

Geeky side of medicine

Mathematical modelling of infectious diseases sounds a long way from paediatrics, but Professor Jodie McVernon is living proof ...

FOR her last birthday, Professor Jodie McVernon's husband gave her the *Ladybird Book of the Nerd*. It was a totally appropriate gift, she confesses.

"I am a geek. We all are."

"We" is the group of academics – epidemiologists, mathematicians, computing specialists, and physicists – that Professor McVernon leads at the Peter Doherty Institute for Infection and Immunity, where she is director of Doherty Epidemiology, part of the Victorian Infectious Diseases Reference Laboratory.

She also leads an NHMRC-funded nationally distributed Centre of Research Excellence in Policy Relevant Infectious Diseases Simulation and Mathematical Modelling – known as PRISM – "because we're geeks; we had to make sure to avoid the *Dark Side of the Moon* album cover as a logo".

It could have been so different, however.

"I wanted to be a plastic surgeon when I was 3 years old," Professor McVernon tells the *MJA*.

"I always had a curiosity about things like that. I was fascinated by the *TIME-LIFE* book of the body."

By the time she reached medical school at Monash University her interest had switched to paediatrics.

"I always liked kids, and kids tend to get better on the whole, so there was a real reward in that," she says.

"Paediatrics was a very logical place for me to go. I enjoyed walked into a

room, and just sitting on the floor with my patient and ending up with a kid in my lap. It was just part of the job."

Apart from her MBBS, completed at Monash in 1994, she also has a Bachelor of Medical Science in paediatrics, particularly focused on the breathing and feeding patterns of infants.

"I had enjoyed other specialties while doing my internship, but nothing else but paediatrics seemed like a 'forever' thing," she says. "I knew I liked to know a lot about a few things, and I wanted to pursue something in depth."

Fate intervened in the form of a handsome blond English doctor, also studying paediatrics.

Professor McVernon followed him back to the UK and undertook her PhD studies at Oxford University, in collaboration with Public Health England, looking at the resurgence of *Haemophilus influenzae* type b disease among vaccinated children. Her thesis went on to directly inform UK immunisation policy.

She and the doctor, now her husband, arrived back in Melbourne in 2004, where she applied for, and was awarded, a Fellowship with Professor Terry Nolan, at the University of Melbourne's School of Population and Global Health, working on mathematical modelling of infectious diseases.

"Mathematical modelling was not a well-developed field in Australia at the time," Professor McVernon tells the *MJA*.

But because of the work of Professor Nolan and an NHMRC Capacity Building Grant led by Professor Raina MacIntyre (now at the University of NSW), Melbourne became a "node" in a national modelling network, with emerging post-doctoral researchers gathering together to develop expertise in the area.

"What brought us all together was the concern about bird flu – just before the 2009 pandemic," she says. "When swine flu emerged as a global public health threat, it all started to take off."

"When the pandemic did come we were the go-to people to develop models to help support the response. We were able to work with policy makers [who were looking for] good models which could help understand the situation and predict what might happen next, how to intervene most effectively".

"[When we started] we were 10 to 15 years behind the US and Europe in the use of modelling for infectious diseases policy. We've worked with policy advisers and public health responders to develop a shared understanding of the appropriate use of mathematical modelling. And how to talk with governments about it, to support their decision making."

Professor McVernon is the first to admit that she is not a mathematician.

"I stand on the shoulders of true mathematicians, physicists and computer scientists" she says.

What she is good at – world-leading, in fact – is separating the wheat from the chaff.

"In medicine we love the detail, we don't want to miss anything so we tend to ask more questions than we really need, and sometimes we end up with redundant information that we can't use.

"What [mathematical modellers] do is distill down to the core data – the essential pieces of information to understand what's going on. We're always trying to simplify things as much as possible, so the assumptions we're making in the models remain transparent."

It's a busy life, and Professor McVernon concedes that work/life balance is a constant "juggle", with two doctors and two daughters, aged 11 and 13 years.

"We're an academic and a clinician so we have a more predictable life [than some]," she says. "It takes mutual understanding and respect, and we've invested a lot of money in domestic help."

"The priority has always been giving the kids a stable and happy life, and it works very well for us."

Time spent with friends, yoga, good books, travel, and a newly discovered obsession with backyard veggie gardening, also keep Professor McVernon grounded and relaxed.

Cate Swannell

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