The Irish Journal of Paramedicine (IJP) is the official journal of the Irish College of Paramedics, the professional body for Irish prehospital emergency care practitioners.

The IJP is an open access, peer-reviewed, international journal dedicated to advancing and promoting the science of prehospital clinical care, research, education, policy, management and operational delivery, with a focus on Irish research.

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A National Ambulance Service paramedic is preparing to load a patient onto an Irish Coastguard S92 as part of a major incident training exercise.

Photo courtesy Rónán White, National Ambulance Service.

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June 2016

Editorial

Alan M. Batt
Editor, Irish Journal of Paramedicine. editor@irishparamedicine.com

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EDITORIAL

Fáilte go dtí an Irishleabhar Parai-Mhíochaineoireachta na hÉireann

Welcome to the Irish Journal of Paramedicine

Alan M. Batt

Editor, Irish Journal of Paramedicine

Correspondence: Alan M. Batt, 1001 Fanshawe College Blvd, London, ON N5Y5R6, Canada. Email: editor@irishparamedicine.com

Welcome to the first issue of the Irish Journal of Paramedicine (IJP). It gives me great pleasure to launch this journal, a first for Irish paramedics, and pre-hospital care in Ireland. I am also honoured to announce that the IJP has been adopted as the official journal of the Irish College of Paramedics, the professional body for prehospital emergency care practitioners in Ireland.

A newly emerging profession, paramedicine is now poised at a crossroads. Previously alluded to with colleagues from around the globe, the role of the paramedic is one that is rapidly evolving, and yet paramedicine as a discipline has yet to figure out where it belongs.(1) Are we public safety professionals, first responders or healthcare professionals? Williams has previously stated that the road less travelled requires the paramedic profession to pursue identity as a healthcare profession and not as emergency responders, EMS workers, or ambulance drivers, which we are so commonly identified as.(2)

Initiatives within Ireland such as the Centre for Prehospital Research national research agenda, the move to higher education for paramedics in University College Dublin and the University of Limerick, and the publication of high-quality peer-reviewed research, undertaken for paramedics, led by paramedics, and published in paramedicine journals are key components in this pursuit of professionalism. It is our hope that the Irish Journal of Paramedicine will play its part as a vehicle in this endeavour.

It is important however to point out that the Irish Journal of Paramedicine is not exclusively for paramedics. Within Ireland, and around the world, there are many other prehospital care providers, including community responders, volunteer first responders, EMT practitioners, nurses, physicians and others who deliver high quality patient care and are as committed to their personal and professional development as any paramedic. This journal is for the entire prehospital care community, within Ireland and abroad.

On behalf of the editorial board and the executive of the Irish College of Paramedics, I would like to outline our vision for this journal. We aim to deliver a high quality, freely accessible, peer-reviewed journal that will help to further the professionalisation of paramedicine and prehospital care provision both in Ireland and internationally.

Our aim is to provide you with access to research, reviews, appraisals, clinical updates, case reports and opinions that will help you to provide the best quality service – whether you are a student, clinician, educator, manager or researcher. We aim to present a wide range of topics relating to clinical practice, professional issues, role development, education and training, policy and service delivery, thereby representing all aspects of paramedicine and prehospital care.

Our editorial board consists of respected academics, researchers, clinicians and educators from Ireland and abroad who are committed to furthering the cause of paramedicine, and encouraging its future development of professional standing. I am indebted to them for the time they gave so freely in helping to establish this journal.

We strongly encourage you to submit articles, reports, letters and other contributions to the journal. It is also our vision to publish abstracts of research activity undertaken by Irish prehospital care providers and practitioners, which has been presented at various conferences and scientific meetings, such as the EMS Gathering, and Irish College of Paramedics Scientific Days to name but two.

Remember this is your journal and it will be as successful as you want it to be. This journal has been a long time in the making, and we look forward to helping it to develop into a true academic and clinical resource along with your assistance. Thank you.

Alan M. Batt
Editor

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June 2016

Guest Editorial

Dr. Shane Knox
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Follow the Irish Journal of Paramedicine online at www.irishparamedicine.com, on Twitter (@irishparamed) and on Facebook.
It is with great anticipation and excitement that we launch the first edition of the Irish Journal of Paramedicine. The Irish College of Paramedics (ICoP) are sincerely grateful to the Editor, Mr. Alan Batt, for this initiative and for his invitation to participate in this, the first Irish journal for national and international pre-hospital practitioners.

The Irish College of Paramedics, like our regulatory body the Pre-Hospital Emergency Care Council (PHECC), has identified research in pre-hospital care as a central and important objective. In furthering our role as a professional body ICoP believe research by pre-hospital practitioners is essential to developing the profession. Like many other healthcare professions, paramedicine needs to develop a culture of research to contribute to the improvements in guidelines, culture, ethics and practice so as to impact positively on our patients whilst promoting this evolving profession.

Research in the pre-hospital arena is sparse and there is an immediate need to contribute to this important field. This past decade has seen some improvement in the amount of reputable journals focused on pre-hospital care exclusively and these are very much welcomed. Indeed these journals, to their credit, encourage submissions from paramedics and other pre-hospital practitioners, students and related faculty.

The Australasian Journal of Paramedicine has really set the standard and paramedic profession has benefitted from their innovative approach to publishing. This model allows contributions from those practitioners interested in publishing, some for the first time. The net benefit is a varied and interesting cross section of literature from many core and peripheral fields of paramedicine.

The Irish Journal of Paramedicine will have a similar ethos and I know the entire approach has the ability to contribute positively to our profession. The fact too that this journal is ‘open access’ will also allow for minimal restriction of articles and maximum exposure to authors. I am honoured to be part of the editorial team whilst amazed at the international mix of experience in this team.

I hope the launch of the Irish Journal of Paramedicine will encourage all those members of our community interested in publishing to contribute through direct submission and that we all support this outstanding initiative.

A journal dedicated to promoting and advancing the science of pre-hospital care and all things related, has the full support of the Irish College of Paramedics. We are delighted to make the Irish Journal of Paramedicine the official journal of the Irish College of Paramedics and we wish Alan and the entire team all the very best.

Thank you Alan.
Shane Knox PhD MSc HDip AssocCIPD Cert.Mgt MCPara
President of the Irish College of Paramedics
June 2016

Introducing the Irish Journal of Paramedicine Editorial Board.

Alan M. Batt  
Editor, Irish Journal of Paramedicine. editor@irishparamedicine.com

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Mr. Alan Batt GradCertICP MSc(c) CCP
Editor, Irish Journal of Paramedicine

Alan is an Irish paramedic who previously worked with the National Ambulance Service in Ireland. He has previous experience across Europe, North America and the Middle East as a critical care paramedic, educator, researcher and consultant. He is currently faculty in the Primary Care and Advanced Care Paramedic programs at Fanshawe College, Canada, faculty in several clinical and research programmes at Portland Community College, USA and a Paramedic Educator with the Centre for Paramedic Education and Research, Hamilton Health Sciences in Canada. He is also a Research Paramedic with National Ambulance in the United Arab Emirates, where he leads all research activities within the service. He holds a Certificate in Critical Care Paramedicine and a Graduate Certificate in Intensive Care Paramedic Studies, and is currently finishing an MSc in Critical Care. He has research affiliations with several international research centres related to prehospital care and care of the elderly, and has presented and published research findings internationally.

Dr. William Leggio MS EdD NRP
Associate Editor, Irish Journal of Paramedicine

William is clinical faculty and paramedic program coordinator at Creighton University in Omaha, Nebraska. His experiences as a scholarly practitioner includes academic service in the Middle East, publishing in and supporting peer reviewed journals, and serving on a variety of community, university, and professional organization committees. He is passionate about advancing EMS education in the United States, embracing interdisciplinary initiatives in the health sciences, increasing global understanding of EMS, and evidence based decision making in EMS. He has completed an MS in Negotiation and Dispute Resolution and a Doctor of Education (EdD) in Interdisciplinary Leadership from Creighton University, Nebraska, USA.

Mr. Joseph Acker MA PhD(c) EMT-P(cc) MPA

Joe is a Senior Lecturer in Paramedicine at Charles Sturt University (CSU) in Port Macquarie, NSW, a founding member of International Paramedic, and a Board Member of Paramedics Australasia. Joe has 25-years experience as an urban and rural paramedic, critical care flight paramedic, senior manager, ambulance service executive, researcher and paramedic academic. Joe maintains his clinical practice as an Intensive Care Paramedic with the New South Wales Ambulance Service. Joe has gained international experience working, consulting, and studying prehospital care in Australia, Canada, the United States, China, Abu Dhabi, Dubai, Brunei, and the UK. As a PhD candidate at CSU, Joe is researching remote and industrial paramedic practice in Australasia.

Dr. Malcolm Boyle ADipBus ADipHSc(Amb Off) MICACert BInfoTech GCertAcaPrac MClinEpi PhD FPA

Mal has been a paramedic for over 30 years with the last 22 years as a Mobile Intensive Care Ambulance (MICA) Paramedic in Victoria, primarily working in rural areas. Mal has been working in academia since 1999. His PhD looked at triage and error detection in prehospital trauma management.

Mr. Eddie Callachan NDip MHSc PhD(c)

Eddie has been a practicing advanced life support paramedic for 20 years, 15 years of which has been as a flight paramedic. His current position is as deputy chief flight medic for the UAE Armed Forces SAR program which he has held for 13 years. He holds the South African National Diploma in Emergency Care, Postgraduate Certificate and Diploma in Retrieval Medicine and a Master of Health Sciences in Aeromedical Retrieval and Transport from the University of Otago and is currently in his final year of a PhD in Emergency Medicine. Eddie also serves as a paramedic examiner for the Health Authority in Abu Dhabi licensing committee, and adjunct lecturer for the Bachelor of Emergency Health degree program at Fatima College of Health Sciences in Abu Dhabi

Mr. Marc Colbeck MACP PhD(c) CCP

Marc was a Critical Care Paramedic in Toronto, Canada who is now a Senior Lecturer and Course Coordinator of the Bachelor of Paramedicine degree at the Australian Catholic University in Brisbane. He spent several years teaching paramedicine in the Middle East, was previously the General Manager of Clinical Governance for South Australia Ambulance Service, and is currently a candidate for a PhD in Medicine from the University of Adelaide. He holds a Master of Arts in Counseling Psychology.
Mr. Eoghan Connolly HDipEMT MScEMS AP
Eoghan is an Advanced Paramedic with the National Ambulance Service in Ireland. He holds a Higher Diploma in Emergency Medical technology and a Master of Science in EMS (Advanced Paramedic). He leads the research and education portfolio for the Irish College of Paramedics.

Mr. Keith Colver MPhil
Keith is Clinical Governance Manager for the Scottish Ambulance Service, having previously served as Resilience Advisor and Special Operations Response Team Manager. He has previously published on treat and refer guidelines and mass casualty incident preparedness.

Dr. Patrick Cotter RGN RM ANP BSc MSc DNP
Patrick works as an Advanced Nurse Practitioner in Emergency Nursing in Cork University Hospital, Ireland and was the first graduate of the Doctorate of Nursing Programme in University College Cork. In addition to this, he teaches on several undergraduate and postgraduate nursing programmes in University College Cork.

Associate Professor Fergal Cummins MB BCh BAO BMEdSci MSc(DM) DMMD FRCEM FACEM FRCSEd (A&E)
Fergal is a Consultant in Emergency Medicine and Retrieval Medicine. He gained his primary medical degree from University College Cork. In addition, he holds an MSc in Disaster Medicine from the Université Libre de Bruxelles (Belgium) and from the Università degli Studi del Piemonte Orientale 'Amedeo Avogadro' (Italy). He has worked as a Consultant in Emergency Medicine and Retrieval Medicine in Europe and Australasia. He holds the academic positions of Associate Professor at Charles Sturt University, NSW, Australia and Senior Clinical Lecturer at the University of Limerick, Ireland. He joined National Ambulance in the UAE in June 2013 where he is responsible for the development and management of all clinical services for the organisation in the United Arab Emirates.

Professor Stephen Cusack MB BCh BAO BSc FRCSI FRCEM
Stephen is a graduate of University College Dublin. His basic professional training was in Dublin and he undertook his training in Emergency Medicine in Scotland at the Royal Infirmary of Edinburgh and Glasgow. His interest in Prehospital Emergency Medicine developed when he worked on Edinburgh Royal Infirmary's 'Medic One'. He was appointed as the first, and to date only, Chair of Emergency Medicine in Ireland at University College Cork in 2010. He has sat on the Prehospital Emergency Care Council's Medical Advisory Committee since its inception and continues to try and drive the development on Prehospital Emergency Care in Ireland.

Mr. Mark Dixon MSc AP
Following 30 years in EMS, Mark is now Course Director for three third level programmes, heading the Paramedic Studies Department based in the Graduate Entry Medical School of the University of Limerick. Each programme contains a heavy research and evidence based practice theme with Mark pushing this new EMS agenda whenever possible. He has presented his prehospital research findings in multiple countries across three continents. His specialist areas of research include supraglottic airway management, high fidelity simulation and spinal immobilisation.

Mr. Ricky Ellis HDipEMT MScLMD AP
Ricky holds an MSc in Leadership and Healthcare Management Development and is an adjunct faculty member of the Royal College of Surgeons, (Institute of Leadership), where he provides supervision on the Masters programme in Healthcare Management and also provides leadership development coaching on several of RCSI's external leadership programmes. Ricky is a practicing Advanced Paramedic with Dublin Fire Brigade who has a history of educational programme development and was seconded to PHECC on a project which saw him redevelop the national examination framework (NQEMT) for three clinical grades in Ireland. He has also published peer reviewed EMS educational research into e-learning and presented this research at a number of international conferences. He has lectured on personal leadership development to the Irish College of Paramedics and other Irish healthcare practitioners.

Mr. Darren Figgis MScEMS DipIMC(RCSEd) AP
Darren has been working in the Ambulance Service since 1995. Qualifying as a Paramedic in 1999 he became an Advanced Paramedic in 2008. In 2012 he completed an MSc in Emergency Medical Science (Immediate Care) and holds a Diploma in Immediate Medical Care (RCSEd). He has worked as a pre-hospital care professional in four countries across three continents. Now he is currently assigned to the Emergency Aeromedical Service on behalf of the National Ambulance Service.

Dr. David Fitzpatrick PhD DipIMC(RCSEd)
David is a Paramedic Clinical Research Specialist employed by the Scottish Ambulance Service and has been attached to the Scottish Government, Chief Scientist Offices’ Nursing, Midwifery and Allied Health Professions Research Unit (University of Stirling) for the past 10 years. His position within the Scottish Ambulance Service Clinical Directorate involves undertaking applied research aligned to the services clinical strategy. David’s work focuses on improving the quality and safety of pre-hospital emergency and unscheduled care. He completed his PhD in 2015 whereby he undertook a multiple methods investigation into pre-hospital hypoglycaemic care in Scotland. Several other projects are
ongoing at present and involve hypoglycaemic care, mental health/psychiatric related emergencies, COPD, pre-hospital and in-hospital handover. David continues to practice clinically as a paramedic within the West Division of the Scottish Ambulance Service.

**Mr. Damien Gaumont HDipEMT AP**
Damien is a French born paramedic who has spent over 17 years working on the front line; initially as an occupational first aider at sea, a firefighter and now as an Advanced Paramedic and Flight Paramedic for the National Ambulance Service in Ireland. Damien is now an Assistant Tutor at the Paramedic Studies Department, Graduate Entry Medical School in the University of Limerick. He is also affiliated with the Centre for Prehospital Research in UL, where he has conducted research projects and undertakes Clinical Practice Guideline reviews. He has experience in adapting and teaching courses in French and English, and setting up a community based Public Access Defibrillator Program.

**Dr. John Glasheen MB BCh BAO BMedSci BSc MScEMS MRCEM**
John started his prehospital career as an EMT and later as a paramedic in Ireland. He graduated from medical school at University College Cork in 2008, and completed a MSc in Emergency Medical Science (Immediate Care) while working in various critical care posts in Cork and Limerick. He moved to Australia in 2013 to gain further experience in prehospital and retrieval medicine with Sydney HEMS and with Careflight in Queensland. He is currently an Emergency Medicine registrar in Brisbane, and continues to work with Careflight.

**Mr. David Halliwell MSc Paramedic**
Dave is a paramedic researcher and developer of immersive education strategies. He has almost 30 years of experience in prehospital care and paramedicine. An Olympic gold commander for sailing, David is currently advising and educating teams throughout the Middle East on mass casualty response and counter terror measures. Dave was the main investigator for the UK arm of the LINC study - Lucas in Cardiac Arrest. He is a Director at the Academy of Professional Development based near London, and an international lecturer/educator for EMS and disaster relief strategies. He is often found in many of the worlds trouble zones helping to implement education strategies and newer technologies. A former army medic, David joined Dorset Ambulance service in 1989 and progressed from care assistant to head of education for the South Western Ambulance Service Trust.

**Mr. Kieran Henry HDipEMT MScEMS AP**
Kieran is an Advanced Paramedic and Supervisor with the National Ambulance Service based on a front line emergency ambulance in Cork City and also completes rotations on the Emergency Aeromedical Service based in Athlone. He has completed an MSc in Emergency Medical Science (Advanced Paramedic) through UCD and has presented his published research on Out of Hospital Cardiac Arrest at conferences in China and Spain. He is actively involved in teaching neonatal and paediatric resuscitation and was a key player in an Irish-Sudanese maternity hospital partnership project. A PHECC registered tutor, his other interests include teamwork development and crew resource management. He is the founder and co-organiser of ‘EMS Gathering’ an international pre-hospital event held in Ireland.

**Dr. Jason Horan MB BCh BAO BMedSci DipMedTox DipIMC(RCSEd) MRCSEd FRCEM**
Jason graduated from University College Dublin in 2002. He embarked on specialist training in Emergency Medicine in Ireland and took up his first Consultant post in 2013. He currently works in Mayo University Hospital. He has been involved with the Graduate Diploma in Emergency Medical Science in UCD since 2008. He holds postgraduate diplomas in medical toxicology and immediate medical care. He is a medical advisor for Mountain Rescue Ireland and is on the WEMSI-International faculty for their Wilderness EMT and Wilderness Physician programmes. He is also the clinical lead for Mayo ICRR (Irish Community Rapid Response).

**Ms. Tania Johnston RN MA PhD(c) EMT-P(cc)**
Dual trained as a paramedic and nurse, Tania has 22 years experience in prehospital care. Her clinical experience includes emergency nursing as well as paramedic practice in rural and urban ambulance services. Tania spent two years teaching in the paramedic program at the Northern Alberta Institute of Technology (NAIT), in Edmonton, Alberta, Canada before transitioning into an educator role with the Shock Trauma Air Rescue Society (STARS) air ambulance retrieval program. She enjoyed working as a critical care flight nurse/paramedic and Medical Base Manager during her 5½ years with STARS. Upon completing her Master's studies, Tania gained valuable experience working in government in the area of Emergency Medical Services and provincial air ambulance dispatch. Since arriving in Australia in 2010, she has been involved in educating CSU paramedic students and is a lecturer in the Bachelor of Clinical Practice (Paramedicine) at the Port Macquarie, NSW campus. She continues to practice as an emergency nurse and paramedic in New South Wales. Additionally, she enjoys spending time travelling internationally as a cruise ship nurse. Tania is currently studying for her PhD on the topic of paramedic professionalism.

**Dr. Shane Knox HDipEMT MSc PhD AP**
Shane is an Assistant Chief Ambulance Officer and an Advanced Paramedic Educator currently employed as the Education Manager in Ireland’s National Ambulance Service College. Shane is also a UK registered Paramedic, a member of the College of Paramedics (UK) and President of the Irish College of Paramedics. The topic of Shane’s PhD was ‘A...
Mr. Ciaran McKenna BSc(Hons.) DipECP
Ciaran trained as a Paramedic in London, completing his BSc Hons in Paramedic Science in 2005. He continued his studies and gained his Emergency Care Practitioner Diploma in 2010. He worked for the London Ambulance Service for 12 years during which time he undertook a number of operational and management roles including working as a Station Officer and Venue Commander at the 2012 London Olympics. In 2011-2012, Ciaran completed a secondment as a Flight Paramedic with London's Air Ambulance. He returned to Northern Ireland in 2013 and is currently employed as the Clinical Service Improvement Lead with the Northern Ireland Ambulance Service. His current role involves the development and implementation of Appropriate Care Pathways.

Dr. David Menzies MB BCh BAO BMedSci DipForensicMed PhD MRCSI
Adrian graduated from University College Cork (UCC) in 2003 and undertook his higher specialist training in emergency medicine at various hospitals throughout Ireland. Adrian was conferred with a PhD from University College Dublin in 2015 for research exploring current and future trends in prehospital paediatric pain management. His research has directly facilitated the introduction of intranasal fentanyl for use by advanced paramedics in Ireland for the prehospital treatment of acute severe pain in children. Adrian has completed a Fellowship in Prehospital Emergency Care with London Air Ambulance and is currently a Consultant in Emergency Medicine and Prehospital Emergency Care in Cork, Ireland.

Mr. Michael Nolan MA DipEd CCP(f)
Michael has served as a paramedic, Critical Care Flight Paramedic, Professor, Deputy Chief of the Ottawa Paramedic Service, Director of Emergency Management for the City of Ottawa, President of the Paramedic Chiefs of Canada and Chairman of KidActive, a not for profit organization in support of healthy childhood development. Currently, Michael is the Paramedic Service Chief and Director of Emergency Services for the County of Renfrew, in Ontario, Canada. Since working as a front line clinician, Chief Nolan has worked to align and advance emergency services leadership locally, nationally and internationally through research, government relations, policy development and the creation of regulatory standards in support of evidence based practice for paramedicine and emergency services.

Mr. Cian O’Brien BSoc(Hons.) MPH RGN EMT
Cian works in the Emergency Management Office with the Health Service Executive South Region, Cork, Ireland. From a clinical perspective, Cian is an Emergency Medical Technician, Registered General Nurse, and holds a Masters degree in Public Health & Epidemiology from University College Cork. A life-long member of St. John Ambulance Brigade, Cian has always had a keen interest in pre-hospital emergency care. He currently holds posts at both local and national levels. Cian is the National Director of the Emergency First Responder Programme, and the Programme Director for the Emergency Medical Technician Programme in the southern region of Ireland.

Professor Peter O’Meara BHA MPP PhD FPA FANZCP
Peter is an internationally recognised expert on paramedicine models of care and education. He was one of the first paramedics in the world to complete a doctoral qualification researching paramedicine. He is the inaugural Chair of Rural and Regional Paramedicine in the LaTrobe Rural Health School, Bendigo. He has published one book, nine book chapters, 59 peer-reviewed papers and 13 other publications.

Dr. Damien Ryan MB BCh BAO BA MD DipMedTox DMMID DipIMC(RCSEd) FRCEM
Damien is a Consultant in Emergency Medicine at St. Vincent’s University Hospital and clinical lead of Emergency Medical Science at University College Dublin. He is also medical director of the Wicklow Cardiac First Responders Group.

Mr. Cian O’Brien BSoc(Hons.) MPH RGN EMT
Cian works in the Emergency Management Office with the Health Service Executive South Region, Cork, Ireland. From a clinical perspective, Cian is an Emergency Medical Technician, Registered General Nurse, and holds a Masters degree in Public Health & Epidemiology from University College Cork. A life-long member of St. John Ambulance Brigade, Cian has always had a keen interest in pre-hospital emergency care. He currently holds posts at both local and national levels. Cian is the National Director of the Emergency First Responder Programme, and the Programme Director for the Emergency Medical Technician Programme in the southern region of Ireland.

Professor Tom Quinn MPhil RN FRCN FESC FAHA
Tom is Professor of Nursing at Kingston University and St George’s, University of London. He has worked in acute cardiovascular care for over 30 years in various clinical, research and strategic roles in hospitals, the ambulance service, the Department of Health and latterly as a full time academic. While at the Department of Health, where he was closely involved in the National Service Framework for Coronary Heart Disease, and helped to establish the Defibrillators in Public Places Initiative, he was an ex officio member of the Resuscitation Council (UK) Executive, and for many years a member of the Joint Royal Colleges Ambulance Liaison Committee (JRCALC). He is a member of the Community Resuscitation Committee established jointly by the BHF, Resuscitation Council (UK), Association of Ambulance Chief Executives and NHS England as part of the Cardiovascular Outcomes Strategy. He is a member of the PARAMEDIC and PARAMEDIC-2 Trialists’ group.

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Cian works in the Emergency Management Office with the Health Service Executive South Region, Cork, Ireland. From a clinical perspective, Cian is an Emergency Medical Technician, Registered General Nurse, and holds a Masters degree in Public Health & Epidemiology from University College Cork. A life-long member of St. John Ambulance Brigade, Cian has always had a keen interest in pre-hospital emergency care. He currently holds posts at both local and national levels. Cian is the National Director of the Emergency First Responder Programme, and the Programme Director for the Emergency Medical Technician Programme in the southern region of Ireland.

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at the University of Toronto. He has published and presented on prehospital and emergency medicine research both nationally and internationally and continues to be involved in paramedic education and professional development.

Ms. Brigid Sinnott RGN MScEMS
Brigid qualified as an RGN in 1989 from Waterford University Hospital. She worked in Wexford General Hospital from 1990 until 2006. Fourteen of those years were spent in Intensive Care. In 2006 Brigid took up the role of the Basic Life support Coordinator in the Irish Heart Foundation, she continues in this role today ten years on. In 2012 she completed her MSc in Emergency Medical Science (Immediate Care) in UCD. Her current role involves her strengthening all the links in the chain of survival, mainly through training. She is passionate about the need to improve the quality of CPR in Ireland.

Ms. Nadine Seymour NDipEMC BTech MPhil
Nadine is an advanced life-support paramedic working at the Namibia University of Science and Technology (NUST). She started her ambulance career in 2001 as a Basic Ambulance Assistant and in 2003 completed the Ambulance Emergency Assistant course. She then joined the Western Cape Provincial Government Emergency Services and during this time completed the National Diploma in Emergency Medical Care as well as the Bachelors degree in Emergency Medical Care at Cape Peninsula University of Science and Technology. She completed a Master of Philosophy in Emergency Medicine specialising in Clinical Emergency Care at the University of Cape Town, during which time she completed electives in Education as well as Disaster management. She is currently Head of Department for Health Sciences at NUST which incorporates four programmes namely Biomedical Sciences, Environmental Health Sciences, Emergency Medical Care as well as Health Information Systems Management.

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E-learning on the road: online learning and social media for continuous professional competency.

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E-learning on the road: online learning and social media for continuous professional competency.
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Abstract

Background
The impact of social media and online learning in health professions education has previously shown generally positive results in medical, nursing and pharmacy students. To date there has not been any extensive research into social media and online learning use by prehospital health care professionals such as paramedics.

Aim & Methods
We sought to identify the extent to which Irish pre-hospital practitioners make use of online learning and social media for continuous professional competency (CPC), and the means by which they do so. A cross-sectional online survey of practitioners was conducted to obtain both quantitative and qualitative data. The release of the survey was in a controlled manner to PHECC registrants via various channels. Participation was voluntary and anonymous.

Results
A total of 248 respondents completed the survey in full by closing date of 31 March 2015, representing 5.4% of all registrants (n=4,555). 77% of respondents were male, and the majority were registered as Emergency Medical Technicians (49%), followed by Advanced Paramedics (26%). Over 78% of respondents used a mobile device in the course of their clinical duties; the majority used an iOS device. Social media and online learning were considered learning tools by over 75% of respondents, and over 74% agreed they should be further incorporated into prehospital education. The most popular platforms for CPC activities were YouTube and Facebook. The majority of respondents (88%) viewed self-directed activities to constitute continuous professional development activity, but 64% felt that an activity that resulted in the awarding of a certificate was better value. Over 90% of respondents had previous experience with online learning, but only 42% indicated they had previously purchased or paid for online learning.

Conclusion
Prehospital practitioners in Ireland in the population studied consider online learning and social media acceptable for CPC purposes. The main social media outlets used by PHECC registrants are YouTube and Facebook. Practitioners consider online learning that awards a certificate to be better value than self-directed activities. The majority have previous experience of online learning. The results of this study can be used to ensure educational interventions are targeted at practitioners through the correct channels.

Keywords: CPC; paramedic; EMT; social media; e-learning; online learning; Ireland

Introduction
The impact that social media and the internet have on our everyday lives is apparent, with a large percentage of the population having multiple social media network accounts. Websites such as Facebook and Twitter have transformed personal communication and redefined social interaction. An Ipsos Market Research Board of Ireland (MRBI) Social Networking Quarterly poll in August/September 2015 shows that 59% of Irish adults have a Facebook account, 28% have a Twitter account, 23% have a LinkedIn account and 21% have a Google+ account.(1) These figures have fluctuated only slightly since August 2013, indicating a consistent market penetration. In addition, many people, in particular those with a Facebook account, use it on a daily basis.(1)

The impact of social media and online learning on paramedic education is not well researched, but studies in other healthcare professions to date are encouraging, showing generally positive results.(2,3) Healthcare professional students have responded favourably to the blending of e-learning into clinical teaching in medical, nursing and allied healthcare fields. Jaffar (2014) studied the impact of anatomy and physiology education for medical students through Facebook, with the majority of students surveyed agreeing that Facebook could be a suitable learning environment.(4)

Pharmacy students surveyed in 2012 about a Facebook learning page in their program in the USA responded favourably to its addition, and the majority stated that they were more likely to post on Facebook rather than on Blackboard (the official university learning management system) and that they were more likely to see and read posts on Facebook than on Blackboard.(5) Nursing students in the UK showed similar usage, and statements provided by
students when surveyed about the use of Facebook included “I’m used to using Facebook” and “It is] easily accessed at any time of day”.

Social media and e-learning can also facilitate asynchronous instruction, or the concept of individual interactive instruction which, is defined as “individualized learning away from groups of similar-level learners, which allows learners to consume material at their own pace on their own timetable”. Previous research has shown that newly acquired knowledge through e-learning can be successfully adopted and transferred to clinical practice, making e-learning a potentially useful tool for prehospital practitioners. Social media also allows for individuals who cannot attend conferences, seminars and other live continuous professional competency (CPC) activities to stay current and informed of the latest developments at these events.

Since the advent of CPC requirements for registered prehospital care practitioners in Ireland in recent years (8,9), educational institutions and practitioners themselves have been investigating the most effective methods for undertaking CPC activities. Continuing education in Ireland for prehospital care practitioners has previously been delivered through online learning means such as the Pre-Hospital Emergency Care Council (PHECC) eLearning Academy. However, there has not been any extensive research conducted into the use of social media and online learning by prehospital healthcare professionals such as Emergency Medical Technicians (EMTs) and paramedics in Ireland outside of this venue.

Aim

The aim of this study was to identify the extent to which Irish pre-hospital practitioners make use of online learning and social media for CPC purposes, and the means by which they do so.

Methods

A cross-sectional, anonymous, online survey was constructed to obtain quantitative and qualitative data. Nationwide ethics approval was obtained from the Research Ethics Committee of the Health Services Executive, University Hospitals Limerick, Limerick, Ireland.

No previous questionnaires investigating paramedics or other healthcare professions similar use of social media for continuous professional development were identified in the literature. The survey tool consisted of 29 questions (Appendix 1). Respondents were provided with a concise, unbiased explanation of the survey topic. Participation was voluntary and anonymous. Consent to participate was assumed once the survey was accessed and recorded. Data was collected and reviewed by the researchers, and no third-party had access to the stored data.

The questionnaire was designed to yield data to evaluate the incidence, relevance and opinions of Irish prehospital practitioners on social media and online learning for continuous professional competency purposes.

The participants were asked to complete 29 questions, including some basic demographic data (gender, age bracket, qualification level and length of time qualified). They were then asked to rate statements on a five-point Likert-scale style ranging from 'strongly disagree’ [1] to ‘strongly agree’ [5]. Quantitative and free text written comments to open-ended questions (qualitative) responses. They were also asked a number of closed ‘Yes/No’ questions relating to use of certain social media platforms. To make analysis more meaningful, responses to the five-point Likert scale were analysed using three options, ‘strongly agree/agree’, ‘undecided’ and ‘strongly disagree/disagree’. Qualitative data was analysed and grouped into themes based on frequency.

The link to this questionnaire was distributed to PHECC Registered EMTs, Paramedics and Advanced Paramedics through the Centre for Prehospital Research mailing list, the Irish College of Paramedics membership database, training officers and education managers of statutory and voluntary services, and direct mailings to individual practitioners where possible. As a follow-up, reminder emails which have been shown to be beneficial in improving the response rate (10) were emailed four weeks later to the same group.

The survey software used was LimeSurvey, a self-hosted secure survey platform. All options to collect identifiable data such as date and time of submission, IP address, personal information etc. were disabled. The survey tool was piloted by ten EMTs and paramedics. These responses were subsequently excluded from analysis.

The data were downloaded to an electronic data file and quantitative analysis was performed using Statistical Packages for the Social Sciences (IBM SPSS version 20.0).

Presented now is an overview of the results of the study. Quantitative data is related in percentages relative to the number of survey respondents. To add further detail, a selection of the qualitative data relating to identified themes has been selected by the authors.

Results

Demographics

A total of 262 respondents replied to the survey by the closing date of 31 March 2015. Of these, 248 respondents completed the survey in full. A further 14 only provided partial responses and were excluded from analysis. The results presented below are based on the 248 complete responses received. These responses represent 5.4% of the total PHECC register, correct as of 2nd April 2015 (n=4,555).

Of the respondents to the survey, 191 were male (77%) and 57 were female (23%). The majority of respondents were aged 35-44 years (n=81, 33%), followed by 45-54 years old (n=70, 28%), and 25-34 years old (n=63, 25%). Twenty-five percent of respondents were aged over 55 (10%) and nine were aged under 24 (4%). A total of 233 respondents were resident in Ireland (94%) with the majority of the
The majority of respondents were resident in counties Dublin or Cork, followed by counties Limerick, Meath, Wicklow and Galway. The majority of respondents (n=121, 49%) were registered at the Emergency Medical Technician level, with 63 (25%) registered at Paramedic level (or student/intern level), and 64 (26%) registered at Advanced Paramedic level (or student/intern level). (Figure 2) These figures represent 6% of all EMTs (n=2,007), 3% of all Paramedics (n=2,129) and 15% of all Advanced Paramedics (n=419) registered with PHECC as of April 2015.

Median length of qualification was 5 years (range 1-35 years). A total of 63 respondents had completed, or were currently pursuing postgraduate level studies of some description (25.4%).

The majority of respondents practiced primarily for the National Ambulance Service (n=93) followed by the Irish Red Cross (n=48), Order of Malta Ireland (n=39) and Civil Defence Ireland (n=16). The majority of respondents (n=144, 58%) did not practice with a second organisation. Those who did mainly practiced with one of the voluntary organisations as a secondary organisation (Irish Red Cross, Civil Defence Ireland, St. John Ambulance Brigade or Order of Malta) Ireland.

Mobile device use

A total of 195 respondents (79%) indicated they used a smartphone or tablet device in the course of their clinical practice. The majority of these (n=117, 47.1%) were devices running iOS, with 84 respondents (34%) using devices running Android operating system. Six respondents used devices running Windows Phone or Windows 8. Only two respondents used a Blackberry device. (Some users used more than one device, hence the overall numbers exceed the total respondents to this question). Over 50% of respondents used these devices to complete CPC activities during “downtime” such as between calls.

Social media and e-learning

Social media and online learning were considered learning tools by over 75% of respondents (n=187). When asked if social media or online learning should be further incorporated into paramedic education, 74% strongly agreed/agreed (n=183), 9% disagreed/strongly disagreed (n=22) and 17% (n=43) were unsure. A selection of the participants’ comments are listed in Table 1.

When the advantages and disadvantages to online or social media-based learning were investigated, over 80% of respondents provided feedback. Some of their responses are outlined in Table 2.

Over 88% of respondents (n=219) viewed self-directed activities (such as reading a blog, watching a webinar, listening to a podcast etc.) to constitute continuous professional development activity. However 64% of respondents (n=159) were of the opinion that online learning activities that awarded a certificate or statement of achievement were better ‘value’ than those that don’t. The majority of respondents (n=155, 63%) used webcasts for CPC purposes, followed by podcasts (n=111, 45%) and blogs (n=100, 40%).

Over 90% of respondents had previous experience with online learning (n=225). Only 106 (43%) previously purchased access to online learning materials. A total of 27% (n=66) indicated they had an active personal subscription to any journal, and these subscriptions ranged from the Journal of Emergency Medical Services (JEMS) to the British Medical Journal (BMJ).

The majority of respondents had a Facebook account (n=206, 83%), followed by LinkedIn (n=137, 55%), YouTube accounts (n=131, 53%), Twitter (n=121, 48.8%) and Google+ (n=113, 46%). Only 11% of respondents (n=28) had an account with a massive open online course (MOOC) provider and a total of 73 respondents (29%) had access to an Athens account.

When the use of these accounts for CPC activities was investigated, the most commonly used platform for CPC activities was YouTube (n=87, 35%) followed by Facebook (n=78, 35%), Athens (n=65, 26%) Twitter (n=56, 22.5%), LinkedIn (n=44, 17.7%), Google+ (n=32, 12.9%) and MOOC providers (n=25, 10%).

Discussion

E-learning has previously been identified by Irish practitioners as a successful tool for delivery of prehospital educational information.(11) However, Irish prehospital
practitioners consider e-learning curricula without practical components to be irrelevant, but welcome access to e-learning when supplemented by related practical modules. (8,9) This theme was also highlighted in the qualitative data analysed in this survey.

Some of the results obtained in our study surrounding social media use were not surprising based on anecdotal interactions with prehospital care providers in Ireland regarding the topic. The vast majority of respondents had a Facebook account, and they stated it was very easy or easy to use. However, less than one-quarter of respondents felt it was meeting their learning needs, which potentially indicates a lack of engagement by learning material providers with the Facebook platform. We are not aware of any particular educational activities targeted at Irish prehospital care providers that are delivered or facilitated through Facebook. The results regarding prevalence of other social media account use are of interest. Twitter, LinkedIn and YouTube present further potential areas for engaging with prehospital care practitioners in Ireland.

The free open access medical education (FOAM) community is involved in the sharing of resources including links to blogs, podcasts and other freely accessible educational materials. The sharing of content on Twitter has been central to the continued development of the FOAM community through the use of several hashtags such as #FOAMed.(12) The #FOAMems Twitter hashtag was also registered in 2014, to facilitate discussion around prehospital care topics on Twitter. There have been almost 60,000 tweets registered in 2014, to facilitate discussion around prehospital care topics on Twitter. There have been almost 60,000 tweets generated by almost 7,500 Twitter users.(13) In addition, since completion of this study, the #IrishEMS weekly tweet chat was launched in late 2015 where users engage in weekly themed Twitter discussions around issues pertaining to prehospital care in Ireland. This has resulted in almost 6,000 tweets with over 6.5 million views from 562 users since late 2015.(14) As a result of these initiatives, the use of Twitter by Irish prehospital care practitioners is likely much higher today than the results of this study would indicate.

### Table 1. Participants comments to free text questions regarding incorporating social media and online learning into paramedic education.

<table>
<thead>
<tr>
<th>For</th>
<th>Against</th>
</tr>
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<tbody>
<tr>
<td>- Helps people from isolated areas access training.</td>
<td></td>
</tr>
<tr>
<td>- Encouraging the use of social media as both a consumption and creation tool will empower students to guide their own learning, and to learn outside of the curriculum.</td>
<td></td>
</tr>
<tr>
<td>- Considering that at the moment there is literally zero provided to us by our employer, except for rare up skilling days, I believe something has to be done to provide practitioners with the opportunity to better themselves.</td>
<td></td>
</tr>
<tr>
<td>- Online training is fine if it does not require hands on.</td>
<td></td>
</tr>
<tr>
<td>- It should not be used as a replacement for traditional learning but can be used as a way to reinforced learning.</td>
<td></td>
</tr>
<tr>
<td>- It is useful for getting out new information and discussion of the results of recent studies.</td>
<td></td>
</tr>
<tr>
<td>- I don't think social media should be used or marketed as a learning tool as in my opinion it is invalidated, unsecured information.</td>
<td></td>
</tr>
<tr>
<td>- Not everyone is comfortable with e-learning especially the older ones.</td>
<td></td>
</tr>
<tr>
<td>- It would be hard to see the value of increasing the volume of e-learning without an increase in the standard of the e-learning.</td>
<td></td>
</tr>
<tr>
<td>- The use of social media will not capture all potential participants. Personally I do not have any social media profiles and do not intend to have one.</td>
<td></td>
</tr>
<tr>
<td>- E-learning should only be delivered using dedicated platforms; either web or app based.</td>
<td></td>
</tr>
<tr>
<td>- Social media such as Twitter/Facebook – no, but online learning such as PHECC Online Academy is good.</td>
<td></td>
</tr>
<tr>
<td>- Social media is just that; social, not a learning forum.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Participants comments to free text questions regarding advantages and disadvantages to online learning and social media

**Advantages**
- Ease of access. Can be done on days off, on breaks, down time on night shifts etc.
- Asynchronous learning, allows for development even when committed to a full-time position.
- Self-paced, interactive learning.
- Exactly the same course taught to everyone - no local misrepresentations.
- Don’t have to give up “personal time” to travel to and attend training.
- More time efficient as not wasting time sifting for information through traditional sources such as text books.
- Clinical experts of all levels imparting their knowledge.

**Disadvantages**
- Can lack structure, information overload.
- Less face to face time with tutors.
- Some people don’t have the IT skills to access it.
- Easy to lose focus.
- Need for a computer and good broadband connection.
- Quality of educational material varies enormously.
- It is not peer reviewed or subject to the same standards as published material.
- Management see it as a tool to replace direct learning.
- Access to broadband in rural areas.
YouTube was identified as the single largest platform used for CPC purposes in this study. However, the accuracy of medical information provided on the internet, and in particular videos on YouTube needs to be further investigated.(15) For example, recent reviews have found that approximately 13% of videos relating to ECG interpretation were misleading (16), almost 50% of videos discussing management of peripheral neuropathy were not discussing evidence-based recommendations (17) and 66% of videos pertaining to seizure management did not depict a seizure. (18) A review by Duncan et al showed that the quality of the majority of clinical skills videos on YouTube was questionable, with very few being graded as completely accurate.(19)

One such initiative which is harnessing the popularity of YouTube access for CPC activities, and providing viewers with accurate evidence-based information is the O’Brien Institute (OBI-CPC) event. Live educational sessions are broadcast to several satellite locations around Ireland, and made available for personal viewing via YouTube. Participants can sign up and attend for free, and a certificate of attendance is issued after the event for CPC records. To date there have been eight events organised, with 24 unique topics delivered. Since June 2014 there have been over 3350 views of the eight events on YouTube (live or recorded), combined with 1,244 in person attendances at the live-event or at a satellite location.(20)

As our study has shown, the majority of Irish prehospital care practitioners surveyed prefer CPC activities that results in the awarding of a certificate. This is a somewhat antiquated view of CPC activities, and highlights a potential area for improvement. PHECC have previously issued guidance on CPC activities to practitioners (21) which clearly outlines several options such as journal article review, reflection, case study completion, mentoring and other non-certified activities (Table 3). While the authors wholeheartedly agree with the collection of evidence surrounding CPC activities, the emphasis and practitioner preference displayed regarding perceived value of certificates may promote a culture of “tick-the-box” course attendance that may not necessarily meet the learning needs of the individual practitioner. Evidence of completed CPC activities can take many forms, and does not have to explicitly include the issuance of a certificate.

The majority of practitioners reported using a smartphone during their clinical practice (to reference guidelines and medication information for example), but over half of the respondents in this study also used their smartphone or mobile device to complete CPC activities during “downtime”. Ensuring that learning and CPC resources can be accessed easily using these devices should theoretically make it easier for practitioners to undertake CPC activities.

Equity of access to online learning was a major theme discovered on analysis of qualitative responses to this survey. An estimated 1.7 million Irish people live in rural areas, which is almost 37% of the total population (4.6 million).(22) Total broadband penetration in Ireland is approximately 80%

![Table 3. CPC activity guidance outlined by PHECC (13) for Emergency Medical Technicians](image-url)
counties Antrim, Armagh, Carlow, Derry, Down, Fermanagh, identified personnel within the organisation. The reasons for this are unclear as the link was distributed to employer of paramedics and advanced paramedics in Ireland. employed with Dublin Fire Brigade, the second largest preference. No responses were received from practitioners this may influence the results in terms of platform usage and profession is increasing steadily. It is uncertain exactly how profession, although the number of females entering the preference and usage. To put this in context however, which could potentially affect results regarding platform uptake of Athens account access. PHECC registered Practitioners working within Dublin Fire Brigade, or the voluntary organisations are not provided with access to an OpenAthens account by their organisation. At the time this study was conducted, PHECC provided a free personal subscription to the Journal of Paramedic Practice to all registrants, however our results indicate practitioners were not aware of this, or chose not to redeem it.

Our study has several limitations which need to be highlighted. A sample size of 355 respondents was required in order to analyse results for statistical significance. The fact that our 248 survey participants only represent 5.4% of the overall register at the time the survey was conducted is an obvious limitation, and the results outlined cannot show statistical significance. A forum to contact all PHECC registrants through official PHECC channels for research purposes is currently unavailable. The link to survey completion was distributed via email, which may lead to the introduction of selection bias. However, the link was not distributed on social media in order to control its distribution to PHECC registered practitioners only.

The majority of respondents were male 77% (n=191) which could potentially affect results regarding platform preference and usage. To put this in context however, prehospital care provision in Ireland is a predominantly male profession, although the number of females entering the profession is increasing steadily. It is uncertain exactly how this may influence the results in terms of platform usage and preference. No responses were received from practitioners employed with Dublin Fire Brigade, the second largest employer of paramedics and advanced paramedics in Ireland. The reasons for this are unclear as the link was distributed to identified personnel within the organisation.

No responses were received from providers resident in counties Antrim, Armagh, Carlow, Derry, Down, Fermanagh, Roscommon or Tyrone. Six of these counties are located in Northern Ireland, and Paramedics practicing in these five counties would be registered with the Health and Care Professions Council (HCPC) of the United Kingdom. This does not explain the lack of responses from Carlow and Roscommon, where providers would be registered with PHECC.

A significant number of respondents represented a younger population (with 62% under the age of forty-four years) and this would may also have influenced the results. This particular population may prefer a blended learning approach and may be more amenable to incorporating e-learning and social media technology in their learning, given the possibility that they may be more familiar with these technologies.

Recommendations and conclusions

To date, little research has been conducted with PHECC registered practitioners, and this survey is the first to ascertain the use of online and social media technology by a sample of Irish prehospital practitioners. E-learning is an important and powerful tool for pre-hospital providers for many reasons, including facilitating self-directed learning during “down-time” or whilst at a standby location. It also allows practitioners to plan their own learning, facilitating differing levels of clinical practice and competency.

Learning resources should be targeted at the most commonly utilised platforms, such as Facebook, YouTube and LinkedIn, webcasts and podcasts. The recent surge in Twitter activity also needs to be factored in. It should also be borne in mind that preferences with regards to platform usage can, and do, change with time, and education providers and organisations should ensure they continually assess the needs and wants of their learners. The facilitation of further blended education delivery should be considered by education providers in Ireland. Solutions to ensure equity of access to high-speed, reliable internet in the case of paramedics living or based in rural locations need to be identified.

This study has demonstrated that many Irish prehospital practitioners already use smartphones and tablets during their everyday clinical practice, and providing learning and CPC resources that can be accessed using these devices will make it easier for practitioners to maintain current competency. Engaging with the active FOAM community allows practitioners to plan their own learning, facilitating differing levels of clinical practice and competency. Engaging with the active FOAM community may also benefit prehospital care practitioners in Ireland, and their continued engagement with and sharing of prehospital specific materials is encouraging. The results of this study can be used to aid in the development of e-learning and social media educational resources in Ireland in the near future.

Author contributions

AB was the principal investigator for the study, principal author of the manuscript and performed the literature review and data analysis. NC developed the study design, validated the literature review, performed data analysis and contributed...
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APPENDICES

Appendix 1: Survey Tool

General Demographics
- Gender
- Age Bracket
- Country of residence
- County of residence (if living in Ireland)
- PHECC Register level
- Years since initial NQEMT qualification
- Post-graduate training completed or in progress (e.g. HDip/GradDip EMS, MSc EMS etc.)
- Primary Affiliated Organisation
- Secondary Affiliated Organisation (if any)

Online Learning & Social Media
- Do you have previous experience of online learning? Y/N
- Do you consider social media an online learning tool? Y/N
- In your opinion should more online/social media learning be incorporated into traditional paramedic education? Y/N (please elaborate)
- In your opinion, what are the main advantages to online/social media learning? (please elaborate)
- In your opinion, what are the main disadvantages to online/social media learning? (please elaborate)
- Do you consider self-directed activities such as reading a blog article, watching a webcast or listening to a podcast as continuous professional development activity? Y/N
- In your opinion is online learning that results in the awarding of a certificate or statement of achievement better than self-directed activities? Y/N (please elaborate)
- Have you purchased any online learning courses? Y/N
- Do you have accounts for any of the following platforms? Twitter, Facebook, Google +, LinkedIn, YouTube, MOOC Provider (e.g. Coursera), Athens/OpenAthens
- Do you use any of these accounts for continuous professional development or learning purposes? Twitter, Facebook, Google +, LinkedIn, YouTube, MOOC Provider (e.g. Coursera), Athens/OpenAthens
- Please rate each of these platforms on the following (Likert 1-5 scales) Ease of use; Broad access to content; Meets learning needs
- Which of the following do you use for continuous professional development or learning purposes? Blogs; Webcasts; Podcasts; Journals
- Do you have an active personal subscription to any journals (not through Athens account)? Y/N (please elaborate)

Mobile Learning
- Do you use a smartphone or tablet device in your clinical practice (e.g. drug calculations, reference to guidelines etc.) Y/N
- If yes, please indicate operating system type: iOS; Android; Windows Phone; Blackberry; Other

Do you use this device to complete CPD activities during “downtime” (e.g. time between calls)? Y/N

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Decision-making processes when paramedics refer low acuity patients away from hospital: a scoping review.

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Recommended Citation

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Decision-making processes when paramedics refer low acuity patients away from hospital: a scoping review.

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Abstract

Background
Paramedic practice faces increasing service demand with decision-making and referral pathways needing to change. Patients with low acuity clinical presentations do not necessarily require ambulance transport to an emergency department, and previous studies show alternative referral pathways can be effective, safe and efficient. With limited previous research, decision-making processes within the context of referring low acuity patients, need to be further examined.

Objectives
To examine the literature related to paramedic decision-making when referring low acuity patients to alternative care services, instead of transporting to hospital.

Methods
In this scoping review, the literature between 2005 and 2015 of service providers was examined. Key search terms were developed to search four databases and Internet search engines.

Results
Four studies were specifically related to decision-making. A further nine studies on the broader topic of paramedics referring low acuity patients to alternative medical services were included in this review.

Conclusions
Key factors including clinical experience, education, protocol use, referral processes, and holistic healthcare approaches all influence decision-making of paramedics when referring low acuity patients away from hospital.

Further research into these factors is required to understand how they influence and interact with each other.

Keywords: Paramedic, Emergency Medicine, Pre Hospital Care, Community Paramedicine.
The review included nurses providing a role similar to paramedic standards in some countries, as opposed to medical practitioners whose scope of practice differs. The emerging nature of this research also influenced the timeframe of between 2005 and 2015. While articles exist prior to this time, some authors have continued to publish and their most recent work was included.(19, 20) Electronic databases and reference lists were used as well as consultation between the authors.(21) The databases deemed most appropriate for ambulance or paramedic related practice included CINAHL, Medline, ProQuest and Expanded Academic ASAP, with Google Scholar also used to find individual citations.(3, 10, 22) A variety of terminology is used in different countries regarding paramedic practice and so numerous key terms and combinations were used when searching databases and these are listed in Table 1.(22)

The authors developed exclusion and inclusion criteria to facilitate selection of appropriate studies, and this may have excluded some relevant research (Table 2). The review was limited to peer reviewed, published journal articles, partly due to author time constraints.(22) While many articles included some or all of the search terms, further analysis ranked the criterion for inclusion. Decision-making was the key term and many articles included analysis about the accuracy of decisions, particularly in relation to clinicians ability to predict a patients need for hospital care.(3, 10) The review sought to understand the process involved in clinical decisions and so articles purely measuring accuracy and ambulance adherence to protocols were excluded.(17)

A flow chart explaining article selection is included as Figure 1. Only articles including a clear path of referral, along with decision-making, have been included.(16) Some studies suggested mixed results where paramedics appropriately left patients at home with only self-care advice, thus, these were excluded from the study.(23) Research relating to treat and discharge processes at public events were also excluded.(23) A number of the included papers were in relation to extended care programs.(20, 24) The aim of this review was to explore standard paramedic practice, therefore some extended care programs were included when these studies had a focus on referral and decision-making.(25) Others have been excluded due to limited decision-making analysis.(26)

Another facet of emerging paramedic practice is telephone based triage by health care professionals instead of paramedic attendance.(27) These involve referral, analysis of decision-making and sometimes using computer decision support.(27, 28) Only trials involving paramedics physically attending patients were included, as data suggests dispatch coding tends to over triage, and referral is likely to occur.(29) The most recent research of this nature was excluded as there was limited analysis of decision-making and referral elsewhere.(30) Some articles complicated this inclusion criterion, by having computer decision support as part of in person assessment, or related to patients left at home with only self-care advice.(28, 31) These articles however, included detailed analysis of decision-making and referral possibilities, and were included.(28, 31)

**Results**

Titles and abstracts of 531 articles were reviewed and ultimately, thirteen articles were included in the review. Four articles specifically focussed on the research question, namely Coates, Halter, Snooks, and Snooks.(15, 16, 28, 32) The remaining articles were included because of their focus on paramedic decision-making, or limitations in education regarding decision-making when referring low acuity patients away from hospital.(33) Some articles discussed specific programs with additionally trained staff referring targeted presentations away from hospital.(13) Others analysed paramedics’ ability to predict patients’ likelihood of requiring hospital admission.(32) These articles were only included if there was discussion of this ability relating to future referral of low acuity patients away from hospital.(10) A further three systematic reviews were excluded as the articles cited in relation to decision-making were already included in the review.(3, 34)

Various methodologies were included and Table 3 differentiates these and provides details of the study design for each article.
Discussion

A thematic analysis was used to draw the findings together.(39) Each article was interrogated by exploring them paragraph by paragraph to draw out similarities and differences between the articles.(39) This method of managing data and creating categories is described by Grbich as ‘block and file’.(40) A process of reducing redundancy amongst the categories then occurs and a model is created that incorporates the most important themes.(40) Many studies had a mixed methods approach, allowing patient demographics to enhance and support qualitative findings. (15, 35) Five main themes emerged in relation to decision-making processes; clinical experience, protocols, education, referral processes, and holistic health care.

Clinical experience

Nearly half the articles reviewed considered clinical experience or instinct as a vital component of decision-making when referring low acuity patients.(15, 16, 32) When provided with additional professional development and protocols to guide referral of low acuity patients, paramedics indicated that clinical experience heavily influenced their decisions.(15, 16, 37) However, neither levels of experience, nor tangible ways of measuring or achieving it were discussed.(5, 32, 35) Several articles indicated that quantitative data can support paramedic and physician reliance on clinical experience levels relative to correct referral decisions.(32, 35)

Protocols

Protocols often guide paramedic practice, and studies examining referral of low acuity patients found varying success in their use.(13, 16, 31) Adherence rates are reportedly mixed with paramedics stating that at times they used guidelines to validate decisions already made using their clinical experience.(16, 28) Protocols requiring consultation with other medical professionals have greater adherence and success with clinical outcomes.(25, 31) However, paramedics report that the binary nature of protocols are unhelpful when referring patients with complex clinical histories, and social circumstances.(15, 16) Reliance on protocols alone is not strongly supported and the changing nature of patients endorses more collaborative approaches. (15, 16, 25)

Education

Education was viewed as fundamental to decision-making.(20, 33, 36) Most articles spoke of education relating to continuing professional development by employers.(28, 35) Where the primary influence of decision-making was education, paramedics expressed increased confidence in utilising the expanded skills they had developed.(38) Cooper speculated that additional education had a direct influence on increased referral rates away from hospitals.(20) Education that focused on holistic, in-depth knowledge of complex patients and medical conditions was considered necessary as well.(13, 16, 32, 33) Education seems central to paramedic professional development, as it becomes responsive to emerging practice and essential changing needs.(33, 38) Some articles included a component of university education and as pre-employment academic education becomes more common in paramedicine, consideration must be given to when and by whom the education of particular facets of knowledge needs to occur.(25, 38) The varying level of academic qualifications across different paramedic locations, may also need investigation.(3, 13, 23, 38) Professional registration can facilitate education standards for research based individual and organisational responsibilities, ensuring accountability.(22) Arguably, consistency is achieved with other health care professionals, and with additional research, improved and shared referral processes.(19)

Referral Processes

Paramedics have not traditionally utilised pre-existing referral pathways when diverting low acuity patients from hospital attendance.(20, 31, 33) Establishing new pathways and ensuring ongoing collaboration seems to be an enduring issue that influences whether paramedics refer or not.(15) Several authors hypothesise that if paramedics received feedback on referral and patient outcomes, they would be encouraged further and be more confident in their decision-making.(13, 16, 28) Comans found paramedics were often identified as separate from other services and health care professionals, another factor that could influence success of referral processes.(33) Where interagency and professional collaboration occurred, paramedic satisfaction and referral rates improved.(37) In some studies, engagement with physicians or nurses facilitated higher paramedic rate of referral, as these professions more readily engage in patient referral and perhaps indicate that referral is improved by a broader understanding of health care.(13, 25) The complexity of influences on successful referral processes suggests perhaps an interdependence on other factors identified in this review, including collaboration with other professionals.(13,
Holistic Healthcare

A holistic approach including collaboration with other professionals is needed, with paramedics regularly expressing concern at their limited understanding of medical conditions and health services outside of the emergency setting.(3, 10, 15, 37) Jensen reports paramedics shifted the focus of their decision-making from protocol and transport considerations in long term care settings such as nursing homes.(25) Decision-making instead involved forward planning, integrating all facets of a patient’s life.(25) Reinforcing this approach, national frameworks concerning chronic medical conditions now inform education and development of referral processes, rather than profession-specific interventions.(36, 37, 38) Collaboration with other professionals consistently increases paramedic confidence and accuracy in decision-making as well.(13, 25, 31) With greater collaboration and an expansion of underlying healthcare knowledge, paramedics’ decision-making in referring low acuity patients is enhanced.(15, 37)

The evidence of what influences decision-making became clear; articles where successful outcomes for low acuity patients and paramedic satisfaction occur, found that a balance of the various factors emerges with collaboration.(15, 37) Difficulty occurs in prioritising the factors in relation to each other, and perhaps by examining each factor individually, evidence will emerge.(24) Education and targeted professional development dominated the articles reviewed.(20, 38) Future research needs to investigate the...
role of education in developing decision-making skills, chronic clinical presentations and managing social welfare issues.(15) Additional consideration must be given to teaching approaches, as well as how professional registration influences responsibility for ongoing education.(22)

Many studies identified clinical experience as a factor influencing decision-making but it is argued that studies struggle to identify a tangible measure and threshold for such a dynamic component of health care professionals work.(16) By improving the contact between paramedics, medical and other health professionals, either through holistic approaches or referral pathways, factors such as clinical experience and education improve.(25, 33) Research may never identify a gold standard for necessary clinical experience, but examination of protocols and how they are utilised may assist.(15)

The results of this review show inconsistencies in the use of protocols.(16, 28) As service demand evolves, protocol use may remain in relation to acute presentations, while holistic collaboration with other health care professionals will emerge for low acuity patients.(3, 25, 37) Individual factors, chronic health variation and locational influences make it difficult to create uniform guidelines.(3, 24, 34) Further analysis of this approach must occur, along with investigation of referral processes, which also may need to be guided by individual and location factors.(10, 34) The evolution of paramedicine in primary care regarding low acuity patients, must be prioritised as a research focus if the profession is to truly understand the nature of current work.(3)

Limitations
This review selected studies during a particular timeframe and searched only English language papers. As a result some articles may have been missed that could have influenced the nature of this scoping review. Thematic analysis has a subjective component to it that may influence the replication of this study.

Conclusion
Paramedic practice is evolving as public demands change in the utilisation of emergency care.(3, 24) By exploring the paramedic process in referring low acuity patients away from hospital attendance, this review has sought to identify factors influencing decision-making in this area. Previous studies suggest that clinical experience, protocols, education, referral processes, and holistic healthcare approaches, all influence how paramedics navigate referral of patients. From this, further analysis of each factor is required, as well as the interaction between each of them.

As paramedicine changes consideration must be given to how these factors influence wider health policy, pre-employment university education, and ongoing organisation support mechanisms for the paramedic workforce.

References


2008;16(6):370-5.


**Author contributions**
KS was the principal author of the manuscript and performed the literature review. POM and GV validated the literature review and contributed to the final editing.

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**Conflict of interest:** POM is a member of the editorial board of the IJP.

**Provenance and review:** Not commissioned, peer-reviewed.

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Clinical Update: Improving Cardiac Arrest Care in Ireland

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Improving Cardiac Arrest Care in Ireland

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Abstract
Over the past two years the National Ambulance service has engaged with both the country’s leading resuscitation experts and our international counterparts in a collaborative project focused on developing and expanding the National Ambulance Services response to out of hospital cardiac arrest. The One Life Project not only represents our commitment to improve standards of care it also represents our commitment to measure and publicly report on clinical outcomes of patients.

Keywords: resuscitation; cardiac arrest; OHCA; CPR; Ireland; National Ambulance Service

Introduction
The National Ambulance Service (NAS) serves a population of almost 4.6 million people in the Republic of Ireland, the service responds to over 300,000 ambulance calls each year. The NAS employs over 1,600 staff across 100 locations and has a fleet of approximately 500 vehicles. Emergency Medical Services attempt resuscitation on just under 2000 Out of Hospital Cardiac Arrest (OHCA) cases each year.

Over the past two years the National Ambulance service has engaged with both the country’s leading resuscitation experts and our international counterparts in a collaborative project focused on developing and expanding the National Ambulance Services response to out of hospital cardiac arrest. The One Life Project not only represents our commitment to improve standards of care it also represents our commitment to measure and publicly report on clinical outcomes of patients.

Strategy
The implementation strategy is broken into four strategic pillars (Figure 1).

NAS community interaction and public education
The National Ambulance Service continues to support and grow its Community First Responder (CFR) network and currently has in excess of 140 linked CFR Schemes. The role of the One Life Project has been to support the growth of CFR groups linked to the NAS and to seek out complementary methods of community response, such as; increasing Public Access Defibrillator (PAD) registration, activation of off duty NAS practitioners, activation of other healthcare professionals and responders and exploring the evolving arena of social media responders.

We have had an excellent response from our medical colleagues in General Practice. In conjunction with University College Dublin MERIT program we have now almost 100 General Practitioners across the country linked to the NAS to receive text alert to OHCA cases in close proximity to their workplace.

This area also focuses on the interaction and education of the public, from growing support for schools CPR programs in association with the Irish Heart Foundation to a significant increase in our services promotion of the chain of survival via our social media outlets on Twitter and Facebook.

National Emergency Operations Centre call taking and dispatch
When an emergency ambulance call is received, the Call Taker within the National Emergency Operations Centre (NEOC) uses a medical priority dispatch system (MPDS) to triage the call to determine the clinical priority and the appropriate response required. A coded response system is used, based on international best practice.

Life threatening calls, such as a cardiac or respiratory arrest take precedence over all other calls. The closest available resource is immediately dispatched, such as a NAS Emergency Ambulance, NAS Rapid Response Vehicle, NAS Intermediate Care Vehicles, or a local Community First Responder (CFR) group or doctor. For a suspected cardiac arrest the NAS Call Taker will instruct the person making the call, how to perform CPR and how to use an automated external defibrillator (AED) where available to the person.

The NEOC is continually striving to enhance the role they play in each OHCA, focusing on key areas of impact such as, early recognition of the cardiac arrest patient, increasing bystander CPR rates and rapid activation of multiple responders. This has been achieved through ongoing...
education and performance review and investment in the newest software support MPDS v13.0 which incorporates a Fast Track to “hands-on-chest” for suspected OHCA cases.

This continued focus on improving outcomes from cardiac arrest has seen a continued rise in bystander CPR rates from 60% in 2012 to 71% in 2014.

High quality care delivered by Emergency Medical Services at the scene of an OHCA

The One Life Project has developed a comprehensive position paper on the optimal scene management of an out of hospital cardiac arrest which will be released early in 2016 in line with clinical practice guideline updates on the 2015 ILCOR guidelines. The document and supporting material focuses on the best evidence in resuscitation care outlining the principles of high performance resuscitation and human factors management, the objective of which is to improve the quality and dignity of care delivered by NAS practitioners at the scene.

This process includes a renewed emphasis on resuscitation training in 2016 where NAS Education and Competency Assurance Teams (ECAT) will be introducing the principles high-performance resuscitation into each OHCA. This includes a well-planned, well-rehearsed and often choreographed approach to caring for the victim of sudden cardiac arrest with an increased focus on using a team approach; human factors training and the use of pre determine roles and checklists during resuscitation at the scene.

This quality improvement process is running concurrently with a significant investment by the NAS in a single monitor /defibrillator solution for the entire service (Physio Control LIFEPAK® 15) and an increase in the number of mechanical compression devices (LUCAS2®). This investment is providing our service with the opportunity to standardise the equipment used during each resuscitation and a greater opportunity to capture data at the scene and analyse our performance via CODE-STAT™ 9.0 data review software.

The One Life Project has also introduced post return of spontaneous circulation (ROSC) checklists, optimising the care of the post ROSC patient. This incorporates the principle outlined in the 2015 ILCOR guidelines, including optimising oxygenation, ventilation, haemodynamic and neurologic status and targeting those STEMI patients who require direct admission to primary percutaneous coronary intervention.

High quality data management, audit and research processes

Ireland is one of only three European countries with a single national OHCA registry. Since its inception in 2007, the Out-of-Hospital Cardiac Arrest Registry (OHCAR) has grown from a regional register in the North West to a nationwide register in 2012, incorporating OHCA data from statutory and voluntary services across Ireland. One of the early innovations of the One Life Project was the identification of the issues surrounding OHCAR data collection and processing.

Until this point there had been no single approach to the collation of OHCAR data from each region within the NAS. The One Life Project has developed and instituted a national process of data collection, regional collation and data processing; with collaboration from OHCAR the NAS can now track each OHCA event from inception to conclusion and has significantly reduced the data processing required and allowed greater emphasis on Validation of the data and feedback to the appropriate stakeholders.

In November 2015 the NAS Medical Directorate introduced quarterly OHCA infographics to highlight the important work NAS practitioners are carrying out in each of their own areas. The One Life Project will continue to work with OHCAR to maximise the data collection and processing in line with future technological advances.

Summary

The benefits to patients and their families remain the overarching focus of the One Life Project. Our service’s goal is to treat effectively as many people in cardiac arrest as possible so that they are neurologically intact and ready to resume their role within their family and society. Since the introduction of this quality improvement initiative we have seen a steady rise in the percentage ROSC at ED rates, from 24% in 2014 to 42% at the end of 2015, this is down to the consistent professional effort by our front line call takers, dispatchers and practitioners.

By working together, the implementation of this project will improve patient outcomes for each cardiac arrest call and dramatically increase our chances of saving that ‘One Life’.


Conflict of interest: None declared.

Provenance and review: Not commissioned, peer-reviewed.

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June 2016

Abstracts from the 2016 EMS Gathering

Conference abstracts for oral and poster presentations at the EMS Gathering, Killarney, Ireland, June 8th to 10th 2016.

Recommended Citation


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Follow the Irish Journal of Paramedicine online at [www.irishparamedicine.com](http://www.irishparamedicine.com), on Twitter (@irishparamed) and on Facebook.
Abstracts from the EMS Gathering, Killarney, Ireland, June 8th-10th, 2016

The editorial board of the Irish Journal of Paramedicine (IJP) is honoured to present these abstracts accepted for presentation at the 2016 EMS Gathering, 8th to the 10th of June 2016 in Killarney, Ireland. As part of our commitment to furthering the profession of paramedicine, and encouraging future development of professional standing, we publish this special supplement containing the selected abstracts.

These abstracts represent academic dedication, intellectual discovery, enthusiasm and for some, a foray into a new territory of research and academia. We are grateful for each and every one of these authors’ commitment to the advancement of our profession. We are privileged to publish these brief summaries of some of the novel and exciting research our colleagues are undertaking. Abstracts were received from several countries around the world, including Ireland, Canada, Australia, the USA, Croatia and Germany. We are also encouraged to see several abstracts primarily authored by paramedic students. The future is indeed bright.

This year, the EMS Gathering received 21 abstracts for consideration, and accepted 19 of the submissions (90%). One abstract was withdrawn by the authors after acceptance. Each abstract was independently reviewed by six reviewers who were blinded to the identities of the authors. Final determinations for scientific presentation were made by the EMS Gathering Abstract Review Committee. The decisions of the committee were based on the final review scores, with consideration to the time and space available at the meeting for oral and poster presentations.

We present these abstracts as they were received, with minimal copyediting and proofreading. Any questions related to the content of the abstracts should be directed to the authors. Please note that the abstract numbers presented here do not match the presentation numbers at the meeting. Attendees should consult the on-site programme for abstract session content, dates, times and location.

On behalf of the editorial board of the Irish Journal of Paramedicine, the Irish College of Paramedics and the organising committee of the 2016 EMS Gathering, we sincerely thank our colleagues for these valuable contributions, and their continued efforts to expand the knowledge base of paramedicine and prehospital care, ensuring we constantly strive to deliver the best care to our patients, and the best education to our prehospital care professionals.

Abstract Review Committee
Mr. Alan Batt MSc(c) CCP (not involved in peer-review)
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Dr. John Glasheen MB BCh BAO MSc
Mr. Brad McArthur BHSc CCP(f)
Dr. Marietjie Slabbert MB ChB MSc
Mr. Darren Figgis MSc AP

In choosing abstracts for the meeting, our goals are logic, fairness, and transparency. We do not believe one form of research is inherently better than another. In the interests of transparency and fairness, we are pleased to share our abstract scoring criteria (Figure 1). Remember, scoring is a judgment call. As an author one is welcome to use the criteria to score one’s own abstract, but this won’t change how the reviewers score the abstract on review.

All abstracts were reviewed in a blinded manner. Reviewers indicated if they had any potential COI during the review process (knowledge of the submitting authors or the work of specific abstracts etc.). No conflicts were declared by any reviewer. Abstracts were scored on the content of the abstract, educational value, and quality of the written abstract.

Content of the abstract—scientific accuracy and relevance of the abstract, as described in the outlined headings: Introduction/Background, Objectives, Methods, Results and Conclusion/Discussion.

Education value—what interest and appeal would this abstract hold to EMS Gathering audience. Does it represent a contribution to practice, theory, research or knowledge, and how novel or innovative is this contribution? Is the topic relevant to conference?

Quality of the written abstract—is the abstract self-contained, coherent and readable?

Scores from each reviewer were tallied, and the mean score was calculated for each abstract. Abstracts were then ranked according to mean score. Eight abstracts were selected for oral presentation based on highest mean scores. Other abstracts were ranked in order for poster presentation. A winner and runner-up were selected within oral abstracts and poster abstracts based on mean review scores.
Introduction

Objectives

Methods

Results

Conclusion

Interest and appeal to EMS Gathering audience

Contribution to practice, theory, research or knowledge

Novel or innovative contribution, relevant to conference

Self-contained

Coherent and readable

Abstracts from the 2016 EMS Gathering, Killarney, Ireland.


Best scoring poster abstract: 4. Ellis and Ryan. The uptake of online Continuous Professional Competency activity by prehospital care providers.


The following standardised abbreviations are used in the abstracts:

ACP Advanced Care Paramedic
ALS Advanced Life Support
AP Advanced Paramedic
BLS Basic Life Support
CPC Continuing Professional Competency
ECG Electrocardiogram
ED Emergency Department
EMS Emergency Medical Services
MD Medical Doctor (Physician)
PCP Primary Care Paramedic
RN Registered Nurse

1. Investigating paramedic service use by home care patients
Matthew Leyenaar¹, Andrew Costa¹, Brent McLeod¹,²
1. McMaster University, ON, Canada; 2. Hamilton Paramedic Service, ON, Canada.

Background: Community paramedic programs use existing paramedic service personnel in non-emergency capacities with extended scope of practice to improve access to health care services for patients that repeatedly call for assistance. Referral to allied health care services is an important resource that these paramedics use. Conversely, home care services use DIVERT scores (generated from the interRAI HC) to identify patients at risk for visiting an emergency department (ED). Based on the characteristics of home care patients, it is expected that these patients will use paramedic services to access the ED. Therefore, it is expected that services will benefit from identifying these patients in order to better co-ordinate clinical management.

Objectives: Specifically, this project investigates whether long-stay home care patients who have been assessed to have high DIVERT scores utilized paramedic services within 90 days of assessment, when compared to patients assessed to have low DIVERT scores. This project considers risk factors in home care patients that use paramedic services—either in an emergency or non-emergency capacity.

Methods: Paramedic service records, home care records, and emergency department records provide the necessary data to facilitate this investigation. Prevalence of paramedic service use by home care patients as well as prevalence of patients receiving home care among patients seen by paramedic services will present important baseline information for these service providers. Use of paramedic services will be modelled using logistic regression and survival analysis.

Conclusion: This investigation will have implications pertinent to the collaborative efforts between paramedic services and home care providers to improve care for these individuals.

2. The SPRRUCE Study: Measuring a Spatial Profile of Risk for Repeated Use of Paramedic Services Following Community Paramedicine Enhancement
Matthew Leyenaar¹, Niko Yiannakoulia², Michel Ruest², Michael Nolan²
1. McMaster University, ON, Canada; 2. County of Renfrew Paramedic Service, Pembroke, ON, Canada.

Introduction: Geographic evaluation of accessibility to health care services, also known as spatial accessibility, typically generates indices of spatial access that reflect a population’s ability to travel to health care resources. Geographic profiling, typically applied within criminology, generates probabilities useful in identifying the location of specific cases. This research draws on both concepts in order to generate spatially defined probabilities of paramedic service use by frequent users.

Methods: Using logistic regression, a model was developed to identify individual level risk factors that predict frequent use patients. The model was tested on independent subsets of data from subsequent years in order to determine its validity. The resulting probabilities generated through the modelling process were aggregated to two different spatial scales to create profiles of community needs. Due to ongoing community paramedic programming within the region of study, the resultant community health profiles serve as an evaluation of the benefit of these programs in these locations. The community health profiles also can be used to assess community level probabilities of patient needs in future.
interventions.

**Results:** The model performed with a receiver operator characteristic area under the curve of 0.876. This performance was 0.866 and 0.874 in the two validation datasets. Other tests of calibration presented similarly accurate results. Therefore, the model was applied to generate spatial profiles of risk for frequent use.

**Conclusions:** This analysis can serve as a new way to assess spatial accessibility to health care services and identify locations with increased risk of frequent use of paramedic services. While the results are specific to the location of study, the methods of analysis employed as well as the specification of the model may be adapted to other settings. Future work may consider other variables as measures of patient accessibility. The results serve to validate ongoing community paramedic programming as marked decreases in risk were observed in communities where specific interventions occurred.

3. **Barriers to effective communications in the Irish prehospital setting: the paramedics perspective.**

Neil Coleman¹, Nia Clendennen¹, Crea Carbury³

1. University College Dublin, Dublin, Ireland.

**Background:** For most people who access the emergency medical system via 112/999 in Ireland, their first point of contact within the system is often a paramedic or advanced paramedic. The diversity of presenting complaints, coupled with a limited range of diagnostic equipment means that one of the key skills that must be utilised in order to attain accurate and pertinent patient history is the ability to communicate in a clear and easily understandable manner.

**Objectives:** To assess the perceived barriers to effective communications in the Irish pre-hospital setting, how paramedics perceive their own ability to communicate with patients from the perspective of qualified paramedics, assess the level of communications training received by paramedics, assess the views of paramedics towards formalised communications training and their views as to who is best placed (by profession) to deliver formalised patient communications training.

**Methods:** A written survey was distributed to four groups of paramedics involved in advanced training programmes (four AP intern classes at different stages of their respective courses, total 78 students). Respondents returned the survey both voluntarily and anonymously. With the exception of length of service, there was no data contained in the study that could potentially identify any respondent.

**Results:** The majority of respondents feel that they communicate well with patients. The largest barrier to effective communication identified by the group were patients under the influence of an intoxicant. Language barriers were also identified as an issue, however fluency in a second language was low in the sample group. The majority of respondents also stated having received no formal training in patient communications. Majority view was that a formalised course in patient communications would be beneficial, with opinion being split as to who would be best placed to deliver this type of training.

**Conclusion:** Initial data would indicate that there is a place for formalised communications training within the prehospital syllabus in Ireland. The question remains as to whether this would be more beneficial at paramedic grade or advanced paramedic grade training.

4. **The uptake of online Continuous Professional Competency activity by prehospital care providers**

Glen Ellis¹, Grainne Ryan²


**Background:** The delivery of continuing professional competency (CPC) education to prehospital care providers in Ireland has evolved to include online and social media based activities. Paramedics and other prehospital care providers have also indicated their support for further online and social media based CPC activities. As a result, in June 2014 the O’Brien Institute CPC (OBI-CPC) Nights project was founded. This event aims to provide regular, live online CPC events for Irish prehospital care providers, free for all to attend. The medium for delivery is via a live video feed hosted on YouTube.

**Objectives:** The purpose of this study is to describe, characterise and evaluate the content of the OBI-CPC Nights project since its formation, and to evaluate the impact and engagement to date.

**Methods:** Total figures for live attendance at on-site event and at satellite sites were obtained. In addition, total views on YouTube for the recorded event was also obtained. An analytical report for #obicpc was also generated on symplur.com, with a search date from 16th February 2016 (registration date of hashtag) to date, a total period of 6 months. All of these data were combined to generate the results presented.

**Results:** During the study period (June 2014 - April 2016), eight OBI-CPC nights were conducted. These involved 24 speakers, who spoke on 24 topics, ranging from sepsis to trauma to education. As of March 1st 2016 a total of 505 individuals attended the event live, in-person, with an additional 497 that attended satellite sites, and 2777 have viewed the events on our YouTube channel. The hashtag #obicpc was registered in February 2016, and there have been 226 tweets by 52 users, with a total reach of approximately 162,060.

**Conclusion:** The results to date indicate that prehospital care practitioners in Ireland are engaging with the concept of live, electronically distributed CPC activities. The OBI-CPC Nights project has been a success to date with sustained growth evident from its inception. *figures to be updated prior to presentation.

5. **Clinical Scope of Practice of Select Air Ambulance Paramedics in Germany and USA.**

John R. Clark¹, Jurgen Gollwitzer³

6. Triage in Emergency Department (ED): addressing the most urgent patients through the Emergency Severity Index (ESI) modification.

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Abstracts from the 2016 EMS Gathering, Killarney, Ireland.

**Objective:** The objective of this cross-sectional online survey was to more fully understand the difference in the scope of practice between paramedics practicing in rotor-wing air ambulance programs in Germany versus their USA counterparts and their own expectations regarding their ability to provide optimal patient care.

**Methods:** An online survey of frontline paramedical staff in Germany and the United States was conducted using SurveyMonkey (SurveyMonkey Inc., Palo Alto, California, USA). Paramedics were asked to respond to eight questions relating to their beliefs and expectations relating to paramedic scope of practice in the air ambulance environment using a four-point Likert scale for each. Descriptive statistics are used to describe responses to survey questions. Tests for trend between nominal and ordinal explanatory variables and ordinal survey responses were performed using chi square statistics.

**Results:** There were 148 responses to the survey throughout the 1-month study period. Responses were split between German and USA paramedics with 1/3 coming from Germany and 2/3 from the USA. While many similarities exist between the two counties, the scope of practice and the training requirements are vastly different between the German and USA flight paramedic. When responding to questions about special skills and education required for air medical environment, provider beliefs about scope of practice are more closely aligned. Crew configuration (MD versus RN) seemed to play a significant part in the extent of the role of the flight paramedic.

**Discussion/conclusions:** Respondents to this online survey appear to enjoy a broad scope of practice beyond the practice of their ground ambulance counterparts. While a greater sample size and more specific questions would help better define the difference between the German and the USA flight paramedic, the initial questions demonstrated that while practice is similar, the scope of practice between the two countries are significant enough to not allow a 1:1 transfer of paramedic practice from a German program to a USA program, but the survey does demonstrate that collaboration is possible and both groups could benefit from future collaboration to improve the delivery of patient care that the flight paramedic delivers.

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**Background:** The number of patients arriving at EDs increases. Researches show that the number doubles within seven years. The ED of University Hospital in Cracow is a part of the Trauma Center with average patient’s flow about 125 people daily and 4 doctors working at once. Doctors report that a growing number of patients is a threat to those who are in serious condition, paying particular attention to the large number of patients appearing even though they do not require emergency service.

**Objective:** The objective of this study was to vivificate if the ESI modification allows to optimally address the most urgent patients when the increased patients influx excesses available resources.

**Methods:** The retrospective study was conducted. Books of reports on patients flow between 1st December 2015 and 29th February 2016 was analyzed. The analysis included the number of patients, assigned triage level (1-5) according to the ESI modification adjusted by consilium of emergency medicine specialists, final decision on admission or discharge and deaths. Moreover, the reasons of patients’ assigned to level 5 admissions were analyzed. The triage was performed by qualified nurse or paramedic, the final decision on admission was made by the doctor after medical examination (exam) and test results. To assess the total number of requiring hospitalization, deaths were classified as patients eligible for admission. During the study the participant observation was carried. The observer evaluated the performance in terms of waiting times for exam of particular triaged patients’ groups.

**Results:** The total number of ED patients was 11368. Out of this number 20,17% were qualified for admission. Each triage level was respectively: 1–0,53%, 2–2,75%, 3–17,91%, 4–73,08%, 5–5,73%. Inside these groups decisions on admission were: 1–100%, 2–74,44%, 3–42,29%, 4–13,54%, 5–2,15%. Deaths occurred only in levels 1-3. Reasons for admission of level 5 were triage errors largely caused by staff aversion to intoxicated patients who should have been assigned to the upper level or planned admissions held by ED. Participant observation showed that on the busiest time waiting exam time for level 3 patients may exceed 1,5 hour. Waiting time for level 4 patients exceed 4 hours.

**Conclusions:** Level 4 group is large as the waiting time is long. However, these are patients who are not at risk so in a situation of limited resources can be postponed. Level 3 patients are the most vulnerable - in this group are both: not requiring hospitalization and at risk of dying. Staff shall undergo periodic training to ensure high quality of triage. System solutions are also necessary.
grounded in a behaviourist paradigm. I focused on understanding the learning experiences that shaped participants’ knowledge constructs in readiness for the complexities of practice. This research puzzle began with my first experiences as a novice paramedic learning to do practice. My interest in this study evolved through reflection upon my experiences as a student, practitioner, and educator. Story is an important way paramedics can interpret how their experiences shape them. The meanings embedded in paramedic learning experiences can be understood and shared through stories, which can provide insight for future paramedics. Research texts were co-constructed iteratively over time with participants while attending to a 3-dimensional narrative inquiry space (temporality, sociality, and place). As a narrative inquirer coming into relation with participants in order to conduct this inquiry, I brought Dewey’s (1938) experiential theory based on continuity and transaction as central to my understanding of teaching and learning experiences. I interpreted the stories through my postmodernist lens, which shapes my telling as well as my thinking with others’ stories. Participants’ stories form the basis for learning to practice narratives. The narratives that emerged from the stories revealed what participants found meaningful during their student experiences and how this shaped their knowledge constructs. The narratives illuminated the complexities, tensions, and possibilities embedded within experiences of learning to become a paramedic. Narratives that arose from thinking with the stories that shape learning for practice feature (a) relational ethics, (b) developing identity, and (c) tacit knowledge.

8. Ultrasoundography in the diagnosis of deep vein thrombosis (DVT) in the emergency department (ED). The number of tests performed, technical aspects and diagnostic pitfalls.

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Background: Patients with suspected DVT are a small group compared to the total number of patients presenting to the ED. However, due to the high health risk for the patient with DVT its diagnosis using a limited-compression ultrasonography (LC US) is essential among doctors working in the ED.

Objectives: 1. To determine the frequency of patients’ presenting to the ED with suspicion of DVT. 2. To introduce DVT diagnostic principles in the ED environment using physical examination, LC US and laboratory tests, based on the own experience and available publications.

Methods: The electronic records of all the patients admitted to the Emergency Department Trauma Center University Hospital in Cracow between 01.07.2013 and 30.06.2014 have been searched for International Statistical Classification of Diseases and Related Health Problems codes related to DVT diagnoses and procedures. These group of patients has been analyzed for the performed diagnostic tests and final diagnosis.

Results: From out of the total 39 383 patients we have selected 296 (0.75%) among whom DVT has been suspected. DVT has been finally diagnosed in 82 cases (27.7%), which accounted for 0.2% from all the studied population. In 214 cases (72.3%) DVT has been excluded. In 39 cases (47.6% of DVT diagnoses) diagnosis has been based on physical examination and D-dimer result. That was due to the lack of the LC US among the standard tests performed in the ED. In 43 cases (52.4% of DVT diagnoses) for the DVT diagnosis were additionally used full compression ultrasound or LC US. In 205 cases (95.8% of DVT exclusions) the exclusion was made based on the full compression ultrasound or LC US, when the D-dimer result was positive or not taken. In 9 cases (4.2% of DVT exclusions) DVT were excluded on the basis of negative D-dimer result without performing any ultrasonography.

Conclusions: In the environment of a large ED the DVT diagnostic procedures are carried on average on one patient daily. Interpretation of D-dimer test and preforming LC US should be present in ED physician’s skills. Ultrasound examination is mainly used to exclude the DVT with the presence of positive D-dimer test. In some situations it is necessary to perform a reference ultrasound by an experienced specialist from outside of the ED.
EMS Physician Presence Decreases Scene Times for Trauma Calls: A Pilot Study

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Introduction: In North America physician response to EMS scenes is not a common occurrence. Most systems do not utilize an EMS physician and field response unit for call response. Our system currently utilizes a physician vehicle where the EMS physician is available for independent response to incident scenes. Our vehicle is fully equipped with ALS equipment and medications including video laryngoscopy and 12 lead ECG capability. We can respond independently to any call when on duty and are available off duty to respond to major incidents when requested by the local EMS agency. Scene times in prehospital trauma patients have been studied and show an increased survival benefit when the EMS physician was present. A large prospective study is planned to look at prehospital patient outcomes.

Methods: We conducted a retrospective chart review for quality assurance of dispatch logs over the previous 90 days. Trauma calls were defined as traffic accidents (including vehicle vs pedestrian), gun shot wounds, stabbings and traumatic injuries and were included in the data set. Furthermore, calls were chosen only if there was an emergent response and transport to the hospital. The primary outcome was on-scene time.

Results: We collected data on 20 charts with physician response and compared them to a matched historical control subset with no physician present on scene. Scene time was calculated from the time the transporting unit arrived on scene to when they departed for the hospital. The mean scene time for calls in which the EMS physician was present was 14 (±5 95%CI: 11-16) minutes compared to 19 (±10 95% CI: 15-24) minutes (p = .008). All scene times were <20 min when physician was present. There was a 68% decrease in scene times for trauma patients when the EMS physician was present on scene.

Conclusion: In this pilot study a decreased scene time was achieved for trauma patients when physician was present. A large prospective study is planned to look at prehospital patient outcomes.

11. Did Paramedics Learn in CME?

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Introduction: The Kolb’s Experimental Learning design identifies four distinct learning styles which coincide with a four-staged learning cycle. The Kolb’s method includes learners feeling, watching, thinking and doing. The Regional Paramedic Program for Eastern Ontario is mandated to provide medical oversight inclusive of Continuing Medical Education (CME) to nine paramedic service operators in Southeastern Ontario.

Objectives: Our goal was to evaluate the Kolb’s experimental learning model after implementation at our CME.

Methods: The CME session was planned designed and implemented utilizing the Kolb’s model. Facilitators were introduced to the learning objectives and desired outcomes prior to the CME sessions and delivered the objectives to the learners (paramedics) during the CME day. Anonymous pre learning (session) and post learning (session) multiple choice questionnaires were administered to the paramedics. The questions directly related to a deliverable (learning objective) within the CME sessions. Using an observational study, we measured the change (increase or decrease) in learning by pairing up pre and post for each paramedic and noting the results.

Main Results: 712 paramedics participated in Spring CME. 492 paramedics completed pre and post questionnaires. 157 (32%) respondents were ACP, 335 (68%) respondents were PCP. Mean knowledge increase range for 157 ACPs: 12.1% to 32.1% (confidence interval [CI] 95%). Median range for 157 ACPs: 3.9% to 20.0%. Mean knowledge increase range for 335 PCPs: 18.0% to 27.3% (confidence interval [CI] 95%). Median range for 335 PCPs: 13.4% to 26.7%. The results demonstrate a marked increase in paramedic learning after leaving the CME session, two-tailed P value is < 0.0001 and one-tailed P value is 0.0002. There was evidence that suggested that participant satisfaction scores did not correlate with paramedics overall learning.

Conclusions: Utilizing Kolb’s Experiential Learning Design Model for adult learners, Paramedics did increase their learning in their classroom continuing medical education.
12. Skills retention 3 months after neonatal resuscitation training in a cohort of healthcare workers in Sierra Leone

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Background: Sierra Leone has one of the highest neonatal mortality rates in the world, with almost one in twenty babies dying within the first month of life [1]. A number of simple interventions are available, which can potentially reduce newborn death rates. However, coverage of these interventions remains low [2]. Data suggests that less than 15% of midwifery staff in Sierra Leone possess the skills to resuscitate a newborn [3]. As approximately one-third of neonatal deaths in low-income countries are secondary to birth asphyxia [4], neonatal resuscitation training is a potentially important intervention in these environments.

Objective: To evaluate skills retention three months after neonatal resuscitation training amongst a cohort of healthcare workers in Sierra Leone.

Methods: A one-day neonatal resuscitation training programme was delivered to 48 healthcare workers in Bo Government Hospital, Sierra Leone. The primary measured outcome was the baseline examination score immediately after completing the training and the 12-week repeat testing score. We compared baseline and repeating testing results using a repeated-measures ANOVA.

Results: 34 healthcare workers returned for testing. Their baseline characteristics and baseline skills-test scores were not significantly different from those who did not return. The median baseline score achieved on the skills test was 90%. After three months, this dropped to 55%. There was no relation between frequency of involvement in neonatal resuscitation and skills degradation.

Conclusions: Regardless of role or experience, neonatal resuscitation skills decreased dramatically over a period of three months post-training. Stand-alone resuscitation training is the predominant model of resuscitation training in many countries, both in low- and high-income settings. These data suggest that isolated resuscitation training courses may not be sufficient to achieve ongoing competency in certain environments.

13. Patient Outcome Feedback for Paramedics

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Background and Purpose: There is an immense need for quality assurance in all fields of medicine. A potential way to increase quality improvement in prehospital health care is to provide hospital driven feedback to paramedics. We devised a study to gain insight into professional opinions and attitudes regarding patient outcome feedback. Furthermore, we aimed to evaluate the perceived effectiveness of patient outcome feedback in increasing clinical diagnostic skill and confidence.

Methods: Participants were recruited via email and social media (i.e. Facebook, Twitter). A general consensus survey on Google Forms of 15 questions was distributed to working paramedics to gain insight into professional opinions regarding patient outcome feedback. Responses for 462 people were analyzed.

Results: The results of the survey demonstrated that paramedics are interested in learning the diagnosis of their patients from the emergency department. Of the 426 survey participants, 95.8% (n=442) believed that learning their patient's diagnosis in the ED would be beneficial to them. A majority, 98.5% (n=455), stated they would access the information if it were available to them. Furthermore, 86.1% (n=398) of participants believed receiving feedback would lead them to complete research on the topic of their patient's diagnosis and 91.6% (n=423) believed receiving patient outcome feedback would improve their confidence as a health care professional.

Conclusions: Based on the responses from the survey, it is apparent that paramedics are of the professional opinion that patient outcome feedback information would be beneficial to them. Respondents stated that a feedback system would increase their confidence as health care professionals and would lead them to complete further research. More research is required to determine if patient outcome feedback increases paramedic diagnostic accuracy.

14. Paramedicine Use of Realistic Simulation in Education (PURSE)

William Johnston1, Alan M. Batt1,4


Background: Significant bodies of evidence have suggested the importance of simulation based learning for medical education in training of physicians, nurses, and other allied health professionals. Although there is a large body of evidence in other medical fields, there has been very little reported evidence of simulation use in paramedic education. We are examining the prevalence and types of simulation used in Canadian Paramedic education. We intend to assess gaps in simulation use.
**Objective:** The purpose of this study was to examine the patterns of simulation use and simulation resource inventory in Paramedic programs across Canada.

**Methods:** This is a cross-sectional survey of paramedic educators across Canada. Survey questions were devised by the researchers after consultation with key stakeholders in simulation education in the fields of Paramedicine as well as other allied health professions. These questions were then reviewed by Paramedic educators to ensure that the questions were clear and accurately assessed the desired information. After review the questions were sent via online survey to Paramedic program coordinators across Canada.

**Results:** We are still waiting on results and this abstract will be updated when they are available. We expect to find that simulation use is prevalent in some form in all Paramedic education throughout Canada. We expect that more low fidelity models of simulation (simple manikins and task trainers) are being used significantly more than high fidelity simulation. We expect that the largest barrier to high fidelity simulation use in Paramedic education is not lack of resources, but lack of appropriate training.

**Conclusion:** Paramedics treat patients in austere environments with limited resources. These calls often require critical timely interventions with high potential benefit to our patients. Unfortunately these calls are rare and often do not occur during transition to clinical practice. Realistic simulation allows training of these skills when patient health is not at risk. By understanding the current gaps in education use we can address improvements that can be made to the educational process to better prepare Paramedics and benefit our patient’s health.

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**Damien Gaumont**

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**Background:** Pain is the main complaint for Emergency Department (ED) presentation (Cordell et al 2002; Alonso-Serra and Wesley 2003). Historical reports show that prehospital analgesia has been suboptimal (Chambers 1993; Murphy et al 2016). In recent years the Prehospital Emergency Care Council has improved the scope of practice of the Irish prehospital providers with a larger choice of agents (PHECC 2014). Targeted stakeholders have accepted Pain relief as a principle Key Performance Indicator (KPI) for ambulance services (Murphy et al 2016).

**Objectives:** To understand the effectiveness, times of peak of effect and duration of effect, of a single dose of the pain relieving medications available to Irish prehospital practitioners. To develop educational visual aids.

**Methods:** A literature review of Randomised Control Trials comparing analgesic agents used in prehospital care was undertaken. Individual medications pharmacodynamics were reviewed.

**Results:** No one analgesic agent is the panacea for prehospital pain management. Practitioners need to take into consideration, the pain pathways, non-pharmacological options, as well as the pharmacodynamics of the different medications available. Patient’s analgesia and comfort should be considered for the rescue / extrication phase, the transportation phase and the waiting-for-further-treatment period in the ED. Three educational visual aids were developed.

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16. Trauma Review: intubation– how good are we; fluids – is there too much of a good thing; and let’s talk transfusion. What does the literature say?

**Joe Desreux**

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**Background:** There is controversy regarding morbidity and mortality associated with prehospital airway management and fluid resuscitation. In many prehospital environments, emergency service providers are tasked with assessment and intervention with little or no time to optimize patients. What does the literature say regarding these topics? Is there room for improvement?

**Objective:** A literature review of journal articles was performed to ascertain in trauma settings: 1) Prehospital endotracheal intubation success rates 2) What is an appropriate blood pressure goal during fluid resuscitation and associated mortality with aggressive fluid use? 3) What are appropriate blood product administration ratios. Methods: An on-line search through the National Center for Biotechnology Information database for journal articles, and other available online resources was performed. Only recent articles (publication dates 2009 – 2015) were assessed.

**Results:** Prehospital intubation success rates range from 70-98% when performed by paramedic personnel (land and air services), with a high number of unrecognized esophageal intubations (~ 12%). First pass success rates are low (~64%) with improved rates for subsequent attempts (70-98%). Resuscitation with a goal of normotension can have a significant repercussion for trauma patients, including dilutional coagulopathy, soft clot dislodgement and increased blood loss. Literature suggests a target systolic blood pressure of 70-90mmHg with normal mentation and peripheral pulses; this can be achieved with crystalloid solutions, colloids or vasopressors although one must consider individual pathology when deciding upon colloid solutions. With a massive transfusion of blood product, the ratio for these products should be 1:1:1 Packed cells: platelets: fresh frozen plasma, as a reduction in mortality (36% to 17% at 24hrs, and 55% to 34% at 30 days)and coagulopathy has been shown.

**Conclusions:** For prehospital intubation, there is room for improvement with first pass success rates, which may be easily improved with basic positioning and preparation techniques. As for blood pressure management during trauma resuscitation, “permissive hypotension” should be our goal rather than normotension. To that effect, crystalloid solutions, colloids and vasopressors are all appropriate. Massive transfusion using a 1:1:1 ratio results in a significant decrease...
in mortality.

18. Educating paramedics for the future: more than lights and sirens
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Background: The United Kingdom, Australia and New Zealand have moved toward near-mandatory higher education models for entry-level paramedics. While three-year Bachelorette degrees generally provide the scope and flexibility to introduce a wider range of studies in primary care and public health, they face the challenge of adding these topics to an already crowded curriculum.

Objective: One Australian university has responded to this challenge through the development and implementation of a four-year paramedicine program. Shortly after its provisional accreditation, the program was reviewed against the future needs of students, industry and the community.

Methods: Practice trends and the educational requirements of future entry-level paramedics were critically examined in Australia and internationally through a literature review, conference attendances, direct feedback from the field, and overseas visits. Practice trends and the educational needs of future entry-level paramedics were critically examined and addressed through a four stage process consisting of: collection of relevant evidence; analysis of data; curriculum development; and implementation of the program.

Results: The review of the literature, field visits and brainstorming activities confirmed the need for a broader educational curriculum and field experiences for paramedicine students that would better equip them for the emerging roles of paramedics both within traditional ambulance services and a wide range of other settings, such as the Defence Forces, remote industry sites, overseas aid missions and more.

Conclusion: The program was modified, and a four-year Bachelor of Paramedic Practice / Bachelor of Public Health Promotion was developed and first offered to commencing students in 2014. The structure of the program provides opportunities for students to gain skills and knowledge beyond that traditionally delivered, such as knowledge specific to primary health care and public health promotion. The program is designed to broaden paramedicine student horizons and prepare graduates for interdisciplinary, inclusive, and integrated practice. The public health components of the program allow for enhanced and flexible roles within communities and professional settings, and are responsive to calls for a holistic model of education to meet future paramedic role demands.

19. Paramedics assessing Elders at Risk for Independence Loss (PERIL): Derivation, Reliability and Comparative Effectiveness of a Clinical Prediction Rule
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Objectives: We conducted a program of research to derive and test the reliability of a clinical prediction rule to identify high-risk older adults using paramedics’ observations.

Methods: We developed the Paramedics assessing Elders at Risk of Independence Loss (PERIL) checklist of 43 yes or no questions, including the Identifying Seniors at Risk (ISAR) tool items. We trained 1,185 paramedics from three Ontario services to use this checklist, and assessed inter-observer reliability in a convenience sample. The primary outcome, return to the ED, hospitalization, or death within one month was assessed using provincial databases. We derived a prediction rule using multivariable logistic regression.

Results: We enrolled 1,065 subjects, of which 764 (71.7%) had complete data. Inter-observer reliability was good or excellent for 40/43 questions. We derived a four-item rule: 1) “Problems in the home contributing to adverse outcomes?” (OR 1.43); 2) “Called 911 in the last 30 days?” (OR 1.72); 3) male (OR 1.38) and 4) lacks social support (OR 1.4). The PERIL rule performed better than a proxy measure of clinical judgment (AUC 0.62 vs. 0.56, p=0.02) and adherence was better for PERIL than for ISAR.

Conclusions: The four-item PERIL rule has good inter-observer reliability and adherence, and had advantages compared to a proxy measure of clinical judgment. The ISAR is an acceptable alternative, but adherence may be lower. If future research validates the PERIL rule, it could be used by emergency physicians and paramedic services to target preventative interventions for seniors identified as high-risk.

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