Flying Doctors: Pre-hospital Care in New Zealand

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Being part of the flight crew of an air ambulance is probably the closest one can get to being the real-life version of a comic book superhero: you fly, you respond to calls of distress, you wear a jumpsuit costume, and you also happen to possess incredible superpowers (the technological Batman-type, not the Superman-type).

Given the country’s low population density, varied topography, and substantial rural population, New Zealand’s air ambulances have played an important role in medical retrieval, especially in cases where access to secondary care by land transport is difficult, time-consuming or dangerous to the patient. They have come to occupy a highly visible profile in the community: rescues are frequently featured in the news, and more recently missions by services in Auckland and the Coromandel have been serialised on the show Rescue 1 for national television.

Contrary to this high profile of flight rescues, New Zealand undergraduate medical training provides very limited, if any, exposure to the pre-hospital setting. Emergency physicians and trainee registrars in the country do periodically get dispatched on pre-hospital missions across the country—pre-hospital care forms part of the core curriculum of the Australasian College of Emergency Medicine (ACEM)—but ambulances in New Zealand, not just of the aerial variety, have historically been modelled around paramedic- or technician-based first response care. Although equipped and trained to provide some degree of stabilisation to the acutely unwell patient, first responders are frequently limited by both resource and expertise to provide definitive medical care, which remain confined to the hospital. Rather than to ‘stay and play’ for (relatively) extended periods of time, pre-hospital services are modelled to primarily stabilise, then ‘scoop and run’.

But there is growing recognition internationally of the importance of the pre-hospital period for a lot of patients. For example, we already know that many of the acutely unwell are more likely to have favourable long-term outcomes if they are treated as closely to the onset of their symptoms as possible, as in the case of ischaemic stroke or ST-elevation myocardial infarction.

Dr Marietjie Slabbert, an anaesthetist-intensivist in the United Kingdom, recently completed her six-month secondment as a pre-hospital registrar at London’s Air Ambulance. She shared her thoughts on why the pre-hospital period is also important in trauma: “Up to 50% of patients who die from trauma injuries die within minutes of the injury. From the moment of injury, the clock starts ticking. The more critically injured or ill a patient is, the more second matters. The pre-hospital field is the arena where true life-threatening airway, breathing, and circulatory emergencies have to be addressed if a patient stands any chance of making a meaningful survival.”

In September 2011, Auckland District Health Board and the Auckland Rescue Helicopter Trust (ARHT) collaborated to establish the Auckland Helicopter Emergency Medical Service (HEMS), which is New Zealand’s first dedicated paramedic-doctor partnered pre-hospital care service. “Our model of care enables earlier critical interventions,” described Dr Chris Denny, an Ontario-trained emergency physician who has been the Medical Director for Auckland HEMS since its inception. “This places emphasis on the development of a high-performing clinical team. Auckland HEMS is the only service providing daily senior doctor coverage on a rotor-wing platform [in New Zealand] at this time.” It is also the only ACEM-accredited centre for Special Skills training in Pre-hospital and Retrieval Medicine in the country. Doctors in the crew include consultants and registrars from a variety of backgrounds, including emergency medicine, anaesthetics and intensive care at the three main Auckland hospitals.

So, how does a doctor in the helicopter improve on the current model? HEMS amalgamates pre-hospital services with some aspects of hospital-level care, and allows the pre-hospital team to function as an extension of secondary care, rather than a separate and chiefly ambulatory service. “Our goal is to provide seamless care from the roadside through to the bedside,” explained Dr Denny. He stressed that a doctor-included model is not meant to substitute for the role of advanced paramedics, but to complement what they do. Indeed, a unique aspect of pre-hospital care for the doctor is the close working relationship with professionals from other disciplines, including paramedics, pilots, and flight nurses.

“We [doctors] form part of the flight crew,” explained Dr Denny: “Teamwork is defined as task interdependency. Working within our flight crew, the intensive care paramedic provides leadership at the scene. As we transition towards definitive care, the doctor provides clinical leadership. This may require a technical procedure or it may involve timely communication with our hospital teams”—such as the trauma team, the cardiac catheterisation laboratory, or the neurologists in the case of an acute stroke.

Auckland HEMS presently receives an average of one call-out per day, although they can become much busier in summer. They cover the whole of Auckland region with some overlap with Northland and Waikato. “Within this region is roughly one third of the population of New Zealand,” said Dr Denny. Potential missions, either medical or trauma, are initially triaged at the St John’s Ambulance Communication Centre. The flight crew is dispatched based on the National Ambulance Sector Office’s call-out criteria, taking into account difficulty of access to the patient (such as in remote places), the number of patients involved, whether it is a time-critical condition, as well as the skills required to stabilise the patient.

Pre-hospital care is a fast developing area of medicine: rather than being singly aimed at transporting the patient to the hospital for a necessary intervention, some of these interventions are now happening in the ambulatory setting.

Aside from basic pre-hospital interventions such as splinting, non-opioid pain relief, and non-pharmacological haemorrhage control, the presence of a trained doctor allows for the flight crew to employ more specialised investigations and interventions, including rapid sequence intubation (the role of which remains controversial in the pre-hospital setting), point-of-care sonography, or nerve blocks—all of which, until now, could only be
performed in the hospital resuscitation bay in New Zealand. Overseas, increasingly sophisticated interventions are also being employed, which include thrombolysis, mechanical chest compressions, on-scene limb amputations, and roadside thoracotomy to stem haemorrhage. London’s Air Ambulance, amongst the pioneers in the field, is currently trialing the role of resuscitative endovascular balloon occlusion of the aorta in pre-hospital trauma response.

Auckland HEMS is also pioneering change in New Zealand’s pre-hospital landscape. “One new intervention we are considering is the role for pre-hospital blood products. There are specific instances, such as prolonged entrapment with multi-system injury and hemorrhagic shock, where we think there may be benefit to our patients with the early administration of blood,” said Dr Denny.

Internationally, the field is becoming progressively more robust and visible as a sub-specialty of its own within critical care medicine. Across the Tasman, the Queensland state government revealed plans in July to unroll the doctor-paramedic HEMS model across the entire state, recognising pre-hospital care’s role in patient care. Closer to home, New Zealand’s first HEMS looks to stay. Originally developed as a two-year pilot, Auckland HEMS has recently secured funding for another three years. “Pre-hospital care is entering an exciting phase in New Zealand,” explained Dr Denny. “New national dispatch guidelines will soon be in place.”

However, the challenges of pre-hospital care are not simply limited to the medical, according to Dr Slabbert. The ambulatory setting necessitates a small team—often times comprised of only a doctor and an advanced paramedic—working under pressure in an ever-changing environment. “It presents unique challenges for both my technical (clinical) skills as well as non-technical skills such as situational awareness, leadership, teamwork and decision making.”

Nuanced aspects not encountered in the hospital setting include extrication issues, liaison with other community agencies (such as the fire brigade in a fire, or the police in a shooting), crowd management, as well as the unpredictable, unfamiliar, dynamic pre-hospital environment which, unlike the bedside, is very rarely within the control of the attending crew—it is not impossible to have to perform delicate procedures, such as intubation, in the dark, in the rain, or by the roadside. Pre-hospital care is a lot of medicine, ad hoc. Under such circumstances, safety for both the crew and the patient is paramount, and considerations such as whether there is any fuel leakage at the scene of a road traffic collision, or if the handbrakes had been pulled, become second nature. The human aspects are themselves no less: the pre-hospital crew is often times the first to speak to family or members of the public, who were witness to a traumatic event or a death. Pre-hospital care can be as much about managing time, people, and resources as it is about medical management. The crew needs to be able to adapt and improvise at a moment’s notice. “I have to go back to basics without having all of the technology present in an emergency department like CTs and blood tests,” explained Dr Slabbert. And, at times, “every second literally counts.”

“The saying ‘thinking on your feet’ becomes a true reality in pre-hospital care,” she added. Sometimes the environment can be challenging and shifts can be fatiguing, but I continue to learn something new in every job.”

Dr Denny echoed a similar sentiment: “Part of what is great [about pre-hospital care] is the challenge. As a doctor, you bring all of your knowledge and skills in medicine, learning to work well with other professionals to care for patients in austere conditions.”

And he was clear: “The rewards are immense.”

Dr Denny has one final word for readers: “We are looking at ways to engage with the future doctors of New Zealand. At present, we are working to develop a longitudinal elective in resuscitation. One motivated senior medical student is serving as our test pilot [this year]. Watch this space in 2014.”

For more information about Auckland HEMS, please visit their unofficial blog at www.aucklandhems.com or follow them on Twitter @aucklandhems