Leveraging COVID-19 equipment investments for long-term improvements

*Experience from Ethiopia*
Between 2016-2019, CHAI supported FMOH and Regional Health Bureaus to improve oxygen systems

**Conducted advocacy relating to policy and finance to ensure continued investment in O₂ systems**

- National Oxygen Scale-Up roadmap developed; oxygen and pulse oximeters included in clinical guidelines.
- Supported various levels of government in increasing production (leveraging both public&private capacities).
- Support for increased financing for procurement of oxygen devices and pulse oximeters *(see next slide).*

**Strengthening clinical and technical guidelines and training materials**

- Developed national curricula and training packages targeting Oxygen therapy for clinicians and Maintenance for Biomedical techs.
- Developed national specifications for oxygen plants, oxygen concentrators, and pulse oximeters.

**Supporting the introduction of holistic oxygen delivery and maintenance systems**

- Supported FMOH and RHBs in training on hypoxemia diagnosis and treatment in 32 hospital NICUs and PIPDs.
- Piloted the use of concentrators and pulse oximeters in 12 HCs to inform policy on scale-up at the primary care.
- Gas quality assessment in 52 hospitals and 12 health centers targeting concentrators, cylinders and plants.
FMOH funded procurement of **more than 3,000 concentrators, 800 cylinders, 5,500 pulse oximeters** mainly targeting hospitals.

In addition, EPSA included **oxygen devices and pulse oximeters as well as cylinder spare parts** in the 2018 RDF procurement. Some of RHBs introduced use at health center level. E.g: Oromia RHB procured **two pulse oximeters for each HCs** in the region.

**Five public oxygen plants** become functional in Addis, Hawassa, Bahir Dar, Dessie and Jimma. **Additional plants were planned and budgeted** for in different regions but there procurement bottlenecks.
COVID-19 in Ethiopia

Epidemiology, as of 27th Sept 2020

- 1.25M tests conducted
- >73K confirmed cases
- ~42K active cases, 249 cases in critical care
- 1,170 deaths
- Majority, male

Following the report of the index case on 13 March 2020, the government of Ethiopia has:

- **Established** a national multi-sectoral ministerial team to coordinate the COVID-19 response
- **Activated** the National Disaster and Relief Mitigation Emergency Operation Center
- **Introduced** measures such as school closures, mandatory quarantine of all incoming travelers
- **Provided** guidance to the public on adherence to non-pharmaceutical interventions (NPI).
- **Enacted** a State of Emergency on 8th April for 5 months
COVID-19 in Ethiopia

Status of oxygen availability in Ethiopia

- Despite substantial efforts from the government to increase oxygen availability prior to COVID-19, a recent assessment & quantification of respiratory care equipment and oxygen shows:
  - A significant oxygen production gap to meet COVID-19 supply need
  - Critical shortages of oxygen delivery equipment, accessories and spare parts

FMOH and its partners are putting huge efforts to boost oxygen availability through strong maintenance programs, procurement of oxygen equipment and employing redeployment mechanisms; however, there is still significant need requiring support.
In April 2020, CHAI was called by FMoH to support in efforts to avail Oxygen as a part of COVID-19 response

- National quantification for COVID-19 Oxygen supplies completed (WHO ESFT tool).
- Respiratory equipment inventory assessment in 83 COVID-19 treatment sites

- National guides developed and refined
  - SOPs for manifold/piping in HFs (with focus on COVID-19 ICUs)
  - Oxygen plant management manual to ensure continuous functionality

- Explored strategies to increase oxygen production by:
  - Engaging private oxygen producers to assess opportunities of increasing production capacities
  - Encouraging the maintenance of existing non-functional plants for COVID-19 use

- Training HCWs on COVID-19 Critical care/ use of oxygen (Therapy)

- Supporting in equipping two COVID-19 makeshift hospitals with respiratory/oxygen care items
  - Millennium Hall
  - Addis Ababa Field hospital
Equipping Millennium Hall COVID-19 makeshift hospital with Oxygen systems and working towards potential redeployment to MNCH facilities during post COVID-19 period.
Millennium Hall (conference center) was converted into COVID-19 treatment makeshift hospital to facilitate rapid response in Addis Ababa

- St Paul Millennium Medical College (SPMMC), a university hospital in Addis, was delegated to run MH
- FMOH and SPMMC led the overall conversion efforts:
  - Through preparation, designing, building and implementation
  - Mobilized and recruited qualified health professionals
  - Supplied adequate resources and materials for training of facility personnel and furnished

### Millennium Hall (MH)

<table>
<thead>
<tr>
<th>Total Bed Capacity</th>
<th>1100</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU Beds</td>
<td>40</td>
</tr>
<tr>
<td>High dependency beds (HDU)</td>
<td>60</td>
</tr>
</tbody>
</table>

### Use and capacity of MH as of 27 Sep 2020

<table>
<thead>
<tr>
<th>Total ever admitted and treated</th>
<th>3048</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total inpatients</td>
<td>154</td>
</tr>
<tr>
<td>On Critical care</td>
<td>55</td>
</tr>
</tbody>
</table>
Through funding from BMGF, CHAI supported in setting up systems for Oxygen systems with focus on three areas

1. Procurement support
   - Finalization of procurement list, in collaboration with FMOH, Millennium Hall team and BMGF
   - Direct procurement of 360 Masimo RAD-G pulse oximeters & 300 SafetyNet pulse oximeters; through WHO consortium, procured 258 Oxygen concentrators
   - Support piping/manifold system set up for 130 critical care beds
   - Working to procure PSA oxygen plant to meet high HDU and ICU demands. Contracted for ~100m3/hr with tentative delivery by end of October.

2. Inventory and maintenance support
   - Developed database for all items procured through BMGF/CHAI
   - Registered baseline info for all equipment procured
   - Conducting regular update of the database for inventory and maintenance
   - Coordinated with all responsible (e.g. Masimo) to provide training on use and maintenance where feasible

3. Redeployment support
   - Redeployment of respiratory care items procured for MH makeshift hospital after COVID-19 is over. All devices procured through BMGF/CHAI to be relocated on post COVID-19 closure of the facility.
   - Continue tracking/recording of all devices procured through BMGF
   - Sign tripartite FMOH, SPMMC and CHAI on redeployment
   - Provide support on post Re-deployment training and use
Key steps leading to redeployment

- Developed simple excel tool to capture equipment information at baseline and subsequent monitoring (see next slide)
- Data entered at equipment delivery to MH
- Regular monitoring and equipment status checks in place

- Agreed procurement list (previous slide), focusing on items that could be redeployed.

- Consensus built with FMOH and the facility from the outset on the need and importance of redeployment
- Tripartite MOU developed, reviewed and signed b/n FMOH, CHAI and managing facility
- Roles and responsibilities defined (more information following slides)

- Set post COVID-19 redeployment sites criteria (with focus on MNCH)
- Resource planning (+ mobilization): logistics to redeployment sites, end user training, maintenance training plan, spare part issues
- Define role of RHBs in the redeployment process and post redeployment use
Database was created for storing procured device info and subsequent monitoring

**Major features & contents:**

<table>
<thead>
<tr>
<th>I. Background information:</th>
<th>II. Equipment name:</th>
<th>III. Deployment type (first deployment or redeployment):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility Name:</td>
<td>Manufacturer</td>
<td>Serial No</td>
</tr>
<tr>
<td>Current facility head name and contact:</td>
<td>Model</td>
<td>Weight/Volume In</td>
</tr>
<tr>
<td>Health Facility Type:</td>
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<td>Kgs/Liters</td>
</tr>
<tr>
<td>Name of data (status assessor) collector:</td>
<td>&lt;enter information&gt;</td>
<td>Type</td>
</tr>
<tr>
<td>Woreda:</td>
<td>Year manufactured</td>
<td>Year manufactured</td>
</tr>
<tr>
<td>Zone:</td>
<td>Energy/voltage need()</td>
<td>Energy/voltage need()</td>
</tr>
<tr>
<td>Region:</td>
<td>Expected service date</td>
<td>Expected service date</td>
</tr>
<tr>
<td></td>
<td>Functional Status</td>
<td>Functional Status</td>
</tr>
<tr>
<td></td>
<td>Reason for Non-Functional</td>
<td>Reason for Non-Functional</td>
</tr>
<tr>
<td></td>
<td>Current location of non-functional device</td>
<td>Current location of non-functional device</td>
</tr>
<tr>
<td></td>
<td>Responsible person who directly manages the device</td>
<td>Responsible person who directly manages the device</td>
</tr>
<tr>
<td></td>
<td>Device special (specific) need or attention</td>
<td>Device special (specific) need or attention</td>
</tr>
<tr>
<td></td>
<td>Remarks</td>
<td>Remarks</td>
</tr>
</tbody>
</table>
Description of medical equipment:

<table>
<thead>
<tr>
<th>Name of Equipment/system</th>
<th>Product origin</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen concentrator</td>
<td>China</td>
<td>258</td>
</tr>
<tr>
<td>Pulse oximeter</td>
<td>USA</td>
<td>360 + 300</td>
</tr>
<tr>
<td>Manifold/Piping system</td>
<td>China</td>
<td>130 critical beds</td>
</tr>
<tr>
<td>Oxygen PSA plant</td>
<td>Turkey</td>
<td>01**</td>
</tr>
</tbody>
</table>

Tentative Timelines

- **Oxygen equipment (listed above) procured and installed at MH COVID-19 treatment center**
  - CHAI: 31, October 2020
- **Post COVID-19 redeployment sites selected and site list developed**
  - FMOH, CHAI: 31, January 2021
- **Oxygen systems dismantled from MH and installed at redeployment sites**
  - FMOH: 31, March 2021
- **End user training provided at redeployment site**
  - CHAI: 30, April 2021

**Two units with capacity of ~50m³/hr each**
• **Maintain all records** related to respiratory care items procured.  
• **Lead and coordinate** the redeployment of based on need of the facility.  
• **Identify the facility** where the Medical Equipment and manifold will be redeployed  
• Ensure redeployment **facility preparedness**  
• **Mobilize resources** for dismantling of the equipment and deploy technicians to redeployment site  

• **Maintain all records** related to respiratory care commodities (e.g. concentrators, POxs, PSA plant etc.) procured and delivered by CHAI.  
• Ensure all procured **equipment are in a good condition, safe, ready to be transferred to other health facilities.**  
• Ensure all procured **equipment are ready for redeployment** by decontaminating the system and cleaning the area for dismantling.  

• **Maintain all records** related to respiratory care commodities procured.  
• **Coordinate reinstallation process** of procured medical equipment.  
• **Provide technical assistance** in redeployment plan.  
• **Provide technical assistance** in dismantling and installation  
• **Ensure end user trainings** are provided at redeployment sites.
Potential Challenges & Mitigation Strategies

**Uncertainties**
- Timing of redeployment
- Constantly changing needs
- Equipment functionalities after use at COVID-19 sites.

**Redeployment**
- Supply system constraints
- Redeployment logistics/installation costs
- Defining requirements at each redeployment sites (spare parts, user trainings)
- Strong planning and prep
- Resource mobilization and allocations

**Health Systems Strengthening**
- Redeployment shouldn’t be perceived as a “project” – need to ensure that the efforts are meant to strengthen the health system!
- Ensure redeployment is built on existing systems (MEMIS, maintenance, financing, service delivery/use)
- Establish agreements in advance

**Need for rapid response** in a technically difficult and complex area.
- Regular monitoring and maintenance at COVID-19 centers
MH redeployment will be a learning for other COVID-19 treatment centers given there are multiple dedicated COVID-19 treatment centers.

Based on recent FMOH and CHAI assessment conducted nationally, there are 83 COVID-19 treatment centers with different levels of respiratory equipment availability.

- One-third of current COVID-19 treatment are stand alone and dedicated to COVID-19 treatment only.
- FMOH and RHBs want equipment in these facilities to be redeployed after closure of these centers.
- Redeployment Processes and implementation experience from MH can be a lesson for these sites.
Thank You & Questions