

# 2021

# Annual Report



2021 Global Health Collaborative Research Symposium attendees, 30 November 2021.

Photo credits: John Kayemba

global health  
collaborative  
MUST · Uganda



MASSACHUSETTS  
GENERAL HOSPITAL

GLOBAL HEALTH

## Global Health Collaborative Annual Report, 2021

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## TABLE OF CONTENTS

|  |    |
|--|----|
| GHC-MUST Core Team.....                  | IV |
| Executive Summary 2021 .....             | V  |
| Abbreviations.....                       | 1  |
| Research .....                           | 4  |
| Innovation.....                          | 32 |
| Clinical and Community Partnerships..... | 34 |
| COVID-19 Response .....                  | 40 |
| GHC Core Support.....                    | 54 |
| Activity Highlights .....                | 55 |
| In Memoriam .....                        | 59 |
| Appendix.....                            | 60 |

## GHC-MUST CORE TEAM



**Stephen Asiimwe, MBChB, MS, DrPH**  
Program Director



**Annet Kembabazi, MSc**  
Senior Program Manager



**Ezra Turinawe**  
Research & Infrastructure Manager



**Rhina Mushagara**  
Relations Manager



**Julius Turyasingura**  
IT Manager

## EXECUTIVE SUMMARY

The Global Health Collaborative (GHC) is a partnership between Mbarara University of Science and Technology (MUST), Mbarara Regional Referral Hospital (MRRH), and the Massachusetts General Hospital (MGH) Center for Global Health, as well as other participating local and international academic institutions. The mission of the Collaborative is to build bilateral institutional capacity through responsive and sustainable program implementation.

2021 has been a difficult year for most of us. COVID-19 overshadowed every element of our lives and specifically, our program. From the lockdown and associated travel restrictions, to the infection and deaths we experienced directly. GHC lost 2 eminent health workers to COVID-19 – Dr Moses Ndema (First Mile MMED Scholar, RIP and Carol Orishaba RN (CAD/Ageing Study Nurse, RIP. This, plus a few other staff members who contracted the disease but thankfully re-covered. The GHC, with support from the CGH Global Disaster Response team, supported MRRH through the shadow cast by the spike caused by the delta variant of COVID.

Despite the challenges above, the program learned from them and achieved a lot through activities run under its 5 strategic objectives namely: Research, Innovation, Clinical/Community Health Partnerships, Advanced Medical Education, and Core Infrastructure Support. Despite all challenges, collaborative research work has been scientifically productive this year, publishing 59 manuscripts in peer reviewed journals and contributing to various high impact magazines and news outlets like STAT News and the Prospect Magazine UK. Notably, the CAMTECh innovations like Sanidrop hand sanitizer and several smart-phone based applications became so useful and applicable in the difficult period, offering easier remote clinical and research access. We had a very successful research symposium themed on “Adapting to research challenges posed by COVID-19: Lessons picked over the last two years.” Several GHC-supported advanced degree scholars at MUST were among the close to 100 attendees of this year’s symposium. A lot of lessons on how to move on were shared. The new COVID Treatment facility was completed and equipped, and MRRH was supported by the MGH Global Disaster Response Team on how to optimally utilize the facility at the peak of the second wave. The GHC also supported more than 18 staff members as part of the emergency COVID-19 response of the hospital. We also recently launched a COVID-19 vaccine advocacy program (the VAX-Uganda Project) to amplify community voices to secure more access to much needed COVID-19 vaccinations in our community. We are now in partnership with local civil society to reach out to and mobilize policymakers locally and globally towards this cause.

As we look forward to the year 2022, we believe it will be full of opportunity to move global health to a higher and deeper level of impact, especially as we jointly tackle the COVID pandemic and launch the second phase of the First Mile program.

We continue to thank the leadership at the MGH Center for Global Health, our leaders and partners at MUST and MRRH as well as all donors, students and collaborative scientists.

Succeed we MUST!

Dr. Stephen Asiimwe MBChB, MS, DrPH  
Program Director



## ABBREVIATIONS

|                    |   |
|--------------------|---|
| <b>ADEPTT</b>      | Alcohol Drinkers' Exposure to Preventive Therapy for Tuberculosis                                   |
| <b>ART</b>         | Antiretroviral Therapy  |
| <b>AYLHIV</b>      | Adolescents and Young Adults Living with HIV  |
| <b>AZT</b>         | Zidovudine  |
| <b>CAD</b>         | Coronary Artery Disease   |
| <b>CGH</b>         | Center for Global Health  |
| <b>CME</b>         | Continuing Medical Education  |
| <b>CMV</b>         | Cytomegalovirus   |
| <b>COPD</b>        | Chronic Obstructive Pulmonary Disease   |
| <b>COVID-19</b>    | Coronavirus Disease 2019  |
| <b>CROI</b>        | Conference on Retroviruses and Opportunistic Infections   |
| <b>CRP</b>         | C-Reactive Protein  |
| <b>CT</b>          | Computerized Tomography   |
| <b>CTC</b>         | COVID Treatment Center  |
| <b>DBS</b>         | Dried Blood Spots<br>Population Effectiveness of Dolutegravir Implementation in Sub-Saharan Africa: |
| <b>DISCO</b>       | A Prospective Observational Cohort Study  |
| <b>DM</b>          | Data Manager  |
| <b>DSA</b>         | Digital Speech Assistant  |
| <b>e-VHT</b>       | Electronic Village Health Team  |
| <b>EFV</b>         | Efavirenz   |
| <b>ENT</b>         | Ear, Nose, and Throat   |
| <b>FoM</b>         | Faculty of Medicine   |
| <b>GDR</b>         | Global Disaster Response  |
| <b>GDRHA</b>       | Global Disaster Response and Humanitarian Action  |
| <b>GHC</b>         | Global Health Collaborative   |
| <b>GRT</b>         | Genotypic Resistance Testing  |
| <b>HCIV</b>        | Health Centre IV  |
| <b>HEPS-Uganda</b> | The Coalition for Health Promotion and Social Development-Uganda                                    |
| <b>HiB</b>         | Haemophilus influenzae type B   |
| <b>HIV</b>         | Human Immunodeficiency Virus  |
| <b>ICU</b>         | Intensive Care Unit   |
| <b>IDI</b>         | Infectious Diseases Institute   |
| <b>IL</b>          | Interleukin   |
| <b>IP</b>          | Intellectual Property   |
| <b>IQR</b>         | Interquartile Range   |
| <b>IRB</b>         | Institutional Review Board  |
| <b>ISS</b>         | Immune Suppression Syndrome   |
| <b>IT</b>          | Information Technology  |
| <b>ITS</b>         | Information Technology Services   |
| <b>IV</b>          | Intravenous   |
| <b>KCRC</b>        | Kabwohe Clinical Research Centre  |
| <b>LM</b>          | Lab Manager   |
| <b>LT</b>          | Lab Technician  |
| <b>MGH</b>         | Massachusetts General Hospital  |

|                  |  |
|------------------|--|
| <b>MGO</b>       | MUST Grants Office   |
| <b>mL</b>        | Mililitre  |
| <b>MOH</b>       | Ministry of Health   |
| <b>MoSTI</b>     | Ministry of Science, Technology, and Innovation  |
| <b>MRRH</b>      | Mbarara Regional Referral Hospital   |
| <b>MUDSReH</b>   | MUST Data Science Research Hub   |
| <b>MURCI</b>     | Multi-morbidity in Uganda Research Capacity Initiative   |
| <b>MUST</b>      | Mbarara University of Science and Technology   |
| <b>nCoV-2</b>    | Novel Coronavirus  |
| <b>NIH</b>       | National Institutes of Health  |
| <b>NNRTI</b>     | Non-Nucleoside Reverse Transcriptase Inhibitor   |
| <b>NVP</b>       | Nevirapine   |
| <b>OAsIS</b>     | Optimizing Adherence through Implementation Science  |
| <b>OBGYN</b>     | Obstetrics and Gynaecology   |
| <b>PACO</b>      | Placentas, Antibodies and Child Outcomes   |
| <b>PC</b>        | Program Coordinator  |
| <b>PI</b>        | Principal Investigator   |
| <b>PLWH</b>      | People Living With HIV   |
| <b>PM</b>        | Preventive Maintenance   |
| <b>PPD</b>       | Purified Protein Derivative  |
| <b>PPE</b>       | Personal Protective Equipment  |
| <b>PREP</b>      | Pre-Exposure Prophylaxis   |
| <b>PRISMS</b>    | Protecting Infants Remotely by Short Message Service   |
| <b>RA</b>        | Research Assistant   |
| <b>REVAMP</b>    | Resistance Testing Versus Adherence Support for Management of Patients with Virologic Failure on First-Line Antiretroviral Therapy in Sub-Saharan Africa |
| <b>RHITES SW</b> | Regional Integration To Enhance Services in the Southwest  |
| <b>RIP</b>       | Rest In Peace  |
| <b>RNA</b>       | Ribonucleic Acid   |
| <b>RRH</b>       | Regional Referral Hospital   |
| <b>SACC</b>      | Comprehensive Customized Accounting Software   |
| <b>SMSS</b>      | Smart MedTech Monitoring System  |
| <b>SOC</b>       | Standard Of Care   |
| <b>TB</b>        | Tuberculosis   |
| <b>TDF</b>       | Tenofovir Disoproxil Fumarate  |
| <b>TLD</b>       | Tenofovir, Lamivudine, and Dolutegravir  |
| <b>TNF</b>       | Tumor Necrosis Factor  |
| <b>UCI</b>       | Uganda Cancer Institute  |
| <b>UNBS</b>      | Uganda National Bureau of Standards  |
| <b>UPDF</b>      | Uganda People's Defense Force  |
| <b>USAID</b>     | US Agency for International Development  |
| <b>WIMS</b>      | Wireless Physiologic Monitoring in Postpartum Women  |
| <b>WLWH</b>      | Women Living With HIV  |

## PROGRAM OVERVIEW

The Global Health Collaborative (GHC) is a partnership between Mbarara University of Science and Technology (MUST), the Massachusetts General Hospital (MGH) Center for Global Health, and various other local and international academic institutions. Our unique partnership works closely with MUST and Mbarara Regional Referral Hospital (MRRH) as the local entities, as well as Massachusetts General Hospital and Harvard University as our primary international partners.

### Vision

We aspire to be a leading academic model of a partnership that optimizes health and well-being globally.

### Mission

To build bilateral institutional capacity through responsive and sustainable program implementation in research, education, medical innovation, and clinical care in Uganda and the United States.



GHC Core team members Rhina Mushagara (L) and Annet Kembabazi (R) at the 6th Annual GHC Research Symposium. *Photo credits: Florence Kobusingye*

### Core Values

We strive to uphold the following four core values:

**Integrity-** We uphold our commitments in our actions

**Excellence-** We always pursue the highest standard

**Innovation-** We boldly approach challenges with curiosity, creativity and enthusiasm

**Collaboration-** We cultivate enduring partnerships to generate mutual learning for a common mission



GHC Core Team Members. Back row L to R: Rhina Mushagara, Julius Turyasingura, Azfar Hossain (Harvard Medical School). Front row L to R: Ezra Turinawe, Annet Kebabazi, Dr. Stephen Asimwe. **Photo credits: John Kayemba**

## RESEARCH

Despite challenges posed by the ongoing COVID-19 pandemic, in 2021 all GHC research programs made progress towards their objectives. Below is a list of all GHC-affiliated studies active in 2021:

| Study Title   | Program Coordinator (PC)              | Principal Investigator (PI)   |                   |
|---|---------------------------------------|-------------------------------|-------------------|
|   |                                       | MUST                          | MGH               |
| Quality of Life and Aging with HIV in Rural Uganda (Aging)  | Ruth Sentongo, Edna Tindimwebwa       | Stephen Asimwe                | Mark Siedner      |
| Epidemiology of Coronary Artery Disease among People with HIV in Rural sub-Saharan Africa (CAD)                                 | Flavia Atwiine, Edna Tindimwebwa      | Samson Okello, Stephen Asimwe | Mark Siedner      |
| Population Effectiveness of Dolutegravir Implementation in Sub-Saharan Africa: A Prospective Observational Cohort Study (DISCO) | Victoria Nanfuka                      | Winnie Muyindike              | Suzanne McCluskey |
| Caesarean Delivery in Uganda: A Mixed Methods Study (Cradling)  | Alan Babweteera                       | Henry Mark Lugobe             | Adeline Boatin    |
| Inflammation, Social Networks, and Depression in Rural Uganda (HopeNet)   | Charles Baguma                        | Bernard Kakuhihire            | Alexander Tsai    |
| Transition Readiness Among Adolescents Living with HIV in Uganda (Transition Readiness)   | Charles Baguma                        | Scholastica Ashaba            | Rajesh Gandhi     |
| Self-Management Study   | Charles Baguma                        | Scholastica Ashaba            | Alexander Tsai    |
| Placentas, Antibodies and Child Outcomes (PACO)   | Patricia Kyosimiire, Edna Tindimwebwa | Joseph Ngonzi, Stephen Asimwe | Lisa Bebell       |
| Wireless Physiologic Monitoring in Postpartum Women (WIMS)  | Patricia Kyosimiire                   | Joseph Ngonzi                 | Adeline Boatin    |

|   |                                 |  |                 |
|---|---------------------------------|--|-----------------|
| Optimizing Adherence through Implementation Science (OASIS)   | Edna Tindimwebwa                | Stephen Asiimwe,<br>Denis Nansera                      | Jessica Haberer |
| Resistance Testing Versus Adherence Support for Management of Patients with Virologic Failure on First-Line Antiretroviral Therapy in Sub-Saharan Africa (REVAMP) | Isaac Aturinda                  | Winnie Muyindike,<br>Bosco Mwebesa Bwana<br>(Deceased) | Mark Siedner    |
| Alcohol Drinkers' Exposure to Preventive Therapy for Tuberculosis (ADEPTT)  | Christine Ngabirano             | Winnie Muyindike                                       | Judith Hahn     |
| Mobile Technology to Extend HIV Counseling to HIV Positives in Uganda (EXTEND)  | Naome Sanyu                     | Winnie Muyindike                                       | Judith Hahn     |
| Multi-morbidity in Uganda Research Capacity Initiative (MURCI)  | Keith Asiime,<br>Zahra Reynolds | Francis Bajunirwe                                      | Mark Siedner    |
| MUST Data Science Research Hub (MUDSReH)  |                                 | Prof Celestino Obua<br>(Vice Chancellor)               | Jessica Haberer |

Below are brief summaries from projects above highlighting study achievements and research progress in 2021.

## Quality of Life and Aging with HIV in Rural Uganda (Aging)

### Investigators

Mark J. Siedner, MD MPH (Principal Investigator), Stephen Asiimwe, MBChB MMed DrPH Samson Okello, MBChB MMed MS, Janet Seeley, PhD, Noeline Nakasujja, MBChB, MMed Robert Parker, PhD, Meredith Greene, MD, Alexander Tsai, MD, PhD, Deanna Saylor, MD, MHS and Ana-Claire Meyer, MD, MSHS

### Team Members

Zahra Reynolds (PM), Ruth Sentongo. N(PC), Rebecca Gilbert(PC), Edna Tindimwebwa(PC), Anacret Byamukama (Study Clinician) Godfrey Masette(LM), Bernard Nuwahereza (LM)Rogers Ankunda(LT), Miria Kyokusiima(DM), Tomson Mukunde(DM), Flavia Atwiine(RA) Zulaika Namboga(RA), Andrew Lukanga.M.K(RA), Phionah Naturinda(RA), Chrispus Namanya(RA) and Nelson Niwagira(RA)

### Background

People living with HIV (PLWH) have a rapidly increasing life expectancy, and there will be an estimated 15 million PLWH over 50 years old on the continent by 2040. To sustain the benefits of these massive investments in HIV care, a corresponding focus on the determinants of quality of life for older PLWH is needed. In the US and Europe, older PLWH on suppressive ART have decreased physical and neurocognitive functioning. However, social factors, lifestyle behaviors, environmental exposures, medical co-morbidities, and HIV-disease characteristics that drive these declines in the US and Europe differ meaningfully from those in sub-Saharan Africa. Our scientific premise is that the social, biomedical, and HIV disease-specific determinants that compromise quality of life for older PLWH in rural Uganda will be distinct from those among PLWH in resource rich settings.

### Objectives

The over-arching goals of this four-year, US National Institutes of Aging funded study are to identify intervention targets to improve functioning and quality of life for older PLWH in the region by exploring HIV influences on quality of life, comparing trajectories of social, cognitive, and physical functioning, and quality of life by serostatus, and assessing the acceptability and feasibility of promising interventions. We added an amendment to the study in 2020 which aims to understand the impact of COVID-19 on wellbeing of older age people in rural Uganda.

### Specific Objectives

Use qualitative methods to develop a conceptual framework explaining how HIV influences quality of life among older PLWH in Uganda; compare trajectories of social, cognitive, and physical functioning, and global quality of life by HIV serostatus in Uganda; identify intervention targets, and assess the acceptability and feasibility of promising interventions, to improve functioning and quality of life among older PLWH in Uganda; determine the impact of COVID-19 on the quality of life of older people in this region.

## Methods

An initial qualitative component of the project was completed through purposive sampling of 36 older aged Ugandans (greater than 48 years old) PLWH on ART, and a comparative group of older-aged HIV-uninfected individuals from the clinic catchment area. We conducted in-depth interviews using a structured interview guide to assess the factors affecting quality of life that are most important to respondents.

For the quantitative component of the study, we will enroll 600 participants, comprised of 300 PLWH and 300 HIV-negative participants. Participants with HIV will be drawn from two clinics in Southwestern Uganda (Mbarara and Kabwohe) and be eligible for the study if they are greater than 48 years old, in clinical care at one of these two clinics, and have been taking ART for at least 3 years. We will also enroll 300 age and sex-similar HIV-uninfected participants drawn from the catchment areas of the two clinics.

To both respond to the constraints to research caused by the COVID-19 pandemic, but also to understand the impact of both the epidemic and the public health response, we altered the first year procedures to entail interviews assessing the effects of Covid-19 on quality of life.

## Achievements

We completed enrollment of all planned 600 individuals in the phase 2 and 3 study, who completed structured quantitative phone-based interviews across the two study sites, the Kabwohe Clinical Research Centre and the Mbarara Regional Referral Hospital, that studied the COVID-19 impact.

Staff have had specific training on neurocognitive measures, and the remainder of Aim 2 and 3 procedures.

The training was conducted by Professor Robert Paul, Director Missouri Institute of Mental Health, University of Missouri-St Louis.

All our study staff have been fully vaccinated against COVID-19. This is in line with the Ministry of health recommendations to have all health workers vaccinated.

## Major Challenges

With a focus on phone-based interviews this year, some participants had phone battery challenges during the phone interviews. Research Assistants continued the interviews at a later time or date in these instances. Some working participants found it difficult to conduct interviews during normal working hours. In these instances, we conducted evening interviews.

Some participants do not own phones. In these cases, we have encouraged them to borrow a phone from a friend or relative.

Some participants have poor network where they reside. This, sometimes made interviews last longer to capture clear responses.

## Focus (Major Activities) for 2022

Complete year 2 of the longitudinal study on age-related health and quality of life. This will include in person study visits (COVID-19 epidemic willing) to assess neurocognition, frailty, physical function, hearing, and vision in the next year of the cohort study to meet Aims 2 and 3 of the study.

## Conference Submissions

None

## Publications

*A paper, entitled "Aging in Uganda: What does it mean to age well?" that summarizes results of the Aim 1 qualitative interviews has been drafted. It will be submitted in the coming months after compiling feedback from study co-investigators.*

## Epidemiology of Coronary Artery Disease among People with HIV in Rural sub-Saharan Africa (CAD)

### Investigators

Samson Okello, MBChB, DTM&H, MMed, SM; Mark J. Siedner, MD, MPH; Stephen Asimwe, MBChB, MS, DrPH; Moses Acan, MBChB, MMed; Crystal North MD, MPH; Brian Ghoshhajra, MD, MBA; Prossy Bibangambah, MBChB, MMed

### Team Members

Zahra Reynolds (PM), Ruth Sentongo. N(PC), Rebecca Gilbert(PC), Edna Tindimwebwa(PC), Anacret Byamukama (Study Clinician) Godfrey Masette(LM), Bernard Nuwahereza (LM)Rogers Ankunda(LT), Miria Kyokusiima(DM), Tomson

Mukunde(DM), Flavia Atwiine(RA) Zulaika Namboga(RA), Andrew Lukanga.M.K(RA), Phionah Naturinda(RA), Chrispus Namanya(RA) and Nelson Niwagira(RA)

## **Background**

The expansion of antiretroviral therapy (ART) to over 12 million people in sub-Saharan Africa has significantly increased life expectancy for people living with HIV (PLWH). The sustainability of these investments will require substantial focus on non-AIDS conditions among PLWH in the region. In the US, PLWH have an increased burden of coronary artery disease (CAD), particularly those with low recent or nadir CD4 counts, which remains a common phenomenon in much of sub-Saharan Africa. Yet, differences in traditional and region-specific exposures in sub-Saharan Africa are likely to alter the pathophysiology of CAD in sub-Saharan Africa. Our scientific premise is that PLWH in rural Uganda will have an increased burden of CAD due to region-specific differences in HIV-related and environmental risk factors.

## **Objectives**

The over-arching goals of this four-year, US National Institutes of Health / National Heart Lung and Blood Institute funded study are to demonstrate the extent to which coronary artery disease (CAD) burden may be greater among PLWH in rural Uganda, to discern which risk factors are responsible for this greater burden, and to propose a risk score and promising intervention targets to improve the health of this population.

## **Specific Objectives**

Determine whether CAD is more prevalent and severe among PLWH than HIV-uninfected comparators in rural Uganda. Determine the extent to which the association between HIV infection and CAD is modified by sex and region. Identify regional correlates of CAD and develop a risk prediction score for the presence of CAD among PLWH in rural sub-Saharan Africa.

Measure the prevalence of COPD, the co-prevalence of COPD and CAD, and the contribution of HIV to the prevalence of COPD in rural Uganda.

Compare sputum biomarkers of inflammation, immune activation, and endothelial function by HIV serostatus and air pollution exposure in rural Uganda.

Determine the comparative prevalence, and correlates of fatty liver disease in people with and without HIV infection in rural Uganda.

## **Methods**

We will enroll 600 participants, comprised of 300 PLWH and 300 HIV-uninfected participants. Participants with HIV will be drawn from two clinics in Southwestern Uganda (Mbarara and Kabwohe) and be eligible for the study if they are greater than 40 years old, in clinical care at one of these two clinics, non-pregnant, have adequate renal function and have been taking ART for at least 3 years. We will also enroll 300 age and sex-similar HIV-uninfected participants drawn from the catchment areas of the two clinics. Participants will undergo blood collection for renal function and lipid testing, complete questionnaires about cardiovascular disease risk factors, pulmonary function testing, liver chemistry tests, and undergo contrast enhanced computed tomography of the coronary arteries.

## **Achievements**

We have screened 333 participants, 330 have been consented, 3 declined consent, 310 have completed all study procedures including a cardiac CT scan, 17 have been disenrolled, 3 have been screened, waiting to complete CT Scans. All our study staff have been fully vaccinated against COVID-19. This is in line with the Ministry of health recommendations to have all health workers vaccinated.

Dr. Brian Ghoshhajra our primary study radiologist continues to virtually offer a number of capacity building opportunities for study staff and collaborators during biweekly meetings.

This project has led to three Fogarty Clinical Research Fellowships for junior investigators to date – including for Dr. Prossy Bibangambah at MUST, Dr. Rita Nassanga at Makerere, and Dr. Njambi Mathenge at MGH. The first of these is being led by Dr. Prossy Bibangambah, who is using images collected as part of the study, a secondary analysis to assess liver disease among the study participants.

## **Major Challenges**

The study has had many pauses, due to the COVID-19 epidemic and malfunctioning of the CT scanner. Specifically, we had a halt of our study procedures due to the breakdown of contrast injector for the CT scanner at Nsambya Hospital on April 5, 2021 and the COVID-19 epidemic which saw the country go into lock down. Study procedures were restarted on August 20, 2021 with COVID-19 precautions in place and only fully vaccinated staff then, had in-person interactions with participants.

## Focus (Major Activities) for 2022

To continue recruitment and completion of study procedures for the remaining 9 participants at the Mbarara site and 258 at Kabwohe site, with a goal to recruit 8-10 participants per week to complete our main goal of recruiting a total of 600 participants during the planned enrollment period.

## Conferences Submission

None

## Publications

Publications are underway



*Aging/CAD Study Team. Photo credits: Rhina Mushagara*

## Population Effectiveness of Dolutegravir Implementation in Sub-Saharan Africa: A Prospective Observational Cohort Study (DISCO)

### Investigators

Dr. Suzanne McCluskey, Dr. Winnie Muyindike, Dr. Mark Siedner

### Team Members

Victoria Nanfuka (Research Assistant/Coordinator), Nimusiima Komukama (Senior Research Assistant), Kansiime Lydia (Research Assistant), Ian Barigye (Research Assistant), Daniel Omoding (Laboratory Technologist), and Tumusiime Justus (Data manager)

### Study Duration

2019-2023

### Study Description

DISCO is a prospective observational cohort study at three government-supported HIV clinics in rural South Africa and Uganda. We enrolled 500 adults living with HIV in Uganda who were switched from first-line antiretroviral therapy (ART) containing non-nucleoside reverse transcriptase inhibitors (NNRTIs) to TLD (Phase 1) and we will enroll 385 ART-naïve participants who are initiating ART with TLD (Phase 2). We follow participants for one year with study visits at enrollment, 24 weeks, and 48 weeks. Study procedures include interviews, anthropomorphic measurements, chart review, and collection of blood and urine specimens for testing, including viral load, drug resistance testing, antiretroviral drug level testing, and tests to evaluate the effects of TLD on renal, liver, metabolic, and other organ function.

The aims of the study are 1) to determine the contribution of drug resistance prior to TLD initiation on risk of treatment failure and 2) to explore the use of pharmacologic measures of adherence to distinguish virologic failure on TLD due to poor adherence versus due to drug resistance.

### **Major Milestones for the Study**

We launched our study on 14th May 2019, and started enrolling for phase 2 in February 2021

Completed our 24-week data analysis

48-week analysis on going

### **Plans**

Got IRB approval to expand to another site (MMC) to boost our recruitment numbers for phase 2.

Planning to do one extra visit for the phase1 participants.

### **Challenges**

Missed some participants follow-up visits during the lockdown due to COVID related transport restrictions.

Slow recruitment for Phase 2 participants.



*DISCO Study Team. Photo credits: Victoria Nanfuka*

## **Caesarean Delivery in Uganda: A Mixed Methods Study (CRADLING)**

### **Principal Investigators**

Henry Mark Lugobe, MBChB, M.Med, Mbarara University of Science and Technology

Adeline Boatin, MD MPH, Massachusetts General Hospital/Harvard University

### **Co-investigators**

Joseph Ngonzi, MBChB, M.Med, Mbarara University of Science and Technology

Kayondo Musa, MBChB, M.Med Mbarara University of Science and Technology

Onesmus Byamukama, MBChB, Mbarara University of Science and Technology

Leevan Tibaijuka, MBChB, M.Med Mbarara University of Science and Technology

Isioma Okolo, MBChB, MRCOG, DTMH, Program for global surgery and social change/Harvard

Deen Garba, Program for global surgery and social change/Harvard

Lina Roa, MD, Program for global surgery and social change/Harvard

Paola Del Cueto, MD Massachusetts General Hospital

## **Project Coordinator**

Alan Babweteera

## **Data Manager**

Praise Tindiweegi

## **Regional Referral Hospital Supervisors and Research Assistants**

Fort Portal RRH: Dr Twizerimana Hillary RA Acayo Gladys, Gulu RRH: Dr Arwinyo Baifa RA Nayalyn Akech, Jinja RRH: Namala Angella Clare RA Nabukalu Robinah. Kabale RRH: Dr Aheisibwe Hillary RA Katusiime Gladys, Lira RRH Dr Okello James RA Betty Apio, Lubaga RRH Dr Daphne Kibanda RA Namukasa Resty, Masaka RRH: Dr Jjuko Mark RA Tageya Sofie, Mbale RRH: Khaweka Emma RA Matuka Edith, Mbarara RRH: RA Lydia Nyiraguirwa, Mengo RRH: Dr Richard Billy Ndiwalana RA Christine Kiggundu, Nagulu RRH: Dr Wanyama John RA Mukoka Anet, Nsambya RRH: Dr Hope Sandra RA Dyabe Susan, Lacor RRH: Dr Sande Ojara RA Acayo Judith, Hoima RRH: Dr Mutudha Augustine RA Oroma Maria Collin

## **Objectives**

Overall goal is to determine the contribution of patient, provider and facility characteristics to variation of CD rates and maternal and perinatal outcomes at RRHs in Uganda.

Aim 1: To use survey methods to explore practice patterns of clinicians around caesarean usage in Uganda

Aim 2: To explore clinician decision-making around mode of delivery at RRHs in Uganda

Aim 3: To determine the contribution of patient, provider and hospital characteristics to variation in caesarean delivery rates across Regional Referral Hospitals and large private non-profit hospitals in Uganda

## **Stage of Progress on Data Collection for CRADLING per RRH**

**Aim 1:** This aim involved a survey approach involving caesarean section providers in Uganda. An online survey was sent out to obstetricians, residents, medical doctors and midwives practising in Uganda. This phase of the study was completed with 430 surveys collected; 430 responses (287 included in data analysis; 143 excluded due to incompleteness or concerns about the validity of response)

**Aim 2:** This aim involves qualitative interviews for stakeholders involved in the provision of caesarean section services. These included the doctors, hospital administrators and midwives. To date 19 interviews have been collected.

**Aim 3:** This aim involves primary data collection using medical record review across all regional referral hospitals and private non-for-profit hospitals in Uganda for the periods of May to July 2021. We have a total of 14 hospitals recruited and actively collecting data. Thus far we have achieved data collection on 5579 births across the 14 hospitals with data collection still ongoing and anticipated to be completed by December 2021.

## **Challenges**

Missing files from records department at study hospitals, duplicated inpatient numbers and documentation gaps Four of our staff suffered from COVID 19

Unstable internet at the time of uploading data to the server on the side of Research Assistant.

## **Publications**

The following abstracts have been presented from this work:

Caesarean Delivery Variation Across Facilities in Uganda, presented at Society for Maternal Fetal Medicine Conference, January 2021

## **The following abstracts have been submitted:**

Attitudes of Ugandan Clinicians around Mode of Delivery - submitted to American Congress of Surgeons Academic Meeting

Awareness and Utility of Robson's Criteria amongst Medical Doctors working Obstetrics & Gynaecology in Uganda – submitted to 16th Annual Scientific Conference of Association of Obstetricians & Gynaecologists in Uganda.

Finances, Litigation and What else? Comparing Drivers of Caesarean Delivery amongst Doctors working in Public vs Private Facilities in Uganda- submitted to 16th Annual Scientific Conference of Association of Obstetricians & Gynaecologists in Uganda

Additional abstracts/manuscripts are being prepared for local and international conferences.



Study Staff (L-R) starting with top row. Adeline B, Isioma O, Praise T, Noor B, Leevan T, Mark HL, Deen G and Alan B. **Photo credits: Alan Babweteera**

## Inflammation, Social Networks, and Depression in Rural Uganda (HopeNet)

**Sponsor:** NIH, Paiko Foundation **Study Duration:** 11 years. **Current Year:** 10th

### Investigators

Dr. Benard Kakuhikire, Dr. Alexander Tsai

### Team Members

Allen Kiconco (RA), Betty Namara Elizabeth (RA), Gumisiriza Patrick (RA), Justus Kananura (Lead RA), Kyokunda Viola (RA), Mercy Juliet (RA), Patience Ayebare (Administrator), Phionah Ahereza (RA), Patrick Lukwago (Driver), Charles Baguma (Program Manager), Matte Michael (Data Manager)

### Synopsis

This study, formerly titled, “Health Outcomes, Progressive Entrepreneurship, and Networks” is a longitudinal, population-based study that aims to measure the health, economic, and social impacts of clean water and microenterprise interventions at the individual, household, and social network levels in Nyakabare Parish, Rwampara District, Uganda. It targets approximately 1,900 adults for each biennial survey since 2012. Since its inception, HopeNet has been funded by NIH K23MH106362 and the Paiko Foundation. A sub-component of the HopeNet study, funded by NIH R01MH113494 under the title, “Social Networks, HIV Stigma, and the HIV Care Cascade in Rural Uganda” aims to measure the causal effects of a) injunctive norms on negative attitudes toward people living with HIV (PLWH), and b) HIV stigma on outcomes relevant to HIV prevention and treatment. Additional funding is from NIH R01MH125667.

The longitudinal survey conducted biennially measures key socio-economic variables including economic status, water and food security, self-reported physical and mental health, substance use, domestic violence, community norms, social networks, and collects biomarkers through biennial health fairs to supplement self-report survey data. The results from these surveys have contributed to the development and validation of several tools for use in south-western Uganda.

We successfully surveyed 1,635/2,000 targeted study participants for the third biennial survey that was concluded early this year. We have so far surveyed 1,071/ 2,000 targeted study participants for the fourth biennial survey through phone-based interviews.

We continued running biomarker lab tests with blood samples collected during the 2015, 2017, and 2019 health fairs: lipid panels at Lancet Labs and CRP, TNF-alpha, IL-1b, and IL-6 tests at IDI in Kampala. These tests are now complete, and we are currently analyzing the data.

As a result of physical contact limitations due to COVID-19 in Uganda, we could not implement the 4th biennial health fair/medical camp (to screen community members for communicable and non-communicable diseases, refer them to care, and to conduct rapid biomarker data collection from the study cohort). We hope to implement the health fair in

later 2022 if COVID-19 vaccination targets for Uganda are achieved. Adding COVID-19 vaccination could be another possibility for this health fair.

### Publications in 2021

Tsai AC, Kakuhikire B, Perkins JM, Downey JM, Baguma C, Satinsky EN, Gumisiriza P, Kananura J, Bangsberg DR. Normative vs. personal attitudes toward persons with HIV, and the mediating role of perceived HIV stigma in rural Uganda. *J Glob Health*. 2021 Sep 15;11:04956.

Jurinsky J, Perkins JM, Kakuhikire B, Nyakato V, Baguma C, Ahereza P, Kananura J, Rasmussen JD, Satinsky EN, Audet CM, Bangsberg DR, Tsai AC. Ease of marital communication and depressive symptom severity among men and women in rural Uganda: cross-sectional, whole-population study. *Soc Psychiatry Psychiatr Epidemiol*. 2021 Aug;10.1007/s00127-021-02135-4.

Kakuhikire B, Satinsky EN, Baguma C, Rasmussen JD, Perkins JM, Gumisiriza P, Juliet M, Ayebare P, Burns BFO, Mushavi R, Evans CQ, Siedner MJ, Bangsberg DR, Tsai AC. Correlates of attendance at community engagement meetings held in advance of bio-behavioral research studies: A longitudinal, sociocentric social network study in rural Uganda. *PLoS Med*. 2021 Jul;18(7):e1003705.

Kim AW, Kakuhikire B, Baguma C, North CM, Satinsky EN, Perkins JM, Ayebare P, Kiconco A, Namara EB, Bangsberg DR, Siedner MJ, Tsai AC. Adverse childhood experiences and adult cardiovascular disease outcomes: cross-sectional, pop-ulation-based study of adults in rural Uganda. *J Glob Health*. 2021 Jul;11:04035.

Perkins JM, Kakuhikire B, Baguma C, Jurinsky J, Rasmussen JD, Satinsky EN, Namara EB, Ahereza P, Kyokunda V, Perkins HW, Hahn JA, Bangsberg DR, Tsai AC. Overestimation of alcohol consumption norms as a driver of frequent and heavy alcohol consumption: a whole-population network study of men across eight villages in rural, southwestern Uganda. *Addiction*. 2021 Jun;10.1111/add.15615.

Satinsky EN, Kakuhikire B, Baguma C, Rasmussen JD, Ashaba S, Cooper-Vince CE, Perkins JM, Kiconco A, Namara EB, Bangsberg DR, Tsai AC. Adverse childhood experiences, adult depression, and suicidal ideation in rural Uganda: A cross-sectional, population-based study. *PLoS Med*. 2021 May;18(5).



Study staff L-R, starting with top row: Alexander T, Allen K, Betty N, Bernard K, Patience A, Patrick G, Lukwago P, Mercy J, Emily S, Photo credits: Charles Baguma Michael M, Jessica P, Phionah A, Justus K, Charles B

## Transition Readiness Among Adolescents Living with HIV in Uganda (Transition Readiness)

Sponsor: NIH grant # 5P30AI060354

### Investigators

Dr. Scholastica Ashaba, Dr. Rajesh Gandhi

### Team Members

Charles Baguma (PC), Gabriel Nuwagaba, Arnold Kamugisha, and Patricia Tushemereirwe

### Esether Synopsis

Adolescents and young adults living with HIV (AYLHIV) should be transitioned from pediatric into adult HIV care for age and developmentally appropriate care to maximize life-long term functioning. AYLHIV often fail to transition smoothly to adult care due to inadequate preparedness and this elevates their risks of disengagement from care and loss to follow up, worsened immunological outcomes and increased mortality. Assessment of transition readiness should be the first step, but HIV care centers in sub-Saharan Africa generally do not undertake these assessments due to lack of validated scales for assessing transition readiness. This study is being conducted among AYLHIV aged 15-24 years, care givers and health care providers to develop and validate a transition readiness scale for use among perinatally-infected ALHIV in Uganda. The study main objectives are 1) To use qualitative methods to elaborate a conceptual model of transition readiness for perinatally-infected ALHIV in Mbarara, Uganda (n=50 in-depth interviews. 30 AYLHIV, 10 caregivers, and 10 health care providers) and 2) To develop and validate a transition readiness scale for perinatally-infected ALHIV in Mbarara, Uganda (n=300 structured interviews with perinatally infected ALHIV).

### 2021 Achievements

For aim 1, all planned fifty (50) in-depth interviews among adolescents living with HIV, their caregivers, and health care providers to elaborate a conceptual model of transition readiness for perinatally-infected Adolescents Living with HIV (ALHIV) in Mbarara, Uganda have been completed, transcribed, coded, and analyzed. Two manuscripts on “Perspectives about transition readiness among perinatally infected adolescents and young people living with HIV in rural, southwestern Uganda” and the other on “Challenges faced by adolescents and young people living with HIV during transition from pediatric to adult HIV care in south-western Uganda” are being finalized for publication in peer re-viewed Journals

For Aim 2, we have developed the transition readiness scale and conducted 238/300 interviews to validate the scale. **Next Steps**

To complete interviews by end of November 2021, analyze the data and prepare manuscripts from the quantitative data for publication in peer reviewed journals.

### Challenges

As a result of the second lock down in Uganda in July 2021 due to COVID-19, data collection was halted. We were granted 6 months no cost extension period to complete study activities



L-R: Dr. Scholastica Ashaba (PI), Gabriel, Charles, Arnold, & Patricia. Photo credits: Charles Baguma

## Self Management Among Adolescents Living with HIV in Uganda

Sponsor: NIH grant # K43TW011929

### Investigators

Dr. Scholastica Ashaba, Dr. Alexander Tsai

### Team Members

Charles Baguma (PC), Patricia Tushemereirwe Esether, Keith Asiime

## Synopsis

Aimed at developing a self-management intervention for ALHIV transitioning to adult HIVcare and test the impacts of the intervention on HIV outcomes. The study has three aims: To conduct qualitative research to elaborate a conceptual framework of the barriers faced by ALHIV transitioning to adult HIV care in Uganda (Aim 1), develop a self-management intervention that will enable ALHIV to successfully transition to adult HIV care (Aim 2), and assess feasibility, acceptability, and preliminary effects of the self-management intervention on HIV outcomes for ALHIV transitioning to adult HIV care.

## 2021 Achievements

For aim 1, 10/60 in-depth interviews among adolescents living with HIV have been completed. Transcription and transcript review ongoing to refine the interview guide.

For Aim 2 & 3, no progress to report.

## Next Steps

To complete data collection for aim 1, analyze the data and prepare manuscripts from the data for publication in peer reviewed journals.

## Challenges

None to report



L-R: Dr. Scholastica Ashaba (PI), Charles, Patricia. *Photo credits: Charles Baguma*

## Placentas, Antibodies and Child Outcomes (PACO)

### Investigators

Drs Lisa Bebell, Joseph Ngonzi, Stephen Asimwe (PIS)

Drs Julian Adong Adeline Boatin and Leevan Tibajuka(CO-PIS)

### Study Coordinators

Patricia Kyosiimire (Coordinator Mbarara site)

Edna Tindibwebwa (Coordinator KCRC site)

### Research Nurses/Research Assistants

Masika Shanura, Nnaiga Patience, Ritah Namugumya, Mercy Nasasira, Emmanuel Ategeka, Kusasira Anitah, Betty Agaba, Ruth Tusingwire, Shine Amanyana, Ninsiima Consolet, Angela Tusiime, Mackline Twikirize', Donam Nuwabimanya, Alex Ahabwe

### Lab Staff

Kumureeba Lauben (Mbarara), Yona Mbalibulha (Mbarara), Benard (KCRC)

### Objectives

Compare the prevalence of a composite outcome of one or more inflammatory placental abnormalities by maternal HIV serostatus and PREP use.

Determine the correlates of inflammatory placental abnormalities among women living with HIV, including maternal systematic factors(CD4 count,ART regimen, CMV viremia) and placental factors (detectable placental HIV and placental infections, e.g CMV,Malaria, mycoplasma and ureaplasma).

Determine whether the placenta acts as a mediator of the association between maternal HIV infection and (i) Infant hospitalization or death, or 2. Quantity of tranplacental streptococcus pneumoniae and Haemophilus influenza type

B(HiB) antibody transfer among WLWH.

Define the sensorineural hearing loss in neonates and infants.

### **Achievements**

Study participant enrolment commenced in December 2019

Total study enrolments stands at 514 participants( inclusive of those already delivered their babies, mother still pregnant and being monitored at their ANC visits until they come to deliver with the study) Study follow up of participants well on going

Three mothers who have completed the study procedures of follow up at two years 3 months follow up visits completed at 75% 6 months follow up visits-91%

9 months follow up-77%

12 months at -89%

15 months follow up visits at- 79%

18 months -65%

21 months stands at 68%

PACO Study managed to be one of the studies that participated in the GHC annual dissemination this year 2021 at Igongo

### **Planned Activities**

To continue study enrolment until January 2021

Some staffs contracts ending in April 2021

Follow up of participants until the last participant makes two years in the study.

To continue internal staff trainings/refresher trainings

### **Challenges Faced in 2021**

Slow enrolments due to covid-19 when the study activities were halted in June 2021 to August 2021.

Follow visits were also missed due to covid 19 pandemic

Participants have shifted from and has led to most missed visits



*PACO Kabwohe study team. Photo Credits: Musoke Lawrence*

## **Wireless Physiologic Monitoring in Postpartum Women (WIMS)**

### **Investigators**

Drs. Adeline Boatin & Joseph Ngonzi(PIS); Dr Lisa Bebell( Co-Pi)

### **Study Coordinator**

Patricia Kyosiimire

### **Research Nurses/Research Assistants**

Masika Shanura, Nnaiga Patience, Ritah Namugumya, Mercy Nasasira, Emmanuel Ategeka, Kusasira Anitah, Betty Agaba, Ruth Tusingwire, Shine Amanyanya, Mercy Aturinde, Moonlight Sheilla

### **Objectives**

To Estimate the clinical effectiveness of wireless physiologic monitoring of women in the first 24 hours after Caesarean delivery at Mbarara Regional Referral Hospital (MRRH)

To evaluate the clinical adoption of wireless physiologic monitoring at MRRH using an implementation science approach.

To use qualitative methods to explore clinical adoption by doctors and acceptability of wireless physiologic monitoring among postpartum women at MRRH and understand facilitators and barriers to uptake of wireless physiologic monitoring.

To estimate the cost of providing wireless physiologic monitoring of women in the first 24 hours after caesarean delivery at MRRH.

### **Achievements**

Study participant enrolment commenced in December 2019

Total study enrolments in intervention Block -959

Total enrolments in control block-1757

Study managed to be one of the studies that participated in the GHC annual dissemination this year 2021 at Igongo

### **Planned Activities**

To continue study enrolment until January 2021

Some staffs contracts ending in 28TH February 2021

Continue making phone calls to mothers who are discharged

To continue internal staff trainings/refreshers trainings

### **Challenges**

Slow enrolments due to covid-19 when the study activities were halted in June 2021 to August 2021. Lock down measures and curfews affected staff movements to get to work

Long awaiting constructions/renovations of maternity ward also affected the study enrolments

## **Optimizing Adherence through Implementation Science (OASIS)**

### **Investigators**

Dr. Stephen Asimwe, Dr. Jessica Haberer, Dr. Denis Nansera

### **Team Members**

Edna Tindimwebwa (PC), Lindsey Garrison, Robert Baijuka, John Bosco Tumuhairwe, Lawrence Musoke

### **Objectives**

High and sustained adherence is critical for achieving the individual and public health benefits of HIV antiretroviral therapy (ART). Electronic adherence monitors provide a detailed understanding of adherence and enable real-time interventions. Research has shown the benefit of these monitors and low-cost models have recently become available; however, their use to date has largely been confined to the research context.

This study is an implementation science-driven assessment of strategies to improve uptake of electronic adherence monitoring and associated interventions for routine, clinical delivery of ART in Uganda. The study consists of two aims. In Aim 1, we will conduct multi-level formative interviews to design a preliminary implementation strategy. In Aim 2, we will use an iterative approach to optimize the implementation strategy. All work will be guided by the Consolidated Framework for Research Implementation.

The electronic adherence monitors to be assessed in this study are pill bottles that record each opening as a proxy for pill taking behavior. They provide day-to-day information about adherence that can be used to provide informed

counseling at clinic visits, as well as SMS reminders and notifications for missed or late doses.

**Aim 1.** Define a preliminary implementation strategy for real-time electronic adherence monitoring plus associated interventions for routine HIV clinical care in Uganda. We will recruit up to 35 health care administrators and clinicians from various levels of the Ugandan health care system (Health Center IV to the national hospital level), as well as 15 individuals taking ART at the KCRC. We will conduct individual, in depth qualitative interviews to define a preliminary implementation strategy for these electronic adherence monitors to be used in routine HIV clinical care.

**Aim 2.** Deploy and optimize an implementation strategy for real-time electronic ART adherence monitoring plus associated interventions in routine HIV clinical care in Uganda. Iteration 1, we will deploy the electronic adherence monitors and associated interventions per the strategy identified in Aim 1 among 30 individuals taking ART at the KCRC. We will monitor their adherence for 3 months, during which time we will quantify multiple metrics of the deployment. We will review these metrics with the same health care administrators and clinicians from Aim 1, as well as up to 15 individuals who used the adherence monitors in the Aim 2 deployment. We will then interview both groups to develop an improved implementation strategy for deployment in a second iteration. Iteration 2, we will utilize the revised implementation strategy to deploy the electronic adherence monitors and associated interventions among a new cohort of 30 individuals taking ART at the Kabwohe Health Centre IV. We will then repeat the assessment of the implementation strategy with the same health care administrators and clinicians from Aims 1 and 2 (iteration 1), as well as up to 15 individuals who used the adherence monitors in the Aim 2 (iteration 2) deployment. We will conclude the study with recommendations for wide-scale uptake of this technology in routine HIV clinical care.

### Progress

Since the last review, we implemented the evriMED device with 26 clients who take ART at Kabwohe HC IV. We completed three months of follow up with 25 participants, with one participant lost to follow-up. We're now working on data analysis from the most recent iteration. We are also preparing to implement the evriMED device among adolescents at the ISS clinic at MRRH.

### Publications

Our paper, Factors affecting the implementation of electronic antiretroviral therapy adherence monitoring and associated interventions for routine HIV care in Uganda: A qualitative study, was published in the Journal of Medical Internet Research.



OASIS Team. Left picture, from L Stephen Asiimwe, Edna Tindimwebwa, Lindsey Garrison, Robert Baijuka, John Bosco Tumuhairwe, Lawrence Musoke. Right picture: Jessica Haberer (center). **Photo credits: Edna Tindimwebwa**

## Resistance Testing versus Adherence Support for Management of Patients with Virologic Failure on First-Line Antiretroviral Therapy in Sub-Saharan Africa (REVAMP)

### Background

The REVAMP study was an open label, randomized controlled trial. The study was conducted at study sites in Uganda and South Africa. The study enrolled people living with HIV on first-line antiretroviral therapy, who were failing treatment with a recent viral load >1,000 copies/milliliter (mL). Eligible participants were randomized to the WHO-based standard of care for management of virologic failure or immediate resistance testing with use of results to guide ART regimen decisions. The primary outcome of interest was viral suppression (<200 copies/mL) at 9 months after study enrollment and was assessed using an intention to treat analysis, where missing or absent results were considered failures. Secondary outcomes of interest were viral suppression below the limit of assay detection, viral

suppression on continuation of first line (non-nucleoside reverse transcriptase inhibitor [NNRTI]-based) therapy, drug resistance at study conclusion, and mortality, among others. The overarching goal of this study was to determine whether addition of routine resistance testing, to guide management of virologic failure and sustain the successful completion of the HIV continuum of care, improves clinical outcomes and reduces costs for patients with virologic failure on first-line therapy in sub-Saharan Africa.

### **Objectives**

We collected data to accomplish the following aims:

**Aim 1:** Estimate the effectiveness of resistance testing-based management of virologic failure (resistance testing arm), versus viral-load based management per WHO guidelines (standard of care arm). We hypothesized that resistance testing-based management will be superior to standard of care management measured by the proportion of patients with undetectable viral load 9 months after detection of virologic failure.

**Aim 2:** Evaluate the cost effectiveness of resistance-testing versus viral load-based management of virologic failure in sub-Saharan Africa. We hypothesized that resistance testing will be cost effective, because the cost of the assay will be offset by downstream cost savings through reduced use of second line therapy.

### **Accomplishments and Study Results**

The study was completed in 2020. Primary findings are summarized in the following abstract.

#### **Background**

HIV virologic failure predicts the development of drug resistance and mortality. Genotypic resistance testing, which is standard of care after virologic failure in high-income settings, is rarely implemented in sub-Saharan Africa.

#### **Objective**

To estimate the effectiveness of genotypic resistance testing to improve virologic suppression rates among people with HIV failing first-line therapy in sub-Saharan Africa.

#### **Design**

Pragmatic, unblinded, randomized-controlled trial (NCT02787499).

#### **Setting**

Public sector ambulatory HIV clinics in Uganda and South Africa.

#### **Patients**

We enrolled adults on first-line antiretroviral therapy with a recent HIV RNA >1,000 copies/milliliter.

#### **Intervention**

We randomly assigned participants to receive standard of care (SOC arm), including adherence counseling sessions and repeat viral load testing, or immediate genotypic resistance testing (GRT arm).

#### **Measurements**

Our primary outcome of interest was achievement of an HIV RNA <200 copies/milliliter nine months after enrollment.

#### **Results**

We enrolled 840 individuals, divided equally between countries. Approximately half (51%) were women. Most (73%) were enrolled on a regimen of tenofovir, emtricitabine, and efavirenz. We found no difference in the rate of virologic suppression nine months after enrollment between the GRT (63%, 263/417) and SOC arms (61%, 256/423, OR 1.11, 95%CI 0.83-1.49, P=0.46). Among participants with persistent failure at nine months, the prevalence of drug resistance was higher in the SOC arm (76% [78/103] versus 58% [48/82], OR 2.30, 95%CI 1.22 to 4.35, P=0.014). Other secondary outcomes, including nine-month survival and retention in care, were similar between arms.

#### **Limitations**

The majority of participants were taking non-nucleoside reverse transcriptase inhibitor-based therapy at enrollment, limiting generalizability of our findings.

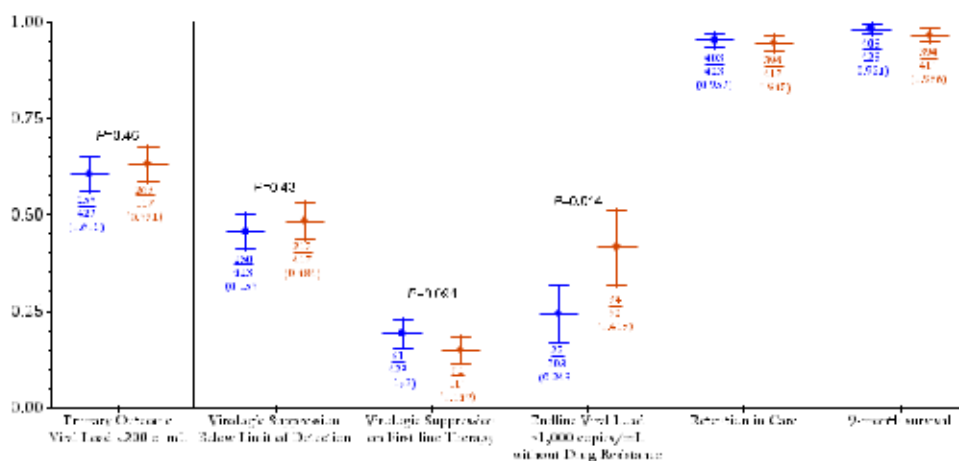
#### **Conclusions**

The addition of genotypic resistance testing to routine care after first-line virologic failure in Uganda and South Africa

did not improve rates of re-suppression.

| Characteristic  | Total Cohort (n=840) | Standard of Care Arm (n=423) | Genotypic Resistance Testing Arm (n=417) |
|---|----------------------|------------------------------|--|
| Sex – no. (%)   |                      |                              |  |
| Female  | 430 (51%)            | 221 (53%)                    | 209 (50%)                                |
| Male  | 410 (49%)            | 202 (48%)                    | 208 (50%)                                |
| Pregnancy – no. (%)                                       |                      |                              |  |
| Pregnant at enrollment                                    | 13 (2%)              | 7 (2%)                       | 6 (1%)                                   |
| Not pregnant at enrollment                                | 827 (98%)            | 416 (98%)                    | 411 (99%)                                |
| Median age – (IQR)  | 37 (31-45)           | 37 (31-45)                   | 37 (30-44)                               |
| Country – no. (%)   |                      |                              |  |
| Uganda  | 420 (50%)            | 210 (50%)                    | 210 (50%)                                |
| South Africa  | 420 (50%)            | 213 (50%)                    | 207 (50%)                                |
| Median ART duration (IQR) – yr                            | 3.2 (1.1-6.4)        | 3.5 (1.1-6.5)                | 3.0 (1.1-6.4)                            |
| Median CD4 count (IQR) – 10 <sup>9</sup> cells/L          | 0.281 (0.121-0.457)  | 0.303 (0.132-0.475)          | 0.259 (0.112-0.434)                      |
| ART regimen – no. (%)                                     |                      |                              |  |
| TDF/3(F)TC/EFV  | 606 (72%)            | 311 (75%)                    | 295 (71%)                                |
| AZT/3TC/NVP   | 118 (14%)            | 60 (14%)                     | 58 (14%)                                 |
| Other   | 116 (14%)            | 52 (12%)                     | 64 (15%)                                 |
| Self-reported treatment adherence at enrollment – no. (%) |                      |                              |  |
| <100% in prior 30 days                                    | 592 (70%)            | 297 (70%)                    | 295 (71%)                                |
| 100% in prior 30 days                                     | 248 (30%)            | 126 (30%)                    | 122 (29%)                                |

ART: antiretroviral therapy; TDF: tenofovir; 3(F)TC: lamivudine or emtricitabine; EFV: efavirenz; AZT: zidovudine; NVP: nevirapine; IQR: interquartile range



**Figure.** Primary and secondary outcomes by study arm. Proportion of participants achieving primary and secondary outcomes in the standard of care (blue boxes) and resistance testing arms (orange boxes). Error bars represent 95% confidence intervals and were calculated using stratum-level frequency weighting, analogous to estimation of the Cochran-Mantel-Haenszel test statistic. P-values were estimated using conditional

The primary results were presented at the 2021 Conference on Retroviruses and Opportunistic Infections, at the 2021 International Workshop on HIV Drug Resistance, and recently accepted for publication in the Annals of Internal Medicine. In addition, we have disseminated study results to key stakeholders in Uganda. Including the following meetings:

**(A) Participants Dissemination**

Conference Date: 20th May 2021

Attendees: Participants, GHC core staff, CAB representatives and IRB representative

**(B) Hospital and Clinic Partner Dissemination Conference:**

Date: 05th May 2021

Attendees: ISS clinic staff, JCRC Mbarara site staff, GHC staff, Heads of departments and Internal medicine students

**(C) Key Stakeholders Conference**

Date: 26th May 2021

Attendees: MUST leadership, Heads of Departments Faculty of medicine, GHC core team and study coordi

nators, Epicenter, Central public health lab, JCRC, Uganda Virus Institute, TASO, Uganda AIDS commission, Uganda Information Centre, MUST IRC, UNCST, Ministry of Health and MUST Grants office

#### **(D) US Centers for Disease Control and PEPFAR Uganda**

**Office Date:** Friday, 11th June

**Attendees:** Over 100 participants from US State Department and PEPFAR Branch in Kampala and across Uganda were in attendance

#### **Significance**

The increased availability of viral load testing has resulted in sizeable increases in identification of virologic failure in sub-Saharan Africa. Without resistance testing, patients with treatment failure are switched to second-line therapy based on WHO guidelines, with unclear consequences for patients and health systems. As PEPFAR and Ministries of Health shift their focus to sustainable control of the HIV epidemic, it is crucial to determine the efficacy and costs of the current standard of care compared to a resistance-based testing approach for management of treatment failure.

This was the first study in sub-Saharan Africa to robustly evaluate the implementation of resistance testing to optimize management of virologic failure. Owing to high costs and unclear effectiveness, HIV drug-resistance testing is not currently part of routine clinical care in most of sub-Saharan Africa.

#### **Challenges**

COVID 19 pandemic remains a challenge in running study activities. Fortunately, the study has been closed for almost a year, so no further participant interactions are required. The study staff are following research collaboration and government SOPs to remain safe and execute remaining quality control and regulatory duties.

#### **Plans**

We will conclude analysis of our primary and secondary outcomes for the clinical trial, and undertake economic modeling and cost-effectiveness analyses to complete our study aims in the next year.

#### **Infrastructure and Development**

This clinical trial aimed to assess routine resistance testing as part of clinical care in public HIV testing facilities in Uganda and South Africa. As part of this effort, Drs. Mark Siedner and Kevin Ard, investigators on the study, have conducted clinical training on the rationale, biology, interpretation, and response to HIV resistance results. The trainings were performed for clinical officers and doctors in both Mbarara, Uganda and Durban, South Africa. A refresher training on HIV resistance was provided to the clinic in Uganda by Dr. Suzanne McCluskey in February 2019, and Dr. Mark Siedner presented a lecture on HIV Drug Resistance and use of Dolutegravir at both the Annual Workshop on Advanced Clinical Care in Durban and at the 27th International Workshop on HIV Resistance and presented on clinical management of complex drug resistance in resource limited settings at the International HIV Drug Resistance Conference in Johannesburg in October, 2019.

In addition to the counselors being supported, the study supported staff to work at the clinic during the COVID epidemic and has been supporting the costs of laboratory testing for the clinic.

Finally, the REVAMP study is also being used a platform for research for junior investigators. Dr. Suzanne McCluskey, a post-doctoral fellow at Massachusetts General Hospital was awarded a K23 award focusing on HIV drug resistance and treatment outcomes in Uganda and South Africa, and Dr. Henry Sunpath has been accepted as a PhD candidate with a research focus on health systems strengthening after HIV virologic failure in South Africa, which incorporates data from the REVAMP study.

#### **Publications to Date**

1: Sunpath H, Pillay S, Hatlen T, Murphy RA, Marconi VC, Moosa MS, Naidoo K, Siedner MJ. A nurse-led intervention to improve management of virological failure in public sector HIV clinics in Durban, South Africa: A pre- and post-implementation evaluation. *S Afr Med J*. 2021 Mar 31;111(4):299-303. doi: 10.7196/SAMJ.2021.v111i4.15432. PMID: 33944759; PMCID: PMC8100970.

2: Sunpath H, Hatlen TJ, Moosa MS, Murphy RA, Siedner M, Naidoo K. Urgent need to improve programmatic management of patients with HIV failing first-line antiretroviral therapy. *Public Health Action*. 2020 Dec 21;10(4):163-168. doi: 10.5588/pha.20.0052. PMID: 33437682; PMCID: PMC7790490.

3: Rautenberg TA, George G, Bwana MB, Moosa MS, Pillay S, McCluskey SM, Aturinda I, Ard K, Muyindike W, Moodley

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4: Sunpath H, Hatlen TJ, Naidu KK, Msimango P, Adams RN, Moosa MS, Marconi VC, Murphy RA, Gandhi RT, Pillay S, Siedner M, Naidoo K. Targeting the third '90': introducing the viral load champion. *Public Health Action.* 2018 Dec 21;8(4):225-231. doi: 10.5588/pha.18.0063. PMID: 30775284; PMCID: PMC6361489.

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REVAMP study team. *Photo credits: Isaac Aturinda*

## Alcohol Drinkers' Exposure to Preventive Therapy for Tuberculosis (ADEPTT)

### Investigators

Prof. Judith Hahn, Dr. Winnie Muyindike

### Project Director

Nneka Emenyonu

### Team Members

Christine Ngabirano, Adah Tumwegamire, Yona Mbalibulha, and Caroline Asimwe

### Summary

Tuberculosis (TB) infection is extremely common (30% worldwide prevalence) and is the leading cause of mortality in persons with HIV. Heavy alcohol drinkers are at a 3-fold greater risk for active TB compared to others; thus, HIV-infected alcohol users should be prioritized for TB prevention. TB preventive therapy decreases both all-cause mortality and active TB in persons with HIV by 30-50% above and beyond the benefits of antiretroviral therapy (ART) alone.

The Alcohol Drinkers' Exposure to Preventive Therapy for Tuberculosis (ADEPTT) study aims to assess toxicity and adherence to Isoniazid Preventive Therapy (IPT) and determine whether the benefits of TB preventive therapy outweigh its risks when given to TB/HIV-infected drinkers. The study concluded enrollment in January 2020 with 302 participants, including 155 females and 147 males. Of these, 200 are current alcohol drinkers and 102 are alcohol abstainers. To achieve our enrollment, we screened 1,434 patients from the Mbarara ISS Clinic, of whom 1,312 consented for further screening for latent TB. Out of 1,192 PPD placements completed, 308 (26%) participants had positive results for latent TB and were eligible for the study, and 302 were enrolled. All data collection for the ADEPTT Main study ended on April 1, 2021.

The recent outbreak of COVID 19 presented an opportunity for us to apply for an administrative supplement grant and study the role of the COVID 19 pandemic on alcohol consumption and health in a subset (125) of ADEPTT participants who are current drinkers. To date, the ADEPTT COVID supplement sub-study has completed enrollment of the 125 participants with 76 males and 49 females. As of November 30th, 2021, 37% had completed their 6-months follow-up visits. In July 2021, we successfully shipped 142 hair samples and 71 Dried Blood Spots (DBS) for testing ART levels in participants' hair and the amount of alcohol present in their blood respectively.

The ADEPTT COVID supplement study has two years of funding and we are currently in the second year of operation, we have successfully obtained all IRB renewal approvals at all institutions and executed a sub-award agreement with MUST Grants Office. The major focus for 2022 shall be the completion of all follow-up visits, specimen collection and storage, shipment of samples, data cleaning, quality control, data analysis, and writing of more abstracts/manuscripts.

We are excited about the news of our abstract titled "Alcohol Use and Suboptimal Adherence to Isoniazid in Persons with HIV and latent TB" which has been accepted for a poster presentation at the Conference of Retroviruses and opportunistic infections. The MUST principal investigator, Dr. Winnie Muyindike is looking forward to presenting these results at CROI in February 2022.

**We wish you a happy reading of our publications indicated below;**

1. Muyindike WR, Fatch R, Cheng DM, et al. Tuberculin skin test response among HIV-infected alcohol users on antiretrovirals in Uganda. *Alcohol Clin Exp Res*. 2018.
2. Muyindike WR, Fatch R, Cheng DM, et al. Tuberculin skin test positivity among HIV-infected alcohol drinkers on antiretrovirals in south-western Uganda. *PLoS One*. 2020. doi:10.1371/journal.pone.0235261.
3. Freiman, J. M., Fatch, R., Cheng, D., Emenyonu, N., Ngabirano, C., Geadas, C., & Hahn, J. A. (2021). Prevalence of elevated liver transaminases and their relationship with alcohol use in people living with HIV on antiretroviral therapy in Uganda. *PLoS one*, 16(6) e0250368.



*Sorting of DBS samples by the study team. Photo credits: Christine Ngabirano*

## **Mobile technology to extend clinic-based counseling for HIV Positives in Uganda (Extend)**

### **Investigators**

Dr. Winnie Muyindike, Dr. Judith Hahn

### **Director**

Dr. Nneka Emenyonu

### **Study Overview**

The main aims of this R01 are to adapt and test an effective alcohol intervention leveraging phone-based technology to reduce alcohol use and improve HIV outcomes in persons with HIV in Uganda. Alcohol reduction counselling is

most effective when delivered over multiple sessions, thus we used cell phones to deliver multiple booster sessions to supplement in-person counseling. The project had a formative phase in the first two years, which involved qualitative research to adapt the existing intervention and to develop the cell-phone-based components of the intervention. Following the formative work, we conducted a randomized controlled trial to compare the uptake, acceptability, efficacy, and cost in reducing unhealthy alcohol use and increasing viral suppression.

Summarily, this study will adapt a successful intervention and develop low-cost delivery methods that fit in the needs of the target populations while keeping in mind its low resource setting. The pilot RCT results will inform the design of a larger trial of a low-cost intervention to reduce alcohol use and increase viral suppression among those with HIV in SSA.

### **Specific Study Aims and Arms:**

**Aim 1:** To adapt an existing intervention and develop a tailored 2-way automated SMS/IVR-based system for tech booster sessions as part of an intervention to reduce unhealthy alcohol use among persons with HIV in rural Uganda.

**Aim 2:** To estimate the uptake and acceptability, preliminary efficacy, and cost of methods of delivery of an intervention to reduce unhealthy drinking and HIV viral failure in a pilot randomized controlled trial (RCT) among persons in HIV care in rural Uganda (n=270).

The study has 3 arms; (1) in-person alcohol reduction counseling timed with routine clinic visits plus live counselor-delivered phone-based booster calls every 3 weeks between clinic visits-92 randomized (2) in-person counseling timed with routine clinic visits plus twice weekly 2-way tailored mobile phone based booster sessions between clinic visits-90 randomized and (3) the standard of care (SOC, brief unstructured advice, with a wait-listed intervention) as the control arm-91 randomized.

### **Achievements**

In 2019, we completed the formative work to adapt an existing brief alcohol intervention that was successful in reducing alcohol use among women with HIV in Baltimore (Chander G, 2015). The aim of the formative phase of the study was to adapt the content of the existing intervention to make it culturally appropriate, and to obtain input on the delivery of both the clinic-based counseling and the mobile technology components in the context of clinic settings. We concluded enrollment for the formative phase of the study with 107 participants, comprising members of the Community Advisory Board (CAB), HIV clinic clinicians and staff, and alcohol consuming patients. We completed 20 focus group discussions (FGDs), and 16 individual cognitive interviews (ICIs) with enrolled participants as part of AIM

1. Summary notes from the completed FGDs and ICIs were written and transcripts of the FGDs and ICIs were created, coded, and analyzed. To this effect, we published a manuscript summarizing our findings from AIM 1 entitled Adapting an evidence-based brief alcohol intervention to reduce drinking for HIV-positive men and women in western Uganda. Right now, we are in the process of writing 3 additional manuscripts that is; Behavioral and structural interventions for alcohol consumption control in Africa: New ideas for intervention design being led by our Costing expert; 'Lessons learned paper on formative work - focus on alpha and beta testing and general implementation lessons being led by our project director and Tech development paper; being led by our tech development team (ISTREAMS)'

In September this year, we successfully finalized recruitment enrollment and follow up of the RCT (Aim 2) participants. We had an equal balance of our participants randomized across the 3 study arms i.e Live call 91 participants, Tech arm 91 with 62 on IVR and 29 on SMS and 91 on the SOC arm. We successfully exited all the participants in September this year. Data analysis and writing of the main Qualitative and Quantitative papers are in progress.

*Compiled by Project Coordinator: Ms Naomi Sanyu*

*Reviewed by MUST PI: Dr Winnie Muyindike*



EXTEND study team: *Photo credits. Sanyu Naomi*

## Multi-morbidity in Uganda Research Capacity Initiative (MURCI) at Mbarara University of Science and Technology

### Program Faculty

Francis Bajunirwe MS PhD MBBS, Mark Siedner MD MPH, (Program Directors)  
Joel Bazira MD PhD, Conrad Muzoora MD, Simon Rugera MS (MUST Program Faculty)  
Jessica Haberer MD MS, Alex Tsai MD PhD, Patrick Sluss PhD (MGH Faculty)

### Team Members

Keith Asiime CRA (PC), Zahra Reynolds BS (PC)

### Background

The MURCI – a collaborative initiative involving MUST, MGH, and other institutions – aims to strengthen multi-morbidity research capacity among Ugandan junior faculty and institutions.

### Objectives

The MURCI has three Specific Aims:

**AIM 1:** Develop expertise on multi-morbidity for junior faculty in Uganda

**AIM 2:** Train junior faculty to measure determinants and consequences of the regional, social, behavioral and environmental risk factors for multi-morbidity

**AIM 3:** Develop laboratory capacity for translational and clinical research on multi-morbidity

### Achievements

The MURCI grant was awarded on September 1, 2020. We instituted a series of activities that allowed us to begin implementing the grant. Two program oversight committees were constituted: the program leadership committee, and the MURCI core implementation committee. The program leadership committee comprises the two Program Directors, MUST Program Faculty, Project Coordinators, and MGH Faculty. The program leadership committee held a series of planning meetings, developed a five-year work plan for the MURCI, developed selection and scoring guidelines for the MURCI trainees, selected the first cohort of trainees, developed mentorship guidelines, and paired and appointed at least 2 mentors for each MURCI trainee.

Fellow Selection: A call for applications was released on November 25, 2020 and closed on January 15, 2021. As per the advert, the call highlighted 1) the background of the MURCI program, 2) the specific aims, 3) overarching goal and partner institutions, 4) description about the training program, 5) the eligibility criteria, and 6) application requirements which included a four-page research proposal in multi-morbidity, evidence of experience in research, support letter from the respective division head and the candidates proposed mentor, NIH formatted bio sketch, and personal statement.

The program received a total of 24 applications from different disciplines including Internal Medicine, Nursing, Laboratory Medicine, Gynecology and Obstetrics, Microbiology and Public Health among others. The leadership committee developed the scoring criteria and evaluation guidelines similar to NIH grant review processes. On February 25, 2021, the committee held a meeting and 4 successful trainees were selected, 2 of whom are women and 2 are men. The trainees are:

1. **Ritah Kiconco:** She is an Assistant Lecturer of Medical Laboratory Science at Kampala Internationals University and at MUST. She is the departmental Examinations coordinator of medical laboratory science, School of Allied Health Sciences at Kampala International University. In these roles she has the privilege to contribute to research and training of undergraduate and postgraduate students. She has close to 7 years of experience working in the field of medical laboratory science as an educator, biomedical scientist, and researcher. She has identified diabetes related research topics as an area of research interest and intends to acquire more knowledge and skills in the semantics of the disease. In her application, she proposes to build on her existing capacity as a researcher in diabetes and obtain additional training in a range of new techniques such as molecular and genetic based techniques which will be very vital in her research study methods. For her fellowship, she proposes to study “Gene polymorphisms for nephropathy and SARS-COV2 susceptibility among hypertensive type 2 diabetes mellitus patients at Mbarara Regional Referral Hospital in southwestern Uganda.”
2. **Catherine Atuhaire:** She is a nurse practitioner and Public Health Specialist with vast experience in research, teaching and clinical practice. She has an interest in intersection between mental health, cardiovascular disease and maternal health. For her fellowship, she proposes to study “The relationship between postpartum depression and a new diagnosis of diabetes / hypertension or both and the quality of life experienced by mothers suffering from these multi- morbidities NCDs in south western Uganda.”
3. **Edwin Nuwagira:** He is a Physician/Internist at Mbarara Regional Referral Hospital (MRRH), a researcher, and lecturer at MUST. He has 6 years’ experience of clinical research in HIV/AIDS and the associated opportunistic infections. In December 2017, he won a students’ grant to conduct research (awarded by the University of Minnesota, under the Uganda Research Training collaboration), and he received a certificate of excellence after the work was published. He has been involved in three major clinical trials; two involving patients with cryptococcal meningitis, and one involving solar lighting to reduce indoor air pollution. He currently serves as the Drug Resistant Tuberculosis (DRTB) Physician at MRRH, and has previously partnered with colleagues from the University of Virginia, to conduct research among patients with severe forms of Tuberculosis. For his MURCI fellowship, he proposes to study “Prevalence of Chronic Obstructive Pulmonary Disease (COPD), quality of life, trends in lung function and one-year survival after cure of pulmonary tuberculosis at Mbarara Regional Referral Hospital.”
4. **Leevan Tibaijuka:** He is a Ugandan Medical Doctor, and recently completed his residency training in Obstetrics and Gynecology, awaiting graduation. As an Obstetrician-Gynecologist at Mbarara Regional Referral Hospital (MRRH)/MUST, he provides clinical care, supervise trainees, and he intends to continue conducting research on implementation strategies to improve reproductive, maternal and neonatal health care in this resource limited setting. His research interests are aimed at understanding the modifiable predictors of negative clinical outcomes and to develop appropriate interventions that improve maternal-fetal outcomes. His academic training and research experience provide him with an excellent background in maternal and neonatal health. For his MURCI fellowship, he proposes to study, “Multi-morbidity in pregnancy and post-delivery at Mbarara Regional Referral Hospital.”

The trainees have been paired/matched with at least 2 mentors as below:

| Fellow             | Mentors                | Mentor Institution                             |
|--------------------|------------------------|--|
| Leevan Tibaijuka   | Dr. Adeline Boatin     | MGH  |
|                    | Dr. Ngonzi Joseph      | MUST   |
| Edwin Nuwagira     | Dr. Peggy Lai          | MGH  |
|                    | Dr. David Meya         | Makerere University College of Health Sciences |
| Catherine Atuhaire | Dr. Rukundo Godfrey    | MUST   |
|                    | Dr. Laura Brennaman    | SEED Global Health                             |
| Ritah Kiconco      | Dr. Opeyemi Olabisi    | Duke University                                |
|                    | Dr. Robert Kalyesubula | Makerere University College of Health Sciences |
|                    | Dr. Gertrude Kiwanuka  | MUST   |

## Major Challenges

We have experienced challenges due to COVID-19 travel restrictions which have prevented faculty from the US from travelling to Uganda. If these restrictions remain, we anticipate that certain fellowship activities like travel for laboratory externships and conferences will be delayed. We also anticipate that fellowship research activities may be slowed down, and recruitment of study participants may be slower than usual as well.

## Focus (Major Activities) for Next Reporting Period

1. Have all the four trainees submit their study protocols to MUST Research Ethics Committee for ethical approval of their research.
2. Complete the mentor/mentee curriculum and deliver a Mentoring the Mentor course.
3. Work with MURCI study team members to develop and deliver formal didactics to include scientific writing, RCR, Introduction to NCD Epidemiology, Multi morbidity and aging, environmental health, statistical methods. These will be presented by team members based both in Uganda and the U.S.
4. Review career, research and mentorship progress for each trainee through routine meetings between the fellows and their mentors as well as between the fellows and the MURCI core team.
5. Avail the MURCI trainees and some MURCI key personnel opportunities to participate in local and/or international meetings on research/bioethics.
6. Advertise, select and enroll the second cohort of MURCI trainees.
7. Continue MURCI program leadership meetings and the Training Advisory Committee.

## MUST Data Science Research Hub (MUDSReH)

### Investigators

Prof Celestino Obua MD MSc PhD (Vice Chancellor- MUST), Jessica Haberer MD MS, Leo Anthony Celi, MD MPH MSc

### Background

Data science hold great promise for sub-Saharan Africa, yet research capacity and appropriate training are limited. Medical images are particularly exciting for data science in this setting given their ability to facilitate care delivery across healthcare cadres. Efforts to translate the knowledge gained through data science into improved clinical care can be fostered through implementation science. Strategic multi-disciplinary, multi-institutional partnerships will be key for the development and ultimate impact of data science for African-based solutions.

The Mbarara University Data Science Research Hub (MUDSReH) in Uganda will use multiple technologies to improve the capture of medical images and employ key data science methods, such as machine learning and artificial intelligence, to expand their utilization in sub-Saharan Africa. Clinical impact will be strengthened through implementation science methods. Formal training will be available for both data science and implementation science, and ongoing expansion of efforts will be promoted through regional summits and collaboration. The two initial research projects—optimized posterior fundus imaging to diagnose posterior segment eye disease, and mobile- phone based cervical images to detect cancer—will involve partnerships with the College of Ophthalmologists of Eastern, Central and Southern Africa in Kenya and the Kwame Nkrumah University of Science and Technology in Ghana, respectively. Massachusetts Institute of Technology will provide technical support for data management and analysis, and Massachusetts General Hospital will support the use of implementation science and other relevant content areas for individual research projects. Each project will work with local Ministries of Health, community-based organizations, and/or technology partners to advance the mission of harnessing medical images for improved clinical outcomes and impact.

This proposal is innovative in 1) its use of data science with medical images for advancing clinical care, and 2) integration of data science with implementation science to promote clinical impact.

As this project was awarded funding in late 2021, project activities and achievements will begin in 2022.

## Objectives

**AIM 1:** To integrate all partnering academic institutions, technology companies, and non-governmental organizations to advance data science for medical imaging. All partners will contribute to a common infrastructure for data processing and analysis. We will establish both the administrative and technical mechanisms for data exchange, accounting for necessary data security and quality assurance and control. We will further create pathways for facile expansion to include additional research projects involving medical imaging (e.g., in radiology and dermatology) at multiple African institutions.

**AIM 2:** To integrate implementation science with data science to advance clinical impact. All research projects in the MUDSReH will include implementation science methodologies to ensure the developed technology reaches the end user in practical ways that meet local needs and priorities.

## 6th Annual Global Health Collaborative Research Symposium



2021 GHC Research Symposium attendees. *Photo credits: John Kayemba*

### Date

Tuesday, 30 November 2021 (8:00am-5:30pm)

### Location

Igongo Cultural Centre and Country Hotel, Mbarara, Uganda

### Participants

95 attendees, including members of Global Health Collaborative (GHC) research teams and leaders from Mbarara University of Science and Technology (MUST) and Mbarara Regional Referral Hospital (MRRH).

Key speakers included Dr. Celestine Barigye (Hospital Director, MRRH); Dr. Nixon Kamukama (Deputy Vice Chancellor, MUST); Dr. Joseph Ngonzi (Dean of Faculty of Medicine, MUST); Dr. Jonans Tusiimire (Deputy Dean of Faculty of Medicine, MUST); and Dr. Francis Bajunirwe (Chair, MUST Research Ethics Committee and Senior Lecturer, MUST Department of Community Health), who provided the keynote address. Dr. Louise Ivers (Executive Director, Massachusetts General Hospital [MGH] Center for Global Health) also spoke via video.

### Summary

The theme of this year's GHC research symposium was "Adapting to research challenges posed by COVID-19: Lessons picked over the last two years." The day-long symposium featured short presentations from 20 GHC-affiliated research, clinical, and advocacy programs, highlighting how these efforts have made adaptations throughout the COVID-19 pandemic; question-and-answer sessions on COVID-19 vaccines led by physicians from MGH; and reflections from university and hospital leadership on advancing research at MUST/MRRH.

The symposium was opened with speeches from distinguished guests, including the Dean of Faculty of Medicine and the Deputy Vice Chancellor, who each explained how COVID-19 will likely have permanent impacts on global health research. This was followed by a keynote address by Dr. Francis Bajunirwe, who highlighted specific challenges to conducting research in Uganda during the pandemic – such as lockdowns restricting movements, the ‘therapeutic misconception’ among some research participants (who may assume that their participation in COVID-19-focused research may immediately benefit their own health, even when this is not the case), and the threat of ‘biopiracy’ – as well as innovations in response to these obstacles, from virtual informed consent practices to best practices for working re-motely.

Following these remarks, the symposium moved into several themed sessions. **Session One** was a COVID-19 situational update. During this session, Dr. Edwin Nuwagira (a physician and MUST faculty member) reminded the audience how more than 200 people have died from COVID-19 in Mbarara, and reviewed treatment protocols for various levels of COVID-19 disease (ranging from mild disease to critical disease). This was followed by presentations on efforts to genotype COVID-19 variants in Mbarara – likely to be increasingly important given the recent emergence of the Omicron variant – and to advocate for increased access to COVID-19 vaccines in Uganda. The advocacy presentation featured remarks from Kenneth Mwehonge (Program Manager for Health Policy Advocacy, HEPS-Uganda), who traveled from Kampala to attend the symposium.

**Session Two** (“Community Research amidst COVID-19”) and **Session Three** (“Innovations for Health Research in a Pandemic”) included presentations on several locally-developed, phone-based technologies, which can assist patients and clinicians even when in-person services are limited by social distancing policies. These technologies included a training platform for village health teams (EVHT); a service to more quickly refer pediatric cancer patients to specialist care (PEDCan); a cell phone-based tool providing treatment algorithms for newborns (PRISMS); a software improving medical interviews for patients with deafness (Digital Speech Assistant); and a ‘smart’ pillbox and SMS-reminder service for patients living with HIV (OASIS). Session Two also included summaries from the HopeNet, Transition Readiness, and Izumi teams on ways these established programs had to change workflow procedures after the arrival of COVID-19.

During **Session Four** (“Emerging Trends in HIV Research during the COVID Pandemic – Study Updates”), nine HIV-focused research programs shared ‘lessons learned’ for continuing data collection in the midst of COVID-19. Discussed best practices included: COVID-19-specific training for all staff members; provision of PPE for staff members; implementation of social distancing policies in research offices; conducting virtual interviews with research participants when possible; and increasing transport reimbursements for research participants.

Interspersed throughout Sessions One through Four were question-and-answer discussions about COVID-19 vaccines, led by Drs. Amir Mohareb, Crystal North, and Adeline Boatin from MGH. Questions were collected from audience members both prior to the symposium and in real-time during these discussions.



Speakers included Dr. Stephen Asimwe (Program Director, GHC; left), Dr. Nixon Kamukama (Deputy Vice Chancellor, MUST; center), and Dr. Joseph Ngonzi (Dean of Faculty of Medicine, MUST; right).

Photo credits: John Kayemba



Dr. Louise Ivers (Executive Director, MGH Center for Global Health) spoke to attendees via a video recording.

**Photo credits: John Kayemba**



Each session was moderated by subject area experts. Session One – a COVID-19 situational update – was moderated by Drs. Francis Mugabi (right) and Dr. Rose Muhindo (center). **Photo credits: John Kayemba**



Dr. Francis Bajunirwe delivered the keynote address.

**Photo credits: John Kayemba**



Closing remarks were provided by Dr. Celestine Barigye (Hospital Director, MRRH), who attended the symposium for almost the entire day. **Photo credits: John Kayemba**

### Symposium Acknowledgements

- Uganda – GHC core team (Rhina Mushagara, Julius Turyasingura, Annet Kembabazi, Ezra Turinawe & Dr Stephen Asimwe); Florence Kobusingye & Laban Mwesigwa
- CGH Boston – Kate Bell, Jodi Ansel, Kerry Phelan
- Rapporteur – Azfar Hossain
- Panelists – MUST Faculty and MRRH Clinical leaders
- Dr Francis Bajunirwe – Keynote speaker
- MGH Faculty – Drs Amir, Boatman and Crystal
- Leaders – Prof Louise Ivers (CGH/MGH), Nixon Kamukama (MUST), Celestine Barigye (MRRH)
- Service Provider – Igongo Cultural Center and Country Hotel

### Symposium Attendees

*Moderators, key speakers, and local leadership*

| No. | Name                  | Affiliation | Position  |
|-----|-----------------------|-------------|---|
| 1   | Dr. Francis Bajunirwe | MUST        | Chair, Research Ethics Committee; Senior Lecturer, Department of Community Health |
| 2   | Dr. Francis Mugabi    | MUST        | Head of Community Services  |
| 3   | Dr. Winnie Muyindike  | MUST        | Director, ISS Clinic  |
| 4   | Dr. Rose Muhindo      | MUST        | Head of Department of Medicine  |
| 5   | Dr. Edwin Nuwagira    | MUST        | Faculty   |
| 6   | Dr. Elias Kumbakumba  | MUST        | Head of Department of Pediatrics  |

|    |                       |      |  |
|----|-----------------------|------|--|
| 7  | Prof. Nixon Kamukama  | MUST | Deputy Vice Chancellor                     |
| 8  | Dr. Joseph Ngozi      | MUST | Dean of Faculty of Medicine                |
| 9  | Dr. Jonans Tusiimire  | MUST | Deputy Dean of Faculty of Medicine         |
| 10 | Dr. Data Santorino    | MUST | Director, CAMTech Uganda                   |
| 11 | Dr. Celestine Barigye | MRRH | Hospital Director                          |
| 12 | Dr. Denis Nansera     | MRRH | Faculty, ISS Clinic                        |
| 13 | Mr. Keneth Mowonge    | HEPS | Program Manager for Health Policy Advocacy |
| 14 | Dr. Adeline Boatin    | MGH  | OB/GYN physician                           |
| 15 | Dr. Crystal North     | MGH  | Pulmonary and critical care physician      |
| 16 | Mr. Wilber Tusiimire  | TASO | Manager, TASO Mbarara                      |

#### **Additional attendees**

| No. | Name                  | Affiliation    | Position               |
|-----|-----------------------|----------------|------------------------|
| 1   | Asiimwe Caroline      | ADEPTT         | Research Assistant     |
| 2   | Christine Ngabirano   | ADEPTT         | Project Coordinator    |
| 3   | Mukunde Tomson Rivers | CAD /AGING     | Data Manager           |
| 4   | Atwiine Flavia        | CAD/AGING      | Project Coordinator    |
| 5   | Phionah Naturinda     | CAD/AGING      | Research Assistant     |
| 6   | Edna Tindimwebwa      | CAD/AGING      | Project Coordinator    |
| 7   | Niwagira Nelson       | CAD/AGING      | Research Assistant     |
| 8   | Namanya Chrispus      | CAD/AGING      | Research Assistant     |
| 9   | Lukanga Andrew        | CAD/AGING      | Research Assistant     |
| 10  | Sentongo Ruth Nakku   | CAD/AGING      | Project Coordinator    |
| 11  | Namboga Zulaika       | CAD/AGING      | Research Assistant     |
| 12  | Masette Godfrey       | CAD/AGING      | Lab Manager            |
| 13  | Anacret Byamukama     | CAD/AGING      | Study Physician        |
| 14  | Barnabas Atwiine      | CAMTech PEDCan | Principal Investigator |
| 15  | Nura Izath            | CAMTech        | Project Lead           |
| 16  | Ankunda Prossy        | CAMTech        | Research Assistant     |
| 17  | James Semitego        | CAMtech        | Project Member         |
| 18  | Anitah Kusaasira      | CAMTech        | Project Coordinator    |
| 19  | Martin Mukama         | CAMTech        | Innovation Lab Manager |
| 20  | Nambogo Nuriat        | CAMTech        | Grants Manager         |
| 21  | Tumuhimbise Manasseh  | CAMTech/e-VHT  | Innovator              |
| 22  | Kamuhair Emmanuel     | CAMTech        |                        |
| 23  | James Semitego        | CAMTech        |                        |
| 24  | Alan Babweteera       | CRADLING STUDY | Project Manager        |
| 25  | Praise Tindiweegi     | CRADLING STUDY | Data Manager           |
| 26  | Alexis Byaruhanga     | DIPT           | Research Assistant     |
| 27  | Adah Tumwegamire      | DIPT           | Senior Data Manager    |
| 28  | Severa Nshabohurira   | DIPT           | Research Assistant     |
| 29  | Allen Kekibiina       | DIPT           | Project Coordinator    |
| 30  | Mugisha Stephen       | DIPT           | Research Assistant     |
| 31  | Kyakusiimire Agripina | DIPT           | Screeener/Tracker      |
| 32  | Kahinda Catherine     | DIPT           | Screeener/Tracker      |
| 33  | Victoria Nafuka       | Disco study    | Coordinator            |
| 34  | Naomi Sanyu           | Extend         | Project Coordinator    |

|    |                        |   |                            |
|----|------------------------|---|----------------------------|
| 35 | Rhina Mushagara        | GHC   | Relations Manager          |
| 36 | Stephen Asiimwe        | GHC   | Program Director           |
| 37 | Julius Turyasingura    | GHC   | IT Coordinator             |
| 38 | Azfar Hossain          | GHC   | Medical Student            |
| 39 | Annet Kembabazi        | GHC   | Senior Program Manager     |
| 40 | Florence Kobusingye    | GHC   | Admin                      |
| 41 | Laban Mwesigwa         | GHC   | Security                   |
| 42 | Patience Ayebare       | HopeNet   | Finance Officer            |
| 43 | Baguma Charles         | HopeNet   | Project Manager            |
| 44 | Kiconco Allen          | HopeNet   | Research Assistant         |
| 45 | Gumisiriza Patrick     | HopeNet   | Research Assistant         |
| 46 | Matte Michael          | HopeNet   | Data Manager               |
| 47 | Mercy Juliet           | HopeNet   | Research Assistant         |
| 48 | Ahereza Phionah        | HopetNet  | Research Assistant         |
| 49 | Atuhaire Christian     | HopeNet/Self-Management                                     | Research Assistant         |
| 50 | Bernard Kakuhikire     | HopeNet   | Principal Investigator     |
| 51 | Justus Kananura        | HopeNet   | RA Team leader             |
| 52 | Patrick Lukwago        | HopeNet   | Driver                     |
| 53 | Dickson                | HopeNet   | Driver                     |
| 54 | David Muhumuza         | leDEA   | Data Personnel             |
| 55 | Viola Kyokunda         | Inflammation Social Networks and Depression in Rural Uganda | Research Assistant         |
| 56 | Namara Elizabeth Betty | Inflammation Social Networks and Depression in Rural Uganda | Research Assistant         |
| 57 | Mucunguzi Olivius      | Izumi   | Coordinator                |
| 58 | Robert Baijuka         | Oasis study   | Research Assistant         |
| 59 | Patricia Kyosiimire    | PACO/WIMS   | Study Coordinator          |
| 60 | Ategeka Emmanuel       | PACO/WIMS   | Research Nurse             |
| 61 | Naiga Patience         | PACO/WIMS   | Research Assistant         |
| 62 | Mercy Aturinde         | PACO/WIMS   | Nursing Officer            |
| 63 | Moonlight Sheila       | PACO/WIMS   | Research Assistant         |
| 64 | Barnad                 | PACO/WIMS   |                            |
| 65 | Tumwesigyire Jonan     | REVAMP Study  | Research Assistant         |
| 66 | Rubega Abel            | Scholar   | SHO                        |
| 67 | Nkwanga Jacob          | Scholar   | Internal Medicine          |
| 68 | Namusisi Jane          | Scholar   | Pediatrics                 |
| 69 | Byamukama Onesmus      | Scholar   | OBGYN                      |
| 70 | Kywalyanga Mike        | Scholar   | Paediatrician              |
| 71 | Chrispin Wonyoto       | Scholar   | Anesthesia                 |
| 72 | Ochora Moses           | Scholar   | Senior House Officer       |
| 73 | Mike Kywalyanga        | Scholar   | Paediatrician              |
| 74 | Ahabwe Onesmus Magezi  | Scholar   | Obstetrician/Gynaecologist |
| 75 | Munakenya Laban        | Scholar   | Ophthalmologist            |
| 76 | Nelson Wandera         | MRRH  | Vaccination Team           |
| 77 | Akena Denis Uma        | MRRH  | Vaccination Team           |
| 78 | Michael Kanyesigye     | ISS Clinic  | Project Coordinator        |
| 79 | Rita Ayebazibwe        | ISS Clinic  |                            |

## INNOVATION

The Consortium for Affordable Medical Technologies: Uganda (CAMTech Uganda) – the joint innovation platform of GHC, MUST, and the MGH Center for Global Health – continued its development of multiple new products and services in 2021.



### CAMTECH UGANDA ACHIEVEMENTS- 2021

#### Project-based achievements

| # | PROJECT NAME  | PROJECT OVERVIEW  | ACHIEVEMENTS  |
|---|---|---|---|
| 1 | SANIDROP  | A locally made hand sanitizer killing 99% of germs. Its produced in both liquid and gel.  | -SaniDrop got a Quality mark renewal from Uganda National Bureau of Standards (UNBS).<br>-Received a grant from MoSTI to automate the production process. The equipment is already purchased and awaiting shipping.   |
| 2 | MOBICARE  | A mobile based application that allows patients/caretakers to directly get in touch with the health worker of their choice and request for convenient appointments.   | -The MobiCare application is fully developed and is currently on Play store for download. <a href="https://bit.ly/mobicare">https://bit.ly/mobicare</a><br>-We have carried out a pilot in 5 private health facilities in Mbarara municipality.<br>-We earlier carried out a feasibility study and the publication is underway. |
| 3 | Comprehensive Customized Accounting Software (SACC) | A software tool that was developed to reduce the time and cost required to manage patient records, appointments and financial transactions for health facilities.   | -SACC has fully deployed the system in 11 clinics in Mbarara, Rukungiri and Ntungamo.<br>- Signed a 3-year renewable contract with MTN Uganda for full integration With MTN Mobile Money.   |
| 4 | Photo Kabada  | A hybrid remotely monitored phototherapy machine that will be able to treat multiple babies simultaneously.   | -Photokabada has a complete prototype and has been deployed in the field at the pediatric ward of Mbarara Regional Referral Hospital) for real time feedback from the nursing and clinical.<br>-The team acquired funding from MoICT&NG.  |
| 5 | The Smart Med-Tech Monitoring System (SMMS)         | A device that remotely monitors and reports location, functionality and usage of medical devices in real-time to enable technical individuals in charge to quickly take action.   | - Solid works designs of the hardware system was made from which a prototype was fabricated.<br>-The first version of the prototype was tested for functionality with positive results.<br>-The team received funding from MoICT&NG.  |
| 6 | Digital Speech Assistant (DSA)                      | A software application to enable effective communication between deaf patients and health workers for better clinical outcomes.   | - Version 1 of the application development is done.<br>- DSA content is already translated into sign language (pictorials, animations, and audio amplification).<br>-The team has already acquired MUST REC approvals carryout an acceptability study among health workers and deaf patients in 3 health facilities in Mbarara. |
| 7 | Autothermo  | A continuous temperature monitoring device with remote central display capabilities, that health workers can use to monitor temperatures for babies in their care and facilitate provision of timely thermal care interventions for newborn babies in need. | -Version 1 device development was done<br>-Device testing was completed at Uganda Industrial Research Institute (UIRI) and data was validated.<br>-Development of version 2 of the device is underway   |

|    |   |  |  |
|----|---|--|--|
| 8  | Electronic Village Health Team(e-VHT)                         | A smartphone application aimed at training Village Health Team workers to provide improved health education information to their community members.  | <ul style="list-style-type: none"> <li>- The application is already developed with six education modules so far.</li> <li>- The team has conducted end-user feedback among VHTs in different communities of Mbarara District.</li> <li>- We have worked on 2 modules for Covid-19 to support VHTs in delivering Covid-19 related information to their community members.</li> <li>- We also worked on the interactive forum for VHT educators.</li> <li>-The exercises session to assess the vhts.</li> <li>-</li> </ul> |
| 9  | PRISMS (Protecting Infants Remotely by Short Message Service) | A newborn clinical decision tool to aid frontline health workers to provide appropriate care for sick newborns   | <ul style="list-style-type: none"> <li>-PRISMS is now deployed in 60 health facilities in Uganda with plans underway to deploy in 4 health facilities in Tanzania and one in Nigeria.</li> <li>-The team is developing a French Version of PRISMS that is to be deployed in French speaking countries like Burundi, Rwanda.</li> </ul>   |
| 10 | PEDCan  | A mobile based application to guide early childhood cancer suspicion by lower-level health workers.  | <ul style="list-style-type: none"> <li>-The application is fully developed.</li> <li>-A feasibility and acceptability study was conducted in 3 health facilities in Mbarara and Rwampara among 45 health workers.</li> <li>-The team has written a manuscript and almost ready for publication.</li> </ul>   |
| 11 | I-Dress   | A wound dressing material made out of Honey and Olive oil impregnated in gauze to protect mothers with Caesarean wounds from infections and mechanical damage while promoting a faster healing.  | <ul style="list-style-type: none"> <li>- The team developed the first prototype and run animal tests of which results were positive.</li> <li>-The second prototype was developed from Uganda Industrial Research Institute and Uganda Cancer Institute.</li> <li>- The pilot study was conducted in 3 health facilities and results indicated faster healing of caesarean wound with I-dress compared to those where normal dressing was used.</li> </ul>   |
| 12 | Vein Locator  | A low cost, non-invasive lightweight blood vessel illuminator to ensure timely delivery of intravenous medication. It helps clinicians easily locate the proper vein.  | <ul style="list-style-type: none"> <li>- The device is ready and lab tests already conducted.</li> <li>-The team acquired Intellectual Property (IP) rights for the A-Lite vein locator.</li> <li>-The team received MUST REC approvals and now awaits UNCST approvals to carryout clinical trials for the device.</li> </ul>  |
| 13 | MamaOpe   | A multimodal device which will aid health workers easily diagnose pneumonia.The technology automatically determines and interpretes body temperature, pulse oximetry, breath sounds and respiratory rate, which are the signs and symptoms of pneumonia. | <ul style="list-style-type: none"> <li>-The project gained a technical proof of concept</li> <li>-Preclinical testing of prototype and Initiation of Design History File (DHF) was done.</li> </ul>  |
| 14 | I-Drain   | Idrain is a device intended for use in patients with pleural effusion. The device provide regulated negative pressure to the patient's lungs to let the luids out.   | <ul style="list-style-type: none"> <li>- The third prototype is ready and laboratory tests already conducted.</li> <li>-Team is preparing for a feedback survey among clinicians.</li> </ul>   |
| 15 | TB-SPEED  | A research project that is aimed at providing a feasible, cost-effective and decentralized childhood Tuberculosis diagnostic approach among TB high risk children.   | <ul style="list-style-type: none"> <li>-The prototype is already developed and tested.</li> <li>-The IRB documents are already worked on and submitted for approvals.</li> <li>- Team is preparing for an acceptability study.</li> </ul>  |

### Other CAMTech Achievements

We have been helping to conduct hackathon for University of Ngozi in Burundi. We have so far helped to conduct 3 hackathons.

CAMTech facilitated the signing of a Memorandum of Understanding between Mbarara University of Science and Technology and Ngozi University in Burundi. This has strengthened the relationship between the two universities.

We have continued to support Innovators incubated under co-creation lab.

We have a partnership with University of Illinois in the US. We have supported their students' innovations program by taking students through practical concept writing sessions.

We signed an MOU with Ministry of ICT and National Guidance to support their innovators.

## CLINICAL AND COMUNITY PARTNERSHIPS



| Clinical Partnerships                            | Partnership Goal/Objective(s)   | Grant Manager           | Location                     | MGH Lead Partner     | MUST/MRRH Lead Partner  |
|--|---|-------------------------|------------------------------|----------------------|-------------------------|
| Department of Obstetrics and Gynecology          | Research supervision, faculty mentorship, cervical cancer screening                     | MGO                     | MRRH, OBGyn Dept             | Dr. Tom Randall      | Dr. Joseph Ngonzi       |
| Essential Medicines Fund                         | To provide critical medication and supplies to Pediatric clients (general and oncology) | MUST Dept of Pediatrics | MUST Dept of Pediatrics      | Prof. Louise Ivers   | Dr. Elias KumbaKumba    |
| Department of Radiology                          | Resident & Faculty Mentoring  | MGO                     | Dept of Radiology            | Dr. Mark Siedner     | Dr. Moses Acan          |
| MRRH Children Cancer Unit                        | To address the unmet need for quality pediatric oncology training and care              | MGO                     | MRRH                         | Dr. Howard Weinstein | Dr. Barnabas Atwine     |
| MRRH Adult Cancer Unit                           | To address the unmet need for quality adult oncology training and care                  | MGO                     | MRRH                         | Prof. Louise Ivers   | Dr. Rose Muhindo        |
| Department Pediatrics & Nutrition (Natasha) Ward | Reduce pediatric morbidity and mortality and malnutrition disease                       | MGO                     | MUST Dept of Pediatrics/MRRH | Dr. Jessica Haberer  | Dr. Elias KumbaKumba    |
| Department of Pathology                          | Improved quality of pathology services at MUST/MRRH                                     | MGH                     | MUST/MRRH Dept of Pathology  | Dr. Drucilla Roberts | Dr. Raymond Atwiine     |
| Department of Medical Lab Sciences               | To improve lab capacity (testing, quality, and sample storage) & technical support      | MGO                     | Research lab, MUST           | Dr. Suzanne McLuskey | Dr. Simon Rugera        |
| MRRH Emergency Medicine Unit                     | To support training and clinical care in medical & surgical emergency medicine          | MGO                     | MRRH Emergency Unit          | Dr. Vanessa Kerry    | Prof. Gertrude Kiwanuka |

### Pediatric Oncology

#### Team Members

Dr. Barnabas Atwine, Dr. Winston Asasira, Dr. Semei Ssekitene, Imelda Busingye, Emma Baluku, Isiiko John, Kato Idrin, Ampaire Ruth, Owomugisha Catherine, Twakire Catherine, Kasambura John, Daniel Owomugisha, Ganafa Aurther, Mukama Ashely, Divian Tumwebaze Kobutungu Editah

#### Overview

The MGH/MUST/MRRH Pediatric Oncology partnership started in May 2017 with the commitment of providing the state of art comprehensive cancer care to the local community of south western Uganda. A pediatric oncology unit was constructed with initial support from James Mooney. The goal was to provide quality patient cancer care, ensure more reliable drug supply to the clinic and motivate additional local resources to support the cancer services at MUST and MRRH.

#### The long-term goals were:

- Improve cancer care
- Engage in research led by MUST/MRRH
- Increase staff supported by MOH and UCI
- Continue capacity building

## Achievements by Objectives

### **Improve Cancer Care**

425 patients are currently enrolled in the clinic. Males are 233 and females are 192. 115 new patients enrolled in 2021 alone. 31 patients died in 2021 and only 12 patients were lost to follow-up in 2021.

The commonest cancers seen are Wilms tumors, lymphomas and leukemias. Over 120 cases have been reviewed and discussed between the MGH and MUST/Oncologists and an average of 25 outpatients are seen on a very clinic day. The clinic has one official clinic day (Wednesday). On average, 100 patients are seen per month on clinic days



Head, MUST/MRRH Pediatric Oncology Unit. *Photo credits: Rhina Mushagara*

### **Engage in Research led by MUST/MRRH**

As a way of improving clinical care, oncology researchers have started engaging in research. Dr. Barnabas together with colleagues, sought to understand why patients were getting lost to follow up for cancer care. He won the best presentation award during the 2021 Uganda Conference on Cancer care. He has submitted his paper in the Journal of Blood and Cancer for Children. He has also done work on the prevalence of nephrotoxicity among adult cancer patients at MRRH.

### **Increase Staff Supported by MOH and UCI**

Currently, MGH is supporting 14 staff to the oncology unit (1 physician, 1 medical officer, 3 graduate nurses, 3 registered nurses, 3 enrolled nurses, 1 data person, 1 pharmacist, and one cleaner).

UCI and MOH have increased the number of staff employed. Initially, MGH was supporting all staff. So far, one Pharmacist was taken on by UCI, one medical officer was taken on by MOH, a pharmacist who was supported by MGH was also taken by UCI, 2 registered nurses were recently taken on by MOH. UCI has also sent one physician, one medical officer and one nurse to MRRH. We hope for more staff coverage in years to come.

At the beginning of GHC leadership, Head of Department pediatrics MUST, lead pediatric oncologist and the hospital Director (MRRH) had a strategic meeting about more staffing specifically for the pediatric unit by MOH.



L-R: Stephen Asimwe (GHC), Annet Kembabazi (GHC), Elias Kumbakumba (MUST), Celestine Barigye (MRRH) & Barnabas Atwine (MUST). **Photo credits: Rhina Mushagara**

### **Continued Medical Education (CME)**

There have been CMEs conducted by the team on the ground to specifically discuss cases and patient management of patents. There have been bi- weekly and then monthly pediatric oncology calls between MRRH/MUST and MGH staff pediatric oncology calls to continue strengthening capacity of both the MUST/MRRH and MGH staff. Over 10 calls have been conducted and over 100 cases were discussed.

### **Adult Oncology**

#### **Team Members**

Dr. Barnabas Atwine, Dr. Winston Asasira, Dr. Semei Ssekitene, Imelda Busingye, Emma Baluku, Isiiko John, Kato Idrin, Ampaire Ruth, Owomugisha Catherine, Twakire Catherine, Kasambura John, Daniel Owomugisha, Ganafa Aurther, Mukama Ashely, Divian Tumwebaze Kobutungu Editah

#### **Overview**

The Adult Cancer Unit at the Mbarara University of Science and Technology (MUST)/MRRH was established in 2012. It is still one of the only cancer care centers in south western Uganda, offering holistic care to the adult cancer patients. The center introduced virtual visits through phones and computers to make sure patients can interact with their health care providers with ease. The MGH Global Health Collaborative at MUST has continued to support the short-term hiring and training of critical human resources to staff and maintain the Cancer Unit within the hospital. Their role is to improve the quality of patient care, ensure a more reliable drug supply for the clinic, and motivate additional local resources to support the expansion of cancer services at MUST and MRRH.

#### **Achievements by Objectives**

##### *MGH Human Resources Support*

Currently there are over 10 staff members supported under the oncology statement of work through Mbarara University Grants Office. This staff continues to give clinical care to the patients.

#### **Clinical Care**

Total Clinic enrollment was 3,866 as of December 6, 2021. 2,126 are males and 1740 are females. 468 are dead. 2021 alone saw 714 new patients enrolled and 87 deaths. The commonest cancers are: prostate, breast, esophagus, stom-ach, colorectal and choriocarcinoma.

### **Continued Medical Education (CME)**

Dr. Arpana Parikh, the new Director of the MGH Global Oncology program, reached out to MRRH and MUST to see how best to work with the oncology team in Uganda to continue improving cancer care.

Two meetings were held in 2021 with all stakeholders to see how best to improve the program. Many more strategic meetings will be held in the coming years. Dr. Stephen Asiimwe, the Program Director Global Health Collaborative made an ask for Dr. Arpana to come visit Uganda so she can have first-hand information about oncology care at MRRH.

## Pathology

### Team Members

Dr. Raymond Atwine, Prof. Diaz Amnia, Dr. Mitala Yekosani, Dr. Tobias Tusabe, Abraham Birungi (Senior Lab Technologist), Paddy Behayo (Chief Technologist), Ninsiima Jolly (Lab Technician), Ayebazibwe Benon (Lab Assistant)

### Overview

The Pathology department at Mbarara University of Science and Technology (MUST) started a partnership with MGH pathology department at Massachusetts General Hospital (MGH) on April 1, 2016. An annual membership agreement was signed for one year and since then the partnership has been operating under the memorandum of understanding between MUST and MGH. The goal of this partnership is to improve clinical diagnosis and clinical care of patients as well as improving teaching skills and knowledge of both post graduate and undergraduate students in the faculty of medicine at MUST.

### Achievements by Objectives

#### *Human Resources Support*

In the Annual membership agreement, it was agreed that Mbarara University provides human resources for health, especially pathologists. This year, Dr. Mitala was hired as an assistant lecturer, Prof. Diaz was hired on a part time basis for a year and, Prof. David Griffiths was given a lecturer appointment by Mbarara University of Science and Technology. This has increased on the number of pathologists from 1 in 2016 to 4 in 2021.

### Supplies for Clinical Diagnosis

In 2021, with the help of Dr. Drucilla Roberts, Dr. David Griffiths has provided the following supplies to the pathology department.

7500 cassettes, 40 grossing knives, 1500 lids, 5000 coverslips, 200 microtome blades, and 2 liters of DPX. Additionally, the pathology department received an Aperio Scanner for scanning slides to ease clinical diagnosis.

### Teaching and Skills Development

Dr. David gave 9 slide seminars in 2021 to post graduate students, supervised 10 self-directed lectures by MMEDs, gave one lecture to undergraduates and spent most of the time supervising grossing and sign out of cases.

MGH is currently sponsoring advanced degree scholars (MMEDs) in the pathology department. Two are completing this year and one has just joined year one, the only female pathologist (Dr Rita).

### Strategic Partnership Meetings

There were also partnership strategic meetings with Global Health Collaborative team.



*R-L: Prof. Diaz Amnia (Cuba), Dr. Raymond Atwine (MUST) & Dr. David Griffiths (Univ. of Cardiff, UK) and Annet Kembabazi (GHC at MUST) at a strategic meeting in November 2021. Photo credits: Café Havana*

## Improved Paediatric In-Patient Morbidity and Mortality and Community-Based Management of Malnutrition in Uganda (IZUMI FTF – Phase V)

### Project Team

Dr. Jessica Haberer (External PI), Dr. KumbaKumba Elias (PI), Mucunguzi Olivius (Project Administrator), Orikiiriza Justine (Neonatal Nurse), Ahimbisibwe Edivina (Neonatal Nurse), Habyara Flora (Neonatal Nurse), Tusiime Bashira (Neonatal Nurse), Muhindo Moreen (Neonatal Nurse)

### Background

The Paediatrics Ward of the Mbarara University Teaching Hospital (MUTH) currently admits approximately 5,000 children annually; newborns and premature babies account for about 45% of admissions, the majority being born within the hospital. While the ward officially has a 70-bed capacity, bed occupancy rates average 120%. Our children primarily suffer from infectious diseases and malnutrition. Although the hospital is supported by the Ugandan government, limited resources often result in shortages of critical medicines and basic supplies, and our families can rarely afford to pay for their care themselves. The IZUMI Foundation has supported us since 2010 to address the considerable morbidity and mortality we face.

### Specific Objectives

- To purchase and distribute otherwise unavailable medications (e.g., antibiotics) and basic medical supplies (e.g., IV tubing and gloves)
- To regularly monitor the Paediatric Ward for morbidity and mortality levels and coordinate prioritization of care delivery and resource allocation.
- To provide nursing care for the most vulnerable admissions to the Paediatric Ward – particularly the sick newborns, premature babies, and other critically ill children;
- To reduce childhood malnutrition in Isingiro District through enhanced community education, plus the development of alcohol-free men's clubs as a way to improve household food security and prevent malnutrition;
- To continue to seek permanent solutions for supplying medications and basic medical supplies.

### Progress

The grant has continued to provide buffer stocks for antibiotics and other medicines as well as other medical supplies, such as gloves, nasogastric tubes, and intravenous cannulas, among other supplies over the last one year, from Joint Medical Store. This year was particularly critical because most government resources were directed towards the COVID-19 pandemic.

We continue to capture admissions and outcome data on a daily and individual child basis using the database from a prior IZUMI Foundation grant. We use this data to do monthly, quarterly and annual morbidity and mortality audits. It is managed by two administrative assistants, who also support the administration of other aspects of the grant.

Whereas COVID-19 pandemic restrictions reduced our overall admissions this year from about 5000 to 4000, newborns constituted about 60% of our 4000 in-patient admissions. The grant enabled us to maintain 4 nurses for the newborn unit working in alternate shifts to maintain full newborn unit nursing coverage. There are often 50-60 newborns in the unit at any one time. The in-patient neonatal mortality rate increased from 5.3 to 8.72% due to late arrival of mothers and newborns occasioned by COVID -19 movement restrictions. This could have been worse without the support of this grant to experienced committed nurses and medical supplies.

We proposed to contribute to reduction in childhood malnutrition in Isingiro District through enhanced community education, plus the development of alcohol-free men's clubs as a way to improve household food security and prevent malnutrition. However, the COVID 19 pandemic and consequent lockdown restrictions in movements and gatherings (that started in March 2020 in Uganda) meant that we could not implement this activity. We have practically lost a whole year of implementation. However, implementation will begin after wide spread vaccination coverage.

### In-Patient Indicators of the Year 2021

|                                   |      |
|-----------------------------------|------|
| Total in-patient ward admissions  | 2673 |
| Total neonatal admissions         | 1637 |
| Total number of in-patient deaths | 233  |



*Izumi Team. Photo credits: Olivius Mucunguzi*

## Emergency Medicine

### Team Members

Dr. Justine Athieno Odaka

### Overview

Through SEED Global Health, MGH supported the department of emergency medicine with human resources. Dr. Justine Athieno Odaka was supported through the MUST Grants office through November 2021. She has been instrumental in ensuring good clinical care for patients at emergency medicine as well as teaching MMEDs and under graduates' students at MUST.

### Advanced Medical Education Support

The Center for Global Health at MGH has worked in partnership with Mbarara University of Science and Technology in supporting the development of advanced skill sets in medicine and nursing. This has been accomplished through of-fering scholarships in specialties like critical care nursing, internal medicine, radiology, pathology, medical lab science, surgery, obstetrics and gynecology, ENT, medical lab science and many others. To date, a total of 140 post graduates have been sponsored. In 2021, 12 MMEDS were sponsored. 3 got partial sponsorship of tuition and 2 were given partial research support. The scholarships were supported by Kayanja and First Mile financial schemes.

**A total of 14 sponsored students graduated in April 2021.**



*Some of First Mile MNS students who graduated virtually on April 24, 2021 gathered in Kampala to celebrate their success. R to L: Atukwase Joseph, Alobe Jennifer, Turyasingura Johnan, Komugabe Penina, Were Phiona, Jalia Sserwada. Photo credits: Jonan Turyasingura*



OBGYN Kayanja MMED Scholars celebrating their graduation with Dean Joseph Ngozi (Center, in red) at Peers Hotel in Mbarara on April 24, 2021. **Photo credits: Dr. Onesmus Ahabwe**  
We expect many more students to graduate in 2021.

Partnership Report prepared by Annet Kembabazi

## COVID-19 Response

With our partners, in 2021 we responded to the ongoing COVID-19 pandemic through treatment, disaster response, vaccination, and advocacy efforts.

### Status Update on the COVID-19 Response at MRRH

#### Introduction:

Following the outbreak of the Coronavirus global pandemic, and in line with directives from H.E the President of Re-public Uganda, Mbarara Regional Referral Hospital has been actively involved in implementing a series of activities in the prevention and management of COVID-19. Here I present a status update from Mbarara Regional Referral Hospital.

#### Background

The novel Coronavirus (nCoV-2) originated from Wuhan, Hubei Province of China and has caused a global pandemic, affecting all continents and all countries including Uganda. To date, Coronavirus disease (COVID-19) has caused over 188,653,391 confirmed infections and over 4,066,847 deaths globally. Africa is now on spotlight with new variant such as Alpha-United Kingdom, Beta-South Africa, Gamma-Brazil and Spain, Delta-India, Lambda-Peru and others.

As of September 2021, Uganda has registered over 99,701 confirmed infections. Of these 23,817 were active cases, 62,213 recovered cases and 3,031 deaths so far. A total of 1,436,264 individuals have been vaccinated.

Mbarara RRH has cumulatively cared for 1,397 confirmed cases with 645 admissions, 409 recoveries, 192 deaths, 752 managed under home based care.

While national efforts are clearly helping to reduce the spread of the virus, there is a need to strengthen the health system to handle and manage patients who present to health facilities, including those requiring emergency and intensive care.

Mbarara Regional Referral is a 460-bed capacity hospital that serves the south western region of Uganda, comprised of 12 districts and one City. It is uniquely situated in the South western region, bordering Tanzania, Rwanda, The Democratic Republic of Congo and frequently receives patients from these neighboring countries. In addition to providing various specialized services (e.g. Eye, Ear Nose and Throat, Cancer, dialysis, intensive care, emergency medicine, etc.), the hospital has a temporary infectious disease isolation unit that is dedicated for infectious diseases management. Having successfully managed highly infectious diseases previously (Viral Hemorrhagic fevers – Ebola, Crimean Congo, Rift Valley) in partnership with Epicentre Mbarara Research Centre and Uganda Virus Research Institute, there is enormous in house experience and expertise in handling such emergencies. The hospital has led the region in training, surveillance, screening and taking samples from suspected individuals and in managing COVID-19 patients.

#### Objectives:

The overall objective of the hospital's COVID-19 response is to strengthen COVID-19 management and mobilize re-

sources. Specifically, the hospital aims to:

Effectively screen and test all individuals in the region suspected to have COVID-19, using PCR and Gene xpert provided by partners and MOH respectively.

Offer surveillance, training and community support to all health facilities and communities in the region.

Renovate, expand and equip the isolation unit to receive and manage patients with mild to moderate and critical COVID 19 infection.

Prepare a dedicated COVID-19 intensive care unit to offer optimum respiratory support to all patients with severe and life threatening COVID 19.

Provide a patient care environment that is respectful of human rights and preserves the dignity of patients with COVID-19

Adequately protect all health workers, other patients and every individual accessing Mbarara Regional Referral Hospi-tal from the risk of infection with the deadly Coronavirus.

### Progress in Covid-19 Response

Following the declaration of a global pandemic by World Health Organization declared COVID-19, Mbarara Regional Referral Hospital set up a COVID-19 Management team that feeds into the City task force which spear heads a num-ber of activities to prepare for and manage this pandemic. The following actions have been/are being undertaken.

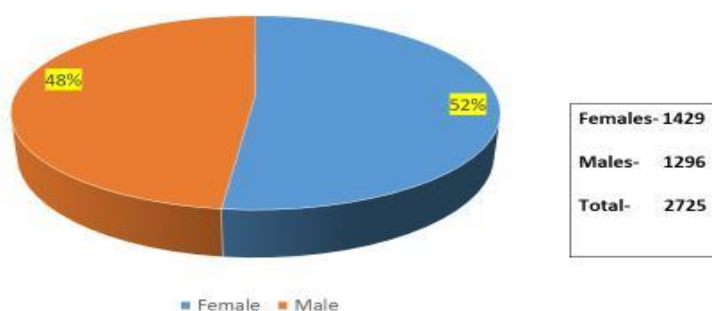
### Patient Care

As of October, Mbarara Regional Referral Hospital has so far received, admitted and managed 1,468, cumulative admis-sions 645, current admissions 6, cumulative discharges 422, cumulative death 198. Cumulative Home based care 1046, Cumulative de isolation 996, Current HBC 21 COVID-19 patients. There are 48 COVID -19 dedicated beds of which 15 are situated in Emergency unit, 16 in Main CT U and 17 in Private wing. COVID-19 is categorized in the following ways; mild, moderate, severe and critical. Mild cases are treated at home under home based care (With reference to the HBC guidelines), the rest are managed in the hospital. Patients with severe and critical disease are managed in High Dependence Unit while the most severe and critical are managed in ICU. The scattered nature of these service units poses management challenges.

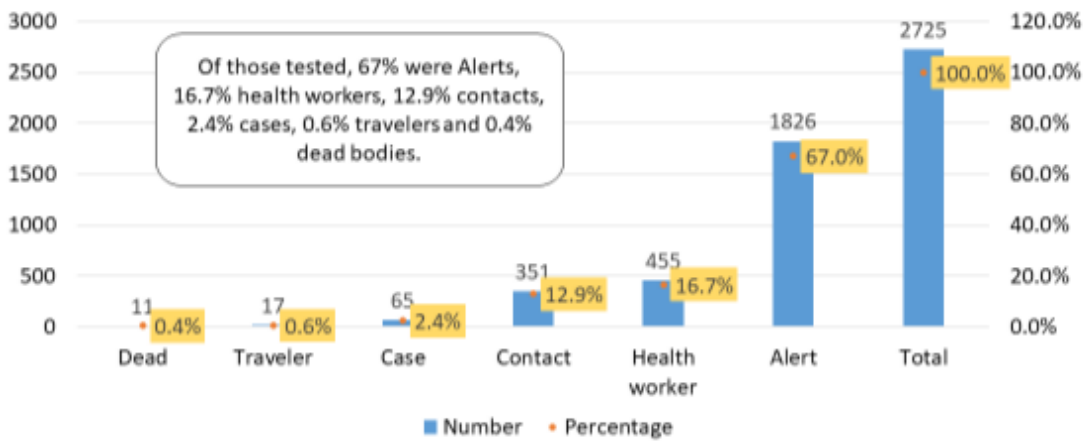
### Effective Screening and Testing of all Individuals in the Region Suspected to have COVID-19

Mbarara Regional Referral Hospital is the regional hub for sample collection from all suspected COVID-19 patients.

## PERCENTAGE TESTED BY GENDER



# TESTING BY CATEGORISATION



## TESTING BY AGE GROUP AND GENDER

| Age group in years | Female | Male | Total | Percentage |
|--------------------|--------|------|-------|------------|
| 0-10               | 82     | 73   | 155   | 6%         |
| 11-14              | 35     | 26   | 61    | 2%         |
| 15-19              | 82     | 59   | 141   | 5%         |
| 20-24              | 165    | 124  | 289   | 11%        |
| 25-29              | 220    | 186  | 406   | 15%        |
| 30-34              | 216    | 196  | 412   | 15%        |
| 35-39              | 182    | 156  | 338   | 12%        |
| 40-44              | 107    | 122  | 229   | 8%         |
| 45-49              | 79     | 102  | 181   | 7%         |
| 50+                | 261    | 252  | 513   | 19%        |
| Total              | 1429   | 1296 | 2725  | 100%       |

## COVID19 TESTING BY WEEKS

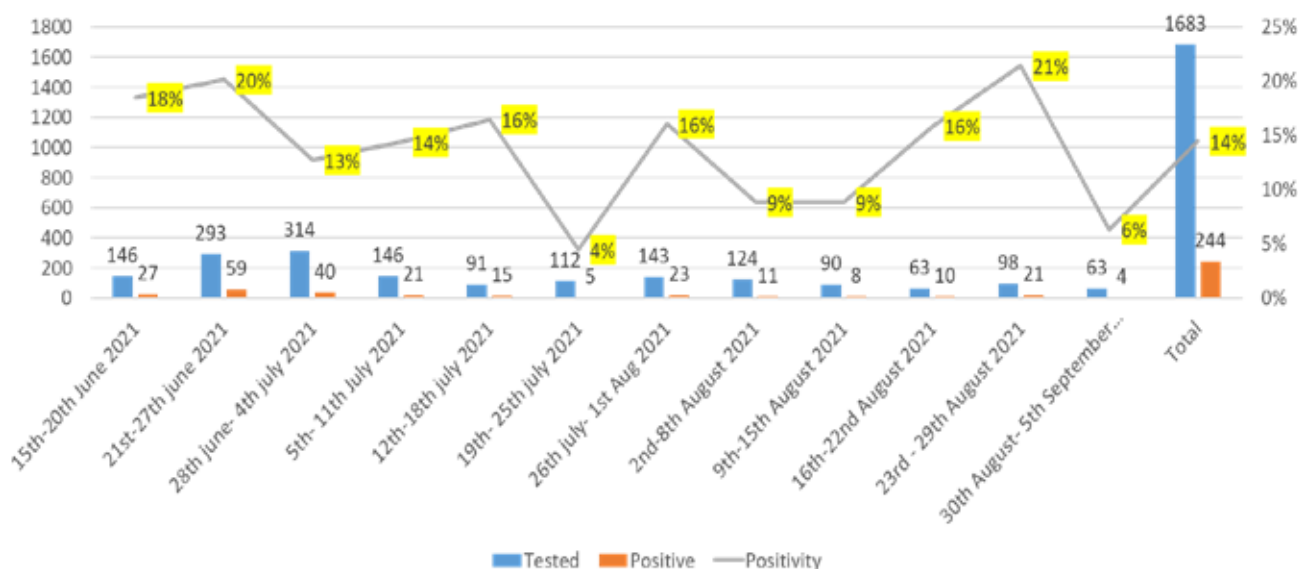
### TESTED BY GENDER

| Week                            | Female | Male | Total |
|---------------------------------|--------|------|-------|
| 15th-20th June 2021             | 189    | 177  | 366   |
| 21st-27th June 2021             | 235    | 225  | 460   |
| 28th June- 4th July 2021        | 283    | 253  | 536   |
| 5th- 11th July 2021             | 161    | 142  | 303   |
| 12th-18th July 2021             | 97     | 84   | 181   |
| 19th- 25th July 2021            | 62     | 71   | 133   |
| 26th July- 1st Aug 2021         | 89     | 76   | 165   |
| 2nd-8th August 2021             | 82     | 65   | 147   |
| 9th-15th August 2021            | 50     | 64   | 114   |
| 16th-22nd August 2021           | 46     | 36   | 82    |
| 23rd - 29th August 2021         | 67     | 59   | 126   |
| 30th August- 5th September 2021 | 68     | 44   | 112   |
| Total                           | 1429   | 1296 | 2725  |

### TYPE OF TEST USED

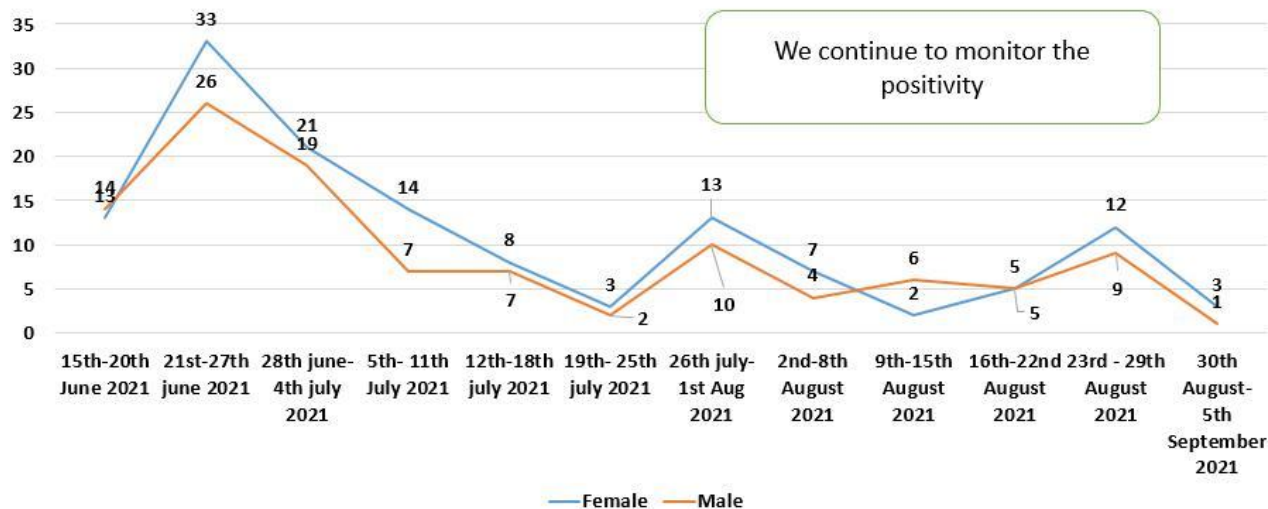
| Week                            | PCR Only | RDT  | Total |
|---------------------------------|----------|------|-------|
| 15th-20th June 2021             | 220      | 146  | 366   |
| 21st-27th June 2021             | 167      | 293  | 460   |
| 28th June- 4th July 2021        | 222      | 314  | 536   |
| 5th- 11th July 2021             | 157      | 146  | 303   |
| 12th-18th July 2021             | 90       | 91   | 181   |
| 19th- 25th July 2021            | 21       | 112  | 133   |
| 26th July- 1st Aug 2021         | 22       | 143  | 165   |
| 2nd-8th August 2021             | 23       | 124  | 147   |
| 9th-15th August 2021            | 24       | 90   | 114   |
| 16th-22nd August 2021           | 19       | 63   | 82    |
| 23rd - 29th August 2021         | 28       | 98   | 126   |
| 30th August- 5th September 2021 | 49       | 63   | 112   |
| Total                           | 1042     | 1683 | 2725  |

## RDT ANTIGEN TESTING OUTCOMES



The positivity got a rise in the week 3<sup>rd</sup> & 4<sup>th</sup> week of August but it went back to 6% in the last week.

## RDT POSITIVE BY GENDER



## Surveillance, Training, and Community Support to All Health Facilities, Health Workers and Communities in the Region.

In line with our mandate and in relation to COVID-19 activities, Mbarara Regional Referral Hospital is providing ongoing support to 12 districts and 30 HCIVs and district hospitals in surveillance, training, sample collections, providing Personal Protective Equipment (PPE) and coordination.

## Infection Prevention and Control (IPC)

This is a very important component of the COVID-19 response. The hospital IPC team extends support to the region in IPC in activities related to COVID. The IPC team ensures that the required equipment and supplies to prevent transmission of infection is available. These include PPEs, (masks, coverall, aprons, head caps and gloves), handwashing facili-

ties and regularly monitors infection prevention and control measures in the hospital and provides on-going training.

## Publicity

A number of radio and television talk shows, press briefings etc., have been carried out through the local media houses free of charge. We appreciate the media houses for this support in fighting COVID-19.

## Welfare of Health Workers and Patients

The hospital received funding from Ministry of Health to support COVID-19 responses. Additional support was received from Mbarara University of Science and Technology, Global Health Collaborative, USAID Regional Integration To Enhance Services in the Southwest (RHITES SW), Massachusetts General Hospital, Mbarara District Task Force, UPDF and other well-wishers for providing meals to facilitate smooth continuous running of hospital services.

## Summary of Funding Received for COVID-19 Response

| S/ no    | Date                         | Amount received                                  | Source /Org.                | Purpose   | Comments                     |
|----------|------------------------------|--|-----------------------------|---|------------------------------|
| 1.<br>2. | 2/4/2020<br>29/4/2020        | 252,936,950=<br>99,144,000=<br><br>352,080,950=  | Global Health Collaborative | <ul style="list-style-type: none"> <li>Infrastructure (Isolation unit) 100M</li> <li>Oxygen Refilling</li> <li>Acquisition of PPEs</li> <li>Emergency work force facilitation</li> <li>Data Collection and communication</li> <li>Surveillance and community response.</li> <li>Awareness.</li> </ul> | All funds received.          |
| 3.<br>4. | 12/8/2020<br>31/8/2020       | 270,000,000=<br>107,211,000=<br><br>377,211,000= | Ministry of Health          | <ul style="list-style-type: none"> <li>Motor vehicle fuel and maintenance</li> <li>Task force</li> <li>Food and refreshments</li> <li>IPC</li> <li>Air time for coordination</li> <li>Completion of Covid-19 isolation unit.</li> </ul>   | Funds received and accounted |
| 5.       | 19/09/2020<br><br>16/12/2020 | 450,000,000=<br><br>300,000,000=                 | Ministry of Health          | <ul style="list-style-type: none"> <li>Completion of Covid-19 Isolation Unit.</li> <li>Risk allowances</li> <li>Feeding patients</li> <li>Fuel</li> <li>Toiletries</li> <li>Administrative costs</li> </ul>   | Funds received and accounted |
| 6.       | 10/03/2021                   | 354,000,000=                                     | Global Health Collaborative | <ul style="list-style-type: none"> <li>Emergency Support including additional Staff,</li> <li>equipment and supplies</li> </ul>   | 100,000\$                    |
| 7.       |                              | 180,000,000=                                     | Epicenter                   | <ul style="list-style-type: none"> <li>Donations in Kind(High dependence beds and mattresses)</li> </ul>  | Given in kind                |
| 8.       |                              | 3,000,000=                                       | Allen interiors             | Plumbing items given in kind.   | Given in kind                |
| 9.       |                              | 5,000,000=                                       | Mbarara Business Club       |   | Given in cash and banked.    |
| 10.      |                              | 1,000,000=                                       | Vision empire               | Mr. Kafoko  | Given in cash and banked.    |
| 11       |                              | 36,500,000=                                      | WFP Mbarara                 | PPEs  | Given in kind                |

## Challenges in COVID -19 Management

- **Completion of the new isolation unit:** The funds from partners mentioned earlier have been depleted and the permanent infectious disease unit is far from being completed and equipped. Funding is required for this.
- **Medical supplies:** A budget for medical equipment and supplies requirements (e.g. ventilators, PPEs drugs, etc.) was submitted.
- **Welfare:** While the lockdown has been gradually eased, health workers and patients still struggle to find affordable meals. The hospital is currently providing meals at subsidized costs. But this too is not sustainable. There is need for more food to feed this population.

- High numbers of patients present for services compared to bed capacity of CTU thus causing congestion and flow cases.
- A number of staff have contracted COVID-19 infection and this has affected the workforce available to manage-ment cases.
- **Vaccination:** A total of 4,742 individuals were given first dose and out of which only 1,719 received their second dose due to shortage of the vaccine. 1,077 health workers got the 1st dose and 444 the 2nd dose. Of the 444 who received their second dose, 222 are Mbarara hospital staff.
- **Oxygen supply:** The hospital has an oxygen plan but it's not sufficient to meet the growing demand.

**Recommendations**

There is need to:

- Mobilize and encourage community participation as individuals, groups and partners in the management of COVID-19 for visibility, ownership and sustainability of epidemic response interventions
- Recognize, appreciate and commend the key players like Mbarara RRH fraternity with its partners and collabora-tors.
- Practice transparency, good leadership and accountability in building trust especially in resource mobilization
- Consider all health workers in the hospital as a team and force handling COVID-19 in facilitation and motivation endeavors especially payment of incentives
- Regularly and continuously avail COVID-19 related supplies especially PPEs for infection prevention and control

**Project Description for New COVID-19 Treatment Unit**

The structures of the project are majorly three which include

- Staff Donning and Doffing area
- Fully furnished, 20 bed each up to ICU standard
- Fully furnished, 12 bed each confirmed case ward

**Conclusion**

I thank H.E. President YK Museveni for guiding the country during the pandemic. The district city task force headed by RCC Lt. Colonel James Mwesigye. Mbarara Regional Referral Hospital has led the fight against the pandemic on many fronts and continues to do so. A lot has been achieved so far. With more support from the Ministries of Finance and Health, and from other partners the hospital will be better positioned to manage this and future similar threats.

**Submitted by**

**Dr. Barigye Celestine**  
**Hospital Director, Mbarara RRH**



*Progress of works on the COVID-19 Treatment Unit. Photo credits: Barigye Celestine*



*Rear views of the COVID-19 Tretment Unit. Photo credits: Barigye Celestine*



The pictures above show partitions by aluminum in one of the suspect wings. **Photo credits: Barigye Celestine**



Work station on the ward. **Photo credits: Barigye Celestine**



Picture showing the aerial view of the site. **Photo credits: Barigye Celestine**

## **CGH Global Disaster Response Deployment (June 24 – July 7, 2021)**

### **Team Members**

Lindsey Martin, NP – Blake 12 ICU, Center for Global Health (Team Leader)  
Mary Sebert, RN, MPH – Center for Global Health  
Catherine “Skeeter” Welder, RN – Blake 7  
Mary Elizabeth Bedenbaugh, RN – Blake 12 ICU  
Russell Demailley, RN – Operating Room  
Lynn Black, MD, MPH – Division of General Internal Medicine

### **Mission Overview**

In the context of global vaccine inequity, we have seen a sharp decline in cases in the United States while cases continue to surge in other areas of the world. The MGH Center for Global Health collaborates closely with the Mbarara Regional Referral Hospital (MRRH) in Mbarara, Uganda in areas of clinical research, fellowship, and nursing education. MRRH experienced a sharp increase in the number of COVID patients in June. This surge, on top of an already busy and complex census, is stretching their human resource capacity.

MRRH requested for urgent volunteer clinical staff to support the care of patients admitted to their facility as well as assist with the establishment of the new COVID Treatment Center. A total of six MGH clinicians from the Global Disaster Response and Humanitarian Action (GDRHA) team were deployed on June 24th for a period of 14 days, set to return on July 7th.

### **Clinical Mission**

The team arrived to Mbarara on June 26 and was immediately briefed by Dr. Stephen Asiimwe, Program Director for the Global Health Collaborative and Dr. Celestine Barigye, Hospital Director for MRRH. The situation was described as dire and worsening, both in the community and in the hospital. Uganda was on day 7 of a 42-day lockdown and hoping that the strict measures would reduce the infection rate across the country. Since the beginning of the second surge two weeks prior, there had been 876 cases of COVID, 419 admissions, and 101 deaths. The doctors noted that patients were presenting with more severe symptoms requiring higher levels of care, namely oxygen, versus the first surge when most patients were dispositioned to home. Although there is limited sequencing, it is assumed that the severity of the second wave is being driven by the delta variant or similar variants. As of June 29, 861,645 first doses of COVID vaccine have been distributed to eligible adults which is a rate of 1.9%.

The MGH team was asked to focus on three main areas: direct clinical support in the COVID treatment unit, setup of the new COVID treatment center (CTC), and training of clinical staff across the continuum of COVID care from triage to disposition. In the first week, the team focused on direct patient care in the COVID ward and operationalizing the CTC. The hospital administration had set an ambitious goal of opening the CTC on July 1st however several major shortfalls were identified including lack of stable oxygen supply, staffing, processes for triage and transport of patients, water and waste management, and the availability of medications and supplies. In concert with the hospital staff who were working directly with COVID patients, the team made recommendations to expedite the opening, procure the critical resources, and put in place efficient processes. The GDR team utilized frontline nurses and doctors in our planning to ensure the recommendations are appropriate to context and needs. For example, each patient is accompanied by an attendant, usually a family member, who is pivotal in their care. These attendants are critical given human resource shortages and remain at the bedside. However, it was noted that these attendants are subsequently infected and become severely ill. In some families, several members or generations have died after being caregivers for their relatives. The team is working to create protocols that are practical but also keep attendants safe in the new CTC.

In terms of clinical support, the team worked on the COVID treatment ward, a 24-bed unit with the highest acuity patients. Due to the lack of capacity, both staffing resources and sufficient oxygen supply, there were no patients on ventilators, however there were ventilators at the facility. Given the demand from the patients, the oxygen compressor in the oxygen plant was only operating at 50%. Therefore, most patients relied on wall oxygen and a cylinder as their lifeline. Typically, many of the patients were on 15L via nasal canula and 15L via facemask with saturations ranging from 70-90% and were unable to wean from the high flows. Both the acuity and the mortality in the unit were high. The clinical team noted a recent increase in maternal COVID particularly with severe and critical disease. Given the limited resources, the outcomes for these women were poor. The MGH team worked with the nurses, medicine, and OB to stabilize when able and manage their symptoms. There were several other areas of opportunity for collaboration and learning the team identified: palliative care, antibiotic management, diabetes management in the setting of steroids, and ICU nursing.

### **Clinical Mission Updates (provided by Lindsey Martin, GDR Team Lead)**

The team spent the second half of the deployment focusing on direct patient care in the COVID ICU to support and relieve staff. This will be a protracted crisis and recovery for MRRH. Current staffing capacity is strained by volume of patients (nurse: physician: patient ratios), illness, and fatigue. With the addition of the new space, the hospital would benefit from ongoing deployment of clinical support (MD intensivist, ICU RN) with COVID expertise. The overall length of the deployment was short but gave the team invaluable situational awareness. GDR will explore the possibility of a longer deployment of staff as the crisis persists.

Upon departure, the new treatment center was nearing completion and an opening ceremony was held. The purposed date for accepting patients from the main hospital was July 15th. However, oxygen production and supply remains a critical limitation. The Ugandan team is working with the Center for Global Health, Build Health International, the Ministry of Health, and hospital administration to establish a stable source of oxygen to the new unit while not depleting other areas of the hospital that still remain busy (neonatal ICU, maternity, surgery, etc.). Long-term solutions include the installation of an oxygen plant while shorter term solutions will involve piping O2 from donated cylinders outside each ward block.

The team provided critical care and COVID education to nurses in the Master program specializing in critical care who will be involved in patient care on the wards. Team members also reviewed protocols and worked with MRRH clinical staff to incorporate some new practices. The team leads were asked to present their recommendations to the hospital COVID taskforce in the areas of clinical care as it pertains to COVID, infection prevention and control, nursing practice, and the new treatment unit. The recommendations were well received and the ensuing discussion allowed the GDR team to answer our own questions about hospital resource limitations, critical needs, and approach to following national guidelines versus local custom. The meeting was a collaborative success overall and GDR committed to continued advocacy and assistance filling gaps.

All team members returned together on Wednesday, July 7. The team was deployed for a total of 14 days including travel days.



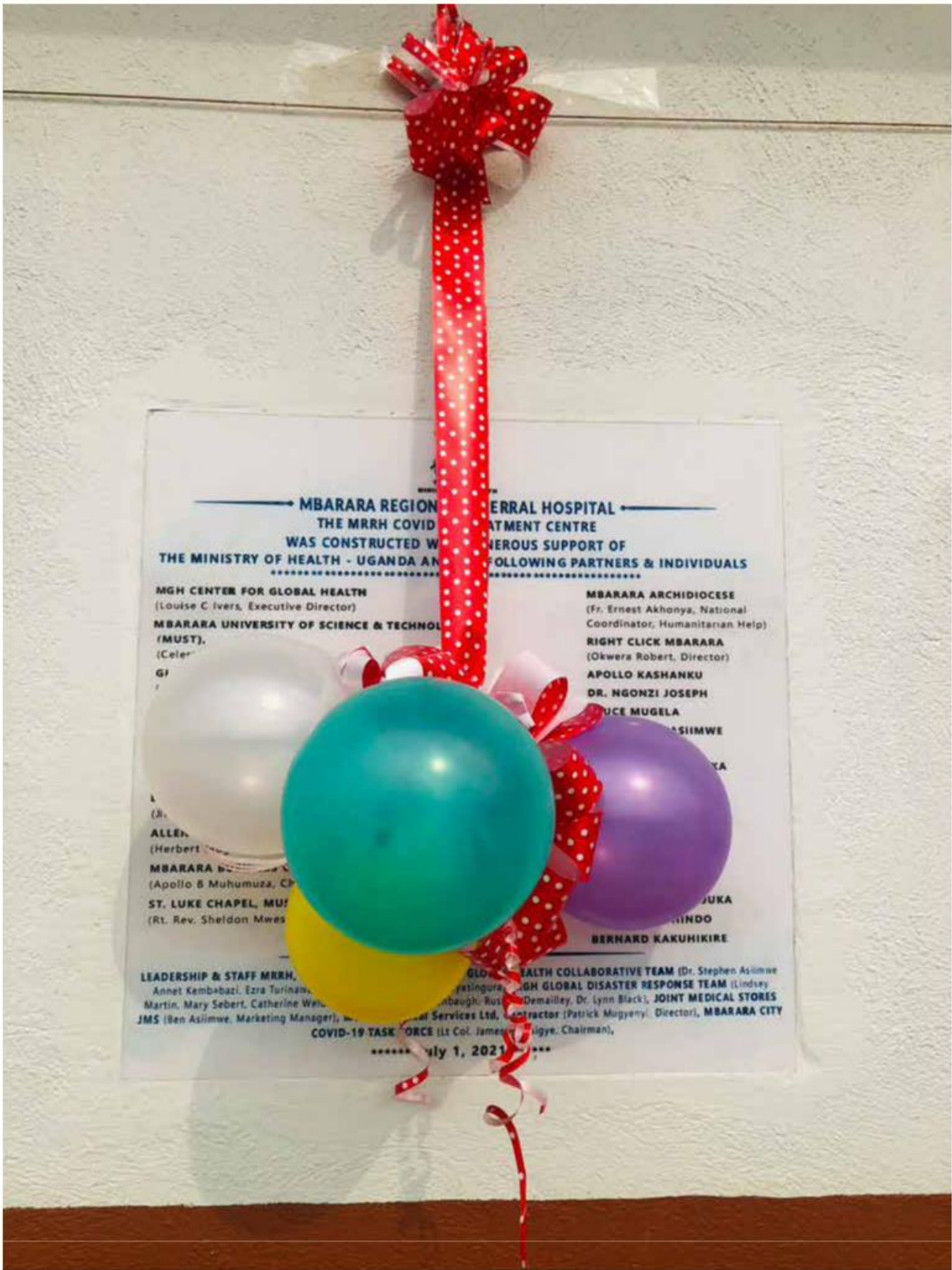
MGH GDR Team received by GHC and MRRH leadership. **Photo credits: Rhina Mushagara**



Dr. Stephen Asiimwe and Mary Sebert attaching labels to new COVID-19 Treatment Unit. **Photo credits: Rhina Mushagara**



Mbarara Resident District Commissioner, Col. Mwesigye James (center), Dr. Barigye, and hospital leadership at the launch of the COVID-19 Treatment Unit. **Photo credits: Rhina Mushagara**



Plaque of contributors to the COVID-19 Treatment Unit. Photo credits: Rhina Mushagara



MGH GDR team and hospital director unveiling the plaque to open the COVID-19 Treatment Unit.  
Photo credits: Rhina Mushagara



GDR, GHC, and MRRH leaders at the COVID-19 Treatment Unit opening. Photo credits: Rhina Mushagara



Oxygen cannisters at the COVID-19 Treatment Unit. Photo credits: Rhina Mushagara



List of contributors to the COVID-19 Treatment Unit. Photo credits: Rhina Mushagara

## COVID-19 Vaccination Report from MRRH

As of 22 November 2021

Mbarara Regional Referral Hospital launched COVID 19 vaccination on 12th March 2021 at the hospital canteen. The hospital been supplied 14,846 doses of AstraZeneca vaccines. 17,216 doses were administered since march 2021 consisting of 13,369 first doses and 3847 second doses. In November 2021, a total of 5005 individuals were vaccinated.

### MONTHLY SUMMARY TALLIES

| Month           | QTY Supplies | Doses Used | Balance | 1st Doses | 2nd Doses | Total  |
|-----------------|--------------|------------|---------|-----------|-----------|--------|
| November        | 4540         | 4160       | 370     | 4902      | 103       | 5005   |
| October 2021    | 2600         | 2560       | 0       | 2,446     | 386       | 2832   |
| March-Sept 2021 | 7746         | 7746       | 0       | 6,207     | 3172      | 9379   |
| Grand Total     | 14,846       | 14466      | 370     | 3847      | 3832      | 17,216 |

## COMMUNITY OUTREACHES

|   | Venue                  | Frist | Second | Total |
|---|------------------------|-------|--------|-------|
| 1 | Agaba Services Centre  | 304   | 6      | 310   |
| 2 | Must                   | 139   | 30     | 169   |
| 3 | Men at Night -Kamukuzi | 90    | 11     | 101   |

## Categories

| Category                  | First dose | Second Dose |
|---------------------------|------------|-------------|
| Health worker             | 1244       |             |
| Armed forces              | 140        |             |
| Elderly                   | 1,370      |             |
| Others                    | 4,454      |             |
| People with Comorbidities | 334        |             |
| Teacher                   | 1111       |             |
| Grand total               | 8,653      | 3558        |

## November Daily Tallies

| Date               | OTY Supplies | Doses Used | Balance | 1st Doses | 2nd Doses | Total |
|--------------------|--------------|------------|---------|-----------|-----------|-------|
| October BF         | 40           |            |         |           |           |       |
| 4th November 2021  | 2000         | 260        | 1780    | 293       | 32        | 325   |
| 5th November 2021  |              | 560        | 1220    | 603       | 44        | 647   |
| WEEK 1 TOTAL       |              |            |         | 896       | 76        | 972   |
| 8th November 2021  | 2000         | 460        | 2760    | 520       | 45        | 565   |
| 9th November 2021  |              | 340        | 2420    | 394       | 14        | 408   |
| 10th November 2021 |              | 320        | 2100    | 377       | 7         | 384   |
| 11th November 2021 |              | 270        | 1830    | 320       | 05        | 325   |
| 12th November 2021 |              | 420        | 1410    | 468       | 40        | 508   |
| WEEK 2 TOTAL       |              |            |         | 2079      | 111       | 2190  |
| 15th November 2021 |              | 280        | 1130    | 302       | 19        | 321   |
| 16th November 2021 |              | 290        | 840     | 340       | 13        | 353   |
| 17th November 2021 |              | 240        | 600     | 271       | 17        | 288   |
| 18th November 2021 |              | 110        | 490     | 117       | 15        | 132   |
| 19 November 2021   |              | 240        | 250     | 270       | 23        | 293   |
| WEEK 3 TOTAL       |              |            |         | 1300      | 87        | 1387  |
| 22nd November 2021 | 500          | 380        | 370     | 441       | 15        | 456   |
| 23rd November 2021 | 200          | 330        | 200     | 378       | 20        | 398   |
| GRAND TOTAL        | 4740         | 4500       | 240     | 5280      | 123       | 5403  |

7866 and 2721 individuals were entered into the information management systems 16,760 single doses administered with 30.5% of the people vaccinated has completed their second dose. 8000 individuals are expected to complete their second dose by 28th February 2021. Note: Out of 1077 health workers given first dose, 222 were staff of MRRH.

## Community Outreaches

- Kakyeka Stadium during the Corporate league
- Saint Joseph University
- Igongo Hotel
- Poor Claire's Monastery, Nyamitanga
- Kikagate Power Plant
- Bank of Uganda, Mbarara

## Challenges

Inadequate supply of vaccine

Inadequate reporting of vaccine related adverse effects

### Action Point

Scale up Community out reaches. – Install two computers for data entry  
Lobby for a printer

### Prepared by:

Akena Denis Uma  
Senior Medical Social Worker, MRRH

### Reviewed by:

Dr. Nelson Wandera  
Medical Officer, MRRH



*Dr. Nelson Wandera.*  
*Photo credits: John Kayemba*

## Vaccine Advocacy Accelerator – Uganda (VAX-Uganda) Project Launch



*2021 Mbarara vaccine advocacy moment attendees.*  
*Photo credits: John Kayemba*



*Several individuals involved with COVID-19 vaccine advocacy efforts in Uganda. From left: Kenneth Mwehonge, Dr. Stephen Asimwe (Program Director, GHC), Azfar Hossain, and Dr. Nelson Wandera (Medical Officer, COVID-19 Vaccination, MRRH). Photo credits: John Kayemba*

**Date:** Tuesday, 30 November 2021

### Location

Igongo Cultural Centre and Country Hotel, Mbarara, Uganda

### Participants

Around 95 participants, including members of Global Health Collaborative (GHC) research teams and representatives from Mbarara University of Science and Technology (MUST) and Mbarara Regional Referral Hospital (MRRH).

Key local health leaders taking part included Dr. Celestine Barigye (Hospital Director, MRRH); Dr. Nixon Kamukama (Deputy Vice Chancellor, MUST); Dr. Joseph Ngonzi (Dean of Faculty of Medicine, MUST); and Dr. Francis Bajunirwe (Chair, MUST Research Ethics Committee and Senior Lecturer, MUST Department of Community Health).

Advocacy expert Kenneth Mwehonge (Program Manager for Health Policy Advocacy, HEPS-Uganda) traveled from Kampala to participate.

### Summary

During the 6th Annual GHC Research Symposium, Azfar Hossain (Medical Student, Harvard Medical School) and Kenneth Mwehonge (Program Manager for Health Policy Advocacy, HEPS-Uganda) gave a joint presentation on the urgent need to increase access to COVID-19 vaccines in Uganda and globally, and on upcoming advocacy activities planned by GHC, HEPS-Uganda and Massachusetts General Hospital (MGH).

Following this presentation, symposium participants took a large-group photograph with a banner and posters calling for an end to ‘vaccine nationalism’ by wealthy nations. Language for these posters had been previously provided by HEPS-Uganda. Almost all symposium attendees participated in this advocacy moment, including leaders from MUST and MRRH.

On Twitter, a picture of the gathering – with an associated caption highlighting vaccination disparities between Uganda and the US – was seen by more than 18,000 users in 49 hours and became GHC’s [most Retweeted/Favorited post of 2021](#). The post was amplified by the Twitter accounts of HEPS-Uganda, MUST, the Association of Surgeons in Uganda, and Ugandan Nobel Peace Prize nominee Dr. Frank Mugisha. Key global advocates who shared the Tweet included Dr. Joia Mukherjee (Chief Medical Officer, Partners In Health), Fatima Hassan (Founder and Director, Health Justice Initiative), Andrew Goldstein (a well-known American advocate for vaccine equity), Global Health Strategies (a leading communications and advocacy firm with over 94,000 Twitter followers), HealthGAP (a leading HIV advocacy organization), and Boston-based organizers including Jon Shaffer and Garrett Wilkinson. Tagging well-known vaccine advocates in the Tweet, and reaching out to colleagues asking them to amplify the content, likely helped to increase the reach of the post.

The event served as a launch for the Vaccine Advocacy Accelerator – Uganda (VAX-Uganda): a joint advocacy project between GHC, HEPS-Uganda, and MGH that will aim to increase access to COVID-19 vaccines throughout Uganda. Additional project activities – including training for Ugandan civil society organizations, meetings with key stakeholders, and media and social media campaigns – will begin in 2022.



*Azfar Hossain (medical student, Harvard Medical School; left) and Kenneth Mwehonge (Program Manager for Health Policy Advocacy, HEPS-Uganda; right) spoke to symposium attendees about the urgent need for increased access to COVID-19 vaccines in Uganda. Photo credits: John Kayemba, Azfar Hossain*

### Project Launch Acknowledgements

- GHC Core Team: Dr. Stephen Asimwe, Annet Kembabazi, Rhina Mushagara, Julius Turyasingura, Ezra Turinawe
- HEPS-Uganda: Kenneth Mwehonge, Joan Kilande, Cliff Abenaitwe, Denis Kibira
- MGH/MGH Center for Global Health: Dr. Louise Ivers, Dr. Amir Mohareb, Edward Alexander, Azfar Hossain

## Information Technology Update



It was another fulfilling year for Information Technology Services (ITS) in serving the GHC with its projects and programs. We continued to focus on GHC’s main strategic objectives and core values as a continued foundation of building IT infrastructure and offering the required user support.

This report mainly outlines some of the accomplishments that have been made during the course of the year 2021, working collaboratively with various project/program coordinators and managers.

Access and connectivity are key elements in supporting research and collaborative activities. To this end, both wireless and wired networks have been revamped so that access is easy for all staff and partners.

The core network backbone for the entire GHC was upgraded in line with the required standards as per the IT guidelines. This has helped projects and programs to have their activities run smoothly.

One of the major responsibilities of any IT department is to maintain equipment in a good working condition. This has been achieved by adhering to the set quarterly schedules of performing preventive maintenance (PM) and servicing of all IT equipment.

Procurement of the right equipment. Electronic activities can be a mess for any project if the equipment doesn’t conform to the required specifications for a particular task. I have been able to work with project coordinators and managers in ensuring that they procure appropriate cost effective equipment.

Network monitoring and management. GHC is a big organization with a good number of staff, office sites and computers. This makes it difficult to offer IT user support and also monitor the number of computers and the network at large. This has however been made easier by deploying dynamic network management tools and remote access tools. Computer and network security. You are always sure to find new computer threats from day to day which would otherwise paralyze the performance of computers and networks if not well handled. We have managed to maintain a secure network by deploying both software and hardware to avert any eventualities.

It is almost important to note that we still have a challenge to do with un-reliable office Internet. Having said that, we were able to identify an Internet Service Provider who extended a fibre connection to the GHC office. As a result, the Office Internet speeds have significantly improved but also, the cost per each mbps has reduced by more than 50%. Below is a table summarizing all the projects that have benefited from IT support under Core Infrastructure.

| Project/Program             | No. Of computers | No. Printers |
|-----------------------------|------------------|--------------|
| HopeNet                     | 15               | 02           |
| Traditional Readiness Study | 02               |              |
| REVAMP                      | 03               | 01           |
| Health Families             | 03               | 01           |
| CAD                         | 05               | 02           |
| DISCO                       | 03               |              |
| GHC Core                    | 05               | 02           |

In general, IT support particularly with computers and accessories has rotated around the following among others;

- Ensuring that the computers are working normally at all times and also regularly updated with the right software that conform to International IT standards.

- Well serviced and maintained and this has been done four times this year(Quarterly)
- Ensuring that the computers/printers are configured in line with our network standards to facilitate the day to day running of project/program activities.

## Shared GHC Research Infrastructure Update

### Space, Staff, and Resources

In 2021, GHC hosted 33 full time staff in two locations: the lower office inside the expatriate quarters, and the upper office at the TASO building.

At the moment, 4 staff members are supported financially under the infrastructure budget:

1. Research manager (ethical oversight and infrastructure)
2. IT manager
3. Relationship manager
4. Office attendant

### Shared resources include:

- Utilities
- Security
- Janitorial
- Rent
- IT support (internet, equipment, etc.)
- Infrastructure support staff
- Other infrastructure operational costs (trainings, meeting)

Details on Upcoming and Closed Protocol Studies

| NEW Upcoming study                       |  |      |    |     |                     |                     |
|--|--|------|----|-----|---------------------|---------------------|
| 11                                       | Colorectal Carcinogenesis in the Young: Diet, Microbiome, Genetic and Epigenetic Alterations, Metabolism and Inflammation in Cohorts on Three Continents | MRRH | 01 | TBD | David Mutibwa       | Dr. David Ljungman  |
| Closed protocol but still open with MUST |  |      |    |     |                     |                     |
| 12                                       | Examining HIV treatment adherence During Early disease (META Study)  |      |    |     | Dr. Stephen Asiimwe | Dr. Jessica Haberer |
| 13                                       | “Uganda AIDS rural treatment outcomes cohort study (UARTO II)” 14/01-03  |      |    |     | Dr. Conrad Muzoora  | Dr. Jessica Haberer |

## ACTIVITY HIGHLIGHTS

### March 2021

March 7: “Improving quality of healthcare begins with attaining quality & advanced medical education’ PD @drsasiim-we remarked as he joined the Dean FoM on handing over scholarships to Drs for MMED studies with several female trainees recipients Several female doctoral trainees were recipients of Kayanja and First Mile MMED Scholarships in Pathology, Anaesthesia and Pediatrics at MUST. Happy Women’s day”

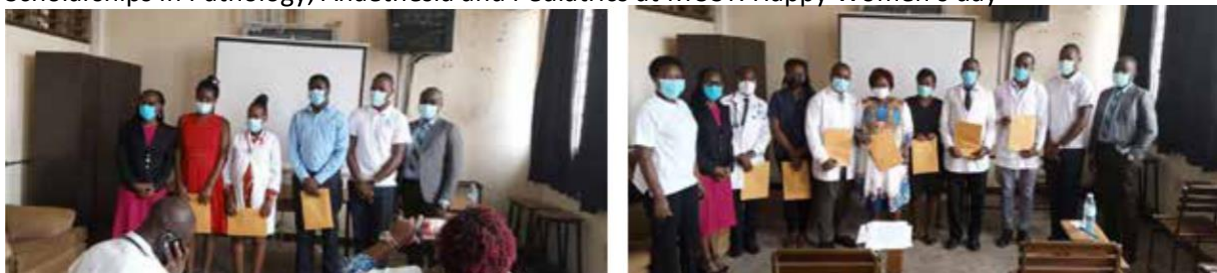


Photo credits: Rhina Mushagara

March 18: "Fighting a pandemic is a team effort.' GHC PD @dr\_sasiimwe handing over a consignment of donated kits & COVID test swabs from @GlobalHealthMGH to Mbarara Hospital today. Received by- @barigyec1, the Hospital Director"



*Photo credits: Rhina Mushagara*

### June 2021

June 15: "Needs assessment for emergency COVID mitigation support at MRRH. "We must listen to and support our partners and colleagues on the frontline through this COVID crisis until we get through it TOGETHER"



*Photo credits: Rhina Mushagara*

June 21: "GHC PD @dr\_sasiimwe receives first of 2 JMS shipments of CGH @GlobalHealthMGH supported emergency equipment and supplies for the MRRH COVID-19 treatment Center to the Hospital Director,- @barigyec1. Installation begins ASAP to increase bed capacity."



*Photo credits: Rhina Mushagara*

June 23: "Sustainable programs have local support. We thank Mbarara Business Club for supporting our efforts to furnish the new CTC at MRRH. Leaders @dr\_sasiimwe & @barigyec1 picked up a UGX 5M cheque from MBC chair, Mr Apollo B Muhumuza (Balya)"



Photo credits: Rhina Mushagara

**July 2021**

July 1: "We had discussions with MRRH COVID treatment team to improve on 1)Clinical management 2)Nursing care 3)Infection control 4) Operationalization of the new COVID-19 treatment facility at MRRH. Great progress in mitigating this pandemic"



Photo credits: Rhina Mushagara

## August 2021

August 20: "True Partnership in Action: Welcoming Peter Olds k, MD to serve at MRRH COVID treatment unit with colleagues Rose Muhindo, MD and Nelson Wandera, MD."



*Photo credits: Rhina Mushagara*

## September 2021

The core team enjoys a staff bonding trip to Lake Bunyonyi.

## October 2021

October 12: "Working on increasing global COVID-19 vaccine access on partner at a time. With [@hepsuganda](#) team laying strategies to amplify our voices to call on key stakeholders increase Covid vaccination in Uganda and beyond"



*Photo credits: Rhina Mushagara*

November 2021

Dr. Stephen Asiimwe prepares for the Vaccine Advocacy Accelerator – Uganda (VAX-Uganda) launch.

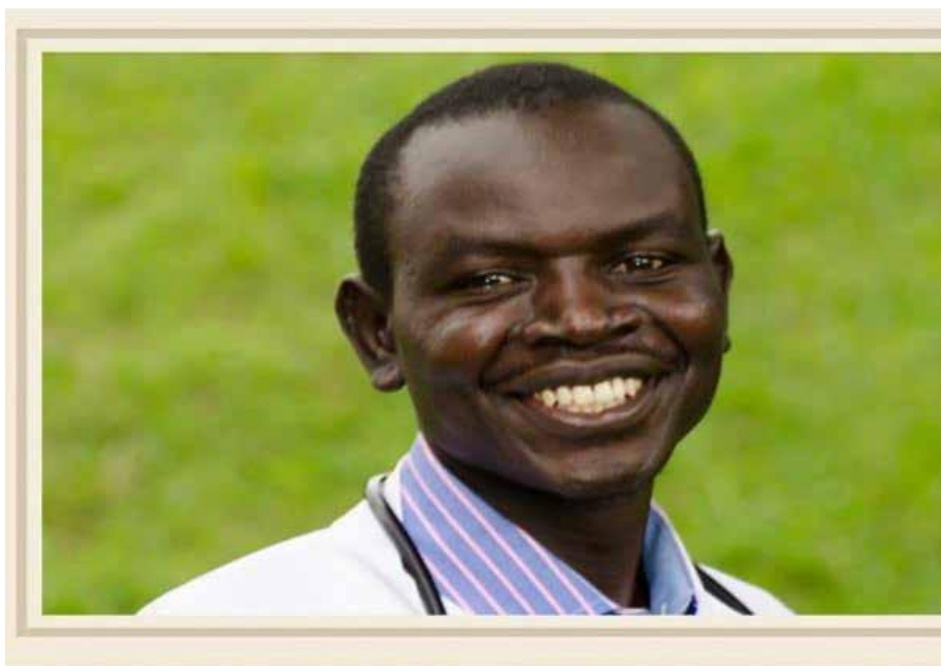


*Photo credits: Rhina Mushagara*

## IN MEMORIAM

In July 2021, the GHC community lost two of its own members to COVID-19.

Dr. Moses Ndema was a physician-in-training at MRRH, who had received a First Mile scholarship through the MGH Center for Global Health in support of his medical training. He is remembered for the enthusiastic way in which he cared for patients, hoping to make a lasting contribution to the surrounding community.



*Moses Ndema, MBChB - First Mile Scholar. Photo credits: Rhina Mushagara*

Carol Orishaba, RN, was a nurse at MRRH and a member of several GHC research teams. She is remembered for her outstanding contributions to both patient care and to groundbreaking investigations related to HIV. She had been a member of the MRRH and MUST communities for 15 years.



Carol Orishaba, RN – Research Nurse, CAD/Aging Studies. **Photo credits: Edna Tindimwebwa**

We miss Moses and Carol every day and continuously honor their memory and work.

## APPENDIX

### GHC-MGH/MUST Visitors Report 2021

| Name                 | Month     | Association                  | Position                               | Purpose   |
|----------------------|-----------|------------------------------|--|---|
| David Griffiths      | March     | University Hospital of Wales | Locum Consultant in Cellular Pathology | Teaching in pathology department                                |
| Adeline Boatin       | March     | MGH CGH                      | Fellow OB-Gyn MGH                      | Research Study Oversight  |
| Lisa Bebell          | March     | MGH CGH                      | Physician                              | Research Study Oversight  |
| Lindsey Martin       | June      | MGH GDR                      | Head Nurse                             | Support Mbarara Hospital during COVID pandemic                  |
| Mary Sebert          | June      | MGH CGH                      | Head Nurse                             | Support Mbarara Hospital during COVID pandemic                  |
| Elizabeth Bedenbaugh | June      | MGH GDR                      | Nurse                                  | Support Mbarara Hospital during COVID pandemic                  |
| Catherine Welder     | June      | MGH GDR                      | Nurse                                  | Support Mbarara Hospital during COVID pandemic                  |
| Lynn Black           | June      | MGH GDR                      | Physician                              | Support Mbarara Hospital during COVID pandemic                  |
| Russell DeMailley    | June      | MGH GDR                      | Nurse                                  | Support Mbarara Hospital during COVID pandemic                  |
| Peter Olds           | August    | MGH                          | Physician                              | Support Mbarara Hospital during COVID pandemic                  |
| Lisa Bebell          | September | MGH CGH                      | Physician                              | Research Study Oversight  |
| Kayln Parks          | September |                              | PhD student                            | Lisa Bebell's Mentee  |
| Hossain Azfar        | September | Harvad Medical School        | Medical Student                        | Working with HEPS Uganda on advocating for global health equity |

|                   |          |                              |  |   |
|-------------------|----------|------------------------------|--|---|
| David Griffiths   | October  | University Hospital of Wales | Locum Consultant in Cellular Pathology | Teaching and mentorship in pathology department |
| Suzanne McCluskey | October  | MGH CGH                      | Research Fellow                        | Research Study (DISCO) Oversight                |
| Rebecca Gilbert   | October  | MGH CGH                      | Project Coordinator                    | Research Study (CAD/Aging) Coordination         |
| Mark Siedner      | November | MGH CGH                      | Research Fellow                        | Research Study (CAD/Aging) Oversight            |
| Kara Montbleau    | November | BCH                          | Research Fellow                        | Research Study Oversight                        |
| Crystal North     | November | MGH CGH                      | Research Fellow                        | Research Study Oversight                        |
| Adeline Boatin    | November | MGH CGH                      | Fellow OB-Gyn MGH                      | Research Study Oversight                        |
| Emily Satinsky    | December | MGH CGH                      | Project Coordinator                    | Research Study Oversight                        |

## 2021 Publications and Abstracts

### GHC Publications in 2021

Ainamani HE, Bamwerinde WM, Rukundo GZ, Tumwesigire S, Kalibwani RM, Bikaitwaho EM, Tsai AC. Participation in gardening activity and its association with improved mental health among family caregivers of people with dementia in rural Uganda. *Prev Med Rep.* 2021 May 30;23:101412. doi:10.1016/j.pmedr.2021.101412. PMID: 34159048; PMCID: PMC8193614.

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### GHC Publications in Process

- “Aging in Uganda: What does it mean to age well?” (Aging study)
- “Perspectives about transition readiness among perinatally infected adolescents and young people living with HIV in rural, southwestern Uganda” (Transition Readiness study)
- “Challenges faced by adolescents and young people living with HIV during transition from pediatric to adult HIV care in south-western Uganda” (Transition Readiness study)

### GHC Presented Abstracts in 2021

- “Caesarean Delivery Variation Across Facilities in Uganda,” presented at Society for Maternal Fetal Medicine Conference, January 2021
- “Use of Smart Pill Boxes to Support ART Adherence in Routine Care: Early Implementation Science Lessons from Southwestern Uganda,” presented at Adherence 2021, November 2021

### GHC Submitted Abstracts in 2021

- “Attitudes of Ugandan Clinicians around Mode of Delivery” – submitted to American Congress of Surgeons Academic Meeting
- “Awareness and Utility of Robson’s Criteria amongst Medical Doctors working Obstetrics & Gynaecology in Uganda” – submitted to 16th Annual Scientific Conference of Association of Obstetricians & Gynaecologists in Uganda
- “Finances, Litigation and What else? Comparing Drivers of Caesarean Delivery amongst Doctors working in Public vs Private Facilities in Uganda” – submitted to 16th Annual Scientific Conference of Association of Obstetricians & Gynaecologists in Uganda

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### MUST Leadership

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GHC Core Team. Photo credits: John Kayemba



GHC core team and MRRH COVID-19 unit and biomedical engineers discussing the operationalization of COVID-19 Treatment Unit. Photo credits: Rhina Mushagara



Local press coverage of COVID-19 Treatment Unit operationalization at MRRH. Photo credits: Rhina Mushagara



L to R: Michael Matte, Julius Turyasingura, Charles Baguma, Rhina Mushagara, Annet Kembabazi, Gabriel Nuwagaba, Stephen Asimwe. Photo credits: Laban Mwesigwa



Hospital director (Dr. Barigye Celestine) (center), flanked by Dr. Stephen Asimwe (L), showing equipment delivered to COVID-19 Treatment Unit by GHC to Mbarara Resident District Commissioner, Col. Mwesigye James. Photo credits: Rhina Mushagara



MGH GDR team meeting with Head COVID-19 Task Force, Mbarara City, Col. Mwesigye James. Photo credits: Rhina Mushagara



GHC and MRRH hosting Mbarara Corporate Club members who donated to the COVID-19 Treatment Unit at MRRH.  
**Photo credits: Rhina Mushagara**



Hospital director (Dr. Barigye Celestine, center) explaining a point to the Mbarara Corporate Club Members.  
**Photo credits: Rhina Mushagara**



GHC Program Director (Dr. Stephen Asimwe, center-left) explaining a point to the Mbarara Corporate Club Members.  
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Dr. Lynn Black explaining clinical management of COVID-19 cases with MRRH management. **Photo credits: Rhina Mushagara**



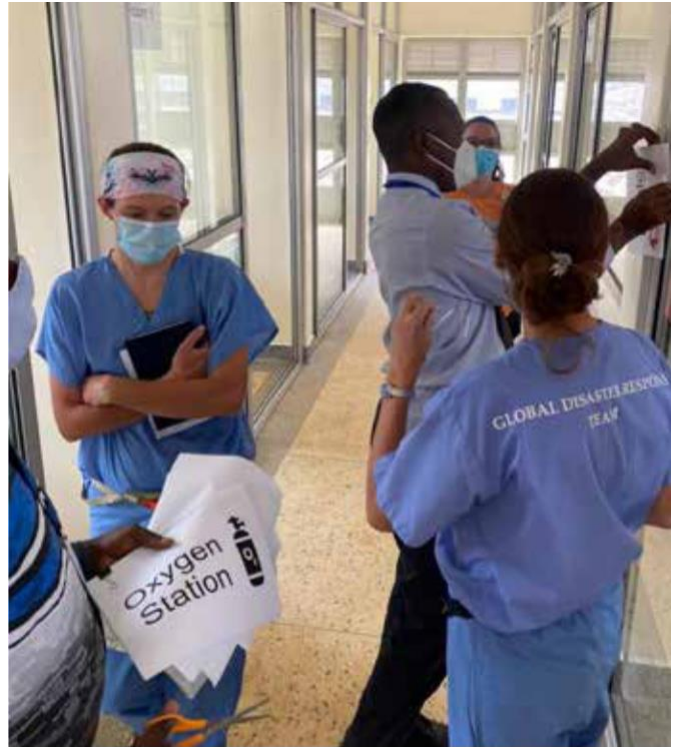
GHC and GDR teams placing labels on the new COVID-19 Treatment Unit. **Photo credits: Rhina Mushagara**



GHC and GDR teams planning the layout of the new COVID-19 Treatment Unit. **Photo credits: Rhina Mushagara**



Mbarara Corporate Club members touring the new COVID-19 Treatment Unit facility. **Photo credits: Rhina Mushagara**



GHC and GDR teams placing labels on the new COVID-19 Treatment Unit. **Photo credits: Rhina Mushagara**




GHC team bidding farewell to the MGH GDR team at the end of their deployment. **Photo credits: Rhina Mushagara**



GDR team US Independence Day cake. **Photo credits: Stephen Asiimwe**



Touring new MRRH laboratories. L to R: Contractor, Mark Siedner, Stephen Asiimwe, Robert Wagubi (pointing), Barigye Celestine. **Photo credits: Masette Godfrey**



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