



Aviation medicine – the specialty you didn't know existed

Alistair Lock

School of Medicine
Faculty of Medical and Health Sciences
University of Auckland

> Alistair Lock is a Trainee Intern at the University of Auckland, currently placed in the Waitemata cohort. He was a previous academic editor for the New Zealand Medical Student Journal and has an interest for a career in academic surgery, with a focus in orthopaedics. He hopes to apply for a job at Waitemata District Health Board later in the year.

My medical selective was with the Royal New Zealand Air Force (RNZAF) on their base at Whenuapai, Auckland. The Base has over 1000 personnel and is the largest RNZAF base in New Zealand. It is the home of three flying squadrons: Number 5 (P-3K2 Orion); Number 6 (Seasprite Helicopter); and Number 40 (C-130 Hercules and Boeing 757-200). My role on base was with the Aviation Medicine Unit (AMU), New Zealand's only aviation medicine centre, to perform a literature review on the health effects of fatigue. The aim was to review the evidence and recommend fatigue risk-mitigation strategies, not only to reduce short and long-term health risks in employees of safety-critical industries such as aviation, but also to create more efficient, productive, and effective defence force personnel with longer and more fulfilling careers. The results from this review are planned to be published elsewhere, and this publication will focus on the experience of a medical selective on an RNZAF base.

Defence health centre

As this was an academic task, I wanted to keep up my clinical knowledge with some time at the base's Defence Health centre. The centre had four civilian general practitioners (GPs) and 10–12 uniformed medics. I spent one morning a week at the Defence Health centre.

The health centre has walk-ins in the morning, called 'the sick parade'. I was able to see these patients alone in my own consultation room. I would take histories and perform relevant clinical examination, then present my differential diagnoses to the overseeing GP with a management plan for appropriate diagnostics investigations if required. Each morning I would see up to five patients alone. The ability to independently assess and make differentials and management plans for patients was beneficial for my learning and my confidence. I noticed that as I was not being watched, I could ask questions in my own way and not worry about the semantics too much – I could focus more

on rapport building and thinking of the next question. In addition to the sick parade, I also helped with minor surgeries. I performed several core biopsies and wide excisions independently, with supervision.

I became very passionate about general practice on this placement, which is something I previously had not considered. I noticed that the patients presenting to the clinic were young, often with acute injuries. There were not many chronic-disease cases and patients valued exercise and well-being. I felt that people would act on my recommendations and education, which gave me a lot of satisfaction. The patients were also very engaged and asked appropriate questions, which further added to my satisfaction as it felt like a process of shared decision making, rather than having the whole burden on myself. The clinic was also not too busy and the doctors had scheduled morning, lunch, and afternoon breaks. I felt that the Defence Force cared about doctor and patient well-being and this translated into better patient care.

I worked in a team at the centre and would often meet with the medics for wound dressing, vaccinations and other tasks. The medics themselves were interesting, as they also saw patients by themselves, despite only having a three-year medic course from the Defence Force, with no prior medical training. Their efficiency and knowledge were incredible considering this time frame and it made me really question the efficiency of my six-year medical degree.

Aviation medicine initial course

I wanted to assist with and learn from any AMU training courses that occurred on my selective. One such course that occurred during my third week was the aviation medicine initial course (AVMEDI). This is a course for any base employees who need to work on an aircraft. The personnel included pilots, navigators, and flight attendants. The

course consisted of various lectures and practical sessions over four days. The content of the lectures covered flight safety, fatigue, hypoxia, hyperbaricity, flight clothing, alertness management, noise, human factors, visual hazards, and motion sickness, just to name a few. I learned a lot of new information in these sessions, much of which I had no prior knowledge about.

The most interesting practical sessions for me were the motion sickness simulator session and the reduced oxygen breathing apparatus session, both of which I was able to partake in. While these principles are not often thought of in conventional medicine, they are at the forefront of aviation medicine. I was able to use this new knowledge and information to make connections with previous experiences I have had in hospital. I noticed that the signs of hypoxia I saw in the practical session (reduced cognition, sleepiness, deep heavy breathing) were also seen in clinical conditions such as chronic obstructive pulmonary disease (COPD). This further strengthened my understanding of the pathophysiology behind COPD, which I believe will support my further clinical decision making when seeing patients with this condition.

The knowledge obtained from this course was also applicable to my work with the Defence Health centre. I was able to educate patients who asked me questions about the course, and any medical requirements to undertake it.

Selected base activities

I visited all three of the base's Squadrons (5, 6, and 40) during my selective. I wanted to see all of the available aircraft and working environments, and ask staff for their opinions on fatigue in the workforce and possible mitigation strategies.

Ride on Seasprite Helicopter. I was very lucky to be given a ride on a Seasprite Helicopter¹ with six Squadron. It was a 12:00 flight, to return at 14:30. I had to arrive an hour before for the safety briefing. I learned from this that safety is very important in aviation. They spent a lot of time discussing the weather, other aircraft in the vicinity, our plan for the trip, and back-up plans for any complications that might occur along the way. This made me think of the surgical safety checklist and time out. We could add to the safety checklist by having a mandatory discussion of procedures for critical situations, such as for example allergic reaction, malignant hyperthermia or major bleeding. From my experience in surgery, the safety checklist seems like a requirement that nobody wants to do. However, for six Squadron, it was clear that the crew were passionate about the safety briefing because they knew the severe implications of omitting it.

There were four crew members. A pilot, a navigator, a crewman, and myself. The flight consisted of a flight around the harbour bridge, Devonport, central business district area, then over the Hauraki Gulf. We then flew over Redwood Forest and I was winched out of the helicopter in a simulation of what would happen when a medic is dropped down to an injured person.

One thing I noticed from this trip was how fatiguing the equipment was. Wearing the flight suit, the life jacket, and the helmet with the seatbelt on was very restricting and heavy. I felt physically exhausted on my return and I incorporated this into my research on fatigue.

Ohakea Air Tattoo Show. During my selective, the RNZAF celebrated its 80th birthday, and to celebrate they hosted the Air Tattoo Military Air Show at Ohakea RNZAF Base, Palmerston North.² International air forces from the United Kingdom, United States of America, Australia, Canada, Singapore, Japan, and New Caledonia were invited to bring a wide array of aircraft and performed spectacular air and ground displays. I was taken down to the Ohakea base from the Whenuapai base in a Canadian C-130J Hercules – it was far from the coffee and cookie with Air New Zealand! It is the type of plane that wounded personnel are

taken on in stretchers. It showed me a taste of what being a medical officer in the RNZAF would be like. At the air show, I assisted with the medical personnel in triaging anyone requiring medical treatment. It was mostly heat exhaustion and handing out sunscreen, however, I did manage to see one patient with chest pain and make a differential and management plan for the over-seeing doctor. In my free time I was able to visit the planes from other countries. Selected photos are shown in Figure 1.

P-3K2 Orion simulation. I spent one afternoon piloting the P-3K2 Orion via simulation. This was a very fun experience and one that made me consider whether I should have been a pilot instead of a doctor. The experience showed me how much concentration is required to pilot a plane. There are a lot of instruments and dials which need to be checked and observed in flight and after only a couple of hours I felt very drained. This was an important insight for my research in fatigue.

Ride on P-3K2 Orion. Five Squadron allowed me to fly on their P-3K2 Orion,³ which was even better than the simulation. There was a 16-man crew and the flight was about seven hours. The trip consisted of a flight to the east coast of the North Island, then a turn and up to Cape Reinga, then a turn again and low-altitude flying (around 200–500 feet) over the sea on the way back to Auckland. I was able to roam around the plane and speak to the pilots, flight engineers, and technical rail crew (radar operator, camera crew, etc) about their experiences and thoughts on fatigue. Various fatigue mitigation strategies were described to me, some of which I used in my research. Another point I considered on this flight was noise. Despite wearing earplugs the noise itself was still loud and quite fatiguing.



Figure 1 Selected images from the 2017 Air Tattoo Air Show. A – Two Royal Australian Air Force F-18 Hornets. B – Japan Air Self Defence Force KC-767. C – Selected older aircraft, no longer in service. D – Singapore Air Force C-130J Hercules.

40 Squadron Visit. Although I never got to fly on any of the 40 Squadron aircraft, I was taken on a tour by their warrant officer and I had a detailed discussion to him about fatigue in the Defence Force. I was taken on the Boeing 757-200,⁴ which is the New Zealand equivalent of the American Air Force One. I was also shown the C-130 Hercules,⁵ the same plane I had been on to go down to the Ohakea air show (but this was the New Zealand model). I was taken inside the flight deck and this showed me the conditions that pilots work in. It was very hot and cramped – not ideal for napping and general comfort. I was also shown the hangar and spoke with some of the flight mechanics on their opinions of fatigue and how to manage it.

I was able to learn about the legal aspects of fatigue on this tour; the maximum hours of flying in one day is 18 hours, and if this full time is taken then a mandatory 12 hour stand-down period begins. The concept of stand down could be applied to medical practice, as doing a long day as a registrar, then doing a 10 hour day the following day with no stand down, is far from ideal. The pilots were shocked when I told them this is what happened on acute and post-acute days.

Conclusions and future thoughts

I had a fantastic time on my selective. It was nothing like the kind of clinical medicine I have been used to and I really enjoyed the run and miss the people I worked with. I built great relationships with the staff at AMU and the Defence Health centre and the selective ignited a spark inside me for aviation medicine. I would definitely consider returning to the RNZAF in some capacity, possibly as a reservist. The AMU offers at least two on-list selectives every year, so I would highly recommend it for anyone considering it as an option for a non-hospital based medical selective.

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