



## Report on Utilization of Funds by OpenO2 Initiative

### Summary

During the second wave of the COVID pandemic in Malawi, the Scotland Malawi Partnership (SMP) made an appeal to support the COVID response in Malawi. Of the money raised, 13,879.25 USD (10,000 GBP) was given to the OpenO2 initiative of the Global Health Informatics Institute (GHII). To date, 2,427.97 USD of this amount has been utilized to assess and repair oxygen concentrators at Zomba and Mzuzu central hospitals, St Andrews Clinic, Ekwendeni Mission Hospital and David Gordon memorial hospital. A total of 44 concentrators have been returned to service at these health facilities. A further 2,173.71 USD has been used to pay for compressor service kits that have been used to repair oxygen concentrators at over 30 health facilities that the OpenO2 team has visited since receiving the funds. The remaining 1,525.73 USD have been utilized to support two biomedical interns and the GHII finance and administrative officer. The remaining funds amounting to 7,751.84 USD have been obligated for site visits to nine health facilities and salary support for two biomedical engineering interns and the GHII finance and administrative officer.

### Introduction

In response to the COVID pandemic the Global Health Informatics Institute (GHII) launched the OpenO2 initiative, a knowledge base for oxygen concentrator repairs. However, due to the increased demand of oxygen and the lack of human resource to perform oxygen concentrator repairs, GHII launched a second intervention under the OpenO2 initiative i.e OpenO2 Mobile. OpenO2 mobile is a group of engineers and technicians that visit health facilities using converted buses as mobile workshops. The OpenO2 team thus brings the needed expertise, spares and a workforce to carry out oxygen concentrator repairs at the health facilities.

The Scotland Malawi Partnership (SMP) has been working in Malawi officially since 2004. In response to the COVID pandemic, SMP launched a special oxygen appeal to raise funds to support Malawi's efforts to manage the pandemic. One of the recipients of these funds was the OpenO2 initiative with the aim of ensuring that the service offered through OpenO2 Mobile could have the greatest impact in Malawi. This report provides an update of the activities carried out using these funds.

## Oxygen Concentrator Repair Update

Since the work of conducting oxygen concentrator work started, OpenO2 has managed to return 329 concentrators back to service across 37 health facilities in Malawi. Based on our assessment we have projected that there is another roughly 550 concentrators that are in need of repair.

## Distribution of Flow-Meters and Pulse Oximeters

We received a total of 55 flow-meters and bull-nose regulators. Ten bull-nose regulators and flow-meters were sent to Mzuzu and the rest were scheduled to be distributed to the sites on our visits. We also received 37 pulse oximeters. On examination, we found that two flow-meters were defective. We utilized the tracking tool provided by the ministry of health in Malawi to determine which sites to provide with these items and the quantity. Most sites reported a surplus of pulse oximeters. The rest of these items have been distributed as follows:

Site	Flow-Meter	Bull-nose Regulator	Pulse Oximeters
Salima District Hospital	3	3	
Dowa District Hospital	3	3	
Zomba Central Hospital	5	5	5
Nkhatabay District Hospital	3	3	
Likoma District Hospital	3	3	
Ntchisi District Hospital			1
Ludzi Community Hospital			1
Nkhotakota District Hospital	3	3	
Rumphu District Hospital	3	3	
Mzimba South District Hospital	3	3	2
Chiradzulu District Hospital	3	3	3
Balaka District Hospital	3	3	
Mangochi District Hospital	3	3	
MonkeyBay Community Hospital	3	3	
Chitipa District Hospital	3	3	
Nsanje District Hospital	3	3	3
Chikhwawa District Hospital	3	3	3
Mchinji District Hospital			3
Mwanza District Hospital			3

The remaining two flow-meters and four bull-nose regulators have been reserved to be delivered to Phalombe district hospital. This hospital is new and we anticipate that they may not have enough equipment to provide effective care. We are therefore reserving this equipment to assist the health facility. We have therefore also reserved four pulse oximeters to be delivered to this facility. A further eight pulse oximeters have been reserved to be delivered to Kamuzu central hospital. We are currently in the process of determining who the right person would be to hand these over to so that they are immediately put into use and are of benefit to patients there.

## Fund Utilization

A total of 13,879.25 USD (10,000 GBP) was received from the appeal by SMP. Of this amount, we have utilized a total of 6,127.41 USD. These funds have been used to pay for trips to repair oxygen concentrators at Zomba central hospital, Mzuzu central hospital, Ekwendeni mission hospital, David Gordon Memorial, and St Andrews Clinic. The total cost of these trips accounts for 39.6% (2,427.97) of all the expenditure.

A total of 2,173.71 USD has been used to purchase service kits for oxygen concentrator compressors. Underperforming compressors and saturated zeolite in sieve beds are two of the most common faults that result in oxygen concentrators needing repairs. In the past, SMP provided 300 kilograms of zeolite that we are using to repair oxygen concentrators. We used the funds from SMP to purchase compressor cups and sleeves to service compressors as part of the oxygen concentrator repairs.

The remaining utilized funds amounting to 1,525.73 USD have been used to pay for stipends for two interns, and salary support for the GHII finance and administrative officer.

## Upcoming Plans

In the current period, OpenO2 has utilized funds from COOPI, DAK Foundation and SMP to conduct site visits. Funds from COOPI have been used to pay for fuel, accommodation, and a daily subsistence allowance for the teams while they are out in the field. Funds from the DAK foundation have been used to pay for trip consumables such as masks, gloves, O-rings for sieve beds and other items. Funds from SMP have been used to purchase service kits for overhauling oxygen concentrator compressors. The current agreement with COOPI is that the OpenO2 team will visit and repair oxygen concentrators at all district and central hospitals along with one extra site per district. While this covers a significant portion of the ETUs, many other mission and community health centers are not included.

To further increase the availability of oxygen therapy, we plan to utilize the remaining funds from SMP as follows:

Description	Amount (USD)
OpenO2 Intern Stipends	2,070.00

Salary Support for OpenO2 Finance and Administrative officer	1,050.00
Site Visits	4,631.84

## Justification for Proposed Budget

1. **Intern Stipend (2,070 USD)**: Human resources are required to carry oxygen concentrator repairs. We recruit four engineering interns at a time to ensure that we have enough capacity to carry out oxygen concentrator repairs at the different health facilities. The allocated amount is sufficient to see out the contracts of the two interns currently funded by SMP and hire a second pair of interns to continue the work for another six months.
2. **Finance & Administration Salary Support (1,050 USD)**: Ensuring that funds are properly used and accounted for is of prime importance to the Global Health Informatics Institute. To ensure that this happens, we recruited a part-time finance and administrative officer. The money included in this budget will support this role for 6 months while we continue to carry out oxygen concentrator repairs.
3. **Site Visits (4,631.84 USD)**: The OpenO2 uses two mobile workshops to visit different health facilities and repair their oxygen concentrators. Trips can either be day trips for sites that are within two hours driving distance of our base in Lilongwe or overnight trips for sites that are further away. Costs for day trips include a per diem for working outside of the office, fuel costs to the health facility and consumables used in fixing oxygen concentrators. Overnight trips incur an extra expense for accommodation. The sites scheduled to be visited are listed in Table 3.

Site	District	# Of Faulty Concentrators	Estimated Cost (MKW)
Malamulo Mission Hospital	Thyolo	5	814,350.00
Mlambe Mission Hospital	Blantyre	TBD	
Pirimiti Clinic	Zomba	4	771,000.00
St Luke's Mission Hospital		TBD	
Mzimba South District Hospital*	Mzimba	10	1,825,900.00
Embangweni Mission Hospital	Mzimba	4	
Ekwendeni Mission Hospital	Mzimba	7	
Rumphu District Hospital	Rumphu	7	
Alinafe Community Hospital	Nkhotakota	TBD	218,200.00



## Concept Note for Piped Oxygen at Kamuzu Central Hospital Emergency Treatment Unit

The COVID pandemic has emphasized the critical role that oxygen plays in the clinical setting. For moderate to severe COVID cases, the odds of survival have been greatly influenced by the availability of oxygen therapy. In many low resource settings, oxygen generation and delivery has been done in one of two modalities. In the first place, Pressure Swing Absorption (PSA) plants have been used to generate oxygen that is then compressed into oxygen cylinders that are transported and used at the bedside. This has been the primary modality that has been used even though it has huge logistical overheads in terms of transporting and refilling the oxygen cylinders. The second modality for generating and delivering oxygen is through the use of oxygen concentrators which can be used at the bedside and provide a near infinite source of oxygen. However, most oxygen concentrators cannot provide the high flows of oxygen that are often required for severe and moderate COVID cases. While oxygen concentrators can be joined to achieve higher oxygen flow, this model does not work very well in crowded treatment units where space is a premium.

To address the deficits of both oxygen generation and delivery modalities, we propose the use of piped oxygen to the bedside with either a cylinder manifold, or an array of concentrators supplying a low-pressure storage tank from which oxygen will be distributed from a central location.

Below is a rough estimate of materials needed to implement this proposal:

Item	Cost (USD)
Copper pipe crimp tool	150
22mm copper piping	450
Copper connectors (elbow, straight coupler and Tee)	320
Wall outlets connectors and flow meters (23)	1,610
<b>Total</b>	<b>2,530</b>