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# Strengthening HTM Through Strategic Partnerships

*Phoebe Khagame,  
Director,  
Oxygen Alliance.*



# About Us

**History:** This initiative emerged in response to the devastating consequences of non-operational oxygen devices during the peak of the COVID pandemic. The Oxygen Alliance was established facilitate the repair, maintenance and reintroduction of crucial devices into healthcare service.

**Mission:** To make a real difference in the healthcare ecosystem by rallying all stakeholders to prioritise maintenance and repair of biomedical equipment.

**Vision:** To create a resilient and sustainable healthcare infrastructure built on robust systems for maintenance and repair of medical devices in low- and middle-income countries (LMICs).



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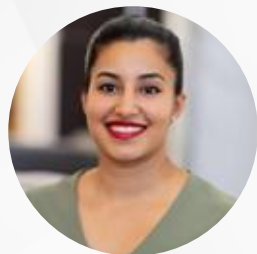


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# Meet The Team



**Amarpreet Rai**

Advisory Board Member



**Gerry Douglas**

Advisory Board Member



**Timothy Mtonga**

Advisory Board Member



**Phoebe Khagame**

Director



**Philip Amoko**

Country Lead - Kenya



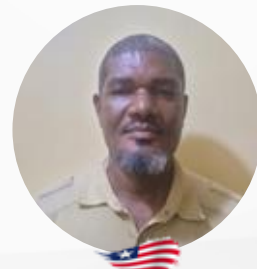
**Robert Ssekitoleko**

Country Lead - Uganda



**Dawit Assefa**

Country Lead - Ethiopia



**Mark Luke**

Country Lead - Liberia



**Damian Masanja**

Country Lead - Tanzania



**Raphael Piringu**

Country Lead - Malawi





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THE PROBLEM



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# Non-Functional Medical Equipment

Healthcare has become dependent on medical devices before the necessary workforce, physical infrastructure and policies are in place to support them. This results in many “equipment graveyards” full of broken, yet often easily-repairable medical devices.

According to WHO, Up to **70%** of medical equipment in sub-Saharan Africa is out of service.



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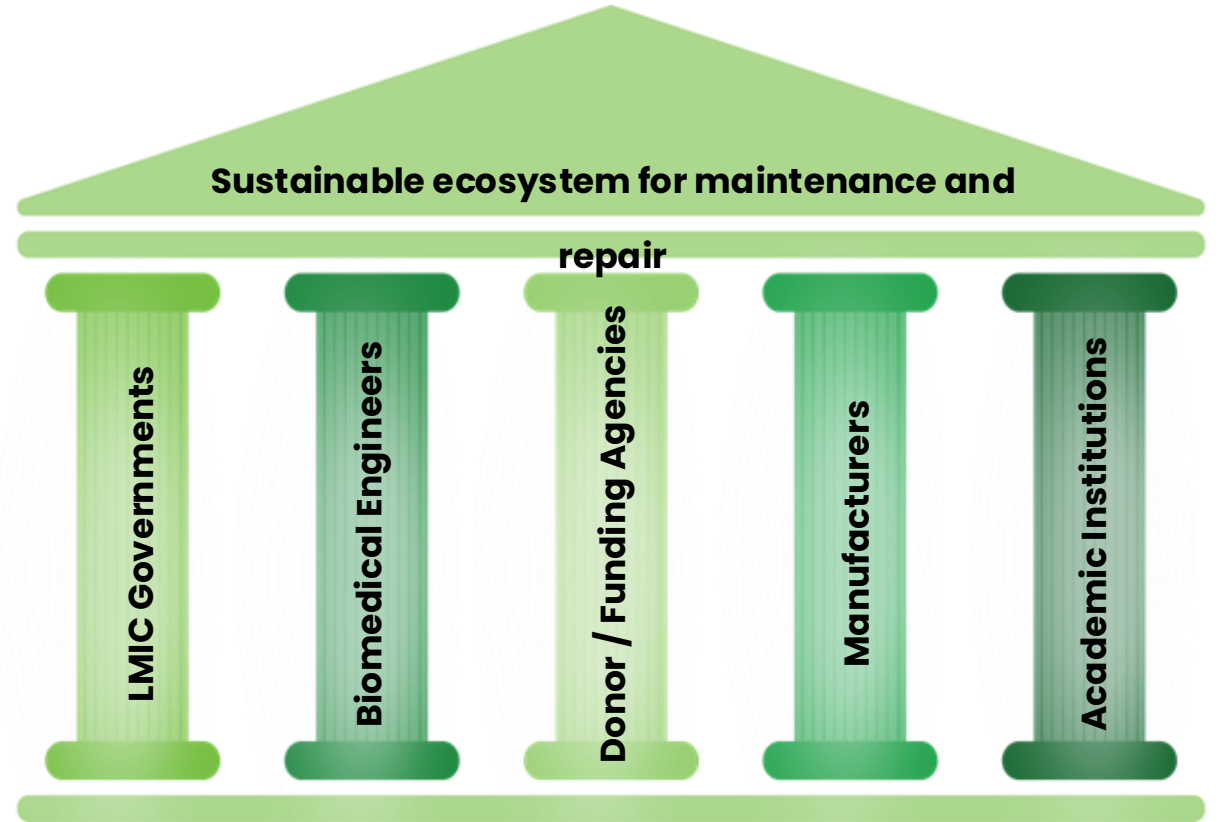


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# Championing Healthcare Technology Management

Our mission is to strengthen the repair and maintenance of medical devices through multidisciplinary collaboration, ensuring sustainable and resilient healthcare systems in low- and middle-income countries (LMICs) that consistently deliver high-quality care to every patient.

OUR SOLUTION





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# Our Vision & Approach



## **Governments & Ministries of Health**

Partner for evidence-based policy changes/  
formulation and  
implementation of  
guidelines



## **Biomedical Engineers**

Join our community for  
professional growth



## **NGO/ Donor/ Funding Agencies**

Share experiences and  
advocate best practices;  
Embrace sustainable aid  
strategies



## **Manufacturers**

Collaborate for  
accessible repair  
materials



## **Academic Institutions**

Enhance curriculum for  
real-world impact;  
Publish research





# Our Footprint

# 6

Agreements with  
Ministries of Health

Including Malawi, Tanzania,  
Kenya, Uganda, Liberia, and  
Ethiopia

# 6

Situational Analyses  
Completed

Across various health  
facilities with bed  
capacities >100 in each  
country

# 1700

Engaged for digital  
Personnel

That are part of our  
community and subscribe  
to events and updates



# Our Offering

Our sustainable products, born out of our diverse engagements, aim to support and empower different stakeholders in the journey to building sustainable healthcare systems

# Championing Healthcare Technology Management



## Situational Analysis

Assesses country-wide gaps in medical equipment maintenance and usage in partnership with Ministries of Health



## BME-Konza Mobile App

A mobile that serves as a hub for resources, community networking, and first-hand support to engage professional societies



## Webinars

Provides a capacity building and knowledge sharing platform for biomedical engineering professionals, manufacturers, and students



## BEST-LMIC Journal

A no-cost, open access platform dedicated to faculty and students to publish research dedicated to LMIC-specific challenges

# Situational Analysis

The resilience of our healthcare systems depends directly on the expertise and effectiveness of biomedical engineers. Our recent situational analysis moves beyond identifying systemic equipment gaps; it provides a clear roadmap for targeted action.

- [The BME-Konza App](#): A dynamic mobile resource and support hub created specifically for technicians to enhance diagnostic and maintenance capabilities.
- A Professional Self-Assessment Tool: An instrument for engineers to benchmark their competencies against established standards and chart a course for continued professional development.
- The Biomedical Engineering Maturity Model: A collaborative framework we are implementing with partners to guide health facilities toward sustainable, long-term growth in technical capacity and equipment management.

# BME-Konza Mobile APP

The BME-Konza app is an essential tool for Biomedical engineers and technicians seeking to streamline their work and improve their understanding of medical equipment.



## **Browse through different manuals**

Easily browse through a collection of equipment manuals for various medical devices, whether you're troubleshooting or seeking detailed operational guidance.



## **Search functionality**

Our app includes a search function that lets you find service manuals, instructional videos, and answers to frequently asked questions.



## **Get Answers to Your Questions**

Encountering issues with medical equipment? Our app allows you to ask specific questions and receive expert answers, helping you resolve problems quickly and effectively.

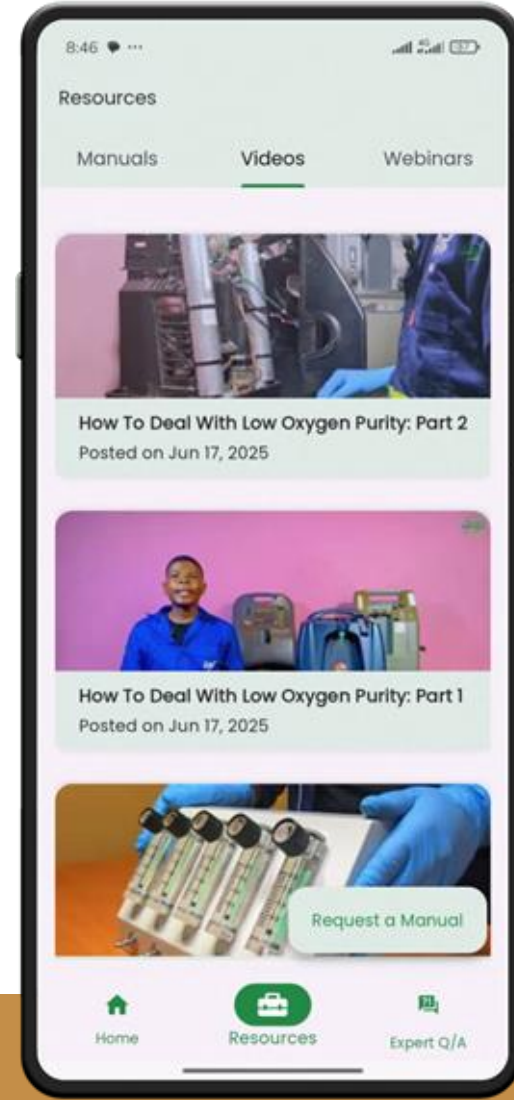
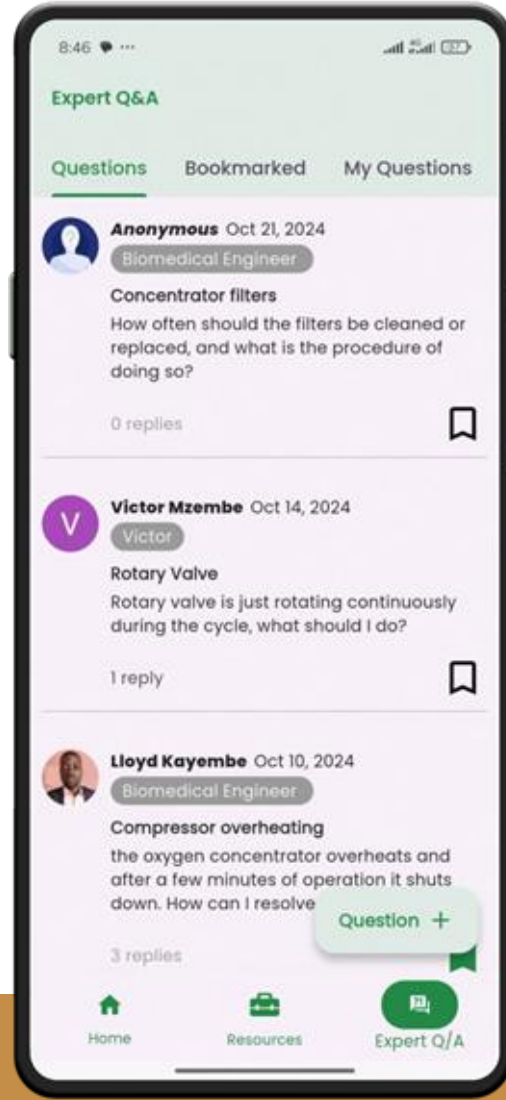
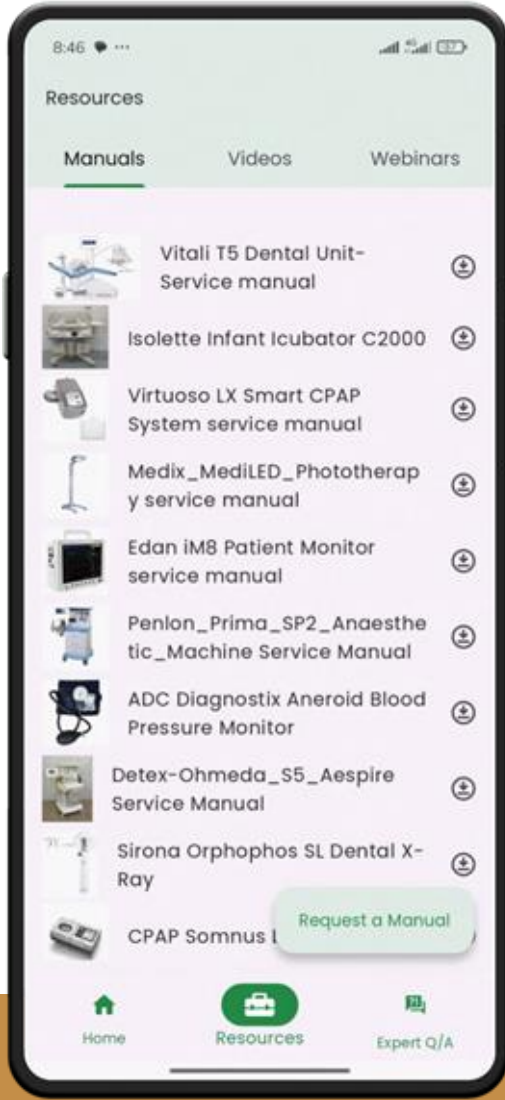


## **Share Your Experience**

Contribute to the community by adding your own experiences and insights in the profile section.



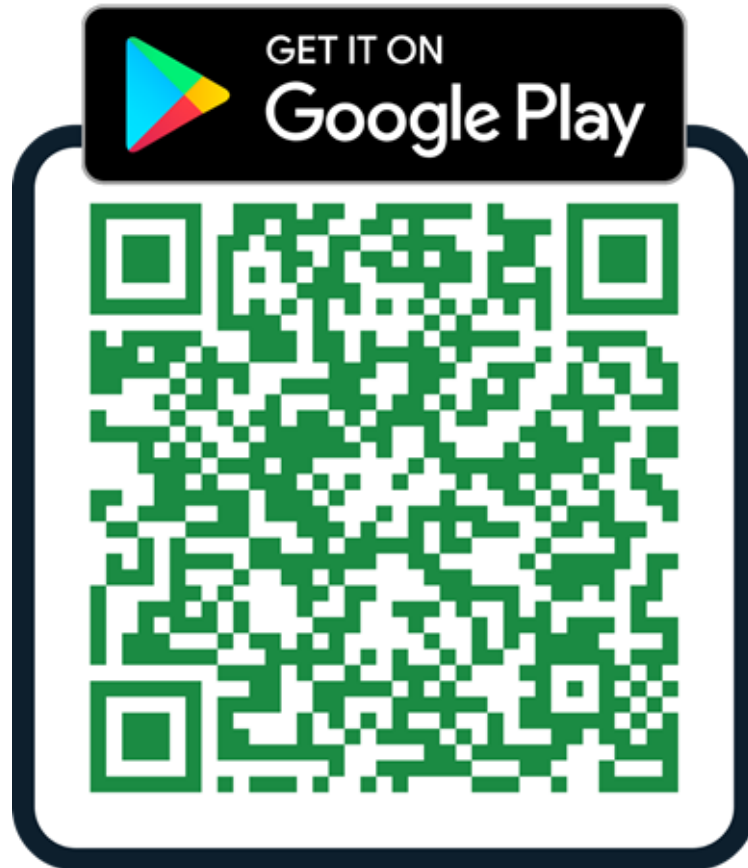
# Videos, Manuals and Q&A Forum





## BME- Konza

# Get The BME Konza App



## Requires:

- Android OS Version 7 or higher
- Google Play Services

# Webinars

The Oxygen Alliance webinars are key mediums for ongoing engagement with professional societies of biomedical engineers and manufacturers, providing platforms for knowledge sharing, updates, and capacity building. Held in quarterly themes of 6-7 webinars, the sessions provide an opportunity to gain holistic technical knowledge from industry experts from different countries, ranging from manufacturers, healthcare specialists, biomedical professionals and many more.

## WATCH OUR PREVIOUS WEBINAR SERIES

-  [Medical](#) [Equipment](#) [Management](#) [1](#)
-  [Sterilization](#) [Equipment](#) [Series](#)
-  [In Focus - Medical Imaging Series](#)

# Students' Professional Development Series

The Oxygen Alliance Student Webinars Initiative extends our successful in-service technical webinars to **biomedical engineering students**, addressing the gap between academic theory and real-world practice.

## What We Are Offering:

- **Online and free monthly webinars** accessible to students in all universities
- Sessions led by **experienced biomedical engineering professionals**
- Practical, real-world topics aligned with students and industry needs

## Expected Outcomes

- Improved student readiness for professional practice
- Early exposure to diverse biomedical engineering career paths
- Stronger alignment between academic training and health system needs

# Partner With Us!

## Mobilise Students

- Share with BME students

## Shape the Topics

- Recommend priority themes
- Help us align with curriculum needs
- Let us know of emerging & applied BME areas

## Participate as Presenters

- Nominate faculty or professionals
- Deliver in a learning session

# Next Generation, Fit for Purpose Technology

## UNICEF Target Product Profile for a Resilient Oxygen Concentrator

- Defined what a Fit for Purpose Oxygen Concentrator looks like for hospital use in LMICs
- Energy efficiency – variable power
- Increased resilience and robustness
- Improved usability – Tailored for multiple users in many facilities

Tested by the Oxygen Alliance during product development in Africa

*First device developed: PulmO2 10L oxygen concentrator*  
[www.pulmo2-concentrator.com](http://www.pulmo2-concentrator.com)



# BEST-LMIC Journal

The BEST-LMIC journal provides an open-access platform for faculty and students to publish their research while accelerating and facilitating the sharing of research and innovation. Established by the Oxygen Alliance, The Journal of Biomedical Engineering Systems and Technologies for Low- and Middle-Income Countries (BEST-LMIC) is dedicated exclusively to work that addresses the specific challenges and needs prevalent in low- and middle-income countries (LMICs). The Journal is peer-reviewed, open access, and requires no monetary payment for publication.

 [Visit the BEST-LMIC Journal Website](#) 



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# Our Footprint

**1000+**  
Bilateral cooperation

Across 20+ countries  
including Kenya, Egypt,  
Tanzania, and Saudi Arabia

**22**  
Agreement with  
Academic Institutions

To enhance curriculum and  
address barriers in the  
academic field

**200\***  
Cooperation with  
Developing Countries

In Kenya, Uganda, Tanzania,  
Liberia, Malawi, and Ethiopia



# Mentorship and Coaching



# What we're doing



A focused systems transformation of Health Technology Management (HTM) and BME capacity building in 15 high-volume facilities that already engaged in our 2024 situational analysis.



**Target state:** Each site reaches STEP-BME Stage 3 (Advanced)—with functional workshops, routine onsite repairs, 5S/visual management, and KPI-driven reporting.

# Our approach (framework + practice)



**Framework (STEP-BME):** Stepwise Transformation and Evolution Platform for Biomedical Maintenance and Engineering across HR, infrastructure, equipment management, and M&E—used to baseline, plan, and benchmark progress.



**Practice (BOOST):** Two embedded mentorship waves per site (2 weeks + 1-week follow-up), monthly remote coaching, always-open troubleshooting channel, and midline/endline reviews.

## What changes on the ground:

- **Dedicated BME workshops** with clean/repair/quarantine zones, tool shadow boards, labeled inventory, and wall-mounted boards.
- **5S + visual management** so work is visible, prioritized, and auditable.
- **Simple systems:** logbooks, job cards, SOPs, KPI boards, routine reporting to hospital leadership.
- **Inventory replaceable parts:** reuse/repurpose (“salvaging”) to ease parts bottlenecks.
- **Culture shift:** ownership, continuous improvement, and safe, routine maintenance as a team habit.



<b>Stage 4</b>	<p><b>Sustainable &amp; Innovative (Exemplary)</b> Fully integrated workshop supporting multiple health facilities. Local capacity-building programs and knowledge transfer. Strong collaboration with universities, NGOs, and government bodies. Continuous improvement processes and innovation in healthcare technology management.</p>
<b>Stage 3</b>	<p><b>Advanced (Optimized)</b> Advanced tools. Scavenging used for spares inventory 5S implemented in work areas Repairs and maintenance routinely conducted onsite by hospital BMET staff</p>
<b>Stage 2</b>	<p><b>Intermediate (Structured)</b> Basic tools. Dedicated spaces. At least one qualified BMET. Documented processes. Monthly reporting on key equipment status to create situational awareness.</p>
<b>Stage 1</b>	<p><b>Developing (Emerging)</b> At least one full time person assigned to biomedical engineering responsibilities. Some repairs conducted.</p>
<b>Stage 0</b>	<p><b>Basic (Reactive)</b> No personnel assigned to biomedical engineering responsibilities.</p>



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PERFORMANCE & MAINTENANCE DASHBOARD - ENGINEERING		
PRACTICE	INDICATOR	MONTH Target
<i>Performance KPIs</i>		
Electrical and Plants KPIs	Plant: Oxygen Purity (%)	
	Plant: Oxygen Pressure (bars)	
	Oxygen Plant Downtime (hrs)	0
	Number of oxygen cylinders produced	
	Number of Oxygen cylinders used	
	Amount of fuel used (liters)	0
	Electricity Outages (number)	0
	Generator Running hrs	-
	Generator Downtime (hrs)	-
	Water Plant Downtime (hrs)	-
Biomedical Equipment Uptime	Main Operating Theatres	90%
	Emergency Department	90%
	Adult Intensive Care Unit (AICU)	90%
	Neonatal Intensive Care Unit (NICU)	90%
	Laboratory	90%
	Labour wards	90%
	Radiology	90%
	Contracted Equipment /Total Equipment (Risk Factor)	
Contracted Equipment uptime		
<i>Maintenance KPIs</i>		
General Maintenance type Work	Total Maintenance Jobs	-
	Total Corrective maintenance jobs	
	Corrective maintenance (%) of all jobs	
	Total Planned Preventive Maintenance jobs	
	Planned Preventive Maintenance (%) of total jobs	
	Total Open Jobs (backlog)	
	% Open Jobs (backlog) of total jobs	
	Total Plumbing total jobs assigned	
	Plumbing (%) of total jobs completed	
	Total Biomedical jobs assigned	
	Total Biomedical jobs completed	
	Biomedical % job completed	
	Total Electrical jobs assigned	
	Electrical % job completed	
	Spares Usability	Total Biomedical Jobs requiring spares





# Health impact- What success looks like

## ≥85%

≥85% functionality for 1-5

**priority** device types per site (concentrators, anaesthesia, sterilizers, suction).

## 100%

100% of sites establish

functional workshops and adopt visual/KPI management in the first 3 weeks of engagement.

## ≥3

People and practice: ≥3 BME

staff per site directly coached; observable shifts in SOP adherence and proactive problem-solving.

## 80%

Record keeping standardized:

80% of serviced devices have up-to-date logs; monthly reports reach hospital management.

### Why it's strategic for MoH:

Sustained equipment uptime improves service readiness, infection prevention, surgical/anaesthesia safety, oxygen reliability, and lab continuity—multiplying returns on current surveillance, lab, and workforce investments (including Pandemic Fund activities). [WHO | Regional Office for Africa](#)



# Join The Oxygen Alliance Community

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Or visit

[bit.ly/joinoxygenalliance](https://bit.ly/joinoxygenalliance)