

PARAMEDIC RESEARCH

Principles, Designs and Methods

**Edited by
Julia Williams and
Graham McClelland**

Foreword

It is my pleasure to introduce *Paramedic Research: Principles, Designs and Methods*, a vital resource that sheds light on the critical nexus of research and practice in paramedicine. As someone deeply entrenched in the world of evidence-based care, I understand firsthand the profound impact that well-conducted research can have on shaping the future of paramedic practice and patient outcomes.

Although focusing on paramedicine, this book offers valuable insights and practical guidance which will be useful to a wide range of health and care professionals. In an age where evidence-based practice is paramount, this text provides readers with the tools they need to engage in meaningful research that drives innovation and improves care delivery.

From foundational research principles to ethical considerations and practical methodologies, each chapter contributes to advancing the science and practice of paramedicine through rigorous research.

I am confident that *Paramedic Research: Principles, Designs and Methods* will inspire and empower paramedics and other health professionals to embrace research as a powerful tool for improving patient care and driving positive change in their respective fields.

Professor Richard Lyon, PhD, MBE

Consultant in Emergency Medicine at the Royal Infirmary of Edinburgh
Director of Research and Innovation, Kent, Surrey and Sussex Air Ambulance
Professor of Prehospital Emergency Care at the University of Surrey

Preface

As the field of paramedicine continues to evolve, so too does the importance of evidence-based practice and research. In this exciting and timely textbook, we embark on a journey through the fundamental principles and practical applications of paramedic research.

Paramedic Research: Principles, Designs and Methods offers a comprehensive exploration of the paramedic research landscape, from its historical roots to its future trajectories. Through the collaborative efforts of esteemed authors, each chapter delves into key aspects of paramedic research, providing invaluable insights and practical guidance for both novice and seasoned researchers alike.

In Section 1, we set the stage with an examination of the evolution of paramedic research and the various methodologies that drive it forward. From understanding the importance of evidence in informing practice, to navigating the intricacies of research paradigms, this section lays the groundwork for the chapters to come.

Section 2 explores the nuts and bolts of research design and data collection, whether quantitative, qualitative or mixed methods. Readers will gain a fundamental understanding of how to design studies and analyse data effectively to generate meaningful insights that can inform paramedic practice.

Ethical considerations and the role of governance in research are explored in Section 3, alongside practical guidance on engaging with service users, understanding health economics and disseminating research findings. Additionally, invaluable advice on developing research proposals, securing funding and exploring career pathways in research equips readers with the tools they need to embark on their own research journeys.

This text would not have been possible without the support of our research communities, as well as Class Professional Publishing. We have been writing through times of great change in healthcare, in part due to the COVID-19 pandemic. We thank all our authors for continuing to support this publication while at the same time managing to navigate the challenges brought to the forefront by the pandemic, with many of us maintaining patient-facing roles during those years. Equally, we thank everyone at Class Professional Publishing for believing that we would complete this textbook in spite of these unique and additional pressures.

As editors, we are delighted to present this practical resource to the research communities. We extend our deepest gratitude to the contributing authors for their expertise and dedication in shaping this textbook. They have written with passion, expert knowledge and a desire to make the content meaningful and accessible to all. It is our sincere hope that *Paramedic Research: Principles, Designs and Methods* will inspire and empower paramedics and other health and care professionals to engage in research endeavours that drive innovation and advance the field for years to come.

Julia Williams and Graham McClelland

About the authors

Editors

Julia Williams, PhD, PGCert ED, PG Cert, Dip HE, FCPara. Professor of Paramedic Science and Director of the Paramedic Clinical Research Unit (ParaCRU) at the University of Hertfordshire, UK. Head of Research at the College of Paramedics, UK. Head of Research, South East Coast Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0000-0003-0796-5465>.

Julia, a registered paramedic and Professor of Paramedic Science at the University of Hertfordshire, has been involved in paramedic education and development since 1996. As Head of Research for the College of Paramedics, she actively promotes paramedics' contributions to clinical research and advocates for their involvement in health and care research studies. Julia has extensive experience with qualitative, quantitative and mixed methods research in paramedic practice, emergency and urgent care, paramedic education and workforce wellbeing, both in the UK and overseas. She has led research in the South East Coast Ambulance Service NHS Foundation Trust since 2005 and is a member of the National Ambulance Research Steering Group (NARSG). Julia has served on multiple trial steering groups, funding panels, and committees. She is also the Editor-in-Chief of the British Paramedic Journal and has mentored several paramedic PhD students. She firmly believes that a career in paramedic research is full of opportunities and exciting challenges, and hopes this book will be a valuable resource for everyone interested in research at all different levels.

Graham McClelland, PhD, MClinRes, BSc (Hons), FCPara. Vice-Chancellor's Fellow and Assistant Professor in Health, Northumbria University, UK. Visiting Professor, University of Hertfordshire, UK. Honorary Research Fellow, North East Ambulance Service NHS Foundation Trust, UK. Visiting Clinical Researcher, Stroke Research Group, Newcastle University, UK. ORCID: <https://orcid.org/0000-0002-4502-5821>.

Graham is a registered paramedic and Vice-Chancellor's Fellow at Northumbria University. Graham joined the North East Ambulance Service in 2003 and worked in a variety of clinical roles until he started getting involved in research which took him down a different career path. Graham is a pragmatic, applied healthcare researcher who has been involved in studies across the breadth of conditions encountered by paramedics, but his main focus has been on stroke. In addition to this, Graham has

served on the editorial board of the British Paramedic Journal since it was set up, is a reviewer for multiple journals and funding bodies and has been a member of both NHS and university ethics committees. Graham is privileged to be able to support, mentor and supervise paramedics from internships through to PhD students. He thinks this is an exciting time to be involved in prehospital and emergency care research, and hopes that paramedic researchers will continue to seek ways to improve the care delivered to patients.

Contributors

Elicia Austin, BSc (Hons), AFHEA, MCPara. School of Health and Social Work, University of Hertfordshire, UK. South Central Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0009-0003-6306-3287>.

Jack Barrett, PhD, BSc (Hons), BSc (Hons), MCPara. Senior Paramedic Research Fellow, South East Coast Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0000-0002-0040-537X>.

Alan M. Batt, PhD, PGCME. Assistant Professor, Queen's University, Canada and Associate Professor, Monash University, Australia. ORCID: <https://orcid.org/0000-0001-6473-5397>.

Fiona Bell, PhD, BSc (Hons). Head of Research and Development, Yorkshire Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0003-4503-1903>.

Sarah Black, DCLinRes, PGDip, BSc (Hons). Head of Research, Audit and Quality Improvement, South Western Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0000-0001-6678-7502>.

Karl Bloomer, MSc, BA (Hons), MCPara. Consultant Paramedic, Northern Ireland Ambulance Service Health and Social Care Trust, UK. ORCID: <https://orcid.org/0000-0002-7822-4528>.

Mike Brady, PhD, PGDip, ACP, BSc (Hons), Dip HE. Cyfarwyddwr Clinigol Cynorthwyol/ Parafeddyg Ymgynghorol ar gyfer Gofal Clinigol o Bell, Ymddiriedolaeth Brifysgol GIG Gwasanaethau Ambwlans Cymru, which translates to Assistant Clinical Director/ Consultant Paramedic for Remote Clinical Care, Welsh Ambulance Services NHS Trust, UK. ORCID: <https://orcid.org/0000-0001-6675-9149>.

William Broughton, MSc, PGCert, BSc (Hons), FCPara. Professor of Paramedicine, Buckinghamshire New University, UK. ORCID: <https://orcid.org/0000-0002-9764-9433>.

Cheryl Cameron, M Ed. Advanced Care Paramedic, Director of Operations, Canadian Virtual Hospice, Canada. ORCID: <https://orcid.org/0000-0002-4085-7995>.

Karl Charlton, MRes. Research Paramedic, North East Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0000-0002-9601-1083>.

Scott Devenish, PhD, MVocED, FACPara. Professor of Paramedicine, Australian Catholic University, Australia. ORCID: <https://orcid.org/0000-0001-9118-0163>.

Enrico Dippenaar, PhD, MSc, PGCert. Honorary Research Associate, University of Cape Town, South Africa. ORCID: <https://orcid.org/0000-0001-8406-7373>

Georgette Eaton, DPhil (Oxon), MSc, PGCert, BSc (Hons), FHEA, MCPara. Consultant Paramedic, Urgent Care, London Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0001-9421-2845>.

Tim Edwards, PhD, MSc, MSc, BSc (Hons), BA (Hons), MCPara. London Ambulance Service NHS Trust, UK ORCID: <https://orcid.org/0000-0001-6084-932X>.

Ruth M. Fisher, MSc, Dipl, DipHE, PGCert, BSc (Hons), MCPara, MRCSEd, FHEA. Senior Lecturer, Queen Margaret University, UK. Yorkshire Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0003-3959-4021>.

Adam Greene, MSc. Critical Care Paramedic Unit, BC Emergency Health Services, Canada. ORCID: <https://orcid.org/0000-0002-4366-9455>.

Pete Gregory, MEd, BSc (Hons), FCPara. ORCID: <https://orcid.org/0000-0001-9845-0920>.

Anthony Herbland, PhD, MA, PGCert, FHEA. Programme Lead for MRES in Health and Social Care, University of Hertfordshire, UK. ORCID: <https://orcid.org/0000-0001-6182-4191>.

Kim Kirby, PhD, MCLinRes, MCPara. Senior Research Fellow, University of the West of England, UK. South Western Ambulance Service NHS Foundation Trust. ORCID: <https://orcid.org/0000-0002-8092-7978>.

Ian Maconochie, FRCPCH, FRCPI, FRCER, PhD. Professor of Practice in Paediatric Emergency Medicine, Imperial College London, UK. Consultant in Paediatric Emergency Medicine, Imperial College Healthcare Trust NHS, UK. ORCID: <https://orcid.org/0000-0001-6319-8550>.

Peter McMeekin, PhD, MSc, BA (Hons). Professor at Northumbria University, UK. ORCID: <https://orcid.org/0000-0003-0946-7224>.

Jamie Miles, PhD, MSc, ClinRes, PGDip, DipHE, MCPara. Advanced Clinical Practitioner, Barnsley Hospital NHS Foundation Trust, UK. Visiting Research Fellow, Oxford University, UK. ORCID: <https://orcid.org/0000-0002-1080-768X>.

Scott Munro, PhD, PGDip, PGCert, BSc (Hons), MCPara. Lecturer, School of Health Sciences, University of Surrey, UK. Critical Care Paramedic, South East Coast Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0000-0002-0228-4102>.

Georgina Murphy-Jones, MA, PGDip, PGCert, BSc (Hons), MCPara. Deputy Director of Clinical Assessment and Pathways, London Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0002-6681-1506>.

Andy Newton, PhD, MSc, PGCE, IMCDip, FCPara. Chief Executive Officer, Newton, London, UK. Chair of HPAC. ORCID: <https://orcid.org/0000-0002-6708-8524>.

Mary Peters, MSc. Head of Patient Safety, North West Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0003-0628-7084>.

Helen Pocock, PhD, MSc, PGCHPE, BSc (Hons), MCPara. Senior Research Paramedic, South Central Ambulance NHS Foundation Trust, UK, Warwick Medical School, University of Warwick, UK. ORCID: <https://orcid.org/0000-0001-7648-5313>.

Alison Porter, PhD. Associate Professor of Health Services Research, Faculty of Medicine, Health and Life Science, Swansea University, UK. ORCID: <https://orcid.org/0000-0002-3408-7007>.

Larissa Prothero, BSc (Hons), PhD, BSc (Hons). Research Paramedic, East of England Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0002-5440-8429>.

Duncan Robertson, MSc, MSc. Chief Paramedic Officer, South Central Ambulance Service NHS Foundation Trust, UK. ORCID: <https://orcid.org/0000-0002-6205-6558>.

Ursula Rolfe, PhD, MPhil, BSc (Hons), BA (Hons), PG Cert Ed. Associate Professor Paramedic Science Faculty of Health and Social Sciences, Bournemouth University, UK. ORCID: <https://orcid.org/0000-0003-3914-2607>.

Kristy Sanderson, PhD, BSc (Psych) (Hons), FRSPH. Professor in Applied Health Research, School of Health Sciences, University of East Anglia, UK. ORCID: <https://orcid.org/0000-0002-3132-2745>.

Jamie Scott, MSc, PgCert, MCPara. Lecturer in Paramedic Science, Ulster University, UK. Advanced Paramedic Practitioner: ORCID: <https://orcid.org/0000-0003-2402-021X>.

Helen Snooks, PhD, BSc (Hons). Professor of Health Services Research, Swansea University, UK. ORCID: <https://orcid.org/0000-0003-0173-8843>.

Hayley Stagg, PhD, MMath. Senior Information Analyst, North East Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0009-0005-4693-1921>.

Christopher Stein, PhD, MSc Med. Professor of Emergency Medical Care, University of Johannesburg, South Africa. ORCID: <https://orcid.org/0000-0003-3874-6847>.

Joel Symonds, PGDip, BSc, MCPara. Advanced Practitioner (Critical Care), Scottish Ambulance Service NHS Trust, UK. ORCID: <https://orcid.org/0000-0003-4841-3499>.

John Talbot, MSc, PGCert, BSc (Hons). Primary Care Paramedic, Visiting Lecturer University of Hertfordshire. ORCID: <https://orcid.org/0009-0003-6070-0834>.

Janette Turner, MSc. (Retired) Reader in Emergency and Urgent Care Research, SCHARR, University of Sheffield, UK. ORCID: <https://orcid.org/0000-0003-3884-7875>.

Gregory Adam Whitley, PhD, MSc, PGCert, BSc (Hons), MCPara. Paramedic Research Fellow, East Midlands Ambulance Service NHS Trust, UK. Associate Professor in Paramedic Science, School of Health and Care Sciences, University of Lincoln, UK. ORCID: <https://orcid.org/0000-0003-2586-6815>.

James Yates, MSc, DipIMC, MCPara. Specialist Paramedic, Critical Care, Great Western Air Ambulance Charity, UK. Advanced Paramedic, South West Neonatal Advice and Retrieval, UK. ORCID: <https://orcid.org/0000-0002-2520-0602>.

Chapter 1

Introduction: paramedic research: what is it all about?

Julia Williams and Graham McClelland

Purpose of this chapter

Completion of this chapter will help you to:

- identify how this book can contribute to learning about research in paramedicine
- outline what is meant by the term 'paramedic research'
- understand the importance of research for the paramedic profession.

Introduction

Over the past few decades, from the mid-1990s to the present day, the landscape of paramedic research has undergone a remarkable transformation, ushering in a new era of evidence-based practice and innovation. The end of the 1990s was a pivotal period in the history of prehospital care, with a growing interest in research among paramedics and healthcare professionals alike. This era witnessed the emergence of pioneering figures like Malcolm Woollard, a distinguished paramedic professor and trailblazer in the field of research in the UK. Woollard's contributions not only laid the groundwork for paramedic research, but also served as a catalyst for its integration into mainstream healthcare practices.

Since then, paramedic research has evolved from its nascent stages into a multidisciplinary domain utilising diverse methodologies, from clinical trials to qualitative studies. The significance of research in this context cannot be overstated, as it provides the foundation for advancing the quality, safety and effectiveness of paramedic practice, whether paramedics are working in prehospital care or any other setting.

By fostering a culture of inquiry and critical thinking, paramedics are empowered to consider evidence-based interventions that are grounded in robust scientific evidence, bridging the gap between theory and practice. By systematically evaluating interventions and protocols through rigorous inquiry, or exploring experiences and other phenomena, paramedic research contributes to the ever-expanding body

of evidence that informs clinical decision making and policy formulation. To fully harness the transformative power of research, it is imperative for paramedics to not only understand its relevance, but also actively engage in its pursuit. By providing accessible opportunities for education, training and mentorship, we can enable paramedics to embrace research as an integral component of their practice.

In expanding research capability and capacity among our own professional workforce, the importance of interprofessional and interdisciplinary collaboration must not be overlooked. We are working at a time when health and social care challenges are complex and multifaceted, and collaboration across disciplines is essential for generating comprehensive solutions. By fostering partnerships between paramedics, academic discipline experts, researchers, clinicians and other healthcare stakeholders, we can bring together diverse perspectives and expertise to tackle pressing healthcare issues in practice, management, education, policy and service delivery.

Equally vital is the involvement of patients and the public in research processes. By actively engaging stakeholders from the outset, researchers can ensure that studies are designed to address the needs and preferences of those directly impacted by paramedic practice. Through meaningful involvement in all stages of the research process, from study design to dissemination of findings, patients and the public become true partners in advancing the science of health and social care, no matter what the discipline.

What do we mean by ‘paramedic research’?

Terminology has its uses, but it can also lead to confusion if there is no shared understanding of the term. Paramedicine is still defining its parameters and meanings, and this is also true when it comes to paramedic research. We have been asked before whether it means research undertaken by paramedics, research about the paramedic profession, or both? Or something else completely? There may not be consensus on this, but when we refer to paramedic research, we are broadly talking about studies, investigations or inquiries undertaken to enhance the understanding, effectiveness and quality of care provided by paramedics. This could be in any setting where paramedics are working, whether that is ambulance services, primary care, tertiary care, industry, education, prisons, acute hospitals – the list is growing.

Sometimes this involves prehospital care, which may include emergency medical care delivery. By implication, prehospital indicates the patient is likely to go to hospital and in the 21st century this is not necessarily the case for all our patients, and certainly does not reflect the work of the whole of our workforce. However, on many occasions it is totally appropriate to refer to prehospital care, and in this book, we want to be inclusive of all roles and settings related to our profession. So sometimes we will refer to prehospital care and other times we might refer to unplanned or unscheduled, urgent and/or emergency care. The phrase ‘paramedic research’ just appears to be a more encompassing term than ‘prehospital’ or ‘out of hospital’ as it relates to all situations, settings and roles which affect paramedics and their working practices.

The paramedic profession is in a state of flux and we are still defining our scopes of practice – and there are many. Hopefully, research will add to our understanding of

these areas as we continue to grow as a profession. We need to acknowledge that there is no simple phrase that encompasses everything that paramedics do and, therefore, most of the time in this book we are likely to refer to research relating to paramedic practice or the paramedic profession.

At the same time as wanting to include all paramedics and our associated workforce, we also want to embrace opportunities for interprofessional research and multidisciplinary working. Paramedic research, while focused on improving care provided by paramedics, is not exclusive or undertaken in isolation. On the contrary, it encourages collaboration and interdisciplinary approaches to problem-solving within the broader healthcare landscape. Rather than promoting siloed working, paramedic research actively seeks to engage with other healthcare professionals, researchers, academics and stakeholders to foster a comprehensive understanding of unscheduled and/or unplanned, urgent and/or emergency care and its integration into the larger health and social care systems as well as other organisations. You can see the dilemma here as we cannot write this out in full all the time, which is why authors frequently shorten it to prehospital or paramedic research, more for convenience than necessarily as an accurate delimiter of the settings.

Paramedic research examines various aspects of paramedic practice, including, but not limited to, the following:

- Clinical interventions, such as evaluating the effectiveness of specific medical treatments or procedures administered by paramedics.
- Patient experiences and outcomes, focusing on the perspectives, needs and experiences of patients receiving paramedic treatment and management, as well as the factors influencing their outcomes and satisfaction.
- Workforce well-being, examining the health and well-being of paramedics and other emergency care staff working in different settings.
- Education and training, investigating the efficacy of different education/training programmes, simulation exercises or educational strategies in preparing paramedics to manage their expanding practices whether they are related to emergency medical services, health promotion or primary care, to name a few.
- Evolving technology and equipment, exploring the use of new technologies, devices or equipment in improving the delivery of paramedic treatment/management and patient outcomes.
- Paramedic career development, investigating the impact of different elements whether related to clinical, management, education, research or entrepreneurship.
- Development of protocols and guidelines, assessing the impact of different protocols and guidelines on patient outcomes and resource utilisation.
- Workflow and systems, exploring organisations and integration of the paramedic workforce within the broader health and care systems to optimise patient outcomes and experiences, promoting integrated care and collaboration across the health and social care professions.