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Welcoming paramedics into the National Registration and Accreditation Scheme

Associate Professor Stephen Gough ASM, FPA, is Chair of the Paramedicine Board of Australia

Paramedics are an important and valuable part of the health system. On 1 December 2018, paramedics will join the National Registration and Accreditation Scheme (National Scheme), along with more than 750,000 other registered health practitioners in Australia. The heart of this National Scheme is public safety, which is delivered through the application of national standards for each of the registered health professions.

Paramedicine has its origin from very humble beginnings in Australia, which can be traced back to the late 1890s. In those early days, communities believed in and invested in the establishment of ambulance services to meet their care and transport needs. Paramedicine has seen almost unprecedented change in the past two decades to where it is today. All through this journey to become Australia’s fifteenth registered health profession, paramedics have had the patient at the centre of everything they do – showing compassion, understanding and empathy to the circumstances and needs of those to whom they provide care.

Paramedics are working in a wide range of roles and environments, using sophisticated treatments and technology to provide high quality care for their patients. We should also not forget those paramedics who work in non-clinical roles. Those who make a major contribution to the profession every day using their professional knowledge working in management, administration, education, research, advisory, policy and regulatory roles that impact on the safe, effective delivery of services in the profession.

In meeting with paramedics and people from all over Australia, I am often asked the question – why is it so important that the profession of paramedicine is regulated? My response is always – because of the work that we do in the profession. Paramedics at times are required to carry out complex clinical interventions in a diverse range of emergency care settings, often away from direct supervision. It is therefore essential that the person providing care as a paramedic, using a title that is well documented as being highly respected by the public, is appropriately skilled, trained and qualified. The community must have the confidence and be assured, that as a registered paramedic, that person meets national standards for practice in the profession. That’s why we have regulation.

Under the Health Practitioner Regulation National Law (National Law) ‘paramedic’ will become a protected title. This means that only people who are registered with the Paramedicine Board of Australia will be able to lawfully call themselves a paramedic. To become registered, paramedics must demonstrate that they meet the five mandatory national registration standards set by the Board. The registration standards were developed following extensive consultation with the paramedicine profession and the public. They set the minimum requirements for competent and safe practise of paramedicine in Australia and along with title protection, are the way the National Scheme protects the public.
It is important that all eligible paramedics apply for registration before 1 December 2018, if they want to call themselves a paramedic in accordance with the requirements of the National Law. I therefore encourage those paramedics to start their online registration now to avoid any processing delays that might occur with the expected large volume of applications received by the Australian Health Practitioner Regulation Agency.

The future seems very bright for paramedics as registered health professionals. The paramedic profession has seen monumental change in practice over recent decades with a comprehensive set of skills and technologies to provide world class services to Australian communities. Paramedics will work closely with their health practitioner colleagues in evolving roles to meet the increasing demand for health services, seeking innovative and new pathways in providing quality healthcare.

1 December 2018 will be a milestone event in the paramedicine profession’s history, as finally, after many years of debate, deliberation and the sustained efforts of so many, all eligible paramedics will be welcomed into the National Scheme and acknowledged, in their own right, as registered health professionals.

Stephen Gough
Chair, Paramedicine Board of Australia
Review

Kounis syndrome: A case report and literature review of pre-hospital treatment

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Abstract

Introduction
Kounis syndrome is an uncommon clinical presentation of acute coronary syndrome secondary to an allergic or hypersensitivity reaction, especially anaphylaxis. It results when inflammatory mediators are released following mast cell activation, some of these mediators cause coronary artery vasospasm and may initiate thrombus formation in susceptible individuals. Although Kounis syndrome is becoming more widely known, many clinicians are still unaware of its existence. We present a case report and a literature review of the pre-hospital treatment of Kounis syndrome by emergency medical services.

Methods
A literature search of the EMBASE, MEDLINE and PubMed electronic medical databases was conducted using the terms ‘Kounis syndrome’, ‘allergic acute coronary syndrome’ and ‘allergic myocardial infarction’. The purpose of the literature search was to identify the pre-hospital treatment of Kounis syndrome by emergency medical services. We included case reports of Kounis syndrome that described the medical treatment provided by emergency medical services, published any time up to October, 2017.

Results
Anaphylaxis is the most commonly treated component of Kounis syndrome by emergency medical services (66% of reported cases). Both components of Kounis syndrome, anaphylaxis and acute coronary syndrome, were treated in 16% of reported cases. No specific treatment was provided for either component of Kounis syndrome in 16% of reported cases.

Conclusion
The pre-hospital treatment of Kounis syndrome by emergency medical services is infrequently reported in the literature. Kounis syndrome involves two distinct clinical conditions, both of which should be considered during treatment.

Keywords:
Kounis syndrome; allergic acute coronary syndrome; allergic myocardial infarction; pre-hospital; EMS

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Introduction

Kounis syndrome (KS) was first described in detail in 1991, however the first reported case of acute myocardial infarction (MI) secondary to an allergic reaction occurred in 1950 (1,2). Kounis syndrome is defined as the concurrent presentation of an allergic or hypersensitivity reaction (mostly, but not exclusively anaphylaxis) and acute coronary syndrome (ACS), which may range from unstable angina to ST-elevation MI, and occurs as a result of the inflammatory mediators released during mast cell activation (3). The main pathophysiologic mechanism proposed is coronary artery vasospasm (4).

There are three reported variants of KS. Type I occurs in subjects with normal or near-normal coronary arteries due to coronary artery vasospasm. Type II occurs in subjects with pre-existing atherosclerotic disease due to coronary artery vasospasm with or without plaque disruption and thrombosis. Type III includes subjects with drug-eluting stent thrombosis. The cardiac enzymes and troponins may be normal or indicate acute MI (3,4).

Although KS is currently under-recognised, as clinician awareness increases the number of cases reported in the literature is growing exponentially (3). Owing to its unpredictability, the opportunity to study KS predominantly comes from the reporting of individual cases. We present the case of a man, 69 years of age, who developed ACS following penicillin-induced anaphylaxis as well as a literature review of the pre-hospital treatment of Kounis syndrome by emergency medical services (EMS).

Case report

A male, 69 years of age, suffering for several days with fever and right-sided neck pain, was seen at his house by a locum general practitioner. The patient was prescribed oral penicillin for a tonsillar abscess, which the patient self-administered shortly after the doctor had departed. Approximately 5 minutes after ingestion the patient developed an erythematous and pruritic abdominal rash associated with nausea, vomiting and dyspnoea. An ambulance was called immediately. Ambulance Victoria (AV) operates a two-tiered emergency ambulance service; initially Advanced Life Support (ALS) paramedics responded as the sole resource. An intensive care paramedic was requested from the scene by ALS paramedics following an abnormal 6-lead electrocardiogram (ECG).

The patient’s past medical history included type 2 diabetes, hypertension, dyslipidaemia and previous coronary artery bypass graft surgery. Notably, the patient had no known pre-existing allergies.

On examination, the patient was alert with a blood pressure of 120/85 mmHg and a heart rate of 124 beats/minute. The initial 6-lead ECG showed sinus tachycardia with ST segment elevation with Q waves in leads III and aVF as well as reciprocal ST segment depression in leads I and aVL, indicating acute inferior MI (Figure 1). Before treatment, a 12-lead ECG was attempted but not possible due to artefact caused by severe rigors as the patient was febrile with a temperature of 39.2°C. Pulse oximetry demonstrated an oxygen saturation (SpO2) of 84% on supplemental oxygen via nasal cannulae, applied by ALS paramedics. Chest auscultation revealed clear lung fields with no adventitious sounds. The patient didn’t complain of chest pain at any point during ambulance attendance.

The patient was treated with aspirin 300 mg and ondansetron 4 mg orally by the ALS paramedics. A non-rebreather mask with oxygen flow at 10 L/min improved SpO2 to 99%. Adrenaline 300 mcg was administered intramuscularly, one further dose of intramuscular adrenaline 300 mcg was required 5 minutes after the first dose. The patient also received dexamethasone 8 mg intravenously. Normal saline 0.9% was attached to keep vein open with a total volume of 250 mL administered.

Figure 1. Initial 6-lead ECG showing ST segment elevation with Q waves in leads III and aVF, and ST segment depression in leads I and aVL
Following treatment a 12-lead ECG was performed before arrival at the emergency department (Figure 2).

The treatment resolved the patient's pruritus, nausea, vomiting and dyspnoea; only a small patch of erythema remained. In the emergency department (ED) subsequent ECGs showed resolution of the ST segment abnormalities. An echocardiogram wasn't performed in the ED. Bloods showed a troponin peak of 0.34 mcg/L (N<0.05) and evidence of sepsis with a peak CRP of 107 mg/L. The patient was treated with intravenous ceftriaxone and metronidazole and was discharged home on day four of admission following an uncomplicated hospital stay with no further evidence of acute ECG abnormalities. Angiography wasn't performed during the patient's hospital admission. An outpatient stress echocardiogram demonstrated no evidence of inducible ischaemia at moderate workload and the patient has remained asymptomatic from a cardiac point of view.

Methods of literature review

A literature search of the EMBASE, MEDLINE and PubMed electronic medical databases was conducted using the terms 'Kounis syndrome', 'allergic acute coronary syndrome' and 'allergic myocardial infarction'. The purpose of the literature search was to identify the pre-hospital treatment of Kounis syndrome by EMS. We included case reports of Kounis syndrome that described the medical treatment provided by EMS, published any time up to October, 2017. Articles not in the English language were excluded.

Globally, EMS are not all staffed in the same manner; some ambulances are staffed solely by paramedics whereas others are staffed with doctors alongside paramedics. In this literature review all reports were included, regardless of whether the treatment was provided by a doctor or a paramedic.
Where a report specifically stated treatment was provided by a doctor this was recorded, otherwise it was assumed that a paramedic provided treatment.

Results

The search identified a total of 3273 articles, after exclusion of duplicates and articles not in the English language, 12 articles met the inclusion criteria (Table 1). Of the 12 articles identified, three identified a doctor as the treating clinician.

Eight patients (66%) were treated for anaphylaxis, making it the most commonly treated component of KS by EMS. Three patients (25%) were treated for ACS. In two patients (16%), both components of KS were treated by EMS. One of these patients was treated by a doctor and the other patient was treated by a paramedic. Two patients (16%) received no specific treatment for either anaphylaxis or ACS.

Discussion

Anaphylaxis and ACS are two clinical presentations that EMS are familiar with, however they usually present separately.

Table 1. Pre-hospital treatment of Kounis syndrome

<table>
<thead>
<tr>
<th>Author</th>
<th>Clinician</th>
<th>Acute coronary syndrome</th>
<th>Anaphylaxis</th>
<th>Non-specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antonelli (5)</td>
<td>Paramedic</td>
<td>-</td>
<td>Hydrocortisone</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Promethazine</td>
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<tr>
<td>De Groot et al (6)</td>
<td>Paramedic</td>
<td>-</td>
<td>-</td>
<td>IV fluid</td>
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<tr>
<td></td>
<td></td>
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<td>(not specified)</td>
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<tr>
<td>Gosselin and Gross (7)</td>
<td>Paramedic</td>
<td>-</td>
<td>-</td>
<td>Dopamine</td>
</tr>
<tr>
<td>Ihdayhid and Rankin (8)</td>
<td>Paramedic</td>
<td>Glyceryl trinitrate</td>
<td>-</td>
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<tr>
<td></td>
<td></td>
<td>Fentanyl</td>
<td></td>
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</tr>
<tr>
<td>Licitra et al (9)</td>
<td>Paramedic</td>
<td>-</td>
<td>Adrenaline</td>
<td>IV fluid</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Hydrocortisone</td>
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</tr>
<tr>
<td>Memon et al (10)</td>
<td>Paramedic</td>
<td>Heparin</td>
<td>Diphenhydramine</td>
<td>IV fluid</td>
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<td></td>
<td></td>
<td></td>
<td>Methylprednisolone</td>
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<td></td>
<td></td>
<td></td>
<td>Salbutamol</td>
<td></td>
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<tr>
<td>Mirijello et al (11)</td>
<td>Doctor</td>
<td>-</td>
<td>Chlorphenamine</td>
<td>Crystalloid solution</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Hydrocortisone</td>
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<tr>
<td>Nittner-Marszalska et al (12)</td>
<td>Doctor</td>
<td>-</td>
<td>Adrenaline</td>
<td>Colloid solution</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Clemastine</td>
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<tr>
<td>Regis et al (13)</td>
<td>Paramedic</td>
<td>-</td>
<td>Diphenhydramine</td>
<td>Normal saline</td>
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<td>Salbutamol</td>
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<tr>
<td>Rekik et al (14)</td>
<td>Doctor</td>
<td>Aspirin Clopidogrel</td>
<td>Diphenhydramine</td>
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<td>Wada et al (16)</td>
<td>Paramedic</td>
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<td>Normal saline</td>
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The patient described in this case report had several signs and symptoms that can be attributed to anaphylaxis. The World Allergy Organization provides a detailed list of signs and symptoms of anaphylaxis, including the sudden onset of urticaria, pruritus, erythema, oedema of the oral structures (eg, lips, tongue), dyspnoea, wheeze, stridor, cough, nausea, vomiting, abdominal pain, syncope and hypotension (17).

Signs and symptoms of myocardial ischaemia include various combinations of: chest, upper extremity, mandibular or epigastriac discomfort, dyspnoea, fatigue, diaphoresis, nausea, vomiting, syncope and palpitations. Special patient groups including women, the elderly and diabetics may present with atypical symptoms (18). In this case, the patient’s diabetic history may be a possible explanation for the absence of any chest pain.

The patient presented with several acute ECG abnormalities that corrected with treatment. The initial ECG (Figure 1) shows ST segment elevation and Q waves in leads III and aVF along with reciprocal ST segment depression in leads I and aVL indicating acute inferior MI. The post-treatment ECG (Figure 2), along with ECGs performed in the ED, show that the Q waves persist in lead III and completely resolve in lead aVF. The Q waves in lead III persist but reduce in depth across serial ECGs taken in the ED. The Q waves most likely represent a previous MI, however they may be transient and normalising or they may be a normal finding in this patient (18). The 12-lead ECG comprehensively examines the heart to identify ischaemic changes, it may be considered for all cases of anaphylaxis to help identify KS. The presence of cardiac biomarker changes (preferably cardiac troponin) indicates myocardial necrosis and is designated as MI (18). Presumably, the patient’s ECG changes as well as the troponin rise were due to coronary artery vasospasm progressing to acute MI.

Fever is a common feature in acute MI; it can develop within 4–8 hours and usually resolves by the fourth to fifth day. The presence of fever is an independent predictor of adverse clinical outcomes and a larger infarct area in patients with STEMI. In this case, the timeframe from antibiotic ingestion to ambulance arrival indicates that the origin of the fever can be attributed solely to the tonsillar abscess (24).

Kounis syndrome can be caused by medications, insect bites and food. Antibiotics are among many known medications that cause KS; others include: nonsteroidal anti-inflammatory drugs (NSAIDs), cardiovascular drugs, contrast media, glucocorticoids, anti-neoplastics, anaesthetics, analgesics, skin disinfectants, thrombolytics, anticoagulants and proton pump inhibitors (3). Antibiotics and insect bites are reported to be the most common causes of KS (23). Kounis syndrome secondary to penicillin has been reported previously, and was the cause of the first ever reported case of acute MI secondary to an allergic reaction in 1950 (2).

Mast cells are the main inflammatory cells implicated in the development of KS, along with their interactions with macrophages and T-cells (3). Mast cell activation is mediated by either immunologic or non-immunologic mechanisms in response to a range of stimuli (25). The activation of mast cells leads to both the release of pre-formed mediators as well as the release of de novo synthesised mediators, which comprise of a heterogeneous group of molecules with diverse but interlinked biological effects that act both locally and systemically (26). A number of these mediators are capable of inducing coronary artery vasospasm, the main pathophysiological mechanism responsible for KS. Histamine, platelet-activating factor (PAF), thromboxane, serotonin, prostanlgin D2, and leukotriene C4 released during mast cell activation are all capable of inducing vasospasm in coronary arteries (27). Additionally, mast cells found in coronary arteries secrete the neural proteases chymase, cathepsin D and cathepsin G (28). Chymase, cathepsin D and cathepsin G are able to convert angiotensin I to angiotensin II, a potent vasoconstrictor (3,29). Along with vasospasm, patients with type II KS may experience atherosclerotic plaque disruption with resulting intraluminal thrombosis, which may be occlusive or non-occlusive (3,4,18). Several mediators released during mast cell activation can potentially cause plaque disruption and initiate thrombus formation, these include: histamine, PAF, tryptase, chymase, cathepsin D, cathepsin G, thromboxane and tumour necrosis factor-α (3). Finally, coronary artery vasospasm itself may cause plaque disruption in type II KS.

The majority of cases of ACS result from coronary artery thrombosis secondary to atherosclerotic plaque disruption following the rupture, ulceration, fissuring or erosion of the fibrous cap and may occur with or without coronary artery vasospasm (18,30). Although ACS is not usually associated with an acute allergic or hypersensitivity reaction, the role that inflammation plays in the long-term progression and ultimate disruption of atherosclerotic plaques in ACS is well established (30,31). Mast cells, macrophages and T-cells are found in advanced atherosclerotic plaques and many exhibit signs of activation long before plaque disruption and thrombosis (31,32). Activated mast cells, macrophages and T-cells produce mediators that may contribute to plaque disruption through a number of mechanisms (30). Many of the mediators found in patients with advanced atherosclerosis and ACS are the same as those released during an episode of KS. This pathophysiological parallel points toward a possible common pathway between KS and cases of ACS not associated with allergy or hypersensitivity (3,30). Despite the knowledge that mast cells and their mediators play a key role in the progression of atherosclerosis, this understanding has failed to translate into novel detection methods or therapeutic options to avert plaque disruption in patients with stable coronary artery disease (CAD) and other manifestations of atherosclerosis. It is known that serum tryptase level, a substance released during mast cell activation, is elevated in patients with stable CAD (33-35).
The levels of several other mast cell–derived molecules such as histamine, chymase, thromboxane, leukotrienes and interleukin-6 are all elevated in stable CAD and ACS (3). Anti-inflammatory medications that stabilise the mast cell membrane may play a future role in the management of atherosclerosis.

The treatment of KS is complex because of the need to manage two separate conditions and the medications normally given for one condition can adversely affect the other (3). In 2016, Fassio et al proposed the first treatment algorithm for KS. It contains two treatment arms: one for the allergic or hypersensitivity reaction and one for the ACS (36). Treating the allergic or hypersensitivity reaction may abolish symptoms in type I KS, but type II KS requires treatment directed at ACS as well (3).

Adrenaline administration for KS is recommended to resolve symptoms of anaphylaxis, but its use comes with several pros and cons. The administration of adrenaline in KS may provoke unwanted cardiovascular effects. Adrenaline in KS may worsen coronary artery vasospasm, exacerbate myocardial ischaemia or trigger arrhythmia. These adverse effects are more likely when adrenaline is administered intravenously and the intramuscular route is considered a safer alternative (17). The potential for adverse effects should be balanced against the beneficial actions of adrenaline. In doses used in anaphylaxis, adrenaline causes vasoconstriction by acting on alpha-1 adrenoceptors, which is particularly helpful in correcting hypotension. Adrenaline, through its action on beta-1 adrenoceptors, increases the inotropic and chronotropic properties of the heart. Adrenaline’s action on beta-2 adrenoceptors includes bronchodilation as well as rapid stabilisation of mast cells (37). Mast cell stabilisation decreases mediator release and terminates the allergic or hypersensitivity reaction that underlies KS. The case described above illustrates the efficacy and beneficial effects of adrenaline administered intramuscularly in KS. In this patient, adrenaline administration resulted in almost complete resolution of the signs and symptoms of anaphylaxis, in combination with the rapid resolution of the ECG signs of transmural ischaemia.

Treatment of chest pain with morphine may be problematic in KS owing to its ability to induce mast cell degranulation. Fentanyl use may prove to be a sensible alternative in this respect (3). In the case presented here, pain was never reported.

Conclusion

The pre-hospital treatment of KS by EMS is infrequently reported in the literature. Kounis syndrome is an under-recognised and under-diagnosed presentation and should be suspected when symptoms of anaphylaxis and ACS occur concurrently. The treatment of KS is incomplete without acknowledging the presence of both pathological processes, although careful consideration should be given to each therapeutic option, as with any other treatment plan.

Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

References

References (continued)

Operationalising the multidimensional role of the paramedic preceptor

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Abstract

Introduction
This study reports on a subset of findings from a recent doctoral study by the first author, which explored the lived experience of being a paramedic preceptor to novice paramedics in their first year of on-road practice.

Methods
A qualitative methodology underpinned by Gadamerian hermeneutics was chosen for this study. Semi-structured interviews were undertaken with a purposive sample of 11 paramedic preceptors from an Australian government-funded ambulance service. Interviews were audio-recorded and data analysis proceeded from the interview transcripts.

Results
Analysis revealed the paramedic preceptor to be a complex, multidimensional role that is operationalised within four key domains: coach, role model, socialiser and protector. Expectedly, a core function of being a paramedic preceptor is that of coach, supporting and scaffolding novices as they learn to apply theoretical knowledge in practice. Preceptors also appear to play an integral role in the professional socialisation of new employees, and are an important role model of professional behaviours and an empathetic healthcare provider. The paramedic preceptors in this study also viewed their role as a critical advocate for patient safety in the clinical practice environment. Advocacy and protection by the preceptor extended to the novice too, safeguarding their physical and emotional wellbeing during the learning process.

Conclusion
To our knowledge, this is the first study to specifically explore paramedic preceptorship from the perspective of preceptors in an Australian context. Therefore it provides an important contribution to understanding how paramedic preceptors operationalise this educative role in the clinical practice environment.

Keywords:
paramedic; preceptor; preceptorship; education

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Introduction

In this paper, we examine how the multidimensional role of the paramedic preceptor to novice paramedics during their internship year is operationalised. We do this by revisiting some of the findings of a recent doctoral study by the first author (1). Over the past few decades paramedic education in Australia has largely transitioned from a post-employment vocational model to the pre-employment model within higher education (2). Despite this transition, industry and academics continue to debate the road-readiness of graduates to practise at the end of their university degree (3). This is often described as a ‘theory-practice gap’ (4,5). Preceptorship offers an approach to mediate a bridging of this gap between theoretical learning in higher education and the clinical practice environment (3). Notwithstanding this ongoing discussion, agreement has ostensibly been reached that new graduates are expected to have at least a foundational level of competence to practise under supervision at the completion of their degree, and on gaining employment with an ambulance service, be able to practise independently at the end of a supported graduate internship year (6).

Support during this internship takes the form of the novice paramedic working closely with a paramedic preceptor. For the purpose of this study, a paramedic preceptor was defined as an experienced paramedic given the responsibility of providing one-to-one transitional support to a novice paramedic in their first year of on-road practice. In the study setting, this novice may be a newly graduated paramedic or vocational trainee. It should be noted that although the term ‘experienced’ paramedic is used, the reality in many ambulance services is that paramedics are being asked to perform this role early in their careers (2).

Background

Previous research has identified the period of transition to employment in clinical practice from higher education as a difficult and challenging period for new graduate paramedics; characterised by feelings of stress, anxiety, inadequacy and perceived deficits in both skill and knowledge domains (5,7,8). As with other professional health disciplines, paramedicine students undertake clinical placements as part of their university degree to facilitate learning in the practice environment with the aim of easing their transition from classroom to practising in the real-world (3). However, it has been reported that while student clinical placements provide an invaluable period for students to begin to contextualise their learning and integrate theory into practice (5), many students are not exposed to a sufficient number or diversity of cases commensurate with their scope of practice to adequately practise their skills or link theoretical knowledge with practice (9). Paramedic preceptorship during a postgraduate internship therefore remains an integral component in the formative education of novice paramedics.

Consistent with the Council of Ambulance Authorities (6) definition of readiness to practice under supervision, most university paramedicine programs in Australia still require new graduates to undertake a period of internship, albeit of variable form and length, at the completion of their degree before becoming fully qualified (3). As such, an effective and positive preceptorship is essential to the future preparation of graduate paramedics (10). The importance of this on-road period of education has been recognised as the signature pedagogy of paramedicine (3).

The Council of Ambulance Authorities (11) Paramedic Professional Competency Standards (PPCS) outline ‘mentoring, teaching and development of others’ as a core standard of paramedic practice. Further, the PPCS broadly acknowledge that this standard is achieved through guidance, support, sharing knowledge, role modelling, coaching and mentoring, and teaching of students, colleagues and others. A review of the literature however, finds that there is a dearth of empirical studies that elucidate how this standard and the education of novice paramedics is operationalised in the practice environment from the preceptor perspective. This doctoral study (1) sought to fill this gap in the literature by exploring the lived experience of paramedic preceptors. The focus of this paper is to report on a subset of findings from this research that specifically relates to how the role and responsibilities of the paramedic preceptor are being realised on-road.

Methods

Design

A Gadamerian hermeneutic (12) approach was chosen to conduct this study. Using a qualitative approach which favoured language and narrative to elicit data collection enabled exploration of the phenomena in rich detail and to develop an understanding of meaning from the perspective of the participants (13). Furthermore, because the principal researcher was an experienced paramedic and preceptor, by adopting Gadamer’s philosophical notions of understanding as intersubjective and the achievement of a shared understanding through dialogue, this methodology was commensurate with the researcher authentically engaging in the research process as a co-participant.

Participants and setting

The study setting was a single state government-funded ambulance service within Australia. The study organisation employs over 4000 people, with 90% being operational staff employed to deliver frontline services. The organisation provides ambulance services to approximately 7.6 million people in metropolitan, regional and rural areas, across an area of 800,600 square kilometres. At the time the study was conducted, the study site accepted new entrant paramedics as new graduates with a tertiary paramedicine degree or vocational entrants without prior qualifications.
A purposive sample of 11 paramedic preceptors, plus the principal researcher as co-participant, participated in this study. Participants were recruited from current operational, qualified paramedics with experience in precepting a new graduate or vocational trainee paramedic on at least one occasion.

Data collection
Semi-structured interviews were conducted with each of the participants on a one-to-one basis at a time and place convenient to them. Before commencing the interview, written consent was obtained from each participant. Interviews were audio-recorded and later transcribed verbatim by a professional transcription service. These transcripts were provided in MS Word™ by the transcription service and subsequently uploaded into QSR NVivo 10™ to assist with data analysis.

Data analysis
Although space does not permit an in-depth description here, data collection and analysis were guided by Gadamer’s (12) philosophical hermeneutics; in particular, the notions of prejudice, Bildung, the hermeneutic circle and a fusion of horizons. In Gadamer’s (12) ontological view, prejudices are not necessarily unjustified or erroneous in the modernist sense, but constitute the initial directedness of our whole ability to experience the world; they give us our projections of fore-meaning from which to enter the hermeneutic circle in order to understand something. The hermeneutic inquirer therefore, does not make a vain and unattainable attempt to put aside or bracket away their preconceptions, but rather acknowledges their prejudices and places them at risk. In doing so, our prejudices become questionable and this opens us to the possibility that something new may be discovered and our prejudices may be challenged and (re)formed (12). Which brings us to the second notion that guided data analysis, that of having the character of Bildung. Gadamer (12) asserts that one must have the character of Bildung in order to come to understanding. It is a way of being, an attitude of being receptive to an otherness, a ‘keeping oneself open to other, more universal points of view’ (12). The third notion is that of the hermeneutic circle. When we wish to understand an other, we enter into a dialogical process of question and answer in an iterative process that tests one’s prejudices against the horizon of the other. The hermeneutic circle is thus a metaphor of the productive nature of coming to understand; starting from our anticipation of meaning, our fore-projections, and moving back and forth until we reach a shared common meaning (12). The last notion discussed here is Gadamer’s (12) fusion of horizons. Our horizon is metaphorically our perspective of the world, our historically effected consciousness from which we continually proceed in the world. In the interpretation of a phenomena, a shared meaning of understanding is reached when our own horizon and that of the thing we wish to understand ‘are fused into a common view of the subject matter – the meaning – with which both are concerned’ (14).

Ethical considerations
The consent form provided to participants outlined the purpose of the research, that interviews would be audio-recorded and transcribed, and stipulated that participation was free and voluntary, and that participants could withdraw at any time. Unisex pseudonyms were assigned to each participant to ensure confidentiality. Ethics approval was granted for this study by Charles Sturt University HREC under approval number 406/2012/11, and from the South Eastern Sydney Local Health District under approval number 13/022 (LNR/13/POWH/90).

Findings and discussion
An analysis of the data revealed that the operationalisation of the paramedic preceptor role to be a complex and broad-ranging set of responsibilities that may be categorised into four key dimensions: coach, role model, socialiser and protector.

Coach
Participants in this study consistently described their role in the learning and development of a novice paramedic as being focussed on the novice’s practice-in-context, rather than the delivery of informational content and only minimal instructional training in technical skills. In the laboratory setting, isolated patient assessment skills and interventions are learned and practiced. In the clinical practice setting, novice paramedics must take these learned routines and translate this knowledge into an embodied performance in a complex, unpredictable and often unsafe environment. Finding that preceptors are using strategies of support, guidance and advice, coaching would seem to be the most accurate description of the pedagogy being enacted between preceptor and preceptee:

The clinical stuff is what they should be teaching you in school, and putting into practice and doing your job as a whole is what the training officer [preceptor] does. (Taylor)

The main role I guess would be just to support them and make sure they’re keeping on track with their education and their skill development … I mean they should already have the sort of knowledge in the back of their head from school, but really we’re not here to be their primary knowledge giver in a way, they should have already had background information from college or from university … I should just be sort of mentoring and watching their skills on how they’re actually doing it in a way. (Jordan)

Within this one-to-one coaching relationship, participants in this study expressed the importance of establishing an understanding of their preceptees as individual learners who have come to paramedicine with different backgrounds, skills and experience.
Novice paramedics can enter the profession through several different pathways. They may be new graduates from university, or they may be mature individuals who have become paramedics as a career change later in life. As such, although being a novice as a paramedic, they are likely to come with a breadth of experience and prior knowledge in other areas, including diverse clinical backgrounds such as nursing or one of the allied health professions. Effective adult learning embraces these individual differences and uses the knowledge of a novice’s prior experiences to tailor the learning experience, which in turn makes the adult learning environment more effective (15):

[You need to] listen to them [the novice], in the first short period, like the first day or two, hear where they’re coming from, try and find out what their background is. They may not have just been a shop assistant all their life. I’ve had a few that are actually from a nursing background that had decided not to fast track, to come through the system the old way, through the VET system; and clinically they’re switched on. (Kim)

I always ask them what they’ve done previously to this job. Because there’s plenty of times where you get someone who’s a probationer and they say oh, I did medical science for three years at university, or you know, I was a doctor in another country but now I’ve moved here and I can’t practise. Or ... one probationer I had, he was a nurse for a couple of years before he did this job. So not just looking at someone seeing blue on their epaulettes and thinking they don’t know anything. (Andy)

Unique to paramedic practice from the other health professions is the mobility of the practitioner combined with an urgency of attendance. The ubiquitous lights and siren of an ambulance racing to a scene is well known. And with this, comes the skill of urgent duty driving requires experience and practice with real-time coaching from the preceptor:

I think definitely initially in the driving aspect because I think that’s a whole new world for everyone coming into the job, lights and siren et cetera, and the build-up, where there is – I think there’s very little training, let’s be honest, in how to do that. And we don’t go through any defensive driving courses or anything. So that is largely probably up to the training officer when they feel that person’s ready’. (Chris)

But as far as service life, I think, driving is another, something I’d forgotten then, driving is 50% of the job and I don’t think there’s enough emphasis on driving skills. (Robin)

Interaction with patients is at the core of clinical practice. To bridge the learning of technical skills to application in patient care, simulation is increasingly being used in the undergraduate training of paramedic students within Australia to more closely replicate the ‘real world’ (16). However, some participants felt that the simulation environment does not provide the opportunity for students to learn to engage with real patients in a sensitive and empathic manner. Therefore, this aspect of the learning experience is more suited to internship:

I actually for the last two shifts got a chance to work with a graduate that was doing their ride-along. So had a chance to work with them, which I haven’t for a while, and I more or less let her go about how she would talk to patients or build a rapport and that sort of thing. She was good, she’d been out for a little while, but we were reflecting about how that’s not really taught to them at university. They have this million dollar SIM room where they walk in and there’s a mannequin lying on the ground and it coughs and vomits and talks to them, but they don’t really have that chance to build a rapport, to communicate with the patients, understand body language or verbal cues, non-verbal cues. (Alex)

According to Wyatt (17) paramedic practice knowledge is often a tacit understanding and contextual ‘knowing’. The characteristic of this embodied professional knowledge is knowing how to proceed in a given arrangement of circumstances, a sense of judgement and reflexivity between the present and experienced past. One participant, Alex, articulates the preceptor’s facilitation of this knowing as imparting street sense:

[You’re just teaching them like the street sense I suppose, what to do when you’re walking into somewhere. When to judge, like your instincts, or when to go by the book and do things the way your protocols say. (Alex)

Coaching further extends beyond the technical skills of paramedic practice to include non-technical abilities such as interpersonal and communication skills and psychosocial assessments. Communication is an important component of clinical care to establish rapport and facilitate patient assessment and treatment (5) Moreover, patient-centred communication leads to a positive patient experience by making patients feel safe, reassured and cared for as individuals (18). It has been reported that novice paramedics frequently struggle with their interpersonal communication skills, especially early in their transition to practice (5):

A lot of the time it’s just as simple as communicating with a patient, different culture, different people within the health service and other emergency service personnel. (Drew)
I had a [graduate intern] not that long ago that came out and it was, we’ve got to do three sets of obs on every patient. The first thing he would do when he walked in was kneel down and take the blood pressure. I was like ‘Aren’t you going to introduce yourself? Who are you?’ [The intern’s response was] ‘Oh, well, we’ve got to get a base set of obs… we were always taught that you have to’. ‘No, well, you do need a base set of obs, but talk to the patient first’. (Kim)

You can get [graduate interns] from the university that have gone to uni at 18 and they finish their degree at 21 or 22 and they get a job at 22 and they can’t communicate with someone … I’ll give you an example, I had a person who’s been a young probationer and they couldn’t at all empathise, not that we all want to sympathise, but empathise with a 40-year-old male, 40 or 50-year-old male that has just tried to hang himself because he caught his wife having an affair and then she ended up getting the children as well, gaining custody of the children … And the patient said to him (the intern), he goes, what would you know, you don’t know anything, you’re all but 22, what advice have you got to give me? And it was true, he pretty much dumbfounded him and he nothing else he could say. But that’s where I kind of jumped in and said look, I can’t understand what you’re going through, but I know that you wanting to hurt yourself and harm yourself is not the right way of doing this because you’ve still got your children you know. And he (the intern) didn’t have the life skills or like the advanced life experience in a way to understand that and use that as an approach. (Jordan)

Inter-professional collaboration is also an important component of paramedic practice. Novice paramedics must be able to learn to effectively communicate with not only other paramedics, but with other medical staff and those from other response agencies:

So interacting with triage nurses, bedside nurses and doctors when you have to give a handover. And just being confident in yourself and talking in a good, loud, strong voice, trying not to stop, um, ah and those sorts of things. And she (graduate intern) agreed, that it’s not really anything that they teach them or they don’t usually teach them a lot of those things at the university. It’s a lot of clinical stuff, it’s a lot of anat/phys, skills-based, not really interpersonal communications. And it’s something that takes a long time to develop. I don’t think you can really teach it in a classroom. (Alex)

With a biological model predominating healthcare, presentations to emergency departments of hospitals, particularly for older persons, assessment often focuses on the specific presenting clinical problem and neglects to assess the psychosocial, occupational and functional needs of patients; despite these being independent risk factors for unplanned readmissions (19). Providing clinical care in a person’s home often provides paramedics with a wealth of information on psychosocial impacts of their patient’s health and wellbeing which can be passed onto medical staff. Paramedic preceptors in this study recognised that this is an important dimension of assessment to emphasise to their neophyte practitioner, much different from the clinical simulations students experience at university:

We have to do scenarios on dummies, they don’t look like people. You can walk into a room and work out so much about a patient without even talking to them but if you walk into a room with a manikin, it doesn’t give you anything. You might look at someone’s living situation, the clothes they’re wearing to see how they care for themselves, if they have family to take care of them … their perfusion, a manikin doesn’t have colour, it doesn’t sweat, it doesn’t make noise, it doesn’t live anywhere and you can get so much from that when you’re in actual person’s house … so yes you can learn how to do a skill but when the patient you’re treating is a human being I think that’s very different. (Sam)

A key coaching strategy utilised by paramedic preceptors was found to be facilitated reflective practice. Being a reflective practitioner is recognised as a fundamental characteristic of professional paramedic practice (20,21):

So I think it’s alright to say to a trainee ‘Do something’. But if you don’t then visit it and say ‘The reason we did it’, or ‘The reason we didn’t do it’, and that’s probably a bigger issue, when you don’t do something, why we didn’t do something, if you don’t tell them why, they’re not going to learn. They know the book says to do it, we didn’t do it. ‘So we didn’t do it ever?’ ‘No, we didn’t do it in this case because of’, whatever the reason. So I think debriefing jobs, it’s one of the tricks I use. (Kim)

Talk them through every single step of the way, and you can’t do that on every job, but if you pick out something on each job and then reflect back and go, ‘Well, this morning where did you park the car? Does that apply this time? How did you answer the door? How did you stand, or where did you stand when they answered the door? How did you morning where did you park the car? Does that apply this time? How did you answer the door? How did you stand, or where did you stand when they answered the door? When you walk into a room what did you notice? Was there anything out of the ordinary? So you didn’t notice the knife on the table? You’re supposed to.’ (Taylor)

I’d talk to my probationer afterwards and I’d recap that and I’d say look, we haven’t done this before, what could we have done better? What would you do next time with the knowledge you now have? What did you do wrong? All those kind of things. We’d go through each job, I’d try and get out as much as I could, just to help build them up and show them where they could do things better, where they did things well. (Andy)
After every job, you say to someone how do you think that job went? What would you like to do differently? What did you learn from it? What did you expect me to do for you? (Sam)

An additional coaching strategy was for preceptors to create opportunities for learning in the practice environment. This strategy was revealed in several different ways, but the goal was always to maximise the ‘learning moments’ available for the novice. With case assignment to each ambulance somewhat by chance, with most cases matched by closest ambulance resource, sometimes preceptors would attempt to be allocated a specific case where they felt this would offer a learning opportunity for their preceptee. The jargon is ‘to jump a job’:

[I]f I hear a [cardiac arrest] go down … we’ll clear for that straight away. Because they need that experience. So you are jumping jobs that you would normally not jump. Because let’s face it, there’s some jobs that you just would prefer not to go to … [but] all of a sudden you think ‘Well, they have never done something like that, I’ll jump the job’. (Kim)

If there’s something like a code 9 [trapped patient] or a cardiac arrest or a stabbing or shooting, by all means I’ll say we’re clear and can assist with that. You try and get them into it that way. (Drew)

Participants also sought out learning opportunities by encouraging novices to learn through observation of patient care inside the emergency department and to gain a more holistic view of the patient’s treatment:

[I]f there’s an interesting job or an interesting patient and given that we’re not pushed for doing another casualty or whatever obviously, um I’ll try to say, ‘hey let’s go and watch this and let’s go and do this.’ (Charlie)

Especially if it’s a big trauma or something unusual, and they are doing chest thrusts or whatever for extreme asthma or something, then – because the stuff you wouldn’t see often, or how they might treat pulmonary oedema or what it sounds like, and stuff that’s really important to get a grasp on, but you mightn’t have come across it in a year or two, or whatever. So yeah, try and make them available to get into it, sort of thing, yeah. (Leigh)

The coaching dimension of paramedic precepting is itself a complex role. It has been identified in this study the learning and development that occurs during the internship is more than applying theory to practice; instead, this pedagogical approach is a guided facilitation of knowledge translation, where the novice builds on their foundational knowledge from university and develops a practical, embodied know-how of paramedic technical and non-technical practices.

Role model

According to Chapleau (22) the paramedic preceptor may be the most important person in moulding a novice’s attitudes and behaviour. Role modelling was used in all aspects of the position of paramedic preceptor, whether interpersonal interactions with patients, colleagues or managers, driving and adherence to organisational policies and procedures:

... from me they would get the right way to do things. I try to be as professional as I can with patients, with hospital staff, colleagues, as what I can be. ... they’ve got to learn that there is a time and place to joke around and a time and place to be serious and game face sort of thing, so to speak. (Drew)

And the trainee will feel how the training officer performs, too, whether it be driving or whether it be talking to patients, or whether it be talking to management, I think that’s really like a sponge, I’m sure, in the first few months. So I think setting that example is important and staying within the guidelines. (Chris)

At the start it’s totally beyond them, but towards the end of their training they should really be taking in what you’re doing as well as what they’re supposed to be doing. So it is a role model when you’re doing your job and you’re doing it properly, then they should notice that as well. (Taylor)

Myrick and Yonge (23) suggest an effective role model is not based on a dialogue of telling a person how to behave, but demonstrated in the every day actions of the preceptor in the practice environment. Paramedics in this study similarly reported that preceptors must ‘walk the walk’, emphasising that the novice is more likely to emulate how the preceptor behaves, rather than what they say should happen:

If I say, ‘Oh, you need to build a rapport with that patient,’ then I go to the next patient and go, ‘Come with me,’ be abrupt and stern and not be patient, it’s not going to – it’s going to fall on deaf ears. So I guess it’s like any leader. People learn from the leader’s actions rather than their words. (Chris)

Yeah, that’s attitude, it’s everything. It’s what you actually do, what you say, it’s your attitude, it’s how you interact with your colleagues, how you interact with hospital staff, police, everything. (Taylor)

I guess the best way I do this, for me, is try and lead by example. I let the probationers see how I build a rapport with the patient, how I talk to them. And hopefully try and get my probationer to emulate that. Because being able to build a rapport with someone who you’re a complete stranger with, when you’re walking in to their bedroom and they’re you know, can be stark naked lying in their bedroom at their most vulnerable.
The unwritten components of practice:

You’ve got to be able to build a rapport quickly with that person. Let them know that you’re in charge, you’re controlling the scene and you’re going to look after them. And that you’re someone who they can feel supported by and not threatened and hopefully if I can demonstrate that my probationer takes that on and I feel like I’ve done my job. (Andy)

Preceptor as role model is an embodiment of being professional. Role modelling allows preceptors to demonstrate how professionalism is enacted in practice, and what it means to assess and care for patients in a sensitive and empathetic manner. Building trust and rapport with patients, their families, bystanders and other health professionals is a key part of paramedic practice. Paramedic preceptorship allows novices to see how this occurs by their experienced colleague’s interaction with others.

Socialiser

Newly graduated paramedics and trainees entering the workforce undergo a period of being socialised into the realities of practice. This includes familiarisation of local practice and the culture of ambulance, but also a reconciliation of the dissonance between romanticised expectations of the profession and being a paramedic (24,25). Ambulance internship represents a challenging period for new graduates (25) as they internalise the norms and standards of paramedic practice and begin developing their own professional identity and a commitment to the profession (24). The paramedic preceptor plays a key role in the socialisation of the new employee into the organisation by introducing them to colleagues, orientating them to workplace practices and introducing them to cultural norms of the workplace (26).

Participants in this study socialise their novices through a range of strategies. Facilitating a sense of belonging was achieved through introduction to colleagues and managers, but also the practical aspects of lockers and station familiarisation:

I think, for me personally I take the point myself of introducing them to everyone and let them know how things are and what’s happening, just so they feel included. (Andy)

It’s up to me to introduce them to people to show them the station ... Once we’ve gone through the car I will introduce them to [the station manager], allocate them a locker and show them around. (Sam)

But it means that they know where the store is, they know where the fridge is, the tea fund, they know where their locker is, all that sort of thing. (Kim)

Reducing culture norms and expectations to a tangible, concrete form is difficult. However, preceptors in this study felt they were in a position to impart this intangible knowledge to the preceptee, guiding the novice in their early introduction in the unwritten components of practice:

So I guess it would be to impart my experience, knowledge onto that junior officer in the sense of, I guess clinical abilities but not only that, all the culture of the organisation that we work with, all the unspoken kind of rules that people don’t actually tell you unless you’re mentor to the [trainee]. (Charlie)

There is definitely a culture and there’s a lot of unwritten rules that it’s just expected that you know and follow, and you definitely have to teach your trainees those rules. You don’t want them to make a mistake because they’re not aware of a particular rule. (Alex)

I think part of what’s expected, I suppose, like in terms of maybe part of their culture of – equipment and who does – the driver does the – has the portable and is responsible for which roles of – and saying who does what, and what you’d need [intensive care] backup for, and what you’d need Inspectors for and – because I think a lot of that stuff, well, I don’t think when I was getting trained, I don’t think a lot of that stuff was very clear at [university/the education centre]. (Leigh)

Protector

The fourth key dimension of the paramedic preceptor role to emerge in this study was that of protector. This role of protector operates in two directions. Firstly, because the paramedic internship is a learning environment, the preceptor acts to ensure the novice’s practice while learning is performed in a safe manner. Modern paramedic practice has seen significant advances from a predominantly transport focused service to the provision of professional out-of-hospital clinical care (27). The scope of today’s practice for paramedics includes a wider range of medications and invasive procedures than ever before. Paramedics now make important investigations and decisions on time-critical health conditions such as a stroke and myocardial infarctions. Learning in this setting means greater potential risk and the need to ensure patient safety is never compromised. Supervised practice during the paramedic internship therefore provides an important safety net. Preceptors in this study strongly recognised their role in patient safety:

Because patient safety is the most important thing we do. (Drew)

The sense of personal responsibility for patient safety was tangible in the responses of all participants. Each reported feeling that they were responsible for the actions of the novice:

It always comes back to the [training] officer (Sam).

You have the responsibility of the vehicle, you’re the senior clinician. If someone was to go pear shaped it would more than likely be on your head as to why it happened or why it went that way. (Alex)
Essentially the buck stops with us, being the only qualified operator in the car. And if something happens that compromises their safety it’s pretty much our fault. We should be there to watch them like a hawk, so to speak. (Drew)

Participants reported using several strategies in operationalising this aspect of the preceptor role. Listening and open communication between preceptor and preceptee appear to be key:

I wouldn’t take a back seat and just drive and not be aware of what’s going on in the back of the ambulance. I’m listening to what’s being said in the back. (Sam)

Well … depending on what sort of patient we have but I would often say, well what are the [oxygen levels] now, or what is the heart rate now? If we’re giving fluids for a hypotensive patient, what’s the blood pressure now? … I’m not just letting them write it down and me not know because it’s up to me. So I always ask or get them to call it out, heart rate 80, blood pressure whatever it might be. (Robin)

Despite the internship being an experiential learning period, preceptors sometimes felt that patient safety requires the novice to take a more observational learning approach while the preceptor assumes care for the patient:

When you’ve got a sick patient in the back and they are treating for the shift, often I’ve swapped and got them to drive and I’ll treat, because I’m not yet comfortable with them being competent enough to deal with that situation … But I think it’s about the patient, it’s not about – like, it’s not always about training the probationer. Sometimes it’s actually more about the patient, because their welfare needs to be considered, because that’s why you’re there. (Chris)

But again if the patient is critical or unstable, I would remain with the patient. (Robin)

If the patient’s ever that critical where I think that I shouldn’t be leaving the probationer with the patient to do something, I’ll say how about you go to the car, you get this and I’ll continue on with the patient. (Drew)

In addition to responsibility for patient safety, it also emerged in this study that the paramedic preceptor is protector of the novice during their internship. Paramedic practice often operates in uncontrolled and potentially dangerous circumstances. Providing care involves operating in environments such as construction sites, by the roadside, and in poor lighting. It also involves working with patients and bystanders that may have serious mental illness or are affected by illicit drugs and alcohol. A recent study by Maguire et al (28) found Australian paramedics were at risk of serious injury at a rate seven times higher than the national average. Preceptors in this study were cognisant of their role in ensuring that novice paramedics unfamiliar with the dangers of paramedic practice remained safe:

I would do it mainly before arriving on scene [such as] a violent scene or to a car accident or something. You can discuss how you park and position the vehicle for a speedy getaway or just to look out for X, Y, Z when you go inside the house. If you’re suspecting they’re going to be a violent patient you want to make sure you’ve always got an escape plan sort of mapped, marked out, that sort of thing. (Drew)

Yeah there’s also like the element of like your own safety and rather them almost being naïve about things and not really looking at the bigger picture in terms of maybe it’s an unsafe house or an unsafe area and just doing some little things that you’ve been around for a while. It’s not taught to you, it’s just something that you learn and they haven’t had that experience to learn. You know, walk into a house, make sure the front door is unlocked and you can open it again, rather than letting patients lock doors behind you. (Alex)

Depending on where they come from, they may never have come into any situation where their wellbeing might be threatened. So really naïve as to what could happen; the fact that we’re in uniform, we can be targeted and if they’ve not worn a uniform before they probably don’t know that either. So you have to educate them as to what could happen, how to prevent it, and if it does happen, what to do after that as well; so all aspects of safety is really what you need to teach them, depending on what their background is. (Taylor)

Safety of the novice paramedic also extended to preceptors looking after the novice’s emotional wellbeing too. Preceptor guidance and support can assist novices with their self-confidence and maintaining realistic expectations of their learning curve:

You need to be able to guide them, so if they’re going down the respiratory pathway but you think it’s cardiac, you need to be able to bring them back without making them look like they don’t know what they’re doing in front of the patient, and that’s a trick on its own to try and steer someone without decreasing the people’s confidence in them, and their own confidence in themselves. (Kim)

And just basically the way I do it is just try and guide them along and yeah, make them feel comfortable, give them a chance to make mistakes within reason, so long as they’re not big ones. But let them learn things for themselves too. But act mostly as a guide and someone who’s going to be there to support them. (Andy)
In addition to the environmental risks of practice, the paramedic is routinely exposed to circumstances involving human suffering, pain and death. These cases can be highly stressful and a hazard to the emotional health of the paramedic, exposing them to an increased risk of developing post-traumatic stress disorder (PTSD) (29). Paramedic rates of PTSD have been reported as some of the highest of all industries, including those of other emergency services (30). Monitoring and acting to ensure the emotional wellbeing of the novice paramedic is therefore an important function of the preceptor role. All the participants in this study recognised the need for providing psychological support to their novice, which also includes knowing when to escalate support to professional services:

You are their main mentor, and who else is going to check up on them? Management is certainly not, and educators aren’t, certainly. So I think that’s again an added responsibility, that their welfare personally comes into it too, their emotional stability and their ability to take various scenes on board, whether it be emotional, whether it be traumatic, or whether it be challenging for them.

Everyone’s got a different background, so there will be different triggers for different people. So until you know what their triggers are, I think it’s important to follow up on their welfare, because it’s not just a desk job. (Chris)

You’d still help them out with everything, so most definitely an emotional assistance is there as well because if they’ve got kids of the same age that you go to a job, if they’ve got a parent that’s gone through a similar thing, if they’ve got a history of being in a car accident, and they don’t divulge that sort of stuff but at the end of a job you notice that there’s something wrong, if you can help them get over that then you’re going to help them deal with the job in general. (Taylor)

It’s probably a large, probably one of the more important roles in emotional support of a trainee, because we’re the ones face-to-face with them every day and we should be able to recognise when something’s wrong or what not and be able to firstly try and assist them small as possible or recognise when you have to refer them on to management or the assistance programs to be supported, chaplaincy, depending on what’s going on. (Drew)

I remember talking to this person and I said look, you know, if you ever want to talk to me about this, or you’re not sure, or you’re upset, I said give me a call, I’m more than happy to chat about it with you ... But this person I made sure they had that support as well. And that they knew other services and areas they could go to talk to as well if need be. (Andy)

The preceptor as protector is perhaps the most important, yet under recognised, dimension of the preceptor role.

Study limitations

This was a single centre study and therefore the findings may not be generalisable to all ambulance services. As there is currently a limited number of empirical studies exploring ambulance preceptorship form the perspective of the preceptor, further studies from different services, and from different countries, would be useful in building a body of knowledge on this important area of paramedic education.

Conclusion

In this paper we have discussed some of the findings of the first author’s recent doctoral study into paramedic preceptorship. We have chosen to focus on elucidating the preceptor as a multidimensional role consisting of four key dimensions: coach, role model, socialiser and protector; highlighting how paramedics operationalise their understanding of each dimension in the practice environment. Despite the transition from higher education to clinical practice being a challenging time for novice paramedics, the preceptor can ease this transition by providing a scaffold of support across the technical and nontechnical aspects of paramedicine.

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Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

References

References (continued)

25. Devenish AS. Experiences in becoming a paramedic: a qualitative study examining the professional socialisation of university qualified paramedics: Queensland University of Technology; 2014.
Research

Enhancing the quality of CPR performed by laypeople

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Abstract

Introduction
The prognosis of survival for a person suffering from cardiac arrest increases when a layperson performs cardiopulmonary resuscitation (CPR) on-site. In Sweden, providing CPR training to people working in public places is considered a social benefit.

Objective
The aim of this study was to investigate the effect of a 3-hour CPR intervention for electricians.

Methods
Data were collected through an intervention by means of simulation and consisted of a pre- and post-assessment of the participants’ CPR performance.

Results
The results show a statistically significant improvement in ventilation (41%) and quality of compression (36%).

Conclusion
With short rehearsal training, the layperson can significantly improve the quality of CPR given. In a situation of cardiac arrest, this can be crucial for the patient’s survival and continued quality of life.

Keywords:
CPR, intervention, layperson, simulation

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Introduction

The average survival rate for cardiac arrest outside the hospital setting in Sweden is just over 10% (1). If the cardiac arrest is witnessed and CPR initiated immediately by a layperson, the chance of survival increases (2). The shorter the time between cardiac arrest and the commencement of CPR and defibrillation, the greater the chance of survival (3). There are also differences in survival rates from different communities (4). To enhance the chances of survival in all communities, CPR education for laypeople is important.

Cardiopulmonary resuscitation refers to external chest compressions and ventilation of the lungs, possibly in combination with defibrillation (5). Well-performed CPR comprises of good quality chest compressions containing adherence to rate, depth, full recoil and fraction. Chest compressions are performed at a depth of 5–6 cm, at a rate of 100–120 compressions per minute. The ventilation involves inflating of the patient’s lungs with sufficient air volume for 1 second. Ventilation of the patient is conducted using a mouth-to-mouth or mouth-to-pocket mask. The chest compressions to ventilation ratios are 30:2 (6). Cardiopulmonary resuscitation aims at restoring spontaneous circulation and respiratory function in a person who has had a cardiac arrest. In some cases, the cardiac function can be reset immediately only by means of defibrillation; in other cases, intensive care treatment after CPR may be required (5).

The quality of the CPR affects both the short- and long-term survival of the patient (6). CPR can be considered successful when a patient suffering from cardiac arrest recovers spontaneous breathing and circulation, and can continue to live a good quality life. At the same time, there is a risk that the patient’s survival will mean a continued life with different degrees of cerebral and cardiac muscle impairment due to oxygen deficiency. When circulation stops, the risk of injury increases proportionately to the duration of the cardiac arrest (5). In some cases, CPR can result in patient survival but with a life of low quality or to die in a manner that neither the patient nor his family would have chosen (7).

In Sweden, all employers must ensure that employees have preparedness for first aid and CPR (8). Electricians working in factories or industries are therefore regularly trained to perform CPR and provide immediate resuscitation. All larger workplaces in Sweden are equipped with defibrillators and basic medical equipment. Examples of CPR that the electricians may perform include traumatic or non-traumatic cardiorespiratory arrest and electrocutions with muscular paralysis (9). Whatever the reason for the cardiac arrest, it is difficult to perform high-quality CPR. Studies show low quality in pre-hospital CPR performed by professionals (10,11). Both professionals and laypeople therefore need regular CPR training (12,13).

A short period of time between the cardiac arrest and the commencement of high-quality CPR increases the patient’s chance of survival. It also reduces the risk of cellular damage caused by oxygen deficiency. The aim of this study was to investigate the effect of a 3-hour CPR intervention by electricians.

Methods

This study had a quantitative approach. Data was collected through an intervention by means of simulation and consisted of a pre- and post-assessment of the participants’ CPR performance.

Participants

Participants consisted of 27 electricians, all men, with an age range of 23–64 years (mean 50 years, median 57 years). The time since latest CPR training was 3 years, for all participants. One participant had previously performed CPR on a human. Inclusion criteria were participation in a CPR education intervention. All participants received oral information about the study and were asked to participate voluntarily.

Intervention and data collection

The study was carried out in three steps. Step one was to assess the participants’ CPR performance. Participants performed CPR for 2 minutes on a Resusci Anne QCPR (Laerdal®). Each of the participants performed chest compressions and ventilations according to European Resuscitation Council Guidelines for Adult Basic Life Support (2). The mechanical spring simulating the thoracic resistance required 30 kg chest compressions to achieve correct compressions depth of 5–6 cm. The ventilation required 400–700 mL/breath. Data were collected on the percentage of correct ventilation and the percentage of correct compression depth, rate, hand placement and recoil.

In step two, the group participated in a 3-hour education session divided into a theoretical part regarding anatomy and pathophysiology and a hands-on part consisting of CPR.

The intervention was completed with step three. Step three was to re-assess the participants’ CPR performance for 2 minutes. No feedback about the CPR performances was given during the step one or step three assessments. All results were read from a SimPad Skillreporter.

Data analysis

The descriptive and analytic analysis was conducted using IBM Statistical Package for the Social Sciences (SPSS) 24.0. Descriptive analysis (central tendency and distribution) was used to describe the data. Analytic statistics (related-sample Wilcoxon signed rank test) were used to compare the pre- and post-assessment.
Ethical considerations

The study followed the ethical principles regarding anonymity and integrity in accordance with the World Medical Association (14). Ethical approval was not needed according to Swedish law (15). Informed consent was obtained from each participant.

Results

On average, the group improved on both ventilation and compressions (Figure 1). Related-sample Wilcoxon signed rank test shows that the p-value for both ventilation and compressions is significant (p<0.001). For ventilation, the average increased by 41%, and for compression, the average increased by 36% (Table 1).

Discussion

The aim of this study was to investigate the effect of a 3-hour CPR intervention for electricians. The results reveal that both the compression and ventilation quality is statistically significantly improved by the intervention. This specific group of electricians had all conducted CPR training 3 years earlier. Previous research has shown that knowledge deteriorates 3–6 months after CPR training (16–19). Therefore repeated training is required at intervals of 3–6 months in order to maintain a high degree of quality performing CPR and thus give patients a better outcome (13). The repetition or training can be done with a short video presentation to a large group of people (20). Training in any form is necessary as a CPR trained layperson performs better quality CPR compared to laypeople without CPR training, following dispatcher-assisted CPR (21,22).

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-group</th>
<th>Post-group</th>
<th>Related sample Wilcoxon signed rank test</th>
<th>Mean % increase</th>
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<tbody>
<tr>
<td></td>
<td>Median</td>
<td></td>
<td>p&lt;0.001</td>
<td>41%</td>
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<tr>
<td>Ventilation mean</td>
<td>17%</td>
<td>58%</td>
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<tr>
<td>Median</td>
<td>23%</td>
<td>56%</td>
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<tr>
<td>Min-max</td>
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<td>25-72%</td>
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<tr>
<td>Compression mean</td>
<td>34%</td>
<td>70%</td>
<td>p&lt;0.001</td>
<td>36%</td>
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<tr>
<td>Median</td>
<td>31%</td>
<td>73%</td>
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<tr>
<td>Min-max</td>
<td>5-77%</td>
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Table 1. Mean and median of compressions and ventilations percentage divided in pre- and post-groups

Figure 1. Compression and ventilation for pre- and post-groups in percent
Training also means that the layperson feels safe in performing CPR (23). Previous studies have shown how performing CPR can affect the rescuer in a negative way (24,25). When the outcome is negative, the rescuer can experience both physical and emotional outcomes such as self-blame, anxiety, sadness and nightmares. This was alleviated by the rescuers having a degree of education and being confident with their knowledge of CPR (26).

**Limitations**

The ventilation score included the ventilation-rate and the number of ventilations. The compression score included depth, rate, hand-placement and recoil. These figures have not been presented separately but as an overall score.

**Conclusion**

Cardiopulmonary resuscitation provided by laypeople is of the greatest importance for patients suffering a cardiac arrest because it improves the patient’s chance of survival. Through a 3-hour intervention, the participants’ CPR knowledge improved by 30–40%. In the event of a cardiac arrest, CPR intervention can be crucial for a patient’s survival and continued quality of life.

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**Conflict of interest**

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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**References**

References (continued)


Working towards wellness: Lessons from 9/11 paramedics and emergency medical technicians for Australian ambulance services

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Abstract

Introduction
The September 11, 2001 terrorist attacks, otherwise known as 9/11, on the World Trade Center in New York City killed 2753 people, including approximately 413 first responders. Some 7000 responders are currently enrolled in the World Trade Center Health Program with illnesses related to their exposure to 9/11, and over 2000 have had to retire on 9/11-related disability. The impact of 9/11 is extensive and ongoing.

Methods
This research used qualitative methods to interview a cohort of 54 paramedics and emergency medical technicians who responded to 9/11. These interviews occurred around the 15-year anniversary of the terrorist attacks. The objective of the research was to explore the long-term physical and mental health impact on the responding paramedics and emergency medical technicians and to investigate key influences on wellness. Information pertaining to ongoing impact, wellness and ideas for effective ambulance wellness programs were extrapolated through thematic analysis.

Results
Seven key lessons for paramedic wellness were identified. These included: the need to understand the paramedic workforce and the key influences on their health and wellbeing; the importance of engaging staff in the development-phase of wellness strategies; avoiding silo-approaches to physical and mental health; providing ongoing professional development opportunities; providing tools for effective peer-to-peer communication; including family members in wellness initiatives; and not forgetting the retiring workforce.

Conclusion
This research makes an important new contribution to the existing knowledge base at a time when Australian ambulance services are currently developing wellness strategies to improve the physical and psychosocial wellness of the pre-hospital workforce.

Keywords:
9/11; ambulance; paramedic; emergency medical technician; wellness; PTSD

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Introduction

The September 11, 2001 terrorist attacks, otherwise known as 9/11, on the World Trade Center (WTC) in New York City killed 2753 people and caused profound human suffering, physical destruction and economic loss (1,2). Among the victims were 413 first responders, including 343 firefighters, 60 police officers and 13 paramedics and emergency medical technicians (EMTs) (3). While New York rebounded strongly following 9/11, one of the painful legacies of the disaster is the lasting effect on the physical and mental health of thousands of individuals who survived the attacks — including the first responders.

In the weeks and months following the terrorist attacks, thousands of emergency first responders (firefighters, police officers, paramedics and EMTs) and tens of thousands of non-emergency first responders (including construction workers, heavy-equipment drivers, metal workers and engineers) spent 12-hour shifts at ‘Ground Zero’ removing debris and searching for victims. In the 15 years following 9/11, over 800 of these responders have died from illnesses related to their exposure to Ground Zero, some 7000 more are registered with the World Trade Centre Health Program with illnesses and injuries linked to their time responding to 9/11, and over 2000 have retired with 9/11-related disability (3). The recommendations provided in this study for Australian ambulance services developing wellness strategies are, in part, drawn from a broader 9/11 long-term study on the health and psychological impact on paramedics and EMTs (4).

Early health assessments following 9/11 tended to focus on firefighters and indicated that sleep issues, mood changes, feelings of detachment and flashbacks were common problems for the Fire Department of New York first responders (5). Published reports on the impact of 9/11 on other first responders, including paramedics, EMTs and police are scarce, however one study published 9 years after 9/11 identified that WTC rescue and recovery workers continued to have a substantial burden of physical and mental health problems. These included respiratory illness, gastro-oesophageal reflux disease, depression and panic disorders (6). Incidence of most disorders was highest in workers with the greatest WTC exposure and extensive comorbidity was reported within and between physical and mental health disorders (6). One study that focussed on 9/11 paramedics and EMTs reported ongoing psychosocial impact 10 years after the disaster (7). Research participants reported problems sleeping, anxiety and depression, extreme moods, addictive behavior (including gambling, smoking and drinking) and a negative impact on their overall wellness.

Wellness

Wellness is typically divided into two components: physical and psychosocial. The physical component often deals with nutrition, exercise, illness and injury. The psychosocial component often involves stress factors and mental illness. Healthy lifestyles that promote wellness allow paramedics and EMTs to perform more effectively and efficiently. In light of the importance of paramedic wellness, programs aimed at maintaining their health have become commonplace around the world. Wellness programs are likely to keep paramedics and EMTs healthier, reduce absenteeism, lower the incidence of injury and long-term illness and help address issues related to stress (8). Common key components of wellness programs include physical and medical evaluations, fitness programs, behavioural modification and psychological support (9).

Wellness in paramedics and EMTs

The Emergency Medical Services Workforce Agenda for the Future identifies “health, safety, and wellness of the EMS workforce” as being critical for developing a thriving, achieving workforce (10). As part of their routine work, paramedics and EMTs experience complex exposures to a succession of challenging events, resulting in concurrent experiences of both physical and psychological trauma. The routine activities associated with work as a paramedic have been directly linked to increased risk of developing depression, suicidal ideation, anxiety, post-traumatic stress disorder (PTSD) and substance-use disorders, as well as cardiovascular illness, musculoskeletal problems, fatigue and burnout (11–22).

This increased risk of health impairment may also be due in part to operational factors such as perceived lack of job autonomy and control, incompatible workplace culture and work overload (22–25). Shift-work, fatigue and burnout have also been linked to health problems in paramedics and EMTs (15,23). The length of time employed also impacts on health, with the risk of developing depression, anxiety and stress increasing the longer someone has been a paramedic or EMT (12). Levels of PTSD among paramedics and EMTs appear to be consistently above the rates for the general population (12,26). This rate increases again for paramedics and EMTs who have responded to major disasters such as terrorist attacks (27).

This high prevalence of PTSD is particularly concerning given that mental health disorders rarely occur by themselves. A diagnosis of PTSD often brings additional diagnoses along with it. A third of all first responders (including firefighters, police, paramedics and EMTs) enrolled in the World Trade Center Health Registry with chronic PTSD symptoms also reported a diagnosis of depression (28). First responders with probable PTSD had an almost 14 times higher chance of developing depression and nearly 10 times higher chance of developing a panic disorder than those without PTSD; comorbid responders were 40–86 times more likely to have emotional disruption of function than were those without PTSD (28).
The Australian context
The primary focus of the current evidence-base for Australian paramedic health has been on the effect of shift-work. Research investigating the effect of shift-work on paramedic mental health found that paramedics had significantly elevated levels of depression, anxiety and stress (19,29). An Australian coronial report identified the incidence of fatal acts of intentional self-harm among emergency services between 2000 and 2012, including ambulance personnel (30). Of the 110 fatalities involving emergency personnel during this time, 26 fatalities involved paramedics (30). The majority of these fatalities across all services were men aged 30–49 years (30). A recent Coroners Prevention Report found that the suicide rate among paramedics was four times higher than the average for all other Victorian jobs (31).

Methodology
Qualitative methods were used to interview 54 first responders (18 paramedics and 36 EMTs) from 17 of the 31 emergency medical service agencies who responded to the WTC precinct on 9/11. These paramedics and EMTs ranged in age from 39 to 68 years; 42 (78%) were male (14 paramedics and 28 EMTs) and 12 (22%) were female (four paramedics and eight EMTs). The interviews were unscripted, however several key prompts were utilised including: physical health, mental health, relationships, access to support and general wellness. Interviews were conducted either face-to-face or via telephone or electronic communication (including Skype and GoTo Meeting technology) and ranged in length from 60 to 90 minutes.

Research participants self-reported as 9/11 paramedics and EMTs and employment status was not confirmed with their employer. Physical and mental health issues reported were not confirmed by medical records. The views and experiences reported by this research are those of the individual participants and do not reflect any views of the ambulance service with whom they were employed. Interview recordings were transcribed and thematic analysis was undertaken using NVivo.

Ethics
Ethics approval was provided by the Human Research Ethics Committee at Edith Cowan University in Australia.

Results
The interviews with the 9/11 paramedics and EMTs are intimate, and offer detailed and unfiltered insights into what happened that day and what has happened since. The wellness of research participants has been impacted by a combination of both physical and psychosocial factors. All report some form of ongoing 9/11-related illness 15 years after the terrorist attacks. For most it is respiratory illness, but many also suffer from gastro-oesophageal complaints and eye problems. Cancer is increasingly impacting the paramedics and EMTs involved in our research, with 14 participants (one male paramedic, 10 male EMTs and two female EMTs) diagnosed with 9/11-associated cancer. The age range for onset of diagnosis was 39–52 years. The cancers reported include thyroid, leukaemia, prostate, melanoma, multiple myeloma and colon cancer.

Male EMT: ‘We are all trying to move on. People want us to move on. My loved ones want me to move on. But I can’t. I’m getting sicker, I haven’t told anyone else that yet. Actually, I haven’t even said it out loud before now… (starts crying)…sorry…’

Of the 54 participants, 80% report ongoing PTSD and 15% have ongoing anxiety related to 9/11. Participants voluntarily reported ongoing loss of emotional capacity and capability that impacted their work and private lives.

Male paramedic: ‘I could just tell I had changed. I started doing things I am not proud of. I hurt my family. I cheated, I lied, I spent all of our money… (pause)… I might not deserve it, but I just want some peace… (crying)…I just want to block out the demons. Even now, 15 years on…(pause)… I left a little too much on the pile I think. I did my job. All I was doing was what I was trained to do. I don’t see myself as a hero. I know that I have been called that, but to me…I don’t know, that word doesn’t sit well.’

Interviewer: “Why”? Male paramedic: ‘Because I was just doing my job.’

Thematic analysis of the 54 interviews with paramedics (n=18) and EMTs (n=36) identified seven key lessons for consideration when developing wellness programs for them.
Lesson one: Understand the workforce

Male EMT: ‘They just don’t really understand what is going on with us.’

It is important for ambulance services to have a good understanding of the baseline wellness of their staff. This includes understanding the range of influences on wellness and any pressing needs of the paramedics and their families. This baseline could be determined through the use of a survey of all paramedic staff within an organisation or through targeted qualitative methods such as focus groups or interviews with a representative sample of the workforce.

Lesson two: Engage with staff

Female EMT: ‘They never actually asked us what support we needed.’

Paramedic wellness programs need to be based on the actual needs of staff. What do they want? How do they want it delivered? In what format do they want it delivered (face-to-face or electronically) and how often do they want it delivered? Who do they want to deliver it? Should it be compulsory? What should it include? It is important for ambulance services to listen to the needs of their staff, to understand what they are being told, to be seen as being responsive and to provide what is needed to improve wellness. The research participants in this study identified that to be useful, wellness programs should be delivered both face-to-face and electronically, and should be delivered by a mix of their trained peers and qualified psychologists. They felt that at least one wellness session should be compulsory every 12 months, to ensure that evolving needs of staff are addressed and paramedics have a regular outlet to discuss their wellness concerns in a ‘safe space’. Additional electronic or online wellness sessions should also be available year-round for staff to access as needed. These sessions should focus on topics such as communication, self-care and recognising signs of ‘un-wellness’ in themselves and their colleagues.

Lesson three: Avoid silo approaches to physical and psychosocial health

Male paramedic: ‘I am sick in the body and I am sick in the head.’

Successful wellness programs will address both the physical and psychosocial needs of staff simultaneously. Traditional approaches have tended to operate in silos, addressing physical health needs in one domain, and the psychosocial needs in another. Ambulance services should avoid making paramedic attendance compulsory for each of these needs in a silo approach by bringing together the support services required into one, easy-to-access, responsive wellness system.

Male EMT: ‘If I could have accessed a one-stop-shop...for all of my problems, I guess I would have talked about my depression sooner. I had been feeling sad for a really long time. You know, I just thought it was the grief. But it was more than that, I just didn’t realise it. If the guy I was seeing for my back could have helped me with what I was feeling, that would have been good…but he never asked…and I never told.’

Lesson four: Ongoing professional and personal development

Male EMT: ‘I need something else to focus on.’

Effective wellness programs provide opportunities for paramedics to expand both their professional and personal development. It is important for ambulance services to engage with staff to identify a range of professional development opportunities that would be of interest and benefit to their staff. The research participants in this study identified that professional development opportunities around leadership, communication, building personal resilience and mental health first aid would have been welcomed.

Lesson five: Provide the tools for peer-to-peer communication

Male paramedic: ‘I don’t know how to talk about it.’

9/11 paramedics and EMTs often highlighted that they were among the first people to notice changes in their colleague’s wellness. However, they didn’t feel equipped to engage in a conversation about health, especially around issues of mental health. Helping paramedics to start these conversations and providing them with resources for supporting their friends could help save lives.

Male EMT: ‘John* started changing, it was about a year or so after the attacks. He just seemed angrier. Little things on the job would just get to him more than they used to. He used to really care what he looked like, we used to rib him about how long he took doing his hair! But he just didn’t seem to care anymore. He started turning up to work late and I could smell the booze on him. I wanted to say something to him, but I was scared I would set him off you know. I didn’t want to be the thing that set him over the edge. So I didn’t say anything. I heard a few years later that he got diagnosed with PTSD and left the service. I don’t know what he is doing now.’

Lesson six: Include family members in wellness initiatives

Female EMT: ‘It impacts my family too.’

9/11 paramedics and EMTs often highlighted that their family members were ‘left out of the loop’ when it came to the provision of psychosocial support.
Wellness programs need to be inclusive and provide opportunities for families to access support together, and also individually. Successful initiatives in the United States following 9/11 included family gym memberships, cooking classes, discounted home food deliveries, weekend camps for children, support groups for spouses and family events held by the services to foster engagement and a feeling of belonging.

Lesson seven: Ongoing support for those who have left the service

Male paramedic: ‘Don’t forget about us.’

Many of the paramedics and EMTs in this research have been so impacted by 9/11 that they can no longer work. For many, being a paramedic or EMT is all they know, and the job has been their life. What do they do once they leave the service? Many felt like they were cast aside and forgotten about – this feeling of abandonment exacerbated the impacts on wellness. Ambulance services should find ways to provide some form of ongoing support to staff who are in the process of retiring or have recently retired. Retired staff could also be involved in the running of support programs and share their own lessons.

Limitations

This research assumes that people can provide meaningful answers and respond appropriately to questions of a sensitive nature. This type of research typically investigates largely subjective, affective feelings and values, rather than objective ‘actual’ behaviours. Therefore, while these findings are reflective of the paramedics and EMTs who participated in this research project, they may not necessarily be generalisable to all paramedics, EMTs or other first responders. The findings reported are reflective of the individual experiences of the participants involved in this research and are not necessarily reflective of other responders. Sampling for this research was largely purposive, with subsequent snowballing techniques. This resulted in a selective study sample that was skewed towards EMTs and male participants.

Self-reported data such as the information provided by the paramedics and EMTs in this research can contain several potential sources of bias. These biases include selective memory (remembering or not remembering experiences or events), telescoping (recalling events that occurred at one time as if they occurred at another time), attribution (the act of attributing positive events and outcomes to oneself but attributing negative events and outcomes to external forces) and exaggeration (the act of representing outcomes or embellishing events as more significant than is actually suggested from other data). The information provided by participants in this research was not verified from any other sources, which could potentially result in some bias in the reported findings.

Implications of this research

This research has made an important new contribution of knowledge to the emerging field of paramedic and EMT wellness. This comes at a time when first responder mental health is an issue of paramount importance for ambulance services, not only in Australia, but worldwide. Therefore, in spite of any limitations associated with the research study design, the novelty of these results should not be overlooked. Despite the contribution of this research to the existing paramedic and EMT wellness evidence-base, there remains an urgent need to continue monitoring a larger cohort of paramedics to ensure that ambulance services have a comprehensive understanding of the baseline level of health among their paramedic and EMT workforce. Wellness strategies and programs should be developed that address the key influences on paramedic and EMT wellness and provide a range of initiatives and support services that they both want and need.

Conclusion

Australian paramedics are currently experiencing a mental health crisis. Suicide rates are up to four times higher than those of the general public and levels of PTSD and anxiety are high. Key lessons for improving wellness can be taken from the experiences of the 9/11 paramedics and EMTs. Seven key themes have been identified from this qualitative research exploring the long-term impact of 9/11 on the physical and psychosocial health of the research participants. These key themes focus on engaging with the paramedic workforce to understand their needs and the influences on their health, ensuring opportunities for ongoing personal and professional development and for the inclusion of family members in activities and support systems, and not forgetting the needs of the retiring responder workforce.

* Names have been changed to protect the identity of research participants and their colleagues.

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Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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References

18. Sterud T1, Ekeberg Ø, Hem E. Health status in the ambulance services: a systematic review. BMC Health Serv Res 2006;6:82.
27. Morren M, Dirkzwager AJE, Kessels FJM, Yzermans CJ. The influence of a disaster on the health of rescue workers: a longitudinal study. CMAJ 200;176(9).
References


Learning approach and trait anxiety on paramedic and nursing students

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Abstract

Introduction
Learning approach and anxiety are important factors in the quality of education. This study was carried out to measure learning approach and trait anxiety levels on paramedic and nursing students.

Methods
This cross-sectional study – undertaken between July and December 2016 – aimed to evaluate paramedic and nursing students studying in Ankara in Turkey. A survey system was used for data collection utilising the Revised Two Factor Study Process Questionnaire and State-Trait Anxiety Inventory methods. The SPSS statistical package program was used to analyse the data. The Kolmogorov-Smirnov test, the Mann Whitney-U test, the t-test, Spearman correlation analysis and multiple regression analysis were used for data analysis.

Results
It was determined that students preferred deep learning; over half of the students were observed to demonstrate lower anxiety levels using this method. As a sub-dimension of surface learning, surface motive was more expressively preferred by the paramedic students. Statistically, no significant relationship was observed between study process and trait anxiety.

Conclusion
Developing deep learning education systems and creating an environment to reduce anxiety is beneficial to students. Further research should be undertaken to determine the relationship between learning approach, socio-demographic characteristics and anxiety.

Keywords:
paramedic; nurse; student; learning approach; trait anxiety

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Introduction

Learning approach is an effective factor in determining an individual's learning processes. It also explains the different success levels between students (1–3). Marton and Säljö established the theory of learning approach by carrying out research to determine what students saw as the purpose for learning, and concluded that students showed deep and surface learning approaches (4,5). Deep learning requires questioning, analytical thinking and an ability to associate new information with former knowledge as well as focussing on a subject without losing its essence. Surface learning, however, is defined by learning enough to pass exams with the least effort, memorising subjects and separating them into fragments; hence, losing the subject's integrity (6–8).

Anxiety is a feeling of uncertainty, dissatisfaction and sadness and anticipation of an uncontrollable threat (9–10). There are two types of anxiety: state and trait. State anxiety is an emotional condition, which is temporary and short-lived and specific to that timeframe. Trait anxiety, however, reflects an individual’s state of mind. These individuals generally experience constant stress, feel continual misery and dissatisfaction and therefore become vulnerable and fragile and may experience more state anxieties (11–13).

Because the health sector is directly related to human life and does not tolerate error, health workers are expected to graduate with adequate knowledge and experience. This is closely related to students' learning approaches. However, it is known that anxiety leads to a lack of interest in learning and negatively affects learning and academic performance (14–15).

In this study, analysis of learning approaches and trait anxiety levels of paramedic and nursing students were targeted. This objective prompted the research questions:

- Is there a relationship between learning approaches and trait anxiety?
- What socio-demographic characteristics affect learning approaches and trait anxiety?

Methods

Study design

This was a cross-sectional study using a paper-based set of survey forms.

Population

This study was undertaken with students of the Gulhane Nursing School (GNS) and Gulhane Health Vocational School (GHVS), which had been members of the Gulhane Medical Academy in 2016 but had since been demilitarised and handed over to the Health Sciences University. The GNS had 77 female nursing students completing a 4-year study course. The GHVS had 108 male paramedic students undertaking a 2-year study course. The paramedic students averaged 20 years of age and the nursing students 22 years of age. The study was performed between July and December 2016 with those students agreeing to participate in the research. The sample size was not calculated for the study and aimed to reach all the senior students.

Instrument

A survey method, which contained a three-part questionnaire, was used as data collection tool.

The socio-demographic character form: There were seven questions in this section prepared by the researchers regarding participants’ school, height and weight, family income level, opinion about school success levels, number of siblings and the education level of parents.

Study process questionnaire: In order to evaluate the learning approach, some inventories were developed by researchers. The Revised Two Factor Study Process Questionnaire (R-SPQ-2F) was used due to its easy implementation and fewer number of questions (16). Onder and Beşoluk translated a scale into Turkish developed by Biggs, Kemberg and Leung (17–18). The Cronbach alpha values were 0.73 for deep learning and 0.64 for surface learning in the original study. This scale contained 20 questions with a 5-fold Likert and consisted of two dimensions: deep and surface learning. The points of each dimension ranged between 10 and 50. Each dimension was further divided into ‘motive’ and ‘strategy’ sub-dimensions within itself. Motivation and strategy expressed why learning was wanted and how was learned, respectively. The dimension and sub-dimension scores were obtained from questions as the sum of points. The arithmetic average was accepted as the limit value (16–18).

Trait Anxiety Inventory (TAI): To examine general anxiety level, Oner and Le Compte (1983) translated the developed scale by Spielberger, Gorsuch and Lushene (1970) into Turkish (12,19). The Cronbach alpha value was 0.78 for TAI in the original study. The scale consisted of 20 questions with 4-fold Likert and the scale score varied between 20 and 80 points, with high scores indicating high anxiety. The average points ranged between 36 and 41. In addition, anxiety level evaluations were graded as: 20–35 low, 36–42 intermediate, 43–60 high and 61–80 serious. Those who scored more than 61 points were at serious anxiety limits and considered as having a health problem, hence, they were required to be followed closely (12,13).
**Statistical analysis**

The SPSS statistical package program (Version 21, Chicago IL, USA) was used to analyse the data. The Kolmogorov-Smirnov test was performed to control the fitness of data to normal distribution. Among nonparametric tests, the Mann-Whitney U test was used to compare inter-group data. Among parametric tests, the t-test was used for independent groups. Spearman correlation analysis was used to determine the relationship between variables while multiple regression analysis was used to determine the effect. The statistical significance threshold was accepted as p<0.05.

**Ethics**

Written approval, ethics committee and questionnaire board permissions were obtained from the Health Sciences University. The survey was conducted by those who agreed to participate to the study voluntarily.

**Results**

The participation rate was 98.3%: 100% of the nursing students (NS) (n=77) and 97.2% of the paramedic students (PS). Of all the participants, 57.7% were male and PS, and 42.3% were female and NS. Among the total group of participants, 79.2% had a normal body mass index, 40.7% had a family income of $350–700, 63.2% had three or more siblings, and 62.7% had good school performance. Furthermore, 58.9% of the participants’ mother and 45.6% of the participants’ father were primary school graduates.

<table>
<thead>
<tr>
<th>Scales and sub-scales</th>
<th>Number of questions</th>
<th>Reliability co-efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-SPQ-2F general</td>
<td>20</td>
<td>0.67</td>
</tr>
<tr>
<td>Deep learning</td>
<td>10</td>
<td>0.82</td>
</tr>
<tr>
<td>Deep motive</td>
<td>5</td>
<td>0.67</td>
</tr>
<tr>
<td>Deep strategy</td>
<td>5</td>
<td>0.70</td>
</tr>
<tr>
<td>Surface learning</td>
<td>10</td>
<td>0.75</td>
</tr>
<tr>
<td>Surface motive</td>
<td>5</td>
<td>0.66</td>
</tr>
<tr>
<td>Surface strategy</td>
<td>5</td>
<td>0.50</td>
</tr>
<tr>
<td>Trait Anxiety Inventory</td>
<td>20</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Reliability meant measurement consistency and high measurement of the internal-consistency-reliability of used scales was important. Reliability co-efficient of scales was 0.67 for the R-SPQ-2F and 0.79 for the TAI. The scales were evaluated as reliable (Table 1).

When school types were taken into account and participants R-SPQ-2F scores were analysed, no statistical significance was observed except for the sub-dimension of surface motive. This score meant studying enough to pass courses and was higher for PS than for NS (p=0.02). When scale average was examined, both PS and NS were identified to prefer deep learning to surface learning. More NS preferred deep learning than PS, but the difference was statistically insignificant. When the TAI scores were analysed NS had higher levels of trait anxiety scores than PS, however, no statistical significance among participants was observed (p>0.05) (Table 2).

<table>
<thead>
<tr>
<th>R-SPQ-2F</th>
<th>School type</th>
<th>n</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>Z*</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep learning</td>
<td>PS</td>
<td>105</td>
<td>12</td>
<td>46</td>
<td>32.68</td>
<td>6.74</td>
<td>0.959</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>18</td>
<td>45</td>
<td>33.62</td>
<td>6.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep motive</td>
<td>PS</td>
<td>105</td>
<td>5</td>
<td>24</td>
<td>16.07</td>
<td>3.58</td>
<td>-0.517</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>7</td>
<td>23</td>
<td>16.31</td>
<td>3.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep strategy</td>
<td>PS</td>
<td>105</td>
<td>7</td>
<td>24</td>
<td>16.60</td>
<td>3.66</td>
<td>-1.298</td>
<td>0.19</td>
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<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>8</td>
<td>23</td>
<td>17.31</td>
<td>3.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface learning</td>
<td>PS</td>
<td>105</td>
<td>15</td>
<td>43</td>
<td>29.82</td>
<td>6.49</td>
<td>-1.691</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>13</td>
<td>37</td>
<td>27.72</td>
<td>6.18</td>
<td></td>
<td></td>
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<tr>
<td>Surface motive</td>
<td>PS</td>
<td>105</td>
<td>6</td>
<td>25</td>
<td>14.93</td>
<td>3.95</td>
<td>-2.276</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>6</td>
<td>20</td>
<td>13.58</td>
<td>3.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface strategy</td>
<td>PS</td>
<td>105</td>
<td>7</td>
<td>22</td>
<td>14.89</td>
<td>3.32</td>
<td>-1.181</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>6</td>
<td>21</td>
<td>14.14</td>
<td>3.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-SPQ-2F general</td>
<td>PS</td>
<td>105</td>
<td>40</td>
<td>84</td>
<td>62.51</td>
<td>7.88</td>
<td>0.507**</td>
<td>0.34</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>40</td>
<td>77</td>
<td>61.35</td>
<td>8.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TAI</td>
<td>PS</td>
<td>105</td>
<td>21</td>
<td>46</td>
<td>34.02</td>
<td>5.45</td>
<td>-1.805</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>NS</td>
<td>77</td>
<td>23</td>
<td>56</td>
<td>35.46</td>
<td>5.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PS: Paramedic Students, NS: Nursing Students, * Mann-Whitney U test, ** t-test, p<0.05*
About 62.9% of PS and 49.4% of NS showed low anxiety level. In general, 57.1% of the participants had low, 36.8% medium and 6.1% high anxiety levels. No participant was at serious anxiety level.

As two different groups (PS and NS), deep learning, deep motive and deep strategy and surface learning, surface motive and surface strategy, showed statistically positive and significant relationship with all dimensions and sub-dimensions of study process. Furthermore, there was a significant relationship between surface learning and deep motive. Unfortunately there was a statistically significant relationship between deep learning and sub-dimensions of surface motive. No significant relationship was observed between trait anxiety and learning approach of its sub-dimensions (Table 3).

As the result of regression analysis, deep learning was significantly but negatively affected only by school success level variable ($\beta=-0.168$, $p=0.03$). In addition, there was no statistically significant effect of variables on surface learning and trait anxiety (Table 4).

### Discussion

Research to determine learning approaches has generally focussed on educational science students and occasionally on medical and health science students. Previous studies performed on educational science and medical science students revealed that students frequently choose deep learning (5,20–23). Our study produced similar results as PS and NS prefer deep learning to surface learning profoundly. Deep learning dimension points for NS found in our study (33.62±6.03) and in other Turkish studies (31.30±5.50) seemed to be similar to Nepal (31.36±4.72) and China (33.40±3,40) (1,24–25). Deep learning dimension points of PS however, were found (32.68±6.74) and no comparison was possible as there was no previous study to compare it with.

### Table 3. Correlation between R-SPQ-2F and Trait Anxiety Inventory

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Deep learning</th>
<th>Deep motive</th>
<th>Deep strategy</th>
<th>Surface learning</th>
<th>Surface motive</th>
<th>Surface strategy</th>
<th>R-SPQ-2F General</th>
<th>TAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep learning</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep motive</td>
<td>0.913**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep strategy</td>
<td>0.914**</td>
<td>0.691**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface learning</td>
<td>-0.142</td>
<td>-0.153*</td>
<td>-0.133</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface motive</td>
<td>-0.236**</td>
<td>-0.250**</td>
<td>-0.205**</td>
<td>0.903**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface strategy</td>
<td>-0.048</td>
<td>-0.060</td>
<td>-0.051</td>
<td>0.900**</td>
<td>0.645**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-SPQ-2F General</td>
<td>0.573**</td>
<td>0.513**</td>
<td>0.533**</td>
<td>0.681**</td>
<td>0.538**</td>
<td>0.692**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TAI</td>
<td>0.038</td>
<td>-0.023</td>
<td>0.088</td>
<td>-0.018</td>
<td>-0.009</td>
<td>-0.043</td>
<td>0.052</td>
<td>1</td>
</tr>
</tbody>
</table>

Spearman Correlation Analysis, *p<0.05 and **p<0.01

### Table 4. R-SPQ-2F and Trait Anxiety Inventory scales and multiple regression analysis for socio-demographic characters

<table>
<thead>
<tr>
<th></th>
<th>R-SPQ-2F</th>
<th>TAI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deep learning</td>
<td>Surface learning</td>
</tr>
<tr>
<td>School type</td>
<td>0.121</td>
<td>-0.061</td>
</tr>
<tr>
<td>Body mass index</td>
<td>-0.065</td>
<td>0.088</td>
</tr>
<tr>
<td>Family income level</td>
<td>-0.152</td>
<td>0.031</td>
</tr>
<tr>
<td>Number of siblings</td>
<td>0.109</td>
<td>0.151</td>
</tr>
<tr>
<td>School success level</td>
<td>-0.168*</td>
<td>0.074</td>
</tr>
<tr>
<td>Education level (mother)</td>
<td>0.021</td>
<td>-0.224</td>
</tr>
<tr>
<td>Education level (father)</td>
<td>-0.041</td>
<td>-1.357</td>
</tr>
</tbody>
</table>

| R       | 0.251 | 0.311 | 0.195 |
| R2      | 0.063 | 0.097 | 0.038 |
| F       | 1.672 | 2.666 | 0.977 |
| p       | 0.119 | 0.012 | 0.449 |

*<0.05, $\beta$: standardised regression co-efficient, R2: variance
In addition, PS preferred using more surface motive than NS. Reasons for that could be the 2-year college paramedic course but with a complex curriculum, implementation-oriented classes rather than analytical knowledge, hence PS may prefer surface motive to pass the courses. Shah et al (23) supported that more NS favored surface motive than PS did.

More than half of the students had low anxiety levels and average scores of NS were higher than PS. However, the difference was insignificant. This study also revealed that analysing anxiety via school type also analysed gender and that females had higher anxiety levels than males. This may be due to female bio-psychosocial features that relate to anxiety (10,11,13). In addition, the loss of post-graduation job guarantee due to the demilitarisation of schools might have raised the level of anxiety somewhat. However, very few students were observed to have a high level of anxiety. Currently there is a high level of health personnel employment in the civil public sector, which may have kept the level of anxiety related to employment options low.

In the literature, the relationship between learning approach and academic success, self-efficacy, epistemological belief, motivation and control centres were pointed out (1,25). Apart from these variables, our study particularly expressed a correlation between learning approach and trait anxiety, and no significant relation was identified between these two variables.

Regression analysis revealed that only school success level had an effect on deep learning. Yardimci et al found that school success did not affect deep learning on NS (1). It was also evaluated that school success and passing the exam and getting high scores and a short duration characteristic had an adverse effect on the deep learning.

Limitations

The study plan covered PS and NS in Turkey. However, due to demilitarisation of these schools only the final grade students participated in the research.

Conclusion

This study analysed the relationship between learning approach and trait anxiety for the first time. In addition, it is the first attempt at analysing the learning approach of PS, determining PS and NS in terms of learning approach and trait anxiety variables and examining the very last military PS and NS.

Nursing and paramedic students used deep learning profoundly, however, PS preferred more surface motive than NS. More than half of the students had low anxiety levels. No significant relationship between trait anxiety and learning approach was observed. In addition, school success level highly influenced deep learning in a negative direction. Developing deep learning education systems and creating an environment to reduce anxiety would be beneficial to students. Studies should be undertaken to determine the relationship between learning approach and state anxiety, and further socio-demographic characteristics.

Conflict of interest

The author declares they have no competing interests. The author of this paper has completed the ICMJE conflict of interest statement.

References

14. Vitasari P, Abdul Wahab MN, Othman A, Herawan T, Sinnadurai SK. The relationship between study anxiety and...
References (continued)

Paramedics Australasia International Conference: Abstracts and Poster Presentations
Whitireia paramedics on the road: How have educational choices supported occupational longevity, promotion and retention?

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Introduction
New Zealand professional paramedicine is coming of age. Tertiary paramedic education has been available for almost 20 years, but once students graduate, little is known about subsequent career progression. The Whitireia New Zealand paramedic degree cohort were traced to explore attrition, promotion and longevity within the paramedic workforce.

Methods
All 508 Whitireia Bachelor of Health Science (Paramedic) graduates (2004–2017) were approached to participate by email. A link was provided to an online questionnaire, which comprised 25 forced response questions covering paramedic practice, occupational pathway, attrition and further study. Qualitative narrative data was obtained through free response questions. Descriptive statistics and thematic analysis were used to explore the data.

Result
One hundred and fifty-nine Whitireia paramedic graduates participated in the study, indicating a 31% response rate. Ninety-two percent were currently working in New Zealand, 87% were employed in an ambulance service and 84% worked fulltime. The majority of responders were frontline emergency (68%) or Emergency Care Paramedics (22%). Fifty-five percent held Paramedic Authority to Practice (ATP), 31% Emergency Medical Technician ATP, and 6% held Intensive Care Paramedic ATP. Thematic analysis identified general satisfaction with the New Zealand model of education, but dissatisfaction with career advancement opportunities and resourcing. Further analysis is ongoing.

Conclusion
Preliminary analysis suggests that New Zealand paramedics experience career longevity and limited attrition. Whitireia paramedic graduates remain and practise in New Zealand, disputing the accepted wisdom of graduate enticement overseas.

Pre-hospital provider relevance
New Zealand trained paramedics remain and practise in New Zealand, but dissatisfaction with career advancement opportunities and under-resourcing may prompt attrition. Impending paramedic registration may increase the alternative career opportunities available, therefore in order to promote career longevity, a structured, accessible career pathway should be available to all degree qualified paramedics.
An evolution of the MANERS model as a framework for peer support

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¹Whitireia New Zealand, New Zealand

Introduction
In 2014, Wellington Free Ambulance (WFA) redeveloped their peer support program using the MANERS (Minimise exposure, Acknowledge the event, Normalise the experience, Educate as required, Restore or refer, Self care) model, an evidence-based framework for providing support following a potentially traumatising event (PTE). Peer support based on the MANERS crisis intervention framework hasn’t been evaluated in New Zealand, nor is it clear whether all aspects of the MANERS model provide useful, employable knowledge or skills to those receiving support.

Methods
Wellington Free Ambulance have 15 paramedic volunteer peer supporters who average 11 calls or contacts per month. Fifty percent are initiated by PTEs and 38% by known distress. Participants were asked to complete a brief, anonymous online survey using quantitative and qualitative response format following contact with peer support. Questions explored the usefulness of the service, satisfaction and areas for improvement. Data collections and analysis is ongoing, with interim results presented.

Results
Of the 37 WFA employees contacted by peer support over a 3 month period, 15 completed the evaluation, indicating a 40% response rate. Contact was made within 72 hours of the PTE in 60% of cases, reported by 60% as satisfactory. The majority found peer support helpful (67%), supportive (93%) and valuable (67%), and the supporter courteous (87%) and empathetic (80%). Fifty-four percent indicated that peer support helped understand and normalise their response to a PTE.

Conclusions
Peer support based on the MANERS model is perceived as beneficial by WFA employees contacted following exposure to a PTE. Paramedic mental health must be protected and peer support has been shown to provide help and guidance for those most at risk.

Pre-hospital provider relevance
Peer support provides a cost effective intervention for paramedics exposed to PTEs. The MANERS model has been shown to provide a useful framework for providing a successful peer support program within a busy urban ambulance service.
Exploring paramedic perceptions of incorporating primary healthcare in practice and the development of a tool to assess patient health resilience

Ms Krista Cockrell¹
¹Western Sydney University, Campbelltown, Australia

Introduction
Meeting healthcare needs in rural communities remains a challenge. Many paramedics recognise primary healthcare elements of their practice, however, barriers exist to implementing primary healthcare-based strategies. This study explores paramedics’ perceptions of augmenting their practice, recognising their unique access to patients at home, with the introduction of a tool to measure sense of coherence, general resistance resources, and social determinants of health (SDH) to help guide them in such cases. The aim of this assessment is to assist building patient resilience to improve outcomes in current and future health events using a salutogenic approach.

Methods
A questionnaire was administered to 146 rural paramedics, exploring their perceived knowledge of health disparities in their communities, the impact of SDH, and their roles as frontline care providers. This aimed to establish the feasibility of utilising a salutogenic approach within paramedics’ current scope of practice.

Results
Most participants recognised a need to move toward salutogenic approaches to healthcare. Results found 73.1% of participants would be highly likely to refer patients to services if they recognised a need and were aware of a service that may be able to assist. Results highlighted paramedic perceptions that their unique access to patients provided opportunities for more holistic assessments and improved referral pathways. Some participants expressed concerns around creating additional stress on already overburdened systems.

Conclusions
This project sets the platform for the adoption of a salutogenic approach to paramedicine and explores new avenues for paramedic practice in line with the evolution of the profession.

Pre-hospital provider relevance
Paramedics are regularly faced with patients requiring a primary healthcare approach. Navigating these situations is complex. The addition of assessment tools empowers paramedics. However, before a tool is developed, it is critical to establish how paramedics view the need for the approach and would engage with it practically and culturally.
Paramedic-delivered fibrinolysis in the treatment of STEMI: Comparison of a physician-authorised versus autonomous paramedic approach

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¹St John Ambulance Service, New Zealand
²Auckland University of Technology, New Zealand

Introduction
Timely provision of fibrinolysis in the treatment of ST-elevation myocardial infarction (STEMI) confers the greatest clinical benefit. This rationale underpins paramedic-delivered fibrinolysis in the pre-hospital setting. However, the current New Zealand approach requiring paramedics to gain physician authorisation prior has proved costly and time consuming. This study aimed at trialling a new autonomous paramedic-delivered fibrinolysis model to examine the accuracy of paramedic diagnosis and the impact on time to treatment and patient outcome.

Methods
Over a 24-month period, paramedics identified patients with a clinical presentation and electrocardiogram features consistent with STEMI, and initiated fibrinolysis. These patients were compared to an historic cohort who received fibrinolysis by paramedics but following physician authorisation. The main outcome measures were pain-to-needle (PTN) time and accuracy of paramedic diagnosis. A secondary end-point was mortality at 30 days and 6 months, and hospital length of stay (LOS).

Results
A total of 174 patients received fibrinolysis (mean age of 64 years, SD ± 11.2). Median PTN time was 87 minutes (IQR = 58) for the historic cohort (n = 96), versus 65 minutes (IQR = 31) for the experimental cohort (n = 78), (p = 0.007). Autonomous paramedic diagnosis showed a sensitivity of 96% (95% CI 89 to 99) and specificity of 91% (95% CI 76 to 98). A significant reduction in both 30-day mortality and hospital LOS was observed among the experimental cohort (p = 0.04 and <0.001 respectively).

Conclusion
Pre-hospital fibrinolysis provided on the initiative of paramedics is safe and feasible and can significantly improve time to treatment, resulting in short term mortality benefit and reduced hospital LOS.

Pre-hospital provider relevance
This study serves as a benchmark that invites other ambulance providers to introduce a similar paramedic model of care tailored to their own local setting and adhering to the same standards.
The appropriateness of cases presenting in the emergency department following ambulance service secondary telephone triage

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2Ambulance Victoria, Doncaster, Australia
3Emergency Services Telecommunications Authority, Burwood, Australia

Introduction
An increasing proportion of ambulance service workload involves low-acuity patients that do not require emergency department (ED) care. Secondary telephone triage aims to reduce the low-acuity workload for emergency ambulances and EDs, however, some cases may unnecessarily remain or re-emerge in these emergency care pathways. This study investigated the appropriateness of ED presentations following ambulance-based secondary telephone triage.

Methods
A pragmatic retrospective cohort analysis of the planned and unplanned ED presentations following secondary telephone triage was conducted. Cases triaged between September 2009–June 2012 were linked to ED and hospital admission records (N=44,523). Planned ED presentations were cases referred to the ED following secondary triage, unplanned ED presentations were cases that presented despite being referred to alternative care pathways.

Appropriateness was measured using an ED suitability definition and hospital admission rates. These were compared to mean population data of all of the ED presentations for Victoria (‘average Victorian ED presentation’).

Results
Planned ED presentations were more likely to be ED suitable than unplanned ED presentations (OR 1.62; P<0.001) and the average Victorian ED presentation (OR1.85; P=0.046). They were also more likely to be admitted to the hospital than the unplanned ED presentation (OR 1.5, P<0.001) and the average Victorian ED presentation (OR 2.3, P<0.001).

Conclusion
The cases the secondary telephone triage service referred to the ED were more appropriate for the ED than cases that presented despite being referred to other services, and more appropriate than all of the Victorian ED presentations during the study timeframe (ambulance and non-ambulance presentations).

Pre-hospital provider relevance
To manage increasing demand, some ambulance services internationally have implemented secondary telephone triage services to divert the increasing number of low-acuity cases to care pathways better matching their needs. There is much variation between these services and almost no evidence about the appropriateness of the triage decisions.
Comparison of prone and kneeling intubation in mannequin model with limitation of neck movement, a cross over design

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Introduction
Endotracheal intubation is the lifesaving procedure for airways management in critically injured patients. In the situation of prehospital care, to intubate a patient who is lying on the floor is more difficult, especially in a traumatically injured patient who needs cervical spine restriction. This study aims to compare the optimal position between prone and kneeling intubation in the case where the limitation of neck movement is necessary.

Methods
This was an experimental study conducted in the Faculty of Medicine Ramathibodi Hospital. Paramedic students participated in the intubation of the supine mannequin model to which was applied a cervical hard collar. The participants were assigned by SNOSE to intubate in a prone or kneeling position as the first method, then performed the alternate method 7 days later. Study outcomes included percentage of successful intubation, time to perform intubation successfully and Cormack and Lehane’s classification of laryngeal view.

Results
There were 39 participants (mean age 23.2 years, weight 67.4 kg, height 167.4 cm and 22; 56.41% were male). The number of successful intubations in the kneeling and prone position were measured (35;89.7% and 37;94.9%, P=0.675), time to perform intubation successfully (23.4±3.5.7 and 15.9±10.4, P=0.222) and there was no difference in Cormack and Lehane’s classification of laryngeal view between the two positions (P=0.948).

Conclusion
There was no difference between the prone or kneeling position in treating a patient requiring cervical spine restriction. The prone position may lessen the time required for a patient requiring intubation and this should be considered.

Pre-hospital provider relevance
Pre-hospital providers can perform the successful intubation of a patient in either the prone or kneeling position depending on the scene situation and their own preference. However, when the time factor is critical for trauma patients, the prone position should be considered.
Do training programs improve a paramedic’s ability to identify and report child abuse and neglect?

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Introduction
This systematic literature review seeks to establish the extent to which training programs improve a paramedic’s competence and confidence when it comes to identifying and reporting child abuse or neglect.

Methods
Selected search terms were entered into eight databases to identify potentially relevant publications. Inclusion and exclusion criteria were applied, and articles were categorised as relevant or irrelevant based on a review of title and abstract, and, when necessary, full text review.

Results
The initial electronic search yielded 872 articles. After the inclusion and exclusion criteria applied, four publications were identified as relevant and included in this systematic literature review. Of these, three were cross-sectional studies and one was a one-group pre-test post-test study. In total, 2,499 subjects were examined across the four articles. Despite the limitations of each study, the results for all four studies were consistent with one another, demonstrating that higher levels of training correlated with greater knowledge and/or confidence regarding both the identification process and the correct procedures for reporting child abuse.

Conclusion
The limited evidence published so far suggests that training improves confidence and ability levels of the paramedic in recognising and reporting child abuse. However, the limitations of these studies needs to be considered before drawing robust conclusions. We call for further research into the topic and suggest that, owing to the complexity of the issue, a qualitative study may be the best way of exploring the variety of barriers to reporting, and the extent to which training would overcome these.

Pre-hospital provider relevance
Paramedics are mandated notifiers in almost all Australian states. Additionally, the Australian paramedics professional body expects competency to ‘undertake a comprehensive assessment of the patient, which includes assessment of the psychological, social and cultural determinants of health’, therefore this topic should be included in all paramedic training programs.
Paramedic-witnessed paediatric out-of-hospital cardiac arrest in Victoria, Australia

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Introduction
A proportion of paediatric out-of-hospital cardiac arrest (OHCA) are witnessed by paramedics. In this study, we examine the characteristics and survival rates for paramedic-witnessed paediatric OHCA.

Methods
We included paediatric OHCA that were witnessed by paramedics between 2000 and 2016 in the State of Victoria, Australia, from the Victorian Ambulance Cardiac Arrest Registry. Baseline characteristics and survival outcomes are reported using descriptive statistics and stratified by age groups (infant <1 year, children aged 1–11 years and adolescents aged 12–16 years).

Results
A total of 1,339 paediatric OHCA were attended by Ambulance Victoria, of which 101 (7.54%) were paramedic-witnessed. Of those witnessed by paramedics, 96 (95.05%) received an attempted resuscitation by paramedics. The most common presenting arrest rhythm was pulseless electrical activity (PEA) (62.79%), followed by asystole (33.72%) and shockable rhythms (2.35%). The overall survival to hospital discharge rate was 15.38%. Survival rates were greatest in patients that presented with PEA (19.23%) and Asystole (13.79%). There were no survivors if the initial rhythm was shockable. Survival rates were highest in the 12–16 years age group (18.18%), followed by infants <1yrs (14.29%) and children aged between 1–11 years (11.90%). Survival to hospital discharge between age groups was not significantly different (P=0.705).

Conclusion
Whilst almost 10% of paediatric OHCA are witnessed by paramedics, the incidence of shockable rhythms is very low and most survivors present with PEA.
Management of post-partum haemorrhage in the Timor Leste National Ambulance Service (TLNAS)

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Introduction
Timor Leste has one of the highest maternal death rates in the world at 215 per 100,000 live births. Post-partum haemorrhage (PPH) accounts for 27% of maternal deaths globally. Annually the Timor Leste National Ambulance Service (TLNAS) attends over 20,000 cases, of which 2% are diagnosed with PPH. The objective of this study was to evaluate pre-hospital care of PPH patients transported by the TLNAS.

Methods
A retrospective audit of PPH patients transported by ambulance between May 2015 and May 2017. The inclusion criteria were patients diagnosed with PPH and transported during the study period.

Results
Data from the patient care records (PCR) of 214 TLNAS PPH patients were abstracted using the PPH care evaluation tool. Paramedics diagnosed 211 (97%) PPH patients, took observations on 181 (85%) and obtained a patient history from 193 (90%) patients. Timor Leste National Ambulance Service paramedics did not regularly provide other treatment including oxygen 36 (17%), intravenous isotonic crystalloid fluid 117 (55%), uterine massage 0 (0%), external aortic compression 0 (0%) and non-pneumatic anti shock garments (NASG) 9 (4%).

Conclusion
This research has shown that paramedics are not consistently using available clinical interventions and further work is required to enhance training and the availability of equipment.
Sepsis the silent killer – one that goes unidentified in the pre-hospital setting

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Introduction
Today, sepsis is an expanding commonness in the public eye due to the expansion in chronic health over patient life expectancies. The evaluated overall rate of sepsis, limited to 1979–2015, was 437 for sepsis and 270 for serious sepsis cases per 100,000 person-year.

Methods
PubMed, PMC and Cochrane were sought and information was sourced from within the past 10 years. It’s factually critical and considered pertinent and relevant to paramedic practice, as sepsis goes unidentified. Keywords utilised in the search included sepsis, paramedic management, antibiotics, IV-fluids and pre-hospital administration.

Results
Literature articles demonstrate utilising broad-spectrum antibiotics; intravenous fluid treatment and pre-hospital notification give the most critical interventions. The research proposes a solid relationship between postponed antibiotic treatment bringing in-hospital mortality 1.09 (95% CI, 1.05-1.13). The increase in mortality associated with an hour’s delay in antibiotic administration was 0.3% (95% CI, 0.01-0.6%; P = 0.04) for sepsis and 0.4% (95% CI, 0.1-0.8%; P = 0.02) for severe sepsis. Hospital mortality is lower among patients treated with pre-hospital intravenous cannulation (P <0.01) has seen a reduction in-hospital patient mortality. Subsequently, receiving sufficient introductory fluids reduces mortality (OR =0.46; 95% CI 0.23, 0.88; p<0.001). The time to administer antibiotics and the source of infection are independently associated with mortality (2).

Conclusion
The most beneficial outcomes to patients are the early administration of mediations, being antibiotics and intensive fluid therapy. Early administration of broad-spectrum antibiotics and intravenous fluid therapy decrease in-hospital patient mortality rates, and this is the overall recommendation.

Pre-hospital provider relevance
The early management and identification provided by paramedics can decrease the mortality of patients in the hospital. The early administration of broad-spectrum antibiotics and intravenous fluid therapy provide the most beneficial outcomes to patients and can be easily initiated in the pre-hospital field.
Cleaning the same site with alcohol before performing glucose measurement does not affect the glucose reading

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Introduction
Point-of-care glucometry (POCG) is a diagnostic test performed by paramedics. Standard practice involves cleaning the sample site with alcohol prior to lancing the skin so that any existing foreign surface material will not contaminate the sample. Anecdotally, non-adherence to this practice is common, and guidance regarding the optimal approach is conflicting. This study aimed to determine if a difference in blood glucose level (BGL) reading exists between capillary blood samples taken from sites cleaned with alcohol compared to sites that are not.

Methods
A prospective comparative study was conducted using volunteers who did not clean their hands before participating. A pair of capillary blood samples was taken from each participant: one from a finger cleaned with an alcohol swab and left to dry for 30 seconds before lancing; the other from an uncleaned finger on the same hand. A paired t-test was used to analyse difference, with statistical significance established at p=0.05. A difference of 1 mmol/l was deemed a-priori to constitute clinical significance.

Results
Thirty-six participants were recruited, achieving sample size requirements. There was no difference in mean BGL between samples from fingers cleaned before lancing to samples from an uncleaned fingers (mean 5.64 mmol/l (SD 0.7) compared versus 5.60 mmol/l (SD 0.8); p=0.8). These findings were also not clinically significant.

Conclusion
Alcohol cleansing of the sample site before lancing did not affect blood glucose reading compared to not cleaning. These data suggest concerns regarding false readings secondary to not cleaning a sample site before performing blood glucose measurement may not be well founded.

Pre-hospital provider relevance
Accurate vital signs inform safe and effective decision making in paramedic practice. These data reduce ambiguity in procedural technique regarding BGL measurement and promote evidence-based practice. The risk of infection presented by sampling from an uncleaned finger was beyond the scope of this project.
A pilot study to reduce falls risk, improve independence and decrease emergency admissions of the elderly

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Introduction
Alfred Health and Ambulance Victoria (AV) partnered to pilot a collaborative falls response care model to reduce falls risk, improve independence and decrease emergency admissions (STRIDE).

Methods
The STRIDE pilot ran from 1 August 2017 to 5 March 2018 within the Alfred Health catchment area. Low acuity falls patients aged ≥ 65 years who could be attended in their home were referred to the service. If accepted, a detailed in-home patient and environment assessment was conducted with recommended interventions and community referrals.

Results
One hundred and twenty referrals were made to the STRIDE service with 104 patients consenting to the evaluation. The median age was 83 years and most patients were female (59%). The majority of patients lived in their own home (74.0%), lived alone (59.6%) and had high polypharmacy (73% taking ≥ 4 prescribed medications). Patients experienced a median of two falls (range 1–26) within the previous 12 months. At baseline, most patients had a moderate to high ‘concern’ and ‘risk’ of falling.

Fear of falling improved at 1 month follow-up with a significant increase in patients reporting a low concern of falling. Further, quality of life improved and there was a reduction in problems (EQ-5D) across all dimensions indicating improved health status. Clinicians and referrers perceived STRIDE to be beneficial in meeting a service gap in the community. Patient satisfaction and adherence to the referral, education and treatments provided by the service were high.

Conclusion
Whilst the STRIDE service had a lower number of referrals than anticipated the patients that utilised the service benefited with improved health status and a reduced falls risk. Future consideration could be considered to integrate the service into an existing allied health service model.

Pre-hospital provider relevance
Provide a rapid falls response service to refer and support elderly patients to access the most appropriate care.
Characteristics of emergency ambulance attendances to patients with dementia

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Introduction
The number of people with dementia is steadily increasing and the complexities in managing these patients is well recognised. Emergency medical services (EMS) frequently transport these patients and provide minimal intervention. Furthermore, there is a paucity of literature exploring EMS attendances to dementia patients in the pre-hospital setting. We sought to describe the characteristics of dementia patients presenting to EMS in Victoria, Australia.

Methods
A retrospective observational review was conducted of all dementia patients who were attended by an emergency ambulance between 1 January 2016 and 31 December 2017. Electronic patient care record data were sourced from the Ambulance Victoria data warehouse.

Results
Dementia patients represented almost 5% of the annual emergency workload. The median age of patients was 85 years (IQR 80–90) and most patients were female (57.7%). Almost half of patients (45.2%) were attended in aged care or nursing homes with pain (12.7%) the most common paramedic assessment. Half of those attended (50.5%) received treatment by a paramedic and most patients (85.4%) were transported to hospital. Of all cases, 18.5% of attendances were due to an exacerbation of dementia symptoms of which confusion (45.3%) and psychiatric episode (25.2%) were the most common presentations.

Conclusion
Patients with dementia represent a significant proportion of EMS attendances, with a lack of treatment options and alternative pathways other than transport to the emergency department. Further research is required to help guide pre-hospital triage, treatment and transport decisions.

Pre-hospital provider relevance
To better understand the clinical presentation of dementia patients and assist in providing the most appropriate care and referral pathways.
Self-reported stigma towards people with mental illness: an international, cross-sectional survey of paramedicine students

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Introduction
Stigma towards people with mental illness is common among health professionals, and has been associated with poor patient outcomes. Attempts to de-stigmatise healthcare workers should begin during undergraduate education. The aim of this study was to quantify self-reported stigma levels among an international cohort of first-year paramedicine students.

Methods
A validated survey instrument, the Opening Minds Stigma Scale for Health Care Providers (OMS-HC), was administered to students across four undergraduate paramedicine university programs in Australia, South Africa, Finland and New Zealand. The OMS-HC produces a score from 20–100, with a higher score representing a higher level of stigma. Descriptive data were calculated, and generalised linear models (GLM) with the log link and Poisson family were used to estimate the adjusted odd ratios (OR).

Results
There were 124 respondents, representing a response rate of 56%. The mean self-reported stigma score was 53.1. Finnish students reported the highest total stigma score (61.9), followed by South African (59.5), New Zealand (57.2) and Australian (53.2). Increasing age was associated with increased adjusted odds of reporting higher stigma. Multivariate results revealed students who had no previous diagnosis of mental illness study years (AOR = 0.92, 95%CI: 0.86, 0.98, p = 0.015) were less likely to report higher stigma scores compared to those students with a history of mental illness.

Conclusion
These data provide a baseline for self-reported stigma scores not previously reported for student paramedics. Stigma levels differed significantly across international sites, suggesting cultural factors may influence perception of people suffering mental illness.

Pre-hospital provider relevance
Paramedic education has traditionally focused on technical and clinical components while neglecting behavioural and attitudinal domains. These results constitute new knowledge that indicates a need for specifically designed programs aimed at de-stigmatisation during formative years, and provide important data that can inform design of undergraduate paramedicine curricula.
Ambulance clinicians and involuntary care: What influences their decision making process to implement involuntary care and restraint

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Introduction
Mental illness is among one of the leading causes of disability worldwide and becoming increasingly prevalent in the community. The introduction of the South Australian Mental Health Act 2009 gave authorised officers powers based on a set of criteria to place a patient under involuntary care and the use of physical, mechanical or chemical restraint. This original research explores patient circumstances and characteristics that the South Australian Ambulance Service (SAAS) clinicians identify as important and relevant in their decision to use these powers and if scope of practice, years in the service and education have an influence.

Methods
The study used both qualitative and quantitative methods collected through a survey and audit of SAAS Patient Clinical Records around involuntary care. SPSS was used to provide descriptive statistics using univariate analysis to determine the frequencies of responses and bivariate analysis to identify relationships.

Results
Several factors were identified, which played a role in the clinicians’ decision-making process. Knowledge, violence and/or aggression, willingness to engage, assessment of direct risk to self, others and property as well as the patients’ social and interpersonal factors. There was also a vast difference in the level of detail and documentation between clinicians.

Conclusion
The study successfully identified common features that influences clinicians’ decision-making. There were no statistically significant results to identify that scope of practice, years in service and/or education, influenced clinicians’ decisions. Further research is required to explore these factors in the pre-hospital setting, as there is very limited research in this area currently.

Pre-hospital provider relevance
The research looks directly at what influences ambulance clinicians’ decisions to implement involuntary care and restraint. The prevalence of mental illness is increasing in the community and expanding paramedics’ responsibilities. This research helps to better understand clinicians’ decision-making in this area and therefore how we can improve their care.
Assessing the effectiveness of infection control prevention in an ambulance environment within the Qatar National Ambulance Service

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Introduction
The study aimed to assess the effectiveness of infection control (IC) prevention in an ambulance environment within the Qatar National Ambulance Service (QNAS), by determining contamination levels as a surrogate measure of the effectiveness of the deep-clean process implemented.

Methods
This study employed a quantitative approach using a longitudinal design to investigate contamination levels and the effectiveness of the deep cleaning procedures. Adenosine Triphosphate (ATP) swab tests were used to determine the level of contamination by measuring relative light units (RLUs) on three high-contact surfaces inside ambulances.

Results
Contamination of three selected high-touch ambulances surfaces viz. console touch screen (X̄=1184.93 RLUs, sd + 2123.869), stretcher handle-D-bar (X̄=901.03 RLUs, sd + 1675.039) and ambulance hand rail (X̄=1605.83, sd + 2052.033), showed extremely high RLU readings (>1000RLUs) at 30 days post-deep cleaning within a subset of 30 operational ambulances. After the standard deep cleaning procedure these results were significantly reduced; console touch screen (X̄= 20.17 RLUs, sd + 22.565), stretcher handle-D-bar (X̄= 23.03 RLUs, sd + 25.902) and ambulance hand rail (X̄=24.23, sd + 27.571); signifying effective decontamination with current processes in place.

Conclusion
Standard 30-day deep clean cycles may be insufficient to maintain a safe environment for staff and patients and should be shortened to at least 15 day intervals to maintain contamination levels below 1000 RLUs. Further education and training may be needed to ensure consistency in cleaning practices.

Pre-hospital provider relevance
The findings of this study are relevant to the pre-hospital provider as they suggest that the high contact points in the ambulances need to be deep-cleaned at 15 day intervals at least. Pre-hospital providers and managers thus need to be cognisant of cleaning ambulances on a regular basis to avoid cross contamination.
Responding to unscheduled urgent and emergency healthcare demand in the UK: A trial of collaborative working between paramedics and fire and rescue service employees

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Introduction
In recent years there has been consideration of encouraging a closer working relationship between the blue light services in the United Kingdom (UK) to meet growing demand on already stretched ambulance services. This study set out to answer the following question: What impact, if any, can firefighters have on the delivery of emergency medical response (eg. co-responding) and wider community interventions (eg. dementia awareness) within communities across the UK?

Methods
This paper focuses on the qualitative component of a mixed-methods study. Twenty-six telephone interviews were undertaken with fire and rescue services participating in the trial across the UK. These were audio-recorded, transcribed verbatim and coded thematically looking for emergent similarities/differences.

Results
Key emergent themes include: communication; triage and dispatch systems; involvement in high versus low acuity 999 calls; training and development; relationships with ambulance services; leadership in clinical settings when working with multi-agency resources; financial considerations; clinical governance issues; value to the community; the way forward.

Conclusion
Fire and rescue services co-responding to time-critical events like cardiac arrest can provide meaningful improvements in patient survival, provided staff are trained and are taking the appropriate action; getting on scene first is not enough by itself. The data indicate strongly that there is support from fire service staff to expand wider work including involvement in lower acuity, unplanned urgent care calls, and that there is potential need from members of the public especially those who may be elderly, isolated and/or vulnerable. However, further research is needed to determine any overall benefits.

Pre-hospital provider relevance
There are global challenges in relation to meeting increasing demands on ambulance services and the effective provision of unscheduled, urgent and emergency healthcare. This study is relevant to the paramedic profession as we must find ways of meeting increased demand whilst ensuring delivery of highest quality healthcare.
The ‘rotating’ paramedic: a new model of service provision

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Introduction
Health Education England funded a program of work to develop a clinically effective and sustainable work model to maximise the contribution of paramedics rotating through a variety of settings including: front-line ambulance work, general practice, and emergency operation/dispatch centres.

The overall aim is to assess if establishing a rotational model of work for paramedics (with a single employer) in a variety of clinical settings is feasible and desirable.

Methods
This paper focuses on the qualitative component of a mixed-methods study. Thirty individual interviews involving a variety of healthcare professionals, including paramedics, were audio-recorded, transcribed verbatim and coded thematically looking for emergent similarities/differences.

Results
Key emergent themes include: improved continual professional development for paramedics; increased collaborative, interprofessional working; improved job satisfaction and subsequent paramedic retention; challenges to clinical governance; complexities of funding; demand for flexible models of rotational working according to local healthcare demand.

Conclusion
It was evident that there was an appetite for a rotational model both from paramedics and other healthcare professionals. This study reports improved working relationships with greater interprofessional understanding of paramedics’ capabilities. Length of rotation in each component is not straightforward. Longer rotations, particularly in primary care support learning and relationship building but shorter rotations increase variety and better support shift rota patterns. Paramedics are keen to continue working within ambulance services but also want to utilise extended skills and expertise in alternative settings. Further research is required to examine longitudinal effects on these areas and to assess impact on patient outcome.

Pre-hospital provider relevance
Similar problems are being reported globally. The rotational model has potential to reverse some of the failings of the past where specialist paramedics in United Kingdom ambulance services were not used to their full potential resulting in them leaving the profession and depleting a workforce that is already in short supply.
The effectiveness of freeze dried plasma in haemorrhagic shock: a systematic review and meta-analysis

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Introduction
Traumatic injury is the leading cause of death in individuals under 45 years of age. Uncontrolled haemorrhage accounts for around 40% of these deaths and is the most common preventable cause of death. Recent military and civilian experience has highlighted the lifesaving benefits of plasma in the resuscitation of bleeding trauma patients. Plasma may be an excellent choice of resuscitative fluid but frozen plasma has significant logistical limitations which make pre-hospital availability extremely difficult. Freeze dried (lyophilised) plasma overcomes these limitations but its comparative effects are largely unknown. The aim was to evaluate the efficacy of lyophilised plasma in the management of haemorrhagic shock. Primary outcomes were mortality and haemodynamics (heart rate and mean arterial pressure (MAP)), while secondary outcomes were serum lactate levels and measures of coagulation (international normalised ratio (INR) and thromboelastography (TEG) parameters).

Method
MEDLINE, Embase, Web of Science and the Cochrane Library were searched to 24 June 2016 using relevant search terms. Experimental and observational studies of humans or animals were eligible provided the subjects were suffering haemorrhagic shock and received at least one unit of lyophilised plasma.

Results
Two human case series of 103 patients and eight experimental studies of 245 swine were included in the review. Lyophilised plasma increased mean arterial pressure, reduced coagulopathy (INR) and improved clot strength (maximum amplitude) yet none of these effects were significantly different to other tested blood products.

Conclusion
Conclusion and relevance: Lyophilised plasma is an exciting innovation that shows promise as a resuscitative fluid for haemorrhagic shock. It may provide the same haemodynamic and haemostatic benefits of frozen plasma without the logistical limitations.

Pre-hospital provider relevance
This has far ranging consequences for pre-hospital clinicians who, as a rule, don't have access to blood products. However, the current evidence is not of sufficient quality to prove non-inferiority and further human trials are warranted.
Validity of MTBI score to predict intracranial haemorrhage in mild traumatic brain injury

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Introduction
Mild traumatic brain injury patients will be sent to have a head computed tomography (CT) scan according to the risk of injury. Moderate and high risk traumatic brain injury (TBI) patients will be considered for transmission for a head CT scan. There is a study to establish a MIBI score by gathering risk scores from high risk and moderate risk groups. The objective was to evaluate the mild traumatic brain injury (MTBI) score to assess the accuracy of predicting intracranial haemorrhage in the mild traumatic brain injury patient who was sent to have a CT scan performed.

Methods
Retrospective cross-sectional study. In 10 hospitals, the patients with a mild TBI were sent to have a head CT scan. The aim was to study risk factors and to calculate points for predicting the MIBI score from patient records. By dividing the injured into two groups, the X-rays of the brain were divided into normal and abnormal. After that, the accuracy of MIBI score was investigated in predicting haemorrhage in a patient’s head CT scan.

Results
There were a total numbers of 999 patients, comprising of 461 (46.15%) persons with abnormal brain CT and 538 (53.85%) persons without brain abnormalities. In the low risk group Mild TBI (MIBI score < 3), moderate risk group Mild TBI (MIBI score 3-6) and high risk group (Mild TBI (MIBI score > 6) the likelihood of positive head CT scan was 0.41 3.53 and 77.3 respectively.

Conclusion
MTBI risk score may help to select the mild TBI patients to have a head CT scan especially in a hospital without head CT scan facilities. It is necessary to immediately transfer patients of high risk and moderate risk score of mild TBI to have a head CT scan.
Building relationships with indigenous communities to improve health outcomes - National Marae Out of Hospital Cardiac Arrest Project

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Introduction
St John’s annual Out of Hospital Cardiac Arrest (OHCA) report, shows that Māori are disproportionately represented in cardiac arrest statistics and are 1.2 times more likely to suffer a cardiac arrest. Since 2015, St John has worked to install Automated External Defibrillators (AEDs) on Marae to reduce the number of fatalities associated with cardiac arrests in the community and improve health equity for Māori.

The OHCA report identifies that Māori have a disproportionally higher incidence of OHCA per 100,000 people per year (106.6) compared with non-Māori (less than 90). Encouragingly, when a public defibrillator is used by bystanders before the arrival of emergency services, patient outcomes improve with 44% of these patients surviving. Given the location of many Marae, early access to cardiopulmonary resuscitation (CPR) and defibrillation is key to improving survival rates among Māori.

Methods
The project aims to increase resilience in Māori communities in dealing with cardiac arrest by improving access to first aid training ('3 Steps for Life' program) and defibrillators and increasing confidence to be able to perform CPR if required.

A key component for success was an effective cultural engagement process. The accuracy and appropriateness of the information being disseminated is essential to support Marae to make robust decisions and to build relationships with Marae.

Results
The total number of Marae who now have AEDs is 69 and over 600 whanau members have completed the training with more Marae coming on board.

Pre-hospital provider relevance
Installing AEDs and delivering first training on Marae, ensures that CPR and defibrillation can occur within the recommended first 4 minutes of a cardiac arrest. Ambulance personnel can then administer early advanced care immediately on arrival, giving a greater chance of survival for Māori.
Development and evaluation of a tool to assess health and resilience in a salutogenic model: The Sense of Coherence, Health and Resilience Assessment (SCHARA) Pilot

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Introduction
This study aimed to develop a tool to allow paramedics, with their unique access to patients in their living environments, to examine individual Sense of Coherence (SOC) and resilience. The Sense of Coherence, Health and Resilience Scale (SCHARA) is designed to help guide health planning and appropriate referral pathways. By assessing SOC and resilience, paramedics may determine patients’ capacity to cope with and manage health events as an adjunct to clinical treatment.

Methods
Information was collected from multiple data sources and utilised systematically, with each phase of study building upon the previous. The final phase of development consisted of a pilot study to validate the SCHARA by comparing the results to that of a previously validated tool to measure individual SOC. Both questionnaires were administered to demographically diverse groups to determine whether the scores would vary based on different life circumstances.

Results
Comparing the components of SOC, comprehensibility scores shown 79.17% validity, manageability results shown 91.67% validity and meaningfulness scores were found to have a 91.67% validity when compared to the scores of the SOC-13.

Conclusion
By utilising a multi-factorial approach to determining one’s health status and predicking their capacity for adaptive coping, healthcare providers will better be able to assist patients/clients in overcoming health events and build health resilience for improved future health outcomes. Further research is needed to further develop the SCHARA into an electronic application conducive to the pre-hospital environment to address the issue of access to appropriate care services throughout rural and remote regions.

Pre-hospital provider relevance
The SCHARA represents a practical tool to allow paramedics to quickly and easily assess not only current health resilience in acute events, but patient behaviour in future health events or compliance with referrals. This has significant implications for community wellness and addressing frequent users.
Venous versus capillary blood glucose measurement using a capillary-based glucometer: a prospective experimental study

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Introduction
Point-of-care glucometry (POCG) is a core component of physiological assessment performed by paramedics. Point-of-care glucometry is analysed using hand-held glucometers engineered to analyse samples of capillary origin. Anecdotally, venous blood samples taken from intravenous (IV) catheters are frequently used for analysis instead of samples of capillary origin. It has been hypothesised that these may produce different measurements and lead to flawed treatment. This study aimed to compare blood glucose level (BGL) derived from venous samples with those from capillary blood.

Methods
Data were prospectively collected from healthy volunteers. Each participant provided paired samples, consisting of a venous sample taken from a peripheral IV catheter and a capillary sample taken from a finger-tip. Blood glucose level was measured using a POCG designed to analyse capillary-based blood samples. A paired t-test was used to analyse the difference between samples. Statistical and clinical significance were set at p=0.05 and 1 mmol/l, respectively.

Results
Thirty-six paired samples were collected, meeting sample size requirements. Fifty-three percent of participants were female (19/36), and the mean age was 26 years (SD 8.3). The mean venous BGL was 5.3 mmol/l (SD 0.6), compared to 5.6 mmol/l (SD 0.8) for the capillary samples. This represented a statistically significant difference of 0.3 mmol/l (p=0.04), but did not reach the a-priori established point of clinical significance (1 mmol/l).

Conclusion
This well-powered prospective study suggests venous and capillary blood can be used interchangeably to measure BG when using a point-of-care glucometer designed to measure capillary blood. This finding is useful to paramedics who routinely rely on BGL to help determine physiological status.

Pre-hospital provider relevance
The findings indicate that in situations where a capillary sample is not available, for example a patient with poor peripheral perfusion and slow capillary refill, a venous sample can be used without fear of a misleading measurement, increasing utility of BGL as a measure of physiological status.
Paramedic-initiated helivac to tertiary hospital for primary PCI: A strategy for improving treatment delivery times

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Introduction
Primary percutaneous coronary intervention (PPCI) is well established as the optimal treatment of patients presenting with ST-elevation myocardial infarction (STEMI) in large metropolitan centres. Less clear is the best management of patients presenting in smaller centres without coronary catheterisation laboratory (CCL) facilities. The aim of this study was to trial a new process of paramedic-initiated helivac of STEMI patients from the field directly to the CCL for PPCI, and to examine both the impact on time to treatment and the accuracy of paramedic diagnosis.

Methods
Over a 48-month period, paramedics identified patients with a clinical presentation and electrocardiogram features consistent with STEMI and transported them directly to the regional rescue helicopter base for helivac to the CCL (flight time 30–35 minutes). These patients were compared to a similar historic cohort transported to the local hospital prior to helivac. The main outcome measures were first medical contact-to-balloon (FMCTB) time and accuracy of paramedic diagnosis.

Results
A total of 92 patients underwent helivac for PPCI (mean age of 64 years, SD ± 10.3). Median FMCTB time was 155 minutes (IQR = 27) for the historic cohort (n = 57), versus 102 minutes (IQR = 16) for the experimental cohort (n = 35), (p = <0.001). Paramedic diagnosis showed a sensitivity of 97% (95% CI 85 to 99) and a specificity of 100% (95% CI 84 to 100).

Conclusion
Paramedic-initiated helivac of STEMI patients from the field directly to the CCL for PPCI is safe and feasible and can significantly improve time to treatment.

Pre-hospital provider relevance
The success of this paramedic pathway has now allowed for routine consideration of PCI as a primary reperfusion strategy in a population of 85,000 whose local receiving hospital is without interventional cardiology services and where distance to the nearest CCL precludes road transfer.
The Pulsara smartphone App streamlines communication between paramedics, hospital emergency and other hospital departments: Preliminary results show improved Ambulance Victoria metrics and treatment times

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Introduction
The time-critical conditions of stroke/STEMI require rapid assessment, diagnosis and treatment involving multiple clinicians. However, communication systems between in-field paramedics and hospital clinicians are fragmented, and rely on various methods and repetition of patient information. This fragmented communication may contribute to delayed processes. The aim of this study is to determine if a smartphone communication app can improve clinical care timelines for patients with suspected acute stroke or STEMI.

Methods
Twelve month pre-post historical-control design. The PulsaraTM Stop Stroke/STEMI smartphone/tablet App (Pulsara) was implemented in 25 Ambulance Victoria [AV] branches and two hospitals in regional Victoria, during 2016/2017. Pulsara provides secure, simultaneous, two-way, real-time communication. Eligible patients had suspected acute stroke and STEMI events assessed by paramedics or hospital clinicians; data collection is ongoing. Preliminary results compare Relevant AV response metrics and care timelines if Pulsara was initiated (Pulsara) or not (no Pulsara).

Results
- 266 patients with stroke (no Pulsara/Pulsara: n=81/n=185 - median 75 years, 52%/48% male)
- Faster paramedic hospital-arrival-to-triage - median 2 minute reduction (p=.002; no Pulsara: 5 minutes [IQR: 3-12]; Pulsara 3 minutes [IQR: 2–6])
- Faster arrival-to-patient-off-stretcher - median 5 minute reduction (p=.001;no Pulsara: 17 minutes [IQR: 10-29]; Pulsara 12 minutes [IQR: 7–18])
- Faster paramedic hospital-arrival-to-departure - median 10 minute reduction (p=.01; no Pulsara: 55 minutes [IQR: 43-64]; Pulsara 45 minutes [IQR: 35–55])
- Patients treated within recommended guideline of 60 minutes from 14% to 25%; p=.29
- Results for STEMI (N=64) will also be presented.

Conclusion
Preliminary results show improved AV and hospital metrics and care timelines for patients with suspected stroke/STEMI.

Pre-hospital provider relevance
Preliminary results show the use of a smartphone app can reduce delays to clinical treatment by streamlining communication between paramedics and multiple hospital departments in real-time. The app provides improvements in security and transparency over traditional methods including providing a case summary to paramedics.
Proactive healthcare via electronic referrals - keeping local communities Safe and Well

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Introduction
St John is working with District Health Boards (DHB), primary health organisations and other health providers across New Zealand to develop formalised, local ‘Safe and Well’ referral pathways for low acuity patients. These pathways support St John’s commitment to provide patients with the right care, at the right time, in the right place.

Ambulance personnel have previously felt powerless to address patients’ unmet health needs in the community, and demand for a direct referral process was identified for ambulance patients (and their families and whanau) who are safe to stay at home but require follow up care or support. Examples include falls prevention, needs assessment, smoking cessation, and community clinical review (eg. diabetes, COPD, etc.).

Results
St John designed an electronic referral process that is straightforward for ambulance personnel to use, maximises the capabilities of the electronic patient report form (ePRF), and ensures that patient information is protected when being transferred to the health/service provider. Safe and Well pathways have been well received by ambulance personnel and external stakeholders, as well as the patients who have benefitted from the services they were referred to.

Conclusion
Safe and Well is about proactive and preventative health care that is equitable and closer to home to improve community health and wellbeing. To date, St John ambulance crews have referred over 3,800 patients to local health and social support services via ePRF, and we continue to develop new pathways to meet the needs of local communities.

Pre-hospital provider relevance
Ambulance personnel attend patients at home on an unplanned basis, and although they may recommend that a lower acuity patient see their general practitioner for review, factors such as cost and lack of transport often prevent the patient from complying. Direct referral pathways ensure the patient receives the support they need.
The underpinnings of paramedic identity: a philosophical exploration

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Introduction
As paramedicine increasingly professionalises, this has implications for professional identity, which is at the core of any profession. Many frameworks exist for defining a profession, often based on characteristics of an occupational group. However, deeper than a collection of characteristics is how members of that profession self-conceptualise.

Successive philosophers have discussed being and identity. Understanding identity requires understanding of both the objective world and how the individual perceives and interacts in that world. The existential philosopher Satre considers identity in terms of ‘facticity’ and ‘transcendence’. Facticity are the objective facts around us including environment, language, occupation, etc. Transcendence describes how an individual surpasses these facts of existence and interacts with the world subjectively. Heidegger describes how this is a constant process of self-reference.

Results
Being a paramedic is more than being employed in an occupation. It involves a unique worldview which allows one to view the world in a uniquely paramedic way and go about existing in the world, including providing care, in a uniquely paramedic way. This unique paramedic view underpins paramedic practice through metaparadigm, that is an approach to practice which is unique and individual to how paramedics see their role in healthcare and how they engage with that role.

Conclusion
As paramedicine develops, it will need to form underpinning theories that explain its practice. These are intrinsically linked to theories of identity. While paramedics have traditionally viewed their identity through their occupation or function, identity and being as a paramedic is a much deeper concept.

Pre-hospital provider relevance
As paramedicine develops, the more important it is to understand the profession and its members at a fundamental level. This explains how paramedics engage with elements such as self-regulation, professional values and relationships to patients and the community as well as underpinning culture, role, wellness and the paramedic worldview.
Impact of acute fatigue induced by sustained wakefulness on cognitive performance

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Introduction
Shiftwork can subject paramedics to acute fatigue that has the potential to negatively affect cognitive function and, subsequently, clinical reasoning. Nightshifts result in periods of sustained wakefulness, and represent an environment in which paramedics may be particularly vulnerable. This feasibility study aimed to investigate the impact of a 12-hour simulated nightshift on cognitive performance.

Methods
This prospective experimental study investigated student paramedic volunteers who undertook a prolonged period of sustained wakefulness by completing a 12-hour simulated ‘nightshift’ from 1900 until 0700. At five pre-determined time-points (1900; 2200; 0100; 0400; 0700), participants completed two measures of cognitive performance: a ‘psychovigilence test’ measuring attention and reaction, and the ‘Wisconsin Card Sorting Test’ measuring executive function. Multilevel Poisson regression that adjusts for confounders by time interaction as covariates was used to produce relative risks (RR).

Results
Seventeen participants completed the 12-hour shift. Fifty-three percent were male, with a mean age of 25 years. There were no significant temporal differences across the five time-points for the primary outcome of psychovigilence (adjusted RR 5.73, 5.75, 5.66, 5.67, and 5.7 for 1900, 2200, 0100, 0400 and 0700, respectively), or for the secondary outcome of executive function (adjusted RR 2.31, 2.36, 2.24, 2.10 and 2.40).

Conclusion
In this exploratory study, cognitive performance did not demonstrate a significant change across the duration of the nightshift. These results provide important data that increase understanding of the impacts of acute fatigue on cognitive performance, and how this may affect paramedic reasoning and cognition in a shift-based clinical environment.

Pre-hospital provider relevance
Little evidence exists from prospective research describing the impact of acute fatigue in the context of paramedicine. These results are counter-intuitive to what might be expected, and should serve to stimulate discussion and further research exploring cognitive performance during nightshifts. The findings may challenge perceptions held by frontline paramedics.
Paramedic learning and reflections: a pilot project using simulation to evaluate student interdisciplinary handover

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Introduction
Loss of information during multiple interdisciplinary handovers is a recognised phenomenon. This project sought to measure handover accuracy and compare this to student perception of handover effectiveness.

Methods
A mixed method crossover design was used to evaluate handovers in multidisciplinary teams of student paramedics, nurses and doctors. Recorded scenarios (video) were inbound: paramedic to nurse; nurse to doctor; doctor to consultant and outbound: doctor to nurse, nurse to paramedic and paramedic to senior paramedic. Each handover video was scored for accuracy of information transfer. Students provided reflective responses on personal handover effectiveness and perceived data points transferred.

Results
Of 18 handovers (nine inbound, nine outbound) inbound handover accuracy was: paramedics 80%, nurses 64%, doctors 50% and outbound accuracy: paramedics 63%, nurse 60%, doctors 61%. Categorisation of handover aspects showed that ‘additional background’ and ‘response to treatment’ was poorly conveyed. Conversely, demographics, clinical impression and treatment were most transferred. Handover accuracy was better in paramedics to nurse than doctors to nurse (p<0.05). Students’ perceptions between clinical data handover (13.83±19.6) and non-clinical (-36.5±26.04) were significantly different P<0.05. Student perceptions of effective handovers indicated written notes, systematic approach and clarification can improve handover accuracy.

Conclusion
There is a significant amount of critical patient information being lost during subsequent handovers (more than one). This includes a discrepancy between perceived and actual information transferred. A concerted effort needs to be made to improve student handover knowledge, understanding and skill.

Pre-hospital provider relevance
Handovers are the ‘gold standard’ for the delivery of patient information from the pre-hospital to hospital environment. If critical patient information is being lost between these two environments, patients are at risk. Enhanced education is required to ensure students have proficient knowledge and skills in handovers.