I am Nicola Shaw, a University of Otago, 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 (Ecuador and Zambia) over my twelve week elective (Feb 23- May 19). It allowed me to donate resources, such as glucose test strips and medications, to St Francis Hospital, in Eastern Zambia.

Zambia at a Glance

Zambia is a landlocked country located in Sub-Saharan Africa, and is similar size to Texas. The population in 2010 was estimated to be 13 million. Of these, 66% were under 25 years but only 5% over the age of 55 (median age 17 years). Life expectancy is low, at only 52 years. In 2007, 42% of the population lived in an urban area, making it one of the most urbanized countries in Southern Africa. Ethnically the country is extremely diverse - there are over 72 different groups, however 90% of these fit into 9 language families. Though English is an official language, it is rarely heard outside the urban centres. The dominant religion is a blend of Protestant Christianity and traditional beliefs.

In recent times, Zambia has been relatively politically stable. There has been increasing Chinese investments in mining, however the country still relies heavily on foreign aid.

The country is split into nine provinces. The wealthiest regions can be found in the Copperbelt (due to mining) and in the south (Victoria Falls). It has a tropical wet-dry climate, where it rains heavily between November and April.

I spent most of my visit located in Eastern Zambia. This region has a population of 1.5 million people (13% of the population), who mostly live rurally. The plains are covered in long grasses, and the earth is dusty and red. It is common site to see a cart pulled by cattle rolling by.

The local market

Houses are tiny. Often made of mud or bricks, the interior space is not much larger than 2 double beds and is the space for an entire family. The roof is made from grass or corrugated iron, depending on the family's wealth. The majority of the region's people are subsistence farmers, meaning that what they grow is what they eat or trade for other food.

Typical staple foods include beans and nshima (ground up maize). This season was a bad maize year. Sadly, it means people, particularly children, will starve before next season comes.

The province is the least developed in Zambia, although it contains one of Zambia's most valuable assets – South Luangwa National Park.

Economically, Zambia exports copper, foodstuffs (especially maize), textiles and agricultural chemicals. The currency was rebased in early 2013 as GDP has finally increased after massive inflation over the past 20 years.

In 2006 64% of the population lived below the poverty line. In 2006 the unemployment rate was 14%.

While the government provides education, it is limited by available money. Schooling is free until year 7 (approximately at 14 years), at which point most children leave, as their families cannot afford to now pay for it. Unfortunately, these schools provide nearly no education in science or mathematics. The number of literate people aged between 10 and 30 years is low. There are a few universities scattered around the capital, Lusaka, and the wealthy Copperbelt region, however there is no government funding available to attend them, and the education available to that point is not of high quality. Consequently, only a select portion of the population will attain a university education.[1]

Health System

Zambia's disease burden is focused in the communicable realm. According to WHO data, the chance of dying between 15-60 years is 683(male) and 656(female) per 1000. Most of these people will die of communicable disease (92%). This is higher than the greater African region.

[1] http://www.postzambia.com/post-read_article.php?articleId=17601

An HIV education poster

The top causes of death include HIV/AIDS, lower respiratory tract infections, malaria, diarrhoeal disease, perinatal disease and tuberculosis. Both the tuberculosis rate and HIV/AIDS mortality is nearly double that of the surrounding region (788 vs. 313 per 100 000 population for HIV).

However, the population has a high immunization rate amongst one year olds – approximately 82% (vs. 66% for the greater African region).

The health system can be split into three service providers – government, mission / other not-for-profit NGOs and private health care. The whole system is facing a human resource crisis, particularly in rural areas. Throughout the country there are very few local doctors. Consequently in the past decades, volunteer-staff have been relied heavily upon to fill personnel gaps.[2]

Zambia has a huge need for medications, particularly for malaria, HIV/AIDS and tuberculosis. However, the majority of drugs must be imported at huge cost to the government. Consequently, they are in very short supply.[3] It means that hospitals can go for up to weeks at a time without basic supplies such as insulin – a reality that cannot even be imagined here in NZ.

On a positive note however, medications, when available, are provided to the public free of charge with a prescription. Doctors' visits within the district that a person lives in are often free of charge, or have a one off hospital registration fee (around ten dollars).

[2] http://www.healthsystemassessment.com/wp-content/uploads/2012/06/Zambia-Country-Report.pdf
[3] http://ukzambians.co.uk/invest/health-sector-in-zambia/

St Francis Hospital

St Francis is a 350-bed hospital located in Katete, Eastern Zambia. The purpose is to provide medical care for the 200,000 people who live in the immediate district. However, the hospital regularly accepts referrals from the whole Eastern Province (population 1.5 million).

While the hospital is integrated with the Zambian Health Service, it is also dependent on foreign donations to maintain basic supplies. The Anglican and Catholic Churches administrate it.

The hospital is made up of 6 main wards (f/m medical, f/m surgical, obstetric and paediatric), SCBU (special care babies unit), OPD (outpatient department), Tb clinic, HIV clinic, physiotherapy, X ray, pharmacy and small laboratory. By local standards this is viewed as extremely well equipped. However, for the entire time I was there, we could not complete a full blood count, except for on the Haemacue in paediatrics. Supplies were a constant issue – at various times we had no salbutamol, IV fluids, insulin, broad-spectrum antibiotics and HIV medications. Giving oxygen to a patient was a big decision – there were usually only 2 functional oxygen cylinders on the medical wards. Neither could provide a flow higher that 2L/min and more than once a decision had to be made about which patients would benefit most from the therapy as there was not enough to go around.

Mercy – local nursing student

The majority of the staff are local people. There are local nursing students present on most wards. Nearly all of the doctors were foreign (there were on average 8 for the whole hospital) and they stayed for variable lengths of time, but no more than a few years. Clinical officers were a new concept to me – they do not have a medical degree, but undergo training that gives them prescribing rights and the general function of a doctor.

Medical students come and go – they stay for on average 6-8 weeks and provide much needed back up for the doctors on ward rounds and in OPD.

To become a patient, if a person lives in the Katete Province, they must acquire a green card. This is a one-time purchase and is approximately $10. All of their

medical treatment, history and medications are recorded on this (and is free). For each presentation to hospital for an appointment or inpatient stay, the patient is expected to bring their green card.

The outpatient department is run as a general practice and emergency department combination. Patients come at the beginning of each day and receive a card to wait in line. The doctors come after ward rounds and will see each patient in turn until there are none left for a particular day. Prescriptions are given, admissions made, and often people told there is nothing we can do for them.

Patients waiting for OPD

Their bedsider provides a patient's daily care. This is a person, usually a family member, who must stay with the patient until discharge. They fetch their medications, food and ensure they have adequate water and sanitation. Without such a person, the patient is at high risk of death due to accidental neglect by hospital staff.

The need for a bedsider's presence can create difficult situations. One that regularly featured was when the patient was a young child who was still breastfed. Did the mother come to be a bedsider, and thus leave her other children (who many be several days walk away), so she could feed her sick child? Or did she stay at home to care for her other children who are well and thus more likely to survive? Unfortunately, there is no 'right' answer to this dilemma, or so many other questions faced by staff and patients on a daily basis.

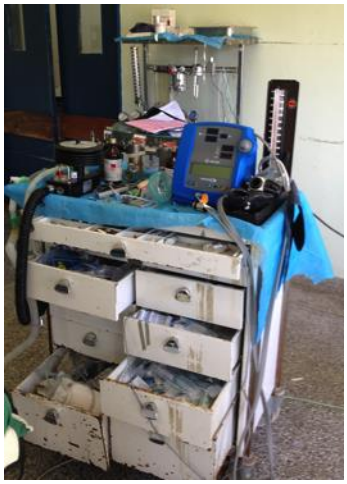
Parents and children in Mbusa Children's ward

General Medicine

I spent 3 weeks attached to the male medical ward. Any person over the age of ten is considered an adult. The ward could hold roughly 30-40 patients.

There was a small area at one end of the ward, which was considered ICU. The only difference between this area and the rest of the ward was the proximity to the nurses' station. It was usual for one patient to die roughly every day.

There were plenty of 'typical presentations' – the lower respiratory tract infection, cellulitis and heart failure. But equally, missing were the IHD patients, the obese, the type 2 diabetics (though the odd one popped up) and the 'vague sense of unease' patients. Nearly all patients who came to be in hospital were seriously unwell, as many had delayed their presentation until the harvest was completed.



The resus trolley

Tuberculosis and complications associated with it are extremely common presentations. Tb meningitis, ascites and severe lower respiratory tract infections were all commonplace. There is an entirely separate wing specifically for Tb, which is open to the outside air, for the purpose of decreasing infectivity.

Each patient who comes in is sent to be HIV tested early in their admission, unless they have been tested in the last 6 months. Pre and post-test counseling is provided by nursing staff.

Extreme clinical signs usually uncommon in New Zealand are commonplace. Massive ascites, velcro crepitations in the lungs, and malignant discharge all come to mind. Gross organomegaly due to multiple previous infections with malaria were as common as not.

Several cases stand out in my mind.

The first was a 28-year-old man who presented unable to walk, moon faced and lethargic. He came without a bedsider and refused to eat, stating he was not hungry. After a few days in hospital it became apparent, he was so depressed he had become malnourished, and this was only worsening by his time as an inpatient. Efforts were made to acquire him some plumpynut (a high calorie rescue food). However, plumpynut is provided by UNICEF, and so it was not available to be given to an adult who was severely malnourished. On his fourth day of admission, he passed away, due to electrolyte imbalances associated with his malnourishment and depression.

This case stands out to me because it is something that in New Zealand we would never be faced with. Patients like this would be aggressively managed long

before they reached this state, both psychiatrically and medically. Once in hospital a person would become responsible for their welfare and feeding. Here, as he had no bedsider, he was repeatedly moved to the back of the ward, out of sight and out of mind. We as doctors were relatively helpless to his case – we had no resources to feed him, apart from NG tube, which he repeatedly pulled out. At least with the lack of rescue food, it was clear-cut that this resource was not available for him - there was there was not even enough for the children it was donated for. We had no medications that could help him – antidepressants would take too long to work, and we had nothing that could improve his electrolyte imbalances. We had limited means of monitoring him – nurses could not make him their main focus, we lacked equipment for appropriate blood tests. All in all, we as a system failed him due to a lack of resources, both medical and personal to improve his chance of survival.

A second case that stands out in my mind was a 26-year-old man with a history of seizures, who presented with near constant partial to generalized seizures over the past few hours. He was not usually on regular medications. Despite administration of all the anti-epileptic medications available in the hospital, including by infusion, his seizures continued near constantly for four days. On the fourth day, over fifty people filled the ICU area and began chanting loudly. By the time they had finished, the man had stopped seizing, and did not seize again by the time he was discharged, 5 days later. While he was initially weak on his left side, with physiotherapy his strength returned and he was able to walk at discharge.

This is a case that simply baffles me. What happened I do not understand, and cannot begin to comprehend the cultural subtleties. We can never know if it was the medication, the group of people, or whether the seizures subsided on their own, or I suppose if they were truly seizures in the first place, as we had no way of completing an EEG. But for whatever reason, miraculously he did not seize again.

Paediatrics

I also spent three weeks in paediatrics.

There are several different areas that comprise paediatrics. We had SCBU (special care babies unit), ICU, babies' room, general paediatrics and malnutrition rooms 1 and 2.

While there are limited beds in the ward, this does little to stem the patient numbers. As children do not take up an entire adult sized bed, it was commonplace to see 2-3 children per bed, along with their bedsider. While it was not rainy season the average death rate was 30 per month. During rainy season it would escalate to 100 per month, due to the increase in malaria.

In general, the children are very scared of doctors, and by association any white people. It is often a cross language barrier game to examine children without them crying. Occasionally, the best clinical sign that a child was ready to go home

was that they would run up and hug you, instead of crying as soon as you neared their bed space.

There were specific presentations common in each area.

SCBU would most commonly see birth asphyxia and premature / multiple delivery babies. The aim of SCBU was to keep the babies warm, hydrated and fed until they reached a weight suitable for discharge. The incubators were wooden boxes with glass doors, heated with a single electric light. The baby / babies would sleep prone (for risk of aspirating vomit) on a thin mattress which may have an apnoea alarm under it.

SBCU twins nearing discharge

NG tubes could be placed if the baby was too breathless to feed. Oxygen could be given to a few babies. More often than not the babies with birth asphyxia would pass away. Those that didn't would eventually reach the discharge weight of 1.8kg. Mothers were expected to stay with their babies to feed them, as they would here in NZ. However, often they would still be breastfeeding other children, and be torn as to stay or go.

General paediatrics would most commonly see malaria. Nearly every admission would be malaria until proven otherwise. Fortunately, we had the facilities to do blood slides and plenty of up to date malaria medication. In this common diagnosis, many children would present hypoglycaemic to the point of unconsciousness, or with haemoglobin counts so low that it seems unbelievable from here in NZ. The lowest haemoglobin count I saw was 12 (normal adult 140)! Thus other than malaria medication, the most common treatment provided was blood.

Charles preparing a blood transfusion

The other common presentation was diarrhoeal disease, requiring usually oral rehydration.

This was also true in the babies' room, but an extensive amount of bronchiolitis was also seen. In there would also feature other anomalies such as hydrocephalus, Wilm's tumour and strange genetic malformations.

ICU was where the extreme cases of malaria and diarrhoeal disease would end up. There was always a difficulty that overnight the hospital was staffed only by clinical officers, who would give the same prescribed treatment to all children, despite clinical symptoms. This came to a head one morning round, where I noticed a new child in ICU. As I began examining him, it became apparent that he was coning in my arms, due to raised intracranial pressure / meningitis and there was nothing I could do to save him. On looking back through his admission note made at 8pm the previous evening, the clinical officer had only prescribed him standard low dose antibiotics, rather than the high dose IV required to treat his meningitis. Would this difference have saved his life? I don't know. But I know I will never forget watching the father wrap his child in his chitengae (cloth) and carry him home on his back, while being escorted from the grounds with the families of other patients wailing with him.

But the most difficult place was malnutrition. It was complex culturally and medically.

Medically as the children could change so quickly and die within hours of hypothermia or sepsis. Weight management was challenging – were they in the weight / fluid loss phase or should they be gaining weight, and were their feeds appropriate for their weight.

Culturally, feeding was a minefield. When a mother becomes pregnant again, no matter the age of a child she is breast-feeding, the child is off the breast and fed nshima (ground up maize). This was the child's most at risk time for becoming malnourished. It was a fixed belief that nshima was a complete food, despite it lacking any protein, and that it was all a child needed to grow healthy and strong. There was also a fixed belief that if a child was given an NG tube for feeding, that it would pierce his/her heart and they would die. It usually took a lot of convincing on our part for the parents to allow us to do this. This created some calamity one afternoon, when the NG tube scratched the throat of a child, and he began coughing up blood. Panic ensued and the NG promptly removed. Despite the child's survival, the parents could not be talked into a second attempt. Fortunately, that child began eating on its own accord an hour or so later and gained weight well.

Overall

My time in Africa was a life changing experience, which I struggle to convey accurately and effectively in words. I am incredibly grateful that The Pat Farry Trust was able to help me realize my dream of working / studying in Africa, if only for a short time.

The constant struggle for basic healthcare is ongoing, and maintaining adequately trained staff is near impossible. The work done by staff at St Francis' Hospital is truly incredible for the trying circumstances. Consequently, this is somewhere I dream of returning to work once I am more qualified.

Any doctors wanting to work in Africa should get in touch with the hospital. Details can be found here; http://www.saintfrancishospital.net/ They are in constant need of qualified staff.