



**Engineering World Health Summer Institute
Guatemala 2020
Final Report**

Engineering World Health CEO:

Leslie J. Calman, PhD

EWH Student Programs Manager:

Ben Fleishman

EWH SI Coordinator:

Megan Lavery

On-the-Ground-Coordinators:

Cristina Guzman-Moumtzis

On-the-Ground-Partners:

Do Guatemala -- Petra Post and

Juan Mario Cervantes

Report Written by EWH Operations Manager:

Victoria Pace

Executive Summary

This was Engineering World Health's sixth year holding a January Institute in Guatemala, and the 2020 program was successful and productive. This year the program was held in partnership with Rochester Institute of Technology and George Mason University. We had 13 participants: 6 male and 7 female, all undergraduates, 7 from Rochester Institute of Technology and 6 from George Mason University.

Unlike our longer Summer Institutes, in which participants complete the instruction portion in their placement country, participants in Campus-to-Country programs take a semester-long course at their home university to prepare for the repair work during the 3 week in-country portion of the program. Upon arriving in Guatemala, the participants spend the first week of the program in intensive language, cultural, and technical trainings conducted in Quetzaltenango. The participants stay in homestays during this time. To provide more cultural immersion, the group went on an excursion to Lake Atitlan while on the program. After their first week of training, the participants traveled to their hospital placements.

The participants were placed in 3 hospitals throughout Guatemala. Collectively, they repaired 69 pieces of equipment, worth approximately \$138,000 USD^[1].

Equipment ranged in complexity from autoclaves to examination lamps. One notable, high impact repair moment came from our participants' work in the operating room of their hospital. They said that nearly every piece of equipment they fixed was put to immediate use within the OR.

In summary, the Guatemala program was productive and made a contribution to health care delivery in the hospitals served.

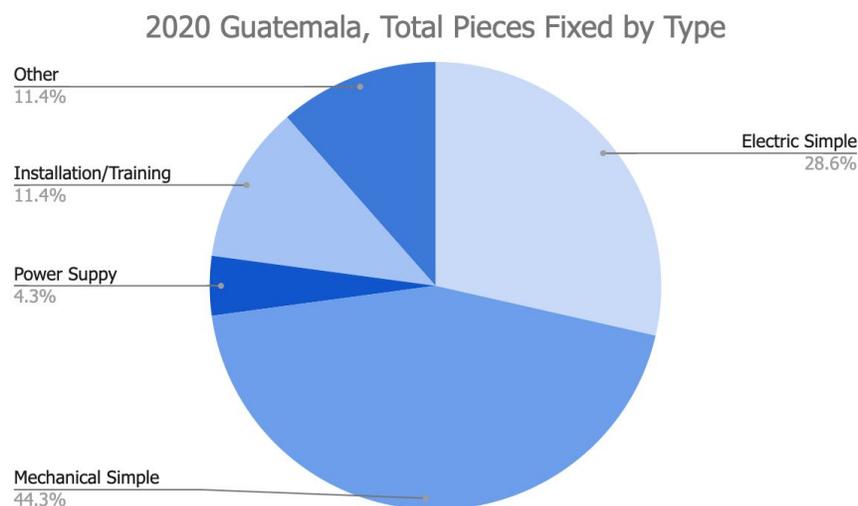
Medical Equipment Repair

Our participants' main objective during the Institute program is to complete hospital equipment repair and maintenance. The training portion of the program prepares them to complete these repairs in a low-resource setting. Once the training is complete, participants are placed in small teams in our partner hospitals with EWH-provided toolkits to complete as many repairs as possible. Participants do not repair every piece of broken equipment that they encounter, which is to be expected, as there are many barriers to equipment repair. The most common barriers we see are lack of parts and repairs which require more advanced knowledge.

The 13 participants repaired or completed preventative maintenance on **69 pieces** of medical and hospital equipment, totaling approximately USD \$138,000^[1] of equipment repair service. We ask participants to complete 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. Their repair work, as taken from the Work Summary Forms, is summarized below.

Repairs by Type of Fix

Participants indicate the main reason for the item being out of service from the following categories. This year, mechanical and electrical issues were the main issues seen in the broken equipment (which is common across our programs). This chart only summarizes data from successfully repaired equipment.



Repairs/Maintenance by Type of Equipment

The table below summarizes the types of equipment on which participants completed repairs. Nebulizers, oxygen concentrators, and manual blood pressure devices made up the greatest percentage of successfully completed repairs. “Other” also made up a large percentage, which is typical, as participants often encounter a number of devices not included in our provided list, or are unsure how to classify an item. Some examples of “other” pieces of equipment include syringe pumps, blood collection monitors, or wheelchairs.

Type of Equipment	Total Pieces	Type of Equipment	Total Pieces
Air Compressor	1	Laryngoscope	1
Aspirator/Suction Machine	4	Other	21
Autoclave	3	Otosopes	1
Blood Pressure Device, Automatic (NIBP)	5	Phototherapy Device	1
Blood Pressure Device, Manual	4	Pulse Oximeter	1
ECG Machine	5	Scales	8
Fetal steth	1	Thermometers	3
Furniture	1	Ultrasound Machine (imaging)	1
Infant Warmer (radiant or other)	3	X-Ray Film View Box	3
Lamp, examination	2		

Secondary Projects

In addition to their primary task of repairing medical equipment, EWH asks participants to identify other ways they can use their skills to benefit the hospital. Through conversations and interviews with hospital staff and directors, the participants identify a need in the hospital and complete a secondary project to address that need.

Hospital 1

This group's secondary project was building proper benches for patients to sit on. The group reported that their placement hospital is overcrowded most of the day, and there are many patients sitting and sleeping on the floor in many locations of the hospital.

The group consulted with the nurses on the locations the benches are most needed, ultimately deciding to build 6 benches. The participants contacted a local welder and assisted him in transporting the materials and attaching them to the wooden bench slabs.

Hospital 2

This group's secondary project was to improve upon the hospital's playground. The group visited the playground to evaluate the playground's necessities. They noticed that the slides were extremely hazardous due to the metal being so pointy and sharp along the handles of the slide at all the joints. Key points along the slides were deteriorating. The group decided to contact an iron worker to help fix the slide's sharp parts, making it safer for the children. The group also found a tire on the ground and a frame rod with a welded hook on it. They purchased chains, screws, washers, and bolts to secure the chains on the tire and the chains on the framed rod and created a tire swing.

Participant Debriefs and Feedback

Engineering World Health seeks not only to assist the hospitals in which our participant volunteers work, but also to influence the volunteers' own development as engineers and as global citizens. Our participant feedback was generally positive

and insightful. Some of the words used to describe the program were educational, broadening, and unique. The On-the-Ground-Coordinator received very good feedback. Participants found the cultural immersion to be very valuable and described their experience in the program as impactful and educational, increasing their skill and confidence as engineers.

Acknowledgements

The On-the-Ground-Coordinator was Cristina Guzman-Moumtzis. Language and cultural training were provided by Do Guatemala. Thank you to Juan Mario and Joe Leier for providing additional support to our participants while they were working in the hospitals.

[1] EWH estimates the mean value of each repair at USD\$2000