The Health Impact of Surgical Interventions in Riobamba, Ecuador: 2015 Mission

By The Healing Hands Foundation, July 2015

Summary

In February 2015, the Healing Hands Foundation (THHF) performed their inaugural mission to Riobamba, Ecuador, to provide surgical and dental care for people in the central highlands. Patients traveled several hours to receive care at the Hospital de la Brigada de Caballería No. 11 de Galápagos located on military base in Riobamba. During the 4 days of service, the medical team performed 37 procedures on 37 patients ranging in age from 2 to 75 years. The most common surgeries performed included cyst and legion removals, hernia repairs, and lip/nose repairs. The impacts of all procedures were great; 125 years of quality life were saved (DALYs averted) across the patient population.

Picture of Health in Ecuador

Ecuador is country of approximately 16 million people, and is situated on the northwest South American continent bordered by Colombia to the north and Peru to the south and west. The majority of its population (about two-thirds)

live in urban areas. Considered a country with high human development by the Human Development Index (HDI), Ecuador is ranked 98th of 187 countries, tied in rank with Colombia but lagging somewhat behind Peru (#82).

The country has a rich culture spanning over 8,000 years, but endured many eras of civil and political upheaval throughout the 19th and 20th centuries. In the last 10-15 years, Ecuador has seen significant improvements in economy, infrastructure, and healthcare, and in 2008, a new Constitution of Ecuador was drafted by the Ecuadorian Constituent Assembly. The 2008 Constitution includes a chapter on health, recognizes the protection of human health as a right, and provides for the construction of the Comprehensive Public Health Network (1).

The most recent national health statistics for Ecuador are on the rise; overall life expectancy has risen from 69 years in 1990 to 75 years in 2014 (2). Ecuador has also cut its infant mortality rate in half, from 20 to 10 per 1,000 live births (2).

Still, various layers of social inequalities in access to healthcare services continue to persist, particularly for the indigenous, low-income and rural households (3). These minority groups continue to struggle for access to healthcare. Therefore, despite improvements, Ecuador remains below the WHO region average for both infant and maternal mortality in South America (4). Further, congenital anomalies account for 21% of deaths in children under 5 years, the second leading cause of death in this age group, behind "other causes" at 22% (4). It is this at-risk population where the Healing Hands Foundation can make a lasting impact, by providing quality care to rural populations with a focus on congenital disorders and other conditions where access to treatment is unobtainable.

The Foundation

The Healing Hands Foundation (THHF) is a non-profit organization founded in 2007 that provides medical services to children and adults around the world. The THHF mission is to **provide high quality surgical care to children with complex congenital malformations in areas lacking resources and expertise**. The medical staff of THHF has decades of combined experience, and its doctors, dentists and nurses have practiced medicine in countries around the world, including Ecuador, Colombia, Guatemala, Panama, Dominican Republic, Laos and Sierra Leone. The mission not only involves surgical and dental services, but also education and mentorship of local surgeons and other health care providers to improve quality of people's lives in these areas.

Volunteers

The 2015 Ecuador mission was truly a national effort, with 27 volunteers coming from across the U.S., including Maryland, Florida, and California. These volunteers are trained surgeons, fellows, nurses, dentists, nurses, psychologists, anesthesiologists, epidemiologists and medical technicians (see Table 1).

Table 1 – 2015 Ecuador Mission Expertise.

Specialty	No. Volunteers
General Surgeon	1
Pediatric Surgeon	1
Plastic Surgeon	1
OR Nurse	2
OR Technicians	2
Pediatric Anesthesiologist	2
CRNA	2
Pediatrician	1
Pediatric Nurse	2

Specialty	No. Volunteers
PACU Nurse	4
Dentist	1
Dental Assistant	1
Coordinator / Translator	1
Director / Logistics	1
Epidemiologist	1
Oncology Tech / Translator	1
Other Volunteers	3
Total	**27**

Goals and Objectives of the Mission

The goals of THHF are to ***provide high quality surgical procedures, medical treatment, dental care, and educational support in Ecuador.*** Through in-country partnerships, THHF engages with communities to identify and treat patients, improve health care infrastructure, and provide needed medical training to surgeons, doctors, and community health care workers.

The Foundation's objectives are to create a long-term impact by empowering impoverished communities to improve the health and quality of life of their own people through sustainable partnerships to meet these goals. As such, THHF looks forward to many more future missions, and plans for the 2016 mission are already underway.

For this mission, the impact on health was determined by estimating the number of years of healthy life that were saved due to performing medical procedures and surgeries. Documenting patient health status and distances patient travel also provide a comprehensive picture of the value that THHF brings to the communities in this region of Ecuador.

Distances Traveled By Patients

Hometowns for 33 patients were recorded during the mission (not recorded for 5 patients) (See Figure 1). These patients came from 6 different towns in the central highland region: Riobamba, Guano, Quito, Chimboraza, Chunchi, and San Isidro. Most patients lived locally in Guano or Riobamba. The furthest patients came from over 212 km away in Quito, or over 122 km away in Chunchi. Although roads are usually in reasonable condition, patients traveling from locations further away still traveled long hours by bus to reach the hospital.

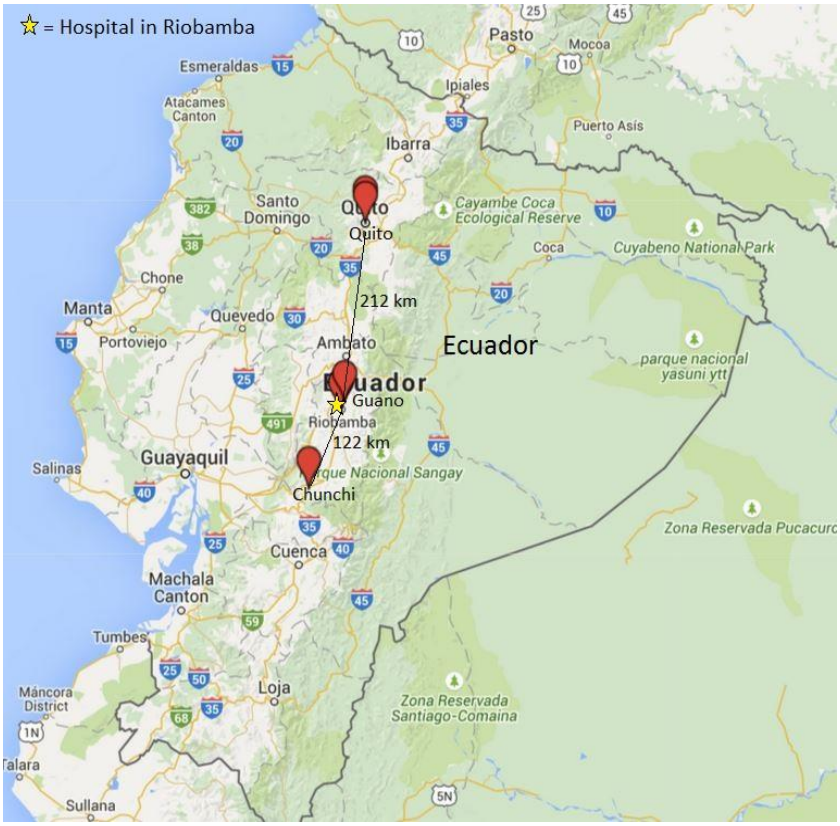


Figure 1 – Locations of Patients' Home Towns and the Hospital (with driving distances to furthest towns)

PROVIDING QUALITY CARE

During THHF's first medical mission to Ecuador, we examined 38 patients and 37 received surgical intervention. Five additional patients arrived for surgery, but changed their minds and canceled prior to surgery, and they are not included in this analysis.

One patient received examination and consultation by THHF surgeons (but no surgery). There were 15 males and 23 females between the ages of 2 and 75 years. Sixteen of the patients (42%) were children under 18 years of age.

Conditions presented

Patients presented with a myriad of medical conditions requiring surgical intervention. Conditions of the head, eye, ear, nose, throat, groin, core, mouth, foot, wrist and hand were observed among 38 patients (See Table 2). The majority of primary conditions affected the ear (n=7) and were usually due to microtia, a deformity where the ear is undeveloped. The second most afflicted areas were the groin (n=6) largely due to hernias, followed by the head (n=5) due to cysts, lipomas, or masses.

Table 2 – Cases by Body Area.

Area Affected	No. Cases
Head	5
Eye	2
Ear	7
Nose	3
Groin	6
Core	4

Area Affected	No. Cases
Mouth	4
Leg	1
Hand	1
Arm	3
Not recorded	2
TOTAL	38

Medical PROCEDURES

The THHF surgical team performed a total of 37 procedures (See Table 3 below). One patient received a medical examination and consultation by a THHF surgeon, but no surgery.

Table 3 – Surgical Procedures Performed on 37 Patients.

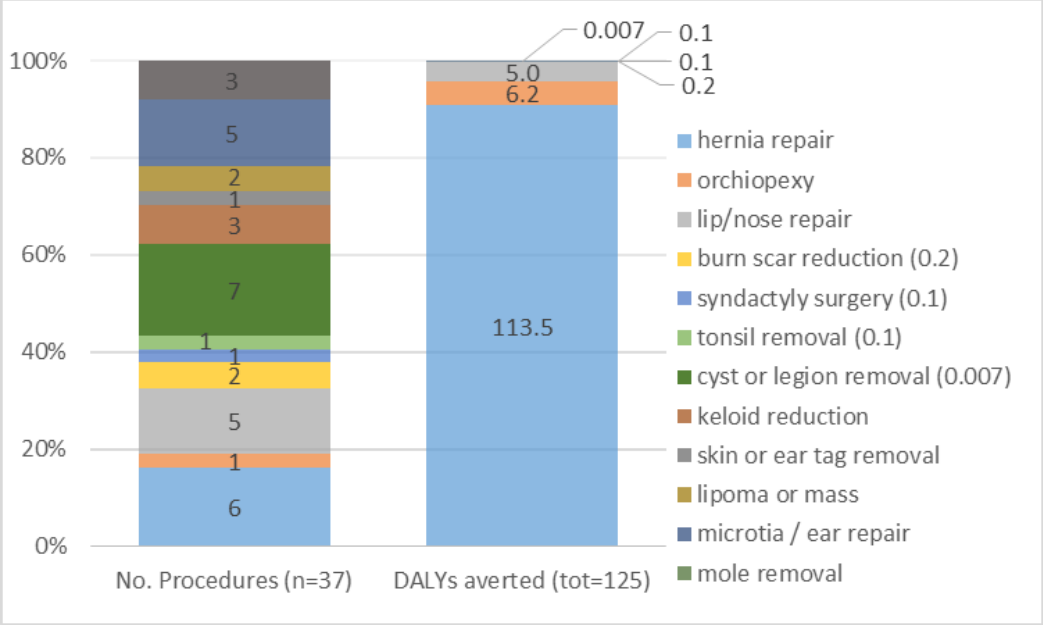
Procedures	No. Completed (37)
Cyst or legion removal	7
Hernia repair	6
lip/nose repair	5
Microtia / Ear repair	5
Keloid	3
Mole removal	3
Burn scar reduction	2
Lipoma or mass	2
Skin or ear tag removal	2
Orchiopexy	1
Syndactyly surgery	1
Tonsil removal	1

Impact on Quality of Life

A total of 125 DALYs were averted by performing the 37 surgical procedures (Figure 2). The most DALYs were saved through hernia repairs (inguinal, umbilical). In all, hernia repairs for 6 patients contributed towards a savings of 113.5 life years – on average almost 19 years of life saved per procedure!

The hernia repairs performed during this mission contributed toward 91% of the total DALYs averted. This is because most other major surgeries performed were those that addressed conditions with no probability of death and not much physical disability. Notable exceptions included 1 orchiopexy, 1 syndactyly surgery, 1 burn scar reduction, and 5 lip/nose repairs (Figure 2).

Figure 2 – Daily Adjusted Life Years (DALYs[1]) Averted by Type of Procedure (Cases).



[1]*Each DALY represents a year of healthy life lost due to disability or death.*

Discussion

Assessing the burden of disease encompasses the prevalence of disease entities, but it is the impact that affects the populace, and optimal intervention evaluations demonstrate impact as opposed to simply enumerating their services (4). In this report we evaluated the impact in terms of years of quality life saved (DALYs averted). We also demonstrated the need for clinical health services based on the patients' health status and the distances patients were willing to travel to receive care

A total of 125 DALYs were averted due to the intervention of THHF! The majority of these DALYs were averted through surgical treatment of inguinal hernias. Some contribution of DALYS averted also came from 5 lip/nose repairs and 1 orchiopexy. Hernias, cleft lip and cleft palate all have a substantial impact on the economic health of countries in the developing world. The Healing Hands Foundation missions provide a cost-effective intervention to treat these conditions and others of major health consequence.

Since certain conditions are not considered life-threatening nor contribute to a quantifiable life-long disability, not all patients' surgical treatments by THHF doctors contributed directly toward the total DALYs averted. Still, these treatments can make an enormous positive impact on those patients' lives in terms of reducing social stigmas associated with deformities and improve self-esteem. These surgical corrections provide the patient, as well as their community, benefits that are not quantified but no less important.

The findings from the 2015 Ecuador mission reveal the impact that THHF's surgical expertise and medical supplies bring to this region, as realized by the distances and variety of locales from which patients traveled to receive care. The DALYs averted show that developing relationships locally with Ecuadorian partners for sustainable long-term relationships will bring about positive impact to a wider patient base in the future. In 2016, THHF looks forward to its second mission to Riobamba, and continue to strengthen our local partnerships there.

Data Analysis

Age, sex, diagnosis, treatment and outcome were documented for each patient. A medical history of each patient was obtained through patient self-report. Pre-surgery vitals were taken including weight, heart rate, blood pressure, height, and temperature. Blood panel test was performed for older or at-risk patients. Any additional medical observations were documented by THHF physicians during the pre-surgery physical exam. Drug treatments were noted when available.

The mission's efficacy in reducing disease burden was determined by estimating disability adjusted life years (DALYs) that were averted due to THHF's medical services and surgeries. According to World Health Organization (WHO) guidelines, the DALY is a measure of disease burden that considers both premature death as well as non-fatal health consequences of disease or injury (disability) (5, 6). Each DALY can be thought of as one year of healthy life lost, and is a commonly used methodology for cost-effectiveness analysis (7). The metric is calculated as DALY = YLL + YLD, where YLL represents years of life lost due to the condition, and YLD the years lived with disability for non-fatal conditions. To calculate YLL, we used published standard values for discounted YLL due to death by age.

A scoring system defined severity of disease and efficacy of treatment (for either life or disability) following previously established methods (5, 8). Disability weights for diseases and conditions were taken from average disability weights used by Murray (5), from values reported in Table 3A.6 of the Global Burden of Disease Project (9) or from other published condition-specific metrics (10).

References

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