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Resuscitation decision-making in out-of-hospital cardiac arrest

A mixed methods exploration of ambulance personnel experiences, preparation and support

Natalie Elizabeth Anderson

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in Nursing, the University of Auckland, 2020.
Abstract

**Background:** Emergency ambulance personnel are highly trained to maximise patient survival from out-of-hospital cardiac arrest. However, resuscitation efforts will only revive the patient if provided without delay and in the context of a reversible cause of cardiac arrest. Researchers have repeatedly examined predictors of survival from cardiac arrest, and ambulance personnel in many countries are authorised to cease or withhold resuscitation efforts following validated termination of resuscitation rules and guidelines. Research suggests significant variation in resuscitation decisions, and attribute some of this inconsistency to the decision makers. However, few researchers have addressed the experiences of ambulance personnel making these decisions.

**Aim:** To describe the experiences of ambulance personnel tasked with decisions to commence, continue, withhold or terminate resuscitation and explore how they are prepared and supported to make and enact these decisions.

**Methods:** A mixed methods exploratory sequential research design consisting of interviews with ambulance personnel (Study One), then focus groups with ambulance educators and peer supporters (Study Two), and finally an online survey of graduating paramedic students (Study Three). Research was underpinned by a Naturalistic Decision Making theoretical lens and a critical realist worldview.

**Findings:** Certainty of a poor prognosis was necessary but not sufficient to enact a decision to withhold or terminate resuscitation. Ambulance personnel also needed significant self-efficacy, skills and experience to manage the subsequent scene of a patient death. Critical non-technical skills include sensitive and supportive communication with crew, bystanders and family, delivering death notification and providing post-mortem care. Attention to these skills is scant in existing formal ambulance personnel education. Ambulance personnel are primarily dependent on clinical exposure and life experience to develop confidence in this area. The Anderson Model of Ambulance Resuscitation Decision-making presents the integrated findings of this research project.

**Conclusions:** Resuscitation decision-making can be challenging, even for experienced ambulance personnel. Opportunities to rehearse difficult conversations could improve ambulance personnel non-technical skills and self-efficacy. Some novice ambulance personnel – including paramedic graduates - have had little or no exposure to resuscitation decision-making or patient death. Therefore, mentoring, senior on-scene or phone backup and personalised post-event peer support are critical to professional development and emotional coping.
Acknowledgements

Special thanks to my supervisors, Professor Merryn Gott and Dr Julia Slark. This journey has taught me so much about research, writing and the peer review process. Undertaking a PhD can be a lonely journey and at times I felt like a tiny ship lost in an enormous, hostile ocean, but your guidance and support kept me afloat and sailing in the right direction!

I gratefully acknowledge the funding I received through a University of Auckland Doctoral Scholarship.

This research features the perspectives of emergency ambulance personnel and paramedic students. Heartfelt thanks to all participants for your generous and enthusiastic contributions. Thanks also to St John New Zealand and all the St John staff who helped to ensure my studies were possible through assistance with logistics, piloting and recruitment. In particular, thanks to Professor Bridget Dicker, Kathryn Steel, Douglas Gallagher and Haydn Drake who all freely-offered their expertise, experiences, practical support, words of encouragement and constructive critique. Thanks too, to Dr Kate Faasse and Dr David Anderson – valued friends and mentors who have shown unwavering belief in me and interest in my research.

Throughout my PhD, I have worked part-time in the acute clinical setting, and I’m proud to continue to be a part of the Auckland Emergency Department team. I appreciated colleagues who showed an interest in my research and regularly asked ‘are you finished with the PhD, yet?’

Completing a PhD with publication has presented unique challenges and rewards. I must acknowledge the peer reviewers and journal editors who provided valuable feedback and helped me to improve the quality of all papers included in this thesis. Thanks also to the diverse international audience who engaged with my research ideas in response to conference presentations, blog posts, podcasts and Twitter. Your thoughts, expertise, questions, encouragement, critique, confirmation and contrasting perspectives have helped me to write a better thesis.

My parents have encouraged and supported me through my many years of university education, paving the way to opportunities, without ever letting me take them for granted. Thanks to Frances Anderson (Mum) for your proof-reading, interest and pride in my work and provision of a greatly-appreciated new espresso machine when mine stopped working just months from thesis submission. Thanks to John Anderson (Dad) for welcome rural respite and unconditionally backing me, when I have faced challenges along the way.

Finally, thanks to my husband, Shane. You have been a superb friend and ally who inspired me to grasp opportunities and live without fear of uncertainty. You made sure I still ate, slept, travelled and took time away from my thesis, throughout this long and demanding project. As a ‘morning person,’ I wrote this thesis on a diet of perfectly poached breakfast eggs, freshly baked bread and lovingly-crafted flat whites. We have overcome many challenges and continued to live life to the fullest throughout these precious years together. I cannot thank you enough.
Research outputs

Publications


Anderson NE, Slark J, Gott M. How are ambulance personnel prepared and supported to withhold or terminate resuscitation and manage patient death in the field? A scoping review. Australas J Paramedicine [Internet]. 2019;16. Available from: https://doi.org/10.33151/ajp.16.697


Presentations

When saving lives is your business: Preparing paramedics for situations where resuscitation is unsuccessful, unwarranted or unwanted. Oral presentation at the 6th Public Health Palliative Care International Conference, 2019 Sydney (AU).


So, you want to save lives…but what if resuscitation is unsuccessful, unwarranted or unwanted? Keynote presentation at the New Zealand Student Paramedic Conference, 2019 Auckland (NZ).

Withholding or terminating resuscitation in the prehospital context: A focus group study exploring paramedic preparation and support for resuscitation decision-making and patient death. Oral presentation at the 16th International Conference for Emergency Nurses, 2018 Melbourne (AU).

When to start and when to stop: NZ ambulance personnel’s experiences of resuscitation decision-making. Oral presentation at the 27th Annual College of Emergency Nurses New Zealand Conference, 2018 Napier (NZ).


Beyond prognostication: An exploratory study of ambulance officers’ resuscitation decision-making. Poster presentation at the Australian Resuscitation Council Spark of Life Conference, 2017 Adelaide (NZ) Joint winner: Best conference poster - See Appendix 1

Commence, continue, withhold or terminate? Seeking a resuscitation-provider perspective on the decisions made in out-of-hospital cardiac arrest. Doctoral provisional year presentation, Faculty of Medical and Health Sciences, 2017 Auckland (NZ).
Media & Education


Paramedic Resuscitation Decision-Making [Two-hour session, now integrated into PARA707 · Intermediate Life Support paper] Auckland University of Technology 2018 & 2019 with further sessions planned for 2020

Paramedic resuscitation decision-making. [Ambulance personnel education session] St John Ambulance Kerikeri Division 12/11/19

What if resuscitation is unsuccessful, unwanted or unwarranted? [Ambulance personnel and community volunteer education session] St John Community Volunteer Auckland Central Division 18/11/19
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Glossary of terms

**Ambulance Personnel**: A collective term used throughout this thesis to describe specialised clinical staff who work on emergency ambulances. It excludes doctors but can include paramedics, emergency medical technicians, ambulance nurses, first responders, ambulance officers and other emergency services personnel. Nomenclature was a contentious issue throughout the research and publication process, but this term was most acceptable and easily understood, both internationally and within New Zealand.

**Aotearoa**: Māori name for New Zealand, which translates to “Land of the long white cloud.”

**Cardiac arrest**: Cardiac arrest occurs when the heart is not pumping blood around the body (a loss of cardiac mechanical activity and systemic circulation). For data-collection purposes, St John New Zealand defines a cardiac arrest as “a patient who is unconscious and pulseless with either agonal breathing or no breathing” [1]

**Extracorporeal membrane oxygenation**: Procedure which involves cannulation of major blood vessels, pumping blood out of the body for oxygenation, then returning it to the circulatory system. ECPR describes the use of ECMO in patients who have suffered cardiac arrest, effectively providing extracorporeal cardiopulmonary resuscitation.

**Emergency medical services**: Term commonly used in some countries, including the USA, to collectively describe emergency personnel in a variety of roles.

**Emergency medical technician**: This term used to describe emergency ambulance personnel with entry-level training in several countries, including the USA and New Zealand. In New Zealand, Emergency Medical Technician is also a specific level of emergency ambulance practice which requires 1-2 years of specialised training.

**Intensive care paramedic**: Experienced advanced paramedics in New Zealand who have demonstrated significant skills and knowledge, in addition to a degree in Paramedicine.

**Māori**: Indigenous New Zealander(s)

**Marae**: A collective term for all of the facilities associated with a traditional Māori meeting area, including the courtyard and meeting house (wharenui).

**Out-of-hospital cardiac arrest**: Cardiac arrest, which has occurred outside the hospital environment, e.g. at a workplace, shopping mall, gym, private home or residential facility.

**Paramedic**: Specialised clinical emergency ambulance personnel with training and authority to practice which varies, internationally. In New Zealand, Paramedic is also a specific level of emergency ambulance practice which requires a degree in Paramedicine or equivalent.
**Primary cardiac arrest**: Cardiac arrest caused by a problem with the heart, e.g. myocardial infarction (heart attack) or primary arrhythmia (electrical problem with the heart).

**Resuscitation decision-making**: Used within this thesis to specifically describe decisions to commence, continue, withhold or terminate resuscitation.

**Return of spontaneous circulation**: Clinical assessment which suggests re-establishment of cardiac output and spontaneous circulation, e.g. palpable pulse, measurable blood pressure, signs of life.

**Secondary cardiac arrest**: Cardiac arrest caused by a problem outside the heart, e.g. drowning, choking, severe injury or poisoning.

**Tūpāpaku**: Body of the deceased

**Whānau**: Family, extended family unit

**Wharenui**: Traditional Māori meeting house, typically a large building which can accommodate visitors overnight
Abbreviations

AED Automated external defibrillator
AF Atrial fibrillation
CPR Cardiopulmonary resuscitation
ECPR Extracorporeal membrane oxygenation as cardiopulmonary resuscitation
ECMO Extracorporeal membrane oxygenation
EMS Emergency medical services
EMT Emergency medical technician
FR First responder
JS Julia Slark
ICP Intensive care paramedic
ILCOR International Liaison Committee on Resuscitation
IPA Interpretative Phenomenological Analysis
MDT Mobile digital terminal
MG Merryn Gott
NDM Naturalistic Decision Making
NA Natalie Anderson
OHCA Out-of-hospital cardiac arrest
P Paramedic
RDM Resuscitation decision-making
ROSC Return of spontaneous circulation
Co-authorship forms
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Commence, continue, withhold or terminate? A systematic review of resuscitation provider decision-making in out-of-hospital cardiac arrest [Included in Chapter 3]

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Unlocking intuition and expertise: using interpretative phenomenological analysis to explore clinical decision making (Included in Chapter 4)

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Given areas: New Zealand ambulance personnel’s experiences of challenging resuscitation decision-making [Included in Chapter 5]

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## CO-AUTHORS

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## Certification by Co-Authors

The undersigned hereby certify that:
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- that the candidate wrote all or the majority of the text.

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Chapter 1 Thesis introduction

Exemplar

It is early in our shift when the ambulance radio rings out across the emergency department. We
listen-in to our first R40 of the day – a brief, structured radio communication from an ambulance crew.
They are en route with a patient in crisis, allowing us time to assemble resources and ready for their
arrival. The paramedic sounds tense, and the wailing ambulance siren provides an urgent soundtrack:
“En route to you with a 42-year-old male, post-cardiac-arrest. ROSC obtained on the scene after 15
minutes of CPR, intubation and adrenaline. Now GCS 3, BP 80-over-palp, HR 140, ETA 10 minutes.”

Our resuscitation team assembles, we assign roles and discuss priorities, begin to draw up
medications and have equipment on standby. We know that few patients survive out-of-hospital
cardiac arrest, but this is a relatively young man making a reversible, primary cardiac cause more
likely. We are primed and ready for action when the ambulance crew roll into the resuscitation room.

We quickly but carefully transfer the patient from the ambulance stretcher to our resuscitation bed.
The intubated patient is unconscious, pale, cold and tiny – perhaps only 40kg. He is naked, apart from
an adult incontinence pad. His muscles are atrophied, his protruding spine curved, and he is lying in a
strange foetal position. The cap for a feeding tube protrudes from his thin, translucent abdominal wall.
With the patient safely transferred, we pause, to hear the handover. The man has Huntington’s
Disease – an inherited progressive neurological disease with no cure, which results in severe
disability and ultimately, death. Recently admitted to hospital, his discharge summary states that he is
at the end of his life and family will be supported to care for him at home, with help from the local
hospice. The hospice nurse was scheduled to make their first home visit later today. This morning, a
family member had found the patient making strange noises, as though choking. Distraught, they had
called the ambulance. On ambulance arrival, the patient was in cardiac arrest, and the newly-qualified
senior paramedic had gained intravenous access, intubated, given drugs and ultimately regained a
pulse.

Our experienced emergency department team quickly recognise that communication, comfort and
compassion are priorities, and further aggressive intervention is unlikely to be life-saving. The family
arrive and a senior doctor takes them away to discuss the situation. Soon afterwards, the young man
is made comfortable, we remove his breathing tube, and he dies almost immediately, with family at
his bedside.

Afterwards, the emergency team discuss this case, and we wonder: Why did the ambulance crew
attempt resuscitation on this patient who was dying at the end of a profoundly debilitating disease
process?
Chapter introduction

For the last six years of my life, I’ve been undertaking research exploring ambulance personnel experiences of resuscitation decision-making. This introductory chapter explains why I chose to explore this topic, my research aims and why it is a vital area for research. This thesis includes seven published papers, woven together to tell the story of my research journey. Numbered referencing styles were required for six of the seven published papers included in this thesis [2]. A single consistent version of these numbered referencing systems, based on the Vancouver style, is used throughout this thesis. This chapter concludes with an overview of my thesis structure, to act as a road-map for the reader.

Resuscitation decision-making in out-of-hospital cardiac arrest

Cardiac arrest occurs when the heart is no longer able to pump blood around the body. Prompt initiation of cardiopulmonary resuscitation and defibrillation are essential links in an evidence-based cardiac arrest Chain of Survival that will give some people a chance to live, again [3, 4]. Reported survival from out-of-hospital cardiac arrest (OHCA) is variable, but the majority of those who cardiac arrest in the community will not be successfully resuscitated [5-7]. Recognising that resuscitation may be unsuccessful, unwanted or inappropriate, many ambulance personnel are authorised to withhold or terminate resuscitation. Once enacted, this decision effectively transitions a scene characterised by hope and valiant, demonstrative efforts to restore life, to one of hopelessness, grief and defeat. During resuscitation, there is a patient, a person, to be saved. From a biomedical perspective, once resuscitation efforts cease, the clinical status of the lifeless patient changes - to a corpse.

This thesis describes research exploring emergency ambulance personnel perspectives on resuscitation decision-making for out-of-hospital cardiac arrest patients. As demonstrated through a critical review of existing literature featured in Chapter 3, very little is known about the process of OHCA decision-making, with few studies seeking to explore the perspectives of those making these critical decisions. This thesis research has implications for clinical educators, policy-makers and future researchers working to better support ambulance personnel, where decision-making is most challenging. Awareness of the key factors informing resuscitation decision-making can improve communication between emergency care providers, as they better prioritise gathering and handover of information. Understanding the needs of ambulance personnel tasked with enacting these complex and demanding decisions is vital to improving confidence, competence and coping. Where resuscitation is unsuccessful, unwanted or unwarranted, preparation and support of ambulance personnel could facilitate sensitive care of family members and bystanders at the scene of patient death.
Research aim

The overall aim of this research was:

To describe the experiences of ambulance personnel tasked with decisions to commence, continue, withhold or terminate resuscitation and explore how they are prepared and supported to make and enact these decisions.

Locating the researcher

My first degree was a Bachelor of Arts in Psychology and Management. Although underwhelmed by my high school education, I was captivated by my university experience, loving the critical exploration of philosophy, logic, human cognition and behaviour. During this time, I worked in a rest home as a health care assistant and also worked for St John in a variety of voluntary and paid roles, including providing first aid at mass gatherings, working as a volunteer ambulance officer and developing and delivering clinical education. Over the course of my BA, my interests shifted, from organisational psychology to health psychology. I subsequently completed a Bachelor of Health Sciences in nursing and began my acute-care nursing career, in emergency departments and intensive care units. A few years later, I completed a Master of Science in health psychology, with a thesis exploring nurses’ first experiences with patient death [8, 9]. My dual academic background and experience as a clinical nurse and educator all inform my interest in the way health professionals manage clinically, cognitively, emotionally and ethically demanding situations.

My earliest experiences providing resuscitation occurred when I was in my late teens, working as a community and ambulance volunteer for St John. Subsequently, I have participated in hundreds of resuscitation attempts, in varied roles and contexts. I have taught resuscitation to members of the public, ambulance personnel, students, nurses and doctors. I have been in countless decision-making discussions with families and clinicians during and after out-of-hospital cardiac arrest. I have worked within fabulous teams and celebrated great successes and miraculous survival. At times, I have also struggled to make sense of tragic, frustrating and ethically-challenging situations.

Resuscitation has a magical quality - snatching life from the jaws of death. News media are quick to herald the successes of CPR [10], and resuscitation efforts depicted in TV dramas appear well-choreographed, efficient, decisive and effective [11, 12]. Often, the outcome is immediately apparent – the patient gasps into life, the body, mind and soul of the individual promptly and wholly restored [13, 14].

After two decades working as a nurse in critical care, emergency and pre-hospital settings, it is my own experience that resuscitation attempts can be noisy, untidy, uncertain and uncomfortable. Clothing is torn or cut, exposing the unnaturally pale and limp arrested patient and unpleasant sounds, sights and smells flood the senses of those present. Resuscitation team members sometimes miscommunicate, disagree, struggle with equipment, space or light, feel doubt, fatigue and distress
and make mistakes. If family members are present, they may stand back in bewildered, horrified silence, whimper, wail, shriek, implore or even become obstructive, threatening or violent.

With experience teaching and providing resuscitation in a range of clinical contexts, I realised that decisions to start, continue or stop resuscitation could be demanding, contextually-specific and have a lasting impact on healthcare providers, patients and families. Once I identified the need for research exploring ambulance personnel perspectives on out-of-hospital resuscitation decision-making, this research project began to take shape.

**Thesis overview**

In this initial Chapter 1, I have introduced myself as a researcher and my thesis topic. I’ve highlighted the importance and overall aims of this research and mapped the structure of this thesis.

In Chapter 2, I provide contextual background for this research by introducing the phenomenon of out-of-hospital cardiac arrest and highlighting incidence, interventions and outcomes. I discuss the introduction of emergency ambulance termination of resuscitation protocols and the unique features and international variations in resuscitation decision-making. I highlight the diverse, dynamic nature of emergency ambulance services around the world and describe the New Zealand emergency ambulance setting of my research.

Chapter 3 presents an integrative systematic review paper entitled Commence, continue, withhold or terminate? A systematic review of resuscitation provider decision-making in out-of-hospital cardiac arrest [15], published in the *European Journal of Emergency Medicine*. This review synthesises the limited existing research into resuscitation providers’ perspectives on resuscitation decision-making for out-of-hospital cardiac arrest patients. Having identified a clear gap in the international literature, I then outline my overall research question, interrogating ambulance personnel’s experiences of resuscitation decision-making.

There can be many ways to ask and to answer any research question, and in Chapter 4 I outline the worldview, theoretical lens and methodological approach informing my chosen research design. This chapter finishes with a methodological discussion paper entitled Unlocking intuition and expertise: using Interpretative Phenomenological Analysis to explore clinical decision-making [16], published in the *Journal of Research in Nursing*. It reviews ways of theorising and researching clinical decision-making and examines the utility of Interpretative Phenomenological Analysis, as a methodology which is well-suited to this task.

Chapter 5 includes two published papers outlining results from Study One, a qualitative interview-based study underpinned by Interpretative Phenomenological Analysis. The first paper focuses on how ambulance personnel make decisions, is entitled Beyond prognostication: Ambulance personnel’s lived experiences of cardiac arrest decision-making [17] and is published in the *Emergency Medicine Journal*. The second paper characterises demands and uncertainty, is entitled...
Grey areas: New Zealand ambulance personnel’s experiences of challenging resuscitation decision-making [18] and is published in the *International Emergency Nursing*.

Consistent with my chosen emergent mixed methods research design, findings from Study One of my research raised new questions and areas for investigation within resuscitation decision-making. In Chapter 6 I present a scoping review of the literature, undertaken in response to Study One findings. The resulting paper, entitled *How are ambulance personnel prepared and supported to withhold or terminate resuscitation and manage patient death in the field? A scoping review* [19], is published in the *Australian Journal of Paramedicine*.

The findings of Study Two – a focus group undertaken as the second phase of my research - are presented in Chapter 7. Senior ambulance personnel in clinical (education) support and peer (pastoral) support roles shared their expertise around preparation and support in this area. The paper is entitled *When resuscitation doesn’t work: A qualitative study examining ambulance personnel preparation and support for termination of resuscitation and patient death* [20] and is published in *International Emergency Nursing*.

Chapter 8 describes a pilot-survey of paramedic students undertaken as the third and final study in this research project. The paper is entitled *Paramedic student confidence, concerns, learning and experience with resuscitation decision-making and patient death: A pilot survey* [21] and is published in *Australasian Emergency Care*.

In Chapter 9 I present my integrated findings in the Anderson Model of Ambulance Resuscitation Decision-making which highlights key processes, preparation and support. I reflect on the strengths and limitations of my thesis, the implications of my findings for practice, policy and future research, and state my overall conclusions.
Chapter 2 Resuscitation decision-making by ambulance personnel

“Although marvellous and reliable in some ways, the heart is the dumbest organ in the body – after all, it keeps going in many people who might be better off dead and stops in good people in the prime of their lives. It’s an essential without which we are no more and, unlike our eyes and our kidneys, we have only one. There is no backup, no seagull engine for when the main motor fails, not even a set of oars. Because the health of our one and only heart is so imperative to our existence, modern society has made a massive investment to know everything there is to know about this essential bit of kit.” Galler, 2016, p. 6 [22].

Chapter introduction

In this chapter, I provide relevant historical and contextual background for this thesis. Initially, I briefly outline the historical development of effective resuscitation techniques, culminating in the widespread adoption of cardiopulmonary resuscitation (CPR) – a method which remains central to resuscitation today. I provide an overview of relevant issues impacting out-of-hospital resuscitation decision-making, including associated clinical and ethical challenges.

I undertook the three studies described in this thesis with New Zealand emergency ambulance personnel and paramedic students. There are significant historical and international variations in emergency ambulance services, including personnel training and scope. To provide contextual background, the next part of this chapter describes relevant features of the contemporary New Zealand emergency ambulance context. The final part of this chapter highlights the emergence of paramedicine as a distinct profession.

A brief history of resuscitation

There are subtle differences in the way the term cardiac arrest is defined and understood, but the clinical reality is less nuanced. When cardiac arrest occurs, the heart fails to perform its vital function – that of pumping blood effectively around the body. An immediate loss of consciousness follows, and without prompt and appropriate intervention, the failure of the body’s circulatory pump will rapidly cascade into a system-wide catastrophe and irreversible death. Cardiac arrest is (eventually) a feature of every death, but it is not always the primary cause of death. As noted by New Zealand Intensivist Dr David Galler in the opening quote of this chapter, the heart is sometimes the last organ to fail.

It is only within the last 100 years that we have discovered effective ways to revive patients from cardiac arrest, although resuscitation efforts date back to ancient times. As the deceased appeared to
be sleeping and unusually cold, attempts were made to wake (with screaming, crying or whipping) or warm (with ashes, hot water or burning animal dung) the deceased [23]. Over more recent centuries bold, determined and creative resuscitation techniques included tickling of the throat with a feather, lying the body of the patient over a trotting horse and blowing tobacco smoke into intimate orifices [24]. The inefficacy of such attempts meant that, for most of history, cardiac arrest has been synonymous with death.

Over time, knowledge of the body's anatomical and physiological function and dysfunction has improved. In the nineteenth century, organised efforts to save drowning victims led to experimentation with pulmonary resuscitation, although it took more than 50 years to develop effective techniques of mechanical ventilation [23]. It was in the early 1900s, with a growing understanding of the electrophysiological underpinning of the heart's function, that scientists first experimented with external electric shock defibrillation, initially on animals [25] and then humans [26]. It became apparent that the chances of successful defibrillation diminished as the duration of cardiac arrest increased, and in the 1960s a group of scientists concluded closed chest massage was a viable alternative to thoracotomy and direct cardiac massage [27, 28]. This technique could be performed outside the operating theatre and required no special equipment. With a growing body of evidence for its effectiveness in combination with artificial ventilation, cardiopulmonary resuscitation (CPR) was quickly adopted in hospitals and then, where cardiac arrests occurred most frequently - out of the hospital environment, in homes, workplaces and other community settings [29].

**Out-of-hospital cardiac arrest resuscitation**

Today the immediate and uninterrupted application of CPR remains a crucial link in the Chain of Survival in out-of-hospital cardiac arrest (OHCA) [30, 31]. The Chain of Survival is a widely-adopted metaphor used to visualise the essential components (chain-links) for survival from cardiac arrest. For the OHCA patient, every minute that passes without intervention worsens outcomes, while rapid initiation of bystander CPR is associated with improved patient outcomes [32]. Significant resources are now invested globally in public education and awareness campaigns to improve recognition of OHCA, rates of bystander CPR [33] and public access defibrillation [34, 35]. Emergency ambulance personnel attend regular simulation training working to achieve perfectly-synchronised, quality CPR with minimal interruption – known as ‘high performance’ or ‘pit-crew’ CPR [36, 37]. As demonstrated by Figure 2.1, there is significant research and clinical emphasis on the ambulance and hospital care of OHCA patients, but the initial links – often provided by families and bystanders - have a more significant bearing on survival.
The International Liaison Committee on Resuscitation (ILCOR) regularly evaluates the evidence for best practice in resuscitation and publishes consensus statements with treatment recommendations, including specific guidelines for OHCA [38]. An increasing number of OHCA registries use a standardised so-called ‘Utstein’ template [39] for data collection, facilitating historical and international comparisons of OHCA incidence, interventions and patient outcomes [40, 41]. Although there is some evidence of modest improvements over the past decade [42] and reported survival rates vary by region and country, aggregate studies continue to place OHCA 30-day survival rates below 10% [5].

The latest attempts to improve survival include the use of mobile digital devices to alert trained members of the public to nearby cardiac arrests and the location of AEDs [43, 44]. Advanced treatment protocols in larger centres include the use of mechanical CPR devices and extracorporeal membrane oxygenation (ECPR) for select patients experiencing refractory OHCA, although further high-quality evidence of efficacy is needed [45-47].
When to start and when to stop: Resuscitation decision-making in out-of-hospital cardiac arrest

The first principle of CPR is the patient must be salvable... The physician should concentrate on resuscitating patients who were in good health preceding the arrest, and who are likely to resume a normal existence Jude et.al., 1965, p.4 [48].

Even as the first studies showed CPR and defibrillation could effectively resuscitate patients from a state of cardiac arrest, the authors of these early papers – as quoted above - acknowledged this was a treatment which may not be appropriate for all patients. Ultimately, CPR can ‘buy time’ to identify and treat reversible causes of cardiac arrest. If provided too late or in cases of irreversible dying, it will not lead to a recovery of the patient, and it is rarely a definitive treatment, in itself. As Lundevall noted, ‘to determine if, and when, resuscitative effort should be applied is not only a question of medical knowledge and technique but also of medical ethics’ [49, p.358]. In early resuscitation trials, a return of spontaneous circulation (ROSC) was an extraordinary achievement for resuscitation science. Today, all OHCA patients who arrive at hospital with a pulse are reported as ‘survived event’, and resuscitation researchers continue to report and compare rates of ROSC [39, 50]. This century, however, more patient-centred measures of resuscitation success are being reported, including survival to discharge home, quality of life and other cognitive, psychological and functional measures of survivorship [51-54].

Decisions to start, continue or terminate resuscitation efforts

International resuscitation consensus guidelines generally state that health professionals should commence resuscitation efforts whenever they encounter OHCA. The American Heart Association Ethical Guidelines consider the only acceptable reasons for withholding CPR to be threats to rescuer safety, evidence of mortal injury or irreversible death or legally documented patient wishes [55]. As a point of difference, the European Resuscitation Council ethical guidelines [56] suggest it may also be appropriate to consider patient values and preferences, and/or evidence of medical futility. Guidance for resuscitation decision-making in New Zealand’s current Clinical Procedures and Guidelines for ambulance personnel [57] aligns closely with the European Resuscitation Council ethical guidelines, and is detailed in later sections of this chapter.

Historically, ambulance personnel commenced resuscitation and transported almost all cardiac arrested patients to a hospital, so physicians could decide whether to continue or terminate resuscitation efforts. Near-universal attempted resuscitation and transport of all OHCA patients continues in a few countries [58, 59]. However, transportation to hospital with ongoing effective CPR in the absence of a return of spontaneous circulation (ROSC) is logistically challenging, risky, costly, resource-intensive and associated with inferior patient outcomes [60-66]. Many ambulance services have responded to this evidence by implementing rules or guidelines for terminating resuscitation in the field [67-69].
Although a great deal of research has been published validating termination of resuscitation criteria [e.g. 67, 70-74], the exact nature of these criteria varies between nations, regions and organisations. Ambulance personnel using decision rules can only terminate resuscitation in situations where all criteria are clearly met [67]. In some ambulance services, physicians must be consulted online, via phone, or even attend the scene before termination of resuscitation [64, 67]. In New Zealand, ambulance personnel can enact decisions to withhold or terminate resuscitation using clinical discretion whilst working within clinical guidelines [57]. Although New Zealand ambulance personnel have access to further clinical support, they are not required to consult before terminating resuscitation.

Research indicates that field termination of resuscitation is generally well-accepted by family members [75, 76] but ambulance personnel comfort and compliance with termination of resuscitation rules vary [77-80]. In challenging cases – notably paediatric patients [81], ambulance personnel may not be willing to terminate resuscitation in the field. Clinical criteria for transport to a hospital with ongoing CPR can include refractory shockable rhythm, ambulance personnel-witnessed collapse and intermittent ROSC [71, 82]. As additional considerations, in centres where it is available, select patients may meet criteria for ECPR or could be potential organ donors [47, 83].

“Harry has been down too long. We try reviving him but he doesn’t respond. I’m hardly surprised. We rip a man’s shirt off, jump on his chest, snap off some ribs, stick tubes down his throat, and for what in the end? All this action to have him stay dead, as most of them do. The whole song and dance, when survival’s out of reach, insults a dignified life” Gilmour, 2019, p.71 [84].

Cardiac arrest is not a homogenous event, and the cause and timing of collapse will have a significant impact on reversibility. For the past few decades, researchers have sought reliable predictors of medical futility, to inform guidelines for withholding or terminating CPR in the field [e.g. 82, 85, 86]. However, decisions to commence, continue, withhold or terminate resuscitation remain ethically, clinically and medico-legally complex [87]. Some researchers have expressed concern that termination rules may not be specific enough [88-90]. Although clinical evidence for accurate out-of-hospital cardiac arrest prognostication is strengthening, numerous societal and cultural factors also impact on the concept of futility [70, 91, 92]. Establishing an acceptable threshold for medical futility is a contentious issue and remains a sticking-point for consensus guidelines [93-95]. Accordingly, researchers have noted significant variation in ambulance protocols for withholding and terminating resuscitation [6, 58, 96].

Patient autonomy is a highly-valued ethical principle and legislated right in healthcare, but CPR is one of the very few medical interventions where consent is assumed [97, 98]. As the cardiac arrested patient is rendered unable to communicate, it can be difficult for ambulance personnel to determine their wishes. Family or bystanders may not have discussed this, and in some countries, ambulance personnel will not act on verbalised wishes via next of kin [99]. There is increasing awareness of the importance of documented patient wishes, particularly in the context of advanced age or terminal
diagnosis [100]. The form of these documents and associated ethical and medicolegal issues vary between regions and countries [101-103]. Even where patient wishes have been discussed and documented, these may not always be available to ambulance personnel, up-to-date, legally-binding or applicable to the specific event [99, 104].

**Emergency ambulance personnel and the developing profession of paramedicine**

Historically, ambulance services in New Zealand and around the world provided protocol-driven emergency first response and conveyance to hospital. The primary role of the ambulance service was to keep the injured or acutely unwell patient alive and expedite their transport to a hospital for definitive treatment [105]. Today’s emergency ambulance personnel are providing urgent care to an aging and increasingly comorbid population. Emergency ambulance crews face myriad diverse challenges from managing life-threatening injuries [106], to carefully assisting frail older patients back into bed [107]. Care provided can include risk assessment for those experiencing mental health crises, health education for anxious new parents or chronic disease symptom management [108-110]. In stark contrast to the ‘scoop and run’ approach of days old, today’s highly-trained paramedics can refer to other health services or provide definitive assessment and treatment at the scene [111].

There is significant heterogeneity in the organisation of emergency ambulance services, roles, education and associated terminology [112, 113]. Two primary models of emergency ambulance care provision exist - the physician-led Franco-German model which dispatches doctors to emergency scenes [114, 115] and the Anglo-American paramedic-led model where ambulance personnel are deployed [116, 117]. Within these broad service models, there is wide variation in all aspects of ambulance service provision including processes of dispatch, response vehicles used and the titles, training and scope of ambulance personnel [118-120].

In countries where emergency ambulance services are paramedic-led - notably New Zealand, Australia [121], the UK [122] and Canada [123] - the knowledge and skills of ambulance personnel have expanded significantly with the evolution of the paramedic role. A growing percentage of the Australasian emergency ambulance workforce have completed paramedicine degrees [124, 125]. Paramedics are making decisions in varied contexts where patients may have complex medical, social or mental health needs. They may choose to assess, treat and then leave patients at home or facilitate access to primary and community health care services, rather than transporting patients to hospital [126-128]. Specialised clinical, academic and research roles are continuously redefining the boundaries of paramedicine [123, 129-131]. Paramedics around the world are working towards professionalisation [132, 133] with paramedic registration established in the UK and Australia and New Zealand paramedics due to be self-regulated, registered health professionals from 2020 [134].
The context of Aotearoa, New Zealand

Original research described in this thesis took place in Aotearoa (New Zealand) between 2015-2018. In contrast to the laboratory setting, ambulance personnel decision-making occurs in uncontrolled, dynamic and varying contexts. It’s essential, therefore, to provide adequate contextual information about the setting of this research, particularly the nature of ambulance services and OHCA in New Zealand.

New Zealand is a topographically and demographically diverse island nation in the South Pacific with a growing population, expected to reach 5 million early in 2020 [135]. Around 86% of New Zealanders reside in urban areas, but the overall population density is low, and remaining residents live in rural and remote areas [136]. According to 2018 Census data [137], around 73% of people resident in New Zealand were born in New Zealand. The remaining 27% were born overseas – predominantly arriving from England, China, India, South Africa, Australia and the Philippines. The major broad ethnic groups New Zealanders identify with are European (70.2%) Māori (16.5%), Asian (15.1%) and Pacific (8.1%)[135].

Whilst most New Zealanders self-report they enjoy good health, national rates of obesity, physical inactivity and hazardous drinking are relatively high [138]. Māori and Pacific New Zealanders have relatively high rates of morbidity and early death associated with lower socioeconomic status, poor-quality housing and other social determinants of health [139, 140]. Around 5% of New Zealanders have been diagnosed with heart disease, and cardiovascular disease is a leading cause of death [141]. Every 90 minutes a New Zealander dies from heart disease, and many of these deaths are considered premature and preventable [142].

Māori: The indigenous people of Aotearoa New Zealand

Māori are the indigenous inhabitants of Aotearoa New Zealand who arrived from Polynesia around 1300AD [143]. Surrounded by vast Pacific Ocean waters, European explorers did not arrive in New Zealand until 1642. European settlement began in the late 1700s, leading to significant conflict around trade, land ownership, rights and sovereignty [143]. In February 1840, the Treaty of Waitangi was signed by representatives of the British Crown and select Māori leaders [144]. Following the declaration of British sovereignty, New Zealand’s population of mostly-European settlers began to swell, whilst the Māori population declined [143]. New Zealand had clear historical and legal obligations to uphold the rights, culture and wellbeing of Māori but colonisation has had an adverse effect in all of these areas [144]. Today, Māori are subject to racial discrimination and deprivation and have inequitable access to healthcare and education, lower life expectancy and higher rates of morbidity and mortality [145, 146].

Māori have a higher incidence of out-of-hospital cardiac arrest, arrest at a younger age and have lower rates of survival to thirty-days than non-Māori [147]. Māori are also under-represented across all
New Zealand health professions, including the emergency ambulance workforce [148]. Current targeted initiatives to address OHCA inequities include a national Marae OHCA project to improve access to defibrillators and support training in CPR [149, 150]. Significant improvements in wellbeing for Māori require new approaches which address systemic inequities [151]. As stated in the recently-published New Zealand Health Research Prioritisation Framework [152]: ‘Health research in New Zealand has the opportunity to advance Māori by upholding and valuing Māori rights, worldviews and knowledge, tikanga Māori (Māori processes and protocol), and by addressing inequity.’ Evidence of responsiveness to Māori within the research presented in this thesis is provided in dedicated sections of Chapter 4 and Chapter 9.

**Emergency ambulance services in New Zealand**

St John provides Emergency Ambulance Services across 97% of New Zealand’s geographical area, with the remaining area serviced by Wellington Free Ambulance [153]. Ambulance services are funded by a complex mix of government and community contracts, Accident Compensation Commission funding, private part-charges and charitable donations and bequests [154, 155].

St John emergency ambulance personnel consist of First Responders (who have advanced first aid training), Emergency Medical Technicians (who have undertaken Diploma-level training), Paramedics (who have typically completed a degree in paramedicine) and Intensive Care Paramedics (who usually hold post-graduate qualifications) [153]. Ambulances are staffed by both paid and volunteer staff, with greater dependence on volunteers in rural and remote areas [156]. Historically, single-crewed ambulances commonly responded to emergencies in rural and remote areas [155]. However, single crewing reduced ambulance personnel to drivers, raised occupational safety concerns and has been associated with poorer patient outcomes [157]. Accordingly, there is a national project currently underway which has significantly reduced single-crewing and aims to have all emergency ambulances double-crewed by 2021.

When emergency services are required, members of the public in New Zealand dial 111. If the call-taker suspects a patient is in cardiac arrest, they will activate a two-tiered response. First, they dispatch the closest available emergency responder to the scene. Initial response providers may be emergency ambulance personnel or co-responders, including New Zealand Fire and Emergency, Primary Response in Medical Emergencies (PRIME) doctors and nurses, Patient Transfer Service staff or even registered GoodSam community responders. An Intensive Care Paramedic or Paramedic - qualified to deliver advanced life support will also be dispatched, providing the second response tier [153].

All ambulance personnel in New Zealand work within nationally-agreed Clinical Procedures and Guidelines which are developed and regularly updated by the National Ambulance Sector Clinical Working Group. New Zealand ambulance Emergency Medical Technicians, Paramedics and Intensive Care Paramedics can elect to withhold or terminate resuscitation efforts under these guidelines [57]. These guidelines provide three acceptable reasons for not starting resuscitation -
Signs of rigor mortis or post mortem lividity
A clear advance directive not to receive resuscitation for cardiac arrest
Scenarios where resuscitation is futile or clearly not in the best interest of the patient
Guidance for termination of resuscitation decisions calls for consideration of time elapsed and
assessment of a poor or good patient prognosis (with longer resuscitation duration indicated in good
prognosis scenarios). Paramedics and Intensive Care Paramedics are authorised to terminate
resuscitation at any time, if they assess that commencing resuscitation was inappropriate or when the
patient’s rhythm has deteriorated into asystole for more than a few minutes, in spite of resuscitation
efforts.

This guidance to consider the best interests of the patient and make contextually-specific prognostic
judgements contrasts from unequivocal termination of resuscitation decision rules adopted by many
ambulance services [67, 158]. It allows New Zealand ambulance personnel to use their knowledge of
prognostic factors and understanding of the unique context of each cardiac arrest, to make a decision
to start, stop or continue resuscitation efforts.

Out-of-hospital cardiac arrest (OHCA) in New Zealand
St John has a cardiac arrest registry and publishes an annual report highlighting OHCA incidence,
response and outcomes. Cardiac arrest registry report data show an increase in the number of
OHCAs attended by St John each year, with around 4500 cardiac arrests attended in the year 2017-
2018 [1]. In this most recent reported year, 97% of reported OHCAs were adults (aged 16 or over)
and 69% were male. In-keeping with high rates of ischaemic heart disease [139] those identified as
Māori had the highest standardised incidence of OHCA, followed by Pacific Peoples. Ambulance
personnel attempted resuscitation (provided CPR, supervised CPR or provided defibrillation) in 44%
of adult cardiac arrests and 68% of child cardiac arrests [1]. Where resuscitation was attempted by
ambulance personnel, 13% of adult patients survived for at least another 30 days. Where
resuscitation-attempted events occurred in urban areas, there was a median ambulance response
time of six minutes, compared to a median response time of nine minutes to rural and remote areas
[1]. Providing a rapid emergency ambulance response is made challenging by New Zealand’s
mountainous geography and geographically dispersed population. A recently published study
suggests 16% of New Zealanders lack timely access to emergency ambulance services and
advanced-level hospital care, due to rural and remote location [136].

Medico-legal considerations
New Zealand is a unique setting to explore resuscitation decision-making as it has a no-fault
compensation system, so patients and families cannot sue New Zealand resuscitation providers for
damages. Health professionals can be subject to disciplinary action for negligent, unethical or
unprofessional practice, but under New Zealand law, resuscitation providers demonstrating good
medical practice and acting in (what they believe to be) the patient’s best interests are generally
providing a lawful excuse for the provision, termination or withholding of CPR [159]. Few New Zealanders have documented advance care plans [160] and research suggests paramedics rarely encounter these and lack confidence interpreting them [161].

Chapter summary

Out-of-hospital cardiac arrest (OHCA) is a major global cause of mortality and without prompt recognition and early intervention, OHCA will always be fatal. Even with attempted resuscitation by ambulance personnel, relatively few patients have a return of spontaneous circulation, and even fewer survive to discharge from hospital. Over recent decades, ambulance services have implemented validated decision rules and evidence-based guidelines, authorising ambulance personnel to terminate or even withhold resuscitation where resuscitation is likely to be futile, unsuccessful or unwanted. The nature of – and compliance with - these protocols varies between countries, regions and organisations. The lack of consistency and consensus arises through complex legal, ethical, emotional, clinical and cognitive challenges associated with resuscitation decision-making after OHCA. As paramedicine establishes itself as an essential, highly-skilled and specialised health profession, it is an exciting and dynamic time to be researching emergency ambulance personnel in New Zealand. Chapter 2 has provided an overview of the setting of my research project. The following Chapter 3 provides a systematic, integrative synthesis of the existing research literature exploring resuscitation provider-perspectives on decision-making in out-of-hospital cardiac arrest.
Chapter 3 A systematic review of resuscitation decision-making in out-of-hospital cardiac arrest

“Managing the multiple decisions associated with resuscitation is challenging from many perspectives, and no more so than when healthcare providers are dealing with the ethics surrounding decisions to provide or withhold emergency cardiovascular care. This is especially true with the increasing availability of technologies that hold the promise of improved outcomes after cardiac arrest.” Mancini, 2015, p.S390 [55]

Chapter introduction

This chapter provides a systematic integrative review of published research papers. Included papers addressed the research question: **Which factors - as identified by resuscitation providers - inform their decisions to commence, continue, withhold or terminate cardiopulmonary resuscitation efforts for out-of-hospital cardiac arrest patients?** A systematic integrative review method was used to identify, evaluate and synthesise data arising from heterogenous study designs [162, 163].

This review reveals how little is known about resuscitation decision-making for out-of-hospital cardiac arrest (OHCA) patients, from the perspective of decision-makers. It identifies the strengths and limitations of the research approaches previously used to explore resuscitation decision-making and identifies a clear gap in the international literature. This review informed the subsequent formulation of my overall research aim and objectives for this research project, which are outlined at the conclusion of this chapter.

This paper is reproduced here in its entirety with permission of the European Journal of Emergency Medicine, which had a 2017 Journal Impact Factor of 1.729 and was ranked 10th of all emergency medicine journals [164]. The paper has also received significant online attention, placing it in the top 12% of all research outputs scored by Altmetric [165]. According to Google Scholar Citations as at January 2020, this paper had been cited 14 times [166].

The full paper citation is:

PUBLISHED PAPER Commence, continue, withhold or terminate? A systematic review of decision-making in out-of-hospital cardiac arrest

Introduction

Every year thousands of individuals have an Out-of-hospital Cardiac Arrest (OHCA) [167]. For some, cardiac arrest may be anticipated; the inevitable conclusion of a progressive illness. For others cardiac arrest may come as a sudden, unexpected and potentially catastrophic event interrupting their everyday lives [168].

Survival from cardiac arrest is dependent on prompt recognition of the emergency and initiation of the Chain of Survival [4] and recognising the potential to save many lives, the international resuscitation community continues to work hard to strengthen all links of the chain. Although incremental gains have been made [32, 169] and reported incidence and survival rates vary internationally and inter-regionally [32, 40] OHCA survival remains very low – with aggregated studies reporting fewer than 8% of patients survive to discharge [167, 170]. In reality, for the vast majority of cardiac arrest patients the event heralds their imminent death [171].

For decades, researchers have attempted to validate criteria for withholding and/or terminating resuscitation [85, 172, 173]. However, even where termination of resuscitation protocols have been implemented, research evidence indicates that there is limited compliance with these protocols [79, 174, 175]. The latest international resuscitation consensus statements remain cautious about intra-arrest prognostication [38, 56] and the American Heart Association recommends withholding of CPR only where an advance directive is legally documented, death is clearly irreversible or the resuscitation provider safety is threatened [55]. Compounding the clinical and ethical challenges of establishing medical futility [94] prehospital resuscitation providers may find themselves in situations where very little verifiable patient information is available [56].

Out-of-hospital cardiac arrests are potentially distressing emergency events which may be witnessed by friends or family or other members of the public. In the vast majority of cases efforts to resuscitate the patient will fail. Resuscitation providers must contend with significant clinical and ethical challenges when deciding to commence, continue, withhold or terminate cardiopulmonary resuscitation (CPR). Greater understanding of factors informing these decisions has the potential to facilitate on-scene assessment, improve handover between health professionals and assist in preparation and support of those tasked with such decisions.
Objectives

The purpose of this review was to synthesise international research addressing the following research question: *Which factors - as identified by resuscitation providers - inform their decisions to commence, continue, withhold or terminate cardiopulmonary resuscitation efforts for out-of-hospital cardiac arrest patients?*

In this systematic review, the term resuscitation provider is used to collectively describe those professionally tasked with initiating, withholding, continuing or terminating resuscitation.

Methods

An integrative systematic review typology was chosen to answer the review question. As scoping searches revealed relatively few relevant studies this inclusive approach enabled synthesis of diverse data from different study designs into a systematic knowledge base [163]. An integrative systematic review establishes what is known and what remains unknown, as well as identifying where uncertainty lies and thereby informing future research [176].

Careful development of an effective search strategy was required as capture of qualitative studies can be particularly challenging when conducting a mixed-method review [177, 178]. Search strategy piloting and review of optimised pre-hospital search filters [179] revealed variation in relevant MeSH terms and keywords both internationally and historically. Accordingly, a large number of synonyms and wildcards were used for each key concept (see Table 3.1: Search terms). In September 2015, Medline, the Cumulative Index to Nursing and Allied Health Literature (CINAHL Plus) and Science Direct databases were searched, from earliest records. Manual searches of key articles’ reference lists, and cited reference searches through Scopus, were undertaken. Resuscitation, the Journal of the European Resuscitation Council was hand-searched from first edition (1972).

Table 3.1: Search terms

<table>
<thead>
<tr>
<th>Resuscitation provider</th>
<th>Resuscitation provider; Allied health personnel; Paramedic*; Ambulance*; Health professional; Physician; Emergency Med*; EMT; First aid; Military medicine; First responder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision-making</td>
<td>Decision*; Withholding Treatment; Medical Futility; Ethics, Medical; Resuscitation Orders; terminat*/attempt*/contin*/start/stop ADJ (proximity operator) resus*</td>
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<tr>
<td>Cardiopulmonary resuscitation</td>
<td>Cardiopulmonary Resuscitation; CPR; Resus*; Basic life support; BLS; Advanced cardiac life support; ACLS</td>
</tr>
<tr>
<td>Out-of-hospital cardiac arrest</td>
<td>Heart arrest; Out-of-hospital; Cardiac arrest; Cardiorespiratory arrest; Sudden death; Prehospital</td>
</tr>
</tbody>
</table>

BLS, basic life support; CPR, cardiopulmonary resuscitation; EMT, Emergency Medical Technician
**Inclusion criteria**

1. All English language research papers which sought resuscitation providers’ perspectives on decision-making for adult (>18 years) OHCA patients, with no restrictions on methodology, country or time of publication
2. Participants: Providers professionally tasked with initiating, withholding, continuing or terminating Basic Life Support or Advanced Life Support
3. Interventions: Descriptive studies of out-of-hospital resuscitation decision-making, implementation trials
4. Outcome measures: Decision-making factors, importance of these factors
5. Study design: All study designs

**Exclusion criteria**

1. Non-empirical articles, including policy statements and opinion pieces
2. Papers which related specifically to advance care planning, paediatric cardiac arrest or in-hospital cardiac arrest
3. Unpublished manuscripts, conference abstracts and posters
4. Foreign language papers with no translation

*Figure 3.2: Study selection flow diagram*
Quality Assessment

Most valid and reliable critical appraisal tools have been designed to assess specific, experimental methods [180]. However, studies included in this review were typically descriptive: exploring a process rather than evaluating an intervention. The use of critical appraisal tools in integrative reviews has been debated [181, 182], but a transparent, methodical assessment of study quality is a preferred feature of the systematic review process [183]. A validated, widely used critical appraisal tool designed to assess studies from diverse paradigms was adopted to assess methodological quality of studies included in this review [184]. Two further assessments were made: the relevance of each study’s method to the review question (methodological relevance) and the relevance of each study’s focus to the review question (topic relevance). Assessment of methodological and topic relevance was independently conducted by NA and MG and where any inter-rater disagreement occurred, this was resolved by JS. The contribution that each study made to answer the research question was then determined by the combined, overall Weighting of Evidence score [185, 186]. No study data were excluded based on quality assessment alone.

Data Extraction and Thematic Synthesis

In order to extract all relevant data, each study was interrogated with the review question. Numerical, categorical and narrative data addressing the review question were then extracted. Where provided, contextual information such as response rates and author interpretations were noted. The characteristics and quality assessment of each study were also tabulated: a summary of this information is provided in Table 3.2: Included studies

Thematic synthesis is a method which facilitates identification of shared concepts across divergent studies and is well-suited to informing hypotheses for future research [187]. Thematic headings are used to summarise ideas which occur repeatedly or prominently [188]. Concepts can be seen as related to one another even if data from diverse research designs are being synthesised [189, 190].

In this systematic review all data describing factors informing decision-making were arranged in an Excel spreadsheet with each decision-making factor on a separate row. In a second column, codes were assigned to each data point. In a third column, codes were grouped in clusters. This process was iterative, with frequent return to individual studies to re-examine findings for convergence and divergence. Codes were initially grouped into eight themes, but with further analysis these groups were reduced and renamed providing the final five descriptive themes.

Results

As shown in Figure 3.1, 14 studies met the inclusion criteria for this review: nine quantitative studies [175, 191-198] four qualitative studies [199-202] and one mixed methods study [203].
<table>
<thead>
<tr>
<th>Reference &amp; aims</th>
<th>Study design, setting, sample</th>
<th>Quality appraisal</th>
<th>Relevant findings</th>
<th>Themes</th>
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<tr>
<td>Chipman Adelman &amp; Sexton, 1981 [191]</td>
<td>Quantitative: Questionnaire collecting demographic data &amp; using hypothetical case studies to test seven criteria for ceasing CPR, derived from the literature: lack of success after 30 mins of ACLS; 10min ‘down time’; no success after 10 min of asystole; acute traumatic brain death; cardiac arrest secondary to hemorrhage; age of patient &amp; prognosis/functional status of patient. Responses also used to calculate indices of tendency to cease CPR for each respondent. Circa. 1979 Oregon, USA 78 physicians practicing emergency medicine in Oregon. Questionnaire handed out during selected business meetings, where emergency physicians were in attendance.</td>
<td>High Weight of Evidence (Medium Methodological Quality, High Methodological Relevance, High Topic Relevance) Convenience sampling of physicians practicing emergency medicine, within Portland &amp; surrounding areas. Response rate not reported. Limited sample demographics described. Proposed criteria for cessation of CPR taken from review of (limited) outcome data available in that time period. Allowed for cease, continue or ‘cease, only if…’ responses, allowing communication of additional factors deemed salient by respondents, although limited reporting of this data. Comparable scenarios used to check for internal validity.</td>
<td>Results indicated there was significant variability in criteria used for cessation of CPR. Criteria for cessation of CPR: 1. Unsuccessful after 30 minutes of ACLS 29% with profound acidosis 25% with severe hypoxia 40% with hypothermia 0% 2. Time before CPR commenced - 10 minutes 44% 5 minutes 5% 3. Unsuccessful after 10 minutes of ACLS patient with asystole 13% patient with ventricular fibrillation 3% 4. Arrest due to traumatic brain death 44% 5. Arrest due to hemorrhage 16% 6. Age 65 or older 4% 75 or older 9% 7. Functional status/prognosis nursing home 18% mental impairment 54% Terminal disease, as per (source unspecified) 87% Source= medical record 81% Source = patient's physician 97% Source = spouse 65% Source = EMT 18% ANOVA found significant correlations between ‘tendency to cease CPR’ indices &amp; some demographic factors. Information regarding the patient is important, but so was the source of that information.</td>
<td>The arrest event Resuscitation provider perspective Patient characteristics</td>
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<td>Reference &amp; aims</td>
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| Brown, Jones, & Glucksman, 1996 [192] | Quantitative: Survey given to convenience sample of inducting UK SHOs, ‘randomly selected’ medical registrars & A&E consultants from one UK hospital. Questionnaire gave 20 factors & asked which were important in the decision to continue resuscitation from OHCA. Circa 1995 UK 132 A&E SHOs, 10 medical registrars & 31 A&E consultants. Repeated measures achieved with SHOs six weeks (73 participants) & six months (55 participants). | Medium Weight of Evidence (Medium Methodological Quality, Medium Methodological Relevance, High Topic Relevance) Limited description of derivation of 20 factors which form questionnaire. Limited response options (Important / Not important / Unsure). Unclear how repeated-measures data were analysed. Limited reporting of descriptive statistics; responses for some factors not reported, results grouped & presented comparatively, some apparent assumption about interpretation, & re-wording of factors. | Several factors associated with prognostic significance identified as important by participants, but considerable variation in perceived importance of other decision-making factors. Factors deemed important by 90% of respondents: CPR started immediately after arrest; Short interval between arrest, ambulance response & arrival in A&E; Rhythm on arrival at hospital; Presence of pulse &/or respiratory effort Factors deemed important by 70-89% of respondents: Age of patient; History of previous cardiac illness; Knowledge of other chronic illness; Defibrillation performed by ambulance crew; Rhythm on arrival of ambulance crew Factors yielding mixed responses: Fixed dilated pupils; Any obvious trauma; Advice of nursing staff/ambulance crew to continue resuscitation; Advice of nursing staff/ambulance crew not to continue resuscitation Factors most commonly deemed unimportant: Body shape; Unkempt appearance; Presence of relatives; IV access established by ambulance crew with or without drugs administered | The arrest event
Patient characteristics
The resuscitation scene
Resuscitation provider perspective |
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<th>Reference &amp; aims</th>
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<th>Relevant findings</th>
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<td>Naess, Steen, &amp; Steen (1997) [199]</td>
<td>Qualitative: Semi-structured, in-depth interviews conducted after each of 70 OHCA cases 1992-1993 Oslo, Norway 9 doctors &amp; 35 paramedics, working within a single EMS system, who attended a total of 70 OHCA cases</td>
<td>High Weight of Evidence (Medium Methodological Quality, High Methodological Relevance, High Topic Relevance) Participants questioned after real OHCA cases, about these cases, to minimise socially desirable responses &amp; maximise validity. Interview guide shows structured approach with prompts for numerous pre-determined factors, but also including open-ended questions, allowing for additional salient points to emerge. Limited description of data analysis. Response ‘counts’ reported, descriptive statistics &amp; analysis of variance used.</td>
<td>Of 70 OHCA cases: 21 CPR not attempted, 28 CPR TOR in field, 15 ROSC in field, 6 transported to hospital with CPR. Identified ‘similar &amp; limited’ criteria, used by both doctors &amp; paramedics, for treatment decisions. Criteria are grouped under thematic headings. The patient perspective. Prognostic criteria: Ventricular fibrillation registered on ECG; Gasps or small movements; Contracted pupils or normal skin colour; = 100% continue/commence CPR Age (not sufficient criterion for cessation); Time intervals (‘If I don’t start CPR, time will run out &amp; I can never make up for the time I have lost’); Cardiac arrest witnessed by the ambulance personnel; Bystander CPR (‘It’s a way of saying thank you for starting’). Ethical criteria: ‘The patient’s right to live or right to die (death with dignity, avoiding medico-technical dying); Age The bystander perspective. Expectations from bystanders (Bystander CPR); Forced to start CPR by bystanders the MD/paramedic perspective EMS-system reputation (for paramedics, not physicians); Burden of responsibility (‘We’re working in a ‘grey zone’ all the time. The relatives say: how can you decide not to start CPR when you are only paramedics?’); Experiences from previous cases (‘Once…I was in doubt whether to start CPR or not. I started &amp; the patient walked out of the hospital three days later. So, if I am in doubt I always start’); Need for practice: The community perspective Social status of the patient (potential, unacceptable, source of bias); Attempted suicide; Ongoing CPR during transport</td>
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<td>The resuscitation scene</td>
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<td>Medico-legal concerns</td>
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| **Mohr, Bahr, Schmid, Panzer & Kettler (1997)** [193]  
‘To determine when resuscitative efforts are usually terminated & which factors are considered important in the decision to abandon CPR attempts in the prehospital setting.’ | Quantitative: Questionnaire mailed to Association of Emergency Physicians in Northern Germany (AGNN) members  
Circa. 1994, Germany  
409 members of the Association of Emergency Physicians in Northern Germany (36.9% of the AGNN) | Medium Weight of Evidence (Medium Methodological Quality, Medium Methodological Relevance, High Topic Relevance)  
Large sample size, moderate response rate. Multiple choice ‘checklist’ approach to identify criteria, without clear rationale for inclusions. Option for free text entries. Some sample demographics provided. Data supports findings. | Multiple choice criteria for termination of CPR chosen by 75% or more of respondents: ECG (asystole, persistent EMD) 83% Pupillary status (fixed & dilated) 78% Age 89% Pre-existing diseases 92% Response time 92% Duration of CPR 90%  
Low response rate factors: Missing brain stem reflexes (31%); Body temperature (12%); Suspected drug intoxication (8%)  
‘Typical’ time frames for TOR sought – response rates quite widely & evenly spread - most commonly within 30-45 minutes. | The arrest event |
| **Marco, Bessman Schoenfeld & Kelen (1997)** [194]  
Assess current resuscitation practice, as reported by survey respondents, & to determine factors influencing decisions to initiate, continue, or terminate resuscitative efforts. | Quantitative: Mailed survey sent to randomly selected members of the American emergency physicians.  
1252 respondents  
1997, USA  
1252 American emergency physicians (25% response rate) | High Weight of Evidence (High Methodological Quality, High Methodological Relevance, High Topic Relevance)  
25% response rate, but evidence sample demographically representative of ACEP membership. Survey questionnaire (including predetermined list of decision-making factors) developed by an expert panel. Survey also solicited additional comments. | Nb. Data reported again in study comparing results (repeated measures 10 years later)  
Factors rated important or very important in resuscitation decision-making by:  
> 90% of respondents – Witnessed arrest in ED; Down time; Advance directive  
60-80% of respondents - Family wishes; Pre-arrest health; Rhythm; Age  
Impact of legal concerns – 94% of respondents indicated that legal concerns do influence practice, although 78% indicated that, ideally, they should not. Fear of litigation or criticism outweighed assessment of medical utility/futility, for many respondents. | The arrest event |

Patient characteristics

The resuscitation scene

Resuscitation provider perspective
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<th>Reference &amp; aims</th>
<th>Study design, setting, sample</th>
<th>Quality appraisal</th>
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<tr>
<td>Hick, Mahoney &amp; Lappe, 1998 [195]</td>
<td>Quantitative: Prospective survey completed by attending paramedic, shortly after attending every unsuccessful resuscitation of a nontraumatic adult OHCA patient. Ranked, in order of importance, the factors informing their decision to transport. 1996-1997, USA 68 OHCA patients attended by Hennepin County Ambulance Service &amp; transported while in cardiac arrest.</td>
<td>Medium Weight of Evidence (Medium Methodological Quality, High Methodological Relevance, Medium Topic Relevance) Ranking of pre-determined decision-making. Result reporting focuses on primary factors – other data lost. Authors note that there were system-related logistical barriers to TOR in the ambulance, during the study, as hospital would not accept a dead-on-arrival patient, &amp; transport of body to medical examiner was problematic. This was not cited as a decision-making factor, but it is unclear if such a response option was available.</td>
<td>Paper results report ‘primary’ factors cited, with some mention of secondary factors. Factors (number of cases where this was primary factor, of 68 cases where patients were transported in continuing cardiac arrest): Transport ordered by on-line physician (13); Transport ordered by EMS physician on scene (1); Public place (17); Traffic hazard (1); Potential hypothermia for patient &amp; paramedics outdoors in winter (6); Arrest in ambulance or en route to ambulance (6); Possible correctable cause (4); Persistent VT/VF arrest (5); Unable to gain intravenous access (5); Airway problems (5); Non–English-speaking family or cultural barrier (1); Family stated unable to accept field termination (2); Family perceived by paramedics unable to accept field termination (1); Extreme obesity (1);</td>
<td>The arrest event Patient characteristics The resuscitation scene Medico-legal concerns</td>
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<td>Reference &amp; aims</td>
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<td><strong>Lockey &amp; Hardern, 2001 [200]</strong></td>
<td>Qualitative: Nine semi-structured interviews &amp; one focus group. Non-traumatic OHCA patients arriving via ambulance, with CPR in progress Circa 1999, UK Purposive sampling A total of 15 emergency physicians (Interviews: 1 clinical fellow, 5 specialist registrars, 3 consultants; Focus group: 1 clinical fellow, 4 specialist registrars, 1 consultant)</td>
<td>Medium Weight of Evidence (Medium Methodological Quality, Medium Methodological Relevance, High Topic Relevance) Small qualitative study. Interview guide shows mix of prompts &amp; open-ended questions. Used focus group to clarify &amp; validate themes, with no new themes emerging. Limited description of sample demographics.</td>
<td>Multifactorial decision-making process with individual variation in importance attached to decision-making factors. Six main themes emerged: Doctor’s past experience – more experienced were more likely to continue CPR in ED Ambulance service issues (‘Any patient who has had a non-paramedic crew will always be brought in because we can do advanced life support’) Prehospital care (witnessed arrest, time intervals, resuscitation duration) Patient characteristics (shockable rhythm, not age) Presence &amp; views of relatives (presumed expectation of ongoing resuscitation) Organisational issues (limitations of assessing in ambulance setting, staff culture)</td>
<td>The arrest event Patient characteristics The resuscitation scene Resuscitation provider perspective Medico-legal concerns</td>
</tr>
<tr>
<td><strong>Marco &amp; Schears, 2003 [196]</strong></td>
<td>Quantitative: Cross-sectional mailed questionnaire with 1546 respondents (41% response rate) 1999 USA 1546 members of America’s National Association of Emergency Medical Technicians</td>
<td>High Weight of Evidence (High Methodological Quality, High Methodological Relevance, High Topic Relevance) Moderate response rate, sample demographics provided. Questionnaire provided &amp; clear data analysis &amp; reporting of results.</td>
<td>Pre-hospital providers who would withhold resuscitation efforts: With state approved advance directive = 89% With verbal report of advance directive = 10% With unofficial document = 4% Providers with &gt; 10 years’ experience reported more perceived futile (low likelihood of success) resuscitation attempts per year than less experienced staff (p=0.01) Have local EMS guidelines for TOR = 73% Consider guidelines inadequate = 22.5%</td>
<td>Resuscitation provider perspective Medico-legal concerns</td>
</tr>
<tr>
<td>Reference &amp; aims</td>
<td>Study design, setting, sample</td>
<td>Quality appraisal</td>
<td>Relevant findings</td>
<td>Themes</td>
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<td>Feder, Matheny, Loveless &amp; Rea, 2006 [197]</td>
<td>Quantitative: Repeated measures programme evaluation, examining the clinical circumstances of 2770 patients with EMS-attended cardiac arrest. Comparisons made pre (1997) &amp; post-guideline implementation (1999) between participating &amp; nonparticipating agencies. 1997 – 1999 Washington, USA 2770 patients with EMS-attended cardiac arrest excluding trauma, suicide or drug overdose Structured interviews with EMS only conducted for 51/99 cases where resuscitation was withheld in the post-guideline participating group.</td>
<td>Low Weight of Evidence (Medium Methodological Quality, Low Methodological Relevance, Low Topic Relevance) Programme evaluation - two of the authors were also main instigators of guideline implementation (potential bias). Focus on patient/clinical characteristics. Comparing pre &amp; post implementation of guideline allowing EMS staff to withhold CPR efforts if patients were known to have a terminal condition &amp; a written or verbal DNR request was expressed. Withholding of CPR based on medical futility criteria not discussed, TOR not discussed. Unclear if participants could discuss non-clinical factors.</td>
<td>New guidelines for withholding CPR made EMTs more than twice as likely to withhold CPR, primarily when honoring verbal DNR requests: ‘Emergency medical services personnel indicated that the guidelines affected their decision to withhold resuscitation. Thirty-two of 51 said they would have initiated or continued a resuscitation effort in a similar situation before guideline implementation, particularly in cases in which there was a verbal request only.’ (p. 638)</td>
<td>Resuscitation provider perspective Medico-legal concerns</td>
</tr>
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</table>
### Marco, Bessman & Kelen, 2009 [198]

**Reference & aims**

**Study design, setting, sample**

**Quality appraisal**
High Weight of Evidence (High Methodological Quality, High Methodological Relevance, High Topic Relevance)
Method comparable to original research, but lower response rate (18%). Table of comparisons given, but some reporting of results from two surveys differs, so further direct comparisons difficult.

**Relevant findings**
2007 study data: Factors rated ‘very important’ in resuscitation decision-making (% of respondents): Advance directives (78%); witnessed arrest (77%); downtime (73%); family wishes (40%); presenting rhythm (38%); age (28%) & pre-arrest state of health (25%). Impact of legal concerns – 92% of respondents indicated that legal concerns do influence practice, although 80% indicated that, ideally, they should not.

**Themes**
The arrest event
Patient characteristics
The resuscitation scene
Resuscitation provider perspective
Medico-legal concerns

### Grudzen, Timmermans, Koenig, Torres, Hoffman, Lorenz & Asch, 2009 [203]

**Reference & aims**
Assess paramedic & EMT comfort with withholding or terminating resuscitation in the field, in accordance with a newly implemented guideline

**Study design, setting, sample**
Mixed methods: Brief written survey & five focus groups conducted on-site with on-duty EMTs & paramedics. Grounded theory used to analyse data. Circa. 2007, USA Convenience sample of 36 Los Angeles County EMS service paramedics & EMTs with ≥ 12 months’ experience in that service.

**Quality appraisal**
Medium Weight of Evidence (High Methodological Quality, Medium Methodological Relevance, Medium Topic Relevance)
Small convenience sample, not well-described. Research conducted on-duty/on-site. Group discussion guide provided. Data collection & analysis well described.

**Relevant findings**
Provider factors important in resuscitation decision-making
Provider knowledge of, comfort with & attitude towards policy: Policy benefits outweigh harm for patients. Paramedics feel empowered by policy:
Group dynamics
Tension between EMS, police & ED staff, regarding resource utilisation
Arrest characteristics important in decision-making: Patient factors Paramedic confidence in identifying patients with poor chance of survival
Family dynamics: Family emotional preparedness
Logistics: Location of arrest; presence of onlookers; space for resuscitation

**Themes**
The arrest event
Patient characteristics
The resuscitation scene
Resuscitation provider perspective
Medico-legal concerns
<table>
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<tr>
<th>Reference &amp; aims</th>
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<th>Quality appraisal</th>
<th>Relevant findings</th>
<th>Themes</th>
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<tr>
<td><strong>Nordby &amp; Nohr, 2012</strong> [201] 'Explore the experiences of paramedics faced with ethical dilemmas regarding resuscitation of cancer patients'</td>
<td>Qualitative: Semi-structured interviews 2009, Norway 15 Norwegian paramedics 'randomly' selected from a group of volunteers</td>
<td>Medium Weight of Evidence (Medium Methodological Quality, Medium Methodological Relevance, Medium Topic Relevance) Limited description of small sample, 'randomly' selected volunteers who had already participated in a larger study. Some details of data collection provided. Data analysis not clearly described.</td>
<td>Ethical decision-making process in the context of resuscitation of cancer patients is characterised by 'double-pressure situations' with conflicts existing between personal beliefs &amp; procedures. Typical reasons for resuscitating: system-related guidelines, uncertainty ('it is better to make one trip too many than one too few'), the value of human life Typical reasons for not resuscitating: clinical judgment, individual caring frameworks, quality of life issues</td>
<td>The arrest event Patient characteristics Resuscitation provider perspective Medico-legal concerns</td>
</tr>
<tr>
<td>Reference &amp; aims</td>
<td>Study design, setting, sample</td>
<td>Quality appraisal</td>
<td>Relevant findings</td>
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<td><strong>Morrison et al., 2014 [175]</strong>&lt;br&gt;‘Implementation trial to evaluate compliance, transport rate &amp; provider comfort with a BLS TOR rule’&lt;br&gt;Quantitative&lt;br&gt;Multi-centre implementation trial.&lt;br&gt;Discretionary rationale for TOR non-compliance was a secondary outcome measure. All OHCA patients treated by EMT-Ds excluding: under 18 year olds, obviously dead, suffered arrest from an obvious cause (drowning, hanging, trauma), written or verbal DNRs 2006-2008 Canada 2421 OHCA cases attended by EMT-Ds (emergency medical technicians trained to use BLS &amp; defibrillate)</td>
<td>Medium Weight of Evidence (High Methodological Quality, Low Methodological Relevance, Medium Topic Relevance)&lt;br&gt;High-quality method for evaluation of implementation. Provider perspective data, relevant to review, was lost by categorising results &amp; it is unclear if data was obtained from predetermined categories – e.g. around 55 reasons fall collectively into ‘other’ &amp; ‘paramedic discretion’.</td>
<td>Discretionary rationales for TOR non-compliance, in descending order of frequency cited: (241 reasons cited in 198 cases) Family distress; Unable to establish phone contact with on-line physician; Short time of arrest; On-line physician chose to transport; Paramedic discretion Other; Short transport to hospital; Patient’s age; Public location</td>
<td>The arrest event&lt;br&gt;Patient characteristics&lt;br&gt;The resuscitation scene&lt;br&gt;Resuscitation provider perspective&lt;br&gt;Medico-legal concerns</td>
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The earliest study was published in 1981 [191] and the most recent in 2014 [175]. Studies were set in the USA [191, 194-198, 203], UK [192, 200], Norway [199, 201], Canada [175], Germany [193] and Sweden [202]. Participant sample sizes ranged from n=7 [202] to n=1546 [196] and included emergency physicians [175, 191, 193, 194, 198, 200], junior and senior medical staff [192, 199], emergency medical technicians [175, 196, 197, 203], paramedics [195, 199, 201] and ambulance nurses [202].

Five themes describing factors informing resuscitation provider decision-making were identified. These were:

1. The arrest event
2. Patient characteristics
3. The resuscitation scene
4. Resuscitation provider perspective
5. Medico-legal concerns

The arrest event

Important decision-making factors derived from clinical features of the arrest itself included; electrocardiogram (ECG) findings, presumed aetiology, the presence or absence of signs of life, whether the arrest was witnessed; downtime and duration of resuscitative efforts.

Several studies suggested ECG findings are significant in resuscitation decision-making. A questionnaire study completed by a large sample of American emergency physicians in 1995 [194], then repeated in 2007 [198] reported that a majority of respondents in both samples considered the presenting rhythm important or very important in decision-making. Another questionnaire study of UK doctors also demonstrated that the presenting rhythm was important – both on arrival of ambulance crew (70-89% of respondents) and arrival to hospital (>90% of respondents) [192]. A shockable rhythm (ventricular tachycardia or ventricular fibrillation) provided justification for commencing or continuing resuscitation [191, 195, 199, 200]. Persistent asystole or electro-mechanical disassociation was reported as a key justification for termination of resuscitation by 83% of German emergency physician respondents [193] but was deemed less important in an earlier study of US emergency physicians [191].

Included studies following-up on real OHCA cases all excluded traumatic arrests [175, 195, 197, 200] and few studies in this review included probes or response categories on the cause of an arrest. However, traumatic and hypoxic aetiologies were mentioned as influential, in decision-making, in three studies [191, 192, 199].

Signs of life including small movements, gasping or presence of a pulse [192, 199] were considered pertinent in resuscitation decision-making, but pupil reactivity yielded mixed responses. Fixed, dilated pupils was deemed an important criterion for termination of resuscitation by 78% of responding emergency physicians in a German questionnaire study [193]. In a questionnaire study set in the UK
around the same time period, 87% of senior house officers believed fixed, dilated pupils were important, but fewer than half of surveyed registrars and consultants agreed [192]. A Norwegian interview study found contracted pupils in combination with normal skin colour, constituted sufficient reason to commence or continue resuscitation [199].

Importance was assigned to the established prognostic factor of ‘downtime’ - the time elapsed between arrest and onset of basic life support [191-194, 198]. A related factor - whether an arrest was witnessed - was also deemed important [198, 200], particularly where an OHCA was witnessed by prehospital resuscitation providers [199] or emergency department staff [194]. Overall time spent on resuscitation also featured as a consideration in termination of resuscitation, although there was a lack of consensus regarding what length of time constituted a sufficient duration attempt [191-193, 200].

**Patient characteristics**

Most studies identified that patient-specific variables, including age, co-morbidities and quality of life, were often considered important in resuscitation decision-making.

In a Norwegian study exploring 70 real OHCA events, age was often mentioned by attending doctors and paramedics, who were interviewed after each event. Older age alone was not considered sufficient reason to withhold or terminate CPR, but youth was given as a reason to commence CPR and appeared to make termination of resuscitation efforts more difficult [199]. In four other studies, a majority of participants considered the patient’s age when making resuscitation decisions [175, 192-194]. Contrasting findings were identified in three studies exploring emergency physicians’ decision-making, where patient age was not a chief criterion [191, 198, 200].

Patient co-morbidities appeared to be a key consideration [192-194, 198, 199] as were evaluations of pre-arrest quality of life [201, 202]. Ascertaining health status and quality of life, and the uncertainty around these evaluations was a particularly dominant theme in a recent study exploring OHCA of patients known to have a cancer diagnosis [201]. The perceived reliability of information about a patient’s medical history may also be important. An early US study showed where a patient’s own physician described the patient as having a ‘terminal illness’ or this was outlined in medical records, it was given significant weighting. If the patient’s health status was reported by a spouse or emergency medical technician, this was less likely to impact on resuscitation-decisions [191].

**The resuscitation scene**

Several aspects of the resuscitation scene appeared to be influential in decision-making, including: the imperative of commencing resuscitation, availability of resources, handover of resuscitation efforts, presence of bystanders and scene safety.
With resuscitation providers cognisant of the time-critical nature of cardiac arrest survival and their own vital, role, participants in three interview studies emphasised the importance of avoiding delays and ‘getting on with CPR’ [199, 201, 202]. Where resuscitation efforts were already initiated – by professional or lay providers - this also appeared to influence decisions to continue efforts. Respondents in an interview study exploring real OHCA cases stated that resuscitation efforts were always continued where bystanders had commenced CPR [199]. This seemed to be in response to the bystander, rather than impact on patient outcome, as the effectiveness of bystander CPR did not influence the decision to continue.

Bystander and/or family expectations, [194, 195, 198-202], perceived distress of bystanders and/or family [175, 195, 203], and cardiac arrest in a public place [175, 195] were also influential decision-making factors. Practical concerns about resource availability [194, 202, 203] and scene safety [195, 199] also exerted an influence on decisions. In a retrospective analysis of decisions to transport patients in ongoing cardiac arrest, six cases involved outdoor resuscitation scenes in sub-zero temperatures and the decision continue CPR and transport the patient was primarily motivated by the need to avoid hypothermia [195].

Resuscitation provider perspective

The most frequently-reported finding in included studies was a lack of consensus between resuscitation providers. Wherever comparisons between participants were made, studies reported significant variability in the criteria considered for decision-making and/or the relative importance given to each criterion [175, 191-194, 196, 198-203]. This is perhaps best illustrated by a series of quotes from the conclusions of included papers.

“… there is wide variation between the responses to all other factors, even among more experienced doctors” [192]

“Strict guidelines would be difficult to construct since individuals vary in the importance they attach to different factors” [200]

“The physicians in this survey made choices to cease or continue CPR that are not consistent with any criteria which might guide them in clinical decision-making” [191]

Two studies reported a positive association between length of resuscitation providers’ experience and tendency to commence or continue CPR [191, 200] with participants apparently influenced by ‘critical cases’ where prolonged resuscitative efforts had been rewarded with favourable outcomes. The results of a large questionnaire-based study of US Emergency Medical Technicians [204] were somewhat at odds with this finding. It found those Emergency Medical Technicians who have worked for more than 10 years reported a greater number of perceived futile resuscitation attempts per year than less experienced staff (p=0.01).
Organisational and medico-legal concerns

Organisational and medico-legal factors considered important in resuscitation decision-making included; provider knowledge and perception of guidelines, organisational issues, advance directives and fear of litigation.

Three included studies were primarily evaluating the influence and acceptability of newly-implemented guidelines for withholding or terminating resuscitation [175, 197, 203]. Although new guidelines appeared to be influencing prehospital resuscitation providers’ decision-making, each of these studies concluded there was some non-compliance. Other included studies also demonstrated there was variable health professional knowledge and perception of guidelines [195, 196], including ethical conflicts between guidelines and resuscitation providers’ beliefs [201].

Three studies also highlighted significant logistical and bureaucratic barriers to termination of resuscitation within ambulances [195, 200, 203]. These barriers centred ongoing responsibility of care for the deceased and bereaved. Organisational issues cited by physicians in a study exploring decision-making for OHCA patients arriving at hospital, included the suboptimal assessment environment of an ambulance interior and demand on resources within the receiving department [200].

Investigating the influence of advance directives was a key objective of one of the included studies. An American study conducted in 1999 reported that 89% of prehospital resuscitation providers would withhold resuscitation efforts where a state approved advance directive was sighted. Fewer than 10% would withhold resuscitation with verbal report or unofficial documentation of an advance directive [196]. Results from the repeated American questionnaire studies also indicated emergency physicians would usually (but not always) follow legally-binding advance directives whilst informal documents and verbal reports of patient wishes were less influential [194, 198].

Results from US studies indicated that fear of litigation outweighed assessment of medical utility or futility, in some contexts. A large survey of US emergency physicians conducted in 1995, demonstrated that 94% of respondents felt legal concerns influenced their resuscitation decisions, though 78% felt they should not [194]. Fear of litigation was cited by 92% of respondents, when the questionnaire was repeated in 2007 [198].

Discussion

This review is the first to synthesise research ascertaining factors identified by resuscitation providers which inform their decisions to commence, continue, withhold or terminate OHCA resuscitation efforts. Although there are relatively few studies in this area, the 14 included studies sought the perspectives of a range of prehospital and emergency resuscitation providers and spanned across four decades and six countries. Bearing in mind the proliferation of published research examining
OHCA it is surprising that so few studies have sought the perspective of the resuscitation providers themselves.

Decisions to commence, continue, withhold or terminate resuscitation in out-of-hospital cardiac arrest are complex and multi-factorial. Resuscitation providers aspire to minimise delays and achieve best-practice according to internationally accepted, evidence-based resuscitation guidelines. On-scene information-gathering may be hampered by prioritisation of resuscitation efforts, task-focus, lack of bystanders, emotional distress or communication barriers.

Findings from this review support simulation studies, exploratory research and retrospective analyses which indicate that the presence, behaviour and perceptions of bystanders may influence resuscitation provider cognitive and emotional responses including decision-making [205-208]. Indeed, significant efforts have been made to increase bystander initiation of CPR and it is plausible that increased public awareness of the time-critical nature of resuscitation and proliferation of digital recording devices may also have increased potential bystander impact over time. Further research in this area is warranted.

**Methodological challenges and limitations of included studies**

Exploring clinical and ethical decision-making is a difficult task and studies in this review were all subject to limitations in design, sampling, analysis and reporting of data. Wherever clinicians are asked to disclose their clinical and ethical decision-making, a sensitive approach must be adopted, and the risk of response bias acknowledged. Almost all studies used convenience samples and were susceptible to volunteer response biases. This is a notable limitation of the included interview-based studies [199-202] where participant samples were mostly homogenous and/or poorly-described.

Three included studies followed-up on specific, real decisions to terminate, withhold, commence or continue resuscitation [175, 195, 199]. Eight studies included checklists or questionnaires [175, 192-196, 198, 203]. However, little information was provided about questionnaire development processes and there was little or no discussion of internal reliability or validity. Measures of decision-making factors were sometimes limited to clinical or established prognostic factors and responses were often reported as categorised data, with a bias towards significant findings. Free-text results and responses to open-ended questions were often combined into a single, nondescript ‘other’ category. In undertaking a thematic synthesis, further data reduction has occurred, and it is possible that salient decision-making factors have been lost, to these processes.

Although there is a wealth of literature providing commentary on resuscitation ethics and the complexity of resuscitation decision-making, only fourteen studies seeking resuscitation provider perspectives were located. With a major international move towards standardised recording and reporting of cardiac arrest outcome data [209] conclusions about resuscitation decision-making may be increasingly drawn through retrospective analysis of registry data. Findings from this review
suggest a number of idiosyncratic, situational and scene-related variables have been captured, where resuscitation provider perspectives have been sought.

**Conclusion and future directions**

This review provides a synthesis of research seeking a resuscitation provider perspective on factors informing OHCA decision-making. Decisions are clearly multi-factorial as resuscitation providers may take into account the arrest event, patient characteristics, the resuscitation scene and medico-legal concerns. Established prognostic factors are generally considered important but there is a notable lack of resuscitation provider consensus on other factors indicating that decision-making is significantly influenced by the perspective of resuscitation providers themselves.

Although it is important to continue to strengthen evidence for resuscitation decision-making guideline criteria, it should also be recognised that OHCA decision-making is idiosyncratic and dynamic. Rather than beginning with a reductionist approach, creating a checklist of known or prognostic decision-making factors, future research should aim to more inclusively explore all clinical and non-clinical decision-making factors. Future studies could explore what characterises challenging OHCA decision-making and what can help to make decisions more straight-forward. Greater understanding of the way resuscitation providers use their education, mentoring and experiences to inform decisions would help to inform teaching and support. Little is known about how resuscitation providers balance the physical and cognitive demands of resuscitation with a systematic approach to information-gathering and ethical decision-making. The influence of bystander behaviour, resuscitation provider beliefs and organisational guidelines also warrants closer examination.

The resuscitation provider perspective is missing from the resuscitation decision-making literature. A greater understanding of OHCA resuscitation decision-making will help future resuscitation providers to meet the clinical, ethical, emotional and cognitive demands of these situations.

[Published paper ends]

**Chapter summary**

Findings from this review of the literature show that provider perspectives play an important role in resuscitation decision-making. Although the knowledge, attitudes, beliefs and experiences of the decision-maker are important, these provider perspectives are notably absent from the research literature. Existing OHCA decision-making research has largely focussed on documented patient factors associated with cardiac arrest incidence, intervention and survival. Studies included in this review reported a clear lack of consensus on the importance of these identified factors. It is also possible that additional, undocumented factors may contribute to resuscitation decisions. The impact of subjective and contextual factors, including the perspectives of individual decision-makers, has received scant attention. These life-and-death decisions are clearly important, complex and could be
influenced by numerous contextual, personal or interpersonal factors. As yet, there has been very
little exploration of the provider perspective on decision-making. Little is known about how they
decide, what aspects are challenging, how they manage uncertainty or what preparation and support
is helpful. It is therefore crucial to conduct a thorough exploration of the experience of those making
decisions to start, continue or stop resuscitation.

Formulation of my research aim and objectives

Having identified a gap in the international literature with the above systematic review, and motivated
by my clinical experience and background in psychology, I was eager to explore the human
experience of resuscitation decision-making. Rather than reducing the experience to quantifiable,
objectively-measured categories, I wanted to capture any complexity, uncertainty, personal or
contextual factors. As a clinical educator I was also eager to ensure my research could inform the
preparation and support of future ambulance personnel. Accordingly, I formulated an overall research
aim:

To describe the experiences of ambulance personnel tasked with decisions to commence,
continue, withhold or terminate resuscitation and explore how they are prepared and
supported to make and enact these decisions.

My overall research aim was addressed through achievement of three research objectives:

i. To describe how ambulance personnel make decisions to commence, continue,
   withhold or terminate resuscitation efforts for out-of-hospital cardiac arrest patients

ii. To characterise the clinical, ethical, cognitive and emotional challenges ambulance
    personnel associate with resuscitation decision-making

iii. To identify what assists ambulance personnel to meet the challenges of out-of-hospital
    cardiac arrest resuscitation decision-making

In the following chapter I describe the key theoretical and methodological frameworks I draw on, to
address my research aim and objectives.
Chapter 4 Research foundations and design

“Features of complexity are highly relevant to the study of health services and systems. The world moves quickly; baselines shift; technologies crash; actions are (variously) constrained; and certainty is elusive. The gap between the evidence-based ideal and the political and material realities of the here-and-now may be wide. Decisions must be made on the basis of incomplete or contested data. People use their creativity and generate adaptive solutions that make sense locally. The articulations, workarounds and muddling-through that keep the show on the road are not footnotes in the story, but its central plot. They should be carefully studied and represented in all their richness.” Goldberger, 2013, p.2 [210]

Chapter introduction

In undertaking the scientific inquiry described in this thesis, I needed to formulate a research aim and design studies which would address my research objectives. Selection of a particular research approach as most suitable or best was influenced by my underlying epistemological framework, perspectives and values – or research paradigm [211]. Research approaches to the exploration of human experiences such as clinical decision-making are particularly diverse. Without direct access to the cognitive and emotional components of others’ decision-making, researchers have had to use creative research methods. This chapter provides an overview of the epistemological, methodological and theoretical frameworks underpinning this research project.

Study One - the initial, qualitative phase of this mixed methods research project - was underpinned by Interpretative Phenomenological Analysis. My research used an emergent exploratory mixed methods design, with emphasis on Study One. This meant the design of Studies Two and Three was informed by findings from the initial, exploratory Study One. It is therefore particularly important to provide a clear rationale for the utility of IPA as my initial and primary methodology for elucidating ambulance personnel experiences of resuscitation decision-making. The final section of this paper includes a published paper affirming Interpretative Phenomenological Analysis as a methodology well-suited to improving understanding of clinical decision-making.

Research foundations

A researcher’s worldview will influence all aspects of their approach to research. Of particular importance is the nature of reality (ontology) and how knowledge is acquired (epistemology), which are also associated with values (axiology). To understand ambulance personnel experiences of resuscitation decision-making, I used an emergent, exploratory three-phase mixed methods research design, beginning with an exploratory qualitative study. My philosophical assumptions have shaped
my approach to research, and it is crucial to articulate these assumptions when reporting qualitative [212, 213] and mixed methods [214-217] research. Inspired by Crotty [218], I have depicted these research foundations in four layers, in Figure 4.1.

Figure 4.3: Research foundations

The outer layer is the researcher worldview - my perspectives on the nature of reality (ontology) and how we learn about it (epistemology). These philosophical assumptions inform the construction of research objectives, and how best to address them. The next layer is my theoretical lens. There are many ways to theorise and model clinical decision-making. It is essential to acknowledge a particular way of understanding and exploring decision-making, to ensure I am building on a specific, existing knowledge base. The third layer is the methodological approach which guided how I answered my research questions. The inner-circle represents the research methods – the procedures and techniques used to obtain and analyse data. I describe each of these four layers in detail below.

**Researcher worldview**

Researcher worldviews are rarely explicitly identified in published emergency ambulance research [219]. Prehospital research is frequently authored by prehospital doctors and published within a medical research paradigm [220, 221]. Today, with increasing recognition that ambulance personnel
practice is complex and socially-situated, there is a call for more diverse researcher approaches, methodologies and research designs [129, 222]. Medical research, including research into clinical decision-making, has predominantly been undertaken within a positivist or (more recently) a post-positivist paradigm. Positivism asserts and values measurable, replicable and objective data. There is little value attributed to hypotheses which cannot be tested through empirical inquiry [223, 224]. The post-positivist epistemological position accepts the fallibility of knowledge but aspires to minimise error. Hence research is designed to reduce bias, improve validity and reliability and revise theory in response to findings [218, 225]. Research approaches are necessarily deductive and reductionist, focussing on a detailed understanding of variables and relationships between variables through replicable and controlled methods [223]. Post-positivists hold a realist ontological view – that there is a single, measurable reality. The realist ontological view and post-positivist epistemological position are more-often associated with quantitative methods [214].

Some social scientists and researchers from a widening range of disciplines have rejected the idea of a single, knowable reality. Instead, they see knowledge as socially and individually-constructed [225]. From a constructivist perspective, qualitative methods are a valuable way of answering research questions and eliciting knowledge. An inductive approach to inquiry incorporates the subjective views of individuals to improve overall understanding of the world [226].

Critical realism arguably sits somewhere between positivism and constructivism, asserting that - although there is a single reality - our understanding of it is ultimately constructed and limited by our experience and perspectives [214]. I undertook this research from a critical realist perspective, and have elaborated on my reasons for doing so, in the following section.

**Critical realism**

My multi-disciplinary academic and clinical exposure has been influential to my worldview. As soon as I left high school, I completed an Arts degree which included philosophy papers and encouraged me to question the nature of reality and knowledge. I then proceeded to work in a variety of healthcare roles which afforded intimate insights into other people’s ways of viewing the world as they encountered healing, frailty, disability, suffering and death. Early in my career, the increasingly-popular pragmatism resonated with the solution-focussed clinician in me. Pragmatism is an approach which focuses on the consequences of research. Pragmatic researchers identify desired research outcomes and prioritise the research plan which they believe will work best [211, 227, 228]. Pragmatic researchers may not feel it is essential to articulate a specific ontological standpoint [229] but I felt this was not my philosophical stance.

Ultimately, I undertook this research from a critical realist perspective. As a critical realist, I accept that reality exists, but believe we can only apprehend aspects of it through our perceptions, resources and understanding [230]. Accordingly, I hold an ontological position of realism (a real world exists) but a constructive epistemological stance (our knowledge of the world is incomplete and subjective [231]).
As depicted in Figure 4.2 there are effectively three layers of reality or ontological domains to consider when researching any event or phenomenon from a critical realist perspective; The Real, The Actual and The Empirical [230].

*Figure 4.4: Ontological domains in critical realism*

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<th>The Real</th>
<th>The Actual</th>
<th>The Empirical</th>
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<td>The underlying structures and processes that generate a phenomenon</td>
<td>The phenomenon of interest</td>
<td>The perceptions &amp; descriptions of the experienced phenomenon</td>
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The Real describes the structures and processes that generate the event or phenomenon of interest. The Real exists independently of human awareness, observation or understanding. As Sayer argued ‘Observability may make us more confident about what we think exists, but existence itself is not dependent on it’ [232].

The Actual is the event or phenomenon – produced by the generative mechanisms of The Real. Aspects of The Actual may be experienced or observed by people.

The Empirical is the perceptions of a phenomenon achieved through indirect or direct observation. From a critical realist standpoint, different ways of understanding and explaining The Real through The Empirical can be of value. Research findings are not (just) a way to understand The Actual phenomenon, but also why and how that phenomenon occurs [230].

**Theoretical lens**

Clinical decision-making has been researched, modelled and theorised in several contrasting ways. Most notable is the difference between normative, prescriptive and descriptive decision-making models. These models are outlined here and further compared and contrasted in the published paper which concludes this chapter. Whilst reading widely around my chosen topic, I located significant resuscitation decision-making research underpinned by normative and prescriptive theories, but could
not identify any descriptive decision-making models of resuscitation decision-making. Reading around
descriptive decision-making theory helped me to locate Naturalistic Decision Making - a specific
theoretical lens which seeks to understand 'the way people use their experience to make decisions in
field settings' [233]. Naturalistic Decision Making (NDM) is the key theoretical lens through which I
have explored ambulance personnel experiences of resuscitation decision-making. Because my
research draws from descriptive – specifically NDM – models, and because findings build on these
existing theories, they are given particular attention in the following section.

Historically, research into clinical decision-making has been normative or prescriptive. The goal of
normative decision-making research is to measure or mathematically-model decision-making in a
highly-controlled experimental environment. Prescriptive decision-making researchers conduct
studies to build or test decision-making rules and reduce subjectivity or bias through the use of
decision aids [173]. These research approaches – and the utility of artificial intelligence in decision-
making [234] - continue to be very important in clinical decision-making research. However, there is
increasing acknowledgement of the complexity of healthcare systems and the limitations of
prescriptive and normative models of clinical decision-making [235]. The clinician is not a fully-
 informs automaton, rationally applying universal decision-rules to homogenous patients. Uncertainty
is often a feature of clinical decision-making [236-239] and characteristic of the emergency
ambulance context [240, 241]. Clinical decisions are made in complicated, dynamic settings and
impacted by emotion, conflict, resource limitations, experience and fatigue [210, 242]. Not all
decisions are diagnostic, and some of the most complex decisions are those regarding patient
management [243]. Descriptive decision-making takes an interest in the process – examining how
people make decisions – as well as the outcome of decisions [244, 245].

Normative, prescriptive and descriptive decision-making theories are discussed in further detail in the
published paper at the end of this chapter, including visualisation in Figure 4.4: Comparing
normative, prescriptive and descriptive decision-making.

Naturalistic Decision Making (NDM)

Descriptive decision-making theories which have proven particularly influential in clinical decision-
making include Dual Process Theory [246], Naturalistic Decision Making [233, 247] and – more
recently – Macrocognition [248]. Several researchers have noted there is significant overlap in the
way these theories have been applied and developed [249-251]. The most influential theory for this
research project has been Naturalistic Decision Making.

Naturalistic Decision Making (NDM) emerged in the late 1980s and continues to provide a popular
framework for understanding decision-making across diverse settings from acute care nursing [252],
to software architecture [253] and rugby league [254]. Whilst some decision-making researchers
continue to assess naïve subjects in laboratory studies, NDM researchers study experienced
decision-makers in their operational settings [255]. This approach acknowledges decisions occur in
complex real-world contexts which may be uncertain and dynamic. NDM is particularly well-suited to
the study of high-stakes real-time decision-making in urgent situations [233, 252, 256]. Researchers
focus on the real-world decision-making of experts working in dynamic or unstructured contexts [257].
NDM thought-leader Klein has conducted research with fire chiefs, military leaders and other experts
making high-stakes decisions with limited or changing information. He found that these experts were
utilising dynamic action/feedback loops [245, 258]. Rather than undertaking a careful weighing-up of
several choices, experts draw on their previous experience of situations that appear to pattern-match.
These so-called Recognition-Primed Decisions [256] allow the decision-maker to locate a course of
action that is ‘good enough’ with ongoing monitoring for best fit. Whilst not necessarily superior to
analytical decision-making, it is an approach which informs immediate action in the context of
incomplete information and/or a dynamic situation. The amount of Recognition-Primed Decision
strategies used increases as the decision-maker becomes more experienced [256]. This model of
decision-making is frequently-cited and has continued to influence clinical decision-making research
[252, 258, 259].

By increasing understanding of how people make decisions in naturalistic (rather than experimental or
controlled) contexts, NDM researchers have disputed many premises of decision-making [233, 260].
Findings from NDM research suggest that biases aren’t always bad, decision-makers don’t always
select actions from choices and certainty is not always improved by the addition of information [260].
As noted by Lipshitz et al. [250] NDM seeks to understand the way experts make sense of a task and
how aspects of the specific environment and context impact on decision-making. As stated by
Schraagen, Klein & Hoffman:

NDM researchers want to document practitioner abilities in order to make sure that the subtle
skills they have are recognized, understood, and supported in training programs and in
decision support systems. NDM researchers seek to understand the true work (for example,
information needs and decision requirements). […] The NDM stance on improving decision
making is to help practitioners apply their expertise more effectively, and help non-experts
achieve expertise faster. Schraagen et.al., 2008, p.5 [249]

NDM research has proven practical utility for improving support systems and training for ambulance
personnel decision-making [247, 261]. It is also concerned with expert decision-making in-context,
without judging decisions against a single correct or best choice [233]. This approach is appropriate to
the New Zealand setting, where ambulance personnel use clinical judgement and resuscitation
decision-making guidelines, not strict decision rules.

As a clinician who has experience in the emergency ambulance setting, I was eager to conduct ‘real
world’ research [262] which could acknowledge complexity and uncertainty, conflicts, biases, personal
and interpersonal issues which factor into decision-making by ambulance personnel [263-265]. In
such an under-researched and complex area, it seemed essential to adopt an approach which could
allow capture of these contextual issues, rather than reducing resuscitation decision-making to
objectively measured, pre-determined variables. NDM researchers are open to understanding both
the expertise and the fallibility of the decision-maker, and the impact of personal, interpersonal and other contextual factors. Identification and understanding of strengths and challenges, certainty and uncertainty are inherently considered necessary. As I am both a clinician and a clinical educator, this was a particularly appealing theoretical position. Rather than exclusively focusing on error and bias reduction, NDM researchers seek to understand and enable confident, skilled decision-making through improved clinical education and decision support [266]. Although it may not be possible to eliminate stressors, elucidating them can help to target ways to seek or provide support. Increased understanding can mitigate challenges and barriers and facilitate safe, confident and sensitive enactment of resuscitation decisions.

NDM is discussed further in the published paper included at the end of this chapter. I present findings from my research and their contribution to NDM theory in Chapter 9.

Methodological approach

In this section, I describe my methodological approach and demonstrate why and how I’ve used mixed methods to answer my research questions. Mixed methods describes a unique approach to research and not just the combination of numerical and text data. Below, I describe mixed methods, provide an overview of its history and typology and identify potential strengths and limitations. I then introduce my application of mixed methods to my chosen research design.

Mixed methods

Mixed methods is a distinct approach to answering a research question characterised by the collection, analysis and integration of both qualitative and quantitative data, using specific designs underpinned by explicit philosophical and theoretical frameworks [214]. There is a lack of consensus on the definition of mixed methods [215], but Johnson, Onwuegbuzie and Turner systematically synthesised 19 previously-published definitions to produce the following, which I have adopted for this research project:

*Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration* [214], p.123 [267].

Although there was a scattering of ideas about combining qualitative and quantitative data for several decades prior, mixed methods only began to receive significant academic attention in the 1980s. With the increasing acceptance of qualitative research, combining both quantitative and qualitative data was seen as an approach well-suited to solving complex problems [214]. Formative years of mixed methods were characterised by the paradigm wars - an academic debate over the superiority of a
quantitative or qualitative approach and the assertion that incompatible underlying paradigms made it impossible to combine quantitative and quantitative data [268]. Researchers have urged moving beyond this ‘qual vs. quant’ purist stance [269, 270], but continue to debate which philosophical approaches best-support mixed methods [217, 227, 271]. Development of more robust, transparent procedures and examples of mixed methods research have helped to increase mixed methods’ acceptability and use. This century, numerous helpful textbooks to guide the novice mixed methods researcher have emerged [e.g. 214, 215, 272, 273]. Well-established high-impact journals dedicated to the methodological advancement and publication of mixed methods include *The Journal of Mixed Methods Research* and *Quality & Quantity*. Although mixed methods studies make up only a small portion of published healthcare research [274] a recently-published systematic review found increasing popularity and acceptability in prehospital and paramedic research [219].

As noted by Creswell and Clark [214] the use of mixed methods is arguably an intuitive approach to research. As an emergency department nurse, I regularly integrate both qualitative patient histories and quantitative test results, giving value to both subjective symptoms and objective assessment findings. In this research, the use of mixed methods facilitated the drawing together of qualitative and quantitative data to produce the best (most useful) knowledge [275]. Combining both qualitative and quantitative approaches can help to address the weaknesses in each. Integrating multiple data sources can create complementarity and may help to strengthen, corroborate or confirm findings – or better identify divergences [273]. The use of mixed methods fits well with a critical realist worldview [230, 231, 271]. In addition to generating mixed data, mixed methods also draws on multiple methodological frameworks. This has allowed me to explore a complex issue from various angles, providing both depth and breadth. Prior research into resuscitation decision-making has been outcome-focused, but use of mixed methods has allowed me to focus on context, process, preparation, support and meaning-making.

**Research design**

Mixed methods research designs can vary in their individual study components. Data may be combined sequentially or concurrently and priority may be given to either a qualitative or quantitative approach [272]. Effectively communicating a mixed methods research design requires an established language or system of classification. I have chosen to use the latest iteration of Creswell and Plano Clark’s widely-known typology [214]. This typology describes the design sequencing and purpose. It is further complemented by use of a notation style – originally proposed by Morse [276] - which highlights the nature of data collected and priority of each phase.

Creswell and Plano Clark’s current typology [214] identifies three core mixed methods designs, as detailed below:

**Convergent Design:** Convergent designs involves the integration of concurrent or parallel study data, to provide a comprehensive understanding of the research topic.
**Explanatory Sequential Design**: Explanatory sequential designs occur in distinct phases, usually driven by an initial quantitative study, with supplemental qualitative data subsequently gathered, to increase understanding and provide more detail.

**Exploratory Sequential Design**: Exploratory sequential designs typically begin with a qualitatively-driven and prioritised phase which then informs a further quantitative phase or phases. Findings from the initial qualitative phase may raise new questions or hypotheses, which can subsequently be tested using quantitative methods. For this research project, I have used an exploratory sequential research design.

Morse’s [276] popular and simple notation allows easy communication of the nature of data integration in mixed methods. It illustrates the order of data collection, relationship between studies and identifies if any particular studies or approaches drive the overall research design. The notations are explained in **Table 4.1**.

**Table 4.3: Notations used to describe mixed methods designs**

<table>
<thead>
<tr>
<th>Notation</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>QUANT</td>
<td>Quantitatively-driven/prioritised research design</td>
</tr>
<tr>
<td>quant</td>
<td>Quantitative study design</td>
</tr>
<tr>
<td>QUAL</td>
<td>Qualitatively-driven/prioritised research design</td>
</tr>
<tr>
<td>qual</td>
<td>Qualitative study design</td>
</tr>
<tr>
<td>→</td>
<td>Sequential research design</td>
</tr>
<tr>
<td>+</td>
<td>Concurrent research design</td>
</tr>
</tbody>
</table>

Notations initially defined by Morse [276]

**Exploratory sequential mixed methods design**

An emergent three-phase exploratory sequential design driven by the initial qualitative study [QUAL → qual → quant+qual] was particularly well-suited to this complex, idiosyncratic area [211, 277]. Findings from the exploratory, phenomenological Study One could then determine the nature of Study Two and then Study Three [278]. As ambulance personnel perspectives on resuscitation decision-making was a relatively unknown area it was valuable to be able to respond to findings, theories and questions which arose in Study One [226]. Potential disadvantages of sequential mixed methods research design are the requirement of a broad researcher skillset and lengthy timeline, with each phase requiring ethical approval, recruitment, data collection, analysis and write-up. As a part-time PhD researcher, my overall timeline was longer and I was willing and eager to learn and implement new research skills, along the way.
In Figure 4.3 I provide an outline of my three included studies, research questions and data collection procedures incorporating notation by Morse [276]. This section provides an overview of all three studies and a focus on issues of research quality and ethics.

Figure 4.5: Overall research design used to explore ambulance personnel experiences of resuscitation decision-making

Study One: Ambulance personnel experiences of resuscitation decision-making

- How do they decide? What are the challenges? QUAL
- Interviews with 16 experienced emergency ambulance personnel

Study Two: Ambulance personnel preparation and support for termination of resuscitation and patient death

- How are they prepared / trained? What supports exist? What more could be done? qual
- Focus groups with 20 clinical education and peer support staff

Study Three: Paramedic student confidence, concerns, learning and experiences with resuscitation decision-making and patient death

- How confident do they feel? What concerns them most? What exposure & learning have they had? quant+qual
- Online survey of 72 Year 3 paramedicine students

RDM = Resuscitation decision-making

Study One: Ambulance personnel experiences of resuscitation decision-making

Study One was qualitative, exploring resuscitation provider experiences of decision-making for out-of-hospital cardiac arrest (OHCA) patients. The design, implementation, analysis and reporting of Study One of my research was underpinned by the methodological approach of Interpretative Phenomenological Analysis (IPA). The nature and utility of IPA is described in detail in the final section of this chapter. Study One findings are presented in two published papers, included in Chapter 5. The first paper has a focus on how decisions are made and the second paper describes associated challenges. Semi-structured interviews were well-suited to the exploration of this, complex issue. Allowing each participant to describe experiences and meanings in their own words, and give priority to aspects of the experience they deemed salient helped to reveal “…an individual’s personal reaction to the phenomenon under investigation, rather than one elicted by way of a forced choice.
between pre-defined options” [279, p.41]. Emphasis was placed on Study One, with each subsequent study design informed by results from the preceding study/studies [278].

**Study Two: Ambulance personnel preparation and support for termination of resuscitation and patient death**

Results from the Study One raised specific questions about ambulance personnel training and support for challenging resuscitation decision-making. In response to these findings, I undertook a further review of the literature, which is included in Chapter 6. In Study Two I conducted expert focus groups to identify the skills, preparation and support required for confident, sensitive termination of resuscitation and management of patient death in the field. A focus group design was selected as it was an effective way to gather data from established groups of experts in a natural discussion setting. I then used thematic analysis [280] to analyse resulting transcripts for key themes which addressed the underlying research questions. Chapter 7 reports Study Two in detail.

**Study Three: Paramedic student confidence, concerns, learning and experiences with resuscitation decision-making and patient death**

The model of training for ambulance personnel in the UK and Australasia has changed over recent decades, with an increasing number of staff completing three-year paramedicine degrees prior to employment. As findings from Study Two emphasised on the job learning, it was important to understand how paramedicine graduates were prepared for resuscitation decision-making. Study Three piloted a newly-developed scale to measure paramedic student confidence in the various skills associated with withholding or terminating resuscitation and managing the scene of patient death. Through completion of an online survey, graduating paramedic students also shared their concerns and learning experiences in this area. I describe Study Three, including the development and testing of the associated survey instrument, in Chapter 8.

**Integrated findings**

Findings from all three studies informed the development of a new Naturalistic Decision Making model of resuscitation decision-making: the Anderson Model of Ambulance Resuscitation Decision-making. This model integrates key processes, challenges and facilitators before, during and after OHCA events. I present and discuss this model and its development in Chapter 9.

**Ensuring quality**

One of the challenges facing mixed methods researchers today is the lack of consensus guidelines to inform the conduct and appraisal of mixed methods research [216]. Attention to the quality of the
individual included studies is essential. However, just as integrated mixed methods research findings produce insights greater than the sum of its parts, it is also necessary to critically appraise the overall research approach [214, 215, 281]. The following section locates evidence of quality in the chosen mixed methods research design. Table 4.2 presents a five-domain framework for mixed methods quality appraisal.

**Table 4.4: Quality framework for mixed methods**

<table>
<thead>
<tr>
<th>Quality Domain</th>
<th>Appraisal criteria</th>
</tr>
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</table>
| Conceptualisation & justification | A critical review of the literature  
A clear rationale for the use of mixed methods  
A detailed description of philosophical assumptions, design, data collection, analysis & reporting |
| Research design                  | An appropriate design for the stated research question  
A design which is described within a known typology |
| Data quality                     | A clear description of all methods  
Adequate sampling, collection and analysis  
Adherence to standards for qual, quant and mixed methods |
| Analytic integration             | A clear plan for integration of data, including sequencing and weighting |
| Interpretative rigour            | Credible interpretations of findings  
Transparent derivation of findings  
Conclusions which are clearly linked to findings |

Domains adapted from [215, 282]

### Conceptualisation & justification

Situating the design of this research within existing knowledge gives my research a ‘foundational element’, as described by Dellinger and Leech [283]. I formulated my primary research questions and Study One design in response to findings from an integrative systematic review of the literature as reported in Chapter 3. Design of Study Two was further informed by a subsequent scoping review reported in Chapter 6.

Clear articulation of underlying epistemological, ontological and axiological assumptions is an essential feature of quality mixed methods research [214, 216, 217]. A recent review of prehospital mixed methods publications identified that researchers rarely reported a theoretical lens or stated their philosophical assumptions [219]. Reviews of mixed methods research in healthcare noted a lack of clear justification for the use of mixed methods and little evidence of data integration [274, 281]. This chapter helps to establish a solid foundation for my research by transparently detailing my philosophical assumptions and explicitly justifying my overall research design. I have included
evidence of well-planned and justified methodology and methods for each study in the associated papers included in **Chapter 5, Chapter 7 and Chapter 8**.

**Research design**

The emergent exploratory sequential design used in this research sits within Creswell and Plano Clark’s well-known typology of mixed methods research [214]. This chapter has provided support for the appropriateness of this design, and the emphasis on the initial exploratory qualitative Study One.

**Data quality**

The methods for individual studies have been introduced in this chapter, but the associated methods sections of **Chapter 5, Chapter 7 and Chapter 8** provide detailed descriptions of each study. I used the Equator Network ([http://www.equator-network.org/](http://www.equator-network.org/)) guidelines to enhance the quality and transparency of each study reported in this thesis. These guidelines included SRQR [213] and COREQ [212] for Study One and Study Two and PRISMA guidelines for the integrative review [284] and scoping review [285]. Ultimately, all three studies and both reviews were deemed of sufficient standard for publication in quality peer-reviewed journals.

**Analytic integration**

The sequential integration of data, with emphasis on Study One, is clearly described in this chapter and **Chapter 9**. I also explain the way that each study informed the next at the beginning of **Chapter 6, Chapter 7 and Chapter 8** as I introduce Study Two and Study Three. I have made clear links to the original sources (Study One, Two and/or Three) of integrated findings included in both the Anderson Model of Ambulance Resuscitation Decision-making and the associated discussion section of this thesis.

**Interpretative rigour**

I have made every effort to maximise transparency, carefully linking study data to study findings. I have included verbatim quotes from Studies One and Two to allow the reader to see connections and to illustrate themes. I have compared and contrasted individual study findings with existing research in the associated discussion sections in **Chapter 5, Chapter 7 and Chapter 8** and presented my integrated findings in the context of the latest literature in **Chapter 9**. Together, these discussion sections identify theoretical consistency (findings which seem plausible within existing knowledge [272]) but also highlight new and divergent findings.
Ethical considerations

The ethical issues identified as potentially arising from this research are discussed under the relevant sub-headings, below.

Informed consent

All participants were provided with a Participant Information Sheet, disclosing the purpose and design of the study. Participants had the opportunity to consider their participation, ask additional questions and choose whether to opt-in, before giving their consent. Participants were not directly approached by the researcher and were given reassurance that participation or non-participation would not affect their employment or grades. In Study One, participants had the opportunity to withdraw all of their data within three months. In Study Two and Study three, participants were not able to remove their data retrospectively, due to the collective (Study Two) or anonymised (Study Three) nature of data.

Confidentiality

No details of participants involved in this research were revealed in any correspondence relating to the project. Data files containing any names and addresses were password protected and access was restricted to the researcher. Only the researcher and her supervisors had access to data from each study. Research results included in published manuscripts or appearing in this thesis did not include any potentially identifying participant details. Any details which might reveal the identity of the participant or their colleagues, patients or other parties were excluded or anonymised. Participants in Study Three remained anonymous, providing minimal demographic data, published only as group data.

Consequences (to participant/researcher/third parties)

It was not anticipated that the participants or the researcher would be at risk of harm as a result of any studies described in this research project. Participants were provided with contact details for their Employee Assist Programme or student counselling service, should they find topics discussed in the interview distressing in any way. The researcher had access to debriefing and support by supervisors experienced in qualitative research interviews. Participants in Study One and Study Two had the opportunity to talk about challenging and rewarding experiences in their professional lives, providing an opportunity for self-reflection (in Study One) and group discussion (in Study Two). Participants in all three studies were asked to consider, discuss or reflect on ethically and emotionally challenging situations. However, other researchers have demonstrated that voluntary participation in research on even the most emotionally-charged of subjects rarely causes lasting distress [286-288]. Interview and focus-group participants in other research more-often reported benefits from participation, including a feeling of catharsis, opportunity for self-reflection and a sense of accomplishment representing
themselves and potentially assisting others [287, 289, 290]. Consistently, several participants in Study One, Two and Three of this research project expressed satisfaction at providing ambulance personnel perspectives, stating that they were pleased to support the exploration of an important and infrequently-researched area.

**Māori responsiveness**

As previously mentioned, Māori experience higher incidence and mortality associated with out-of-hospital cardiac arrest [147]. Māori are also under-represented in the New Zealand emergency ambulance workforce and paramedic education [148]. All health research conducted in New Zealand needs to provide evidence of responsiveness to Māori [152]. Research which is responsive to Māori should consider relevance to Māori, and promote participation and inclusion of Māori voices [151]. I am a member of the Te Ārai Palliative & End of Life Care Research Group [www.tearairesearchgroup.org](http://www.tearairesearchgroup.org) and study design was informed by our bicultural framework [291] and the widely-adopted Māori ethical framework by Hudson et. al [292] which is based around four principles: Whakapapa, Tika, Manaakitanga and Mana.

**Whakapapa** is all about relationships. Over this research project, I have built relationships with ambulance personnel, paramedic students and educators in New Zealand. In developing my studies, I consulted with a large number of stakeholders including St John New Zealand, Wellington Free Ambulance, Fire and Emergency New Zealand, Auckland University of Technology and Whitireia New Zealand. This included discussions with research and ethics committee members, medical directors and Māori staff, educators and cultural advisors. Since completing my research I have accepted invitations to present my findings to students, ambulance personnel and educators at Auckland University of Technology, St John New Zealand and the 2019 New Zealand Student Paramedic Conference.

**Tika** refers to research design. Oral narratives are a valued traditional way of communicating knowledge for Māori [293], and qualitative research aligns well with this, by placing value on the perspectives voices and experiences of participants. Although this research project did not specifically target Māori participants, every effort was made to ensure the recruitment process was inclusive. Two Māori participants were involved in Study One. Māori students may also have been recruited in Study Three, although ethnicity data was not collected, to protect participant anonymity. A question specifically concerning culturally sensitive care of the deceased was included in Study Three, recognising the importance that Māori place on care of the tūpāpaku.

**Manaakitanga** is about cultural and social responsibility. Throughout this research project, I worked to protect participant identity and manage all data responsibly. Due to relatively small populations of emergency ambulance personnel and paramedicine students in New Zealand, demographic questions were limited and solely reported as group data. To protect privacy, I avoided revealing
potentially-identifying information about participants, colleagues, patients and families in my reported findings.

*Mana* is about justice and equity. I have addressed Māori responsiveness in dedicated sections of the introduction (*Chapter 2*), methods (*Chapter 4*) and discussion (*Chapter 9*) of this thesis. I consulted with a Right Care Advisor Hauora Māori for St John New Zealand whilst designing Study Two and Study Three. After I had produced my integrated findings, I also met with a Te Ārai Māori advisor. This meeting provided an opportunity to reflect on my findings and possible implications for Māori emergency ambulance personnel, patients and whānau (families).

**Committee approvals**

All studies included in this research thesis received formal ethical approval from multiple committees.

Study One was approved by the University of Auckland Human Participants Ethics Committee [#016147] and received St John New Zealand Locality Authorisation [St John Reference #9].

Study Two was approved by the University of Auckland Human Participants Ethics Committee [#020035] and received St John New Zealand Locality Authorisation [St John Reference #57].

Study Three was approved by the University of Auckland Human Participants Ethics Committee [#021883] the Auckland University of Technology Ethics Committee [#18/341] and the Whitireia Ethics & Research Committee [RP185-2018].

**Paper preamble**

The first section of this chapter has outlined the philosophical, theoretical and methodological foundations underpinning this thesis. It then introduced the mixed methods exploratory sequential research design and addressed research quality and ethical research conduct. The final section of this chapter includes a published methodological paper exploring the use and utility of Interpretative Phenomenological Analysis (IPA) to increase understanding of complex clinical decision-making. IPA methodology underpinned Study One in my research, the primary exploration of ambulance personnel’s experiences of resuscitation decision-making. This paper describes the way IPA can be used to improve understanding of clinical decision-making, expertise and intuition. It includes a narrative review of published IPA research into clinical decision-making and uses Study One as an exemplar. As introduced in the previous chapter, the use of IPA fits well within a descriptive, Naturalistic Decision Making [233] theoretical lens. This paper is written from an interdisciplinary perspective, but clinical decision-making by nurses is given some specific attention due to publication in a nursing research journal.
This paper is reproduced here in its entirety with permission of the *Journal of Research in Nursing*, an indexed peer-reviewed international journal which publishes quality research papers on healthcare issues that inform nurses and other healthcare professionals.

The full paper citation is:


**PUBLISHED PAPER Unlocking intuition and expertise:**

**Using Interpretative Phenomenological Analysis (IPA) to explore clinical decision-making**

**Introduction**

Although they are the subject of countless studies, it is not possible to directly measure or observe the experienced thoughts and emotions of others. Interpretative Phenomenological Analysis (IPA) is a qualitative methodology used to understand the way that people make sense of salient experiences [294]. IPA studies can yield rich, detailed participant narratives inclusive of thoughts, feelings and actions [295]. Over the past two decades, researchers using IPA methodology have provided important phenomenological, idiographic insights into wide-ranging experiences [296]. IPA has application and value across diverse disciplines, but the bulk of health-related IPA research has focussed on service-user and patient-perspectives of healthcare and illness [296, 297]. Studies have explored the experience of patients making healthcare decisions [298, 299] and of parents and caregivers as proxy decision-makers [300, 301]. This paper describes the use of IPA to explore health professionals’ experiences of clinical decision-making, an area which has received relatively little attention to-date. A study of paramedic resuscitation decision-making is presented to demonstrate the effective use of IPA to explore complex clinical decision-making.

Clinical decision-making occurs when nurses and other health professionals gather and interpret data to inform a choice of action. Clinical decision-making is made complex by any combination of uncertainty, limited information, inter-relatedness, emotional and ethical challenges and time-pressure. Examples of complex clinical decision-making include triage decision-making in emergency departments [302] and end-of-life decision-making in intensive care units [303]. In this paper, we argue that IPA methodology is ideally-suited to providing critical insights into decision-making of this nature. Specifically, it can be utilised to increase understanding of the way that expert nurses and other health professionals seek-out and make sense of complex, dynamic or information-limited situations. This, in turn, reveals something of the nature of real-world intuition and expertise. The
concept of clinician intuition – tacit knowledge based on pattern recognition [266] - is somewhat controversial and poorly understood [304]. There is, however, some acceptance that it can be a feature of expertise – the accumulation of knowledge, skills and experience.

To support these claims, we provide a brief overview of clinical decision-making theory, demonstrating a move towards acknowledgement of context and a call to understand the idiographic perspective of clinicians and their patients. We review the limited published IPA studies in this area, prior to drawing on our own recent use of IPA to explore paramedic decision-making relating to resuscitation. Finally, the strengths and limitations of IPA are summarised, along with potential future directions for the use of IPA in clinical decision-making research.

Theorising Clinical Decision-Making

An overview of the way that clinical decision-making has been theorised is provided to demonstrate how IPA can assist with filling a significant gap in the literature. Historically, clinical decision-making theory has focused heavily on normative and prescriptive models. These models describe ideal decision-making and developed decision-supports, often with the goal of minimising diagnostic error [305]. Clinician decision-makers are imagined as omniscient and rational - using objective patient data and a hypothetical-deductive approach to select a choice which is best for the patient. Specific contextual factors, including the clinician’s experience or the patient’s own views, values and priorities, typically receive little acknowledgement [306]. Decision-supports informed by this body of work, which include clinical practice guidelines and algorithms, are now ubiquitous in all healthcare settings and when well-integrated into clinician workflow, can improve clinical outcomes [307].

In recent decades, however, there has been greater interest in descriptive decision-making models. These are process-focused and recognise the real-world impact of context, uncertainty and so-called human factors in clinical decision-making. Descriptive theorists explore the strengths and limitations of clinicians’ cognitive responses to demanding situations, leading to the extensive description of heuristics and biases [244]. There has also been growing exploration of the way nurses and other clinicians are affected by emotions, ethical conflicts and stress [308, 309]. We have contrasted and compared these three approaches to conceptualising decision-making in Figure 4.4.
A call for real-world clinical decision-making research

In an effort to gain insights into clinical decision-making, researchers have utilised a range of methods, including Think Aloud [310], Cognitive Task Analysis [311] and Delphi studies [312]. Published medical decision-making research often describes either retrospective review of documentation or experimental methods [15]. Although these provide insights into actions and choices, they largely ignore context and the provider’s perspective. Clinical decision-making researchers have called for more in-depth study of clinical sense-making which explores the interplay of emotions, intuition and heuristic reasoning, as well as giving consideration to the individual needs and wishes of patients [313, 314]. For example, Wears and Nemeth [315, p. 207] argue:

“We must use more sophisticated and nuanced models of diagnostic reasoning, that accord to what people actually do, rather than what we imagine should be done. This requires abandoning sterile laboratory exercises in favour of studying practitioners in the real world - as it were, ‘in the wild’.”
Using IPA to elucidate real-world decision-making

IPA has significant utility in the exploration of nurses and other clinicians’ experiences of clinical decision-making, expertise and intuition. IPA is flexible and inductive and can be utilised in highly-theorised or relative unexplored areas [297]. IPA’s philosophical valuing of context, meaning-making and the idiographic phenomenological experience aligns well with Naturalistic Decision Making theory [257] and has much to offer the research-prolific area of human factors in clinical practice [316]. IPA studies can provide detailed, specific, real-world insights into the impact of stress, distraction, intuition and expertise.

Through IPA methodology, researchers can increase understanding of the inner processes behind behaviour – giving insights into the individual, context-specific working of a problem and not just the solution or action [317]. The rich, detailed nature of elicited participant accounts can reveal challenges and rewards, identify coping strategies, and illuminate the way clinicians make sense of their decision-making. Rather than making assumptions about deductive reasoning and idealised practice, data derived from real clinical experiences can build an evidence base for the development of education, guidelines and system supports. IPA research can provide insights into convergence, whilst also acknowledging divergent experiences of individual clinicians, patients and care contexts. The theoretical foundations of IPA and their compatibility with clinical decision-making is further outlined in Table 4.3.

<table>
<thead>
<tr>
<th>Theoretical foundation</th>
<th>Compatibility with clinical decision-making research</th>
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<tbody>
<tr>
<td>Phenomenology: a focus on conscious experience. Elucidating the memories, perceptions and judgements of participants.</td>
<td>Understanding the lived experience of decision-making, with detailed recall of sensory, cognitive and emotional components.</td>
</tr>
<tr>
<td>Hermeneutics: a focus on interpretation. Insights gained through in-depth, iterative analysis of whole and part.</td>
<td>Understanding how health care professionals make sense of complex and dynamic situations and limited data and how they recall, reflect-on and represent their experiences.</td>
</tr>
<tr>
<td>Idiography: a focus on the individual. Considering specific experiences, people and contexts.</td>
<td>Understanding individual decisions and the interaction between the personal values of healthcare professionals and their patients.</td>
</tr>
</tbody>
</table>
Review of existing IPA research in clinical decision-making

For the purposes of this article, a literature search was carried out to identify published IPA research exploring clinician’s perspectives of decision-making. CINAHL, ScienceDirect, PubMed and Google Scholar were searched for papers published since 2000 using search terms ‘Interpretative Phenomenological Analysis’ AND ‘decision-making’ OR ‘decisions’ OR ‘clinical reasoning.’ After de-duplication, 131 studies were screened. Most of these papers were excluded as they did not specifically explore a clinician perspective (67); didn’t focus on clinical decision-making (38) or did not report IPA methodology (11).

Fifteen papers were identified which specifically explored clinical decision-making using IPA methodology. The papers were published in interdisciplinary (n=8), psychology (n=2), medical (n=2), nursing (n=2) and allied health (n=1) journals. As depicted in Table 4.4, they tended to involve large and heterogenous samples. Almost all studies were undertaken in the UK, where IPA was ‘founded’ and has developed significant popularity. All used semi-structured interviews to gather data. Nine studies explored multi-disciplinary perspectives and seven of these included nurse participants. A recent study sought to better understand the role of emotions in end-of-life decision-making in ICU through interviews with 10 ICU nurses and 10 physicians. Results suggested that nurse decision-making was more influenced by feelings toward patients, whilst physician decisions were more influenced by feelings towards patients’ families [303].

Two studies explored shared decision-making, including patients and family participants. Chapman et al. [318] sought multiple perspectives on end of life care of adult patients with cystic fibrosis. In addition to multidisciplinary team members, researchers asked patients with advanced cystic fibrosis and bereaved family members about decisions made at the end of life. Borg Xuereb, Shaw and Lane [319] explored patient and physician experiences of anticoagulation decision-making in atrial fibrillation. In this study, the authors analysed data in seven subgroups - organised by patient decision and physician speciality - and reported separate themes for patients and physicians. The approach to multi-perspective IPA data analysis was clearly articulated. With these three studies as exceptions, most papers tended to focus on convergence and group-level thematic analysis, with little or no discussion of divergence.

Description of study methodology and approach to analysis also varied. Notably, researcher reflexivity was often lacking – a critique of IPA studies more broadly [320]. Many studies appear to have been authored by clinician-researchers, who may have had significant prior exposure to the area being researched, and personal experience within the clinical decision-making context. In spite of this, researchers rarely outlined their theoretical and epistemological framework, and there was limited consideration of the influence of prior assumptions.
<table>
<thead>
<tr>
<th>Publication</th>
<th>Research Question</th>
<th>Setting</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al., 2018 [17]</td>
<td>How do ambulance personnel decide to commence, continue, withhold or terminate resuscitation efforts?</td>
<td>National emergency ambulance provider, New Zealand</td>
<td>16 ambulance personnel</td>
</tr>
<tr>
<td>Laurent et al., 2017 [303]</td>
<td>How do emotions influence the end-of-life decision-making process among professionals working in ICU?</td>
<td>Two independent ICUs at a single Montreal hospital, Canada</td>
<td>20 multidisciplinary clinicians (10 nurses, 10 physicians)</td>
</tr>
<tr>
<td>Anderson et al., 2018 [18]</td>
<td>What are the challenges experienced by ambulance personnel making resuscitation decisions?</td>
<td>National emergency ambulance provider, New Zealand</td>
<td>16 ambulance personnel</td>
</tr>
<tr>
<td>Vandrevala et al., 2017 [321]</td>
<td>How do nursing home staff respond to &amp; manage sexual expression in residents with dementia?</td>
<td>Two London nursing homes, UK</td>
<td>8 multidisciplinary nursing home staff (7 healthcare assistants, 1 manager)</td>
</tr>
<tr>
<td>Borg Xuereb et al., 2016 [319]</td>
<td>How do patients &amp; physicians experience atrial fibrillation (AF) consultations &amp; oral anticoagulation decision-making?</td>
<td>Hospital clinics, primary and secondary health settings in the West Midlands, UK</td>
<td>27 patients &amp; clinicians (11 patients, 16 physicians)</td>
</tr>
<tr>
<td>Kelly &amp; O’Brien, 2015 [322]</td>
<td>How do clinicians perceive oxygen therapy in palliative care?</td>
<td>Diverse health settings where palliative oxygen is prescribed or administered, UK</td>
<td>34 multidisciplinary clinicians (18 nurses, 6 paramedics, 4 doctors, 5 pharmacists, 1 other HCP)</td>
</tr>
<tr>
<td>Doyle et al., 2014 [237]</td>
<td>How do clinicians decide whether to offer bariatric surgery to adolescent patients?</td>
<td>Two NHS bariatric surgery centres, UK</td>
<td>9 multidisciplinary clinicians (including a surgeon, physician, psychologist, psychiatrist, nurse &amp; dietician)</td>
</tr>
<tr>
<td>Publication</td>
<td>Research Question</td>
<td>Setting</td>
<td>Sample</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Rouf et al., 2012 [324]</td>
<td>How do clinicians make decisions about child welfare/protection in adult mental health cases?</td>
<td>Community Mental Health Teams, UK</td>
<td>13 multidisciplinary clinicians (3 community psychiatric nurses, 3 psychologists, 3 social workers, 4 psychiatrists)</td>
</tr>
<tr>
<td>Bradley et al., 2011 [325]</td>
<td>Why do health professionals refer individual patients to specialist day hospice care?</td>
<td>Referrers to a hospice in the northeast of England, UK</td>
<td>8 multidisciplinary clinicians (1 GP, 7 specialist nurses)</td>
</tr>
<tr>
<td>Brien et al., 2010 [326]</td>
<td>How does intuition inform homeopathic clinical decision-making?</td>
<td>Private complementary &amp; alternative medicine clinics, UK</td>
<td>14 homeopaths</td>
</tr>
<tr>
<td>Williams et al., 2010 [327]</td>
<td>How do intellectual disability nurses make decisions, &amp; how does evidence influence decision-making?</td>
<td>NHS Intellectual Disability Nurses working in Wales, UK</td>
<td>12 nurses</td>
</tr>
<tr>
<td>Camhi &amp; Cohn, 2007 [328]</td>
<td>How do clinicians experience ethical dilemmas associated with patients with severe burns?</td>
<td>Single regional burns &amp; plastic surgery unit UK</td>
<td>6 multidisciplinary clinicians (2 surgeons, 2 anaesthetists, 2 physiotherapists)</td>
</tr>
<tr>
<td>Kam &amp; Midgley, 2006 [329]</td>
<td>How do child &amp; adolescent mental health professionals decide whether a young person needs individual psychotherapy?</td>
<td>Single child &amp; adolescent mental health team based in London UK</td>
<td>5 multidisciplinary clinicians (1 psychiatrist, 1 psychologist, 1 family therapist, 1 social worker, 1 counsellor)</td>
</tr>
<tr>
<td>Chapman et al., 2005 [318]</td>
<td>How do patients, families and multidisciplinary team members experience end of life decision-making for adults with cystic fibrosis?</td>
<td>Single regional cystic fibrosis centre, UK</td>
<td>6 bereaved families, 6 patients 9 multidisciplinary clinicians (3 doctors, 1 physiotherapist, 1 dietician, 1 consultant, 1 therapist, 3 nurses)</td>
</tr>
</tbody>
</table>

**Using IPA to explore paramedic decision-making**

We have recently undertaken research which used IPA to explore paramedic decisions to commence, continue, withhold or terminate resuscitation when faced with patients in cardiac arrest [18] and identify the characteristics of challenging prehospital resuscitation decisions [17]. Here, we will briefly outline our study and discuss our learnings regarding the strengths and limitations of using IPA to explore clinical decision-making.
Study background and methods

Historically, ambulance personnel internationally received limited formal training, were dependent on protocols and almost always transported patients to hospital for further assessment [105]. In a way which is comparable to the development of advanced nursing roles, today’s degree-trained paramedics are authorised to autonomously manage diverse, complex patient presentations [111]. Furthermore, it is not unusual for paramedics to manage rapidly-changing, emotionally-demanding situations where information may be limited [240, 241]. Cardiac arrest is a particularly high-stakes and time-critical context for paramedic decision-making. In many countries, including New Zealand, Australia, the UK and Canada, paramedics are authorised to commence, continue, withhold or terminate resuscitation efforts in accordance with clinical guidelines [330]. We undertook an integrative review research into prehospital resuscitation decision-making and found that the clinician-perspective was lacking from the literature [15].

To address this gap in the literature, an IPA study was conducted to explore paramedic experiences with resuscitation decision-making, the factors used to make decisions and the challenging elements. Taking a critical realist epistemological stance, we worked within IPA’s theoretical framework as described by Larkin, Watts and Clifton [295] prioritising ‘giving voice’ and ‘making sense’ of our participants’ experiences. Sixteen experienced ambulance personnel from around New Zealand were asked to describe their experiences of resuscitation decision-making, through participation in semi-structured interviews.

All interviews were recorded and transcribed. An iterative approach to data analysis was undertaken, with each transcript coded, ideas journaled and divergence and convergence noted, prior to moving on the next transcript. Care was taken to produce an auditable decision-trail and transparent process of data analysis [294].

Although participants felt most sure when verifiable, objective data was available to inform decisions, they also described consideration of a large variety of contextual factors and subjective evaluations. Results from this study indicated that paramedics may benefit from specific preparation and support to manage challenging resuscitation decisions and patient deaths.

Strengths of IPA

Whilst it is not possible for researchers to achieve a direct route to others’ experiences [296] participants in the paramedic study appeared to allow us very close, through their recall of events. There was little evidence of self-censorship, as participants made liberal use of jargon and expletives. Several participants became emotional, expressing frustration, elation or sadness as they vividly recalled events. They openly recalled uncertainty, feeling overwhelmed, and awareness that they were affected by stress, fatigue, emotions or cognitive overload. Even when recalling events which
took place decades prior, participants provided lengthy, detailed descriptions of sensory data, such as the appearance of the patient, odours and key characteristics of the scene.

Extract 1: Detailed, uncensored recall

“And it’s in the bedroom and it’s quite cramped and there’s shit lighting. And we pull him onto the ground, pre-cordial thump, start CPR, pads on, call for backup. And it shows – because it’s so cramped in there, I’m like standing over this patient, straddling him doing CPR, instead of being on my knees next to him […] So this is my first time in a cardiac arrest and it’s saying shockable rhythm, so I get out, I get clear and the pads are on and the monitor’s in AED mode and it’s shouting ‘Motion detected, motion detected.’ And this guy was obviously moving because he was well-perfused […] And I obviously had this panic-stricken look on my face that said ‘What is going on?’ And my crew-partner looked at me and said ‘This is not normal, keep going, just keep going.’” Jude (pseudonym), Emergency Medical Technician

CPR = cardiopulmonary resuscitation AED = Automated external defibrillator

IPA has been used to compare different patient experiences of similar illness or surgical procedures [317], and it also offers a way to compare individual clinicians’ experiences of decision-making. On two occasions, attendance at the same cardiac arrest event was described by different participants, allowing the researchers to gain insights into the divergent perceptions of, and meaning attributed to, a single resuscitation event.

Nurses and other clinicians are encouraged to reflect on challenging clinical experiences, to assist with professional development and facilitate coping [331-333]. In the context of time-critical decisions, there is little opportunity for reflection in action, due to competing demands. Paramedics in our study commented on the value of informal discussion of challenging cases and more formal reflective practice, but also noted that busy shift-work often precluded this. IPA interviews offer a chance for reflection on action, after the event. Paramedic participants in this study reported that reflection through research participation had been useful for professional development, recognising personal responses and improving self-knowledge and self-care. Other clinicians involved in IPA studies, including nurses [8] and psychologists [332] have also identified benefits in reflection and sense-making during IPA interviews. Although a research interview is not intended to be therapeutic, it is encouraging to know that those volunteering their time may benefit from the opportunity to reflect on salient clinical experiences. Positive experiences may also encourage participants to be involved in future research.
**Extract 2: Positive participant experience**

“I think it’s wonderful to have the opportunity to comment in something like this, in your research project. […] The other thing is that you’ve actually given me a voice. To make it better for other people. And that sits well with me.” Morgan (pseudonym), Intensive Care Paramedic

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**Limitations and methodological considerations**

IPA studies can produce rich and in-depth insights in decision-making, but they are also time-intensive and inherently context-specific. Researchers are dependent on willing participants and skilled interviewers, to encourage detailed accounts and limit participant self-censorship. The elusive nature of intuitive decision-making is that experts don’t know how they know what they know [246]. Arguably this might also make it more difficult for participants to describe their decision-making processes as expertise develops [302]. In our own study of paramedics, our volunteers were predominantly highly experienced experts, and we had to actively recruit more inexperienced and novice ambulance staff, to include their perspectives. This may be an indication that volunteers for IPA studies are more confident in their ability to make sense of their experiences and more comfortable describing them to researchers.

Most of the existing papers using IPA to explore clinical decision-making have been authored by clinician-researchers. This supports prior assertions that IPA is highly accessible [320] and could be of significant utility to future nurse researchers [297]. However, explorations of specialised expertise present philosophical and practical questions regarding the role of the researcher. Emic (insider) and etic (outsider) perspectives each have strengths and limitations. Clinician-researchers need to demonstrate adequate reflexivity, including the awareness of prior assumptions and likely influence on research from inception through to reporting of results [334].

In undertaking this paramedic study, the interviewer’s (NA) clinical knowledge and previous ambulance experience informed all aspects of study design and facilitated empathetic responses. It also made it easier to ask pertinent questions and interpret jargon and technical data more accurately. Use of journaling helped to explicate the interpretative process and was particularly useful when exploring the discomfort or challenges presented by data which contradicted her own assumptions or personal experiences [335].

Quality IPA reporting should meet consensus guidelines for qualitative research [212]. Description of the research method needs to include sufficient researcher reflexivity and a clear, auditable ‘trail’ of data analysis. Resulting themes need to be outlined with compelling descriptive and interpretative
commentary and generous illustrative quotes [294]. IPA produces results which are embedded in context, and generalisability to other populations cannot be assumed. Authors reporting IPA studies should provide enough information about the specific study context (participants, settings etc) for an informed reader to determine if results might be transferable to other settings [336]. In the case of studies exploring clinical decision-making, restrictive manuscript word-limits imposed by some health journals may preclude adequate coverage in published papers. This may, in part, have contributed to some of these elements lacking in IPA papers included in this review.

Other exploratory approaches to complex clinical decision-making

Although IPA has significant unrealised potential to contribute to understanding of complex clinical decision-making, it is certainly not the only approach which can offer insights. Researchers must select the best approach to answer the research question they have posed, cognisant of associated strengths and limitations. Retrospective interviews are a practical data collection strategy for the exploration of clinical decision-making. ‘Talk me through what you were thinking, with this patient’ is a commonly used clinical education and mentoring approach and sharing narratives of patient encounters a familiar peer support strategy.

Ethnographic research would provide opportunity for naturalistic observation of behaviour in context but such studies can require significant resources, and may induce Hawthorne effects [337]. Grounded Theory may be appealing to those wishing to generate explanatory models of interconnectedness, however the approach to data analysis and development of theory has been described as intimidating to novice researchers. Discourse analysis could reveal differences in language use, identity and meaning between novices and experts but is also regarded as a somewhat complex and specialised research approach for beginner researchers [338]. Thematic analysis provides a clear guide to data analysis, whilst remaining flexible and appears to be popular with researchers who are new to qualitative research [336]. However, it is important that researchers adequately consider and report their philosophical and theoretical underpinnings [336]. Whatever approach is taken to qualitative research in this area, results should be compelling and resonate with readers, and authors should rationalise their chosen approach, demonstrating awareness of the strengths and limitations.

Where well-rationalised, use of multiple research approaches will, in itself, help to build a more robust and detailed understanding of this research area [339, 340]. Indeed, the decision-making study described by the authors is part of a larger, mixed methods research project.

Future directions: Realising IPA’s potential

As demonstrated in this paper, IPA methodology has had limited but important application to nurse and clinician decision-making. Novel future applications of IPA could provide further insights into clinical decision-making, expertise and intuition. Longitudinal IPA designs, as discussed by McCoy
and used by Barr and McConkey [342], could be utilised to explore the changing nature of decision-making accounts and development of nurses and other clinicians’ decision-making strategies, intuition and expertise over time.

Analysis of heterogenous samples requires careful attention to the idiographic, but multi-perspective IPA design could also be very helpful to assist in improving interdisciplinary communication and shared decision-making with patients and families.

**Conclusion**

This paper has demonstrated that IPA is a methodology ideally suited to exploration of decision-making in complex real-world clinical contexts. A small corpus of IPA studies has produced valuable insights into a range of clinical decision-making contexts, giving consideration to multidisciplinary teams and including patient and family perspectives. There is a call for greater acknowledgement of complexity and uncertainty of clinical decision-making, and the impact of cognitive limitations, emotions, stress and personal values. With the recent development of advanced nursing and extended paramedic roles, there are significant opportunities for further research. To-date, however, the role of nurses as clinical decision-makers has received relatively little exploration through IPA methodology. Nurse-researchers are ideally suited to add further knowledge in this area, with an ability to see patients holistically and in-context [343]. Greater exploration of the clinician perspective on decision-making has implications for health educators, inter-professional teams, decision-support designers and patients. IPA research which utilises an idiographic, phenomenological and hermeneutic philosophical framework can provide important real-world insights in this area. IPA researchers must ensure reflexivity and consideration of prior knowledge and assumptions that clinician-researchers may bring. IPA study reporting is also strengthened by a transparent and auditable approach to data analysis. Contributing to this research area in combination with other research approaches, IPA research has significant unrealised potential to inform education, assessment and support interventions and the development of clinical guidelines.

[Published paper ends]

**Chapter summary**

Health professionals are increasingly tasked with decision-making which is time-critical, complex and uncertain, and resuscitation decision-making in out-of-hospital cardiac arrest often presents these features. The first section of this chapter has outlined the philosophical, theoretical and methodological foundations underpinning this thesis. It then introduced the mixed methods exploratory sequential research design and addressed research quality and ethical research conduct. Interpretative Phenomenological Analysis (IPA) has been useful in understanding clinician experiences and clinical decision-making in complex, uncertain and demanding contexts, including
prehospital resuscitation decisions. IPA can elucidate clinician sense-making, emotional responses, conflicts and uncertainties and has unrealised potential to assist in the understanding of expertise and intuition. Study One was underpinned by IPA and the following chapter reports findings from this interview-based study.
Chapter 5 - Study One: Ambulance personnel experiences of resuscitation decision-making

“It’s not a simple decision of ‘I’m going to resus, yes or no.’ There are other considerations to take in. I think the big thing is that we must never forget that we’re human, and we cannot be so black and white about this sort of stuff.” Morgan, ICP, 38 years’ experience

Chapter introduction

This chapter includes two published papers describing results from Study One. The purpose of this study was to explore ambulance personnel’s experiences of resuscitation decision-making in the context of out-of-hospital cardiac arrest. I undertook semi-structured interviews with a purposive sample of sixteen demographically diverse ambulance personnel, currently employed in a variety of emergency ambulance response roles, around New Zealand. Supplementary materials associated with Study One - including ethical approvals, participant information, consent forms, recruitment material, demographic questionnaire and interview schedule - are reproduced in Appendix 1.

The first paper describes the way that ambulance personnel seek-out and integrate information and enact decisions to commence, continue, withhold or terminate resuscitation efforts for out-of-hospital cardiac arrest patients. It addresses my first research objective:

i. To describe how ambulance personnel make decisions to commence, continue, withhold or terminate resuscitation efforts for out-of-hospital cardiac arrest patients

This paper is reproduced here in its entirety with permission of the Emergency Medicine Journal, which had a 2018 Journal Impact Factor of 2.307 and was ranked 9th of all emergency medicine journals [164]. According to Google Scholar Citations as at January 2020, it had been cited 5 times [166]. The paper has also received significant online attention, placing it in the top 5% of all research outputs scored by Altmetric [165].

The full paper citation is:

Beyond prognostication: Ambulance personnel’s lived experiences of cardiac arrest decision-making

Introduction

Across the world, prehospital researchers and clinicians have been working to strengthen the links of the chain of survival [4] and have made incremental gains in survival for out-of-hospital cardiac arrest patients [32]. Ultimately, not all causes of cardiac arrest are reversible, and with increasingly aged and comorbid populations, the majority of those found lifeless in the community are likely to remain that way [170]. Although significant international variation still exists, services in numerous countries including New Zealand, Australia, USA, UK and Canada allow select providers to terminate or even withhold resuscitation efforts in accordance with approved clinical guidelines [330].

Termination of resuscitation guidelines have been developed, implemented and evaluated in ambulance services around the world [71, 344] but there is a lack of international consensus [88] and limited clinical compliance [174, 175]. Resuscitation consensus guidelines recommend a cautious approach regarding intra-arrest prognostication [56] and withholding of resuscitation efforts [55].

A recent integrative review found there have been very few studies examining factors informing out-of-hospital cardiac arrest decision-making from the provider perspective, with most studies using retrospective audit of registry data and other clinical documentation [15]. Whilst these research designs capture predetermined, arrest-related variables, they may not identify the role of idiosyncratic, conflicting or uncertain contextual information, competing cognitive demands, scene stressors and other human factors. This study provides unique insights into the way that ambulance personnel seek-out and integrate complex information, offering providers’ experiences of resuscitation decision-making in the context of out-of-hospital cardiac arrest.

Method

Research setting

New Zealand is a geographically diverse country where emergency response is provided by paid and volunteer ambulance personnel of varying practice levels, as described in Table 5.1. Emergency Medical Technician (EMT) level and above are authorised to commence, continue, withhold or terminate resuscitation and verify death, in accordance with national ambulance clinical guidelines [57]. New Zealand ambulance staff attend over 4,500 unconscious pulseless patients per annum and attempt resuscitation in just under half of these cases. Patients are rarely transported with CPR in
progress, so over two-thirds of attempted resuscitations result in on-scene termination of resuscitation [345]. New Zealand ambulance personnel can face disciplinary action for negligent, unethical or unprofessional practice, but cannot be sued for damages. Under New Zealand law, ambulance personnel demonstrating good medical practice and acting in (what they believe to be) the patient’s best interests are generally providing a lawful excuse for the provision, termination or withholding of CPR [159].

**Table 5.7: New Zealand ambulance personnel practice levels**

<table>
<thead>
<tr>
<th>Practice level</th>
<th>Qualification (or equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Responder (FR)</td>
<td>Short-course in advanced first aid</td>
</tr>
<tr>
<td>Emergency Medical Technician (EMT)</td>
<td>National Diploma in Ambulance Practice</td>
</tr>
<tr>
<td>Paramedic (P)</td>
<td>Bachelor of Health Science in Paramedicine</td>
</tr>
<tr>
<td>Intensive Care Paramedic (ICP)</td>
<td>Bachelor of Health Science in Paramedicine +/- Postgraduate Certificate or Diploma</td>
</tr>
</tbody>
</table>

**Sampling and methodology**

A purposive quota sample of emergency ambulance personnel was recruited through advertising in an electronic weekly staff newsletter, social media advertising via organisational Facebook groups and snowball methods. Participants were all currently employed in emergency ambulance response roles in New Zealand’s primary ambulance service and attended at least two out-of-hospital cardiac arrests in the past 12 months. Semi-structured face-to-face interviews were undertaken by the primary researcher (NA) in mutually-agreed venues including participants’ homes or workplaces and university meeting rooms. Participants were encouraged to provide illustrative narratives of cardiac arrest decision-making, including thoughts, feelings, and actions. Prompts from a pilot-tested interview guide were used where required. Interviews were recorded with a digital recording device and transcribed verbatim by the primary researcher. Recruitment continued until the primary researcher noted meaning saturation [346] - significant repetition and ongoing emphasis of key ideas, with no new central themes arising.

Interpretative Phenomenological Analysis (IPA) was adopted as an underpinning methodology, informing the approach taken to research design, interviewing and data analysis. IPA is particularly suited for examining clinician decision-making [322, 323] - with a focus on the way participants have made sense of their experiences [296]. A rigorous approach was taken to data analysis (see Appendix 1) with a clear and auditable trail, resulting in key resuscitation decision-making themes
The primary researcher analysed all transcript data, meeting regularly with MG and JS to cross-check and question coding and defend developing themes.

**Ethics**

This study was approved by the University of Auckland Human Ethics Committee (Reference #016147) and the emergency ambulance service. The primary researcher (NA) is an emergency department nurse and university lecturer with experience interviewing health professionals. She does not have a current role with the emergency ambulance service and participation was not incentivised. Volunteers who expressed an interest in the study contacted the primary researcher and received a participant information sheet via email. The authors used pseudonyms for all participants and were mindful to ensure individuals were not identifiable through published demographic data or direct quotes.

**Results**

**Sample**

Sixteen ambulance personnel were interviewed, including staff with experience in both urban and rural settings and in paid, volunteer, full-time and part-time emergency ambulance response roles. Length of emergency ambulance experience ranged from 2-38 years with a median of 12 years. This study sought to explore perspectives from diverse ambulance personnel, but more than half of participant volunteers were Intensive Care Paramedics. These, more-experienced participants tended to speak for longer and provide a greater number of illustrative examples. Interview duration ranged from 55-145 minutes with a median of 87 minutes (Table 5.2).

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Authority to Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>4 Female</td>
<td>8 NZ European</td>
<td>13 First Responder (FR)</td>
</tr>
<tr>
<td>25-34</td>
<td>4 Male</td>
<td>8 NZ European &amp; Māori</td>
<td>2 Emergency Medical Technician (EMT)</td>
</tr>
<tr>
<td>35-44</td>
<td>3 Other European</td>
<td>1 Paramedic (P)</td>
<td>3</td>
</tr>
<tr>
<td>45-54</td>
<td>3</td>
<td></td>
<td>Intensive Care Paramedic (ICP)</td>
</tr>
<tr>
<td>55-64</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 5.8: Participant sample demographics**

**Findings: Key decision-making themes**

Participants described integrating numerous factors which influenced how quickly and confidently resuscitation decisions were made, and what actions were taken. The decision-making process is
described under four key themes (phases of decision-making) and associated subthemes (decision-making factors). These themes and subthemes are presented in Table 5.3.

Table 5.9: Key themes and subthemes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes (Sources)</th>
<th>Illustrative quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-arrival impressions</td>
<td>Chain of survival  (16)</td>
<td>“As far as the whole decision-making process goes it’s what’s its presenting rhythm, what’s going on before I get there and how long from the time the call comes in, until I get there or somebody gets there that’s doing something effective.” Max, ICP, 19 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Setting (16)</td>
<td>“I do get a little bit of a preconceived idea if I’m responding to a rest home.” Morgan, ICP, 38 years’ experience</td>
</tr>
<tr>
<td>Immediate on-scene impressions</td>
<td>Patient assessment (16)</td>
<td>“And I think that’s probably what it is. How dead are they? Are they like warm and dead? Or are they cold and stiff and dead?” Jude, EMT, 3 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Getting resus underway (16)</td>
<td>“…my mind-set is come in, do the basics and do things just concentrate on doing things and keep concentrating on doing things, and doing them well, and checking that they’re done well. Until you’re at a point in the resus when you get time to look up.” George, P, 7 years’ experience</td>
</tr>
<tr>
<td>Piecing together the big picture</td>
<td>Handover (12)</td>
<td>“I just walk in and ‘How’s it going? What’s happened? How long have you been here? How long have they been down?’ […] generally, the fire and EMTs, they’ll keep doing CPR until you get there. And they know they’re dead, but they’re doing the best they can.” Dylan, ICP, 29 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Doing everything (12)</td>
<td>“It was a refractory VF that wouldn’t respond to anything. And I was getting – we were about the 30 – 35 minute mark when we were thinking, and I said to a colleague ‘What else can we do?’” Jessie, ICP, 20 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Quality of life (13)</td>
<td>“I’d say ‘So, do you and he live alone? Can he – when he’s well, is there anything he can’t do for himself?’” George, P, 7 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Family wishes (16)</td>
<td>“So those are always ethical dilemmas, the terminal patient that passes away. And the family kind of want or expect you to do something, they’ve called you to help make that decision. So they’re ethically challenging, and sometimes you’ve got to involve the family and get the decision out of them.” Sam, ICP, 25 years’ experience</td>
</tr>
<tr>
<td>Transition to termination of resuscitation</td>
<td>Crew consensus (15)</td>
<td>“And a lot of us are quite good – or, I am – at quietly saying to people ‘This is going nowhere, we’re probably going to do another five minutes [as if going around each crew member] are you ok, are you ok, are you ok?’” Dylan, ICP, 29 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Preparing family (14)</td>
<td>“So you’re managing [family bystanders] mentally and emotionally, as well, to try and let them know that we’re doing our best but things are not going to be looking good and that outcome might not be there.” Ash, ICP, 30 years’ experience</td>
</tr>
<tr>
<td></td>
<td>Care of the deceased and bereaved (13)</td>
<td>“I just said ‘Sit with him, hold his hand, talk to him and say whatever you want to say. We’re here, anything changes or you want to know anything, just come out.’ […] I was always taught when you go to a death, your next patient is the family.” Max, ICP, 19 years’ experience</td>
</tr>
</tbody>
</table>
With updates over the radio or information from call-takers on the Mobile Digital Terminal (MDT), participants sometimes described forming pre-arrival impressions en route to cardiac arrests. Often faced with limited, vague or even contradictory information from bystanders, participants had a strong preference for personally-gathered, directly-observable data – both objective (for example personal record-keeping of time elapsed since collapse or witnessing asystole) and subjective (initial assessment of patient appearance and setting). The immediate on-scene impressions, formed within minutes or even seconds of arrival, was another key theme. If sustained return of spontaneous circulation was not achieved, or the circumstances of the arrest were unclear, further investigation was required and is described under the third theme: piecing together the big picture. If participants felt certain that termination of resuscitation was appropriate, they would transition their focus to achieving crew consensus, preparing family and caring for the deceased and bereaved.

Pre-arrival impressions

Sometimes, participants used available information to anticipate a plan of action, even as they were travelling to the scene. All participants tried to establish if the early links in the chain of survival were promptly initiated – including whether the collapse was witnessed, how much time had elapsed, whether the patient had received bystander CPR and if there was a shockable presenting rhythm.

The setting of a cardiac arrest also appeared to influence pre-arrival impressions. This was particularly true for settings which were associated with high mortality and morbidity – notably aged residential care and the lowest socio-economic areas. More than one participant seemed despondent when describing high levels of morbidity and low levels of successful resuscitation that they had experienced when working in particular neighbourhoods.

“Even the young medical ones – there’s such a huge prevalence of renal dialysis, diabetes, obesity – you name it. There are so many comorbidities in this particular community group, compared to other places in the country that I’ve been, that my threshold for starting is a lot higher here than it would be somewhere else.” Hunter, ICP, 16 years’ experience

Immediate on-scene impressions

When arriving on scene, participants typically described rapid assessment of the patient and scene, leading to commencement or withholding of resuscitation. The way a patient looked and the setting of their collapse was often described in detail, and as a central decision-making factor. This consistently included an evaluation of how obviously, recently or reversibly dead the patient was. Viewing all cardiac-arrested patients as dead appeared to assist ambulance personnel to face the brutality of CPR, the invasive procedures of ACLS and the low survival rate. ‘Deadness’ and the reversibility of that status appeared to be judged at different levels or degrees as if along a conceptual scale or spectrum. As alluded to by Taylor, less-experienced participants were more-likely to describe use of technology - such as ECG findings - when evaluating a patient’s place on the death spectrum.
“And they’re often in an odd position. They’re often cold to touch. They’ve got the film over their eyes, already. […] All animal senses know that that is a dead body. So, you know not to jump in there. When I was new, I always used to put the leads on just to make sure they were dead and there wasn’t anything I could do. But now you can very easily tell by that touch, the skin feels different.” Taylor, ICP, 7 years’ experience

Favourable patient assessment data – including warm skin and agonal gasping – were infrequently encountered, but when they were, participants described feeling compelled to commence or continue resuscitation.

“You still give it a good burst if it looks reasonable. If people’s colour looks reasonable, it’s been witnessed, they’ve made a good effort to drag them off the bed or turn them over or start CPR, in that case.” Ash, ICP, 30 years’ experience

What appeared to be more important than chronological age or comorbidity (which were both sometimes difficult to verify) was a subjective assessment of how worn-out or morbid the patient appeared to be, as determined by a combination of patient assessment and scene clues.

“When someone looks really old, chances are they are – their physical body and their capability for recovery and all that jazz are probably how old they look, rather than their actual age. So, when you’ve got the fifty year-old that’s been smoking for 40 years and drinking heavily for how many years and they look frail and little, skin hanging off them, essentially – all skin and bones. They’re not going to recover well, and you know that. […] And it really does influence it. You also get the 90 year-olds that walk marathons, that look like they’re 60. Chances are you’ll probably start with them even though they’re 90.” Hayden, P, 3 years’ experience

Participants showed a clear preference for verifiable information and often described key findings in their own patient assessment data. Having confidence to withhold or terminate resuscitation based on these immediate on-scene impressions appeared to require some experience and confidence. Morgan attended a cardiac arrest where less-experienced colleagues had already commenced resuscitation, but her assessment of the setting quickly determined the patient had significant comorbidities.

“The triggers for me are the hospital bed and if they’re on any parental or nasogastric-type feeding. […] So, when I talked about that patient with the multiple morbidities and the brand-new paramedic shocked them – just looking around the room it was evident that this person had been having cares for a long time.” Morgan, ICP, 38 years’ experience

Sometimes, pre-arrival impressions were proven false – and participants acknowledged the need for responsiveness to new or disconfirming information.

“We went to one who was a bit tricky it was ‘Oh it’s a CA patient’ and then we get there and discover, no, this person’s just been diagnosed with cancer. She’s nowhere near her terminal
Piecing together the big picture

Where resuscitation efforts had been commenced by junior crews, Intensive Care Paramedics typically described taking handover and ensuring appropriate advanced life support tasks were completed, before transitioning to an information-gathering and scene-assessment phase. Jessie directly contrasted his actions in this context, with his actions where no crew had yet initiated resuscitation.

“. . . if it’s a job where there’s already crews there working, family, and we’re coming in after the fact, it’s different. I won’t just come in and say ‘Stop.’ I’ll gauge the situation, have a discussion with the leading crew-people and then we’ll come up with a plan, and do it that way. As opposed to if I’m the first crew person there, with my colleague and we’ll walk in and all the information suggests – you know, they’ve had a long downtime and they’re dead – yes, we won’t start.” Jessie, ICP, 20 years’ experience

The decision to continue resuscitation was often driven by a desire to ensure everything had been done, and nothing had been missed. Sam expressed some reluctance to withhold or terminate resuscitation unless there was overwhelming evidence of poor prognosis. Instead, “going through the process” of resuscitation protocol appeared to offer a peace of mind.

“I guess we’re lucky in some ways because we have a protocol that we can follow. And that takes some of the decision-making out of it. You go through the process. And if you’ve tried everything in the book, then, you know – supposedly you’ve done what could be done to benefit the patient, you know, so I guess it ‘dumbs in down’ in some ways.” Sam, ICP, 25 years’ experience

Prolonged resuscitation efforts were associated with an intact chain of survival, a young and healthy-looking patient and refractory shockable rhythms. Where there was uncertainty around a decision to terminate, participants described asking themselves, their crew members or calling their medical director to ensure everything that could be done to save the patient, had been done.

If not overwhelmed by resuscitation efforts, and effective communication with family was possible, ambulance personnel would seek-out further information about the patient’s health and functioning – particularly if there was evidence of advanced age, disability or comorbidity. This also provided an opportunity to assess the understanding and expectations of family members.

“And I just went and had a talk to the family, I said ‘What’s his quality of life, anyway?’ […] And yeah, as it happened, he was getting a bit slower and he had a bit of LVF sort-of thing going on, he had a weak heart anyway and he’d obviously had surgery. So, I said to the wife
‘How hard do you want us to work on your husband?’ And I sort-of said ‘I don’t think we’re doing him any favours, here.’ And she said ‘No, I totally agree – please stop.’” - Ryan, ICP, 25 years’ experience

Family wishes or bystander expectations were mentioned by all participants, but elucidation of patient wishes regarding resuscitation was noticeably absent from many participants’ decision-making processes. Formal documentation of patient wishes was rarely described – perhaps rarely encountered. Evidence that a patient was diagnosed with end-stage disease or having palliative or hospice care appeared to make it easier to withhold or terminate resuscitation.

Transitio to termination of resuscitation

Intensive Care Paramedics described reaching an internal threshold of certainty that termination of resuscitation was appropriate, followed by a plan to assess and manage the impact of this decision. Planning for this transition involved consideration of numerous scene-related factors. These included scene safety and privacy, whether crew were aware that termination of resuscitation was imminent, whether police presence was required or desirable and whether family and bystanders had been prepared. Although it was desirable to have family and crew accepting of termination of resuscitation, experienced Intensive Care Paramedics would sometimes have to make this call without consensus.

“A lot of times people don’t want us to stop, but it doesn’t change our intervention. It is what it is. People will get upset, family will be upset, but if it’s the right decision for that situation, that patient then we just have to do it.” - Jessie, ICP, 20 years’ experience

Once resuscitation efforts were terminated, there was still much work to be done and Intensive Care Paramedics acknowledged that assisting with the deceased and bereaved was an important, challenging and rewarding part of their role.

“So you sort-of go into a different phase [...] your resuscitation physically has ended of him and then you’re going into a phase of managing the family and letting them be with him, but tidying him up a little bit, get rid of the tube and bits and pieces so that they can just be with and cradle him and hold him and cry.” - Ash, ICP, 30 years’ experience

Uncertainty

When faced with uncertain, unfamiliar or overwhelming situations commencing or continuing resuscitation was a default action – an automatic, well-rehearsed and safe response to a patient in cardiac arrest. For those describing early career experiences, a common default was to commence or continue resuscitation until evidence pointed overwhelmingly to a poor prognosis, and/or an Intensive Care Paramedic arrived. Participants with limited experience in resuscitation described being singularly focussed on delivering basic life support, giving limited attention to the scene, bystanders or
context. Taylor was one of several participants who confessed they had, as inexperienced personnel, commenced or continued resuscitation due largely to a fear of criticism or blame.

“...And we do have junior crews, as well. They don’t feel confident or comfortable not starting. So, they’ll start with the hope that someone more senior will come and make that decision. I think. I can understand that. Especially if it’s an inexperienced one. I used to do that as a new EMT. If you weren’t too sure. ‘If I start then I can’t be blamed for not doing anything.’” Taylor, ICP, 7 years’ experience

**Discussion**

This study provides unique insights into ambulance personnel’s experiences of resuscitation decision-making, using first-hand accounts, with participants drawing from their collective experience of many hundreds of cardiac arrests, over decades of practice. Results from this study suggest that initial patient assessment data, arrest setting and whether the chain of survival is intact within a short time-frame were all regarded as important decision-making factors. The relative weighting of individual factors varied significantly between participants and arrest contexts. A lack of inter-provider consensus in the importance attached to decision-making factors has been reported by other resuscitation decision-making researchers [200].

Withholding or terminating resuscitation effectively transitions the context into the scene of a death. In addition to feeling sufficient prognostic certainty, participants needed to have the skills and confidence to manage such a scene. This sample included a large number of highly-experienced Intensive Care Paramedics, who acknowledged the complexity, challenge and uncertainty of resuscitation decision-making. Participants described defaulting to commence or continue resuscitation in situations of uncertainty or inexperience. Other studies have associated prognostic uncertainty with the provision of medically futile treatment and noted that confidence in determining futility [196] and withholding or terminating curative treatment [347] appeared to increase with experience. Research exploring reasons for non-compliance with termination of resuscitation protocols noted that lack of family emotional preparedness [203] or family distress [175] were commonly-cited discretionary rationales.

Access to documentation of patient wishes was rarely described by participants, but questioning and negotiation with family and crew members sometimes assisted participants to evaluate what seemed to be in the best interests of the patient. This contrasts with findings from research conducted in the USA, where medico-legal concerns appear to be highly influential [198] and legally-binding evidence of patient wishes may have a greater role in decision-making [196].

Provision of basic life support in a rapid, consistent, task-focused way is arguably the most fundamental and highly-rehearsed skill-set of prehospital emergency providers. This contrasts with the varied, dynamic, complex and psychosocially nuanced approach described by participants in this study when considering withholding or terminating resuscitation efforts.
Limitations

The thoughts and feelings of others cannot yet be directly accessed, measured or observed by researchers. Accordingly, insights into experiences of resuscitation decision-making were gained through participant recall and description of real cardiac arrest events. Although the accuracy of such accounts cannot be verified, there was little evidence of self-censoring. Participants generously shared detailed, jargon-heavy, expletive-littered descriptions and expressed frustration, regret, doubt and sadness as well as pride and satisfaction. The legal, demographic and organisational setting of participants in this study is unique and results may not be transferable to other populations.

The primary researcher had experience in prehospital, emergency, intensive care and resuscitation roles and a dual academic background in nursing and psychology. The undertaking of qualitative research involves some subjective interpretation, and previous clinical knowledge and experience contributed to assumptions and understanding, but also facilitated an interest in this area of research, meaningful interviewing, data analysis and reporting [348].

Conclusion

Participants in this study described decision-making for cardiac arrested patients as complex, idiosyncratic and often-challenging. All participants considered potentially-prognostic factors and made some evaluation of comorbidity, although inexperienced or overwhelmed participants simply defaulted to commencing or continuing resuscitation efforts. Sensory information about the patient and setting was particularly important for experienced participants. Results suggest that prescriptive decision-making algorithms may not support the complex, dynamic integration of variable decision-making factors. Inexperienced ambulance personnel may require additional preparation and support to develop the confidence and skill required to seek-out and make-sense of decision-making factors, and to sensitively manage the scene of a resuscitation termination.

[Published paper ends]

Paper preamble

Study One participants drew on their vast collective experience and shared numerous vivid narratives of resuscitation decision-making, providing rich and plentiful data for analysis. The following paper presents further findings from Study One, which address my second research objective:

ii. To identify what assists ambulance personnel to meet the challenges of out-of-hospital cardiac arrest resuscitation decision-making

Participants in Study One readily identified sources of decision-making uncertainty and highlighted clinical, cognitive, emotional and physical demands associated with decision-making in the cardiac arrest context. Participants described feeling uncertain when attending unusual or unfamiliar cardiac
arrest situations, and/or cardiac arrest patients with unclear or mixed prognostic information. Participants also identified challenges which were highly contextual and sometimes personal. Key demands included the behaviour and expectations of family and bystanders and the emotional and personal impact of attending a cardiac arrest event.

This paper is reproduced here in its entirety with permission of International Emergency Nursing, which had a 2018 Journal Impact Factor of 1.415 [164] and was ranked 5th of all emergency nursing journals [349]. According to Google Scholar Citations as at January 2020, it had been cited 7 times [166] including selection as a primary study in a recent integrative review of clinical reasoning in the emergency medical services [350]. This paper has also received good online attention, placing it in the top 25% of all research outputs scored by Altmetric [165].

The full paper citation is:


PUBLISHED PAPER Grey areas: New Zealand ambulance personnel’s experiences of challenging resuscitation decision-making

Introduction

For the majority of out-of-hospital cardiac arrest patients, the event heralds imminent death [351]. For those with a reversible cause, prompt initiation of the aptly-named chain of survival is vital, as delays reduce the odds of return of circulation, and increase subsequent morbidity and mortality [352]. Emergency ambulance staff attending cardiac arrests are often expected to make rapid judgements in demanding circumstances, with limited available information [353]. With increasingly aged and comorbid populations, initiation of resuscitation or prolonged resuscitation efforts may not be appropriate for all patients found in cardiac arrest in the community [56, 354]. In recognition of the limitations of resuscitation, select emergency ambulance providers in many countries are authorised to commence, continue, withhold or terminate resuscitation in accordance with local guidelines [124, 330]. Evidence-based rules for termination of resuscitation have been developed and implemented [175, 330], but intra-arrest prognostication can be fraught with uncertainty and there is a lack of international consensus [56, 88, 355].

Resuscitation decision-making research designs commonly involve retrospective analysis of cardiac registry data and clinical records, and although this has significant utility in associating arrest variables with patient outcomes, it may not capture the complex and idiosyncratic experience of
resuscitation decision-makers [15]. The purpose of this study was to identify the clinical, ethical, cognitive and emotional challenges that emergency ambulance personnel experience when making decisions to commence, continue, withhold or terminate resuscitation. Identifying challenges encountered by emergency ambulance personnel called to patients in cardiac arrest has important implications for guideline development and the preparation and support of ambulance personnel.

**Research setting**

In New Zealand, cardiac arrests in the community are usually attended by ambulance personnel with varying levels of qualification and skill authorisation. Intensive Care Paramedics are the definitive prehospital resuscitation providers attending most community cardiac arrests, although basic life support ‘co-responders’ – often the New Zealand Fire Service - are commonly first on scene. Medical advisors can be consulted by phone, but doctors rarely attend emergency callouts [124, 345].

<table>
<thead>
<tr>
<th>Practice level</th>
<th>Qualification (or equivalent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Responder (FR)</td>
<td>Short-course in advanced first aid</td>
</tr>
<tr>
<td>Emergency Medical Technician (EMT)</td>
<td>National Diploma in Ambulance</td>
</tr>
<tr>
<td>Paramedic (P)</td>
<td>Bachelor of Health Science in Paramedicine</td>
</tr>
<tr>
<td>Intensive Care Paramedic (ICP)</td>
<td>Bachelor of Health Science in Paramedicine +/- Postgraduate Certificate or Diploma</td>
</tr>
</tbody>
</table>

**Table 5.10: New Zealand Ambulance Levels of Practice**

**Method**

**Recruitment and data collection**

A purposive quota sample of ambulance personnel currently employed in emergency clinical roles across New Zealand, was recruited via an email-advertisement sent-out by St John New Zealand. All interviews were conducted face-to-face at a mutually agreed location and recorded using a digital recording device. Probes from a pilot-tested interview guide were used to elicit specific narratives of challenging decisions to commence, continue, withhold or terminate resuscitation. All interviews were conducted and transcribed by the first author, an experienced research interviewer with a dual background in emergency nursing and psychology.
Methodology & data analysis

An Interpretative Phenomenological Analysis (IPA) methodology informed research design and data analysis. This methodology is particularly suited to exploring participant experiences of complex and significant life events, allowing detailed examination of thoughts, feeling and actions [294]. The researcher seeks to understand the meaning that individual participants have attributed to their experiences, creating a double hermeneutic (the researcher making-sense of the participant’s sense-making) [356]. A rigorous and auditable approach to data analysis – outlined in Figure 5.1 - resulted in the development of superordinate and subordinate themes. A combination of strategies and tools were used during data analysis, including reflexive journaling [335], manual coding on printed transcripts and use of NVivo 11 [357]. Whilst data analysis was primarily undertaken by the first author, JS and MG regularly cross-checked coding and critically questioned the development of themes.

Results

Sixteen ambulance personnel from geographically diverse areas of New Zealand volunteered and all were interviewed. Select demographic information is presented in Table 5.5. Highly-experienced Intensive Care Paramedics readily volunteered for inclusion in the study, but further, targeted recruitment was required to ensure less-experienced provider perspectives were included in the
sample. Interviews were conducted in private spaces on the university campus and in participant homes and workplaces and ran from 55-145 minutes (\(\bar{x}=90\) minutes). Four participants requested review of their interview transcripts, with no resulting changes.

**Table 5.11: Participant demographics**

<table>
<thead>
<tr>
<th>Practice Level</th>
<th>Age</th>
<th>Gender</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Responder (FR)</td>
<td>1</td>
<td>&lt;25</td>
<td>Female, 8</td>
</tr>
<tr>
<td>Emergency Medical Technician (EMT)</td>
<td>3</td>
<td>25-34</td>
<td>Male, 8</td>
</tr>
<tr>
<td>Paramedic (P)</td>
<td>3</td>
<td>35-44</td>
<td>Male, 8</td>
</tr>
<tr>
<td>Intensive Care Paramedic (ICP)</td>
<td>9</td>
<td>45-54</td>
<td>Female, 3</td>
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<td></td>
<td></td>
<td>55-64</td>
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All participants readily recalled experiences of resuscitation decision-making which were challenging, and examples were often provided without prompting. Four over-arching themes captured challenging decision-making:

1. Grey areas – situations where key information was unavailable or conflicting
2. Exceptional cases – first-encounters, arrests of secondary aetiology and those involving children or young people
3. Scene challenges – including the expectations and responses of bystanders, limited resources or difficult patient access
4. Personal responses - the idiosyncratic impact of individual values and emotional triggers

These major themes and their associated subthemes are presented in Table 5.6, along with source frequency and illustrative quotes. The meaning and importance of these themes is discussed in the following section, with generous anonymised verbatim extracts, to provide grounding in data.
<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes (Sources)</th>
<th>Illustrative quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Grey areas</td>
<td>Missing puzzle pieces (14)</td>
<td>“And I think one aspect that we can’t ever ascertain is – even if it’s a witnessed collapse – we don’t definitively know at what point there’s been a loss of cardiac output. There could have been a collapse, they could have had a very low perfusing state, where they’re still getting end-organ perfusion, and we don’t know for sure.” Jessie, ICP, 20 years’ experience</td>
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<td></td>
<td>Mixed prognostic factors (13)</td>
<td>“I remember standing at the feet, going OK, she is elderly and she does have this medication, but it was a witnessed collapsed. They didn’t do bystander CPR but our response time was like two minutes. And I remember thinking this potentially. And then I remember turning back and looking at this blood and going nope. That’s not good.” Hayden, P, 3 years’ experience</td>
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<tr>
<td>2. Exceptional cases</td>
<td>Firsts (12)</td>
<td>“I remember one of the first people I saw that was dead from a natural cause [. . .] And I asked [ICP colleague] ‘What are we doing? Why aren’t we doing anything?’ And I didn’t get that. But he was dead. So that’s just experience, I suppose. I didn’t really get a lot of answers. It took a while – some months or years of experience – to figure that out.” Ash, ICP, 30 years’ experience</td>
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<td></td>
<td>Secondary cardiac arrests (11)</td>
<td>“One I went to – we were told that he was hanging – the firemen cut him down. It was my first cardiac arrest post-hanging as well, so I was a little bit [childlike, as if unsure] ‘I don’t know!?’” Taylor, ICP, 7 years’ experience</td>
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<td>Young people &amp; children (12)</td>
<td>“. . . generally, when people are getting really, really stuck in, it’s the younger the person the more emotional people are, the more they want to help and save their life.” Jessie, ICP, 20 years’ experience</td>
</tr>
<tr>
<td>3. Scene challenges</td>
<td>Having an audience (16)</td>
<td>“So, in a public place it creates a few difficulties because you have a lot of random people around who are a bit taken-aback by the whole situation, somebody’s dying in front of them.” Charlie, P, 6 years’ experience</td>
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<td></td>
<td>Logistical limitations (16)</td>
<td>“. . . yeah, we were just about exhausted, by then. Because you can’t do much. There’s only two of you so once you get an airway in, that’s one of you stuck doing that. And then there’s CPR – you don’t interrupt CPR for anything, so everything else tends to go a little bit more by the wayside.” Taylor, ICP, 7 years’ experience</td>
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<td>4. Personal responses</td>
<td>Managing emotions (16)</td>
<td>“There’s certain jobs that you certainly get upset about. But you have to be very accepting, in this job, because people are always going to die. We can’t save everybody, whilst we do our best. You have to have that approach a bit, if you did take it too personally you wouldn’t last and you wouldn’t be effective in what you do.” Jessie, ICP, 20 years’ experience</td>
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<td></td>
<td>Personal locus (16)</td>
<td>“I mean, personally if I’m in a flat-line, please leave me there. Don’t mess with me. As much as you shouldn’t impose your values on a patient, I think it’s actually quite important, to do that and turn it into ‘Well, what would you want for you, or your family?’ It gives you a bit of a locus, if you like.” Ryan, ICP, 25 years’ experience</td>
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</table>
Key theme 1: Grey areas

“With cardiac arrests you go along and think ‘Yip! It’s a goer’ or ‘No, it’s not.’ But then you get the grey areas.” Morgan, ICP, 38 years’ experience

Incomplete knowledge of key background information about the patient and circumstances of arrest, or a mix of favourable and poor prognostic factors would create what participants described as “grey areas”. Such incomplete or conflicting information could make decision-making more challenging:

“I guess the ones that are a little bit tough at times are the ones where you don’t really know, it was not witnessed. Or perhaps it was sort-of witnessed but nothing’s been done in the fifteen minutes or ten minutes that you’ve responded to the scene. And the expectation’s that you’ll do something, but nothing’s been done. And that’s hard. So, you [sigh] perhaps have a look and perhaps get them on the floor, off the bed and do a little bit of CPR. But you’re also aware that by doing that you’re creating hope. But you’re doing that because you’re not sure of the timings, until you get more of the history, so you’re doing some stuff. So that can be quite tough at times, eh?” Ash, ICP, 30 years’ experience

In the face of limited or conflicting information, participants would commence or continue resuscitation and simultaneously attempt to gather further information, or delegate another crew member to this task. Working in this ‘grey area’ without clear signs of hope or hopelessness, appeared to be a frustrating experience. Participants required an intrinsically-determined amount of concordant verifiable information to withhold or terminate resuscitation, but this was idiosyncratic and the challenges presented in the remaining three themes also exerted an impact on decision-making certainty and actions taken.

Key theme 2: Exceptional cases

Unfamiliar, unusual or unexpected arrest situations were characterised as more challenging, requiring more protracted information-gathering and again, often leading participants to abdicate or delay decision-making, and commence or continue resuscitation. First encounters were often spontaneously described, and associated with doubt or limited comprehension. Secondary cardiac arrests - due to choking, trauma, drowning, poisoning, hypovolaemia and hanging – were also associated with multiple challenging elements. They were infrequently encountered, typically sudden and unexpected and could involve young people or children. Arrests secondary to suicide, trauma or violent crime were often volatile, crew safety uncertain and information incomplete. In the below example, Ryan persisted for some time, in an attempt to resuscitate a young patient who had drowned, and expressed relief when the patient finally became asystolic – apparently providing physiological confirmation that termination was appropriate.

“If it was a cardiac aetiology, if you like, then it would be different. However, it was secondary to a hypoxia and in terms of survivability etc. once I saw the flatline, to be fair I was quite
happy, you know? Because at least you know that is – that’s the full stop.” Ryan, ICP, 25 years’ experience

Cardiac arrests involving children or young people were rarely encountered but highly anticipated events, which commonly triggered emotional responses from crew and bystanders.

“So, it’s that feeling in your gut. You don’t want to have to deal with a really sick-to-dead kid. […] So, you’re counting the minutes as you’re driving with your foot flat to the floor, stressing about ‘What size gear am I going to need?’ You train for it, but you just don’t do it as often. So, it’s just not as sold in your head. What are you going to do, how are we going to deal with it, it’s a small person.” Taylor, ICP, 7 years’ experience

In youthful arrests, resuscitation efforts were more-often initiated and sometimes continued for a longer time than might have been associated with cardiac arrest in a much older person. Even the most highly-experienced participants described a greater weight of responsibility and emotional response, associated with terminating resuscitation efforts in young people.

“I’ve been to people in their twenties that have gone into cardiac arrest and you’ve arrived and they’re in asystole and they’ve been down for some time. And that decision to say ‘They’re dead’ – and you’re looking at somebody who’s half your age. That’s really hard.” Morgan, ICP, 38 years’ experience

Key theme 3: Scene challenges

A number of factors external to the patient and prognosis appeared to complicate decision-making and the way decisions were actioned. Indeed, all participants described on-scene issues which impacted on decision-making. Participants were aware of bystander expectations and behaviours – and needed to adjust their actions and communication with each other, mindful that they had an audience. Many participants described frustration with the unrealistic expectations and perceptions of bystanders.

“And the AED just kept going ‘No shock advised, no shock advised.’ And by that point there were quite a few bystanders and his wife […] started asking ‘Why aren’t you shocking him?’ Which I think is a really big issue with defibs and AEDs, is that the public doesn’t understand that it stops the heart, it doesn’t start it. And they feel that we’re not doing the right job when we’re not shocking them. Because they see it all on TV and [as if manually defibrillating] ‘Boom’ and magically alive, that sort of thing. So, it’s difficult listening to that, especially while you’re doing it.” Bailey, FR, 2 years’ experience

Many participants described commencing or continuing resuscitation primarily or exclusively to ensure crew safety. Highly-experienced Ash described multiple situations where a ‘show’ of resuscitation as made, until back-up arrived or it was otherwise safe to terminate efforts.
“... quite often there were times you just did a little bit longer and tried a little bit harder until police got there, or until you got out or something, because of your own safety. And just the cultural aspects of accepting that this person has died, when it wasn’t expected and all of that. And sometimes they can just get a bit - the anger – you can get caught up in that, as well, involuntarily. Not them being malicious, but just their expression that you should be doing more. So, yeah – sometimes you just keep going to show them that you’re doing some more, and knowing the patient’s dead. I’ve been in a few situations like that, where [as if whispering to a colleague] ‘Hey this guy’s dead but we’ll just keep going.’ Just to talk to them a bit more, wait until your backup comes or your manager comes or police come, just so you can explain things and your safety’s good.”  
Ash, ICP, 30 years’ experience

Key theme 4: Personal responses

The personal values and emotional responses of participants had a modulating influence on decision-making certainty and what constituted challenging or rewarding situations. Participants frequently referenced their personal and professional experiences with death, grief, disability, stress and distress. Death and tragedy were regarded as ‘part of the job’ but participants had divergent beliefs about the impact of their emotions on decision-making and job performance.

“And I’m having a little cry in this ambulance and I’m thinking ‘What the hell? This is not what I thought a cardiac arrest would be!’ And the Paramedic comes out and says ‘Hey, are you alright?’ And I say ‘Yeah.’ And then I’m embarrassed because I’m thinking [swears] how stupid, this is what you do. This is it. So, I cleaned myself up, took a deep breath and went back in.” Jude, EMT, 3 years’ experience

Hunter described the most pronounced emotional disengagement of all participants, and seemed to take pride in his objectivity, repeatedly describing himself as “cold-hearted” and “a numbers person.”

“I don’t have a big problem – in my head, the person’s dead, the person’s dead. And I’ll say ‘I’m sorry, your loved one has died.’ And I’m not sorry in the slightest […] I don’t emotionally engage, generally. It’s not who I am. My role, as I see it in my head, is to bring calm and the right decision to the scene.” Hunter, ICP, 16 years’ experience

In contrast, some participants considered acknowledgement of emotions as a feature of their expertise, and seemed to benefit from connecting with patients and families. Morgan rejected black and white thinking, favouring a considered, compassionate and holistic approach to decision-making.

“It’s not a simple decision of ‘I’m going to resus, yes or no.’ There are other considerations to take in. I think the big thing is that we must never forget that we’re human, and we cannot be so black and white about this sort of stuff.” Morgan, ICP, 38 years’ experience

The role of emotions and sensitivity to patients and families was interconnected with participants’ own values, personal experiences and beliefs. Participants recognised that this provided a lens or locus for
understanding situations, expressing a reluctance to resuscitate a patient who might then face a quality of life they would consider unacceptable for themselves, or someone they loved.

“I like to imagine if this was my partner or my Dad, or if this was me, what would I want? […] What sort of things are going to happen to this patient that will make it worthwhile assisting them to that pathway?” Charlie, P, 6 years’ experience

Differences in personal values meant participants didn’t always agree with the decisions of other ambulance personnel. Several of the more-experienced participants expressed frustration that colleagues had commenced or continued resuscitation efforts in situations where they felt that withholding or terminating resuscitation was appropriate.

“I’ve worked with some of my peers over the years that I haven’t been impressed at how they’ve dealt with some of these situations or what they’ve done, or I’ve seen people that have gone to the absolute excess of resus. To the point that it’s like [sternly, disapproving] ‘STOP, that person is DEAD!’” Morgan, ICP, 38 years’ experience

Discussion

This study offers a provider-perspective on the challenges associated with prehospital decisions to commence, continue, withhold or terminate resuscitation. A lack of information or a mix of prognostic factors created decision-making ‘grey areas’. Ambulance personnel are no strangers to uncertainty [240] and are trained to rapidly integrate data from patient assessment, history-taking and scene evaluation [263] with the patient as the usual focal point and source of information [358]. In cardiac arrest, the patient has no voice and this research supports other studies which show sourcing information from the scene and often-distressed bystanders can make decision-making more complex [104, 359] and ethically challenging [99, 201].

Exceptional cases, including first-encounters, secondary arrests or patients who were young were often described as challenging. These findings are congruent with other studies which have associated infrequently encountered presentations - including care of critically ill children - with higher levels of stress and uncertainty [360]. Clinical experience strengthens decision-making confidence and coping [240, 260, 359, 361] but research shows paramedics have relatively little exposure to out-of-hospital cardiac arrest, and may have few opportunities for ongoing or advanced simulation training, once qualified [362].

Scene challenges identified by participants included bystander behaviour and expectations, logistical limitations and adverse environmental conditions. The need to deliver patient care in the field, with limited resources, is a defining feature of prehospital emergency care [363, 364], but resuscitation skills are often taught and assessed in a well-lit, warm and quiet classroom, a manikin laid on the floor, with adequate surrounding space and resources. Participants in this study described battling hunger, fatigue and stretched resources in noisy, highly-emotional, cramped, dark, cold and chaotic
scenes. A focus on well-rehearsed, rapid ‘pit-crew’ delivery of basic life support is fundamental to emergency ambulance training. However, a singular focus on life-saving skills may not prepare paramedics for the ethically and clinically complex reality of cardiac arrest scenes and the deaths which most-commonly result [201, 207, 365, 366].

The fourth, overarching theme of personal responses described the idiographic nature of the experience of the decision-maker. Each participant articulated personal emotional triggers, experiences, expertise and values. The role of emotions was a point of some divergence, with some participants acknowledging the place of emotional responding, whilst others sought to achieve emotional detachment. High levels of stress and emotional distress in resuscitation contexts have been associated with decreased performance [367], decreased job satisfaction and even PTSD symptoms, amongst prehospital providers [368, 369]. Research suggests that professional and personal development and coping are facilitated by debriefing and other opportunities to share and reflect on challenging cardiac arrest decisions [202, 360]. Awareness of emotions [308, 370] personal values [201] and performance under stress [371] have also been associated with clinical decision-making confidence and coping.

**Limitations**

The participants in this study, whilst demographically diverse, all worked within a single organisational and national setting and results may not be transferable to other populations. The highly-experienced, volunteer sample may have captured ambulance personnel who provided particularly articulate decision-making rationales, and insightful expressions of personal values and ethical standards. This is arguably both a limitation and strength of the study design – notably, all participants conceded that they continued to face challenges when making resuscitation decisions.

**Conclusion**

Drawing on their collective experience of attending thousands of out-of-hospital cardiac arrests, participants in this study described the clinical, ethical, cognitive and emotional demands of resuscitation decision-making. Uncertainty and challenge were associated with a number of features, including the patient, scene, arrest aetiology and available information. Awareness of personal values and emotional responses appeared to have a modulating effect.

Simulated training should move beyond resuscitation task performance, to incorporate challenging elements and encourage ambulance personnel to explore their personal values, stressors and coping strategies.

[Published paper ends]
Chapter summary

As established with my integrative review [15] (Chapter 3), very few studies have examined decisions to start or stop resuscitation efforts in out-of-hospital cardiac arrest, from the provider perspective. Findings from this unique, exploratory study provide new insights into ambulance personnel's experiences of prehospital resuscitation decision-making. Prognostication in out-of-hospital cardiac arrest is known to be challenging, but results from this study suggest that confidence in a poor prognosis for the cardiac-arrested patient is only part of the resuscitation decision-making picture. Termination of resuscitation requires both a high level of prognostic certainty, and the experience and confidence to prepare crew and family for the resulting scene of a death.

Findings from my initial interview-based Study One have been reported in this chapter. Participants provided rich data and detailed descriptions of their resuscitation decision-making experiences whilst readily identifying associated challenges and sources of uncertainty. As participant accounts addressed my research questions in such detail, I chose to publish two papers. The first paper highlighted the way resuscitation decisions were made and the second described the significant challenges for ambulance personnel tasked with resuscitation decision-making. The initial focus of this research was to understand ambulance personnel's experiences of resuscitation decision-making. However, findings from Study One identified that personal, interpersonal and contextual factors made every resuscitation decision unique. Findings also revealed that a lack of information and uncertainty about prognosis were not the only challenges associated with resuscitation decision-making. Even with sufficient information and certainty of a poor prognosis, ambulance personnel sometimes had difficulty enacting the decision to withhold or terminate resuscitation and manage patient death in the field. This led me to question whether ambulance personnel are provided with the training and support to enact these difficult decisions. The following Chapter 6 describes a scoping review, which asks: How are ambulance personnel prepared and supported to withhold or terminate resuscitation and manage patient death in the field?
Chapter 6 A scoping review of ambulance personnel preparation and support for withholding or terminating resuscitation and managing patient death in the field

“I usually like to write-up jobs that I find interesting or challenging. And I think with that, it helps my clinical development and professional development but also gives me an opportunity to look-back at that and see what I could have improved on, or what I could have taken-on board or learnt from a colleague or off-sider that I was working with. That’s my main way of reflecting. And also talking to people about jobs [...] I don’t often spend time thinking back to them or finding they’re taking over my life. But certainly, over time, bits and pieces from each cardiac arrest that I’ve attended have helped shape the way that I go to the next one. And that is with an open mind, because you don’t know what you’re going to get. Yeah. It’s not that you learn one thing that might completely change you from one job, but little teaspoons of information and experiences that you have, and you can put it into a big bowl of experience and use it better, next time.” Charlie (pseudonym) Paramedic, 6 years’ experience

[Quote from Study One participant]

Chapter introduction: Why focus on preparation and support?

The main body of this chapter includes a published scoping review of the literature addressing the question: How are ambulance personnel prepared and supported to withhold or terminate resuscitation and manage patient death in the field? In this introductory section, I explain my focus on understanding preparation and support of ambulance personnel enacting challenging resuscitation decisions.

At the beginning of this project, when I set out my original research proposal, I proposed the use of a two-phase exploratory sequential design QUAL—quant. I imagined that the outcomes from Study One’s phenomenological enquiry would inform a second study of survey-based research. A second study would perhaps test a proposed model of resuscitation decision-making and examine how particular factors impact on decisions.

As is the nature of emergent sequential designs, the findings from Study One took my subsequent study design in a direction I might not have anticipated. Although participants were, at times, quite convinced of the poor prognosis of their patients, they did not always feel confident about enacting a decision to withhold or terminate resuscitation. Study One identified that ambulance personnel withholding or terminating resuscitation needed both adequate negative prognostic certainty and significant self-efficacy in a specific set of non-technical skills. These included communicating with the team, bystanders and family and providing post-mortem care, after a patient had died.
These findings led me to question how ambulance personnel are prepared and supported not only for the clinical and cognitive aspects of resuscitation decision-making, but also for the non-technical skills associated with withholding or terminating resuscitation and managing patient death. In essence, my research focus moved beyond the cognitive demands, elicitation and integration of decision-making factors which contribute to decision-making certainty. Now, I began to focus on the factors which support the enacting of challenging resuscitation decisions, and improve ambulance personnel self-efficacy when resuscitation is unsuccessful, unwanted or unwarranted.

Paper preamble

As discussed above, findings from Study One highlighted that ambulance personnel can find it challenging to withhold or terminate resuscitation and manage patient death in the field. This scoping review provides a synthesis of published research which has addressed three main questions. Each relates to ambulance personnel enacting decisions to withhold or terminate resuscitation and manage patient death: How are they prepared? What supports and coping strategies are utilised? What preparation and support needs have been identified? Using Arksey and O’Malley’s five-stage scoping review framework this review identifies what is known and what further research is needed, in this important area.

This paper is reproduced here in its entirety with permission of the Australasian Journal of Paramedicine, the official peer-reviewed, international journal of Paramedics Australasia. Many ambulance personnel do not have access to paywalled academic journals, so I am pleased to have published some of my research in this open access journal.

The full paper citation is:

Anderson NE, Slark J, Gott M. How are ambulance personnel prepared and supported to withhold or terminate resuscitation and manage patient death in the field? A scoping review. Australas J Paramedicine [Internet]. 2019;16. Available from: https://doi.org/10.33151/ajp.16.697

PUBLISHED PAPER How are ambulance personnel prepared and supported to withhold or terminate resuscitation and manage patient death in the field? A scoping review.

Introduction

Significant efforts have been made to improve rates of bystander cardiopulmonary resuscitation (CPR) [32], use of public access defibrillators [35] and optimise the overall effectiveness of prehospital resuscitation efforts [372]. However, survival rates from out-of-hospital cardiac arrest
remain very low [7, 351]. Ultimately, resuscitation cannot reverse normal dying. With increasingly comorbid and aged communities, universal application of aggressive resuscitation efforts may not always be effective, warranted or what a patient wanted [101]. Recognising this, an increasing number of countries authorise ambulance personnel to withhold or terminate resuscitation in accordance with clinical guidelines [330]. There is, however, evidence of limited compliance where termination of resuscitation guidelines are in place [79, 373].

Ambulance personnel experience high rates of post-traumatic stress and depression [374]. Feeling prepared, having high self-efficacy and adequate organisational resources and support are associated with better workplace wellbeing and performance in ambulance personnel [375, 376]. With an international move away from vocational training of emergency ambulance personnel towards pre-employment degree preparation of paramedics, it is important to optimise preparation and support for demanding emergency ambulance roles and expanding scopes [111, 377]. Recently published research exploring ambulance personnel perspectives indicates that whilst providers retrospectively identify 'inappropriate' resuscitation attempts [378], making and enacting decisions to withhold or terminate resuscitation can be complex and challenging. In order to make such decisions, ambulance personnel need to elicit and integrate numerous patient, context, scene, personal and arrest-specific variables [17, 379]. Managing patient deaths in the prehospital setting can be emotionally and ethically demanding [353, 380] and managing the transition from active resuscitation to care of the bereaved and deceased requires significant skill and confidence [18].

This scoping review was undertaken to establish what is known about the preparation, support and coping of ambulance personnel who make and enact decisions to terminate or withhold resuscitation. Results provide a synthesis of research evidence describing and evaluating what has been done to prepare ambulance personnel to make and enact these difficult decisions, what existing supports and coping mechanisms have been identified and what more could be done.

**Methods**

Ambulance personnel roles and education have evolved significantly over the past few decades, but the evidence base specific to prehospital care by non-medical providers is limited. An initial literature search suggested the existing literature was limited, used a variety of methods and involved demographically diverse samples of ambulance personnel working in varied contexts. This made it difficult to undertake a robust systematic review of evidence addressing the research questions. Instead, a scoping review was used to provide an overview, identify what is known and what further research might be needed [381]. Formal ethical approval was not required for this scoping review. The PRISMA consensus guideline for conduct of scoping reviews was consulted by the authors [285] and the seminal five-stage framework outlined by Arksey and O’Malley [382] provided a clear structure for this review: 1. Identify research questions 2. Identify relevant studies 3. Select studies 4. Chart data 5. Collate, summarise and report results.
Identify research questions

This review sought to identify what is known about the preparation and support of ambulance personnel making and enacting challenging resuscitation decisions to withhold or terminate resuscitation and manage patient death in the field. Research addressing the following questions was sought:

- **How are ambulance personnel prepared to withhold or terminate resuscitation and manage patient death in the field?**
- **What supports and coping strategies are utilised by ambulance personnel withholding or terminating resuscitation and managing patient death in the field?**
- **What preparation and support needs have been identified for ambulance personnel withholding or terminating resuscitation and managing patient death in the field?**

Identify the relevant studies

Search terms (Table 6.1) were developed in consultation with a subject specialist librarian, and with consideration of the numerous terms used to describe non-medical prehospital providers [383].

**Table 6.13: Key search terms**

<table>
<thead>
<tr>
<th>Ambulance personnel</th>
<th>ambulance*, paramedic*, emergency medical services, emergency medical technician, first responder</th>
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<tbody>
<tr>
<td>Challenging resuscitation decisions</td>
<td>resus*, heart arrest, cardiac arrest, death, terminal, palliat*, terminat*</td>
</tr>
<tr>
<td>Preparation &amp; support</td>
<td>educat*, train*, teach*, support*, coping, emotion*, psycholog*, stress</td>
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</table>

In August 2018, the following databases were searched: Medline; Cumulative Index to Nursing and Allied Health Literature (CINAHL Plus); Science Direct and PsychInfo. The lead author also undertook manual searches of key articles’ reference lists and cited reference searches through Scopus.

Inclusion criteria

Searches were limited to English-language publications from the year 2000 onwards, as prehospital protocols for withholding and terminating resuscitation have largely been implemented this century. Published papers and conference abstracts using any research methodology which addressed the three research questions were included.
Exclusion criteria

Non-empirical articles, including policy statements and opinion pieces, and foreign language papers with no translation were excluded. Papers which addressed end-of-life care or cardiac arrest, but did not address enactment of decisions to terminate or withhold resuscitation were excluded.

Select studies

Abstracts were screened for eligibility, with the majority of articles rejected due to lack of subject relevance. Two authors (NA & JS) then independently screened full-text articles for eligibility. Where disagreement existed, the third author was consulted (MG). Three corresponding authors were contacted to enquire about participant scope of practice, definition of end-of-life emergencies and/or existence of any follow-up studies. Study selection is outlined in Figure 6.1.

Figure 6.8: PRISMA study selection diagram
Chart the studies

Summary data from each study was extracted, including author, journal, publication year, sample, setting, research question and research design. Findings relevant to the preparation, support or coping and needs of ambulance personnel faced with challenging resuscitation decision-making were charted in corresponding columns. These charted summaries were imported into NVivo [357] to aid data management and coding. The authors used a combination of iterative coding, manual concept-mapping and critical discussion to create cohesive narrative synthesis of findings relevant to the three research questions. In accordance with scoping review guidelines [285, 384], there was no formal appraisal of methodological quality or risk of bias and no study was excluded based on any assessment of quality.

Collate, summarise and report results

Studies included in this review are summarised in Table 6.2. A narrative synthesis of findings is presented under three headings, corresponding to the three research questions: i. How are ambulance personnel prepared for challenging resuscitation decisions? ii. What supports and coping strategies are utilised by ambulance personnel making challenging resuscitation decisions? iii. What preparation and support needs have been identified for ambulance personnel making challenging resuscitation decisions?

Results

Through the described search and selection process, sixteen papers derived from fourteen studies were chosen for inclusion in this scoping review. All studies were undertaken with qualified, currently-practising ambulance personnel. Studies included quantitative descriptive [77, 78, 81, 385, 386] and qualitative exploratory [207, 387-390] research designs and evaluations of education interventions [366, 391-393] and policy [203]. The majority were undertaken in the USA [78, 81, 203, 366, 385, 386, 391-393] with others conducted in Canada [389, 390, 394], Sweden [207], UK [387], Spain [388] and Singapore [77].
### Table 6.14: Summary of included studies

<table>
<thead>
<tr>
<th>Publication</th>
<th>Research Question</th>
<th>Sample</th>
<th>Method</th>
<th>Key Findings: Preparation, support &amp; coping</th>
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<tr>
<td>Bremer, Dahlberg &amp; Sandman, 2012 [207]</td>
<td>What are EMS personnel's experiences of caring for families when patients suffer cardiac arrest &amp; sudden death?</td>
<td>10 EMS personnel Southern Sweden</td>
<td>Qualitative exploratory design: Interview study informed by hermeneutic lifeworld approach</td>
<td>The EMS personnel interviewed felt they needed to care for both patient &amp; family. Patient care was well-structured but moving to family care required a context-specific, sensitive response. EMS personnel needed to balance between closeness &amp; distance – facing the emotions of families whilst controlling their own emotional distress. EMS need training, clear guidelines, opportunities for reflection &amp; emotional support.</td>
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<td>Douglas, Cheskes, Feldman &amp; Ratnapalan, 2012 [390]</td>
<td>What are paramedics’ experiences with death notification, &amp; what supports exist?</td>
<td>28 paramedics Ontario, Canada</td>
<td>Qualitative exploratory design: Inductive thematic analysis of four focus groups</td>
<td>Death notifications are stressful &amp; dealing with death can be distressing. The four key themes were Practical aspects; Emotional toll acknowledgement; Emotional toll management &amp; Support mechanisms. Switching from clinical to supportive focus during resuscitation is difficult. Afterwards, downtime, managerial &amp; peer support was valued.</td>
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<tr>
<td>Douglas, Cheskes, Feldman &amp; Ratnapalan, 2013 [389]</td>
<td>What are paramedics’ experiences with death notification education, &amp; what format &amp; context would they like, in this area?</td>
<td>28 paramedics Ontario, Canada</td>
<td>Qualitative exploratory design: Inductive thematic analysis of four focus groups</td>
<td>Paramedics usually learn about death notification through trial &amp; error &amp; observation of others, but would prefer evidence-based teaching, including role play &amp; feedback. Paramedics reported very little formal death notification education, but believed that they valued &amp; applied whatever training they have had.</td>
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<td>Fernández-Aedo, Pérez-Urdiales, Unanue-Arza, García-Azpiazu &amp; Ballesteros-Peña, 2017 [388]</td>
<td>What are the experiences &amp; coping skills of EMS staff after resuscitation efforts resulting in death?</td>
<td>13 EMS personnel Spain</td>
<td>Qualitative exploratory design: Inductive analysis of six interviews &amp; one focus group.</td>
<td>Patient death can be distressing, particularly interacting with grieving family members. Participants did not feel prepared to break bad news to families. After patient deaths, EMS personnel sometimes discussed emotional responses with trusted colleagues, but identified few formal coping strategies.</td>
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<td>Publication</td>
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<td>Key Findings: Preparation, support &amp; coping</td>
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<td>Grudzen, Timmermans, Koenig, Torres, Hoffman, Lorenz et al., 2009 [203]</td>
<td>What are paramedic &amp; EMT perspectives after a policy change that allows forgoing or</td>
<td>34 paramedics &amp; 2 EMTs California, USA</td>
<td>Mixed methods evaluation of policy change: Five semi-structured focus group &amp; a brief survey conducted six months after the introduction of new policy.</td>
<td>Generally positive views reported, described termination or withholding of resuscitation in accordance with policy as ‘a risk worth taking’. Importance of non-patient/ non-clinical factors such as provider beliefs, emotional preparedness of family &amp; arrest location appeared to impact on implementation of policy. Policy perceived as empowering &amp; improved care, but still represented a risk to staff. Concerns expressed about situations where body was in a public place or family “weren’t emotionally prepared’ to have a body left on scene.</td>
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<tr>
<td>Hall, Myers, Pepe, Larkin, Sirbaugh &amp; Persse, 2004 [81]</td>
<td>What are paramedic perspectives on TOR for child patients compared with adult TOR?</td>
<td>201 paramedics from a single EMS provider Texas, USA</td>
<td>Quantitative descriptive design: 26-item survey undertaken prior to development of a child TOR policy</td>
<td>Difficulties with adult TOR included: family confrontation (43%) personal discomfort (13%) disagreement with physician (11%) fear of liability (10%) Comfort with concept of child TOR = 1 (on scale with 1 = very comfortable &amp; 10 = uncomfortable) compared to comfort with adult TOR = 9.</td>
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<tr>
<td>Mainds &amp; Jones, 2018 [387]</td>
<td>What are the non-clinical challenges associated with out-of-hospital cardiac arrest, including breaking bad news to family?</td>
<td>12 NHS Ambulance Service paramedics UK</td>
<td>Qualitative exploratory design: Two focus groups each lasting 90 minutes. Thematic framework analysis of transcripts</td>
<td>Paramedics didn’t feel they have enough preparation for managing family present at cardiac arrest scenes &amp; sometimes use distancing (separating family from resus) &amp; distraction (giving family members jobs to do) to manage this. ‘Warning shots’ are used to prepare family for bad news. Paramedics didn’t feel they have enough preparation for managing family at cardiac arrest scenes &amp; learn to break bad news by watching experienced colleagues.</td>
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<tr>
<td>Mao, Ong, Bang, Salim, Ng &amp; Lie 2017 [77]</td>
<td>What factors are associated with EMS psychological comfort with TOR?</td>
<td>254 EMS providers Singapore</td>
<td>Quantitative descriptive design: Questionnaire utilising Personal Comfort with Termination scale to identify comfort with select aspects of TOR.</td>
<td>Personal Comfort with Termination was positively associated with prior resolution of personal loss &amp; knowledge of survival probability. Suggests that TOR training should move beyond didactic components &amp; include evidence supporting TOR protocol, managing personal responses, bystanders &amp; communication with bereaved.</td>
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<td>Publication</td>
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<td>Key Findings: Preparation, support &amp; coping</td>
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<tr>
<td>Morrison, Cheung &amp; Redelmeier 2003 [394]</td>
<td>What factors are associated with EMS psychological comfort with field pronunciation of death?</td>
<td>120 Paramedics, Ontario, Canada</td>
<td>Quantitative descriptive design &amp; evaluation of survey instrument: Questionnaire measuring Personal Comfort with Field Pronouncement</td>
<td>The survey was a valid &amp; reliable instrument for measuring the paramedic psychological comfort with field pronunciation. Technical proficiency had a weak positive relationship with psychological comfort with field pronunciation, but years of overall &amp; advanced paramedic experience did not. Adjustment to personal loss was significantly associated with psychological comfort with field pronunciation. Paramedics struggling with personal loss may benefit from extra support &amp; may find managing patient death more difficult.</td>
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<td>Ponce, Swor, Quest, Macy, Meurer &amp; Sasson 2010 [366]</td>
<td>Is a 60-minute death notification intervention desired &amp; feasible? Does it improve provider comfort with family witnessed resuscitation &amp; death notification?</td>
<td>45 prehospital providers Michigan, USA</td>
<td>Quantitative intervention evaluation: Pilot study using convenience sample of providers attending education seminar. 45 attended 60-minute education session. Sub-group of 20 also attended a 45-minute TOR role play. Pre-post measures of attitudes &amp; knowledge.</td>
<td>Death notification training is desired &amp; feasible. It may increase EMS comfort &amp; skill with family witnessed resuscitation, TOR &amp; death notification. Prior to the intervention, 71% of participants had continued resuscitation efforts despite futility, due to the presence of family. Providers were interested in improving their skills in death notification &amp; facilitating family presence during resuscitation.</td>
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<td>Smith-Cumberland &amp; Feldman 2005 [386]</td>
<td>What are EMTs attitudes towards their training, comfort &amp; role when a patient dies on scene?</td>
<td>136 EMTs 14 states, USA</td>
<td>Quantitative descriptive design: Survey administered prior to completing a continuing education program. Likert scales &amp; demographic variables.</td>
<td>More than half of participants did not feel was training adequate to help families at time of death &amp; three quarters did not think training was adequate to make a death notification. Comfort was higher in more qualified &amp; experienced participants.</td>
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<td>Smith-Cumberland &amp; Feldman 2006 [392]</td>
<td>Are EMTs’ attitudes toward death changed after exposure to a death education program?</td>
<td>83 rural EMTs Wisconsin, USA</td>
<td>Quantitative intervention evaluation: Quasi-experimental pre-post comparison with three conditions: short death education intervention (2hr) long-intervention (16hr) &amp; control group (toxicology training). Measured attitude to death &amp; death notification.</td>
<td>Self-rated confidence increased in long-intervention group. Two-hour unit was enough to improve awareness &amp; knowledge but not confidence or comfort in delivering death notification. The longer unit, which allowed for discussion &amp; role-play, was able to improve comfort. Prior to intervention, most (&gt;80%) EMTs described training to deliver death notifications &amp; assist bereaved families as inadequate.</td>
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<td>Smith-Cumberland 2006 [391]</td>
<td>Can a death education programme change intended &amp; reported behaviour at the scene of a death?</td>
<td>83 rural EMTs Wisconsin, USA</td>
<td>Quantitative intervention evaluation: Quasi-experimental pre-post comparison with three conditions: short death education intervention (2hr) long-intervention (16hr) &amp; control group (toxicology training). Measured intended behaviour &amp; 3month follow-up of self-reported behaviour.</td>
<td>The majority of EMTs who received the intervention &amp; subsequently made a death notification reported changes in their behaviour, post-intervention. Death education interventions were correlated with changes in EMTs intended &amp; reported behaviours in relation to death notification.</td>
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<tr>
<td>Stone, Abbott, McClung, Colwell, Eckstein &amp; Lowenstein 2009 [385]</td>
<td>What are paramedics’ attitudes towards end-of-life situations &amp; how often do they encounter them? What preparation or training do paramedics’ have, in the provision of End of Life care?</td>
<td>236 paramedics Colorado &amp; California, USA</td>
<td>Quantitative descriptive design: Survey convenience sample from two US cities. Self-report measures of frequency encountered, importance &amp; preparedness for End of Life situations &amp; tasks including understanding advanced directives, withholding or terminating resuscitation and supporting the bereaved.</td>
<td>Surveyed paramedics self-reported that End of Life related issues were of high importance &amp; encountered regularly, but they had limited training in these areas. More End of Life training for prehospital providers is needed &amp; wanted. Particular areas of focus should include when to withhold treatments, how to verify &amp; apply advance directives &amp; how to discuss death with bereaved family &amp; friends.</td>
</tr>
<tr>
<td>Tataris, Richards, Stein-Spencer, Ryan, Lazzara &amp; Weber 2017 [78]</td>
<td>What are EMS providers’ perceived barriers to performing TOR &amp; how could protocols &amp; education be improved?</td>
<td>2309 EMS providers Chicago, USA</td>
<td>Quantitative descriptive design: Custom survey instrument.</td>
<td>What training to perform death notification? 37% on the job, 25% certification courses, 22% continuing education, 13% initial workplace orientation, 14% self-study/other, 36% nil training – do not know how. Identified barriers to TOR: Scene safety threats (chiefly secondary to family response to TOR) &amp; a lack of confidence, comfort &amp; training in death notification delivery &amp; dealing with distressed bystanders &amp; family.</td>
</tr>
</tbody>
</table>
How are ambulance personnel prepared to withhold or terminate resuscitation and manage patient death in the field?

When responding to a collapsed patient, it is expected that ambulance personnel will have been effectively prepared to rapidly identify a patient in cardiac arrest and initiate a skilled resuscitation effort which may involve numerous specialised skills. Preparation for this action has likely involved hours of classroom learning, familiarisation with algorithms, skill stations, clinical simulations and assessments. A vast and growing corpus of research has evaluated the efficacy of resuscitation teaching methods [362, 395, 396]. By comparison, this review identified few research studies exploring or evaluating paramedic preparation to make and enact decisions to terminate or withhold resuscitation. Nine included studies reported inadequate training and/or a desire for more training in this area [77, 78, 203, 207, 366, 385-389]. Results from qualitative research by Bremer, Dahlberg and Sandman [207] Mains and Jones [387] and Fernández-Aedo et al. [388] all found ambulance personnel participants felt particularly concerned about the skills required to deliver death notification and communicate with family and bystanders. Tataris et al.’s [78] recent survey of over 2000 Chicago Emergency Medical Service providers showed that 36% of respondents had no training in performing death notification, and only 25% had received training through certification courses. Four papers [78, 386, 387, 389] noted that learning about termination of resuscitation, death notification and communicating with families most commonly occurred on the job, including watching experienced ambulance personnel.

All included education intervention evaluation studies [366, 391-393] described a single brief didactic death notification session, with currently-practising ambulance personnel working in the USA. Two studies also included a comparison group who attended additional or longer education interventions. In the study by Ponce et al. [366] this subgroup was provided with a short opportunity to role play death notification. Smith-Cumberland [391] had one group attend a sixteen-hour intervention comprehensively examining prehospital patient death. Results suggest a short education intervention can increase knowledge and awareness [391, 393] but opportunities for discussion and roleplay may be required to increase ambulance personnel self-efficacy and comfort with termination of resuscitation and communication of death notification [366, 392].

What supports and coping strategies are utilised by ambulance personnel withholding or terminating resuscitation and managing patient death in the field?

Clinical practice guidelines are widely utilised as decision aids in ambulance personnel clinical decision-making. There is significant literature describing the development and validation of termination of resuscitation rules [71], but only one study identified by this review specifically sought to identify or evaluate the supports utilised by ambulance personnel managing termination of
resuscitation and patient death. Grudzen et al. [203] used mixed methods to evaluate a newly-implemented policy allowing ambulance personnel to withhold or terminate resuscitation in the field. Ambulance personnel perceived the policy as empowering and improving care, but many identified barriers to compliance with the policy. They also expressed concern that decisions to withhold or terminate resuscitation carried significant medicolegal risk.

Ambulance personnel are regularly exposed to uncertainty, distress and vicarious trauma. Participants in three exploratory studies valued downtime (brief stand-down from active work) and opportunities for peer debriefing after challenging resuscitation decision-making and patient deaths [207, 388, 390]. Studies using a variety of methodologies concluded that ambulance personnel reporting personal ‘resolved’ experiences with grief were more comfortable with termination of resuscitation and patient death. Patients with unresolved grief or other personal emotional stressors were likely to experience greater discomfort withholding or terminating resuscitation and managing patient death [71, 77, 207].

The behaviour of distressed family or bystanders at the scene of a cardiac arrest can be challenging and impact on ambulance personnel resuscitation decision-making [18]. Seventy one percent of emergency medical personnel surveyed by Ponce et al. [366] described continuing futile CPR when family were present. Three studies in this review found that participants used distancing and detachment as coping mechanisms. Focus group participants in Mainds and Jones [387] study described both physical and emotional distancing in this situation, achieved by moving family members away from the collapsed patient and focussing on the technical aspects of resuscitation. In their exploratory interview study, Bremer, Dahlberg and Sandman [207] also noted that ambulance personnel initially approach cardiac arrest and sudden death scenes with a focus on the rational, structured behaviours of resuscitation or diagnosing death. Although this may be a response to overwhelming cognitive demands, it was also used to avoid interaction or empathetic engagement with family and bystanders.

What preparation and support needs have been identified for ambulance personnel enacting decisions to withhold or terminate resuscitation and manage patient death?

A number of included studies explicitly described or measured preparation and support needs in this area, and these are summarised in Table 6.3.
Table 6.15: Identified preparation and support needs for ambulance personnel withholding or terminating resuscitation and managing patient death

<table>
<thead>
<tr>
<th>Identified preparation needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved knowledge and understanding of:</td>
</tr>
<tr>
<td>• Termination of resuscitation guideline derivation, prognostic indicators and survival statistics [77, 394]</td>
</tr>
<tr>
<td>• Local medicolegal issues including documented patient wishes [81, 385]</td>
</tr>
<tr>
<td>Improved self-confidence through rehearsal/role-play and discussion of:</td>
</tr>
<tr>
<td>• Managing death scenes and bystanders [77, 78, 203, 207, 366, 385-389]</td>
</tr>
<tr>
<td>• Death notification delivery and communication with bereaved family [77, 78, 207, 366, 385, 386, 388, 392]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Identified support needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to:</td>
</tr>
<tr>
<td>• Clear policies or guidelines [203, 207]</td>
</tr>
<tr>
<td>• Informal peer support and opportunities to discuss difficult decisions [207, 388, 390]</td>
</tr>
<tr>
<td>• Professional support for occupational or personal stressors [77, 394]</td>
</tr>
</tbody>
</table>

Discussion

The decision to withhold or terminate resuscitation is not an easy one for ambulance personnel to make or enact, as they must then transition their care to manage the scene of a patient death [18, 397]. This scoping review is the first to provide a synthesis of research describing and evaluating the way that ambulance personnel are prepared for, supported through and cope with the associated challenges. Findings suggest that ambulance personnel feel insufficiently-prepared for death notification delivery and communicating with distressed family and bystanders. Researchers have been calling for more education to better-prepare ambulance staff for patient death scenes, for over 25 years [398]. Education interventions for death notification included in this review provided a structured approach to breaking bad news. These recipe-style guides did not appear to acknowledge the unique contextual demands of the prehospital setting. Ambulance personnel are usually delivering this information to people they have only just met. Death may be sudden and unexpected and the cause unclear. The scene may be uncontrolled and lack privacy, and there may be difficulty ascertaining family relationships and accessing support services [399, 400]. Whilst building on the existing interdisciplinary evidence base is important, research specific to the prehospital emergency context is needed.

This review revealed a lack of evaluation of user-satisfaction with clinical guidelines and other resuscitation decision-supports. With the exception of work by Grudzen et al. [203] there is no evidence supporting the user-utility of documented rules or guidelines for withholding or terminating resuscitation. Whilst there is a strong evidence base validating prehospital termination of resuscitation protocols [e.g. 71, 88, 330] there is also evidence of variation between clinical practice and these
protocols [79, 355]. Future researchers should consider seeking a provider-perspective on the best way to provide information or other supports for clinical decision-making in the field.

Clinical exposure to death and dying is an inevitable part of many healthcare roles, and confidence and comfort managing these situations appears to increase with personal and occupational exposure [401]. Patient death, uncertainty, managing distressed family members and witnessing acute grief reactions have all been identified as potential workplace stressors for ambulance personnel [360, 402]. The strategies identified in this review, including downtime [403], peer support [360, 376] and the use of emotional detachment [370, 404] have all previously been identified as key coping mechanisms for emergency personnel managing critical incidents. Without adequate preparation and support, it appears some ambulance personnel distance themselves from decision-making and commence or continue resuscitation in order to avoid managing a patient death and engaging with the grief of bereaved family members Feeling unprepared and unsupported has been associated with heightened death anxiety, avoidance and distress in ambulance personnel and other health professionals [8, 405-407]. More research is needed, to identify the specific impact of resuscitation decision-making and patient death, and what can be done to improve preparation and support.

**Strengths & limitations**

This scoping review offers an inclusive approach to knowledge synthesis in the developing area of ambulance personnel education. It provides an overview of the existing evidence base and identifies gaps in the published research literature. The authors used an established scoping review framework [382] and consulted the latest consensus guidelines for scoping review reporting [285]. Formal quality appraisal for included studies was limited to each publication’s peer review process [384].

There is significant heterogeneity in study samples within this review, including variation in provider scope, cultural and medico-legal context, education models and provider demographics. Of particular note, North American study samples were made-up of 80%-100% male participants, whilst the studies from Singapore, Sweden and the UK approximated equal proportions of male and female participants. Whilst these samples may reflect their underlying ambulance personnel demographic make-up, this was rarely flagged in study findings. Generalisation across such diverse groups must be made cautiously, with evidence that individual factors such as gender, age and culture impact on prehospital provider coping and support needs [77, 374].

**Implications & recommendations**

This scoping review has revealed relatively little published research exists to specifically guide education policy or supportive practice in this area. Other disciplines including medicine and nursing, have a diverse and building evidence base outlining optimal clinician preparation and support for resuscitation decision-making, communication with bereaved relatives and coping with patient death [e.g. 408, 409-413]. Whilst this research offers some useful insights, resuscitation decisions in the
prehospital setting have unique contextual features, and the needs of ambulance personnel may differ.

Historically, confidence in withholding and terminating resuscitation and managing patient death may have developed in vocational training through mentoring and clinical exposure. However, with an international move to pre-employment degree-level paramedic training it is important to understand the quality and quantity of clinical exposure, learning, comfort and concerns of graduate paramedicine students and how best to prepare and support them. It is likely that unpublished and informal training initiatives and organisational supports are in place, around the world. Where feasible, a review of curricula could provide useful additional information. Evaluation and publication of education and support interventions will facilitate the advancement of ambulance personnel-specific evidence and pedagogical theory in this area.

**Conclusion**

This scoping review highlights a paucity of research exploring the preparation and support of ambulance personnel for making and enacting decisions to withhold or terminate resuscitation and manage patient death in the field. Ambulance personnel need more training to feel confident providing death notifications and communicating with families and bystanders present at the scene of a patient death. Future research designs should acknowledge the unique demands faced by ambulance personnel tasked with making and enacting challenging resuscitation decisions and managing patient death.

Chapter summary

Results from Study One highlighted that New Zealand ambulance personnel need unique skills and self-efficacy to enact challenging resuscitation decisions. Even where ambulance personnel felt confident the patient had died, they sometimes initiate or continue resuscitation efforts. This appeared to be due to a lack of confidence in managing the scene of a patient death and caring for family and bystanders. Findings from this scoping review suggest ambulance personnel from around the world feel inadequately prepared to withhold or terminate resuscitation and manage patient death in the field. Where asked, participants consistently wanted more opportunities to learn and develop skills in this area. Specifically, ambulance personnel wanted more preparation for death notification, communication with bereaved families and safe, sensitive management of death scenes. Ultimately, there has been relatively little research in this area. It is clear more research is needed to determine how best to prepare and support ambulance personnel for the challenges of resuscitation decision-making and patient death.
Study One participants noted differences in practice between experienced and novice staff – or differences in their own practice, over time. Those with more years of emergency experience spoke with pride and confidence about the care provided after they enacted a decision to withhold or terminate resuscitation. As I reflected on these findings from Study One and my scoping review, I concluded it was important to examine ambulance personnel preparation and support in this area. I wanted to know how these important skills associated with resuscitation decision-making and patient death were learned and how ambulance personnel were supported when they faced challenges and uncertainty. Given the changing nature of emergency ambulance training, workforce and scope it is crucial to understand how ambulance personnel are currently prepared and supported, and identify any gaps. The following Chapter 7 reports a focus-group study which asked New Zealand ambulance clinical educators and peer support staff about existing preparation and support, and opportunities for improvement in this area.
Chapter 7 Study Two: Ambulance personnel preparation and support for termination of resuscitation and patient death

Male P: “But I think the clinical desk side of things – it’s a good avenue for those people that find making the decision too hard. That they can call up and get that advice.”

Female P: “Or they don’t want to make the decision. Ones that would make the decision, but they just want somebody else to make that final call to… [pause]… The phrase that comes to mind is to end someone’s life, and that’s not quite what I mean. But they want somebody else to take away all hope. They want to call somebody else so the family aren’t seeing them being the ones that go ‘Nope, we’re stopping’ so that the family see -”

Male ICP: “- that that decision goes to someone else.”

Female P: “Yeah. Even though they know what they want, what to do and it fits, they just don’t want to be that person that makes that last decision.”

[Excerpt from Study Two focus group transcript]

Chapter introduction

New Zealand emergency ambulance personnel can withhold or terminate resuscitation on scene, but findings from Study One demonstrated that enacting these decisions can be emotionally, ethically and cognitively challenging. Around the world, survival from OHCA is relatively rare and over 85% of cardiac arrests attended by New Zealand ambulance personnel result in patient death in the field. There is a wealth of research examining training and performance of life-saving resuscitation efforts. In comparison, the scoping review in Chapter 6 located very little published research examining how ambulance personnel are prepared and supported for the relatively common situations where resuscitation is unsuccessful, unwanted or unwarranted. As paramedic educators have noted, the teaching of fundamental health psychology and sociology, communication and interpersonal skills and other ‘soft’ or non-technical skills is just as important as knowledge of resuscitation [414-416].

Dealing with patient death, family grief and the needs of bystanders and co-responders is an important, demanding and context-specific part of ambulance work. Death may be sudden and unexpected, or occur in the context of life-limited illness or advanced age. Each situation requires a unique, sensitive and supportive response from emergency ambulance personnel, and may have a lasting impact for all involved. In order to identify key preparation and support mechanisms and opportunities for improvement, focus groups were held with senior ambulance personnel working in clinical education and peer support roles.
Supplementary materials associated with Study Two - including ethical approvals, participant information, consent forms, recruitment material and a focus group facilitation guide - are reproduced in Appendix 2. This chapter includes a published paper reporting Study Two of my research project. Findings from Study Two address my third research objective:

iii. To identify what assists ambulance personnel to meet the challenges of out-of-hospital cardiac arrest resuscitation decision-making

This paper is reproduced here in its entirety with permission of International Emergency Nursing, which had a 2018 Journal Impact Factor of 1.415 [164] and was ranked 5th of all emergency nursing journals [349].

The full paper citation is:


PUBLISHED PAPER When resuscitation doesn’t work: A qualitative study examining ambulance personnel preparation and support for termination of resuscitation and patient death

Introduction

Every year, thousands of people are attended by ambulance personnel following an out-of-hospital cardiac arrest [417]. Sometimes the cause of the arrest is sudden and unexpected, but the window of opportunity for effective resuscitation is brief, and survival rates are very low [5]. In some situations, cardiac arrest is a feature of an irreversible or expected death and resuscitation efforts may be unsuccessful, unwanted or unwarranted. Transport of patients to hospital without return of spontaneous circulation is associated with very poor outcomes [175]. Acknowledging this, an increasing number of emergency ambulance personnel around the world are authorised to withhold or terminate resuscitation in the field, in accordance with local clinical guidelines [96, 330].

Ambulance personnel find decisions to terminate resuscitation particularly challenging. Key prognostic information may be unclear and scenes can be emotionally charged and uncontrolled [18, 379, 380]. Even when ambulance personnel are aware that resuscitation efforts are futile or inappropriate, they may start or continue resuscitation [17, 78, 79, 378, 387]. Researchers have identified a number of reasons ambulance personnel may default to resuscitation without hope of a good outcome for the
patient. These include emotional distancing [207, 387] concerns about the behaviour or expectations of family and other bystanders [203] and a lack of confidence in delivering death notification [207, 387, 388].

A wealth of published research has focussed on the effective teaching, retention and performance of ambulance personnel’s technical resuscitation skills [e.g. 3, 418-420]. In comparison, very little research has explored preparation and support of ambulance personnel for situations where resuscitation is unsuccessful, unwanted or unwarranted [387, 390].

Research setting

New Zealand provides an ideal setting to explore this issue, as ambulance personnel are the definitive providers of prehospital emergency care and are authorised to commence, continue, withhold or terminate resuscitation in accordance with clinical guidelines [57]. Ambulance personnel can consult with an experienced paramedic or a medical director, by phone or request a senior paramedic on scene, but doctors rarely attend community cardiac arrests [153]. As is the case in many countries, an increasing number of people with complex medical conditions and advanced age are living and dying in community settings.

In New Zealand, emergency ambulance crews respond to all cardiac arrest calls in the community. Co-responders may include fire service personnel and, in rural and remote areas, volunteer first responders. Emergency ambulance employees are generally qualified at three levels: Emergency Medical Technicians (EMTs) who have completed training equivalent to a diploma, Paramedics (Ps) who have degree-level training and Intensive Care Paramedics (ICPs), who are experienced staff who have often completed postgraduate education. As is the case in Australia, Canada and the UK ambulance personnel education has moved from vocational training to pre-employment paramedic degree training, presenting new opportunities and challenges [421, 422]. This study focusses on the preparation and support of currently-practising ambulance personnel, some of whom were vocationally trained, some who obtained degrees pre-employment and others who completed degrees post-employment.

Research aims

The primary aim of this study was to describe existing preparation and support mechanisms for ambulance personnel terminating resuscitation efforts and managing patient death. We wanted to ask the experts providing clinical education, management and pastoral support, what education and support was essential – and whether they could see opportunities for improvement, in this area.
Method

Design

An exploratory qualitative design utilising inductive thematic analysis [280] was adopted and underpinned by a critical realist framework [423].

Ethics

The primary researcher has a dual background in nursing and psychology and clinical and research experience exploring sensitive topics. She has prior experience with emergency ambulance care and education but is not currently employed by any emergency ambulance service. Ethics approval was obtained from the University of Auckland Human Participants Ethics Committee [#020035] and St John New Zealand. Volunteers initiated contact with the primary researcher in response to study recruitment advertisements and participation was not incentivised. Limited grouped demographic information is provided, to avoid identification of individual participants.

Participants

Recruitment of participants from all regions of New Zealand was undertaken via email advertisements sent out on behalf of the researcher and snowball techniques. All participants were emergency ambulance personnel currently involved in clinical or peer support roles. Clinical support staff were in part-time or full-time professional development and education roles including classroom-based teaching, on-road mentoring and phone support via the clinical support desk. Peer support staff were members of a team of ambulance personnel who provide voluntary pastoral support to colleagues. Although the original intention was to gather data solely through focus group discussion, two participants were eager to contribute their perspectives, but unable to attend focus groups at regional centres. Face-to-face interviews were conducted with these participants, in order to include the perspectives of staff working in rural and remote areas.

Data collection

Five focus groups of 3-5 participants and two interviews were conducted between March and May 2018, in a variety of locations across New Zealand. All focus groups took place face-to-face in ambulance organisational meeting rooms, allowing for a familiar setting and suitably private and quiet environment. Facilitator prompts are outlined in Table 7.1. The first author facilitated, recorded and transcribed all focus groups and interviews, keeping a reflective journal throughout these processes. Journaling aided reflection on focus group dynamics, logistics, facilitation, early ideas, assumptions and derivations of meaning. After four focus groups and two interviews, the primary researcher noted
familiar repetition of key themes and limited new material being introduced. Co-authors discussed and critically appraised the first authors’ notes, ideas and proposed key themes at this point, considering if convergence and divergence had been adequately explored. A fifth and final focus group was then conducted and confirmed that saturation of data in relation to the research objectives had been reached, with repetition of key ideas and no new central issues arising [336].

**Table 7.16: Facilitator prompts**

**Discussion-starter:**
I am just going to give you a minute to think about a situation – acting in your peer support or clinical support role - where you have helped ambulance personnel to manage challenging OHCA decision-making, termination of resuscitation or a patient death. Is anyone happy to share an example?

**Select probes:**
- What competencies do ambulance personnel need to manage resuscitation decision-making, termination of resuscitation and patient death? (How) are these learned? (How) are these assessed?
- To what extent does simulation learning continue beyond the point of death?
- When do ambulance personnel seek support at the time of managing cardiac arrest and death scenes? What is most helpful? What else could be done?
- How are ambulance staff supported after managing challenging cardiac arrest and death scenes? What do staff find most difficult to cope with? What is most helpful? What else could be done?

**Concluding questions:**
- Of all the things we’ve discussed, what are the most important issues?
- Is there anything we should have discussed, but haven’t yet had a chance to?

**Data analysis**

Data were analysed with a focus on identifying patterns across data, using inductive thematic analysis as described by Braun and Clarke [280]. The six stages of data analysis are described in Table 7.2. Although presented in a step-wise fashion, all phases involved iterative re-examining of the data sources. The researchers took a critical-realist perspective, recognizing that knowledge of reality is only accessible through the lens of participants’ world views and experiences [230]. NVivo 11 [357] was used to manage transcript data and keep a record of coding.
Table 7.17: Thematic analysis

<table>
<thead>
<tr>
<th>Stage of analysis</th>
<th>Description of process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Getting familiar with data</td>
<td>Focus group facilitation, transcription, journaling.</td>
</tr>
<tr>
<td>2. Generating codes</td>
<td>Systematic application of latent and semantic codes. Data organised in NVivo.</td>
</tr>
<tr>
<td>3. Generating themes</td>
<td>Searching for clusters, distinctive, important or frequent ideas with a central organising concept. Paper and pen thematic mapping.</td>
</tr>
<tr>
<td>4. Reviewing themes</td>
<td>Refining of themes</td>
</tr>
<tr>
<td>5. Defining themes</td>
<td>Providing themes which stand alone and adequately describe the central concept they represent</td>
</tr>
<tr>
<td>6. Reporting the analysis</td>
<td>Description of themes supported by a sequential model and illustrative extracts</td>
</tr>
</tbody>
</table>

Adapted from Braun & Clark [280, 336]

Results

Twenty ambulance personnel in clinical education and peer support roles around New Zealand participated in this study. Table 7.3 presents summary demographic data

Table 7.18: Participant demographics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Descriptor</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Level</td>
<td>Emergency Medical Technician</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Paramedic</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Intensive Care Paramedic</td>
<td>7</td>
</tr>
<tr>
<td>Age group</td>
<td>25-34</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>45-54</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>55-64</td>
<td>3</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>12</td>
</tr>
<tr>
<td>Role experience</td>
<td>Clinical support</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Peer support</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Clinical desk</td>
<td>8</td>
</tr>
</tbody>
</table>
Focus groups and interviews lasted between 60 and 110 minutes and were generally self-moderating, with participants taking it in turns to express ideas, provide narratives, clarify and check for consensus. Thematic analysis identified key features of clinical and emotional preparation and support for ambulance personnel enacting termination of resuscitation and managing patient death. Themes and subthemes are presented in Table 7.4, along with illustrative quotes and clear descriptions and further supportive quotes, below.

<table>
<thead>
<tr>
<th>Themes</th>
<th>Subthemes</th>
<th>Illustrative quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Preparation prior to event</strong></td>
<td>Clinical exposure</td>
<td>Male ICP: “...when you’ve seen a lot of those situations and you’ve seen death that many times it becomes pretty easy to recognise. It becomes easier to make that decision.”</td>
</tr>
<tr>
<td></td>
<td>Social modelling</td>
<td>Male ICP: “I quite liked how [senior paramedic] communicated with the family, and thought I’d never seen that before, I quite like that and I’m going to add it to my repertoire. And I think that’s what [novices] do - they role-model off other people and take bits that suit them and they develop their own style.”</td>
</tr>
<tr>
<td></td>
<td>Life experience</td>
<td>Male P: “It’s interesting, I think with our changing workforce now, there are a lot of really young people who haven’t got a lot of life experience and some things - like reading people’s emotions – they just don’t do it.”</td>
</tr>
<tr>
<td><strong>2. Support during event</strong></td>
<td>Organisational back-up</td>
<td>Male ICP: “...now everyone’s on the same ground and people have got that opportunity to voice their concerns. And […] in our guidelines there’s a little bit more direction in regards to what is associated with good outcomes and what is associated with not so good outcomes.”</td>
</tr>
<tr>
<td></td>
<td>On-scene or phone support</td>
<td>Male P: “But I think the clinical desk side of things – it’s a good avenue for those people that find making the decision too hard. That they can call up and get that advice.” Female P: “Yeah. Even though they know what they want, what to do and it fits, they just don’t want to be that person that makes that last decision.”</td>
</tr>
<tr>
<td><strong>3. Post-event support</strong></td>
<td>Peer check-in</td>
<td>Female EMT: “So we spoke about it afterwards. And I followed her up, since. Just to see how she’s going. And she said once she got her head around it, then she was OK.”</td>
</tr>
<tr>
<td></td>
<td>A personalised approach</td>
<td>Female ICP: “...because it’s going to be different for everybody, aye. And you know – you can tell if somebody’s really stressed out about a job that they’re not going to be able to go to another job and give their all and give that patient the care they need. And that’s important – to give people that time.”</td>
</tr>
</tbody>
</table>
Theme 1: Preparation prior to event

Subthemes: Clinical exposure; Social modelling; Life experience

Participants felt experiential learning was essential in preparing ambulance personnel for termination of resuscitation and patient death. In contrast to highly-technical resuscitation skills, participants described a specific set of interpersonal or non-technical skills required to manage patient death. These non-technical skills included team management, conflict resolution, decision-making, communication with distressed bystanders and support of bereaved family members. Professional development in these areas occurred through a combination of clinical exposure (e.g. being involved in an unsuccessful resuscitation) and social modelling (e.g. observation of experienced mentors communicating sensitively with family and bystanders, after a patient death). The quality and quantity of early-career clinical exposure to these situations was noted to be highly variable. Clinical support staff knew of few situations where simulation training included management of the scene of a patient death. Although verification of death was sometimes rehearsed as a technical skill, most felt unsure if the non-technical skills they had identified as key were discussed, rehearsed or assessed as part of pre-employment education.

Female P: “[Degree training] is something that’s based on your practical skills and your drugs, your practical skills, your dexterity. Then everything else is learned as you go along. It’s very much – you don’t learn how to deal with family until you’ve seen it happen. You can be told but I don’t think telling someone is allowing them to know what’s happening. To know how to tell someone and the words to use is something you have to watch and something you have to pick up.”

Participants also noted that personal life experience with loss, uncertainty, grief and death impacted on self-knowledge, self-efficacy and coping. They attributed some of their own expertise and sensitivity managing tragic or distressing situations to their personal experiences with death and dying. Exposure was also seen to develop emotional hardiness and increase coping with uncertainty.

Female P: “I think it’s also about personal experiences.”

Male ICP: “It is, it is. And you can’t teach that.”

Female P: “From when my father died – how I deal with palliative care patients is completely different. And I know my colleague who lost her father and mother has said exactly the same thing. It’s actually sometimes about your own personal exposure, as well, that makes a difference to this.”

In comparison, all groups noted that younger novice staff sometimes appear to have had very little exposure to death, dying and care of the bereaved.
Female EMT: “And for the young staff it’s about supporting them a lot. There’s a lot of life skills that you can only get, as you get older. And dependant on how they’ve grown up, and support networks and what they’ve known of death as they’ve grown up. About how things happen. And I actually think a lot of people are sheltered from it a lot, now. I think there’s a lot of ‘oh you can’t go and see grandma because she might die today’ sort of thing. If they’re at that stage of their life. And they don’t want kids to see that. So, then they don’t actually know how to deal with it.”

It was also acknowledged that cumulative exposure to personal and occupational stressors over time could generate vulnerability and emotional distress.

**Theme 2: Support during the event**

**Subthemes: Organisational back-up; On-scene or phone support**

Most ambulance personnel in New Zealand are authorised to terminate resuscitation and verify death. There are clear clinical guidelines and no precedent for medicolegal action in response to a decision to terminate resuscitation. However, participants stressed that inexperienced staff were not expected to make difficult resuscitation decisions or manage challenging patient deaths, alone. In their various clinical and support roles, all participants had attended or ‘backed-up’ other crews making difficult resuscitation decisions, and many had provided support over the phone, through the organisation’s clinical support desk. The clinical desk was viewed as particularly useful for novices and those working in remote locations, who did not have access to on-scene senior support.

**Male P:** “It’s kind of what I teach people, too. That sometimes, if you’re new and you ‘call this’ [terminate resuscitation] you’re going to doubt yourself and you’re going to wonder ‘should I have kept going?’ and it’s just nice to leave that decision to those of us that have been long enough that we can cope with it. So, if nothing else, keep going for your own mental health and let someone else make the call.”

**Male P:** “New people get into the job because they care about people and want to help people.”

**Female P:** “They want to save lives.”

**Male P:** “Yeah, and they don’t want to go wondering whether or not they should have kept doing that CPR on that person or not. They’re hard decisions when you haven’t done much, yet.”
Theme 3: Post-event Support

Subthemes: Peer check-in; A personalised approach

As managers and colleagues, participants described providing a critical safety net, checking-in on other ambulance personnel, following patient deaths. They valued knowing staff well-enough to recognise subtle signs of strain or distress and offer support that accommodated individual coping styles. For those affected by a challenging patient death, opportunities to ‘talk through’ the event with a supportive colleague were considered beneficial for both emotional coping and professional development.

Male EMT: “You just don’t go back on the road until you’ve had that proper debrief that you think people are right to go back on the road. I’ve asked our boss to take people off the road because I know they’re not right. I’ve known these people for fifteen years. I know when they’re not themselves.”

Male P: “Personally, I just get them to talk through the facts. [...] Where there’s greyness, to a certain extent they bring clarity in their own mind, when they talk about it.”

Participants also noted that death was part of the job and ambulance personnel often attended unsuccessful resuscitations or expected deaths without experiencing any uncertainty or distress. It was noted that ambulance personnel utilised a range of different coping styles and sometimes people valued some time alone, for introspection. Availability of formal psychological or clinical debriefing was valued, but a number of participants expressed opposition to one-size-fits-all or compulsory post-event interventions.

Female EMT: “And my colleague just let me be until everyone else had gone […] but that was good. He knew me, so I think it makes a big difference – the crews that you work with a lot. We get to know people. And you can read them – you know the ones who will need a bit more support. Or just the ones that you know will give you a phone in a couple of days, or you phone them. Because they just need that quiet time by themselves.”

Discussion

This study is the first to provide a specific, systematic qualitative exploration of preparation and support for ambulance personnel terminating resuscitation and managing patient death in the field. Senior New Zealand ambulance personnel with significant expertise in clinical, managerial and pastoral support roles emphasised the value of experiential learning.

Participants acknowledged that clinical exposure and personal (life) experience appear to have a complex relationship with ambulance personnel’s support needs and coping. Personal experiences with resolved grief and loss have previously been associated with increased provider comfort with field termination of resuscitation [77, 207, 394]. However, participants provided anecdotes of highly-
experienced staff experiencing uncertainty or distress after clusters of particularly challenging resuscitation decisions or critical events in their personal lives. Other studies have also identified that clinical exposure to patient death in the field can increase self-efficacy but does not preclude uncertainty or emotional distress [18, 77, 207].

Participants identified non-technical skills including complex decision-making and communication with team-members, bystanders and family, as critical attributes for managing termination of resuscitation and patient death. Participants expressed some uncertainty as to how teaching and assessment of these skills could be incorporated into pre-employment training. This echoes previously published research asserting that ambulance personal learn the psychosocial skills associated with termination of resuscitation, death notification and communicating with bereaved families through clinical experience and social modelling [78, 386, 387, 389]. Non-technical skills are critical to emergency ambulance work, particularly the expanding scope of practice of paramedics [133, 364, 424, 425]. Historically they have been dismissed as ‘soft skills’ which cannot be reliably or objectively measured [426] and have only recently become a focus of attention in prehospital research, training and assessment [414]. Although the value of clinical exposure to clinical development is well-established [e.g. 361, 401], researchers have noted that ambulance personnel exposure to cardiac arrest is variable and perhaps insufficient to develop and maintain key competencies [362].

Results from this study suggest ambulance personnel respond idiosyncratically to challenging resuscitation decision-making and patient death, so there is a need for a range of supports. Research into critical incident stress also suggests that subjective appraisal contributes to an individual’s response to critical incidents [427] and there is a need to ‘match’ interventions to individual needs [428]. The personal checking-in or sentinel role outlined by participants was also described by ambulance managers in a qualitative study by Hugelius, Berg, Westerberg, Gifford and Adolfsson [429]. Whilst mandatory formal debriefing was not considered helpful by participants, a personalised offer of peer debriefing and a brief stand-down period was critical to coping. This is a repeated finding in research exploring critical incident management by ambulance staff [376, 428, 430].

**Strengths & limitations**

This study drew on the expertise of ambulance personnel working in teaching and supportive roles. Focus groups generated discussion with disagreements, different perspectives and clarifications contributing to shared meaning [431]. Focus groups were made-up of participants with established collegial relationships and norms for discussion. This appeared to facilitate comfortable, candid, naturalistic discussion and airing of divergent perspectives.

All focus groups were organised, moderated and transcribed by the primary researcher. In order to improve rigor and transparency, researchers met regularly during data collection and analysis to critically discuss key ideas, coding patterns, convergence and divergence.
Focus group data does have limitations. It is difficult to be sure if consensus is genuinely achieved within groups, or acknowledge the importance of convergence and divergence between groups [432]. Naturalistic social interaction also led to some discussion which diverted from the key research focus and a tendency to provide detailed personal anecdotes. Established dynamics between colleagues could also have acted as barriers to full disclosure, or made some group members feel uncertain about voicing disagreement.

**Recommendations**

As noted by participants in this study, ambulance personnel have historically learned to enact challenging resuscitation decisions, manage patient death and communicate sensitively with bereaved family members through observation of senior paramedics. With a move to pre-employment education and training, early-career clinical exposure to these learning opportunities may be limited. Greater awareness and discussion of death, grief and the limitations of resuscitation should be integrated into paramedic degree programmes and may assist novices who have had limited exposure to these issues.

Participants rejected a ‘one size fits all’ approach and argued that support for ambulance staff following challenging patient deaths should be tailored to the needs of the individual. Availability of informal peer support seems to be protective, but new staff might have both greater need and more difficulty accessing this. It is helpful if managers allow sufficient ‘down time’ for colleagues to check-in with each other and informally debrief after challenging patient deaths.

This study sought perspectives of experienced ambulance personnel in senior and support roles within a single, national ambulance provider. Research is needed which explores other ambulance provider, student and novice perspectives on preparation and support needs, confidence and concerns associated with unsuccessful resuscitation and patient death.

**Conclusion**

When enacting decisions to terminate resuscitation, ambulance personnel need sufficient confidence in their ability to competently manage the resulting scene of a death, including post-mortem care, death notification and support for the bereaved, managing personal responses and supporting crew and bystanders.

Experience and exposure are highly-valued but take time to acquire and supportive mechanisms need to be in place to facilitate social modelling, emotional coping and clinical development. Personnel are likely to respond idiosyncratically, so it is best to offer a range of supports including informal, personalised peer support with optional formal psychological and clinical follow-up.

[Published paper ends]
Chapter summary

Study Two findings identified the importance of life experience and clinical exposure for ambulance personnel faced with challenging resuscitation decision-making and patient death. In the past, ambulance personnel were typically middle-aged men with previous occupational and general life experience. They received post-employment training, including apprenticeship-style learning supplemented by short block courses. Staff began in junior roles and were promoted as they accrued experience, clinical exposure, skills and knowledge. With an emerging paramedic graduate workforce, an increasing number of emergency ambulance personnel are beginning their emergency ambulance careers with significant knowledge and skills. It is unclear, however if these degree-qualified ambulance personnel are 'work-ready' for resuscitation decision-making and patient death. This is a demanding and complex aspect of ambulance work, which appears to require sensitivity, experience and self-efficacy. The following Chapter 8 describes Study Three, the final study in this research, which explored paramedic student readiness for resuscitation decision-making and patient death.
Chapter 8 Study Three: Paramedic student confidence, concerns, learning and experiences with resuscitation decision-making and patient death

“[I’d like to learn] what to do after someone dies. For example; getting pillows and blankets for the patient, returning the room back to normal. It’s the small things you don’t learn in class. It could be good to run scenarios where we look for end of life signs and explain the death to a family member. Even if it’s made-up it’s good to have an idea of what you might say and how it feels coming out of your mouth.”

[Paramedicine student participant response, Study Three]

Chapter introduction

As discussed in the last chapter, educators and peer supporters who were involved in Study Two reported concerns about whether paramedic degree graduates were prepared for resuscitation decision-making and – in particular – managing the scene of a patient death. Numerous studies investigating paramedic-graduate work-readiness have been recently published this century [e.g. 433, 434-436] but none were located which addressed paramedic student readiness for resuscitation decision-making and patient death. Paramedics are the new emergency ambulance professionals with New Zealand and Australia boasting a growing workforce of degree-qualified paramedics [124, 125, 437]. This chapter includes a published paper describing the third and final study in this research thesis - an online cross-sectional survey of students nearing completion of a paramedic degree in New Zealand. Supplementary material associated with this Study Three - including ethical approvals, recruitment advertisements, participant information and the survey instrument - are included in Appendix 3.

Study Three piloted a newly-developed Confidence with Resuscitation Decision-Making and Patient Death Scale, to address the research objective:

To identify paramedic student confidence, concerns, learning and experience with resuscitation decision-making and patient death

This paper is reproduced in its entirety with permission of Australasian Emergency Care, which had a 2018 CiteScore of 1.98 [438] and was ranked 4th of all emergency nursing journals [349]. This paper has already received excellent online attention, placing it in the top 10% of all research outputs scored by Altmetric [165].
Introduction

Although overall survival from out-of-hospital cardiac arrest has increased [42] the majority of pulseless patients attended by emergency ambulance do not survive to discharge from hospital [6, 7]. Recognising this, paramedics are increasingly authorised to withhold or terminate resuscitation and manage the resulting scene of a patient death [330]. In the information-limited prehospital context, it can be challenging to determine when initiating or continuing resuscitation efforts might not be in the best interests of the patient. Even where futility is determined, research suggests that prognostication is not the only consideration in prehospital resuscitation decision-making [17, 378, 379]. Paramedics need sufficient confidence in their ability to competently manage the resulting scene of a death, including providing death notification to the bereaved and support to crew and bystanders [15, 17, 78, 207]. Even highly-experienced paramedics can face uncertainty or find it emotionally and ethically challenging to withhold or terminate resuscitation efforts [18, 380].

This century, countries including Australia, New Zealand, Canada and the UK have moved away from vocational certificate and diploma-level training to a new paramedic training pathway of pre-employment degree-level preparation [123, 421]. A variable number of clinical experience hours are included within paramedic degree training, and graduates often find the transition from student to clinician challenging [422, 436, 439].

Studies have examined paramedic student competency and confidence in the skills associated with resuscitation [362] and paramedic preparation for palliative care [440, 441] use of advance directives [103, 442] and delivery of death notification [387, 389, 393] have also received some recent attention. However, no previously published research has specifically examined paramedic graduate preparedness for unsuccessful, unwanted or unwarranted resuscitation and patient death.
Study aims

The purpose of this study was to pilot a new measure of paramedic confidence concerning decisions to commence, continue, withhold or terminate resuscitation and manage patient death. Results from this pilot study also provide a cross-sectional ‘snapshot’ of graduating paramedic students’ learning experiences, clinical exposure and greatest concerns in this challenging area.

Methods

Design

A cross-sectional online survey design was chosen to protect participant anonymity and effectively reach a diverse, geographically distributed population who regularly utilise online resources as part of their degree programme.

Ethics

Ethics approval was obtained from University of Auckland Human Participant Ethics Committee (#021883), Auckland University of Technology Ethics Committee (#18/341) and Whitireia Ethics Committee (#RP185-2018). To ensure anonymity, limited demographic data were collected and results reported as group data. The researchers are not employed by New Zealand’s providers of paramedic higher education, participation was voluntary and recruitment advertising was distributed by third parties.

Survey instrument

A new survey measure was designed as no suitable measure of student paramedic preparedness for resuscitation decision-making and managing patient death could be located. A measure of psychological comfort with field pronouncement designed by Morrison, Cheung and Redelmeier [394] and adapted by Mao, Ong, Bang, Salim, Ng and Lie [77] provided useful background but was not suitable for this study. The development of the survey instrument was informed by a review of the literature [19] and previous research undertaken by the authors. Interview [17] and focus group studies [443] identified the skills required for paramedics to confidently and competently withhold or terminate resuscitation and manage patient death, ensuring scale content validity. An initial pilot instrument was sent-out to a convenience sample of paramedic educators and clinicians, resulting in minor rewording and addition of two scale items. Participants were asked to assume they were acting within the scope of an emergency ambulance role and in accordance with clinical practice guidelines, and rate their level of agreement with statements beginning “I feel confident…” on a six-point Likert-
type scale. (1=Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4=Somewhat Agree, 
5=Agree, 6=Strongly Agree). The online survey was produced using Qualtrics (www.qualtrics.com).

Sample

Students enrolled in Year 3 courses received invitations via email and social media which included a 
link to participant information and a brief online survey. Participants completed surveys in the last 
three months of 2018. At the time, approximately 170 students were enrolled in final-year paramedic 
papers at one of New Zealand’s two paramedic-degree providers. Both part and full-time students 
were eligible. Screening questions were included to ensure participants met eligibility criteria.

Data analysis

Data were exported into IBM SPSS 25, then manually checked and labelled. Incomplete surveys were 
excluded, leaving a data set with no missing values. As this was a pilot study, statistical analyses 
were mostly descriptive, with limited inferential testing. Authors also tested the internal consistency 
and undertook exploratory factor analysis of the newly-developed Confidence with Resuscitation 
Decision-Making and Patient Death Scale.

Participants provided free text responses to five open-ended questions. These were analysed using 
inductive thematic analysis [336]. Data management and coding were undertaken using NVivo 11 
[357]. Open responses are considered and reported in two clusters: ‘Student’s greatest concerns’ and 
‘Other helpful learning opportunities.’

Results

In total, 82 students responded to the survey, although four surveys were excluded as participants did 
not meet inclusion criteria (46% response rate). A further six responses were incomplete, leaving 
seventy-two online surveys included in the final analysis. The sample was demographically diverse as 
summarised in Table 8.1.
Table 8.20: Participant sample

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School-leavers (&lt;26)</td>
<td>40 (56%)</td>
</tr>
<tr>
<td>Mid-life (26-44)</td>
<td>18 (25%)</td>
</tr>
<tr>
<td>Mature (45+)</td>
<td>14 (19%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>49 (68%)</td>
</tr>
<tr>
<td>Male</td>
<td>23 (32%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Enrolment status</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time</td>
<td>50 (69%)</td>
</tr>
<tr>
<td>Part-time</td>
<td>22 (31%)</td>
</tr>
</tbody>
</table>

Confidence with Resuscitation Decision-making and Patient Death Scale

Nineteen scale items beginning “I feel confident…” described actions, skills and knowledge associated with paramedic resuscitation decision-making and patient death. Scale responses are given in Table 8.2, ordered from highest to lowest mean confidence.

The internal consistency of the scale was high (Cronbach’s Alpha = 0.912). An exploratory principal components factor analysis suggested two factors (examining the scree plot and taking eigenvalues >2). Scale items loading highly (>0.6) and more exclusively onto factor one (<0.2 on factor two) appeared to be procedural in nature. These items tended to involve technical skills, which could be rehearsed and measured against a single ‘best standard’ of practice. The highest-loading items were ‘I feel confident verifying patient death in accordance with clinical practice guidelines’ (0.78) and ‘I feel confident identifying that a patient is in cardiac arrest’ (0.74). Scale items loading onto factor two described non-technical or socially-negotiated skills requiring adaptation to contextual demands. The highest-loading items included ‘I feel confident notifying family members of patient death’ (0.78) and ‘I feel confident providing emotional support to bereaved relatives, following a patient death’ (0.78). Some items cross-loaded (>0.4 on both factors) including ‘I feel confident using documented patient wishes to inform resuscitation decisions’ and ‘I feel confident identifying when ongoing resuscitation efforts are medically futile’. This may indicate these scale items combined both technical and non-technical skills.
Table 8.21: Paramedic student Confidence with Resuscitation Decision-Making and Patient Death Scale responses

<table>
<thead>
<tr>
<th>Scale item</th>
<th>Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel confident...</td>
<td></td>
</tr>
<tr>
<td>...providing effective CPR to a patient in cardiac arrest</td>
<td>5.57</td>
</tr>
<tr>
<td>...identifying that a patient is in cardiac arrest</td>
<td>5.44</td>
</tr>
<tr>
<td>...identifying that a patient has died</td>
<td>5.28</td>
</tr>
<tr>
<td>...verifying patient death in accordance with clinical practice guidelines</td>
<td>5.26</td>
</tr>
<tr>
<td>...managing my own emotional responses, following a patient death</td>
<td>5.00</td>
</tr>
<tr>
<td>...supporting a distressed colleague, following a patient death</td>
<td>4.94</td>
</tr>
<tr>
<td>...managing my own emotional responses, whilst communicating with distressed relatives</td>
<td>4.94</td>
</tr>
<tr>
<td>...administering intravenous medications to a patient in cardiac arrest</td>
<td>4.71</td>
</tr>
<tr>
<td>...gathering relevant information from the scene, to inform resuscitation decisions</td>
<td>4.69</td>
</tr>
<tr>
<td>...terminating resuscitation efforts in accordance with clinical practice guidelines</td>
<td>4.61</td>
</tr>
<tr>
<td>...managing bystanders, present during resuscitation</td>
<td>4.57</td>
</tr>
<tr>
<td>...identifying when ongoing resuscitation efforts are medically futile</td>
<td>4.51</td>
</tr>
<tr>
<td>...using documented patient wishes to inform resuscitation decisions</td>
<td>4.44</td>
</tr>
<tr>
<td>...withholding resuscitation efforts in accordance with clinical practice guidelines</td>
<td>4.39</td>
</tr>
<tr>
<td>...providing culturally safe care of a deceased patient’s body</td>
<td>4.35</td>
</tr>
<tr>
<td>...providing emotional support to bereaved relatives, following a patient death</td>
<td>4.32</td>
</tr>
<tr>
<td>...notifying family members of patient death</td>
<td>4.28</td>
</tr>
<tr>
<td>...discussing patient resuscitation wishes with family present during a cardiac arrest</td>
<td>4.28</td>
</tr>
<tr>
<td>...guiding bereaved relatives regarding practical issues, following a patient death</td>
<td>4.03</td>
</tr>
</tbody>
</table>
Exposure to cardiac arrest and patient death

As shown in Table 8.3, participant exposure to cardiac arrest and patient death was highly variable. Five participants reported they had never attended a cardiac arrest. It was interesting to note participants had particularly low personal exposure to communication with family or bystanders. This may suggest paramedic students often rehearse their technical skills of resuscitation at cardiac arrests, but are rarely delegated to communicate with family and bystanders.

Table 8.22: Student paramedic exposure to prehospital resuscitation decision-making and patient death

<table>
<thead>
<tr>
<th>Exposure *</th>
<th>Cardiac arrest</th>
<th>Patient death</th>
<th>Termination of resuscitation</th>
<th>Interaction with family/bystanders</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 (Low)</td>
<td>36%</td>
<td>36%</td>
<td>58%</td>
<td>68%</td>
</tr>
<tr>
<td>5-19 (Medium)</td>
<td>36%</td>
<td>40%</td>
<td>33%</td>
<td>22%</td>
</tr>
<tr>
<td>&gt;20 (High)</td>
<td>28%</td>
<td>24%</td>
<td>9%</td>
<td>10%</td>
</tr>
</tbody>
</table>

* Exposure = total number of events attended on emergency ambulances including clinical placement, employment, volunteering etc but excluding simulation

Limited inferential tests were run on data due to the small sample size. We hypothesised that overall confidence would be higher in student paramedics with more clinical experience. A one-way between-groups analysis of variance was conducted to explore the impact of exposure to prehospital cardiac arrest on overall Confidence with Resuscitation Decision-Making and Patient Death Scale mean scores. A statistically significant difference (p<0.05) in confidence scores was found F(2,69)=12.29. Gabriele post-hoc tests found significant differences (p<0.05) in confidence between those reporting high exposure (M=5.18, SD=0.56) compared with those reporting medium exposure (M=4.70, SD=0.44) or those with low exposure (M=4.35, SD=0.66). The difference in confidence scores between Low and Medium exposure groups was not statistically significant. As participants were from a wide age range it was thought age could also impact on confidence, but ANOVA revealed no significant difference in mean confidence scores between age groups.

Greatest student concerns

Participants provided free-text responses identifying their greatest concern in each of three areas: resuscitation decision-making, patient death and their personal emotional responses to these situations. Students most often cited concerns about making and actioning decisions that were in the best interest of the patient and avoiding doubts, regrets or conflicts. A large number of students also expressed concerns about keeping their own emotions in check and responding appropriately to...
grieving families. Summary themes, frequency counts and illustrative quotes are presented in Table 8.4.

Table 8.23: Students’ greatest concerns

<table>
<thead>
<tr>
<th>Theme [number of comments]</th>
<th>Illustrative quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making the right call [71 Comments]</td>
<td>“Ensuring I had done everything for the patient”</td>
</tr>
<tr>
<td>Making timely, appropriate resuscitation decisions, optimising patient outcomes</td>
<td>“Being at peace with the decision made and knowing we made the best decision for all involved”</td>
</tr>
<tr>
<td>Grieving family [56 Comments]</td>
<td>“Talking to the family, we have had little practice or even guidance on how to address such a sensitive topic”</td>
</tr>
<tr>
<td>Witnessing grief reactions, providing emotional &amp; practical support to grieving family, not saying the ‘wrong’ thing</td>
<td>“Patient family reactions as part of the normal grieving process”</td>
</tr>
<tr>
<td>Controlling emotions [52 Comments]</td>
<td>“Telling the family without becoming emotional myself”</td>
</tr>
<tr>
<td>Fear of feeling overwhelmed, desire to ensure personal emotional responses didn’t impede professional performance</td>
<td>“I am concerned that I will not manage to keep my emotions controlled”</td>
</tr>
<tr>
<td>Facing conflict [20 Comments]</td>
<td>“My colleague and I do not agree on how to manage the resuscitation”</td>
</tr>
<tr>
<td>Lack of consensus between family or crew. Concerns about aggression from distressed relatives.</td>
<td>“Family members wanting something different than what is best for the patient”</td>
</tr>
</tbody>
</table>

Teaching and learning

Participants were asked to rate how helpful certain teaching and learning methods had been, to prepare them for resuscitation decision-making and patient death. The teaching and learning methods most-often rated “very helpful” in preparing participants for resuscitation decision-making and patient death were: clinical placement experiences (81.9%), clinical simulation (69.4%), informal peer discussions (69.4%) and formal mentoring (63.9%). These findings were echoed when participants provided free-text responses indicating what else had helped and what might be helpful to prepare them for resuscitation decision-making and patient death. As shown in Table 8.5, key themes were work experience, simulation and role-play, life experience and mentoring.
Table 8.24: Helpful learning opportunities

<table>
<thead>
<tr>
<th>Theme [Number of comments]</th>
<th>Illustrative quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work experience [45 Comments]</td>
<td>Current or past work experience, particularly ambulance, nursing or other clinical roles which include exposure to death, dying and grief</td>
</tr>
<tr>
<td>&quot;Past jobs have taught me communication skills which allow me to be comfortable to communicate difficult news&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;My current employment granting me exposure to situations where cardiac arrest is in question&quot;</td>
<td></td>
</tr>
<tr>
<td>Simulation &amp; role-play [37 Comments]</td>
<td>Opportunities to rehearse resuscitation decision-making and (in particular) talking with family members</td>
</tr>
<tr>
<td>&quot;More scenarios related to interaction with family and bystanders in stressful situations&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Role playing talking to a family about what is happening during a cardiac arrest scene and then learning about what happens after it is called&quot;</td>
<td></td>
</tr>
<tr>
<td>Life experience [29 Comments]</td>
<td>Older participants noted they were drawing on decades of adult life experience, whilst other students were young school-leavers</td>
</tr>
<tr>
<td>&quot;Being older, with broad life experiences have definitely helped&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Life experience is a huge benefit. Unlike other students, I am older and have more varied experience, including how to handle people in difficult situations&quot;</td>
<td></td>
</tr>
<tr>
<td>Mentoring [23 Comments]</td>
<td>Observation of skilled practice, supervised clinical practice and opportunities to discuss clinical experiences</td>
</tr>
<tr>
<td>&quot;Being guided and mentored on scene by more experienced staff&quot;</td>
<td></td>
</tr>
<tr>
<td>&quot;Speaking to mentors and other ambulance officers of their experiences&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Higher education providers face significant challenges producing ‘work-ready’ paramedic graduates for expanding scopes of practice and professionalisation [133, 421, 444]. This pilot survey provides the first insights into student paramedic confidence, concerns, exposure and preparation for decisions to commence, continue, withhold or terminate resuscitation and manage patient death.

Participants were most confident providing effective CPR, but also reported high confidence identifying cardiac arrest and identifying and verifying patient death. Previous research has also concluded that paramedics are able to confidently and accurately identify when a patient has died [445] or criteria for termination of resuscitation has been met [80]. Lowest participant confidence was reported in association with discussing resuscitation wishes, notifying family members of patient death, and providing emotional and practical support to bereaved family. These findings resonate with other research suggesting a key barrier to paramedic termination of resuscitation is a lack of confidence communicating with the bereaved and managing the scene of a patient death [17, 78, 175, 203, 207].
Other health professions have also noted their graduates can lack confidence or find it difficult to manage patient death [409, 410]. Increased student exposure to death and dying is associated with increased self-efficacy in managing patient death [401]. However, the quality of clinical placements is also important and student paramedics need social modelling and support from supervisors, mentors and peers [433, 446]. Clinical competency, confidence and resilience are developed through opportunities to rehearse, experience, observe, reflect and receive constructive feedback [447-450].

As found in this sample, life experience and exposure to cardiac arrest, grief and death varies within paramedic student cohorts. Exposure to cardiac arrest and patient death amongst practising paramedics also varies and may be low overall [451]. Meeting diverse learning needs is challenging. Previous researchers have noted a lack of consensus in the focus, expectations, duration and nature of paramedic student clinical placement settings in Australasia [446, 452]. Results from this study suggest some paramedic graduates may qualify with little or no clinical exposure to patient death or care of the bereaved. Perhaps there is an opportunity for more group work and peer learning, allowing students with greater exposure to share their learnings and experiences in this challenging area. Interdisciplinary learning may also be helpful, and some paramedic degree programmes are integrating interprofessional simulation and peer-assisted learning [453, 454] into their programmes.

**Limitations**

The authors of this small study used a pragmatic approach to pilot test a new assessment measure of paramedic student confidence, concerns, learning and exposure in the area of resuscitation decision-making and patient death. Results are limited to a small volunteer convenience sample. Ethics approval precluded a direct approach to recruitment, so advertisements were sent-out through third-parties. Recruitment occurred at the end of semester, when many students were focussed on assessments, exam preparation and future employment.

This pilot of the newly-developed Confidence with Resuscitation Decision-making and Patient Death Scale suggests it has high internal consistency, face, content and construct validity. Testing of a larger sample of paramedic students – or qualified paramedics – would help to confirm this. Generalisability of findings from this sample to other paramedic student populations cannot be assumed. However, it is interesting to note that research conducted in contrasting cultural settings of Singapore [77] and the USA [394] also highlighted communication skills, scene management and resolved personal grief as factors increasing paramedic psychological comfort with patient death in the field.

**Conclusion**

Paramedic students felt most confident with procedural or technical skills such as verification of death and least confident with psychosocial or non-technical skills such as providing emotional support to bereaved relatives. Paramedic student exposure to cardiac arrest and patient death was highly
variable and appeared to be associated with overall confidence. Work experience, life experience, simulation and mentoring were considered to be most useful for professional development in this area.

This pilot of the newly-developed Confidence with Resuscitation Decision-making and Patient Death Scale suggests it is valid, reliable and quick to administer. The scale would have utility as a measure of impact for education interventions or policy changes in this area.

[Published paper ends]

Chapter summary

This chapter presented results from Study Three, which suggest that exposure to termination of resuscitation and management of the scene of a patient death is variable amongst graduating paramedics. Findings from Study Two suggest that supported clinical experience is vital to gaining skills and confidence in this area. With a new model of paramedic education, graduates may feel their technical skills and knowledge about providing resuscitation may exceed their non-technical skills and confidence managing situations where resuscitation is unsuccessful, unwanted or unwarranted. This imbalance in skills and confidence may lead to novice graduates commencing and continuing CPR, even where they feel confident the patient will not survive. It is essential to prepare paramedic graduates for the reality that the vast majority of patients found in cardiac arrest will have resuscitation withheld or terminated on scene.

With reporting of the three primary studies in this thesis complete, I present the new Anderson Model of Ambulance Resuscitation Decision-making in Chapter 9. In this final chapter I also discuss strengths and limitations of my research, update the literature, outline implications of my findings and state my overall conclusions.
Chapter 9 Discussion and conclusions

Natalie: “What about you, [Male EMT]? What would you teach ‘younger you’ about managing resuscitation decisions and people dying?”

[Laughter from group]

Male EMT: “Yeah. I guess to a certain extent it’s a case of look and learn when you’re out with an experienced officer. But like they’ve said you don’t build up people’s expectations. I think if you can give family an update on the way through, and pre-warn them that things aren’t going well but we’re doing the best that we can. So, they’re already starting to accept things aren’t too good, here. And if it’s successful, we’ll you’re ace. But if you’re not you can say ‘hey, we’ve tried everything that we can, but unfortunately there’s nothing more that we can do.’ And so, they’re already in that mindset that things are serious and it may not work out too well. Teaching somebody – each situation is so different. So, you have to be adaptable. I don’t know, work through it as you go along, really. I don’t think there’s any hard-set rule that you can teach. People are just so different.”

Male ICP: “Have you had to deal with the post-resus thing from a peer support perspective?”

Male EMT: “Yeah. And people have a whole range of emotions that they go through. As an ambulance officer you may feel despondent or disappointed that you haven’t been able to do anything. Or you may have anger that something’s gone wrong – why couldn’t we get that person back? And people go through those phases. And you have to accept reality, basically. That’s life.”

Natalie: “And how do you help them to come to grips with that?”

Male EMT: “Just explain to them that often that is just a normal range of emotions that they’re going through. They’re not alone in that. Providing what they’re supposed to have done and done their damnedest it’s OK to feel like that. And what’s the percentage? It’s a really low percentage of getting people back.”

[Excerpt from Study Two focus group transcript]

Chapter introduction

In this concluding chapter, I revisit my research aims and overall research method. I then present my key integrated findings as a new Naturalistic Decision Making model - the Anderson Model of Ambulance Resuscitation Decision-making - which includes key processes, challenges and facilitators. I then update the research literature and reflect on theoretical, practical, and
methodological strengths and limitations of this research thesis. Finally, I identify salient education, clinical and research implications of my findings and present my overall conclusions.

Research outcomes

Through the research project described in this thesis, I have explored ambulance personnel experiences of resuscitation decision-making. An emergent, mixed methods design allowed the formulation of focused study designs in response to findings from Study One, and then Study Two. Through the integrated results of three new primary studies, positioned within a critical synthesis of existing literature, I have addressed my overall research aim: To describe the experiences of ambulance personnel tasked with decisions to commence, continue, withhold or terminate resuscitation and explore how they are prepared and supported to make and enact these decisions.

Through the research outlined in this thesis I have:

- Described how ambulance personnel make decisions to commence, continue, withhold or terminate resuscitation efforts for out-of-hospital cardiac arrest (OHCA) patients

- Characterised the clinical, cognitive, emotional and ethical challenges ambulance personnel associate with resuscitation decision-making

- Identified what preparation and support assists ambulance personnel to meet the challenges of resuscitation decision-making

- Developed and piloted a new measure of resuscitation decision-making confidence, and identified New Zealand paramedic student concerns, level of confidence, learning and experience with resuscitation decision-making and patient death in the field

- Developed the Anderson Model of Ambulance Resuscitation Decision-making which incorporates key processes, challenges and facilitators Figure 9.1.

Overview of methods

To explore ambulance personnel experiences with resuscitation decision-making, I used an emergent three-phase exploratory sequential mixed methods design. My research design was underpinned by a critical realist worldview and informed by a Naturalistic Decision Making theoretical framework. With so little research undertaken in this area (Chapter 3) [15], it was essential to be responsive to initial exploratory findings. This design allowed results from each study to inform the development of the next. In Study One, I used an Interpretative Phenomenological Analysis approach and interviewed a purposive sample of sixteen ambulance personnel working in emergency ambulance response roles (Chapter 5) [17, 18]. Interview participants revealed that prognostic certainty was only part of the resuscitation decision-making picture. Before enacting a decision to withhold or terminate
resuscitation, ambulance personnel also needed to feel safe and confident about managing the resulting scene of a patient death. Providing sensitive, competent care after a patient died involved a range of critical non-technical skills, including breaking bad news and offering practical and emotional support to bystanders and the bereaved family. More-experienced participants made unfavourable comparisons against their less-experienced peers and their own historical practice, as novices. It was, however, unclear how less-experienced staff learn these critical non-technical skills. There was also little known about how ambulance personnel are supported if lacking in confidence or experiencing ongoing emotional impact or lingering doubts, after a challenging resuscitation decision-making event.

In response to these findings, and after a further review of the literature (Chapter 6) [19], I turned my attention to the preparation and support of ambulance personnel enacting challenging resuscitation decisions. In Study Two, I conducted focus groups with twenty experts in ambulance personnel clinical education, management and peer support (Chapter 7) [20]. Findings from Study Two emphasised the importance of life experience, clinical exposure and peer support in situations where resuscitation was unsuccessful, unwanted or unwarranted.

Paramedic graduates spend three years preparing for emergency ambulance practice, but it was unclear if this training provided any skills for enacting challenging resuscitation decisions. Study Three was an online survey of paramedicine students, exploring their confidence, concerns, learning experiences and exposure to resuscitation decision-making and managing patient death (Chapter 8) [21].

**Integrated findings**

This research project is the first of its kind to explore ambulance personnel experiences with decisions to start, continue or stop resuscitation. Study One findings revealed that more-experienced ambulance personnel could act quickly and confidently on decisions to withhold or terminate resuscitation, but inexperienced ambulance personnel faced barriers to enacting these decisions. Ambulance personnel participating in Study One noted there was often a frustrating lack of consistent, verifiable information about the patient and the circumstances of their arrest. Where ambulance personnel elicited essential information, certainty of a poor patient prognosis was necessary but not sufficient grounds for withholding or terminating resuscitation. These novel findings from Study One informed the formulation of two further studies, which sought to understand ambulance personnel preparation and support, for these challenging decisions.

This section provides the integrated findings – modelled in Figure 9.1 and discussed below. I actively developed the Anderson Model of Ambulance Resuscitation Decision-making to unite and integrate critical results from Studies One, Two and Three, supported by literature review findings from Chapter 3 and Chapter 6. I began the process of model development by producing a summary document featuring the research question, results and implications from each of my three studies. I then undertook an iterative process of data visualisation. Initially, I grouped the data which described the
process of decision-making and the associated challenges and facilitators (predominantly arising from Study One). In a separate figure, I assembled factors which characterised ideal preparation and support (mostly originating from Studies Two and Three). As versions of my model evolved, I discussed these with my supervisors and gradually re-worked the presentation to incorporate key findings from all three of my studies. Eventually, I produced a model which integrates my findings from Study One, Two and Three along a resuscitation decision-making event timeline – pre-event, during the event and post-event.

The resulting model is **Figure 9.1 Anderson Model of Ambulance Resuscitation Decision-making: Processes, challenges and facilitators.** Research findings from all three studies included in this research project were derived from the narratives, discussions and responses of ambulance personnel and paramedicine students. The Anderson Model of Ambulance Resuscitation Decision-making is unique because it features ambulance personnel and their preparation, decision-making processes and support as its central focus. This model builds on existing Naturalistic Decision Making theory, by visualising the ambulance resuscitation decision-making process, as experienced and described by ambulance personnel [250, 257]. To date, other models of resuscitation decision-making have been built exclusively around cardiac arrest patient outcomes, with a focus on predicted survival from their cardiac arrest event [e.g. 455, 456].

This model presents integrated findings in three phases: pre-, during and post- resuscitation decision-making event. It highlights preparation, resuscitation decision-making and support processes and also outlines challenges and facilitators. ‘Challenges’ are negatively-framed factors which could decrease ambulance personnel certainty or confidence enacting resuscitation decisions. These included lack of privacy, bystander behaviour, conflicts, competing demands, emotional distress, fatigue and self-doubt. ‘Facilitators’ appeared to improve ambulance personnel certainty, self-confidence, and coping with resuscitation decision-making. These included adequate preparation through education, life and professional experience, collegial support with enacting difficult decisions and personalised support after the event. Citations support each claim, linking back to the origin(s), within my published research findings.
Figure 9.9: Anderson Model of Ambulance Resuscitation Decision-making: Processes, challenges and facilitators

Facilitators of confident decision-making
Detailed information from call-taker [17]; Clear clinical guidelines [15, 17, 20]; Clear patient history including circumstances of arrest & patient wishes [15, 17, 19]; Safe event scene with adequate resources [15, 17]; Authority to act without fear of medicolegal action [15]; Senior back-up available on scene or by phone [19, 20]; Rapport with colleagues [19, 20]

Resuscitation Decision-Making (RDM) process

**Facilitators**
- Well-prepared ambulance personnel
  - Knowledge of procedures & prognostic indicators [15, 19-21]; Patient assessment & communication skills [17, 19-21]; Awareness of culture & personal values [15, 17, 18, 20]; Resolved grief [19-21]
- Education & preparation
  - Life experience with death & bereavement [19-21]; Supported clinical exposure to RDM [19-21]; Rehearsing challenging conversations [19, 21]; Exploring personal values & cultural approaches to death & dying [19, 20]
- Poorly-prepared ambulance personnel
  - Inexperience [18-21]; Low self-efficacy [19, 21]; Personal emotional challenges [18, 20]; Cumulative stress [18, 20]; Fatigue [20]; Hunger [20]

**Challenges**
- Decision-making challenges
  - Key factors unavailable or conflicting [18]; Long response time [18]; Difficulty locating patient [18]; Resuscitation attempts prior to arrival [17, 18, 20]; First encounters [18]; Environmental or logistical limitations [18]; Exceptional cases [18]; Managing bystander behaviours & expectations [18]; Personal & emotional responses [18]; Family expectations [18]

**Coping facilitators**
- Personalised approach to support [20]; Supportive colleagues & organisational culture [19, 20]
- Key support mechanisms
  - Peer check-in [19, 20]; Downtime [19, 20]; Option of reflection or debrief [19, 20]; Option of professional counselling [19, 20]
- Coping challenges
  - Doubts & uncertainty [19-21]; Emotional impact [19-21]; Dismissive colleagues [19, 20]; Clinical concerns [17, 20]; Idiosyncratic responding [20]
The processes, challenges and facilitators in the Anderson Model of Ambulance Resuscitation Decision-making (Figure 9.1) are discussed below. The sub-headings below refer to the resuscitation decision-making phases presented in this model: pre-event, during the event and post-event.

**Pre-event: Preparing ambulance personnel and paramedicine graduates to confidently, appropriately and skilfully enact resuscitation decisions**

Study One findings [17, 18] (Chapter 5) revealed that the task of resuscitation decision-making – and in particular, enacting decisions to withhold or terminate resuscitation – required a specific set of skills. A subsequent scoping review and findings from Study Two showed that valued preparation for resuscitation decision-making included clear clinical guidelines, knowledge of prognostic indicators, supported clinical exposure and mentoring, and personal experience with death, grief and bereavement. The role of classroom training and higher education was unclear. Across all studies, participants commented that there was a lack of specific education and training in the areas of resuscitation decision-making, patient death, bereavement and grief. Ambulance training often makes use of simulation training, but very few participants had any experience with the simulation of unsuccessful resuscitation or patient death.

Ambulance education curricula around the world continue to prioritise knowledge and skills used in response to medical and trauma emergencies [421, 424, 426, 457], although the expanding paramedic role now includes holistic primary care and public health [130, 458]. Other researchers also note that ambulance personnel need better preparation for complex patient presentations including psychosocial issues [459, 460] mental health emergencies [461, 462] and end-of-life care [440, 458, 463].

The training, workforce demographics, scope and workload of ambulance personnel around the world has changed significantly over the past few decades [125, 464]. Across the UK and Australasia, the ‘next generation’ of ambulance personnel making resuscitation-decisions are paramedicine graduates. Although ambulance personnel of the past may have gained most of their skills and confidence ‘on the road’, dependence on this model of learning may not be the way of the future. As recently noted by Lazarsfeld-Jensen:

“The paramedic of 2030 will be unrecognisable compared to the ambulance driver or medical technician of the last century. To prepare road-resilient graduates, clinical educators need to extend their teaching far beyond personal experience.” [434, p.516]

Study Three provided insights into paramedic student readiness for unsuccessful, unwanted and unwarranted resuscitation and patient death in the field. Paramedic students had high self-reported confidence in their ability to identify cardiac arrest and initiate resuscitation or identify and verify patient death. Confidence was lowest in non-technical skills, including discussing patient resuscitation wishes, breaking bad news and providing emotional and practical support to bereaved relatives. These findings also link to broader questions about how degree programmes can best ensure work-
During the event: Facilitating confident, appropriate and skilled resuscitation decision-making

Study One provided first insights into the way that ambulance personnel elicit and integrate numerous factors over time, in their decisions to start, continue, withhold or terminate resuscitation. This temporal approach to decision-making, as described in the first paper in Chapter 5, is modelled within Figure 9.1. Ambulance personnel may form an initial impression with information available before their arrival – including the location and nature of the cardiac arrest event - and build this, as more information comes to hand.

Ambulance personnel in Study One rarely described situations where the decision to commence CPR was difficult unless there were concerns about safely accessing the scene of a patient collapse. Less-experienced personnel often described initiating resuscitation as a default action, rather than a conscious decision. Where ambulance personnel started resuscitation efforts, their attention was often absorbed by the demands of that resuscitation attempt. Once sufficient time and resources allowed, ambulance personnel could seek out further information.

Experienced personnel sometimes made a decision to withhold resuscitation based on pre-arrival information, combined with rapid on-scene assessment of the patient and scene. Signs of irreversible death or advanced disease were often immediately apparent to experienced personnel, and — providing the scene was safe — these findings were sufficient grounds for withholding resuscitation. Where effective resuscitation efforts were already under-way upon ambulance arrival, participants felt more inclined to continue, or at least encourage co-responders to continue resuscitation while they gathered more information about the patient and arrest event.

The decision to terminate resuscitation was complex and highly context-specific. Decisions to terminate were the most frequently-discussed examples of challenging decisions in Studies One and Two. The transition - from a focus on patient survival to a focus on communication with crew, bystanders and family - took many different paths. Experienced ambulance personnel preferred to seek crew consensus and stage the breaking of bad news to family, but did not require family and crew agreement to enact a decision to terminate resuscitation.

Identified challenges associated with resuscitation were many and included clinical, emotional, ethical and physical demands. Key challenges were described in detail in the second paper in Chapter 5 and are summarised in Figure 9.1. These included: limited or conflicting information; scene challenges — particularly the expectations of family and bystanders; and the personal experiences and self-efficacy of ambulance personnel.

Limited or conflicting information about the patient and the circumstances of their cardiac arrest was a significant barrier to confident resuscitation decision-making. Time of collapse and pertinent patient...
medical history were both critical to decision-making, but sometimes difficult to determine, on scene. Patient wishes regarding resuscitation were often unknown and rarely documented. In situations where there was evidence of a long serious illness or multiple comorbidities, ambulance personnel expressed frustration that families often hadn’t discussed patient wishes and seemed poorly prepared for the death of their loved ones.

Easily-accessible, current advance directives could improve patient autonomy in situations of known life-limiting illnesses. At present, uptake of advance care planning is low in New Zealand [160] and documented patient wishes are rarely available to emergency ambulance personnel [161, 465]. Documented patient wishes take many forms [100, 101] and where available, ambulance personnel in both New Zealand [103] and abroad [442] have reported limited confidence interpreting these documents. Without a significant cultural shift these will remain unusual for patients experiencing sudden cardiac arrest due to an acute illness or trauma, or dying of very advanced age, frailty, severe disability or dementia [161, 466].

Out-of-hospital cardiac arrests sometimes occur in public places or where a large number of people are gathered. The dynamics of the arrest scene – particularly family and bystander expectations – contributes to decisions to commence or continue resuscitation. Family often expect ambulance personnel to ‘do everything’ and anticipate that resuscitation efforts will revive the patient. The expectation that ambulance personnel will rescue loved ones from death is a source of challenge, conflict and frustration. In New Zealand, as in much of the Western world, death and dying have become medicalised, often hidden from view and rarely openly discussed. As Hetzler & Dugdale [467, p.768] observed:

“The miasma of fear, confusion, and uncertainty surrounding this unpreparedness for death forces patients and families to ask physicians to do everything possible to rescue the dying. When disaster strikes, victims look to be rescued, and the disaster of death offers no exception.”

Multiple studies have shown that the news media, movies and television portray resuscitation unrealistically. Typical coverage has an emphasis on trauma, sudden cardiac arrest and arrests in young people, there is an unrealistically high rate of survival, and incomplete recovery is seldom mentioned [10-14]. Studies from around the world have found that members of the public have poor understanding and overly-optimistic perceptions of survival from cardiac arrest [468-472] as do older inpatients [473] and patients with life-limiting illnesses, including heart disease [474] and chronic obstructive pulmonary disorder [475].

Findings from Studies One, Two and Three suggest that ambulance personnel's personal and professional experiences with resuscitation, death and grief impact on resuscitation decision-making. Experience seemed particularly influential on their willingness and self-efficacy enacting decisions to withhold or terminate resuscitation. Normative and prescriptive medical decision-making literature typically frames provider influence on decision-making as undesirable – error, bias or weakness - to
be identified and minimised [476, 477]. Results from my research suggest that experience, intuitive reasoning and pattern recognition are all valuable assets for ambulance personnel making and enacting resuscitation decisions. This resonates with findings from other Naturalistic Decision Making research in emergency contexts [e.g. 252, 258, 259] and a recent review of paramedic decision-making research [110].

Participants in my research valued patient autonomy but also described the importance of knowing their personal values when judging what is in the best interests of the patient. An extensive cross-sectional survey was recently conducted, with 4018 emergency and prehospital emergency clinicians from 24 different countries participating [378]. This study sought to measure the prevalence of recent resuscitation efforts perceived ‘inappropriate’ by expert clinicians. A secondary aim was to see if clinician perceptions of the inappropriateness of CPR were associated with patient outcomes. This research suggests that clinician perceptions of CPR appropriateness are linked to established prognostic indicators and could help to ensure the allocation of resources to those with the best chance of survival. In contrast to the idea of normative or prescriptive decision-making models, Druwe et al [378, p.116] noted:

“Current guidelines and algorithms only allow refraining from resuscitation when irreversible signs of death or a written advance directive are present. As such, they disregard the added value of clinical insight by healthcare professionals and the fact that uncertainty is inherent to the complexity of every clinical situation, cardiac arrest not being an exception to this rule. Clinicians also use heuristic decision making in the context of resuscitation which not only includes observation of objective factors and application of scientific data, but also ‘tacit’ knowledge based on acquired expertise and pattern recognition.”

Other recent descriptive research into clinician decision-making has begun to explore how implicit reasoning and other provider-factors may impact end-of-life decisions [478, 479]. Within the realm of out-of-hospital resuscitation decision-making, recent research suggests religion does not impact significantly on decisions [480], but gender may [481]. A small retrospective study of out-of-hospital cardiac arrests attended by emergency physicians was conducted within a single French emergency medical service [481]. Findings suggested male physicians were more likely to initiate advanced life support interventions, but this was not associated with improved survival outcomes. The researchers suggested that females may better-predict patient outcomes. Without further research, the mechanism of association is unclear.

Feeling sure that resuscitation should be withheld or terminated can be difficult, but my research has shown that decision-making certainty is not enough. Further challenges exist in the implementation of that decision – and managing that transition from technical patient-focused intervention to non-technical family and bystander-focused emotional support. Much has been written about emergency responders’ identity as life-savers and rescuers [e.g. 467, 482, 483]. Other researchers have noted that emergency ambulance personnel may focus on the delivery of technical-medical interventions to avoid feelings of helplessness, increase a sense of competency and control and create emotional
distance from potentially-traumatic incidents [207, 370]. This research demonstrated that personal responses and self-efficacy play a part in resuscitation decision-making. Those who felt able to enact decisions to withhold or terminate resuscitation were able to recognise and meet the need for leadership, decision-making, sensitive communication and emotional support. Many experienced ambulance personnel emphasised the importance of sensitive care of the deceased and bereaved and considered it a skilled and potentially-rewarding aspect of ambulance care.

Recognising that some resuscitation decision-making contexts combine multiple challenging features, participants in all three studies valued the availability of senior support, either on-scene or via phone. Ambulance personnel regularly call for ‘back-up’ from senior paramedics to provide advanced technical skills including invasive procedures and administration of intravenous medication and fluids. While these skills are a feature of advanced cardiac life support, a senior called to the scene of a resuscitation may not be required to use these skills. When backing-up a crew who already had resuscitation underway, senior paramedics would sometimes elect to take a hands-off leadership role, focussing on scene management, elicitation of further information and support of family and bystanders. Ambulance personnel benefited from having a senior available to take responsibility for terminating the resuscitation and (directly, or by supported delegation) notifying family of the patient’s death.

New Zealand ambulance personnel have 24-hour phone access to clinical support from an experienced paramedic, or medical director if required. Participants in Study Two had experience providing this support and noted it was often utilised by inexperienced ambulance personnel who were geographically isolated from on-scene back-up and struggling to enact a decision to terminate resuscitation efforts. Clinical phone support was also used to share decision-making responsibility, seek a second opinion and allow someone who is positioned at a distance (emotionally, cognitively and physically) to make a decision which might seem too hard, in the field.

Post-event: Supporting ambulance personnel with emotional coping and professional development, after a challenging resuscitation decision-making event

Findings from Study Two suggest that ambulance personnel respond idiosyncratically to unsuccessful resuscitation and patient death, and value personalised support. Downtime and opportunities to reflect with colleagues are associated with ambulance personnel professional development [449] and emotional coping [376, 428, 430, 484]. Ambulance personnel can find themselves continuing to reflect on their decisions, long after the event.

Making challenging resuscitation decisions, dealing with uncertainty, patient death and family grief are potential critical incidents for emergency services workers [360, 369, 370]. Recently-published research findings have highlighted alarmingly-high rates of suicide, post-traumatic stress symptoms, anxiety and depression amongst emergency response staff [485-489]. Many researchers are working to improve ambulance personnel wellbeing and understand and minimise the negative impact of
occupational exposure to potentially-traumatic events [e.g. 360, 368, 429, 490-493]. As previously noted, findings from this research resonate with this broader research into ambulance personnel stress and coping. In particular, the importance of feeling adequately prepared for patient death [389, 406, 407, 488], availability of information and supportive colleagues during the event [360], opportunities to discuss critical incidents with trusted colleagues [360, 449, 488, 494] and availability of downtime [360, 403] after the event. Research suggests ambulance personnel stress and distress is multi-factorial and chronic interpersonal and organisational stressors can also play a role [485, 494].

Findings from Studies One, Two and Three revealed divergent perspectives on the role of emotions in resuscitation decision-making. Select participants from Study One and Two appeared to value emotional detachment, while others felt that empathy and some expressions of emotion could facilitate the provision of sensitive, skilled and compassionate care. Many paramedic students who participated in Study Three expressed concern about being ‘overwhelmed’ by emotions and felt uncertain about their responses to acute grief reactions. This was a point of divergence across all three studies in this research project, as some participants felt emotional responding might threaten professional behaviour, but others described drawing on empathy and emotions to provide sensitive care. Overall, there was agreement that it was important for ambulance personnel to be aware of personal emotional responses and values, coping styles and performance under stress. Other researchers have noted ambulance personnel use of technical focus and emotional detachment during cardiac arrest emergency response [207, 370, 404, 488, 493] although it remains unclear how this impacts on decision-making, resilience or quality of care.

**Updating the literature**

Whilst I was undertaking the studies described in this thesis, additional research describing ambulance personnel experiences of decision-making in cardiac arrest was published. At the time of submitting this thesis, no further studies met inclusion criteria for my scoping review (Chapter 6). However, four new studies would have met the inclusion criteria for my initial integrative systematic review (Chapter 3). In this section, I discuss this updated literature, noting consistent findings which strengthen the transferability of findings from my research project. I also acknowledge and discuss aspects of the research designs, settings and results which contrast with my research project.

Conducted in the diverse settings of the UK [379], Sweden [380], the USA [495] and the Netherlands [496] four new studies have explored ambulance personnel experiences with resuscitation decision-making. Brandling and Kirby [379] explored influences on UK emergency ambulance provider decision-making when commencing and ceasing resuscitation attempts in OHCA. Researchers held focus group discussions, centred-around four vignettes (rather than asking participants to provide narratives of their resuscitation decision-making experiences). Three groups consisted of paramedic managers, teachers and specialist providers, and one group was made-up of ‘standard’ EMS providers. Although the research design and setting differed from that described in Study One, the
findings were strikingly similar to my own. Participants described a staged approach to decision-making and acknowledged the impact of information availability, resources, scene factors, personal values, cultural beliefs, risk perception and interpersonal dynamics. As a point of contrast, the perceived risk of litigation and disciplinary action were considered influential factors in the UK emergency ambulance context.

Waldrop et al. [495] interviewed 43 EMS personnel from New York. The study explored the relationship between family awareness of dying and decision-making in emergency calls near the end of life. Although this was a specific ‘take’ on resuscitation decision-making, in a different cultural and medicolegal setting, it still raised several themes consistent with this thesis. In particular, this research highlighted the impact of bystander and family expectations on ambulance personnel decision-making. Participants felt there was an expectation they would save lives and where death was unexpected scenes could become hostile. Typical of American studies, there was a significant emphasis on the importance of legally-binding documented patient wishes. Participants would commence and continue resuscitation in the absence of this documentation, even where family verbally expressed patient wishes. As New Zealand ambulance personnel can withhold or terminate resuscitation without fear of litigation, this was not central to considerations of participants in my research. Notably, the sample in this study was 98% white and 77% male, reflecting the demographics of USA EMS personnel, which contrast with the more diverse and gender-balanced emergency ambulance personnel in New Zealand [125].

A study conducted by Karlsson et al. [380] sought Swedish ambulance nurses’ experiences of ethical dilemmas in adult cardiac arrest. Findings arising from nine interviews highlighted the importance of upholding patient dignity and making decisions intuitively. Several themes paralleled findings from my research. In particular, participants identified similar ethical and professional conflicts and resourcing-challenges when transitioning from the care of the patient to care of the family. Sweden’s emergency ambulance personnel are working in a different culture and ambulance service, with specially-trained ambulance nurses rather than paramedics. What is similar to New Zealand is that ambulance nurses work relatively autonomously within resuscitation decision-making guidelines rather than strict decision rules. Interestingly, findings from this small exploratory study resonated closely with those derived from New Zealand ambulance personnel although they work within a contrasting service model.

The fourth recent study of particular note sought to identify factors influencing decision making in OHCA secondary to trauma [496]. Researchers conducted interviews with 25 emergency services personnel, working in the Netherlands. In contrast to the paramedic-led ambulance personnel in New Zealand, participants in this study were specially-trained ambulance nurses and helicopter emergency services physicians. In addition to the importance of factual information researchers identified seven other key decision-making influences, including several which mirrored my findings from Study One. Resonant decision-making themes included the impact of bystander and family, personal values around patient outcomes, challenges associated with the age of the patient and seeking consensus with other team members.
Strengths and limitations

Quality research design

This research provides the first comprehensive exploration of resuscitation decision-making internationally, from the perspective of ambulance personnel. Findings enhance our understanding of the experience, challenges and skills required to confidently commence, continue, withhold or terminate resuscitation efforts in OHCA. Results have also identified which preparation and support mechanisms are most helpful, for ambulance personnel enacting these decisions.

I have provided evidence of quality research design in each published paper, and in a dedicated design quality overview in Chapter 4. Each paper included in this thesis highlights the key strengths and limitations of the study it reports. I undertook all three studies in New Zealand emergency ambulance and paramedic education settings. It is the nature of situated or ‘real world’ Naturalistic Decision Making research and qualitative methods that results may differ in contrasting contexts. As noted above, I found meaningful convergence with other recent studies examining resuscitation decision-making in different emergency ambulance contexts, which support the transferability of some findings.

Completion of a thesis with publication presents challenges but also helps to demonstrate the strengths of my research. The science and findings have been scrutinised by others and found to be worthwhile and of interest to readers from medical, nursing, paramedicine and emergency care journals. Whilst I am grateful for the insights offered by experienced reviewers from diverse backgrounds, I also acknowledge that reviewer feedback and editorial preferences have shaped the reporting of my studies. Publication in international journals may have increased the focus on global implications and transferable findings. By comparison, relatively little attention was given to results specific to the New Zealand setting, including culture and Māori responsiveness. Accordingly, the below section focuses on some of the cultural issues which arose during this research.

Culture and Māori responsiveness

Aotearoa New Zealand is geographically and culturally diverse. Participants in both Study One and Two described many contrasting cardiac arrest scenes. An important factor which impacted on these scenes was the culture of family and bystanders who were present. Cardiac arrest scenes described by Study One and Two participants included private homes with only one family member present; church services, funerals and marae meetings with large numbers of family present; and public places with only strangers as bystanders. Participants in Study One and Two sometimes used culture or ethnicity to explain communication barriers, behaviours, differing expectations of ambulance personnel and resuscitation and varying expressions of distress and grief. Most Study One and Two participants also conceded that their personal beliefs, attitudes and values impacted on decisions, actions and coping - particularly in the context of unsuccessful resuscitation and patient death.
Māori are under-represented in both the New Zealand emergency ambulance workforce and paramedic education [148], so it was vital for me to consult with Māori advisors to ensure my approach to the topic was responsive to Māori. I was pleased to have some Māori participants included in my studies. Study One and Two participants conceded that the provision of culturally safe care of the tūpāpaku (body) and grieving whānau (family) could be particularly challenging for new ambulance personnel. Study Three participants reported relatively low levels of self-rated confidence providing culturally safe care of a deceased patient’s body. Several participants described situations where Māori patients had died, including a large number of whānau who wished to touch and be near the patient and expressed their grief openly, through shouting and loud wailing. Study Two participants also noted there was some uncertainty around correct marae protocol in the context of a life-threatening emergency. For example, removal of footwear is expected by all who enter a wharenui (marae meeting house) but paramedics noted that their sturdy steel-capped footwear protected feet from occupational risks including blood, heavy objects and needles. Removing or donning laced boots took time and leaving footwear on facilitated a quick scene departure, if required.

The importance of whānau (family) and Māori beliefs and customs around death and dying have had a positive influence on healthcare provision in New Zealand. Facilitation of family presence, consultation and involvement is a cultural imperative for the care of many Māori whānau. Designated ‘whānau rooms’ are included in all modern hospital settings and unique processes exist to facilitate culturally appropriate care of the tūpāpaku (body of the deceased) and ongoing family presence [293]. In New Zealand, registered health professionals must meet standards of care which include cultural competency. The Health Practitioners Competence Assurance Act [497] explicitly requires health practitioners to demonstrate knowledge of the Treaty of Waitangi and interact respectfully and effectively with Māori. With upcoming registration and inclusion under this Act [134], paramedics in New Zealand will need to demonstrate Māori responsiveness through professional development and service provision. There is very little published research highlighting the needs and preferences of Māori specific to emergency ambulance care [498]. Greater awareness of Māori worldview and tikanga may help to improve ambulance personnel confidence in providing informed care, but cultural safety requires more than cultural competency [499]. More research is needed to ensure safe and equitable access to emergency ambulance care which meets the needs of Māori.

**Reflexivity**

With years of clinical experience and the sharing of many anecdotes with paramedic colleagues, it was unavoidable that I approached this project with some pre-existing ideas about resuscitation decision-making. Journaling and frequent discussion with my supervisors aided in reflexive practice. St John did not employ me during this research project, but my familiarity with and proximity to emergency ambulance work appeared to facilitate understanding and rapport with participants. Finding a balance between being an ‘insider’ and being an ‘outsider’ was vital. Participants in the qualitative phases of my research were sharing experiences which were complex, demanding and sometimes brought up feelings of frustration, uncertainty or sadness. At times I felt that participants
were eager for an interested and understanding audience for their narratives. Shared understanding is easily communicated with a simple ‘you know’ or nonverbal cues, but I worked hard to seek clarification and ensure participant meaning was made explicit. I showed empathy but asked the participants to explain something as simply as they could – as they would to a brand-new volunteer, or layperson – for the benefit of the study.

I worked hard to ensure there were opportunities for new and divergent ideas to be expressed in interviews and focus groups. Ambulance personnel work within clear, hierarchical levels of practice, determining their available technical skillset and scope. I had unconsciously anticipated that level of practice would be a determinant of decision-making confidence and competence. Participants in both the interview and focus-groups studies alerted me to the error of this assumption when they made it clear it was inaccurate to characterise staff capacity in resuscitation decision-making, by qualification. Life experience, clinical exposure and personal attributes were more important, and noted to vary significantly within levels of practice. Self-knowledge and exposure to death, dying and bereavement were seen as integral to skilled practice and coping. It is reassuring to be surprised by findings, and realise the research process had elicited evidence which was somewhat discordant with my own assumptions.

Although finding shared patterns is essential to communicating findings in qualitative research, it is also important to acknowledge divergence in qualitative research. Issues which produced divergent results have been highlighted throughout this thesis. A key area of divergence in participant perspectives – notable in all three studies – was the perceived role of emotions and emotional expression.

**Thesis with publication**

Papers included in this thesis were published in a variety of medical, nursing, paramedicine and emergency services journals. This speaks to the international and interdisciplinary interest in this research. Editors from three of the destination journals stated my research was interesting and important but acknowledged significant difficulty finding suitable peer reviewers for my papers. Paramedicine is a developing discipline, but there are relatively few academics with both expertise in qualitative methodology and familiarity with the emergency ambulance context. This resulted in some delays and methodological challenges in reviewer feedback. For example, reviewers insisted that (quantitative) ‘response counts’ were reported, with qualitative themes. It is, however, encouraging to know that the methods and findings are clearly making a novel contribution.

As observed by Derkenne et al. [481, p. 661] “Out-of-hospital cardiac arrest covers a continuum of diverse situations, from sudden/traumatic death, to the discovery of long-dead patients.” Although research evidence clearly demonstrates very poor overall survival rates from out-of-hospital cardiac arrest [5-7], some reviewers felt uncertain about the language I used to express this. One reviewer was unhappy with the sentence: “The vast majority of pulseless patients attended by emergency
ambulance will not survive to discharge from hospital.” As an author I stood by the factually correct nature of this assertion, but revised my wording to state “…the majority of pulseless patients attended by emergency ambulance do not survive to discharge from hospital.” A different reviewer stated that resuscitation efforts should not be described as ‘unwanted’ or ‘unwarranted’ and asked for different language to be used in the associated paper. The expression ‘managing patient death’ was also seen as too blunt and euphemisms such as ‘supporting the bereaved’ were requested. Some of these comments may reflect international differences in cultural and medicolegal approaches to resuscitation decision-making. Death denial is arguably a significant cultural barrier to patient empowerment and quality end-of-life care. I therefore found it interesting to note this discomfort with open and frank discussion of futility and death, even amongst experts in health research. When undertaking qualitative research, candid quotes featuring slang or profanity can be an encouraging sign that participants were at-ease and not self-censoring. Those working on emergency ambulances frequently encounter suffering and death, and open reflection [368, 500] and use of a dark sense of humour [369, 501] have been identified as common coping mechanisms. Some reviewers and editors expressed reluctance to publish ‘blunt’ quotes from Study One and Study Two, particularly those where ambulance personnel discussed death and futility. In one case, the journal editors initially suggested the paper should be prefaced with the following text:

EDITOR’S NOTE: This paper contains quotes from ambulance staff describing their decision-making when considering termination of resuscitation. Please be aware that it features candid and colloquial language. This will be recognizable and acceptable to fellow emergency health care providers but may be uncomfortable for other readers. The paper has been reviewed in detail by experienced lay person representatives who are satisfied that respect for patients has been upheld and that the language used is necessary to print as quoted to accurately provide honest accounts and understanding.

Ultimately, the above note was not published, but I found the editorial discomfort and desire to censor candid ambulance personnel perspectives on death and dying very interesting.

Implications

This research has elucidated ambulance personnel-perspectives on resuscitation decision-making, a complex, demanding and high-stakes aspect of their work. The new Anderson Model of Ambulance Resuscitation Decision-making makes an important contribution to our understanding of ambulance personnel experiences, processes, preparation and support. These findings have clear implications for ambulance education, practice and further research, and these are outlined below.
Ambulance personnel education

Although prognostic uncertainty was an identified challenge in OHCA decision-making, this was chiefly due to a lack of available information on scene, rather than a lack of ambulance personnel knowledge. Participants in Studies One and Two described use of their Clinical Procedures and Guidelines [57] and some explicitly described memorising and referring to an included table of favourable and unfavourable prognostic indicators. Ambulance education should ensure a clear understanding of the limitations of resuscitation, and the evidence validating termination of resuscitation guidelines and rules [67, 77, 203, 394].

Studies One, Two and Three all highlighted the importance of non-technical skills when enacting decisions to withhold or terminate resuscitation and manage patient death. These findings add to other research lamenting the lack of ambulance personnel preparation for patient death, particularly training in death notification and support of the acutely bereaved [387, 390, 400]. Although clinical experience and social modelling will aid in the development of these skills, it is clear exposure to resuscitation decision-making, patient death and care of the bereaved is variable in quantity and quality [387]. Historically dismissed as ‘soft skills’, interpersonal, social and emotional skills are gradually being recognised as critical to quality ambulance care [415]. Paramedic students included in this research felt most confident with the technical aspects of identifying cardiac arrest and patient death. The teaching and retention of ambulance personnel technical resuscitation skills has been the subject of significant interest [e.g. 362, 419, 420], but relatively few researchers have examined ambulance personnel non-technical skills, in any context [414].

Rather than assuming non-technical skills will be learned on the road or feature as part of a ‘hidden curriculum’ their value should be communicated by teaching, rehearsing and assessing them [416]. It is possible to teach and assess nonclinical skills in a classroom environment [414, 502, 503] and this research suggests paramedic students would value an opportunity to rehearse and discuss these skills. As a local example, a two-hour session on resuscitation decision-making has recently been integrated into the curriculum of Year 3 paramedic students at Auckland University of Technology. This session was included in response to Study Three findings which identified areas where paramedic students feel poorly prepared for resuscitation decision-making and patient death. Initially, this session involved a mix of taught material, class discussion and case studies facilitated by me, with the assistance of an experienced paramedic lecturer. Initial informal student feedback indicated they would like more information about caring for the bereaved. I am now part of a team working to enhance this session with a dedicated focus on managing patient death and caring for the bereaved. We are also working to develop dedicated time in a simulation teaching lab (with performance students playing the role of bereaved relatives), to allow paramedics to rehearse breaking bad news.

Recently, I have also been asked to facilitate training sessions with St John ambulance personnel and community volunteers. These sessions have involved raising awareness of OHCA survival outcomes, prognostic indicators and termination of resuscitation guidelines, followed by small-group discussion of case studies. Informal feedback from these sessions has been positive. More-experienced group
members have eagerly shared experiences with challenging resuscitation decision-making and patient death, whilst less-experienced participants explored personal values and shared concerns about facing situations where resuscitation is unsuccessful, unwanted or unwarranted.

**Ambulance personnel practice**

In the ever-changing landscape of evidence for cardiac arrest interventions, it is important to understand how ambulance personnel are making resuscitation decisions, and to identify the associated challenges and facilitators. With developing technologies, there is a call to provide ambulance personnel with better access to patient health information such as medical histories and advance care plans [504, 505]. Transmission of video information from the scene using data networks is also aiding decision-making in some ambulance services [506]. Results from this research add to evidence that ambulance personnel sometimes use technology and technical task performance to distance themselves from emotionally confronting situations. Ambulance personnel use of digital devices may assist with information, but take time and attention away from the scene, patient and family. It is important to consider how these emerging technologies can impact on decision-making and care provision on scene.

Ambulance personnel in Studies One and Two valued their clear authority to withhold or terminate resuscitation and spoke favourably about the guidance provided within New Zealand’s nationally-adopted emergency ambulance Clinical Procedures and Guidelines [57]. As noted, many emergency ambulance personnel in countries outside New Zealand work within strict decision criteria and rules, rather than guidelines. Researchers continue to express a desire for strict adherence to rule-based decision-making and minimise any ‘inconsistent’ (discretionary) decision-making by emergency ambulance personnel [67]. Ambulance personnel in Study Two didn’t express a desire for more prescriptive or specific decision-making aids, but valued availability of on-scene or phone support for particularly challenging decisions.

Whilst undertaking this thesis research, several major international centres have been trialling ECPR - extracorporeal mechanical oxygenation in the treatment of refractory cardiac arrest [507]. ECPR can buy more time for select patients who have minimal existing burden of disease and a reversible cause of cardiac arrest. In some centres a specially-trained team goes into the field to screen the OHCA patient and begin ECPR [e.g. 508]. However, other centres [e.g. 507] transport select patients, using mechanical CPR [509], to a hospital equipped for ECPR. Although early evidence suggests ECPR is saving lives [510] it is also important that clear selection criteria are judiciously applied. As others have observed, ECPR raises ethical questions as it is hugely resource-intensive and timely access is very limited [511]. The availability of mechanical CPR and ECPR should not be a reason to avoid field termination of resuscitation in situations where death is irreversible.
Future research

This research has explored ambulance personnel experiences with resuscitation decision-making, but there are still many unanswered questions about the needs of families, co-responders and bystanders. Studies One, Two and Three show ambulance personnel and paramedic students are eager to learn more about how to manage the scene of a patient death, provide sensitive culturally safe care and support bystanders and the bereaved. This was accepted as a skilled and important part of emergency ambulance work. Relatively little is known about the best way to support bereaved family when a patient has died suddenly and unexpectedly in the community [512]. Although there are a number of guidelines for ambulance personnel breaking bad news and caring for bereaved families, these were often derived from oncology settings [387]. The evidence base for quality care of the acutely bereaved currently lacks input from the bereaved themselves [387, 513]. Little is understood about why families and caregivers call ambulances, when death is expected [514]. In addition to meeting family needs, ambulance personnel may be in the best position to provide immediate reassurance and support to co-responders and members of the public who have provided bystander CPR or deployed a public access defibrillator. What does great care look like (from the family’s perspective) when emergency ambulance staff attend a patient death [515]? And what immediate support do family, bystanders and co-responders value, when resuscitation is unsuccessful?

Study One and Two participants found it challenging that some patients and families were poorly prepared for death. Even where there was evidence of advanced serious illness, families and patients may not have discussed death, or wishes about resuscitation. This raises questions around death literacy, advance care planning and community support for death and grieving.

Study One and Two participants expressed frustration that the general public had poor understanding of the limitations of resuscitation, which appeared to contribute to disbelieving, critical or even hostile behaviour at the scene of an unsuccessful resuscitation. With significant campaigns to increase bystander CPR and use of public access defibrillators, it would be useful to know if these have changed public perceptions of resuscitation. Increasing bystander resuscitation efforts is clearly important, but unrealistic portrayal of resuscitation and survival from cardiac arrest may contribute to the general public’s poor understanding of the limitations of resuscitation. Ethically, should millions of people around the world, including children, be taught CPR without acknowledgement of its limitations? Multiple studies have suggested that patients’ poor understanding of resuscitation outcomes limits their capacity for informed, shared decision-making at the end of life [473, 516, 517]. Those who have accurate information about the limitations of resuscitation are more likely to refuse CPR [204, 518, 519].

With massive efforts to improve bystander CPR, provision of resuscitation efforts in the community is no longer the exclusive domain of trained emergency ambulance personnel. In New Zealand, and all around the world, lay responders and co-responders such as Fire and Emergency staff are increasingly involved in out-of-hospital cardiac arrest resuscitation efforts. Research suggests co-responders would benefit from immediate supportive debriefing by ambulance personnel, particularly
where resuscitation is unsuccessful [488]. Participants in this research felt post-event support for first and co-responders was highly variable and ambulance personnel were not always prepared or resourced to provide this support. More research is required in this area.

Conclusion

By undertaking this mixed methods research project, I have revealed the complex and sometimes challenging nature of ambulance personnel resuscitation decision-making. I have also identified opportunities to improve ambulance personnel preparation and support for enacting these challenging resuscitation decisions. Integrating the results of all three studies within the existing literature, I have developed the Anderson Model of Ambulance Resuscitation Decision-making which includes processes, challenges and facilitators which can occur before, during and after a cardiac arrest event. Ambulance personnel elicit and integrate key decision-making factors, temporally. Ambulance personnel often feel certain that resuscitation is unlikely to be successful, but certainty of a poor prognosis is not sufficient grounds for withholding or terminating resuscitation. In order to enact these difficult decisions, ambulance personnel need to feel safe and have adequate confidence in their ability to manage the scene of a patient death, break bad news and support family and bystanders. If ambulance personnel feel uncertain, unsafe or inadequately resourced to manage the scene of a termination of resuscitation, they are likely to commence and continue resuscitation until senior support is available. Defaulting to the highly-rehearsed, familiar technical process of providing resuscitation appears to offer protective distancing from the emotional and interpersonal challenges of a cardiac arrest scene.

Having ascertained in Study One that resuscitation decision-making is complex and can be challenging for even the most experienced paramedics, Studies Two and Three identified how ambulance personnel and paramedic graduates are currently prepared and supported for these challenges. These studies revealed that a combination of technical and non-technical skills are required, to manage the scene of a patient death capably and sensitively. Paramedic students completing a degree programme feel least confident and most concerned about non-technical skills, particularly communicating with family and bystanders and providing emotional and practical support to the bereaved. It is critical to furnish graduating paramedics with adequate technical skills to provide life-saving interventions, but there appears to be limited acknowledgement that most patients found by ambulance personnel in cardiac arrest will not be successfully resuscitated. This research identifies important context-specific non-technical skills required of ambulance personnel, when a patient dies. Although these were traditionally learnt on the job the model of paramedic education has changed, and this warrants greater attention to these non-technical skills in training, assessment, mentoring and clinical guidelines.
Appendices

Appendix 1 Study One: Resuscitation provider perspectives on decision-making in out-of-hospital cardiac arrest

Ethical approvals:
University of Auckland Human Participants Ethics Committee
St John Locality Authorisation

Participant information form

Participant consent form

Recruitment advertisement

Demographic questionnaire

Interview schedule

Beyond prognostication: An exploratory study of ambulance officers’ resuscitation decision-making.
(2017) Poster presentation at the Australian Resuscitation Council Spark of Life Conference, Adelaide (Joint winner Best Conference Poster)

18-Dec-2015

MEMORANDUM TO:

Prof Caryl Gott
Nursing

Re: Application for Ethics Approval (Our Ref. 016147): Approved with comment

The Committee considered your application for ethics approval for your project entitled Resuscitation provider perspectives on decision-making in out-of-hospital cardiac arrest.

Ethics approval was given for a period of three years with the following comment(s):

1. Both PISs
   Please remove Dear .... As this is not a letter.

2. Employer – PIS
   Within the section ‘Right to withdraw/Right to results’, participants have the right to withdraw ‘their’ participation – not ‘your participation’.

3. Employer – CF
   Within the following bullet point, state that participation or ‘non-participation’ will not affect participant’s employment.
   • St John Northern Region / NZFS gives assurance that participation will not affect participant employment in any way

4. Replace ‘me’ with ‘them’ within the following sentence:
   • I understand that participants are free to withdraw participation at any time without giving a reason, and to withdraw any data traceable to me up to three months after their interview.

The expiry date for this approval is 18-Dec-2018.

If the project changes significantly you are required to resubmit a new application to UAHPEC for further consideration.

In order that an up-to-date record can be maintained, you are requested to notify UAHPEC once your project is completed.
The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals if you wish to do so. Contact should be made through the UAHPEC Ethics Administrators at re-ethics@auckland.ac.nz in the first instance.

All communication with the UAHPEC regarding this application should include this reference number: 016147.

(This is a computer generated letter. No signature required.)

Secretary
University of Auckland Human Participants Ethics Committee

c.c. Head of Department / School, Nursing
   Ms. Natalie Anderson
   Dr. Lisa Williams
   Dr. Julia Slark
   Assoc Prof Judith Kilpatrick

Additional information:
1. Should you need to make any changes to the project, write to the Committee giving full details including revised documentation.

2. Should you require an extension, write to the Committee before the expiry date giving full details along with revised documentation. An extension can be granted for up to three years, after which time you must make a new application.

3. At the end of three years, or if the project is completed before the expiry, you are requested to advise the Committee of its completion.

4. Do not forget to fill in the ‘approval wording’ on the Participant Information Sheets and Consent Forms, giving the dates of approval and the reference number, before you send them out to your participants.

5. Send a copy of this approval letter to the Awards Team at the, Research Office if you have obtained funding other than from UniServices. For UniServices contract, send a copy of the approval letter to: Contract Manager, UniServices.

6. Please note that the Committee may from time to time conduct audits of approved projects to ensure that the research has been carried out according to the approval that was given.
Locality authorisation - Resuscitation provider perspectives on decision-making in out-of-hospital cardiac arrest

Bridget Dicker <BridgetD@stjohn.org.nz> on behalf of Research <research@stjohn.org.nz>

Tue 15/02/2016 09:22

To: Natalie Anderson <nandaerson@auckland.ac.nz>;

The below email constitutes formal locality authorisation for your study from St John. This can be used as evidence of industry consultation for the purposes of ethics committee applications as required.

Please also keep a copy of this email for your records.

Date: 16 February 2016

Study title: Resuscitation provider perspectives on decision-making in out-of-hospital cardiac arrest.
St John reference: #9

Dear Natalie

Your research study has undergone a locality review by St John, and I am pleased to inform you that your study is now authorized to go ahead subject to the conditions set out below.

Conditions - general
Progress reports should be submitted to St John annually on 1 June until the conclusion of the project. A link to an online form will be emailed to you when this report is next due for your project.
At the conclusion of the project a final report should be submitted to St John with a synopsis outlining the results, conclusions any recommendations from the study. The Principal Investigator is required to complete a copy of the OMF 4.9.7 Research Memorandum of Understanding.

Conditions - project specific
Nil

Yours sincerely

Bridget Dicker
Dr Bridget Dicker, PhD
Clinical Research Fellow
National Headquarters

Bridget Dicker, PhD | Clinical Research Fellow
St John
T 09 526522 ext 6771
M 027 735 2617

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Participant Information Sheet

Project title: Decision-making for out-of-hospital cardiac arrest patients: A resuscitation provider perspective

[Potential interview participant]

Researcher introduction

My name is Natalie Anderson and I am a Professional Teaching Fellow and doctoral student at The University of Auckland, and a staff nurse at Auckland City Hospital Emergency Department. I am undertaking PhD research under the supervision of Professor Merryn Gott & Dr Julia Stark.

Project description and invitation

This research project is looking at resuscitation decision-making for out-of-hospital cardiac arrest patients, particularly around commencing, continuing, withholding or terminating CPR. As a prehospital resuscitation-provider, and following your expression of interest, you have been invited to participate in a face-to-face interview. During the interview, I will ask you to recall and describe some of your experiences with out of hospital cardiac arrest patients, including your thoughts, feelings and actions.

Please take the time to read the following information carefully so that you can decide whether or not you wish to take part. You are welcome to discuss it with others if you wish. If there is anything that is not clear, or if you would like more information, please do not hesitate to contact me.

If you decide to participate in this research, you will be asked to sign a consent form and fill out a short demographic questionnaire. Findings from this study will help to guide a second study and ultimately, the preparation and support provided to prehospital resuscitation providers who attend cardiac arrests. Research results will be published in a way which protects both your identity, and any potentially identifying or sensitive patient details.

Data storage/retention/destruction/future research

Approved by the University of Auckland Human Participants Ethics Committee on 18th December 2015 for three years.

Reference number 016147
Your interview will be conducted at a time and location of mutual agreement, and will take approximately one hour. An audio recording will be made of the interview. You can ask for the audio recording to be stopped at any time without giving a reason. Your interview recording will only be available to the researcher and supervisors and will be transcribed by the researcher. All paper-based materials will be kept in a locked filing cupboard at the University of Auckland. All audio recording data will be stored on a password-protected computer. All data will be wiped and paper-based materials shredded, after 6 years.

You may also be invited to participate in possible follow-up research in 12-18 months time, however this will also be entirely voluntary, and subject to approval of a further ethics submission.

Right to withdraw/Right to results

You have the right to withdraw your information from the study, within three months of the interview. When completing your consent form, you will also be given the opportunity of requesting a copy of your interview transcript, with an opportunity to provide feedback on the accuracy of that transcript. You will also be given the opportunity to request a summary of overall study results.

Ethical issues

Your participation is entirely voluntary, and your employer has given assurances your participation or non-participation will not affect your employment in any way. Research results will be published in a way which protects both your identity, and any potentially identifying or sensitive patient details.

I believe that taking part in this interview will be a meaningful experience for both participant and researcher, and will provide an opportunity to reflect on your personal and professional development, but if you find any topics discussed in the interview distressing in any way, you can access confidential, professional support services through Employee Assistance Programme Services (0800 327 669).

Your participation is greatly appreciated. Thank you for your time and help in making this study possible. If you have any further questions please don’t hesitate to contact me;

Contact details

Researcher: Natalie Anderson na.anderson@auckland.ac.nz  Phone: 021 393 529

Research Supervisor: Professor Merryn Gott mgotts@auckland.ac.nz

Head of Department: Judy Kilpatrick j.kilpatrick@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 18th December 2015 for three years.

Reference number 016147
FMHS postal address: The University of Auckland, Private Bag 92019, Auckland 1142 New Zealand

For any concerns regarding ethical issues you may contact the Chair, the University of Auckland Human Participants Ethics Committee, at the University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: re-ethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 18th December 2015 for three years.

Reference number 016147
Participant Consent Form

This form will be held for a period of 6 years

Project title: Resuscitation provider perspectives on decision-making in out-of-hospital cardiac arrest

Researchers: Natalie Anderson (na.anderson@auckland.ac.nz), Prof. Merryn Gott, Dr Julia Slark

I have read the Participant Information Sheet, and I have understood the nature of the research and why I have been selected. I understand my employer has given an assurance that my participation will not affect my employment in any way. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I agree to take part in this research.
- My participation is voluntary.
- I understand that I will participate in an interview lasting approximately one hour, discussing my clinical experiences with out-of-hospital cardiac arrest patients
- I understand an audio recording will be made. I can ask for the recorder to be turned off at any time without giving a reason.
- I understand that the researcher and her supervisors will have access to the recording.
- I understand that I am free to withdraw participation at any time without giving a reason, and to withdraw any data traceable to me up to three months after my interview.
- I understand that data will be kept securely for 6 years, after which time any data will be destroyed.
- I understand that any reporting or publication of information provided by me will be done in a way that does not identify me, my colleagues, patients or bystanders.
- I understand I may be contacted in 12-18 months’ time to participate in a further study, but that I am under no obligation to volunteer for that study.
- I do / do not wish to receive a copy of my interview transcript, to read and make changes if needed. I will be given a 2 week timeline to review, amend and return the transcript.
- I do / do not wish to receive a summary of study findings

Name: __________________________

Signature __________________________ Date ____________

Email or postal address: __________________________ (If summary or transcript requested)

Approved by the University of Auckland Human Participants Ethics Committee on 18th December 2015 for three years.

Reference number: 016147
Do you attend cardiac arrests?

What are the challenges & rewards?
How are decisions made?

Who: Prehospital providers who have attended at least two cardiac arrests in the St John Northern Region in the past 12 months
What: Meet researcher for a one hour interview, exploring your experiences of out-of-hospital cardiac arrest decision-making
Why: To explore what it is like to attend cardiac arrests, how decisions are made and how to better prepare and support resuscitation providers

For more information please contact researcher:
Natalie Anderson na.anderson@auckland.ac.nz  Ph:021593529
Demographic Questionnaire

(To be administered at beginning of interview)

Name: ............................................................

☐ Male     ☐ Female

Age group:
☐ < 25 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-64 ☐ ≥65

Ethnicity:
☐ NZ European  ☐ Other European  ☐ Maori  ☐ Pacific peoples  ☐ Asian ☐ Other

Current authority to practice as a resuscitation provider:
☐ (First responder)  ☐ EMT  ☐ Paramedic  ☐ Intensive Care Paramedic

☐ Other (please specify)  ............................................

Years of experience in prehospital emergency care:
☐ 0  ☐ 1-5  ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ >20

Estimated number of Out-of-Hospital Cardiac Arrest patients you have attended where resuscitation was attempted (by any person):
☐ 0  ☐ 1-5  ☐ 6-20 ☐ 21-50 ☐ 50-100 ☐ >100

Estimated number of Out-of-Hospital Cardiac Arrest and sudden death patients you have attended where resuscitation was not attempted (by any person):
☐ 0  ☐ 1-5  ☐ 6-20 ☐ 21-50 ☐ 50-100 ☐ >100

Have you ever been in a role where you attended OHCAs outside the St John Northern Region? e.g. pre-hospital emergency training or employment in another region or country

If yes, please detail location, role, organisation and dates .................................................................

.................................................................
Interview Schedule

The purpose of this interview is to explore your experiences of resuscitation decision-making for out-of-hospital cardiac arrest patients. This is in no way a test—there are no right or wrong answers and it is ok if you are unsure about any of the things we discuss. Please feel free to describe your experiences, including your thoughts, feelings, and actions. Any details which might reveal your identity or that of any colleague, patient or family member will be kept strictly confidential.

- Can you tell me about one of the most rewarding cardiac arrests you’ve attended?
- Can you tell me about a particularly clinically challenging OHCA you’ve attended?
- Can you tell me about a particularly ethically challenging OHCA you’ve attended?
- What decisions have you had to make when attending a patient who is in cardiac arrest?
- Can you tell me if the scene of a cardiac arrest – for example the location or presence of bystanders – has ever influenced resuscitation?
- Can you tell me about a sudden death you’ve attended? When do you consider a patient to be dead?
- Do you have any experience with futile resuscitation efforts? How would you define medical futility?
- Thinking about your own experiences with cardiac arrest patients, do you think any particular cases influence your current practice? (…Can you tell me about that?)
- Do you have any contrasting experiences with OHCA working in other countries or organisations? (Where relevant)
- Do you have any contrasting experiences with OHCA overtime, across your career? (Where relevant)
- Do you think there are any other factors which have influenced your decision-making for OHCA patients, which you haven’t yet had a chance to discuss?
- What preparation or support has helped your OHCA decision-making? What else might help?

Thanks so much for sharing your experiences with resuscitation decision making.

- Is there anything else you’d like to add?

Approved by the University of Auckland Human Participants Ethics Committee on 11th December 2015 for three years.

Reference number 016147
Beyond prognostication: An exploratory study of ambulance officers’ resuscitation decision-making

Study objectives

This study provides unique insights into the way that ambulance officers seek-out and integrate complex information to inform resuscitation decision-making in the context of out-of-hospital cardiac arrest.

Background

- In many countries, ambulance officers attending out-of-hospital cardiac arrests are authorized to commence cardiopulmonary resuscitation (CPR) without formalized protocols.
- A major gap exists in our understanding of the cognitive processes that drive decision-making during cardiac arrest.
- To date, the complexity of decision-making in the context of cardiac arrest has only been studied in the context of intensive care settings.

Research design and methodology

Face-to-face, digitally recorded interviews were conducted with a purposeful, convenience sample of 12 ambulance officers. Participants were encouraged to provide illustrative scenarios of cardiac arrest decision-making, including thoughts and feelings. Data were analyzed informally by the principal investigators to identify and analyze themes arising from the interviews.

Results

Sixteen ambulance officers were interviewed, emergency response times varied from 0 to 10 minutes (median 2.5 minutes) and interview durations varied from 45 to 160 minutes (median 65 minutes). While medical advice was sometimes sought and utilized, participants were seeking out and integrating decision-making factors in four phases, and these are described under four key themes:

1. Pre-arrival impressions
2. Patient-in-situ impressions
3. Picking together the big picture
4. Transition to termination of resuscitation

Sense-Making Model

- Pre-arrival impressions
  - Chains of rational thinking
  - Patient-in-situ impressions
  - Chains of rational thinking
  - Patient assessment
  - Sense-making questions

Conclusions & implications

The study provides evidence that ambulance officers weigh several factors that influence resuscitation decision-making. Understanding these factors can help inform the development of educational programs and guidelines for ambulance officers.
### Approach to data analysis

<table>
<thead>
<tr>
<th>Data analysis stage</th>
<th>Data analysis strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1: Interviewing, repeated listening, transcription and initial journaling</strong></td>
<td>Journaling of sensory and theoretical impressions, challenges and early analytical ideas after each interview and verbatim transcription</td>
</tr>
<tr>
<td><strong>Step 2: Initial notation of a single transcript</strong></td>
<td>Manual coding and comments on a printed transcript, facilitating idiographic focus</td>
</tr>
<tr>
<td><strong>Step 3: Coding of single transcript</strong></td>
<td>Performed using NVivo 11, with line-by-line coding, notes and clarifying</td>
</tr>
<tr>
<td><strong>Step 4: Convergence and divergence of codes within a single transcript</strong></td>
<td>Use of NVivo and journaling facilitated clustering of ideas, collecting transcript data at each code and allowing simple aggregation.</td>
</tr>
<tr>
<td><strong>Step 5: Moving to the next transcript</strong></td>
<td>Beginning again from Step 1 with each new transcript.</td>
</tr>
<tr>
<td><strong>Step 6: Identifying convergence and divergence across transcripts (themes including decision-making factors, stages and sense-making approaches)</strong></td>
<td>Codes evolved to better represent content, sometimes combined or separated to reflect convergence or divergence. Codes aggregated into parent nodes and themes.</td>
</tr>
</tbody>
</table>

Although depicted in a step-wise fashion, data analysis involved iterative interaction of researcher with transcript, notes, coding and developing themes.
Appendix 2 Study Two: A focus group study identifying ambulance personnel preparation and support for resuscitation decision-making and patient death

Ethical approvals:
  University of Auckland Human Participants Ethics Committee
  St John Locality Authorisation

Participant information form

Participant consent form

Recruitment advertisement

Demographic questionnaire

Focus group facilitation guide
UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE (UAHPEC)

05-Oct-2017

MEMORANDUM TO:

Prof Caryl Gott
Nursing

Re: Application for Ethics Approval (Our Ref. 020035): Approved with comment

The Committee considered your application for ethics approval for your study entitled When resuscitation doesn’t work: A focus group study examining paramedic preparation and support for termination of resuscitation and patient death.

Ethics approval was given for a period of three years with the following comment(s):

1. PIS and recruitment posters
   The Committee does not encourage use of personal mobile phone numbers for recruitment purposes unless it is a phone dedicated to this research study. If this is a dedicated research study number, please clarify this in section 1.3.

2. Recruitment posters
   Correct the following statements (should ‘or’ be placed between ‘are have’):
   Clinical coaches
   ‘St John Paramedics and Intensive Care Paramedics who are have worked as Clinical Coaches for more than 12 months’
   Peer Support
   ‘St John Paramedics and Intensive Care Paramedics who are have been Peer Support team members for at least 12 months’
   Clinical Desk
   ‘St John Paramedics and Intensive Care Paramedics who are have worked on the Clinical Desk for more than 12 months’

The expiry date for this approval is 05-Oct-2020.

If the project changes significantly you are required to resubmit a new application to UAHPEC for further consideration.

If you have obtained funding other than from UniServices, send a copy of this approval letter to the Activations
team in the Research Office, at ro.awards@auckland.ac.nz. For UniServices contracts, send a copy of the
approval letter to the Contract Manager, UniServices.

The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals if
you wish to do so. Contact should be made through the UAHPEC Ethics Administrators at
ro-ethics@auckland.ac.nz in the first instance.

Please quote Protocol number 020035 on all communication with the UAHPEC regarding this application.

(This is a computer generated letter. No signature required.)

UAHPEC Administrators
University of Auckland Human Participants Ethics Committee

c.c. Head of Department / School, Nursing
Dr Julia Slark
Dr Lisa Williams
Mrs Natalie Anderson
Prof Alexandra McCarthy

Additional information:

1. Do not forget to fill in the 'approval wording' on the Participant Information Sheets, Consent Forms
   and/or advertisements, giving the dates of approval and the reference number. This needs to be
   completed, before you use them or send them out to your participants.

2. At the end of three years, or if the study is completed before the expiry, you are requested to advise
   the Committee of its completion.

3. Should you require an extension or need to make any changes to the project, please complete the
   online Amendment Request form associated with this approval number giving full details along with
   revised documentation. If requested before the current approval expires, an extension may be granted
   for a further three years, after which time you must submit a new application.
Locality authorisation - When resuscitation doesn’t work: A focus group study examining paramedic preparation and support for termination of resuscitation and death

Bridget Dicker <Bridget.Dicker@stjohn.org.nz>

Wed 6/12/2017 13:02

To Natalie Anderson <na.anderson@auckland.ac.nz>

The below email constitutes formal locality authorisation for your study from St John. Please keep a copy of this email for your records.

Date: 6 December 2017

**Study title:** When resuscitation doesn’t work: A focus group study examining paramedic preparation and support for termination of resuscitation and death

**St John reference:** #57

Dear Natalie

Your research study has undergone a locality review by St John, and I am pleased to inform you that your study is now authorized to go ahead subject to the conditions set out below.

**Conditions - general**
Progress reports should be submitted to St John annually on 1-May until the conclusion of the project. A link to an online form will be emailed to you when this report is next due for your project.
At the conclusion of the project a final report should be submitted to St John with a synopsis outlining the results. Any conclusions and recommendations from the study.

The Principal Investigator is required to complete a copy of the OMF 4.9.7 Research Memorandum of Understanding.

**Conditions - project specific**
- There needs to be consideration given to the cultural perspective as this may impact on the participants view of death and dying.
- There is no indication of this in the material submitted.
- Please contact the following people as your point of contact for this study
  - Ryan Bailey <Ryan.Bailey@stjohn.org.nz>: Gavin Holm <GavinH@stjohn.org.nz>

Yours sincerely

Bridget Dicker, PhD
Head of Clinical Audit and Research
National Headquarters

Dr. Bridget Dicker, PhD
Participant Information Sheet – Focus Group Participant

Project title: When resuscitation doesn’t work: A focus group study examining paramedic preparation and support for termination of resuscitation and death

Researcher introduction

My name is Natalie Anderson and I am a Professional Teaching Fellow and doctoral student at The University of Auckland, and a staff nurse at Auckland City Hospital Emergency Department. I am undertaking PhD research under the supervision of Professor Merryn Gott & Dr Julia Slack.

Project description and invitation

This PhD research is exploring paramedic resuscitation decision-making for out-of-hospital cardiac arrest patients, particularly around commencing, continuing, withholding or terminating CPR. As St John peer support / clinical coach / clinical desk staff, and following your expression of interest, you are invited to participate in a focus group. You and 2-3 other focus group members who share your role will be asked to discuss the preparation and support of paramedics, facing challenging cardiac arrest and deaths.

Please take the time to read the following information carefully so that you can decide whether or not you wish to take part. You are welcome to discuss it with others if you wish. If there is anything that is not clear, or if you would like more information, please do not hesitate to contact me.

If you decide to participate in this research, you will be asked to sign a consent form and fill out a short demographic questionnaire. Research results will be published in a way which protects your identity, and any potentially identifying or sensitive patient or colleague details. Findings from this study will inform the preparation and support provided to future paramedics, attending cardiac arrests.

Data storage/retention/destruction/future research

Your focus group be conducted at a time and location of mutual agreement, and will take approximately 60-90 minutes. An audio recording will be made of the focus group. You cannot ask for the recorder to be turned off, but can choose to not answer any question. The focus group recording will only be available to the researcher and supervisors and will be transcribed by the researcher. All paper-based materials will be kept in a locked filing cupboard at the University of Auckland. All audio recording data will be stored on a password-protected computer. All data will be wiped and paper-based materials shredded, after 6 years.

You may also be invited to participate in possible follow-up research in 12-18 months time; however this will also be entirely voluntary, and subject to approval of a further ethics submission.

Right to withdraw/Right to results

Once you have participated in the focus group, it is not possible to withdraw your data, as this risks compromising the integrity of the data from other participants who do not wish to withdraw from the research. You will also be given the opportunity to request a summary of overall study results.
Ethical issues:

Your participation is entirely voluntary, and your employer has given assurances your participation or non-participation will not affect your employment in any way. Participants will be asked to keep all focus group discussion content confidential, but researchers cannot guarantee compliance with this request. Research results will be published in a way which protects both your identity, and any potentially identifying or sensitive patient or colleague details.

I believe that taking part in this focus group will be a meaningful experience for group members and researcher, and will provide an opportunity to reflect on your personal and professional development, but if you find any topics discussed distressing in any way, you can access confidential, professional support services through Member Assistance Programme (0800 284 678).

Thank you for considering this invitation to participate. If you have any further questions please don’t hesitate to contact me.

Contact details

Researcher: Natalie Anderson na.anderson@auckland.ac.nz Phone: 021 593 529

Research Supervisor: Professor Merryn Gott m.gott@auckland.ac.nz

Head of Department: Sandie McCarthy alexandra.mccarthy@auckland.ac.nz

FMHS postal address: The University of Auckland, Private Bag 92019, Auckland 1142 New Zealand

For any concerns regarding ethical issues you may contact the Chair, the University of Auckland Human Participants Ethics Committee, at the University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7559 ext. 83711. Email: ro.ethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 5/10/17 for three years. Reference number 020015
Participant Consent Form

This form will be held for a period of 6 years

Project title: When resuscitation doesn’t work. A focus group study examining paramedic preparation and support for termination of resuscitation and death

Researchers: Natalie Anderson (na.anderson@auckland.ac.nz), Prof. Merryn Gott, Dr Julia Storic

I have read the Participant Information Sheet, and I have understood the nature of the research and why I have been selected. I understand my employer has given an assurance that my participation will not affect my employment in any way. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I agree to take part in this research
- My participation is voluntary
- I understand that I will participate in a focus group lasting approximately one hour, discussing my role in the preparation and support of paramedics tasked with resuscitation decision-making
- I understand an audio recording of the focus group discussion will be made
- I understand that the researcher and her supervisors will have access to the recording
- I understand that I cannot selectively withdraw my data from the focus group data
- I understand that data will be kept securely for 6 years, after which time any data will be destroyed.
- I understand that any reporting or publication of information provided by me will be done in a way that does not identify me, my colleagues, patients or bystanders.
- I understand I may be contacted in 12-18 months’ time to participate in a further study, but that I am under no obligation to volunteer for that study
- I do /do not wish to receive a summary of study findings

Name: ____________________________

Signature __________________________ Date ________________

Email or postal address: ____________________________ (If summary requested)

Approved by the University of Auckland Human Participants Ethics Committee on 5/10/17 for three years. Reference number 020035
Are you involved in the preparation & support of St John paramedics?

Your experiences can help to inform important research exploring paramedic preparation and support for termination of resuscitation and patient death

Who is needed: St John Paramedics and Intensive Care Paramedics who have worked as Clinical Coaches, Clinical Tutors or on the Clinical Support Desk

What is involved: Participants will take part in a 60-90min focus group discussion with 3-5 other clinical support staff. The discussion will explore the support paramedics need when they are making decisions to withhold or terminate resuscitation and manage the scene of a patient death. Food & refreshments will be provided.

For more information please contact researcher:
Natalie Anderson na.anderson@auckland.ac.nz
Ph:021 593 529

Approved by the University of Auckland Human Participants Ethics Committee on 5/10/17 for three years. Reference #820635
St John Locality Authorisation Reference #87
Demographic Questionnaire

Name: ............................................ (A pseudonym will be used in all other records)

Gender:  ☐ Male  ☐ Female  ☐ Other

Age group:
☐ < 25  ☐ 25-34  ☐ 35-44  ☐ 45-54  ☐ 55-64  ☐ ≥65

Ethnicity:
☐ NZ European  ☐ Other European  ☐ Maori  ☐ Pacific peoples  ☐ Asian
☐ Other (please specify)  ............................................

Current qualification/ATP:
☐ EMT  ☐ Paramedic  ☐ Intensive Care Paramedic
☐ Other (please specify)  ............................................

Years of experience in prehospital emergency care:  ....................

Current role(s):
☐ Peer support  ☐ Clinical coach  ☐ Clinical support desk  ☐ Clinical support officer
☐ Other (please specify)  ............................................

At some point during my prehospital emergency care career, I have been responsible for providing:
☐ Classroom teaching  ☐ On-road teaching/coaching  ☐ Running simulation teaching
☐ Formal mentoring  ☐ Informal mentoring/support  ☐ Formal debriefing
☐ Informal debriefing  ☐ Other (please specify)  ............................................

Approved by the University of Auckland Human Participants Ethics Committee on 5/10/17 for three years. Reference number 000315
Focus Group Guide

Welcome and thank you for volunteering to take part in this focus group. You have been asked to participate as your point of view is important. I know you are busy and I appreciate your time.

Introduction: This focus group discussion is to explore the challenges paramedics face when making decisions to commence, continue, withhold or terminate resuscitation. I hope to hear about the way your role as peer support/clinical coach/clinical desk prepare and support paramedics when they are making these decisions, and – often – managing the subsequent scene of a death. Your perspectives will - of course- be affected by your own clinical experience, but I’m keen to focus today on your experiences in your role as peer support/clinical coach/clinical desk. The focus group discussion will take around one hour. I will be recording the discussion and transcribing it for later analysis.

Anonymity & Confidentiality: Despite being recorded, I would like to assure you that your identity, that of your colleagues and any patient details will be carefully anonymised at the point of transcription. As members of the focus group I ask that you do keep this discussion confidential.

Ground rules: The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking but please wait until they have finished. There are no right or wrong answers and you do not have to agree with the views of other people in the group. You do not have to speak in any particular order - when you do have something to say, please do so - but I do hope to hear views from each of you. Does anyone have any questions? OK, let’s begin.

Introductory question: I am just going to give you a minute to think about a situation – acting in your role as peer supporter / clinical coach / clinical support desk staff - where you have helped to prepare or support a paramedic managing challenging OHCA decision making, termination of resuscitation or a death. Is anyone happy to share an example?

Guiding questions & probes:

Clinical coaches

What competencies are taught for paramedic resuscitation decision-making? (How) are these assessed?

How do up-skilling paramedics learn management of TOR and sudden death scenes?

To what extent does simulation learning or mentoring continue beyond the point of death? What learning objectives could be met / competences demonstrated, after a patient dies?

When do paramedics learn how to break bad news? Respond to bereaved relatives? Manage bystander behaviour? Manage/debrief emotionally distressed team members?

What is most challenging for new paramedics facing OHCA decisions, and deaths?

Value/Barriers/Facilitators to peer debriefing? Critical incident debriefing?

What is most helpful? What else could be done?

Clinical desk staff

Approved by the University of Auckland Human Participants Ethics Committee on 5/10/17 for three years. Reference number 02/035
When do paramedics seek decision-support in cardiac arrest and death scenes?

Do paramedics feel confident breaking bad news? Responding to bereaved relatives? Managing bystander behaviour? Managing/debrief emotionally distressed team members?

What is most challenging for paramedics facing OHCA decisions, and deaths?

What is most helpful? What else could be done?

Value/Barriers/Facilitators to peer debriefing? Critical incident debriefing?

**Peer support staff**

What aspects of cardiac arrest and death scenes do paramedics find challenging?

Do paramedics feel confident breaking bad news? Responding to bereaved relatives? Managing bystander behaviour? Managing/debrief emotionally distressed team members?

How do paramedics cope with uncertainty?

How do paramedics cope with death?

Is it important to believe ‘everything was done’?

What coping mechanisms? Opportunities for mentoring? Reflective learning?

Is reflective practice considered inherently ‘good’?

What is most helpful? What else could be done?

Value/Barriers/Facilitators to peer debriefing? Critical incident debriefing?

**Concluding questions**

Of all the things we’ve discussed, what are the most important issues?

Is there anything we should have discussed, but haven’t yet had a chance to?

**Conclusion**

Thank you for participating. Your perspectives are really important, it has been such an interesting discussion, I hope you’ve found participation worthwhile, too.
Appendix 3 Study Three: An online survey of paramedic graduate confidence, concerns and learning experiences with resuscitation decision-making and patient death

Ethical approvals:
- University of Auckland Human Participants Ethics Committee
- Auckland University of Technology Ethics Committee
- Whitireia Ethics and Research Committee

Recruitment advertisement

Participant information

Survey instrument
UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE (UAHPEC)

16-Aug-2010

MEMORANDUM TO:

Prof Caryl Gott
Nursing

Re: Application for Ethics Approval (Our Ref. 021883): Approved with comment

The Committee considered your application for ethics approval for your study entitled Paramedic preparation for resuscitation decision-making: Year 3 paramedic students’ learning, exposure, confidence and concerns.

Ethics approval was given for a period of three years with the following comment(s):

1. FIS:
   a. Please add a full stop at the end of the Researcher Introduction section.
   b. Change "Natalie’s PhD thesis" to "in my PhD thesis".

2. FIS and advertisement email:
   a. Indicate that about 200 participants are anticipated so that the participants have a realistic idea of the chances of winning the Drizzy Card.
   b. Please include in statements that the questionnaire is anonymous because of this, no-one at their institution will know whether or not they have participated and participation is completely voluntary.

The expiry date for this approval is 16-Aug-2021.

If the project changes significantly you are required to resubmit a new application to UAHPEC for further consideration.

If you have obtained funding other than from UniServices, send a copy of this approval letter to the Activations team in the Research Office, at rcc-awards@auckland.ac.nz. For UniServices contracts, send a copy of the approval letter to the Contract Manager, UniServices.

The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals if you wish to do so. Contact should be made through the UAHPEC Ethics Administrators at re-ethics@auckland.ac.nz in the first instance.
Please quote Protocol number 021883 on all communication with the UAHPEC regarding this application.

(This is a computer generated letter. No signature required.)

UAHPEC Administrators
University of Auckland Human Participants Ethics Committee

c.c. Head of Department / School, Nursing
Dr Julia Stark
Mrs Natalie Anderson

Additional information:

1. Do not forget to fill in the 'approval wording' on the Participant Information Sheets, Consent Forms and/or advertisements, giving the dates of approval and the reference number. This needs to be completed, before you use them or send them out to your participants.

2. At the end of three years, or if the study is completed before the expiry, you are requested to advise the Committee of its completion.

3. Should you require an extension or need to make any changes to the project, please complete the online Amendment Request form associated with this approval number giving full details along with revised documentation. If requested before the current approval expires, an extension may be granted for a further three years, after which time you must submit a new application.
Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 321 9599 ext. B316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

30 August 2018

Dear Natalie Anderson

Re: Ethics Application: 18/341 Paramedic preparation for resuscitation decision-making: Year 3 paramedic students’ learning, exposure, confidence, and concerns.

I am pleased to advise that the Deputy Vice-Chancellor of Auckland University of Technology has approved your application to access to students of this University, for the purposes of distributing an invitation to participate in research.

This delegated approval is made in accordance with Appendix R of AUTEC’s Applying for Ethics Approval: Guidelines and Procedures and is approved for a period of three years until 30 August 2021.

I advise that as part of the ethics approval process, you are required to submit to AUTEC the following:

Please quote the application number and title on all future correspondence related to this project.

Standard Conditions of Approval

1. A progress report is due annually on the anniversary of the approval date, using form EA2, which is available online through http://www.aut.ac.nz/research/researchethics.
2. A final report is due at the expiration of the approval period, or, upon completion of project, using form EA3, which is available online through http://www.aut.ac.nz/research/researchethics.
3. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form: http://www.aut.ac.nz/research/researchethics.
4. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
5. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.

We wish you success with your research and look forward to reading about it in your reports.

Yours sincerely

Kate O’Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: m.gott@aut.ac.nz; j.stark@auckland.ac.nz
01 November 2018

Mrs Natalie Anderson  
cl/- University of Auckland  
Email: na.anderson@auckland.ac.nz

Dear Mrs Anderson

Thank you for your application to the Ethics and Research Committee.

The amendments to your project as outlined by the Committee were completed as requested. Therefore, I am pleased to inform you that your research project entitled ‘Paramedic preparation for resuscitation decision-making: Year 3 paramedic students’ learning, exposure, confidence and concerns’ (RP18E-2018) has been approved.

The Committee wishes you all the very best with your research.

With thanks and best wishes.

Yours sincerely

[Signature]

Dr Ruth Anderson  
Director Academic
We need your help to understand paramedic students’ learning, exposure, confidence, and concerns about resuscitation decision making and patient death.

Dear Whitianga / AUT Paramedic Student,

- You have been invited to participate in a brief online questionnaire examining paramedic student preparation for resuscitation decision-making.
- All students currently enrolled in a Year 3 paper in the Bachelor of Health Science (Paramedic) degree at AUT or Whitianga are eligible to participate.
- The survey will take approximately 5-10 minutes to complete.
- Participation is voluntary and anonymous, and no-one will know whether or not you have participated.
- Once you have completed the survey you will be given the opportunity to enter a prize draw for a $200 Prezzy Card – very handy with Christmas approaching!

- For further information and to participate in this important research, please click on the link below:

www.rebrand.ly/Resus

This research is being conducted by Natalie Anderson, PhD candidate at the University of Auckland. Please do not hesitate to contact her if you have any questions about this research project.
na.anderson@auburn.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 16/08/18 for three years [#21183]
Approved by Auckland University of Technology Ethics Committee on 26/08/18 for three years [#18/341]
Approved by Whitianga Ethics & Research Committee on 1/11/18 [RP185-2018]
Paramedic preparation for resuscitation decision-making: Year 3 paramedic students' learning, exposure, confidence and concerns

Researcher introduction: My name is Natalie Anderson and I am a Professional Teaching Fellow and doctoral student at The University of Auckland, and a staff nurse at Auckland City Hospital Emergency Department. I am undertaking PhD research under the supervision of Professor Merryn Gott & Dr Julia Slark.

Project description and invitation: You have been selected to take part in a research study examining paramedic students' preparation for resuscitation decision-making, specifically decisions to commence, continue, withhold or terminate CPR. All students enrolled in Year 3 papers in the Bachelor of Health Science (Paramedicine) degree are invited to participate. Participation is voluntary and will not affect your grades or relationship with AUT/Whittireia. Please contact your HoD if you feel this assurance has not been met. This study is the third and final phase of a larger PhD project exploring paramedic resuscitation decision-making for out-of-hospital cardiac arrest patients.

Project Procedures: The brief online survey will take 5-10 minutes to complete. Both the University of Auckland and AUT/Whittireia have approved this research, but your coursework grades will not be in any way affected by either refusal or agreement to participate. Each participant can opt in to enter a draw to win a $200 Prezzy Card by entering their email address into a separate prize entry survey, made available at the end of the research survey.

Data storage and use: Final data will be stored on a password protected University of Auckland computer, backed up by a server. Access to raw survey data will only be granted to the primary researcher and her supervisors. All survey data will be destroyed after 6 years. Findings from this study will be included in my PhD thesis, may be included in peer reviewed publications or conference presentations to disseminate findings and inform the preparation and support of future paramedic students.
Right to Withdraw from Participation: Participation in this study is voluntary and you can withdraw from it at any point while completing the survey. No negative consequences will result by withdrawing from this study. However, since your data is anonymous, we will not be able to delete your data after you have completed the survey.

Anonymity and Confidentiality: All data will be anonymous, with only the participant’s research code associated with their data, so no-one at AUT/Whitireia will know whether or not you have participated. Each participant’s data will be combined with the results from all the participants for the purposes of reporting the study outcome. Survey provider Qualtrics uses Transport Layer Security (TLS) encryption for all transmitted data. By completing this questionnaire, you are indicating your consent to participate in this research. If you find participation in this survey distressing in any way, you can access confidential, professional support services through AUT’s Counselling Team Ph: 09 921 9292 or Vitae Counselling Whitireia Ph: 0508 664 981].

Contact details

Researcher: Natalie Anderson na.anderson@auckland.ac.nz

Research Supervisor: Professor Merryn Gott m.gott@auckland.ac.nz

Head of Department: Sandie McCarthy alexandra.mccarthy@auckland.ac.nz

FMHS postal address: The University of Auckland, Private Bag 92019, Auckland 1142 New Zealand

For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Office of Research Strategy and Integrity, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: humanethics@auckland.ac.nz

Approved by the University of Auckland Human Participants Ethics Committee on 16/08/16 for three years [#021883]

Approved by Auckland University of Technology Ethics Committee on 20/08/16 for three years [#16/041]
This survey is only open to students currently enrolled in one or more Year 3 paramedicine papers in New Zealand. Are you currently enrolled in any Year 3 paramedicine papers at AUT or Whāireia?

☐ Yes
☐ No
For each of the following statements, assume you are acting within the scope of an emergency ambulance role and in accordance with Clinical Practice Guidelines.

To what extend do you agree with the following statements?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel confident identifying that a patient is in cardiac arrest</td>
<td></td>
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<tr>
<td>I feel confident identifying that a patient has died</td>
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<tr>
<td>I feel confident providing effective CPR to a patient in cardiac arrest</td>
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<tr>
<td>I feel confident administering intravenous medications to a patient in cardiac arrest</td>
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<tr>
<td>I feel confident managing bystanders present during resuscitation</td>
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<tr>
<td>I feel confident gathering relevant information from the scene to inform resuscitation decisions</td>
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<tr>
<td>I feel confident using documented patient wishes to inform resuscitation decisions</td>
<td></td>
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<tr>
<td>I feel confident discussing patient resuscitation wishes with family present during a cardiac arrest</td>
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<tr>
<td>I feel confident identifying when ongoing resuscitation efforts are medically futile</td>
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<tr>
<td>I feel confident terminating resuscitation efforts in accordance with clinical practice guidelines</td>
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</tr>
</tbody>
</table>
For each of the following statements, assume you are acting within the scope of an emergency ambulance role and in accordance with Clinical Practice Guidelines.

To what extent do you agree with the following statements?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel confident withholding resuscitation efforts in accordance with clinical practice guidelines</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>I feel confident verifying patient death in accordance with clinical practice guidelines</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>I feel confident providing culturally safe care of a deceased patient’s body</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>I feel confident notifying family members of patient death</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I feel confident managing your own personal emotional responses, whilst communicating with distressed relatives</td>
<td>☐</td>
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<tr>
<td>I feel confident providing emotional support to bereaved relatives, following a patient death</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>I feel confident guiding bereaved relatives regarding practical issues, following a patient death</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<tr>
<td>I feel confident managing your own personal emotional responses, following a patient death</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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</tr>
<tr>
<td>I feel confident supporting a distressed colleague, following a patient death</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
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</tbody>
</table>
When it comes to resuscitation decision-making, what concerns me most is...

When it comes to patient death, what concerns me most is...

When it comes to my own personal emotional responses to resuscitation decision-making and patient death, what concerns me most is...
Please rate how helpful the following teaching and learning methods have been, to prepare you for resuscitation decision-making and patient death.

*If teaching and learning methods were not used for this purpose, please select "Not used."*

<table>
<thead>
<tr>
<th>Method</th>
<th>Not at all helpful</th>
<th>Somewhat helpful</th>
<th>Very helpful</th>
<th>Not used</th>
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<tr>
<td>Clinical simulation</td>
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<tr>
<td>In-class role play</td>
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<td>○</td>
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<tr>
<td>Lectures / large class teaching</td>
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<td>○</td>
<td>○</td>
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<tr>
<td>Prescribed reading</td>
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<tr>
<td>In-class case studies</td>
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<td>○</td>
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<tr>
<td>Clinical placement experiences</td>
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<tr>
<td>Formal mentoring</td>
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<tr>
<td>Informal peer discussions</td>
<td>○</td>
<td>○</td>
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</tbody>
</table>

What other things do you think *have helped* to prepare you for resuscitation decision-making and patient death? e.g. life experience, volunteer roles, previous employment

What other teaching and learning opportunities do you think *might be helpful*, to prepare you for resuscitation decision-making and patient death?
For the following questions, count experiences in all emergency response roles you may have worked in e.g. student on clinical placement, ambulance officer or first- aider

How many prehospital cardiac arrests have you attended?

How many prehospital deaths have you attended?

How many prehospital cardiac arrests have you attended where resuscitation attempts were withheld?

How many prehospital cardiac arrests have you attended where resuscitation attempts were eventually terminated (stopped) on scene, with the patient still in cardiac arrest?

How many prehospital cardiac arrest or deaths have you attended, where you were actively involved in communication with family members or bystanders?
To ensure anonymity, demographic information from the following questions will be used for group analysis only.

Which age group do you belong to?

What is your gender?

What is your current enrolment status?

- Part-time paramedicine student at AUT
- Full-time paramedicine student at AUT
- Part-time paramedicine student at Whitireia
- Full-time paramedicine student at Whitireia
- Other (please specify)

Is there anything you else you would like to add, or think I should have asked?

Thank you for completing this survey. If you want to opt in to enter the prize draw for a $200 Prezzy Card, please click the NEXT key below and enter your email address. Your email address will only be used to notify you if you win the prize draw and will not be associated with any of your survey responses.
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New Zealand
Attn: Natalie Anderson
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