

Zambian experience: under the microscope

In the early summer of 2017, four years after arriving in Dundee to study Biomedical Sciences, I found myself back in the Scottish Borders where I had spent much of my childhood. The 2nd year of my degree was undertaken at the University of Singapore and I had many travel adventures including returning home on the Trans-Siberian railway. The rest of the summer of 2017 was passed away in Boston, Massachusetts as a leader on a 'Camp America' programme. I was not yet ready to embark on another course of study and a career pathway was unclear. The time was right to undertake some voluntary work to help assess my options for the future but also give me a unique perspective on a culture in the developing world so different to my upbringing. A door swung open wide to spend 4 months at St Francis Hospital, Zambia. I packed the suitcase once more and with passport in hand and ticket to ride set off to the Southern Hemisphere with a heady mix of nervous but excited anticipation. This short report documents discoveries I made about this wonderful country, its people, my work as a volunteer and myself.

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Tuberculosis I didn't waste any time in getting my sleeves rolled up after arriving at St Francis Hospital (SFH) and on the first Saturday I went with the Tuberculosis (TB) outreach volunteers to check-up on patients who were undergoing TB treatment. Most of these patients have to walk extremely long distances to reach SFH to get their medication and be assessed. Therefore a group of 30 volunteers use bikes (donated to them with funds raised in the Scottish Borders a few years ago) to reach these patients at their homes. The dedication and compassion that these Zambians have by giving up their time to visit patients that they don't necessarily personally know amazed me. This is a great testament to their culture of offering support to people in need and their kind nature.



Picture 1: Dennis (on the far right) and TB treatment support volunteers out and about

The Water for Life Project This project was something I was expecting to get my hands dirty with from the word go. However, from day one it was clear that my help was not really needed as much as I thought. John Western, a Welshman had been brought in by the Logie Legacy one month before my arrival to oversee the final stages of the project was doing a great job. He had good labourers and was a man who loved his work and was very good at it. He had previously spent several years there as a volunteer and had a great deal of respect from the Zambians and was also seen as their close friend. My presence at St Francis was

beneficial for my Father since I could act as the middle man for his communication with the team and help generate a follow up report once the project finished in December. The results were outstanding with all-round thumbs up from every household when I conducted a door to door survey of the 140 properties connected and asked if their water pressure and quality had increased. It was an



Picture 2: Water for Life

amazing feeling knowing that people back in the Scotland were responsible for this project which will benefit thousands of patients and staff at St Francis.

The Lenient Laboratory My first morning working within the laboratory was in the microbiology department which turned out to be an educationally-rich experience. I shadowed Austin, laboratory technician, who was extremely helpful and patient in explaining all the processes and science behind what we were doing. The conditions of this laboratory were far below what I expected and not anywhere close to clinical standards of the UK. There were urine samples spilt on the bench, no designated areas for dirty/finished samples and the paper records were strewn about all over the place. The labs were also under refurbishment so random maintenance workers drifted in and out wearing no



Picture 3: With Austin

personal protective equipment. The difference between standards of healthcare between the western world and the developing world is noticeable. As Westerners, a huge challenge faces us to understand how to adapt to these alien conditions but also sensitively try to be the people who bridge that gap and work with our partners to bring about sustainable developments to improve healthcare.

The Importance of the Laboratory The laboratory is under great pressure from all departments to supply results so effective treatment plans can be created. More often than not their work goes unnoticed and can easily be criticised by professionals when problems arise. The lab ran a wide range of tests in their departments (haematology, microbiology and chemistry). For example, the hospital diagnoses 5 times as many TB cases (1600) as seen across the whole of Scotland. A large percentage of patients are HIV positive and over 8,000 tests are conducted annually. Rapid testing for malaria can help enormously in the

7,000 or so patients clinically suspected of this life threatening disease. Unfortunately there is always a shortage of reagents and equipment which is a constant challenge for the staff. The reason for this is due to the lack of funding and supplies provided from the medical stores in Lusaka. Additionally, there are always shortages of staff which makes dealing with the workload received from the wards hard to keep up with.



Picture 4: Plating a specimen

What was I trying to achieve? I went to offer some basic skills in the laboratory I gleaned from my degree in Biomedical Sciences wherever needed most. I found myself alleviating their shortage of staff which they were grateful for. It was very rare they received any volunteer assistance. Over the months I got educated in all departments, microbiology being the main one. I was also able to share with staff my techniques and biosafety measures. On days when there were staff shortages below normal I could be the one technician in a department carrying out investigations – this allowed for accelerated learning.

What were the main activities I performed? There was a range of tests performed in microbiology on a daily basis. The bulk of the works were tests on the

urine and stool samples such as microscopy and culturing. The most common tests were:

- Urine analysis
- Urine sugars
- Pregnancy tests
- Urine and stool microscopy
- Urine, stool and pus culturing
- Gram staining
- ZN staining
- Semen analysis
- Gene XPERT to detect level of TB

What did I think I was able to achieve? I learned a great deal in clinical microbiology which allowed me to run the department myself when called upon. In my spare time, reading the textbooks that the laboratory had to offer would assist me in learning and diagnosing patients. I was able to work in an environment which was sometimes isolating and keep a positive attitude in the work being done. This put a good deal of pressure on me at points but I dealt with it efficiently. I was able to reduce the workload and provided a different insight with investigations when discussing them with colleagues. It was a two-way learning experience. This deepened my understanding of the Zambian's mind, the way they think and their culture. I am able to take away the best parts of this and practise them in my daily thinking. Additionally, I implemented work flow systems in the lab which allowed for a smoother and more efficient turnaround of results.

What future support could the Logie legacy offer to the laboratory? The laboratory itself is far too small for a level two hospital like St Francis. Renovating and extending it would make

it a more professional and a safer environment to work in and greatly enhance patient care. Much of the medicine there is practiced blind without the benefit of laboratory services to assist clinicians. The renovation stopped due to lack of funds. When carrying out investigations in microbiology I noticed that there was a lack of textbooks to reference and consolidate your findings. Most of the textbooks available were out of date or in poor condition with pages missing. Replacement textbooks would be of great use to this department. In relation to investigations, the laboratory was using a windows XP computer with Ethernet connection that was painfully slow. A new more efficient computer would assist in research that the laboratory carries out. Support from an experienced microbiologist and biomedical scientist would be highly valued by the staff – teaching visits or should internet technology improve then regular remote access sessions.

Equipment woes The lab currently has one centrifuge to meet the demands of all departments. This means samples from microbiology are being transported to chemistry for centrifugation which increases the risk of cross contamination and slows down the turnaround time of results. It lacks an electrophoresis machine so they are unable to type haemoglobins they are dealing with. There is no shower in case of emergency in terms of biosafety. Stock count is all recorded manually which is time consuming and unorganised. The need for electronic records is there. There is a lack of quality conical flasks for measuring, mixing and heating agars for microbiology. Most of them are cracked and broken. This makes it a much more dangerous task with boiling solutions regularly overflowing onto the work benches near electrical plugs. The heater that is used to get these to a boil is very out dated and there is no way to regulate the temperature of the heater. There is only an on and off switch. The standard operating procedures are rarely followed. This is down to the quality of them and their availability. They are often lost in piles of paper and notes on the desks in each department. There is a lack of quality control and systems in place for work to flow smoothly through each department. Patient samples can easily be mixed up which causes delays in turnaround times. They were however delighted with the supplies, including the microscope donated by the BGH laboratory.

Life Back in Scotland Now back in Coldstream I can't help but compare this place to Katete. According to UNICEF, life expectancy in Zambia at birth is 57 years. HIV, TB and malaria are big killers. Less than half the population have access to improved sanitation facilities. 82% of girls receive a full primary school education but only 36% complete High School. We in the UK have access to a phenomenal healthcare service, high quality education and great digital services allowing us to learn at accelerated rates. Unemployment rates are low and job opportunities exist no matter what level of education you may possess. A child growing up in rural Zambia is denied many of the privileges I have come to take for granted. This to me seems so cruel an inequality of opportunity. The challenge for me that lies ahead is this - how can I now with my education, greater global awareness and emotional stability make a valid contribution to change the world around me into one which everyone can develop their full potential? I peered down many microscopes whilst in Zambia and often marvelled at what I saw. More importantly however I embraced the opportunity to take a good hard look at my own life and gained a fresh perspective on how best to move forward.

I would like to thank the Logie Legacy for the support that they provided; it would not have been possible without it. I am truly grateful for this experience.