# FUNDING PROPOSAL FOR BIOCHEMISTRY

## PRINCE WELLINGTON NGU HOSPITAL

## NEIAFU, VAVA'U KINGDOM OF TONGA
## August 09

The Kingdom of Tonga is an independent Pacific nation consisting of 176 islands spread roughly N/S along the dateline, with four main island groups and a population of 108,000. The island group of Vava'u has a population of 16,000 (1995 census) while the capital of Vava'u, Neiafu, has approximately 6,000 residents. Tonga is one of the poorest Pacific Island nations with most Tongans remaining dependent on subsistence farming and fishing. The Australian Department of Foreign Affairs describes the Tongan economy as "a small open economy with a narrow export base which relies heavily on private remittances from Tongan communities overseas and external development assistance." An infant mortality rate of 12 deaths/1,000 live births (United States 6.4/1,000, New Zealand 5.7/1,000, Australia 4.6/1,000) is a reflection of the public health issues facing this nation. Basic public health care is limited by poor infrastructure and limited funds.

This report was prepared by Sandy Safton who worked at the laboratory at the Prince Wellington Ngu Hospital in Neiafu from January 2005 until March 2008. She was responsible for setting up the laboratory to the high standard it is today. The 60 bed hospital provides basic medical and dental services and has a budget of $700,000 TOP ($350,000 USD) (2005-06), with a total of 91 staff. There is no provision for laboratory funds in this budget. The hospital maintains emergency, medical, surgical, obstetric and paediatric wards as well as outpatient, diabetic, hypertension/cardiac and dental clinics.

The laboratory employs two full time technicians and one full time laboratory assistant. At present the laboratory is able to provide basic haematology (manual white cell and platelet counts, spun haematocrit, and blood film comments), cross matching for blood transfusion as well as limited microbiology tests (gram stains, urine and faecal microscopy). In October 2006 a small biochemistry analyzer (Vitros DT60) was purchased for the hospital by the Friends of Prince Wellington Ngu Hospital Committee (a local charitable organization that raises funds from the public). Several months supply of reagents were included in the purchase price of $44,000.00 TOP. This instrument is providing a desperately needed service to the doctors at the hospital and the people of Vava'u.

The two technicians are training on the instrument for day to day operation and maintenance. The present analytes are **$Na^+$, $K^+$, (electrolytes) urea, creatinine** and **glucose**. These are basic biochemistry tests that are routine in first world laboratories and are considered part of first line testing in patient diagnosis and management. These five tests provide vital information in almost all clinical situations and are of particular importance in the following:

- Critically ill patients
- Post operative maintenance
- Therapeutic IV administration
- Monitoring of diabetic patients
- Early detection of renal damage

After one month of operation it has been determined that the laboratory is doing approximately 100 **$Na^+$, $K^+$ (electrolytes), urea** and **creatinine** tests and approximately 70 **glucose** tests per month.

A more complete and comprehensive laboratory testing regime i.e. the introduction of additional tests, would enable doctors and medical staff to better manage and diagnose both in and out patients. The addition of **Liver Function Tests (AST, ALT, ALP & γGT) and Cholesterol and Triglycerides** would provide a much needed diagnostic tool to help manage a range of health issues affecting the local population. Abnormal Liver Function tests can provide an indication of liver damage due to drugs (eg alcohol, medications) viral diseases such as hepatitis and dengue fever (health concerns in Tonga), and hypoxia (lack of oxygen) due to congestive heart failure. LFT's in conjunction with cholesterol and triglyceride measurement provide useful information in the diagnosis and management of fatty liver, of which diabetes mellitus and obesity (major health concerns in here in Neiafu) are common causes.

The costs associated with these tests (minimum order 100 reagent slides), including instrument consumables (thermal paper, pipette tips, controls and calibrators, reference fluid) are as follows:

- **Liver Function Tests**, (total of 100 test per year) for each of **AST,ALT,ALP,γGT** @$208.00 per box of 100 slides: **Total for 1 year $832.00 AUD**

- **Cholesterol and Triglycerides,** (total of 200 tests per year for each) @$208.00 per box of 100 slides: **Total for 1 year $832.00 AUD**

- **Electrolytes ($Na^+$, $K^+$), urea, creatinine and glucose** (total of 1,200 tests per year for each analyte): $2,496.00 AUD/year for each: **Total for 1 year $12,480.00 AUD**
- 4 X Control I @ $96.00AUD per box, **$384.00AUD per year**
- 4 X Control II @ $129.00AUD per box, **$516.00AUD per year**
- 2 X calibrators @ $151.00AUD per box, **$302.00AUD per year**

- 3 X reference fluid @ 76.00 per box of 4, **$228.00AUD per year**
- 3 X thermal paper @ $19.00AUD per 3 rolls, **$57.00AUD per year**

**TOTAL COSTS FOR 12 MONTHS OPERATION: $15,631.00 AUD**
(EXCLUDING FREIGHT FROM AUSTRALIA, DUTY AND GOV'T TAXES)

Other consumables such as pipette tips and sample cups are re-used after cleaning and sterilization in order to reduce costs. However, these items deteriorate after many washings and will have to be replaced eventually.

- Sample cups/box 100: **$19.00 AUD**
- Pipette tips/box 250: **$14.00 AUD**

The Ministry of Health of the Government of Tonga is unable to meet these costs at this time. Funding for continued operations must be obtained from elsewhere. At present the laboratory is receiving funds from donations from visiting tourists and from Friends of the Prince Wellington Ngu Hospital Fundraising Committee.

Donations are vital for the purpose of continuing this much needed service in Neiafu. The provision of reliable, accurate laboratory biochemistry results will enable hospital staff to vastly improve the standard of basic health care so desperately needed by the people of Vava'u.

Sandy Safton was a qualified Medical Scientist with over 20 years experience in medical laboratories both in Canada and Australia. She had a BSc from the Australian National University in Canberra, a Dip. Medical Laboratory Science from the Southern Alberta Institute of Technology in Canada and a M. App.Sc. in Medical Laboratory Science from Charles Sturt University in Australia.