme.

² WHO, **COVID-19 oxygen emergency impacting more than half a million people in low- and middle-income countries every day, as demand surges**, 25 February, 2021. Available at: See <https://www.who.int/news/item/25-02-2021-covid-19-oxygen-emergency-impacting-more-than-half-a-million-people-in-low--and-middle-income-countries-every-day-as-demand-surges>.

³ See the **Every Breath Counts Oxygen Crisis Risk List** of LMICs currently experiencing or at risk of COVID-19 related oxygen shortages. Available at: <https://docs.google.com/document/d/1EawG7nDVP1USdrPpJap0wA-3jpRdZZYduOsKI45tlpM/edit>.

⁴ All institutional 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. Available at: <https://accesstomedicinefoundation.org/about-us/investors>.

Several industry leaders expressed strong support for entering into overarching agreements with the ACT-A Oxygen Emergency Taskforce that would provide more certainty about future LMIC oxygen needs and also derisk demand by ensuring LMIC governments can finance the oxygen required not just during the pandemic, but beyond. At the time of the roundtable, all LMICs needed an estimated 15 million cubic meters per day (the equivalent of 2.2 million large cylinders) just to treat COVID-19 patients. The annual cost of meeting this need is estimated at \$US3.2 billion, according to the COVID-19 Oxygen Needs Tracker.⁵ Exactly what proportion of these oxygen needs remain unmet and what type of oxygen support can most cost-effectively save the most lives in each LMIC is critical analysis that is needed to underpin public-private oxygen partnerships.

II. OPENING

“Vaccines are undoubtedly important, but equally important are tests and treatments – including an urgent need for oxygen. Making them all more broadly available worldwide is imperative.”

During opening remarks, the ACT-A was described as an effort to, “mobilize the international community for a common purpose” and end the pandemic everywhere by accelerating the development and equitable distribution of vaccines, tests, and treatments. Launched in April 2020, the ACT-A is overseen by a Facilitation Council, co-chaired by Norway and South Africa, which provides high-level political leadership and resource mobilization.

The ACT-A is divided into four pillars - a vaccine pillar (COVAX) co-chaired by Gavi, the Vaccine Alliance and the Coalition for Epidemic Preparedness Innovations (CEPI); a diagnostics pillar chaired by FIND; a therapeutics pillar co-chaired by Unitaid and Wellcome; and a health system strengthening pillar co-chaired by the Global Fund and the World Bank. WHO provides support across all of the pillars. Oxygen, as a vital therapeutic for the treatment of COVID-19, is located in the therapeutics pillar.

In early 2021, oxygen emerged as critical to the ACT-A response due to the high proportion (15-20%) of COVID-19 patients who need oxygen to survive, the very large quantities each patient needs (up to 60 liters per minute), and the rapid transmission of new virus variants in LMICs. Ill-equipped to provide oxygen at anywhere near these levels in such a short space of time, LMICs struggled to respond. As a result, reports of oxygen shortages and deaths escalated, especially in Latin America, Asia, the Middle East, Central Europe, and Africa.



With slower than expected vaccine rollout in many of these countries, access to oxygen and other medicines were described as “exceedingly important” to reducing more COVID-19 deaths in the short-term, especially as we may only be halfway to ending the pandemic. Further, COVID-19 is a “living enemy” with the capacity to adapt and undermine the effectiveness of vaccines, so treatments like oxygen and steroids must be front and center of the global response to ensure that the millions of people who get sick can be treated no matter where they live. While the level of collaboration between the pharmaceutical industry and the ACT-A on vaccines and tests has been strong, further work is needed to establish the same level of engagement between the ACT-A and the oxygen industry. At this stage of the pandemic, public-private partnerships on oxygen are urgently needed to strengthen the effectiveness of the multilateral response by reducing the high death toll from the pandemic.

⁵ The **COVID-19 Oxygen Needs Tracker** measures the daily oxygen needs in cubic meters and number of large cylinders for all LMICs and provides a three month trend. Available at: <https://www.path.org/programs/market-dynamics/covid-19-oxygen-needs-tracker/>.

Despite the billions of dollars that have been mobilized to date, the ACT-A requires an urgent injection of \$US18.5 billion to finance the work of all of the pillars. ACT-A leaders report that financing gaps for treatment are particularly acute with the drastic undersupply of oxygen risking millions of lives across the world. The ACT-A estimates that fully funding the work of the therapeutics pillar would save up to four million lives with the delivery of life-saving oxygen to those that need it most.⁶

On 1 June 2021, the International Monetary Fund (IMF), World Bank, WHO, and the World Trade Organization (WTO) issued an extraordinary call for \$US50 billion to boost manufacturing capacity, supply, trade flows and the equitable distribution of diagnostics, oxygen, treatments, medical supplies and vaccines.⁷ The G7 meeting, beginning one day after the roundtable, was identified as a major opportunity to secure further ACT-A financing commitments, including for oxygen. The [ACT-A Funding Tracker](#) regularly monitors the state of financing across the four pillars.⁸

Companies and Industry Associations	Air Liquide, Air Products, BCG, CAIRE/Airsep, Drive DeVilbiss, Fisher & Paykel, Gasworld, GCE Healthcare, International Oxygen Manufacturers Association (IOMA), Invacare, Linde Group (Afrox, BOC), Masimo, MEDIGHAM, Messer, Novair, PCI Gases, Philips, Sanrai International, SOL Group
Corporate Investors	AXA Investment Managers, Legal and General Investment Management, Nomura Asset Management
Donor Governments and Foundations	Agence Française de Développement (AFD), Australian Department of Foreign Affairs and Trade (DFAT), Bill & Melinda Gates Foundation*, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), ELMA Philanthropies*, Global Affairs Canada, Italian Agency for Development Cooperation (AICS), Dutch Ministry of Foreign Affairs (MINBUZA), Norwegian Ministry of Foreign Affairs, UK Foreign, Commonwealth and Development Office, US Agency for International Development (USAID)*, Wellcome*
Global Health Agencies	Access to Medicine Foundation*, Clinton Health Access Initiative (CHAI)*, Every Breath Counts Coalition*, Global Fund*, Global Health Labs, International Finance Corporation (IFC), PAHO*, PATH*, Save the Children*, Stanford University, UNICEF*, UNOPS*, Unitaid*, US Development Finance Corporation (DFC), World Bank*, WHO*

*Members of the ACT-A Oxygen Emergency Taskforce

III. ACT-A OXYGEN EMERGENCY RESPONSE TASKFORCE

“If we don’t act together on oxygen, we will see the total collapse of health systems”

During this session, participants heard from four of the members of the ACT-A Oxygen Emergency Taskforce: Unitaid, the Global Fund, UNICEF, and USAID. One speaker acknowledged that, *“if we had done a better job on oxygen before the pandemic, we would not be in this position,”* and all agreed that long-term inequities in access to medical oxygen have been exacerbated by the pandemic. Taskforce members outlined the unprecedented amount

⁶ WHO, ***G20 leaders boost support of the Access to COVID-19 Tools (ACT) Accelerator but urgent and immediate action is needed to maintain momentum***, 21 May 2021. Available at: [https://www.who.int/news/item/21-05-2021-g20-leaders-boost-support-of-the-access-to-covid-19-tools-\(act\)-accelerator-but-urgent-and-immediate-action-is-needed-to-maintain-momentum](https://www.who.int/news/item/21-05-2021-g20-leaders-boost-support-of-the-access-to-covid-19-tools-(act)-accelerator-but-urgent-and-immediate-action-is-needed-to-maintain-momentum).

⁷ WHO, ***A New Commitment for Vaccine Equity and Defeating the Pandemic***, 31 May 2021. Available at: <https://www.who.int/news-room/commentaries/detail/a-new-commitment-for-vaccine-equity-and-defeating-the-pandemic>

⁸ The ACT Accelerator has partnered with Wellcome and the Economist Intelligence Unit on the ***ACT-A Funding Tracker***, an interactive visualization of commitments made to the ACT-Accelerator. Available at: <https://www.who.int/initiatives/act-accelerator/funding-tracker>.

of public financing now available to help LMICs invest in medical oxygen via their respective organizations, although more is needed. All of the agencies described their long history and strong track records of working with the private sector - including by responding to the HIV/AIDS pandemic - and felt the urgency of working more closely to, “unlock the potential of public-private partnerships to meet the world’s oxygen needs.”

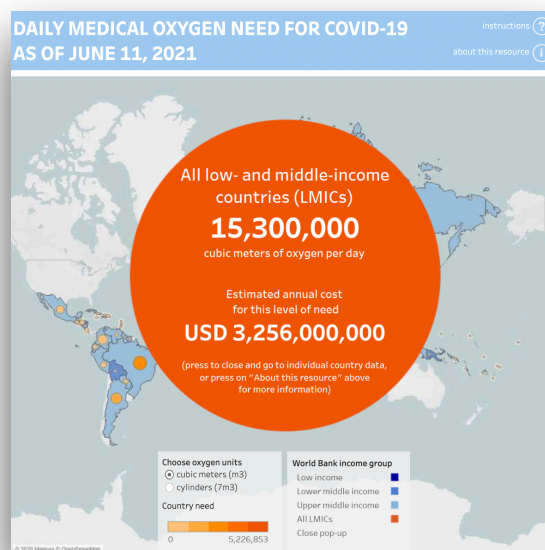
Taskforce members outlined the billions of dollars that have already been mobilized to help LMIC governments finance medical oxygen needs during the pandemic, including:⁹

- \$US3.7 billion via the Global Fund’s **COVID-19 Response Mechanism**, courtesy of the US, German, and Dutch governments
- Billions of dollars in loans and grants via the World Bank’s **COVID-19 Crisis Response**
- \$US182 million via the UNICEF **ACT-A Supplies Financing Facility**, courtesy of the Canadian government
- \$US20 million via Unitaid and Wellcome’s **Oxygen Response**

In addition to these funds for procurement of oxygen supplies, taskforce members including **Unitaid**, **Wellcome**, **WHO**, and **UNICEF** are helping governments finance technical support, training and maintenance services to ensure that new oxygen supplies are installed, operated, and maintained over the long-term. Taskforce members underscored the importance of investing in the human capital required to make sure that new oxygen equipment - liquid, plant, and concentrators - can be rapidly deployed, operated, and maintained by skilled healthcare workers and biomedical technicians. There was concern that without these investments there was a high risk that new equipment would lie idle, or end up in equipment graveyards within years, if not months, after installation. Taskforce members agreed that LMIC governments will need support planning the right mix of oxygen solutions - liquid, plant, and concentrator - and that a different mix of solutions will be needed to suit the needs of different settings.

Taskforce members underscored that to access Global Fund and World Bank oxygen financing, LMIC governments have to prioritize and request it, as they can also use this financing for other COVID-19 support needs (e.g., tests, PPE, other treatments). To date, the Global Fund reported a “huge demand for oxygen” in the applications it has already received, including from the Government of India who opted to use their entire \$US75 million for oxygen support. The World Bank has also funded oxygen supplies in many LMICs, including in **Rwanda**, **Tajikistan**, and **Tanzania**.

To encourage LMIC governments to take advantage of the financing now available, taskforce members have collaborated on an **Open Letter** listing the ACT-A oxygen funding opportunities and urging use of the **COVID-19 Oxygen Needs Tracker** to track daily estimates of the amount of oxygen needed just to meet the needs of COVID-19 patients. From this data, a list of oxygen **hotspots** - LMICs either currently experiencing or at risk of oxygen shortages - is regularly published and shared with LMIC leaders.



COVID-19 Oxygen Needs Tracker, PATH, CHAI and Every Breath Counts

Several taskforce members argued that the unprecedented levels of public sector financing now available for oxygen provided an opportunity to address long-standing market failures in access to medical oxygen in low-resource settings. Barriers to access include affordability, high transaction costs, unpredictability of financing, distribution challenges (e.g., logistics), gaps in hospital infrastructure (e.g., oxygen storage and piping), and human capital constraints (e.g., lack of qualified staff to operate and maintain oxygen equipment). The amount of idle and broken oxygen equipment in LMICs and upstream supply constraints in raw materials and parts, especially for PSA/

⁹ In addition to the \$US150 million spent on oxygen-related support in 2020.

VSA plants (also called Oxygen Generation Plants or OGPs), and oxygen concentrators, were also identified as specific problems. Taskforce members lamented the low levels of competition and innovation in the medical oxygen market as related factors that inhibited access to oxygen in LMICs. The taskforce is currently seeking \$US400 million to properly address these issues to ensure that the new public financing now available for oxygen is a good investment of public money that strengthens both medical oxygen markets and health systems for the long term.

Although taskforce members acknowledged a role for the full range of oxygen solutions to meet the surging need during the pandemic, several underscored the need to ramp up access to bulk liquid oxygen, which one member described as, *“the future backbone of medical oxygen provision in LMICs.”* Several speakers called for specific public-private partnerships to unlock the potential of bulk liquid oxygen and LMIC production of liquid oxygen was described a highly cost-effective strategy for the long term. There was concern that too many of the countries with the widest gaps in access to medical oxygen have limited local production of liquid oxygen and health systems equipped to use it. The pandemic was a major opportunity to change this.

Taskforce members were highly critical of the reactive nature of the oxygen response to date, with one member arguing that, *“if we remain reactive we will pay a high price,”* both in terms of an elevated COVID-19 death-rate and steep financial costs as countries scramble to secure oxygen resources when prices are rising and the risks of oversupply and misallocation of resources (as has been reported in India) escalate. Taskforce members stressed the urgency of the need for more coordinated government-industry action on oxygen, as vaccines are not reaching LMICs fast enough. Immediate measures are needed now, or in the words of one taskforce member, *“vaccines will save people’s lives next year, but oxygen will save lives now.”*

Agencies appreciated the need to sustain new investments in oxygen beyond the pandemic and acknowledged that this will also help to reduce deaths from many other causes including infectious diseases (e.g., pneumonia, malaria, tuberculosis) and chronic diseases (e.g., COPD), and improve outcomes for patients needing surgery. Greater access to oxygen will also benefit patients across the life course, from newborns in respiratory distress to elderly patients with chronic respiratory conditions. In this way, investments in oxygen will help LMICs achieve most of the **Sustainable Development Goals** (SDGs). This preferred approach was summed up by a taskforce member as, *“saving lives in the short term and building the infrastructure to strengthen health systems over the long term.”* Several taskforce members described their commitment to oxygen as long-term with one stating a capacity to *“channel significantly more funding to oxygen.”*



Credit: Getty Images, India, April 2021

IV. OXYGEN INDUSTRY

“We need to execute a strategy between the public and private sectors on oxygen to make sure this never happens again”

During this session, participants heard from five oxygen industry leaders representing the liquid gas (Air Liquide, Linde), pressure swing adsorption/vacuum swing adsorption (PSA/VSA) plant (Novair), and concentrator (Drive DeVilbiss) industries, and industrial gas media giant Gasworld. All speakers welcomed closer collaboration with the ACT-A Oxygen Emergency Taskforce and described how the pandemic had resulted in extraordinary oxygen supply challenges with five to twelve times increases in demand during the pandemic. Speakers acknowledged specific barriers to serving LMIC medical oxygen markets and agreed that with greater clarity on demand and with secure and predictable long-term financing for LMIC governments, the decades of underinvestment in medical oxygen

infrastructure and the skilled workforce needed to operate and maintain the equipment safely could be turned around.

Liquid gas industry speakers outlined their large global footprint and long history (120 years) providing industrial gases with one expressing a commitment to, “leverage our LMIC presence” to “rethink how we meet medical oxygen demands” in LMICs alongside existing LMIC-based mining, oil and gas, and heavy industry (e.g., steel) clients. They cited several examples of strong industry-government collaboration during the pandemic, especially to help countries in Latin America (e.g., **Brazil** and **Peru**), Asia (e.g., **India** and **Nepal**), and Africa (e.g., **South Africa**) typically at the urgent request of LMIC governments and often with bilateral support from donor governments (e.g., **US, UK, French, German** etc.). But they also raised concerns about the crisis nature of the response and argued that much more could be achieved with proactive planning and engagement with governments and their partners before a full-blown oxygen crisis emerged.

While liquid oxygen industry leaders acknowledged the significant capital infrastructure required and long lead times (two to five years) to establish new air separation units (ASUs) in LMICs, they also stated that where the infrastructure exists it is relatively easy to generate additional oxygen supply. What is challenging is getting that supply to LMIC hospitals and ensuring that they are equipped to store and pipe it to bedside or to fill cylinders safely, as liquid oxygen is highly flammable. Typically an existing ASU can serve hospitals within a 300km/190mile radius and if hospitals have the financing, the infrastructure, and the staff to secure and manage a liquid oxygen supply they should not experience shortages, even during a pandemic. Negotiating supply with hospitals in the geographic footprint of liquid oxygen plants is “very feasible” and the focus should be to keep contracts, “simple and safe.”



Credit: Reuters, Peru, February 2021

PSA/VSA plant and oxygen concentrator representatives outlined the major role both technologies have been playing during the pandemic as countries request thousands of PSA/VSA plants (India alone has order more than 500 new plants) and hundreds of thousands of oxygen concentrators. Increasingly, PSA/VSA plants are being understood as a valid, safe, and attractive solution to the medical oxygen needs of hospitals as they offer greater autonomy in oxygen generation and less reliance on often unreliable truck deliveries, especially during pandemics. But both require strong local partners with expertise to operate the equipment and fix it when it breaks. At this stage of the pandemic, the oxygen concentrator industry is experiencing significant challenges generating further supply, with delays in sourcing raw materials and parts (e.g., zeolite and other sieve bed materials, compressors), workers, and transportation pathways to LMICs, as most machines are manufactured in China, the US, and Europe.

Prior to the pandemic the majority of concentrators produced were 5 liter per minute or lower to suit the needs of the home care market in high-income countries. It has been a challenge to ramp up production of the 8 and 10 liter per minute units more suited to the higher oxygen needs of COVID-19 patients, noting that WHO advises many “severe” COVID-19 patients require at least 10 liters per minute and “critical” patients can require at least three times more. But despite these challenges, manufacturers have achieved five-fold increases in production. Both PSA/VSA plant and concentrator manufacturers expressed the need for more technology innovation to better serve LMICs, including more robust, easy-to-use machines that were not so electricity-dependent and which could be remotely monitored and fixed using telemetry.¹⁰

¹⁰ UNICEF’s **Oxygen Concentrator Innovation Project** is currently engaging industry on a new Target Product Profile for oxygen concentrators and an “Oxygen Plant In-a-Box” that would provide an all-in-one option for countries needing to urgently set up a plant in locations where access to equipment is scarce. More details available at: <https://www.unicef.org/innovation/oxygen-concentrators>.

All industry representatives agreed that greater clarity on oxygen demand was the single best strategy to avoid a repeat of the oxygen shortages that have plagued too many LMICs during the pandemic. There was acknowledgement that the increased public financing now available to LMIC governments to procure medical oxygen represents a significant short-term opportunity, but that long-term improvements in access would depend on sustaining that international financing support until LMICs were able to generate adequate domestic financing and build local expertise. One company representative concluded by saying that the projected LMIC growth in both the hospital and home care markets for oxygen was considerable and that it was important that companies were not limited to providing any one technology, but could offer liquid, plant, and concentrator solutions that worked together and met the needs of the entire health system.

A leading industry representative appealed to the parties around the table to collaborate to create a “strategic framework” with “time-bound execution” to respond to the current pandemic and be better prepared for the next one. He also stressed that as we move forward, we must not let the memory of the pandemic fade but turn all of these conversations into the “execution of a strategy to ensure that history does not repeat itself.”

VI. DISCUSSION

“A win-win for industry and governments on oxygen is to treat it like vaccines with an advanced market commitment and the UN fairly allocating the oxygen”

During the discussion session, all roundtable participants were asked to react to the question: “What does a win-win on oxygen access look like for public health and the oxygen industry?” The audience was reminded that at the peak of the recent oxygen shortages in early May, more than 15,000 people were losing their lives to COVID-19 each day with half of these deaths occurring in India and Brazil where oxygen shortages were most acute. Now with oxygen needs increasing exponentially in many LMICs well into the second year of the pandemic, including in several African countries (South Africa, Namibia, Angola, Zambia, Democratic Republic of Congo, and Uganda), governments, industry, and global health agencies must work together with a sense of urgency to prevent further shortages.

Institutional investors

A institutional investor stated that the oxygen industry has an important role to play in increasing access to medical oxygen in low and middle-income markets as part of their broader ESG responsibilities and, as a signatory investor of the Access to Medicine Index, welcomed the steps taken by industry during this critical time and encouraged other companies to follow suit. The investor further underscored the need to not only address emergency capacity needs but also to “build back better” by investing in the necessary infrastructure for medical oxygen so that countries and their health systems are better equipped to meet oxygen needs in the future. The investor also reiterated that investments in medical oxygen and action from medical gas companies will not only reduce deaths from COVID-19 but from many other causes. The investor expressed “strong support for our investment holdings in taking these actions and we encourage those who are available and sitting around the table today to take the lead and also to encourage and support your peers so they can take similar steps.” Access to oxygen is highly relevant to a company’s ESG performance and to their commitment to achieve the Sustainable Development Goals (SDGs) relating to health.

Including access to medical oxygen as a part of a company’s ESG responsibilities is a win-win for public health and the oxygen industry

Collaboration

There was unanimous agreement that greater collaboration between the taskforce members and the oxygen industry was a necessary precondition to reduce the risks of further oxygen shortages during the pandemic and

further oxygen-related deaths during future pandemics. A leading taskforce member said that, “*there is no reason not to pursue similar partnerships with oxygen as we have with pharmaceutical companies*”. Measuring and tracking the impact of collaboration between governments, industry, and global health agencies will be essential to ensuring accountability and assessing the impact of unprecedented levels of public sector investment in medical oxygen delivery in LMICs.

Closer collaboration, including formal agreements and memoranda of understanding to underpin public-private partnerships, are a win-win for public health and industry

Forecasting demand

An early and consistent concern from industry was the lack of data to determine oxygen demand in LMICs over a one- to two-year horizon. A leading industry representative stated that, “*we are currently in a lose-lose situation as with no foresight on one to two year oxygen demand we are not investing in additional production capacity and so we are not ready for the next wave.*” There was strong agreement from other industry representatives they they need more visibility on the demand for oxygen during the remainder of the pandemic and beyond, and that the taskforce has a major role to play providing robust LMIC forecasts not only for oxygen, but for all of the other products and services that go with it, including maintenance and healthcare worker and biomedical engineering staff and training. One industry representative said that without insights into demand for the next one to two years, “*supply chains will not move*”.

Quality, timely, publicly available data that accurately forecasts demand for oxygen and related services in LMICs is a win-win for public health and the oxygen industry

Sustainable funding

All parties agreed that sustaining the current levels of public sector financing to help LMIC governments invest in medical oxygen is critical. Governments need to prioritize oxygen as an essential medicine, ensure that every health facility is appropriately equipped to deal with the day-to-day needs, and that there are emergency plans in place for the future respiratory pandemics which are likely to occur. One industry representative said that during pandemics, oxygen costs should be totally derisked just as vaccines have been. Several industry members expressed challenges in connecting global supply of oxygen solutions with “customers” in LMICs, given the many actors in the mix during the pandemic including UN, multilateral health agencies, development banks, foundations, NGOs and more. Others expressed the view that it is critical that LMIC governments are front and center of procurement, especially post-pandemic when domestic financing of oxygen solutions should dramatically increase alongside continued international support.



Credit: Every Breath Counts, Sierra Leone, 2020

Predictable, adequate financing that enables LMIC governments to tender for multi-year oxygen contracts with transparent pricing is a win-win for public health and the oxygen industry

Maintenance contracts

Many participants expressed deep concern about the lack of support for maintenance and training. Several industry representatives stated that companies are responsible for maintenance and that clear service-level agreements (e.g.,

Managed Technology Services) are essential where governments pay for performance and uptime with operational risk a producer's responsibility. They acknowledged that government procurement often does not include long-term service and maintenance contracts and that when oxygen equipment fails there is limited support. Industry advised global health donors to insist on best practice contracts as defined by World Bank procurement guidelines for medical devices.

Multi-year service contracts that pay oxygen providers for performance over time is a win-win for public health and industry

Accelerating innovation

Industry representatives and taskforce members acknowledged the need for innovations in both oxygen technologies and services that would increase the cost-effectiveness of investments in low-resource settings and expand the market. Specific innovations highlighted included, lower-cost oxygen storage and piping solutions so hospitals could introduce liquid, "turn-key" oxygen plant solutions that were easier to install, connect and commission and which included remote monitoring and repair to reduce the need for local biomedical engineering, and simpler, easy-to-use, more robust concentrators that do not require extensive training to operate.

Greater innovation in medical oxygen technologies and their delivery is a win-win for public health and the oxygen industry

Health worker training

There was no clear consensus on who is responsible for ensuring a strong supply of well-trained and remunerated healthcare workers and biomedical engineers to procure, install, operate, and maintain oxygen equipment. While LMIC governments have a strong role to play in ensuring that an adequate number of staff in public health facilities are trained to operate and manage oxygen equipment onsite - including liquid storage, PSA/VSA plants, and concentrators - there was recognition that donor support is still needed to increase supply and improve the quality of training and supervision. Some industry representatives stated that reputable companies will manage biomedical training as part of their contracts and that, "*producers should never be allowed to sell equipment without qualified biomedical teams in place.*" Another industry expert called for widespread education of health ministry officials and other agencies buying oxygen equipment so that they "*know what high quality looks like*" and "*why it is worth paying for*" and invited the donor community to invest in this area.

Increased investment in an adequate supply of healthcare workers and biomedical engineers trained to procure, operate, and maintain oxygen equipment is a win-win for public health and the oxygen industry

Oxygen purity

Concern was expressed that the view that only oxygen with 99%+ purity is appropriate for medical purposes is restricting competition and access, specifically by limiting the role of PSA/VSA plants which produce 93% oxygen. Liquid gas manufacturers responded that it is not the responsibility of industry to determine medical oxygen purity standards, but rather the role of clinical experts working with the national and international health and regulatory agencies including the WHO. It is hoped that the current revision of the International Pharmacopoeia will make it clear that oxygen with purity above 90% is suitable for medical purposes. The first revision of the draft proposal is now available and the final will be presented at the 56th meeting of the Expert Committee on Specifications for Pharmaceutical Preparations in October 2021.¹¹

Defining medical oxygen purity as 90% or above is a win-win for public health and the oxygen industry

¹¹ See Oxygen for Respiratory Care, Draft proposal for revision in The International Pharmacopoeia, June 2021. Available at: https://www.who.int/docs/default-source/medicines/norms-and-standards/current-projects/qas20_867_oxygen.pdf?sfvrsn=e566ed85_3.

VII. NEXT STEPS

“Oxygen is the key enabler in an effective therapeutic response to the pandemic as there are few other effective medicines apart from steroids”

In summary it was noted that the third roundtable had gathered together an unprecedented number of leading representatives from industry and global health and development agencies. All parties demonstrated a strong appetite to work together more closely to equip LMICs with the products, services, and skills they need to meet the significant needs for oxygen during the pandemic. Everyone has a role to play and the more we can act together the more effective the oxygen response will be both in the short term and the long term.

Oxygen was described as the “key enabler” in an effective therapeutics response to COVID-19 as there are currently few other solutions available apart from steroids such as dexamethasone. This means that together, oxygen and steroids are every country’s best chance at keeping very sick COVID-19 patients alive while they wait for the vaccines to roll out. The world has already lost 3.8 million people to COVID-19, 62% from LMICs most of whom have reported challenges supplying oxygen. WHO has announced that these official counts could underestimate the real death toll by factor of three.

Access to oxygen not only has a major role to play in bending the mortality curve of the pandemic but in continuing to save lives from many other causes in patients young and old. The work of the ACT-A Oxygen Emergency Taskforce is clear - to enable LMIC governments and industry to work more effectively together and build the relationships and strike the contractual arrangements that ensure they have the financing and expertise needed to ensure that all health facilities are equipped with the right amount of oxygen.

In the coming weeks, we must continue the conversation, strengthen commitments, and incentivize and encourage more companies to step up to maximize the creativity needed to develop better solutions and the coordination required to implement them quickly and effectively. The next step is to demonstrate how all of the issues raised at this roundtable can be addressed in agreements between industry and the ACT-A Oxygen Emergency Response Taskforce that serve the public health goals of LMIC governments. Our success will ultimately be measured by the extent to which further oxygen shortages and related deaths are prevented during this pandemic and countries emerge with health systems much better equipped to provide oxygen to sick patients no matter the cause.

CO-HOSTS

*The independent **Access to Medicine Foundation** (est. 2003) stimulates and guides healthcare 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, governments, private foundations and global health agencies) 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, public policy, and the investment community to create a culture of access to medicine. The Foundation is a non-profit organisation, funded by the UK and Dutch governments, the Bill & Melinda Gates Foundation, AXA Investment Managers, and the Wellcome Trust.*

*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, 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. The Coalition is a voluntary membership organization with no dues, funded by the Bill & Melinda Gates Foundation and JustActions.

APPENDIX A

AGENDA

ACCESS TO MEDICAL OXYGEN ROUNDTABLE Dialogue #3

Wednesday 9 June 2021
11:00am-12:30pmET

By invitation only
Chatham House Rules
Zoom dial-in details are provided in the calendar invite

- 11:00 **Welcome**
[Jayasree Iyer](#), Executive Director, Access to Medicine Foundation
- 11:05 **Purpose**
The Honorable [Carl Bildt](#), World Health Organization (WHO) Special Envoy for the Access to COVID-19 Tools Accelerator (ACT-A) and Former Prime Minister and Foreign Secretary of Sweden
- 11:10 **ACT-Accelerator (ACT-A) Oxygen Emergency Response Taskforce**
[Robert Matiru](#), Director of Programmes, Unitaid and Co-Chair, ACT-A Oxygen Emergency Taskforce
[Harley Feldbaum](#), Head, Strategy and Policy Hub, The Global Fund to Fight AIDS, Tuberculosis and Malaria
[Aoubacar Kampo](#), Director of Health, UNICEF
[Jeremy Konyndyk](#), Executive Director, USAID COVID-19 Task Force and Senior Advisor to the USAID Administrator
- 11:25 **Oxygen Industry**
[John Raquet](#), Founder, Chair and CEO, Gasworld
[Jean-Marc de Royere](#), Senior Vice President, Executive Committee, Air Liquide
[Sanjiv Lamba](#), Executive Vice President and Chief Operating Officer, Linde
[Bernard Zenou](#), President and CEO, Novair Group and Chair, MEDIGHAM (Medical Gas Generator for Hospitals, International Association of Manufacturers)
[Joseph Lewarski](#), Senior Vice President, Clinical Affairs, Drive DeVilbiss
- 11:40 **Engaging Industry in the ACT-A Oxygen Emergency Response**
Moderated dialogue by [Leith Greenslade](#), Coordinator, Every Breath Counts Coalition, addressing the question: *What does a win-win on oxygen look like for public health and industry?*
Kick-off by [Maria Larsson Ortino](#), Global ESG Manager, Legal & General Investment Management (LGIM). *Members of the ACT-A Oxygen Emergency Taskforce, government development agencies, and industry representatives will discuss specific engagement strategies to prevent further oxygen shortages across LMICs.*
- 12:25 **Next steps**
[Ed Whiting](#), Director of Strategy, Wellcome and Co-Chair, ACT-A Oxygen Emergency Taskforce

SPEAKERS



Dr Jayasree Iyer is Executive Director of the Access to Medicine Foundation which publishes the Access to Medicine Index, the Access to Vaccines Index, and other studies. Jay has managed a portfolio of public-private partnerships between the Dutch government and the pharmaceutical industry and as worked for various NGOs and academic institutions.

<https://www.linkedin.com/in/jayasreeiyer/>



The Honorable Carl Bildt is WHO Special Envoy for the Access to COVID-19 Tools Accelerate (ACT-A). As a former Prime Minister and Foreign Minister of Sweden he has worked extensively with the EU and the UN on foreign policy and development. He chairs the Global Commission on Internet Governance, co-chairs the European Council on Foreign Relations, and is a member of the International Crisis Group and RAND Corporation boards.

<https://www.linkedin.com/in/carl-bildt-13818789/>



Robert Matiru is Director of Programmes at Unitaid and leads a team managing a \$US1.3 billion innovation investment portfolio. Robert has 20 years of experience in international development and has served as Head of Operations for WHO's H1N1 Pandemic Response and Chief Operating Officer of the Global TB Drug Facility.

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Harley Feldbaum is Head of Strategy and Policy at The Global Fund to Fight AIDS, Tuberculosis and Malaria. He has served as the Director for Global Health, Food Security and Development at the US Government's National Security Council and was a White House Fellow and Senior Public Health Advisor at USAID.

<https://www.linkedin.com/in/harley-feldbaum-0425a54/>



Dr Aboubacar Kampo is Director of Health at UNICEF and has worked as a physician and surgeon in hospitals and clinics in rural and urban areas across Africa and Asia. Dr Kampo has served as UNICEF Representative in Afghanistan and Cote d'Ivoire and has held senior leadership positions with several international NGOs and UN agencies over the last 14 years.

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Jeremy Konyndyk is Executive Director of the USAID COVID-19 Task Force and Senior Advisor to the USAID Administrator. He has served as Director of the Office of US Foreign Disaster Assistance (OFDA), as a Senior Fellow at the Centre for Global Development and with several NGOs including Mercy Corp and the American Refugee Committee.

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John Raquet is Founder, Chair and CEO of Gasworld, the leading global media source of news and information for the industrial gases business. He has 35 years experience in the industry, including with companies Air Products, Taylor-Wharton and Chem Systems, and also leads Spiritus Consulting.

<https://www.linkedin.com/in/john-raquet-7b18626/>



Jean-Marc de Royere is Senior Vice President of Social Programmes and a member of the Executive Committee at **Air Liquide**, a leading industrial gas company. He has served the company for 31 years in a variety of capacities including business development, strategic planning, new ventures, and sustainability, including extensively in the Asia-Pacific region.
<https://www.linkedin.com/in/jean-marc-de-royere-42914373/>



Sanjiv Lamba is Executive Vice President and Chief Operating Officer of the **Linde Group**, a leading industrial gas company. He began his career in 1989 with BOC India and since 2001 has worked for Linde in India, the UK, Singapore, and Germany where he was as a member of the Executive Board. He is the former Executive Vice President of Linde Asia Pacific.
<https://www.linkedin.com/in/sanjivlamba/>



Bernard Zenou is President and CEO of the **Novair Group**, a leading manufacturer of oxygen and nitrogen generators for more than 40 years, and Chair of MEDIGHAM (Medical Gas Generators for Hospitals, International Association of Manufacturers), a not-for-profit international association of medical gas generator companies.
<https://www.linkedin.com/in/bernard-zenou-21580553/>



Joseph Lewarski is Senior Vice President of Clinical Affairs at **Drive DeVilbiss**, a leading manufacturer of oxygen concentrators and other medical devices. He has served the medical device industry for over 33 years and has held numerous leadership positions including with Invacare and Inogen.
<https://www.linkedin.com/in/joseph-lewarski-a570311/>



Leith Greenslade is Coordinator of the **Every Breath Counts Coalition**, a public-private partnership supporting governments to reduce deaths from pneumonia, including from COVID-19. She has served with the UN Special Envoy for Health, on the Boards of Gavi and with the Australian Government including the Deputy Prime Minister and Minister for Health.
<https://www.linkedin.com/in/leith-greenslade-2535a027/>



Maria Larsson Ortino is Global ESG Manager at **Legal & General Investment Management** (LGIM) where she leads efforts on health, global engagement and voting activities for pharmaceutical, biotech, healthcare, chemicals, and tobacco sector holdings. She has worked with the ESG teams at Newton Investment Management and State Street Global Advisors.
<https://www.linkedin.com/in/maria-larsson-ortino-31b3017/>



Ed Whiting is Director of Strategy at **Wellcome** and has served as Private Secretary for Public Services for the UK Prime Minister, covering education, health, environment, energy, climate change and transport. He has also held positions at Nesta's Innovation Lab and with the UK Treasury.
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