



I am Nicola Shaw, a Christchurch School of Medicine Trainee Intern. I was fortunate enough to be awarded the Pat Farry Rural Health Education Trust Travelling Scholarship. This was used to help me travel to two isolated corners of the world over my twelve week elective (Feb 23-May 19). It allowed me to make donations to Cinterandes, the foundation that I spent six weeks with, in Ecuador.

Ecuador at a Glance

Ecuador is a South American country, found in the northwestern corner, straddling the Equator. It has a population of approximately 16 million, with over 87% of the people aged between 0-54 years (median age 26 years). Current life expectancy is 75 years. In 2010, 67% of the population lived in an urban area¹. The majority ethnicity is Spanish decent. Consequently, the main language spoke is Spanish, however there are minorities groups such as the Quichua and Shuar people who speak other languages. The dominant religion is Roman Catholic – with 92% of the country reporting a religion, and of those, 80% are Roman Catholic.



Left: Cuenca, Ecuador – third largest city. Right: Guayaquil – Amazonian basin

Historically, prior to Spanish rule, the Inca's were present – with the Inca Trail running through the mountains, en route to Colombia. Today there are still some Incan ruins scattered throughout the Ecuadorian highlands. Ecuador was a Spanish colony from the 1500s until 1820, when it gained independence. Two of Ecuador's three main cities have been declared World Heritage Sites due to their well-preserved Spanish colonial history. Since independence, the rule has ranged from military dictatorship to the current democratically elected president.

¹ http://www.indexmundi.com/ecuador/demographics_profile.html

The land can be divided into four main regions – the Coast, the Andean mountains, the Amazonian basin and The Galapagos. Consequently, the climate varies dramatically based on altitude. Due to the diverse nature of the landscape, Ecuador is one of the 17 mega-diverse countries in the world.



Economically, Ecuador exports crude petroleum, and is the world's largest provider of bananas and plantains. The adoption of the American dollar in 2000 has stabilized inflation, and along with increased social spending on health and education, the extreme poverty rate has dropped from 40% in 2001 to 17.4% in 2011. However, the population living below the poverty line in 2012 was still 27.4%. Currently Ecuador is ranked 61st for GDP in the world (NZ is ranked 64th), however when this is converted to 'per capita' they drop to 117 (where NZ jumps to 50th).

Unemployment is approximately 4.89% (June 2013²)- where as NZ has a rate of 6.2% (in June 2013)³.

Ecuador has a functional and cheap bus system, which runs throughout the country. However, it is by no means fast. The main roads are generally in good condition, but off these one runs into poor conditions, where gravel is a regular feature, which significantly increases travel time. It is uncommon for people to own cars. Taxis are another common form of transport within cities, along with public buses.

Education is compulsory until approximately 13 years, and is theoretically provided free of charge by the government. However, schools often add extra charges such as stationary and uniforms, and will ban children from attending without these items. There are multiple universities in the larger centres, including those offering medical education.

Ecuador's Health System

Ecuador is facing the same health situation of many 'emerging second world' countries. This is where major health problems span both the communicable and non-communicable. In 2008 the obesity rate was estimated at 21.4% (rated 86th in the world, NZ is 34th) and so type 2 diabetes and cardiovascular disease are

² <http://www.tradingeconomics.com/ecuador/unemployment-rate>

³ http://www.stats.govt.nz/browse_for_stats/income-and-work/employment_and_unemployment/HouseholdLabourForceSurvey_HOTPMar13qtr/Commentary.aspx

becoming increasingly common. However, infectious disease is still a large problem – with dengue fever, malaria, hepatitis A and bacterial diarrhea all still commonplace.⁴

Ecuador has both a private and public health sector. In its current state it is quite fragmented⁵, and can be looked at as a series of separate components that do not function well as a whole. There are public hospitals available in all cities, where patients can turn up without an appointment for paediatrics, general medicine, obstetrics / gynaecology, and general surgery. There are also basic health clinics in rural areas. In theory, the public health system is meant to provide at least basic medical attention without appointment and free of charge. However, my experience was that all health care had a price, and people were turned away if presumed to be unable to pay. An example that comes to mind is a baby who died in my city (Cuenca) after being turned away from hospital, as the parents were believed to lack the funds required (they were indigenous). Interestingly, there is a social security system (IESS), which is a government institution. The idea is that people support this through their employment, and it will provide funding for access to health for the poor. However, this provides very limited assistance for people, and is available for less than 30% of the population.

The Ministry of Health structure is weakened at the moment due to lack of appropriate funding and is consequently struggling to lead the health sector. A major issue is that doctors under the Ministry of Health are only employed 4 hours / day and paid low monthly wages. There is a huge shortage of staff in rural areas. As a way to combat this, junior doctors (often first year out of university) are bonded to work in a rural area for at least one year. While this does ensure doctors are available to an area, they are usually extremely inexperienced, and lacking more senior supports. Thus the combination of economic and geographical barriers means the rural people (often indigenous) are the ones who are missing out.⁶



Left: Dengue Fever educational poster.



Right: Standard hospital operating theatre equipment

⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/ec.html>

⁵ <http://www.orasconhu.org/ckfinder/userfiles/files/002-CASE-Nilda%20Villacres.pdf>

⁶ http://es.wikipedia.org/wiki/Salud_en_el_Ecuador

While the above paints a negative view of the health sector, it is significantly better than it has been historically. President Correa has substantially improved funding and public health initiatives. Since his election in 2007, there have been reports of increased numbers of consultations, investigations and hospitalisations, which have been linked to improvements in access. There are numerous other initiatives in place aimed at improving access, some of which is now linked in with Cinterandes.

Cinterandes

Cinterandes is a non-profit organization dedicated to improving health care delivery in remote and under served areas in Ecuador.

Dr Edgar Rodas began Cinterandes in 1990, to help combat the high costs of healthcare and levels of poverty within the country. It exists purely on donations of money and surgical equipment from foreign contributors. Dr Rodas was inspired to setup Cinterandes after seeing the positive effect that foreign aid agencies were able to provide. He believed that the work would be even more beneficial if run from the ground roots, as a sense of ownership is vital for maintaining the effects of interventions.

Surgical Bus

The mobile surgical truck was introduced in 1994 and is now the main component if the foundation. It is used to provide elective operations for free to those living rurally, within their own community. Services include pre-operative assessment, operation and immediate post-operative care. In the 18 years that the surgical truck has been running, over 7000 operations have been performed. They have found that surgery has been useful in gaining the trust of the local people as it produces immediate and visible results. The fact that there have been no mortalities has been extremely positive, and in fact there have been fewer post-operative complications reported when compared to hospital services. The added benefit is that the operations have been completed at a lower cost (when compared to hospital care). In providing the operations to economically disadvantaged people, they are providing a service to people who would otherwise miss out.



The bus – outside and in

The vehicle is a donated old transportation truck. The operation room is small, with only just enough space for the anaesthetic machine, patient and surgeons / anaesthetist. All that is required for it to function is a water and electricity source. There is a small space at the front of the truck that acts as the scrub room. Everything one could imagine is recyclable, right down to the small pieces of cardboard used to help close the surgical gowns!

The truck operates out of Cuenca every week – completely clinics in nearby villages. Once a month it will travel to a more distant community – sometimes travelling for over 8 hours. Often, they will be located at the local community health centre – and use this as the recovery area. Other times, the town hall or other such space is used. It is important to have this area, as this is where pre-operative clinics and the recovery area is based.

Patients are selected by the local health workers – for problems such as; hernias, gallstones, lipomas, undescended testes or tubal ligation. Each patient must have a low anaesthetic risk – an ASA of 1 or 2, and had any imaging / blood tests required completed prior to the week-long clinic. From the list compiled by the local health workers, Dr Rodas and his team will meet each patient on the first day of their clinic. Here, they decide the suitability of the patient for an operation in the coming days.

Once the final patient list is created, they all must be fitted into daily operating lists. Often, the surgeons will start in the morning, and keep operating until they run out of patients – which can be as late as midnight. Most operations are performed with spinal anaesthesia – as this is both cheaper and less risky than a general anaesthetic, along with the added benefit of faster recovery (and thus time to discharge).



Waiting for her brother

Consequently, many patients are able to go home the same day, however a few are needed to stay overnight. As staff are limited, medical students are often recruited to run the recovery area and have their own patients to monitor. After patients are discharged from the clinic, the local community health worker completes the follow up.



Left: Operating in action. Right: Making use of scarce resources – a drain made of a catheter and surgical glove

In the time I spent with Cinterandes, we travelled to two small towns.

The first was to Puliji, located in the Andes. Here we completed a week long clinic with a paediatric surgeon, and several general surgeons. We were lucky enough to be able to utilise the resources of the local hospital too, meaning we had three operating theatres, rather than just one.

The second trip was to El Pangui, located in the Amazonian region. Here we were parked at the town hall, with much more restraints on supplies. Again we had a paediatric surgeon and two general surgeons with us and operated into the wee hours of the night.

In between times, clinics were run in the towns surrounding Cuenca (by scale imagine going to Amberley from Christchurch), and then one day a week patients recruited from these clinics would travel to Cuenca for operations. Oddly enough these operations were performed in the bus outside a hospital, but the recovery 'room' was a tent outside.

Public Health

The foundation recognized that surgery alone was not enough to improve the health of the general population. And so, in 2001 Programa de Salud Familiar Integral was begun. Its main focus is on preventative medicine.

Its primary areas are providing information about health and staying healthy, immunization, monitoring of child growth and nutrition, family planning, health education in schools, as well as education about oral health, sexual health and drugs / alcohol. Thus far, El Programa de Salud Familiar Integral has been successful in decreasing the malnutrition, increasing immunization rates, and improving antenatal / postnatal care.

In 2008 the government began its own similar preventative health programme, which now involves all the teaching hospitals throughout the country. Now the two programmes are run in conjunction with each other, with the Ministry of Health providing the resources (such as nutritional supplements).

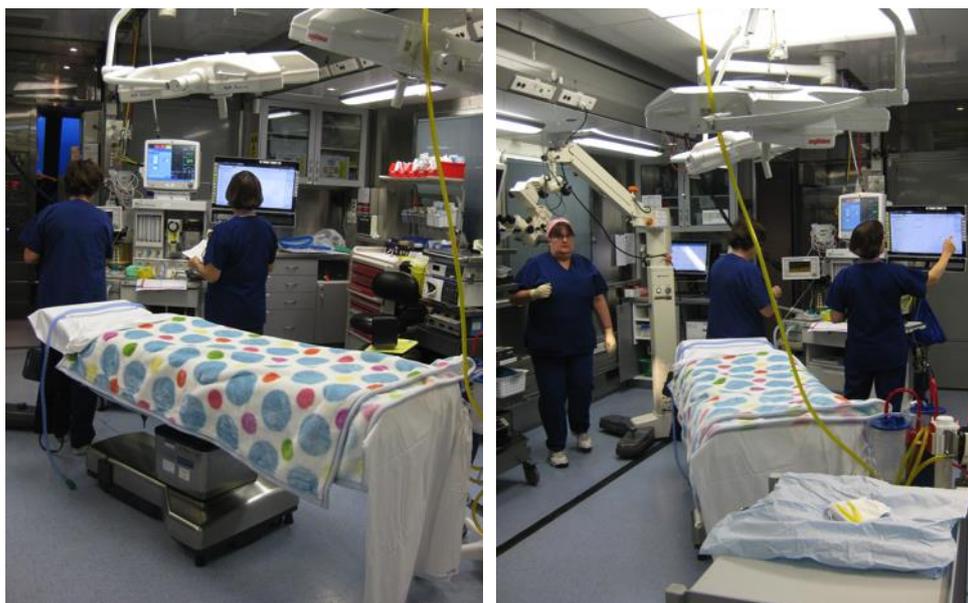
*Information written above comes from resources provided by Cinterandes (note; it is all in Spanish)

Mobile Surgical Services

Mobile Surgical Services is a privately owned company that is run in conjunction with the DHBs and Ministry of Health. The idea is similar to that of Cinterandes, in providing day surgery to rural communities. Since opening in 2002, they have completed over 14000 operations. The bus runs on a five week routine schedule, with good coverage across both the North and South islands. Operations range from dental extractions, to colonoscopies, to gynaecological procedures.

Like the public health system, use of the bus is free for patients, and they are booked onto the bus through their local GP (or dentist).

The bus is well staffed – with staff dedicated to each area of the operation process – pre, intra and post operative. This is extremely positive, as it means that each staff member has a well assigned role and is not over run with different tasks.



The interior of the bus – well equipped and well organised

I was lucky enough to be given the chance to spend a week with them on their tour of Northland. This run involves some dentistry, gastroenterology and ENT. It was a fantastic opportunity for me to see the major differences between our own bus and the Cinterandes truck.

*As per Mobile Surgical Services website

Comparison of Cinterandes vs Mobile Surgical Services

On entering the Mobile Surgical Services bus in NZ some obvious differences struck me.

First impression; the bus was HUGE - the operating room is the size of the entire Ecuadorian truck! It was also well lit, full of modern equipment, and plenty of staff! There were approximately three to one (NZ to Ecuador). It appeared that this came down to the funding made available in NZ by the Ministry of Health, where as Cinterandes was running off volunteers. The difference in quality of care were subtle. Patients in NZ were given more one on one time, and more opportunity to ask questions. However, this was likely matched with the differing health expectations – Ecuador still has a patriarchal medical society, and the patients were extremely grateful to receive any treatment, and also less inclined to ask questions regarding their treatment. The Ecuadorians were also more accepting of 'less than ideal conditions' – such as recovery beds being mattresses on a floor of a hall.

A difference of note, which is more in regards to the running of the bus more than anything else – Mobile Surgical Services only spends a single day in each location. This is not because there are fewer patients there, but due to the fixed schedule that it runs on. Cinterandes by contrast will spend a week in a location – to make the most of the large travel time and the unknown factor of when they will next return. It is likely that even if Cinterandes ran on a regular timetable, the transport time between locations would make it not viable to spend less than a week in one place. (Think 8 hours to drive 180km at times). However, this means that it is possible for Cinterandes to perform operations late into the night as well as complete cases that require an overnight stay.

Cinterandes has a tendency to work in short intense bursts. Mobile Surgical Services plods throughout the year. It reminds me of the tortoise and the hare. Ultimately, Mobile Surgical Services has completed approximately double the number of operations in half the years running. This also could be linked to faster turn around time between operations. From what I observed, this seemed to be due to increased numbers of staff meant that tasks could be split into a more time efficient process without losing quality of care.

In NZ, it is socially expected that a general anaesthetic will be used. And because we have the resources to do so, on the bus a GA is regularly used. However, in Ecuador, a GA is risky, expensive and has longer recovery time. Consequently for every operation possible, a spinal anaesthetic is used instead. The only operations I saw where a general was used, was for laparoscopic surgery and for orchiopepy. Can you imagine, arriving at your operation in NZ for a tubal ligation, and then having it done under a local block!?

Importantly though, both Cinterandes and Mobile Surgical Services will only take patients with a low anaesthetic risk. This is seemingly because back up and ICU if required are not on hand. For this reason patients with an ASA of 1 or 2 are only accepted.

An important similarity in terms of functionality revolves around the fact that both the truck and the bus can be parked up almost anywhere. Both only require a water and power source to be able to operate. In general they both prefer to be

attached to the local health centre, however I saw the truck attached to a town hall, and the bus to a fire station. This versatility is vital to being able to go to places that are otherwise under resourced by the health sector.

Both Cinterandes and Mobile Surgical Services are run by people with a passion for improving outcomes for people in rural environments. They recognize the importance of access and affordability as major health barriers for many people. While neither service is perfect, they both go a long way to improving the quality of health care received by rural people.

As a final note, the Ministry of Health funds Mobile Surgical Services. Unfortunately, Cinterandes has to fight for every last piece of equipment and funding it receives. Despite this, they work extremely hard to provide the best service they can to the people of rural Ecuador. For this reason I would encourage people to donate to Cinterandes, because this foundation puts every last dollar into health care for its rural people.



My host family – Sonita (11 years) and Sonia