

**DRAFT: IFMBE CED – Every Breath Counts (EBC) Coalition – WHO Webinars 19-20 May 2021**  
**Systems Response for Oxygen in COVID-19 Clinical Settings: Challenges & Solutions**  
 Global NGO, Biomedical & Clinical Engineering Health Technology (HT) Perspectives

**World Health Organization 2021:** (1) Oxygen is an [essential medicine](#), indispensable for [COVID-19](#) treatment and is very much in need in all settings! Oxygen is also essential for [surgery](#), [pneumonia](#), [trauma](#) and any other hypoxia condition in Vulnerable groups like the [elderly](#), [pregnant women](#) and [newborns](#) need oxygen in regular basis. (2) ...Vaccines alone will not overcome COVID-19. Commodities such as medical oxygen and personal protective equipment (PPE), as well as reliable diagnostic tests and medicines are also vital. (3) Trained and qualified biomedical (/clinical) engineering professionals are required to design, evaluate, regulate, maintain and manage medical devices (including medical oxygen devices & systems, and PPE), and train on their safe use in health systems around the world.

	<b>Wednesday 19 May, 2:00 - 3:30 pm Geneva time (CET)</b>	<b>Thursday 20 May, 2:00 - 3:30 pm Geneva time (CET)</b>
<b>Time</b>	<b>Challenges</b>	<b>Solutions: LMIC Biomedical &amp; Clinical Engineers' Case Studies</b>
CET time zone, pm	<b>Moderators:</b> Tom Judd (IFMBE CED <sup>1</sup> ), Leith Greenslade (EBC <sup>2</sup> )	<b>Moderators:</b> César Burgi Vieira, MD <sup>9</sup> , Elliot Sloane, PhD (CED) <sup>10</sup>
<b>2:00 – 2:10</b>	<b>Welcome &amp; Introduction:</b> Adriana Velazquez (WHO <sup>3</sup> ), Robert Matiru (UNITAID) <sup>4</sup>	<b>Welcome &amp; Introduction:</b> Yadin David (GCEA) <sup>11</sup> , Ed Whiting (Wellcome) <sup>4</sup>
<b>2:10 - 2:25</b>	<b>WHO Oxygen Tools &amp; Guidelines:</b> Alejandra Velez (WHO)	<b>Using WHO Inventory Tool for MOH Pakistan:</b> Tazeen Bukhari (EBC-WHO) <sup>12</sup>
<b>2:25 - 2:35</b>	<b>PATH Oxygen Needs Tracker:</b> Alex Rothkopf (PATH) <sup>5</sup>	<b>Gambia Developing Oxygen Treatment Centres:</b> Ebrima Nyassi (ESL-EBC) <sup>13</sup>
<b>2:35 - 2:45</b>	<b>Oxygen Clinical Impacts:</b> Paul Sonenthal, MD (Partners in Health-PIH) <sup>6</sup>	<b>Rwanda Biomedical Centre COVID response:</b> Francine Umutesi (EBC-RBC) <sup>14</sup>
<b>2:45 – 2:55</b>	<b>NGOs Closing the Oxygen Gap:</b> Jason Houdek (Clinton Health Access Initiative-CHAI) <sup>7</sup>	<b>Malawi Experience &amp; OpenO2:</b> Grycian Massa <sup>15</sup> (EBC-Lilongwe Inst.) Timothy Mtonga <sup>16</sup>
<b>2:55-3:05</b>	<b>NGOs Closing the Oxygen Gap:</b> Jim Ansara (Build Health International-BHI) <sup>8</sup>	<b>Haiti Implementing BHI's Oxygen solution OxBOS:</b> Steve Mtewa (EBC-BHI) <sup>8</sup>
	<b>Panel &amp; Q&amp;A</b>	<b>Panel &amp; Q&amp;A</b>
<b>3:05 – 3:30</b>	<b>All Presenters &amp; Moderators</b>	<b>All Presenters &amp; Moderators</b>
<b>Zoom Registration</b>	<a href="https://us02web.zoom.us/webinar/register/WN_xJQxIFsTL6564pxBhcVGw">https://us02web.zoom.us/webinar/register/WN_xJQxIFsTL6564pxBhcVGw</a>	<a href="https://us02web.zoom.us/webinar/register/WN_b-OLsNvsTJ-6AuzIVZypwA">https://us02web.zoom.us/webinar/register/WN_b-OLsNvsTJ-6AuzIVZypwA</a>

<sup>1</sup> International Federation for Medical and Biological Engineering *Clinical Engineering Division* (IFMBE CED): <https://ced.ifmbe.org/>. Tom Judd is CED Board Chair, certified Clinical Engineer, and WHO HT Adviser since 1989.

<sup>2</sup> Every Breath Counts (EBC) Coalition <https://stoppneumonia.org/about-us/>. Leith Greenslade is EBC Co-ordinator.

<sup>3</sup> World Health Organization Medical Devices Unit [https://www.who.int/health-topics/medical-devices#tab=tab\\_1](https://www.who.int/health-topics/medical-devices#tab=tab_1). Adriana Velazquez is the WHO Senior Adviser, Medical Devices.

<sup>4</sup> UNITAID <https://unitaid.org/>, Robert Matiru of UNITAID is Co-Chair, *ACT-A Oxygen Emergency Task Force* <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>. Ed Whiting of Wellcome is the other Co-Chair. <https://wellcome.org/>

<sup>5</sup> PATH <https://www.path.org/> & Needs Tracker <https://www.path.org/programs/market-dynamics/covid-19-oxygen-needs-tracker/>. Zach Clemence is Program Officer: COVID-19 Respiratory Care Country Programs Lead.

<sup>6</sup> PIH <https://www.pih.org/> and Addressing Oxygen <https://www.pih.org/global-covid-response>. Dr. Paul Sonenthal is Associate Director, Inpatient Medicine and Critical Care for PIH.

<sup>7</sup> CHAI <https://www.clintonhealthaccess.org/> and Addressing Oxygen Gap <https://www.clintonhealthaccess.org/transcript-of-webinar-investing-in-oxygen-to-close-the-access-gap-during-covid-19-and-beyond/>. Jason Houdek is Senior Technical Advisor, Essential Medicines for CHAI.

<sup>8</sup> BHI <https://www.buildhealthinternational.org/> and Addressing Oxygen Gap <https://www.buildhealthinternational.org/covid-response/>. Jim Ansara is Co-founder & Director at Build Health International. Steven Mtewa is a biomedical engineer on the BHI team in Haiti with global experience

<sup>9</sup> Dr. Vieira is a recent WHO Consultant & CED Collaborator. He also is a Hospital-Based Internal Medicine physician treating COVID-19 patients at Centro Hospitalar Universitário de Lisboa Central in Portugal.

<sup>10</sup> Dr. Sloane is a WHO/PAHO Health Technology (HT) Adviser for 40 years, a certified Clinical Engineer, University professor in Health IT, & global Digital Health leader <https://villanova.academia.edu/ElliotSloane>

<sup>11</sup> Dr. Yadin David is a WHO HT Adviser for over 30 years, a certified Clinical Engineer (CE), a CED Board member, and Leader of the Global Clinical Engineering Alliance with whom CED partners. <https://www.globalcea.org/>

<sup>12</sup> Ms Bukhari is a WHO HT Consultant, a CE, and based on her past significant experience in biomedical / clinical engineering was selected by her Ministry of Health to conduct a WHO survey across her country in 2020.

<sup>13</sup> Ebrima Nyassi is a biomedical engineer, currently serving a CED of Ecomed Scientific Limited in The Gambia, and co-author: *The development and implementation of an oxygen treatment solution for health facilities in low and middle-income countries* (LMIC), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7698571/>

<sup>14</sup> Ms Francine Umutesi is a biomedical engineer, a Health Technology Operations Specialist at RBC <https://www.rbc.gov.rw/index.php?id=188>, with global experience in the Health Technology Management field.

<sup>15</sup> Grycian Massa is a biomedical engineer, Director of Engineering Maintenance at Lilongwe Institute of Orthopaedics and Neurosurgery, see Open O2 initiative information below in References

<sup>16</sup> Timothy Mtonga, PhD, Malawi Director, Global Health Informatics Institute (<https://www.ghii.org/>), whose initiative in Malawi is OpenO2 <https://www.openo2.org/home>.

## References

An extensive list to be compiled from WHO, EBC, *ACT-A Oxygen Emergency Task Force*, PATH, CHAI, PIH, BHI, etc.

## References

### 1. World Health Organization (WHO) Medical Devices

- a. WHO overall Medical Device site: [https://www.who.int/health-topics/medical-devices#tab=tab\\_2](https://www.who.int/health-topics/medical-devices#tab=tab_2)
  - i. Priority medical devices for COVID prevention, diagnostic and management: <https://www.who.int/teams/health-product-and-policy-standards/access-to-assistive-technology-medical-devices/medical-devices/priority-medical-devices-for-covid>; <https://www.who.int/activities/prioritizing-medical-devices>
  - ii. Priority medical devices list for the COVID-19 response and associated technical specifications <https://www.who.int/publications/i/item/WHO-2019-nCoV-MedDev-TS-O2T.V2>; book now available in 6 languages has more than 100 tech specs related to COVID
  - iii. Publications: [https://www.who.int/medical\\_devices/publications/en/#htm](https://www.who.int/medical_devices/publications/en/#htm)
- b. WHO re Oxygen: <https://www.who.int/teams/health-product-and-policy-standards/access-to-assistive-technology-medical-devices/medical-devices/oxygen>
  - i. Cylinder safety: <https://www.who.int/publications/m/item/oxygen-cylinder-safety>
    1. Poster: [https://cdn.who.int/media/images/default-source/initiatives/oxygen-access/cylinder\\_final\\_red.tmb-768v.jpg?sfvrsn=60bb2128\\_1](https://cdn.who.int/media/images/default-source/initiatives/oxygen-access/cylinder_final_red.tmb-768v.jpg?sfvrsn=60bb2128_1)
  - ii. Fire mitigation: <https://www.who.int/publications/m/item/medical-oxygen-fire-risk-mitigation-measures>
    1. Poster: [https://cdn.who.int/media/images/default-source/initiatives/oxygen-access/risk-mitigation\\_final.tmb-768v.jpg?sfvrsn=7f1db1b7\\_1](https://cdn.who.int/media/images/default-source/initiatives/oxygen-access/risk-mitigation_final.tmb-768v.jpg?sfvrsn=7f1db1b7_1)
  - iii. Medical gas piping: <https://www.who.int/publications/m/item/medical-gas-piping-systems-safety>
    1. Poster: [https://cdn.who.int/media/images/default-source/initiatives/oxygen-access/piping\\_final\\_red.tmb-768v.jpg?sfvrsn=c1e3e58d\\_1](https://cdn.who.int/media/images/default-source/initiatives/oxygen-access/piping_final_red.tmb-768v.jpg?sfvrsn=c1e3e58d_1)
- c. **May 2021 WHO Guidelines and Tools for Oxygen:** <https://www.who.int/initiatives/oxygen-access-scale-up>
- d. Other Key WHO Medical Device links
  - i. <https://www.who.int/teams/health-product-and-policy-standards/access-to-assistive-technology-medical-devices/medical-devices>
  - ii. <https://www.who.int/teams/health-product-and-policy-standards/access-to-assistive-technology-medical-devices/medical-devices/newsletter>
  - iii. <https://www.who.int/teams/health-product-and-policy-standards/access-to-assistive-technology-medical-devices/medical-devices/oxygen>
- e. WHO Global research re COVID-19: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov>
  - i. WHO COVID-19 Technology Access Pool: <https://www.who.int/initiatives/covid-19-technology-access-pool>
- f. WHO COVID-19 Home Care Bundle for Health Workers: <https://www.who.int/publications/m/item/covid-19-home-care-bundle-for-health-care-workers>

### 2. WHO COVID-19 Biomedical Inventory Tool (applied at country level): <https://www.who.int/publications/i/item/WHO-2019-nCov-biomedical-equipment-inventory-2020.1>

- a. Senegal: [https://path.azureedge.net/media/documents/FINAL\\_Biomedical\\_Equipment\\_Assessment\\_Gap\\_Analysis\\_for\\_COVID\\_Senegal\\_4-19-21.pdf](https://path.azureedge.net/media/documents/FINAL_Biomedical_Equipment_Assessment_Gap_Analysis_for_COVID_Senegal_4-19-21.pdf)
- b. DRC: [https://path.azureedge.net/media/documents/FINAL\\_Biomedical\\_Equipment\\_Assessment\\_Kinshasa\\_4-21-21.pdf](https://path.azureedge.net/media/documents/FINAL_Biomedical_Equipment_Assessment_Kinshasa_4-21-21.pdf)
- c. Pakistan: <https://ced.ifmbe.org/2021-leadership-webinars/guruPrograms/18-2021-leadership-webinars/65-inn-day1.html>
- d. Ethiopia: [https://stoppneumonia.org/wp-content/uploads/2020/09/COVID-19-Respiratory\\_Oxygen-Equipment.pdf](https://stoppneumonia.org/wp-content/uploads/2020/09/COVID-19-Respiratory_Oxygen-Equipment.pdf)
- e. Malawi - [https://path.azureedge.net/media/documents/Malawi\\_Biomedical\\_Equipment\\_Assessment\\_Report\\_PATH\\_2021.01.25\\_final.pdf](https://path.azureedge.net/media/documents/Malawi_Biomedical_Equipment_Assessment_Report_PATH_2021.01.25_final.pdf)
- f. Zambia: <https://www.path.org/resources/biomedical-equipment-covid-19-case-management-zambia-covid-19-treatment-facility-survey-report/>

### 3. Foundations & Industry

- a. **Global Fund** funding for oxygen: (Call) <https://www.theglobalfund.org/en/covid-19/health-product-supply/treatment-and-oxygen-equipment/> (Response) <https://www.theglobalfund.org/en/our-covid-19-response/> and (How to Apply) <https://www.theglobalfund.org/en/covid-19/response-mechanism/how-to-apply/>
- b. **World Bank: Regional contacts for oxygen funding:** AFRO <https://www.worldbank.org/en/region/afr/contacts>; LA&C: <https://www.worldbank.org/en/region/lac/contacts>; South Asia: <https://www.worldbank.org/en/region/sar/contacts>; East Asia & Pacific: <https://www.worldbank.org/en/region/eap/contacts>; Europe and Central Asia: <https://www.worldbank.org/en/region/eca/contacts>
- c. Philips Foundation: <https://www.philips-foundation.com/>
- d. GE Healthcare: <https://www.gehealthcare.com/corporate/covid-19>

### 4. Global Medical Gas Suppliers <https://www.gasworld.com/>

### 5. Every Breath Counts (EBC) Coalition <https://stoppneumonia.org/about-us/>

### 6. ACT-A Oxygen Emergency Task Force

- a. WHO and the Task Force: <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>
- b. UNITAID Resolution: [https://unitaid.org/assets/R5\\_2021-e\\_Oxygen-Emergency-Support.pdf](https://unitaid.org/assets/R5_2021-e_Oxygen-Emergency-Support.pdf)
- c. Lancet re Oxygen Crisis: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(21\)00561-4/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)00561-4/fulltext)

7. **PATH** <https://www.path.org/>
  - a. Oxygen Needs Tracker - [https://www.path.org/programs/market-dynamics/covid-19-oxygen-needs-tracker/#:~:text=An%20interactive%20tool%20to%20help,%2Dincome%20countries%20\(LMICs](https://www.path.org/programs/market-dynamics/covid-19-oxygen-needs-tracker/#:~:text=An%20interactive%20tool%20to%20help,%2Dincome%20countries%20(LMICs)
  - b. Access to Oxygen Resource Library - <https://a2o2resources.org/> & [Access to Oxygen \(A2O<sub>2</sub>\) Resource Library](#). A joint effort between the [COVID-19 Respiratory Care Response Coordination](#) and the [Tools for Integrated Management of Childhood Illness \(TIMCI\)](#) projects, the library provides a central place to host global and country-specific tools, guidance, data, publications, policies, protocols, and advocacy resources related to oxygen delivery systems and oxygen scale-up.
  - c. [https://path.azureedge.net/media/documents/2021.02.10\\_Zambia\\_Oxygen\\_Summit\\_Report\\_Final.pdf](https://path.azureedge.net/media/documents/2021.02.10_Zambia_Oxygen_Summit_Report_Final.pdf)
8. **Clinton Health Access Initiative (CHAI)**
  - a. Oxygen Program approach: <https://www.clintonhealthaccess.org/our-programs/oxygen/>
  - b. March 11 Global webinar: <https://www.clintonhealthaccess.org/webinar-investing-in-oxygen/>
  - c. CHAI, PATH, Unitaid seek quotes to procure and supply oxygen equipment to 5 countries: <https://www.clintonhealthaccess.org/chai-path-unitaid-seek-quotes-to-procure-and-supply-oxygen-equipment-to-5-countries/>
9. **Build Health International (BHI)**
  - a. BHI Oxygen Solution OxBox: <https://www.buildhealthinternational.org/project/the-oxbox/#:~:text=BHI's%20solution%20is%20the%20Oxbox,ongoing%20primary%20and%20secondary%20care.>
  - b. BHI COVID-19 Response: <https://www.buildhealthinternational.org/covid-response/>
10. **Partners in Health** <https://www.pih.org/>
  - a. COVID-19 Response: <https://www.pih.org/coronavirus-response>
  - b. Clinical Management of COVID-19: [https://www.pih.org/sites/default/files/PIH\\_Guide\\_COVID\\_Part\\_II\\_Clinical\\_Management\\_4\\_21.pdf](https://www.pih.org/sites/default/files/PIH_Guide_COVID_Part_II_Clinical_Management_4_21.pdf)
11. **Assist International**
  - a. Oxygen training resources: <https://www.stanesglobal.com/course?courseid=biomedical-equipment-technician-training> & <https://www.stanesglobal.com/course?courseid=oxygen-therapy-in-children-and-adults&msg=not-logged-in>
12. **OpenO2**
  - a. OpenO2 is an initiative inside the Global Health Informatics Institute (<https://www.ghii.org>). Gerry Douglas is the Board Chair for GHII, and the day-to-day operation of GHII is done by the Malawian Director, Dr. Timothy Mtonga. <https://www.openo2.org/home>
  - b. The team: Gerry Douglas, PhD - <https://www.openo2.org/meet-the-team>, Timothy Mtonga, PhD <https://www.linkedin.com/in/timothy-mtonga-67158453/> and Grycian Massa - <https://www.linkedin.com/in/grycian-m-massa-52050526/>
13. **DAK Foundation** [www.dak.org.au](http://www.dak.org.au)
  - a. Marnie Rickards, Trustee/Founder. DAK Foundation is a supporter of One Heart Worldwide (NGO) working in maternal health in Nepal. Also involved on the Health System cluster for COVID response.
  - b. See the briefing on oxygen for AIDN (India/Nepal) here: <https://www.youtube.com/watch?v=OXUGx23rOt8&t=361s> start at 3m 45sec
14. **Other Faculty LinkedIn**
  - a. Adriana Velazquez <https://www.linkedin.com/in/adrianaavelazquezberumen/>
  - b. Alejandra Velez <https://www.linkedin.com/in/laura-alejandra-v%C3%A9lez-8794911b/>
  - c. Leith Greenslade <https://www.linkedin.com/in/leith-greenslade-2535a027/>
  - d. Tom Judd <https://www.linkedin.com/in/tom-judd-169a181/>
  - e. Robert Matiru <https://www.linkedin.com/in/robert-matiru-38a403/>
  - f. Ed Whiting <https://www.linkedin.com/in/ed-whiting-81aa4639/>
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  - o. Ebrima Nyassi <https://www.linkedin.com/in/ebrima-nyassi-b87b3625/>
  - p. Francine Umutesi <https://www.linkedin.com/in/francine-umutesi-bmeng-78209844/>
  - q. Steve Mtewa <https://www.linkedin.com/in/steve-mtewa-09143339/>

## 15. IFMBE CED-WHO 2020 webinars on Critical COVID-19 Equipment, PPE, and Oxygen, etc.

### English language

- a. [1. Oxygen Systems](#)  
COVID-19 Critical Topic Webinar hosted by WHO & IFMBE Clinical Engineering Division, with the participation of WHO and Ethiopia.
- b. [2. Masks, Respirators, and Face Shields](#)  
COVID-19 Critical Topic Webinar hosted by WHO & IFMBE Clinical Engineering Division, with the participation of WHO and Nigeria.
- c. [3. CPAP-BiPAP](#)  
COVID-19 Critical Topic Webinar hosted by WHO & IFMBE Clinical Engineering Division, with the participation of WHO, France and Benin.
- d. [4. Pulse Oximetry](#)  
COVID-19 Critical Topic Webinar hosted by WHO & IFMBE Clinical Engineering Division, with the participation of WHO and Rwanda.
- e. [5. Mechanical Ventilators](#)  
COVID-19 Critical Topic Webinar hosted by WHO & IFMBE Clinical Engineering Division, with the participation of WHO, Ireland and Rwanda.
- f. [6. Season 1 Summary](#)  
COVID-19 Critical Topic Webinar hosted by WHO & IFMBE Clinical Engineering Division, with the participation of WHO, UK, France, and USA.
- g. [7. Decontamination-Disinfection of Critical COVID-19 Equipment, Health Workers, and Patients](#)
- h. [8. Global CE COVID-19 Day Webinar](#)

### French language WHO-HUMATEM-CED 2020 Webinars

- i. [1 Les Systemes de Production d'Oxygene](#)
  - j. [2 Creation et Organisation d'une unite COVID](#)
  - k. [3 Oxygenation du patient: Les techniques de Ventilation non invasive \(CPAP/BIPAP\)](#)
  - l. [4 Oxygenation du Patient: Les Techniques de Ventilation Invasive \(ventilateurs\)](#)
  - m. [5 Surveillance de l'oxygenation du patient: \(oxymetre de pouls\)](#)
- i.