

## **Papua New Guinea's next generation of medical researchers: Celestine Aho, Patricia Rarau and Pamela Toliman**

GERALDINE VILAKIVA<sup>1</sup> AND TAMMY GIBBS<sup>2</sup>

**Papua New Guinea Institute of Medical Research, Goroka and Telethon Institute for Child Health Research, Centre for Child Health Research, University of Western Australia, Perth**

### **SUMMARY**

**Celestine Aho, Patricia Rarau and Pamela Toliman are amongst the next generation of health researchers at the Papua New Guinea Institute of Medical Research (PNGIMR). Face-to-face interviews were conducted with all three women for the purpose of profiling women who are leaders in health and medicine in Papua New Guinea (PNG). They were asked questions about their early life and childhood, education, work life and training, and mentors who have supported their career path and leadership role. All three see opportunities before them to tackle the health challenges facing PNG, find solutions and contribute to human development in their country. At PNGIMR, Pamela is a senior scientific officer in the HIV and STI laboratory; Celestine is a senior scientific officer in the bacteriology laboratory working on pneumococcal vaccines; and Patricia is the study clinician for the Partnership in Health Project, monitoring the impact of the PNG liquefied natural gas (LNG) project.**

Celestine Aho, Pamela Toliman and Dr Patricia Rarau are three vibrant Papua New Guinean women who are making their mark in the world of medical research at the Papua New Guinea Institute of Medical Research (PNGIMR). They represent a new breed of young, highly educated, career-minded, ambitious yet culturally orientated PNG women. Although they come from different ethnic and cultural backgrounds, one thing draws them together – their love for research. For this trio, medical research has transformed from a profession to a passion – they all want to make a difference and improve health in PNG through research.

Medical research was not always on their minds. As a child, Celestine wanted to be a medical doctor. A science foundation year at university set her on the path to geology but in her third year she had a reality check and decided the 'fly-in fly-out' work roster that came with a career in geology was not for her. She transferred to microbiology and

has no regrets. The switch in science genres took her on a new path and she landed a job at the Wildlife Conservation Society in Goroka, where she worked on building a reference database, classed plant samples and fed birds. A phone call from Dr William Pomat with an offer to work at the PNGIMR saw another career change, setting her on the path to medical research.

Pamela says her choice in science was out of default as she was not sure what she wanted to do after finishing year 12. Her parents wanted her to do medicine so she started with a science degree first, with a view to doing postgraduate medicine down the track. Along with the science degree, she completed a bachelor of arts with a double major in sociology. This degree impressed upon her an approach to research that would be more holistic. For her, the arts degree filled the gaps in her science-based understanding of disease. Both her science and arts degrees were obtained abroad, at the University of

---

1 Papua New Guinea Institute of Medical Research, PO Box 60, Goroka, Eastern Highlands Province 441, Papua New Guinea  
geraldine.vilakiva@pngimr.org.pg

2 Telethon Institute for Child Health Research, Centre for Child Health Research, University of Western Australia, PO Box 855, West Perth, Western Australia 6872, Australia

Queensland. Here, Pamela lived the full university experience: living on campus, participating in college sports, including hockey and softball, and even becoming college president.

Patricia's dream as a child was to follow in her father's footsteps and become a loans officer at a bank. She then entertained the thought of becoming a pilot or accountant. After completing her final high school years at a boarding school in Rockhampton in Queensland, Patricia enrolled in a bachelor of science degree course at the University of Papua New Guinea. Patricia streamed into genetics in the last semester of 2001, enabling her to enter the bachelor of medicine and bachelor of surgery course at the School of Medicine and Health Sciences. She then completed her medical residency at Port Moresby General Hospital in 2006 and 2007.

Unlike her medical colleagues who continued as practising doctors, Patricia took a different path, as she felt the hospital setting wasn't for her and she wanted to help prevent disease and make a difference to the whole population. In 2008, she became a research clinician for one of PNGIMR's major malaria research studies, the Intermittent Preventive Treatment of Malaria in Infants (IPTi) study. Having no idea about research, Patricia took up the challenge after being introduced to IMR by her university lecturer who was then the Dean of the School of Medicine and Health Sciences, Professor Sir Isi Kevau.

Pamela, Celestine and Patricia have all gone on to complete master's degrees. For Patricia, her work on the IPTi study formed the basis for her master's program. The IPTi study looked at antimalarial medications and how effective they are in preventing malaria in PNG infants when administered early in life. Results from the study were published in numerous international journals and also gave Patricia the opportunity to present the results of her thesis, which looked at respiratory viral pathogens in infants, at the 58th American Society of Tropical Medicine and Hygiene annual conference in Washington DC in 2009. She describes this experience as 'awesome'.

After joining IMR in 2006, Celestine completed an honours degree in 2009 before embarking on a master's degree. Her master's project took her to Switzerland for 18 months, where she worked and studied

at the Swiss Tropical and Public Health Institute. She looked at the diversity of *Streptococcus pneumoniae* isolated from the noses of young children, and also isolates from children who were diagnosed with pneumococcal meningitis. Living in Basel, in north-west Switzerland on the Rhine River, was a challenging experience for Celestine, a Goroka local. Everything was so different, including the lifestyle, weather and the way people interact, and she also had no family with her and did not know many people. But she discovered chocolate, cheese, bread and bobsledding, and was able to visit Paris, Barcelona and the Black Forest in Germany.

Since joining IMR in 2003, Pamela's research has been in the area of HIV (human immunodeficiency virus) and sexually transmitted infections (STIs) (Figure 1). These studies have contributed a wealth of information and broadened our understanding of HIV and STIs in PNG. Her honours project evaluated the standard treatment for gonorrhoea to determine its effectiveness in PNG. For her master's, Pamela looked at co-infections in those who are HIV positive. The study was significant as it provided an insight into the common diseases that affect those living with HIV, as well as the social and cultural issues that contribute to this in the PNG setting. Pamela's research also provided the first evidence to show that people are being diagnosed as HIV positive very late, which has a major impact on prognosis. Not only is that person's immune system already decimated, but they could unknowingly be transmitting the disease, further adding to the HIV problem.

Pamela is passionate about this area of health in PNG and is determined to make a difference. In particular, she is concerned about STIs in women as these can cause secondary infertility. For her PhD, she wants to do research into cervical cancer, the biggest cancer killer of women in PNG. Pap smear testing has not been logistically successful in PNG for a number of reasons. Pamela hopes that a rapid human papillomavirus (HPV) test will reduce cervical cancer rates by detecting strains of HPV and seeing women with high-risk strains referred for further treatment.

## Leadership

Today, all three women have leadership roles at IMR. Pamela has risen through the



Figure 1. Pamela Toliman in the HIV (human immunodeficiency virus) and STI (sexually transmitted infection) laboratory at the Papua New Guinea Institute of Medical Research.

ranks in the HIV and STI laboratory from a graduate scientist to a senior scientific officer and the laboratory research coordinator. Celestine is a senior scientific officer in the bacteriology laboratory (Figure 2), where she is part of the acute respiratory infection research team conducting extensive research into pneumococcal conjugate vaccine for PNG children. These studies are done in collaboration with both national and international organizations and have provided vital information which has informed government policy. PNG will introduce a pneumococcal vaccine in 2014, and Celestine is proud to be part of the team that contributed to the research that will help many Papua New Guinean children.

Patricia is currently the study clinician for one of IMR's biggest projects – the Partnership in Health Project – looking after Hiri, one of the four study sites of the project (Figure 3). This project is monitoring the impact of the PNG liquefied natural gas (LNG) project on

the health of the population in the impacted areas Hiri and Hides and in non-impacted areas in the Asaro Valley and on Karkar. The LNG project is the largest resource project in the history of PNG and will have a significant impact economically, as well as on employment, lifestyle and health. This study will compare longitudinal demographic and health trends in these four communities using health and demographic surveillance systems. Patricia is particularly interested in non-communicable or lifestyle diseases such as diabetes, cardiovascular diseases and cancer. Patricia relishes in the opportunity to work on the project since, although it is research, it also gives her the opportunity to see patients in the clinic.

As young, up-and-coming researchers, Celestine, Pamela and Patricia rely on mentors to help teach them the tricks of research and to be good at what they do. These mentors are the special people who have made an impact in their careers and their lives.



Figure 2. Celestine Aho in the bacteriology laboratory at the Papua New Guinea Institute of Medical Research.

## Mentors

For Patricia, Dr Ivo Mueller has been a big influence for her. Now at the prestigious Walter and Eliza Hall Institute in Melbourne, Dr Mueller has shown Patricia how to analyse data and was a big help with her thesis, as was Dr Nicolas Senn. Dr Senn was encouraging and insightful in how to manage a clinical trial study as big as the IPTi study in the PNG setting. Professor Sir Isi Kevau has been continually supportive of Patricia's medical training and now of her current research. And all would not have been possible without God, who she is always grateful to for bringing her to where she is today. Patricia is also very thankful for the great and never-ending support of her family in Rabaul.

For Celestine, it is IMR's Audrey Michael – or Mama Audrey as she is known – who has taught her the value of a good work ethic and professional laboratory conduct. Celestine calls her the 'walking text book',

as she often draws from Audrey's wealth of experience. Celestine also values her willingness to help train young researchers. Audrey always seems to have time for others and Celestine says she does not know where she would be without her. Professor Deborah Lehmann from Perth's Telethon Institute for Child Health Research has always been a good support for Celestine, who says she is not only passionate about her work, but understands the challenges, having lived in PNG for 17 years. Celestine also credits her former boss as the head of bacteriology, Dr Andrew Greenhill, who continues to be a collaborator, for motivating and supporting her during her training. Additionally, Celestine acknowledges Dr William Pomat, who has always been encouraging of her work.

Pamela says that while she has worked with many wonderful people, she has grown most from those who have said she could not do it. However, she does highlight Dr Claire Ryan and Dr Angela Kelly as being influential in her



Figure 3. Patricia Rarau working in the field for the Partnership in Health Project.

career. In particular, Pamela appreciates their honesty, friendship and candour. Pamela says they are the types of people she can go to and ask, “How can I get better at this?”, and there will always be a constructive exchange. Dr Ryan has been a mentor in the lab, sharing her extensive knowledge and diagnosis of STIs. Dr Kelly has taught Pamela to be more critical of the world and her place as a woman in PNG, as well as helping her see how she can contribute to the world and stand up for what is right.

All of them credit their families for being supportive of their career choices.

### Homeward bound

Pamela feels she has the best job in the world and feels privileged to work in this area. She had the opportunity to stay in Australia after completing university, and many of her friends did, but she felt the need to return to her home country and help her fellow Papua New Guineans. It is a sentiment shared

by Patricia and Celestine. All three see opportunities before them to tackle the health challenges facing PNG and find solutions.

But this work does not come without its trials, such as working long hours, dealing with difficult people, being women working in a culturally sensitive PNG society, the frustrations of procurement and logistics, and intermittent internet. Pamela adds to that the challenge of juggling work and family responsibilities, with two children to care for. She says being mum is the proudest thing in her life.

Pamela, Patricia and Celestine all want to make an impact in PNG. They want to continually ask questions and contribute to human development in their country. They have no regrets in choosing this career path. It is their way to make their mark as medical researchers and, more importantly, as Papua New Guinean women.