



**Engineering World Health Summer Institute  
Mongolia 2018  
Campus to Country and Alumni Program  
Final Report**

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Nordic 5 Technical Universities

Oddariya Foundation

## Executive Summary

In 2018, in partnership with Mongolian nonprofit Oddariya and the Technical University of Denmark (DTU), Engineering World Health piloted a new Institute program in Ulaanbaatar, Mongolia. While the program went well, we found that the Mongolian healthcare system is more advanced than our other Institute Program countries. Thus, this will be our only year hosting a Mongolia Institute. We are continuing discussions with Oddariya about the possibility of EWH providing more advanced training for local BMETs.

This Institute hosted 10 participants from 4 different countries. 6 were students of the Nordic 5 Technical schools and were trained at DTU immediately prior to the in-country portion of the program. They were joined in Mongolia by 4 Summer Institute alumni.

The participants stayed with homestay families in Ulaanbaatar, the capital city, for the duration of the program. During the first week of the program, the group underwent intensive cultural and language training. During this time, the group also visited 4 placement hospitals to meet the hospital directors and technical staff.

After the training, participants worked in partner hospitals in groups of 2. Each group was joined by one or two volunteer Mongolian translators. We were able to work with 7 hospitals in Mongolia. During their 4-week placements, **the participants repaired 74 pieces of equipment worth approximately US\$148,000<sup>[1]</sup>.**

This pilot program in Mongolia drew a remarkable group of participants who worked hard to find ways to benefit their hospitals, despite the challenges that came with a pilot program. Although some hospitals had fewer equipment needs, the participants found meaningful secondary projects which had an impact on their hospitals.

We are grateful to all who collaborated to make this program possible.

## Medical Equipment Repair

The 10 participants repaired or completed preventative maintenance on **74 pieces** of medical and hospital equipment, totaling approximately US\$148,000<sup>[1]</sup> of equipment repair service. Their work is summarized in the following charts:

### Repairs/Maintenance by Type of Equipment

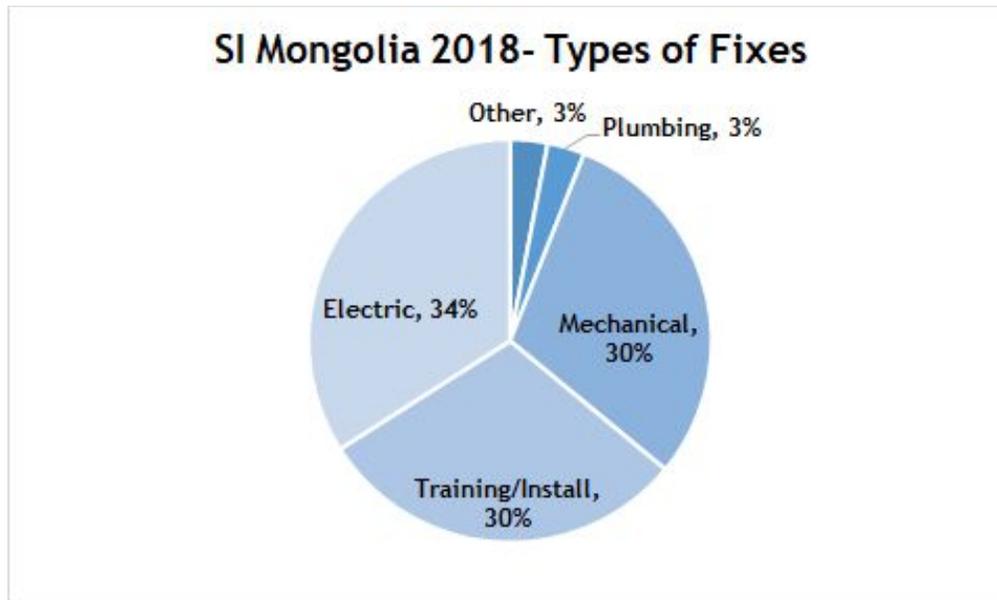
| Type of Equipment             | Total Pieces | Type of Equipment            | Total Pieces |
|-------------------------------|--------------|------------------------------|--------------|
| Anesthesia Machine            | 1            | Lamp, surgical               | 3            |
| Autoclave                     | 2            | Nebulizer                    | 5            |
| Blood Gas Analyzer            | 1            | Operating Table              | 1            |
| Blood Pressure Device, Manual | 1            | Ophthalmoscope               | 1            |
| Drying Machine                | 2            | Oxygen Concentrator          | 1            |
| ECG                           | 3            | Patient Monitor              | 1            |
| Electrosurgery Machine*       | 1            | Ultrasound machine (imaging) | 16           |
| Fetal Stethoscope             | 3            | Other                        | 12           |
| Infusion Pumps                | 20           |                              |              |

\*User training and/or low voltage and peripherals repairs only

### Repairs by Hospital

| Hospital     | Items Touched | Repaired  | Abandoned | Repair Percentage |
|--------------|---------------|-----------|-----------|-------------------|
| Hospital 1   | 18            | 13        | 5         | 72%               |
| Hospital 2   | 20            | 12        | 8         | 60%               |
| Hospital 3   | 28            | 14        | 14        | 50%               |
| Hospital 4   | 36            | 20        | 16        | 56%               |
| Hospital 5   | 14            | 5         | 9         | 36%               |
| Hospital 6   | 22            | 2         | 20        | 9%                |
| Hospital 7   | 21            | 8         | 13        | 38%               |
| <b>Total</b> | <b>159</b>    | <b>74</b> | <b>85</b> | <b>47% avg</b>    |

## Repairs by Type of Fix



## **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, then are given a budget of \$100 per person to use in a creative way to provide for that need.

### Hospital 1

Because this group's hospital placement is rather well-developed, their secondary project was maintenance and upkeep of the hospital grounds. They cleared out an area of hard soil and rock overgrown with weeds, laid new soil, and planted grass. They started by clearing the area of weeds by hand. After that, they distributed the grass seeds over the new soil and covered it using shovels and wheelbarrows provided by the hospital.

### Hospital 2

At 3rd State Central Hospital the engineers have to pay for their tools out of their own pockets, which is a very large expense. Thus, their tools were sparse and some were very worn down. For their secondary project, the participants asked the hospital's engineers for a wish list of equipment. With the secondary project budget they were able to buy all of the items, a total of 11 tools and supplies.



New tools

### Hospital 3

For their secondary project, this group renovated one of the pediatricians' offices. They purchased a medicine cabinet, an electronic baby scale, baby mobile, and wall stickers. They assembled the cabinet, helped the doctor to move all of her medicines to the drawers, and decorated the walls with the stickers. With the help of the hospital's head engineer, they hung the baby mobile over the bed to entertain the infants while they are receiving treatment.



Completed pediatric office

## Hospital 4

This group observed that the hospital's engineers were bringing their own tools into work, as the hospital lacked a budget to provide them with hospital-owned tools. This group worked with the engineers to discover the tools that would be most utilized. After putting together a list, they were able to purchase about half of the items requested by the engineers.

## **Participant Debriefs and Hospital Feedback**

Engineering World Health seeks not only to assist the hospitals in which our volunteers work, but also to influence the volunteers' own development as engineers and as global citizens. This was our first year working in Mongolia, and there were some adjustments that needed to be made as the program went along. We had an excellent group that took these adjustments in stride and with great attitudes. In their feedback, the participants acknowledged the obstacles that come with a new program, but they also acknowledged how much they were able to learn and grow from working in another culture. Some of the words used to describe the program were educational, empowering, and insightful. The language barrier was the biggest challenge for most of the participants. Many of the fixes that needed to be performed were more advanced than the EWH training prepared them for. However, the feedback noted how many difficult fixes the participants achieved during the program, which many listed as their greatest accomplishment.

## **Acknowledgements**

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