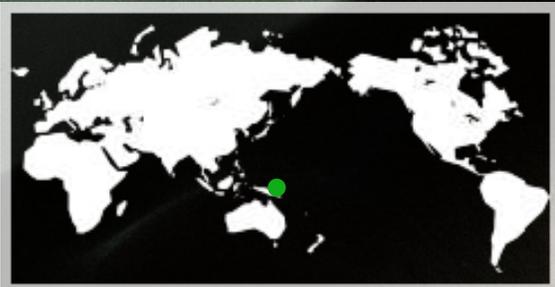


Neurosurgery in Papua New Guinea

**BEN PRICE INTERVIEWS PROFESSOR
ROSENFELD, PROFESSOR OF SURGERY AT
THE MONASH UNIVERSITY, A SENIOR
NEUROSURGEON AT THE ALFRED HOSPITAL,
MELBOURNE, AND HONORARY PROFESSOR
AT THE UNIVERSITY OF PAPUA NEW GUINEA**



Professor Rosenfeld thank you very much for taking the time to speak with me today.

To begin with, and I am aware you have many titles, but would you mind giving our readers a brief introduction of who you are?

My name is Jeffrey Rosenfeld and I am currently a Professor of Surgery at Monash University and Senior Neurosurgeon at the Alfred Hospital, Melbourne. I am an Honorary Professor at the University of Papua New Guinea, an Adjunct Professor, Department of Surgery, Uniformed Services University of the Health Services, Bethesda, Maryland, which is the Medical School for the United States Military. I am an Honorary Professor Department of Surgery, Chinese university of Hong Kong, and Adjunct Professor in the Department of Electrical and Computer Systems Engineering at Monash University, Melbourne, because of my interest in bionic vision, medical engineering and having founded the Monash Institute of Medical Engineering.

These are my main appointments, but I also have military appointments, and was the former Surgeon General (Reserves) of the Australian Defence Force and am currently the Colonel Commandant of the Royal Australian Army Medical Corps.

I graduated from the Melbourne Medical School in 1976, and completed my surgical training at the Royal Melbourne Hospital, Melbourne. I actually trained as a general surgeon and completed my FRACS in general surgery and my Edinburgh fellowship in general surgery as well, but I did become very interested in neurosurgery during my fellowship training and then completed the FRACS in Neurosurgery.

You have been heavily involved in training neurosurgeons in Papua New Guinea, and you mentioned you are currently appointed as an Honorary Professor of Surgery, University of Papua New Guinea, how did you initially become involved in PNG?

My main work has been in PNG, but I have also travelled to Timor, Fiji and the Solomon Islands to also assist these countries. I first travelled to PNG in 1986, and said to myself I would return every year, and I have done that and spent a couple of weeks there at a time.

While I was a general surgery registrar, one of my rotations was a 6-month placement in Port Moresby, PNG at that time. I also had the privilege of working in Goroka and Lae because I had to relieve the surgeons who were on vacation. I was able to perform a lot of major surgery that I would not be able to back in metropolitan Melbourne. Often the pathology was far more advanced and much more 'tropical' in scope. For example, draining liver abscesses and draining pyomyositis. I also managed severe neurotrauma. Overall I had a tremendous experience in PNG.

In the end I said to myself, 'I really love working in PNG and I really love the people', and I could see that they needed a lot of help, and particularly with neurosurgery. I felt I could offer a this help as they did not have a neurosurgeon.

I teach the medical students basic neuro-anatomy and neurophysiology, and clinical neurosurgery. I teach the residents and registrars, and give lectures to the consultants and grand rounds to the entire medical staff. I usually see a number of interesting cases during the week, and try to take photos during the surgery if I operate on these patients.

I then present these at grand rounds and show that this is your hospital, these are your patients and these are the conditions that you have, here are some of the features of that specific condition and here are the things to look for to diagnose them, and this is how it can be treated. The staff get enjoy this because it is not someone coming to them from a developed country to show advanced, high-resource dependent techniques in surgery, but it is someone using their equipment with PNG hospital staff, which they can then carry on.

The key objective is to transfer the skill base and build the capacity, rather than just going in and coming out without leaving much [knowledge or skills] behind.

The reason I have been able to do this is through the generous support of the Pacific Islands Project (PIP) based at the College of Surgeons in Australia (Royal Australian College of Surgeons). To me, this is one of the best uses of Australian foreign aid that there is, because it is funded by the Department of Foreign Affairs and Trade. What they have done is to give enough money for specialist doctors and nurses to travel to these South Pacific island nations which all need help building g their surgical capacity. A surgeon will usually travel with a small team including ward nurses, and technicians, radiologists and medical administrators on occasion to try and improve these other medical and nursing capabilities as well, but most of it is surgery including orthopaedic, cardiothoracic, paediatric, ENT and plastic surgery. The latter has its own program called 'Interplast' and performs large numbers of cleft lip and palate procedures as well as burns scar surgery and other deformity correction.

This has been a wonderful program for me to be a part of, and as the neurosurgery coordinator for a number of years. PIP also has other Australian and New Zealand neurosurgeons who have gone to these countries to assist.

In addition to personnel, you need the resources, the hospital, the anaesthetic equipment – ketamine has been a major advance in anaesthesia in the developing world as a lot of work can be performed under ketamine sedation instead of full general anaesthetic. Many factors apart from surgery itself will need to be considered to improve access to surgery in the developing world.

What inspired you to continue returning to PNG? Was there a particular incident that made the deficit of neurosurgeons very apparent, or was it the culmination of the 6 months?

There are certain cases I saw, for example a young lady with a very large acoustic neuroma who had multiple cranial nerve palsies, was very ataxic and was clearly going to die soon. This is a completely benign tumour which can be cured with surgery. I have seen patients with pituitary tumours who are going blind, and these are also completely treatable tumours and vision can be saved.

I don't expect general surgeons to perform these operations, but these highlight why I feel we do at least need a couple of neurosurgeons in PNG who can perform these more complicated operations. This is what we are currently trying to achieve.

We could continue in PNG with general surgeons performing neurosurgery, that would work for many patients, but there are some conditions that require particular expertise such as some microsurgical skills. For instance, many brain tumours require a neurosurgeon to perform the surgery, and very few general surgeons would possess those skills.

When I teach general surgeons, my effort is not to train them to become neurosurgeons. It is to up-skill them to have a range of basic neurosurgery that they are able to perform.

We did train a general surgeon there to become a neurosurgeon however, and his name was Dr William Kaptigau. In fact, he developed a neurosurgical unit at the Port Moresby General Hospital, and he developed a great clinical audit program. The results were published in the World Journal of Surgery, and highlights what one surgeon is capable of achieving in a developing country and the results one can obtain with passion, leadership and skill. In fact, the results he obtained for head injury outcomes were almost as good as you would see in an advanced hospital in Australia.

In Australia we have approximately 1 neurosurgeon for every 120,000 people, but in PNG they have 8 million people and no neurosurgeons. We have to think; how can we possibly redress that deficiency?

The recent work from a group of the Lancet Commission on Global Surgery has quantitated the burden of disease and estimated the deficit of surgeons currently in particular specialities and the numbers needed. The deficit is so great that there is no realistic means by which the world can train the number of neurosurgeons required, particularly in Africa and South East Asia. The only way around this, in my view, is to train general surgeons to perform basic neurosurgery. It has got to the stage where we are unable to even train enough general surgeons in basic neurosurgery, so the question is can you train medical technicians or nurses to perform some of the basic operations?

I read recently that PNG has their first neurosurgical trainee, Dr Esther Apuahe. Not only is she female but she has a dream of establishing a fully functional neurosurgical unit; this must make you incredibly proud of the nation and provide some reassurance that your legacy will endure once you retire from this line of work?

Esther is currently the only trainee training in Australia on the Rowan Nicks Scholarship of the RACS which covers full accommodation and travel costs, based in Townsville.

There is another neurosurgeon by the name of Dr Benjamin Thomas, who is wanting to continue neurosurgery there [in PNG], and he will hopefully receive a scholarship as well.

When these two surgeons have finished their training, I think PNG will have a good basis for a neurosurgery service that can handle more complex cases. It is fine for Australian surgeons to visit, but we do need to establish domestic surgeons who will remain in PNG. I think this can be achieved in the coming 5 years.

I myself have been very fortunate because I have had experience working at both extremes of medicine. I work at the cutting edge of neurosurgery and research in various areas, but have also worked at the other extreme, such as my military deployments to Africa, the Middle East and in the Pacific which have allowed me to expand my surgical reach. This has given me a wider and deeper perspective of surgical needs, and what can be achieved with very basic neurosurgical training.

You mentioned that you have worked throughout the Pacific, the Middle East and Africa, and I wanted to get your thoughts on whether you feel clinicians have a duty to extend the scope of their practice overseas and not limit it to the city they work in?

That is the ideal – it really is to have a surgeon who is prepared to work pro bono in under-privileged environments. I would say it is our duty to help those less fortunate and if we can spare some time to help those in such environments then that is a tremendous way of giving something back to society and the world.

I see this as part of my mission in life. By writing my book I hope to have a greater effect than simply training a few people, through ‘training’ a lot more as they gain knowledge without ever meeting me. That has been my goal to have a force-multiplying effect as well as to have a direct effect on the people I meet.

Along the way I have helped a lot of sick people, saved lives and prevented disability, which may have occurred without my having been involved. But it is a tremendous privilege and pleasure to be able to do this.

My single regret I suppose is that I have only been able to help relatively small numbers of patients in this way, but by having the force-multiplying effect I hope that I am able to help many more people.

What has been your proudest moment working in PNG thus far?

Being able to develop the neurosurgical training program with the head of the department of surgery, Associate Professor Ikau Kevau, and Professor David Watters. Prof Kevau runs the surgical training programs in PNG. Prior to this they had orthopaedic, ENT and several other specialties represented in their training program but not neurosurgery. Developing this training program and knowing it will endure after I have retired from this line of work is very rewarding.

Is there a particular anecdote, encounter or story you would like to share?

There are so many, but I won't forget the first patient I received in Goroka. I was there as the relieving surgeon, and had not had much experience in neurosurgery, but the first patient I received was an elderly lady who had been attacked by a young male in her garden. He assaulted her with an axe to her the head. She presented with a severe open depressed fracture in her fronto-parietal region. I did everything I could for her but unfortunately she ended up dying. That was certainly a challenge for a young registrar looking to find their feet on the first day. Unfortunately her injury was just too severe to survive.

The other case I remember was when I was called out to a patient with post-partum haemorrhage, in a very remote village. I was flown there in a fixed wing aircraft because it was a surgical emergency. On arrival the patient was severely anaemic and shocked. She had a retained placenta and the haemorrhage was ongoing, but unfortunately we did not have any blood transfusions available. I was unable to gain venous access in her arms so had to insert a femoral venous line, which was a challenge, and we began giving her travenous fluids.

I then had to manually extract the placenta and try to stop the bleeding. I was able to achieve this but she had lost so much blood that she died of severe shock.

This was an absolute tragedy as it was a young woman who died of a totally preventable illness, but this is what happens in remote parts of the developing world. Young women die during childbirth, and after childbirth. Unfortunately I arrived there too late, and it wasn't enough.

I read recently that nursing staff have been trained in Ethiopia to manually remove the placenta in post-partum women with retained products in remote regions where doctors are unavailable. These people have already saved the lives of many young women.

This is a similar concept to the 'barefoot doctor' in China after the revolution, whereby people were trained as technicians to perform basic surgical procedures in rural China. The World Health Organisation has defined a list of basic surgical procedures which can be benchmarked for the capacity of a system to deal with surgical emergencies. This is how surgical capacity is judged in the developing world, and the aforementioned initiatives may assist in meeting this need.

Professor you also have research interests in neurotrauma; is there any overlap between your work in PNG and this academic interest? Did this spark further interest to continue returning to PNG?

I am finding that there is a difference in practice in trauma management in low and middle income countries (LMICs) compared with developed countries, and it relates to a lack of equipment and resources more than anything.

I am working with some other neurosurgeons to define treatment pathways which are practical for LMICs. Many of these countries cannot afford ICP monitors, brain oxygen monitors, long stays in the intensive care unit (ICU), and so they cannot achieve the same degree of traumatic brain injury management but despite this, they often achieve good results.

The big question at the moment is whether you can use decompressive craniectomy (DC) as a substitute for ICP monitoring and ongoing ICU management? This is what many surgeons in LMIC are doing where DC is being used as a primary treatment as opposed to a secondary treatment after medical management has failed. We are currently looking at developing algorithms around this to better improve management, and how you can manage patients without ICP monitors.

The other factor is the decision making around palliative options which are not as developed in LMICs, and this is something that needs to be explored further. It is related to religion and culture, but also family, doctor and staff expectations, and the law of the land. Often doctors will have to do everything they can to keep the patient alive for all patients, but this means the patient suffers by lying in a disabled state on the ward. We need to do better at avoiding this outcome. Doctors in these countries tell me that we can't not treat someone because the family expects full treatment.

You have written a book, titled 'Neurosurgery in the Tropics: A practical approach to common problems'; tell us what inspired you to write this book and how PNG influenced your decision to write a textbook on tropical neurosurgery?

The book was written with Professor David Watters, who is a general surgeon originally trained in Edinburgh but who is a global surgeon having worked in Africa Asia and PNG.

The reason we wrote that book was because there were no written resources available to surgeons working in the LMICs which focused on neurosurgery. Surgeons were able to read books written in and targeted for developed countries, encyclopaedic textbooks of neurosurgery that is, but there is no way these books would have much relevance to a developing country environment.

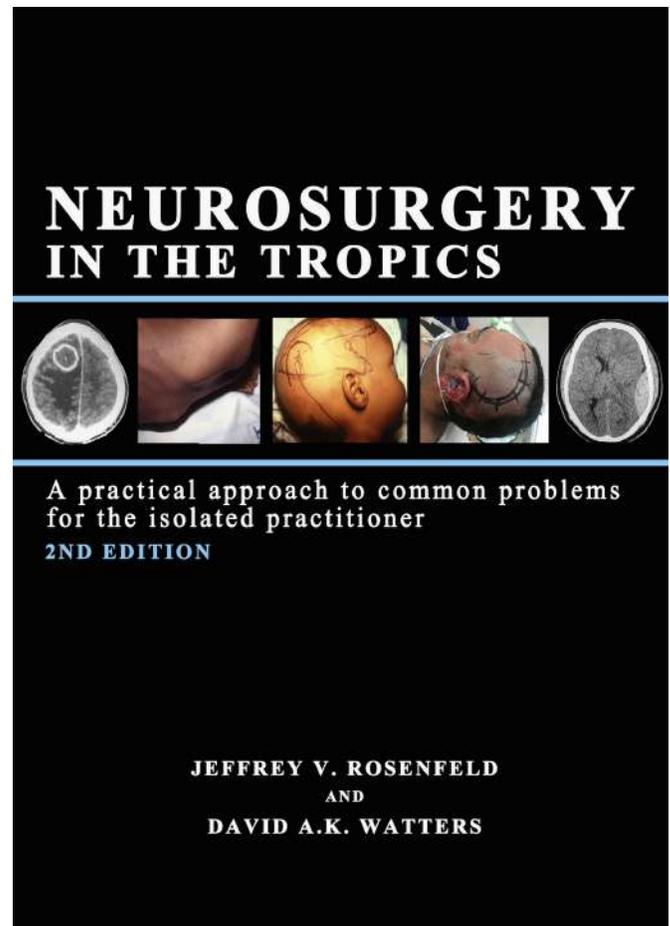
Other resources, such as the courses developed by the World Federation of Neurosurgical Societies, again have the same problem in that they host 10-20 experts in neurosurgery from around the world who teach but it is like learning neurosurgery in an advanced country. The focus is on very advanced concepts and techniques such as clipping aneurysms and removing difficult skull base tumours using microsurgical techniques. These have very little relevance to the developing world, and for the doctors there learning to perform basic neurosurgery, it is not a great method of improving standards of neurosurgical practice in developing countries.

We have aimed to write this book specifically targeted at general surgeons, nurses and emergency doctors in hospitals in LMICs, so that these clinicians can learn to diagnose and treat patients with neurosurgical problems and to perform neurosurgical procedures with very basic equipment and achieve good results. There are many procedures within neurosurgery that are fairly straight forward, such as inserting shunts and treating patients with neurotrauma including acute epidural or subdural haematomas, or correcting a spina bifida or an encephalocele in an infant, or draining a brain abscess, which can all be achieved with very simple instruments and straightforward techniques that can be taught to a generalist. This can make an enormous difference to the quality of life of the injured or those with these conditions.

Many of these conditions can be dealt with so that the patient's life is saved or their quality of life is greatly improved, so they can return to work and support their family or continue on through their childhood to become productive adults.

Without that basic surgery and basic knowledge, these unfortunate people will die or suffer unnecessarily. For instance, a frontal encephalocele is a terrible deformity in a young child because it spoils their appearance and causes them to become an outcast within their community and their entire life ruined. If you can treat that deformity and give them a decent cosmetic result, then you save of life without the need to go to the extreme of transporting them to a major paediatric hospital in Australia.

The first edition of the book is now out of print, but the second edition has just been published. It includes many relevant advances in neurosurgical practice since the book was first published in 2011.



Finally, do you have any words of advice for individuals considering or hoping to become involved in similar positions in their clinical career?

Programs do exist where it may be possible for medical students and junior doctors to become involved, but these are hard to find. Medical schools offer overseas electives, and if this is the case with your medical school then I would advise you to travel to other countries to develop a connection with these LMICs as a student prior to graduating as this is often a great time to begin. I would encourage medical students to do this if possible as long-lasting relationships can be forged early on.

Travelling to LMICs as a resident doctor is becoming increasingly difficult, as few placements are available these days and you may have to take time off during a vacation. A potential downside to travelling to LMICs is the feeling that visiting students or doctors take the place of local students and residents/registrars, which limits access to theatre and exposure to cases, as this can detract from the learning experience of the local personnel. There is a delicate balance to find between visiting and local staff, but it must be achieved.

For senior staff wanting to gain exposure to LMIC settings, it certainly can be done later in one's career. These specialists need to be given an orientation to working in LMICs which includes the environment, the culture, local expectations, and potential treatment options, which are very different from Australia or other developed countries. A change of mindset is required. Particularly once you acknowledge that you as a visiting clinician will go and leave but your treatment outcome is long-lasting.

Exemplifying this is a patient with burns contractures, who, provided the contractures do not recur, usually have a tremendous improvement in their quality of life after a single surgical procedure. Drainage of a brain abscess or insertion of a VP shunt are other neurosurgical examples.

Professor Rosenfeld thank you very much for your time.



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