



# The impact of surgical interventions on patient health in Guatemala: the 2014 mission



The Healing Hands Foundation

August 2015

## Summary

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The Healing Hands Foundation (THHF) provides high quality, free surgical procedures, medical treatment, dental care, and educational support in Guatemala. Through established 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. Despite Guatemala's middle income status, health outcomes here compare unfavorably with those of other much poorer countries. Child mortality (43 per 1,000 live births) and maternal mortality (136 per 100,000 live births) are the highest in Central America. Guatemala experiences extreme inequalities that reflect the exclusion and disparity affecting the indigenous and rural populations. According to the World Health Organization, 20% of Guatemala's people lack regular access to health services (2), and these people represent the poor, rural, young and indigenous. Chronic malnutrition and inadequate health education remain major problems among the rural indigenous communities. These communities face a series of barriers to health care including transport time and cost, language barriers, low or no literacy and the time and cost of consult and treatment.

In October - November 2014, 42 medical and dental professionals traveled to Patzún, Guatemala, for THHF and performed surgeries and provided dental care to people in need. These volunteers consisted of trained surgeons, fellows, nurses, cardiologists, dentists, nurses, anesthesiologists, and medical technicians. THHF performed 71 surgeries on 70 patients, ages 3 months to 71 years (36 male, 36 female), and the dental team provided service to approximately 300 patients. The most commonly performed surgeries during this mission were hernia repairs (n=16), microtia or ear repairs (n=11), and cyst or fistula removals (n=8). In addition, surgeons provided 6 cleft palate and lip repairs on four children (all under 5 years) and two adults. Across the 71 procedures, THHF averted 279 DALYs, thus saving 279 years of quality life across the 70 patients.

Future expansion of THHF services relies on effective and reliable data collection to improve worksite capacity, patient safety, and to evaluate program effectiveness and identify new areas to expand our impact while protecting patient privacy.

## **Acknowledgements**

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We would like to thank all the diligent volunteers from THHF and the THHF Guatemala Branch, who professionally and collaboratively work to provide ongoing support and mentorship to the Guatemalan people. We thank the following organizations for their generous support for our missions: The Dorothy Haus Ross Foundation for funding to purchase medical equipment for the mission, American Airlines, RTS Family Foundation for funding used to expand the recovery room and add an OR procedures room, Rotary Club of Baltimore, Mia Sutphin Foundation and the THHF-Guatemala Board of Directors, and Team Hereford/Ragnar for raising funds to cover 14 surgeries. We thank Marco Ávila and Steven Gandara for their leadership and logistics skills that make our work possible. We also deeply appreciate the hospitality and collaboration from the caring staff at Corpus Christi hospital.

## **The Healing Hands Foundation**

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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,

All Guatemala missions are located at the Corpus Christi Hospital in Patzún, Chimaltenango, Guatemala, which has 3 operating rooms thanks to generous funding by THHF donors and grants, including the RTS and Ross foundations. Patients are either referred to THHF by other medical doctors working in the region, or added to the list during a pre-mission trip in October, where THHF medical staff examined and identified candidate patients for surgery. Patients come from all over the country to receive THHF treatment and care.

## **Conditions in Patients Requiring Surgery**

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During the 2014 mission, 72 patients presented for surgery and the dental team saw approximately 300 patients. Surgical patients presented with conditions of groin, ear, mouth, eyes, core, extremities, and areas of the head or neck. There were 36 males and 36 females, of which 33 (46%) were under the age of 18 years, and 11 (15%) were under age 5 years. The majority of primary conditions treated by THHF surgeons were those that affected the mouth or lip (n=12) and these were mostly due to cleft palate and lip (Table 1). Afflicted areas of the groin (n=17) were mostly due to hernias, while congenital deformities such as undeveloped ear (microtia; n=12) were also most common among patients presenting for surgery.

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**Table 1 – Cases by Body Area in 2014.**

<b>Body Area Affected</b>	<b>Cases Presented</b>
<b>Head / Neck/ Face</b>	7
<b>Eye</b>	1
<b>Ear</b>	12
<b>Lip/Nose</b>	7
<b>Groin</b>	17
<b>Core</b>	5
<b>Mouth</b>	5
<b>Foot</b>	3
<b>Leg</b>	2
<b>Wrist</b>	2
<b>Hand</b>	4
<b>Arm</b>	4
<b>Not specified*</b>	3
<b>TOTAL</b>	72

\*three patients had multiple affected areas or the specific body region affected was not recorded.

## **Medical Team Activities**

In 2014, a total of 71 surgical procedures were performed on 70. Two patients did not receive surgery (one scar reduction from a dog bite, and one circumcision), and one patient received ear tag removal and fistula repair. Since 2011, THHF has had four missions to Patzún, and has performed a total of 233 surgical procedures on 229 patients, ranging in ages from 3 months to 75 years (See Table 2)!

**Table 2 – Procedures Performed on Patients Each Mission.**

Procedure	2011	2012	2013	2014	4-Year Total
Cleft lip repair	7	1	5	4	17
Cleft palate repair	7	3	7	2	19
Contracture release / scar reduction	5	2	1	4	12
Dacryo-cysto-rhinoplasty		1			1
Excisions (mass, lipoma, cyst, skin tags, etc)	6	22	7	16	51
Frenectomy		1	1	1	3
Frontal Condyloma	1				1
Granuloma removal				1	1
Hemifacial microsomia Kaban Type 1		1			1
Hernia repair (femoral)		3			3
Hernia repair (inguinal)		18	3	15	36
Hernia repair (umbilical)	1	2		1	4
Inferior earlobe repair		1			1
Keloid repair	3		2	3	8
Lip release		1			1
Lip/nose repair/revision or Z-plasty	1	1	1	4	7
Lipoma or mass			10		10
Microtia / ear repair	5	5	7	11	28
Nasolabiablasty	1				1
Orchiopexy	1	4	4		9
Palate fistula repair/ closure		1			1
Reconstruction of jaw	1				1
Removal of Digit	2	3	1	2	8
Repair obstructed lacrimal conduit/ eye infection		1			1
Syndactyly surgery				4	4
Tonsil removal			1		1
Other procedures				3	3
<b>TOTAL</b>	<b>41</b>	<b>71</b>	<b>50</b>	<b>71</b>	<b>233</b>

## Our Impact on Disease Burden

The impact that the above surgeries have on the quality of life and in extending life can be determined through the estimation of DALYs (Disability-Adjusted Life Years). The DALY is an estimate of disease burden and each DALY is defined as 1 year of quality life lost due to medical condition or disease. Surgeries correcting these conditions reduce the number of years of quality life lost, hence “averting” DALYs; i.e. this is the desirable effect for medical missions. The mission’s effectiveness in reducing disease burden is estimated by the cost for each DALY averted.

During the 2014 mission, surgical interventions by THHF averted 279 DALYs, thereby saving 279 years of quality life for their patients. Overall, each procedure resulted in an average savings of 3.9 years quality life for every procedure performed by THHF surgeons. When evaluating which procedures had the highest impact, we found that most DALYs were averted through hernia, cleft palate, and cleft lip repairs (See Table 3).

**Table 3 – Number of Quality Life Years Saved (DALYs averted) through Surgical Interventions during the 2014 THHF Mission.**

2014 Guatemala Mission Procedures	No. Procedures (n=71)	DALYs averted (tot=279)	DALYs averted/procedure
Burn scar reduction / release	4	0.41	0.1
Keloid	3	--	--
Cleft lip repair	4	19.68	4.9
Cleft palate repair	2	11.32	5.7
Cyst / legion / fistula removal	8	--	--
Extra digit removal	2	--	--
Skin or ear tag removal	1	--	--
Frenectomy	1	0.06	0.1
Granuloma removal	1	0.005	0.01
Hernia repair	16	246.90	15.4
Lip / nose repair	4	0.23	0.1
Lipoma or mass	7	0.004	--
Microtia / ear repair	11	--	--
Syndactyly surgery	4	0.26	0.1

The high impact of hernia and cleft lip and palate repairs is due to several reasons: first, of the patient conditions presented, these carry the highest risk of death and disability should they remain

untreated. Secondly, young patients who are given potentially life-saving surgery have overall more years “saved” than older patients, due to overall life expectancies which are accounted for in the lifelong DALY calculations. This means that the earlier a patient is treated, the higher the impact in reducing the disease burden. Cleft palate and lip repairs are especially impactful in children under 5. It is during ages 0 to 5 where the risk of death and disability due to cleft palate and lip is particularly high. In 2014, there were four cleft palate and/or lip patients who were under age 5 years. In total, 10 patients were under 5 years old, and 1.3 DALYs were averted before age 5 years for these 10 children.

Some conditions are not considered life-threatening or particularly disabling, so not all procedures contribute toward DALYs averted. Still, microtia repairs and similar procedures have an enormous positive impact on those patients’ lives in terms of reducing social stigmas associated with deformities and improve self-esteem.

## **Dental Team Activities**

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In 2014, a total of 296 dental procedures were performed on 163 patients (Ages ranges from 5-55 years all. 65% females). The dental team performed all their dental efforts in two location (Patzun and Finca Las Margaritas). Since 2009, THHF has had six dental missions and has performed over 2,500 dental procedures. Below is a summary of the 2014 dental mission led by Dr. Oswald Cameron:

### **Results Guatemala 2014 – Dental Team.**

Patzun= 48 patients / 117 procedures

Finca Las Margaritas=115 patients / 179 procedures

**Total: 163 patients / 296 procedures**

Availability of local functional dental equipment made a great positive impact in ease of traveling and delivery of dental care. We should continue working together with THHF-Guatemala to achieve complete availability of dental equipment, instrumentation and supplies.

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## **Needs for Future Missions:**

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THHF has the following needs to expand its capacity and impact, while maintaining the highest level of quality and service.

**1. Electronic Record Keeping.** After 6 missions to Corpus Christi Hospital in Patzún, THHF doctors are seeing some repeat patients, and it is difficult to pull patient histories from paper files. Electronic record keeping will improve tracking and documenting patient health status and history, maintain quality and completeness of data, and streamline patient in-take process. The benefits would also be shared by the Corpus Christi hospital, and there may even be potential for health information sharing with the local Patzún health clinic, providing valuable information on patient medical histories and alerting doctors to potential hidden problems.

**2. Formalize Impact Evaluations.** Formal data analysis and a comprehensive assessment of all THHF missions to Guatemala will help identify future needs, monitor effectiveness and performance, and help identify areas in which THHF can expand to better serve the community. Seek IRB approval to ensure ethical oversight and find partners for funding new projects.

**3. Determine Methods for Patient Follow-up.** Identify strategies to follow patients' outcomes after THHF mission is completed.

**4. Expand Mentoring and Education Plan.** Streamline the process and expectations for training local doctors and medical students, including both Guatemalan students and those volunteering from the U.S., and identify an application process, roles and responsibilities, training goals, and lesson plans.

**5. Expand the Power Generator System for Corpus Christi Hospital.** As many Latin American countries neighborhoods lose power periodically. We experience that last year while we were ready to start two surgeries. This type of incidents cannot occur while we perform our surgeries. For this reason we will be seeking funding to install a power generator system that can provide electricity for the entire hospital. We will be reaching out to potential donor to cover this project.

Finally, continued collaboration with THHFG for logistical support has been and will remain key for THHF support in Guatemala. Having in-country support is tremendous and adds additional local funding to support THHF missions. THHFG also streamlines all logistical activities, allowing the physicians and surgeons to focus on their medical work and fulfill the purpose of the mission.

## **Data Analysis and Assumptions**

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The DALY 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, assuming death at patient's current age. A scoring system defined severity of disease and efficacy of treatment (for either life or disability) following previously established methods. Disability weights for diseases and conditions were taken from average disability weights from published sources. The patient's age and type of procedures were used to calculate DALYs averted by procedure.

Children in the developing world not only fail to receive surgery, but they also miss important post-treatments and therapy that children in the developed world receive. It is challenging to calculate cleft lip/palate DALYs over a person's life-time, because it depends on how much comprehensive care each patient receives, and how old they are when they receive it. Long-term patient follow up is needed to fully understand the impact that one THHF surgery has on increasing life span.

In addition, the Disease Control Priorities Project (DCP1) life tables suggest that the entire burden of disease from a cleft lip and palate is incurred within the first 4 years of life. The absence of disability weights for untreated cleft lip and palate after the fifth year of life does not fit with the reality of living with an unrepaired cleft lip or palate. In our analysis, we assume that disability due to cleft lip and palate is distributed across the patient's life time. In addition, in 2010 Magee et al attempted to demonstrate the cost-effectiveness of cleft lip and palate operations in the developing world, specifically through international volunteer missions, such as Operation Smile, as a vehicle for delivery. They deduced a residual disability measure to take into account the average amount of disability a patient maintains after surgery, and which we used as well in our DALY calculations.