engineeringworldhealth

Summer Institute
Uganda 2023
Final Report

IN-COUNTRY STAFF

Ashley Heida
On-the-Ground Coordinator

Claire Atim
On-the-Ground Coordinator

Dr. Robert Ssekitoleko
Instructor

PARTNERS

Makerere University

EWH STAFF

Tojan B. Rahhal, PhD
President & CEO

Susan Hyman
Institutes Project Manager

Claire Atim
Engineering Consultant

Rachel Goforth
Manager, Development & Communications

J'naya Marville
STEM Education and Outreach Coordinator

EXECUTIVE SUMMARY

Engineering World Health's 2023 Summer Institute in Uganda, where we have a long history of successful programs, was our first Institute in Uganda since prior to the COVID-19 pandemic.

Ojas, Ishir, Natasha, and Pauline outside their placement hospital

This Institute hosted participants from six different countries, including the United States, Canada, Denmark, India, and Rwanda. The international students were joined by five Ugandan students from Makerere University, whose participation was graciously supported by the Lynn Toby Fisher Scholarship Fund, for a total of 12 participants. After one month of intensive language and technical training, participants served as volunteer biomedical equipment technicians in hospitals around Uganda for five weeks.

Students stayed together at a hotel during the first month, and in guesthouses for the second month. During the first four weeks of the program, the group underwent intensive technical and Luganda language training in Kampala, the capital city of Uganda. Their technical training included both lab and lecture, with weekly visits to a local hospital to provide the participants with hands-on experience before beginning their hospital placements. After training, participants were assigned to one of three EWH partner hospitals, located throughout Uganda, to work in small groups.

During their five weeks of hospital work, participants completed an estimated $254,000 worth of service and repairs. A total of 127 pieces of equipment were returned to service across three different partner hospitals, including Masaka Regional Referral Hospital, Mbarara Regional Referral Hospital, and Kawolo General Hospital.

In addition to medical equipment repairs, participants completed a total of three secondary projects and participated in group excursions, including visiting Itanda Falls and Lake Mburo, visiting the source of the Nile River, hiking in several national parks, and going on safaris.

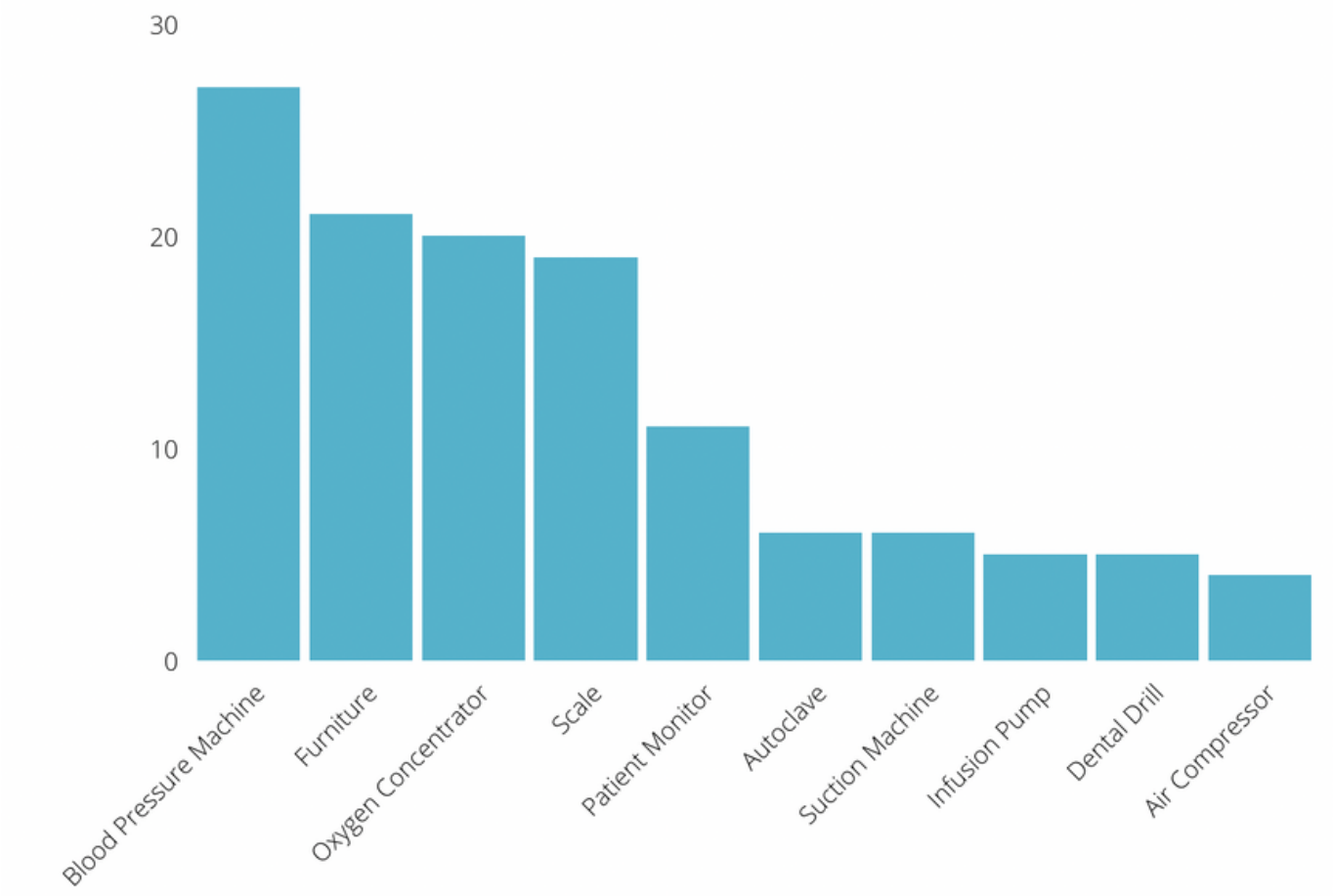
MEDICAL EQUIPMENT REPAIR

Participants were able to repair 127 of the 166 pieces of equipment that they encountered, for an impressive success rate of 77%.

Each team completes a Work Summary Form during their time in the hospital to document the pieces of equipment they encounter, the reason the piece of equipment is broken (e.g, power supply issue, blown fuse, etc), and if the repair is successful. The most common barriers to repair are typically lack of necessary parts and those which require more advanced knowledge. Their work, as taken from the Work Summary Forms, is summarized below.

Evan and a BMET working on an autoclave

Repairs/Maintenance by Type of Equipment - Top 10



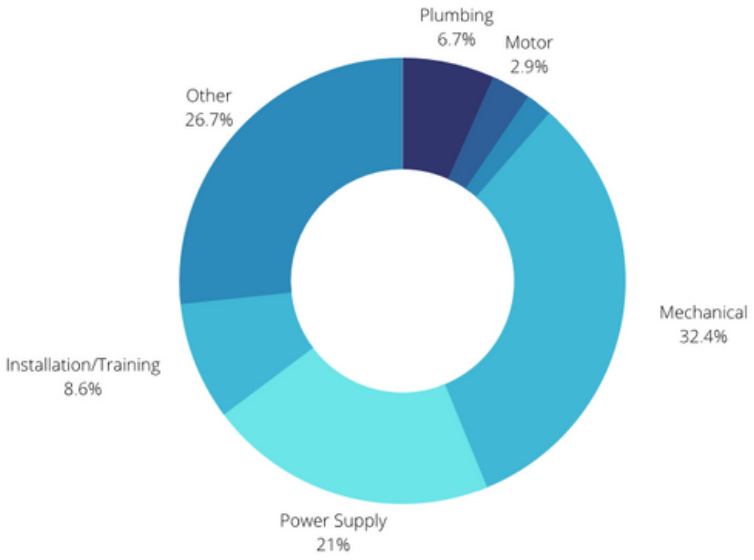
MEDICAL EQUIPMENT REPAIR

Blood pressure machines, furniture, oxygen concentrators, scales, and patient monitors were among the most common types of equipment repaired during the 2023 Uganda Summer Institute.

Mechanical, power supply, and “other” problems were the primary issues identified among broken equipment.

Notable high-impact repairs included a patient bed that had been kept in storage for months because clinicians couldn't get it to adjust up and down to transfer patients. This fix had a signficant impact on the maternity ward, increasing the number of beds from 3 to 4.

Repairs/Maintenance by Type of Repair



2023 Uganda SI Participants at their final conference

The program made me realize that in the grand scheme of things, biomedical engineers play a big role in saving lives at hospitals.

SECONDARY PROJECTS

Each team is encouraged to complete a secondary project for their hospital during their placement. Through interviews with hospital staff, the participants identify a need in the hospital and are given a budget of $100 per person to use in a creative way to provide for that need. Participants completed a total of three secondary projects, detailed below.

Group 1

Group 1 decided to to replace outside light bulbs around the hospital campus for their secondary project. The hospital had approximately 150 bulbs in total, 100 of which were burnt out or not working, leaving key areas around the hospital in total darkness during the evening hours.

The team purchased bulbs and over two days went around the campus replacing bulbs and cleaning the fixtures to improve the safety and security of the hospital for patients, staff, and visitors.

Markus, Evan, and Ernest replacing light bulbs

Group 2

After exploring several different options for their project, Group 2 decided to make the area around their hospital's ICU safer by building covers for deep drainage trenches running across high-traffic areas. These open trenches presented a high risk for falls and driving over them was difficult for cars and ambulances.

Ojas, Ishir, Natasha, Pauline presenting their finished project to hospital staff

After measuring the dimensions of the trenches and designing their covers, they visited local hardware stores to secure building materials. An experienced welder assisted with cutting and joining the metal bars into the proposed shape of the cover, and the group painted them with black paint. They installed and tested the trench covers, which are strong enough to withstand the weight of large vehicles, and much easier for wheelchairs and pedestrians to pass over.

SECONDARY PROJECTS

Group 3

Mark and Rolando hanging new fabric on the repaired frames

Group 3 noticed that the patient privacy screens at their placement hospital were in need of repair. Some had missing or dirty fabric, while others needed new casters or were generally in disrepair.

After assessing what needed to be done, they purchased new casters and welded the metal frames that needed to be repaired. They spray painted the fixed frames and installed clean, new fabric before returning the screens.

PARTICIPANT DEBRIEFS AND FEEDBACK

Overall, participants enjoyed the 2023 Uganda Summer Institute and gained valuable hands-on skills in troubleshooting and medical equipment repair.

Participants particularly loved working with their On-the-Ground-Coordinators, Ashley and Claire, who they said were supportive and knowledgeable. They all indicated that they felt well-prepared for their hospital work.

Primary challenges cited were the language barrier and transportation issues.

Ernest working on a digital scale

When asked to describe the program, students used words like *incredible, fun, enlightening, eye-opening,* and *unique.* 100% indicated that they would recommend the program to a friend.

About his biggest accomplishment, one student said, "My favorite fix was working in the neonatal unit on an incubator and an infant warmer. The two devices were being used, but only as a place for the babies to rest... After servicing the incubator and fixing the phototherapy lights on the infant warmer, the staff can now use all of the features on the medical devices."

Several students remarked on being grateful for the relationships they build during their time in Uganda. One said, "The connections and conversations I have made during this program - I will forever be grateful."

EWH would like to thank all of the students, coordinators, instructors, partners, and donors who helped make this program possible!