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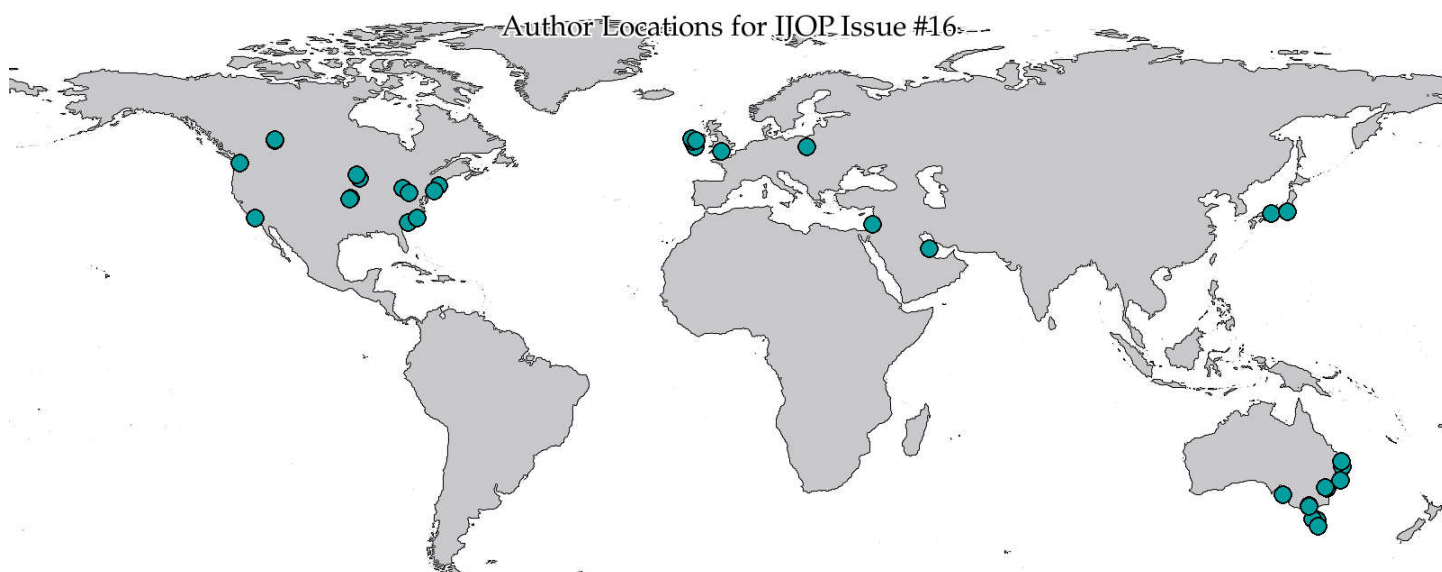
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RESEARCH REPORTS

THE INFLUENCE OF OPERATIONAL EXPOSURE ON SCENE TIME: AGENCY CALL VOLUME AND THE COMPRESSION OF ON-SCENE TIME VARIABILITY IN EMERGENCY MEDICAL SERVICES

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ABSTRACT

A limited number of emergency medical services (EMS) agencies respond to a disproportionate share of all 911-initiated calls in the United States. This study tests the hypothesis that responding units operating within high-volume service areas exhibit shorter and more consistent on-scene times for most call types than units serving lower-volume areas.

This study uses patient care report data generated from EMS providers whose agencies then contribute these reports to the national repository, the National Emergency Medical Services Information System (NEMSIS). The repository publishes data on a yearly basis. A random sample was drawn from approximately 262.7 million records between 2017 and 2023 to create a dataset of over 232,000 records for hypothesis testing. The data reveal a profound inequality of workload in that a relatively small number of agencies from across the country are responsible for handling the vast majority of all 911 calls represented in the sample. Of 7,536 agencies appearing in the nationwide sample, only 75 agencies (~1%) handle 30% of all calls, which is nearly twice the volume of the 6000 least busy agencies put together. Exceptionally busy agencies post faster scene times on average, and these effects survive multivariate analysis. Busy agencies are also less likely to exhibit extreme delays in scene times – keeping their scene times within a narrow and predictable range. No agency in the top 20% busiest by call volume had an agency-level median scene time exceeding 26.7 minutes. Connecting deidentified agency-level codes to each report further permits consideration of high call volume as a possible proxy for experience at the agency level.

RESEARCH REPORTS

UNDERSTANDING MATH ANXIETY THROUGH SELF-EFFICACY AND CULTURE: A MIXED-METHODS STUDY

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Keywords: anxiety, education, mixed methods, self-efficacy, students, emergency medical services, EMS, paramedicine

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ABSTRACT

Background: Health care providers' and students' performances may be impacted by math anxiety and self-efficacy levels. Many factors contribute to math anxiety and self-efficacy, such as bad grades in math at school and a lack of encouragement from parents or teachers. This study aimed to explore the difference in math anxiety and math self-efficacy for paramedic students at two universities in different cultures.

Methods: A sequential explanatory mixed-method study was conducted where data were collected using anonymous self-report questionnaires from students studying paramedicine at Monash University, Australia ($n = 344$) and Jordan University of Science and Technology, Jordan ($n = 161$), followed by face-to-face interviews.

Results: In multivariable regression, higher math self-efficacy was independently associated with lower math anxiety ($B = 0.14, p < .001$), and school country remained a significant predictor ($B = 1.48, p = .024$); interviews suggested motivation, self-confidence, and practice as perceived strategies to strengthen self-efficacy and reduce math anxiety.

Conclusion: This study, conducted in Australia and Jordan paramedic schools, addressed the relationship between self-efficacy and math anxiety among paramedic students. Math self-efficacy and math anxiety levels differed between the two schools according to sex, age groups, and study year level. Future research should focus on studying the effect of self-efficacy on math anxiety for practicing paramedics at national and international levels and focus on teaching and training strategies and interventions. The findings suggest that paramedicine programs should identify students with low math confidence early and use repeated, clinically contextualized medication-calculation practice, supportive feedback, and confidence-building activities to reduce avoidable anxiety before clinical placement.



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RESEARCH REPORTS

INTEGRATED FIELD MONITORING OF PARAMEDIC WORKLOAD AND EXPOSURE: A MULTI-MODAL METHODOLOGICAL STUDY

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ABSTRACT

Introduction: Paramedics experience demanding physical tasks, acute stressors, and chronic under-recovery, defined as an accumulation of incomplete physiological and psychological recovery. However, occupational exposure research has primarily relied on retrospective self-report, simulation, or single-modality monitoring that poorly capture within-shift variation and operational context.

Objective: The objective of this paper was to describe, implement, and evaluate a field-embedded, multi-modal protocol for measuring paramedic occupational exposure across routine rostered shifts, cross-referenced to CAD data. Specifically, we report protocol feasibility, data completeness, artifact burden, and field validity as methodological endpoints.

Methods: We conducted a prospective methodological observational study embedded in the routine operations of a large Australian ambulance service. A work-force-aligned sample of operational paramedics completed multiple monitored shifts wearing Hexoskin smart garments for continuous heart rate, respiratory rate, and accelerometry data, with pre-/post-shift and pre/post call blood pressure measurement and Borg Rating of Perceived Exertion (RPE) where feasible. Anonymized computer-aided dispatch (CAD) records provided call type, priority, and phase timestamps (assign, en route, on scene, to hospital, at hospital), enabling minute-level linkage with biometric data. Standardized procedures were specified a priori for recruitment, device fitting, shift monitoring, logbooks, data export, cleaning, missing-data thresholds and an epoch-based hierarchical data structure (epochs within calls, calls within shifts, shifts within paramedics). Primary procedural endpoints were feasibility and adherence, data completeness and artifact profile, and field validity of Hexoskin measures.

Results: Thirty-two paramedics completed 232 monitored shifts, yielding 918 emergency calls and approximately 2,700 hours of analyzable multi modal monitoring. Protocol adherence was high, with most rostered monitoring opportunities proceeding as planned and shifts meeting the predefined 75% biometric data completeness threshold despite approximately 5% of ECG data being removed as artifact. Hexoskin heart and respiratory rate patterns demonstrated expected gradients across CAD-defined call priorities and operational phases. They were consistent with prior laboratory validation, supporting the field validity of the protocol.

Conclusions: This protocol provides a replicable, EQUATOR-aligned framework for multi-modal paramedic exposure research that could be adapted to other emergency services. By foregrounding design, measurement, data processing, and analytic structure, it provides methodological infrastructure to support future etiologic and intervention studies.

RESEARCH REPORTS

IMPACT OF A NATIONWIDE NOTIFICATION PROMOTING EARLY ADRENALINE ADMINISTRATION ON TIME TO FIRST ADRENALINE IN OUT-OF-HOSPITAL CARDIAC ARREST IN JAPAN: AN INTERRUPTED TIME-SERIES ANALYSIS

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ABSTRACT

Purpose: This study evaluated whether the March 30, 2017, nationwide notification from the Fire and Disaster Management Agency (FDMA) shortened the time from patient contact to adrenaline administration (adrenaline time) for out-of-hospital cardiac arrest (OHCA).

Methods: We conducted an interrupted time-series (ITS) analysis using data from the All-Japan Utstein Registry (January 1, 2010–April 26, 2020). The study included OHCA patients who received adrenaline, with adrenaline time as the primary outcome. We estimated the immediate level change and post-intervention slope change, stratified by shockable and non-shockable rhythms. Ninety-five percent confidence intervals (CIs) and p values were Bonferroni-adjusted for the coprimary endpoints (level and slope change).

Results: We analyzed 18,412 patients in the shockable group and 160,013 in the non-shockable group. For the shockable group, the notification was not associated with a statistically significant level change (.19 minutes; 95% CI_{adj} [-0.33, 0.71]; $p_{adj} = .81$) or slope change (-0.01 minutes/30-day; 95% CI_{adj} [-0.03, 0.01]; $p_{adj} = .38$). Similarly, for the non-shockable group, no significant level change (-0.09 minutes; 95% CI_{adj} [-0.30, .11]; $p_{adj} = .59$) or slope change (-0.01 minutes/30-day; 95% CI_{adj} [-0.02, 0.00]; $p_{adj} = .10$) was observed.

Conclusion: The FDMA notification was not associated with an immediate or long-term reduction in adrenaline time, a clinically relevant prehospital process measure on the causal path to better outcomes.



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RESEARCH REPORTS

LOW-ACUITY CARE IN AUSTRALIAN UNDERGRADUATE PARAMEDICINE LEARNING OUTCOMES

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Keywords: low-acuity cases, non-conveyance, higher education, curricula, emergency medical services, EMS, paramedicine

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ABSTRACT

Introduction: Low-acuity presentations constitute a substantial proportion of ambulance caseload in Australia. Although emergency care is central to paramedicine education, graduates must also be prepared to assess and make non-conveyance decisions for this patient group. In Australia, undergraduate programs provide the foundation for entry into paramedicine. However, little is known about how low-acuity care is represented within curricula, particularly through subject unit learning outcomes (LOs).

Methods: An exploratory document analysis was conducted utilizing publicly available LOs and unit descriptions from Australian undergraduate programs. LOs were examined and categorized as 'explicit', 'implied', 'mixed', 'ambiguous' or 'nil' for both low- and high-acuity content. LOs were categorized as explicit where they directly referred to acuity-related terminology, such as non-emergency, primary care, time-critical, or acute. LOs were categorized as implied where acuity was suggested through context, and as ambiguous where reference to acuity was uncertain.

Results: Fifteen undergraduate programs were included with 1,770 LOs analyzed. Of these, 207 were determined to refer to low-acuity care with 23 categorized as explicit, 16 as implied, 68 as mixed, and 100 as ambiguous. In contrast, 485 LOs referred to high-acuity care with 234 categorized as explicit, 165 as implied, 68 as mixed, and 18 as ambiguous. When explicit and implied categories were combined, 39 of 1,770 LOs referred to low-acuity care, compared with 399 for high-acuity care.

Discussion: The findings of this study suggest considerable heterogeneity across LOs, particularly in how low-acuity care is represented compared to high-acuity. This may limit the articulation of expected graduate capabilities in assessment, management, and non-conveyance decision-making for patients requesting ambulance care for low-acuity conditions.

Conclusion: Greater representation of low-acuity care in undergraduate paramedicine program LOs may support closer alignment between graduate preparedness for practice and contemporary ambulance service demand. These findings may inform future curricula design in low-acuity care.

RESEARCH REPORTS

PATIENT EXPERIENCES OF POSTERIOR CIRCULATION STROKE AT SYMPTOM ONSET: A QUALITATIVE STUDY

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Keywords: stroke, posterior circulation stroke, symptom recognition, patient experience, qualitative, stroke awareness, emergency medical services, EMS, paramedicine

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ABSTRACT

Introduction: Posterior Circulation Stroke (PCS) accounts for around 20% of ischemic strokes but is missed more frequently than Anterior Circulation Stroke (ACS), mainly due to its subtle symptoms and non-specific presentation. Currently there are no studies evaluating PCS patients' experiences of their symptoms at stroke onset, and so this study aimed to evaluate this to aid in paramedic understanding and detection of PCS.

Methods: A qualitative descriptive approach was adopted. Clinical Nurse Specialists and Advanced Nurse Practitioners in Stroke purposefully sampled PCS patients confirmed by MRI and admitted to the stroke wards of University Hospital Galway and Mayo University Hospital in the West of Ireland. Once consented, semi-structured interviews were carried out, transcribed verbatim, and thematic analysis completed. Inclusion criteria were any stroke in the posterior portion of the brain confirmed by MRI, patient 18 and less than four weeks since stroke onset.

Results: Ten patients were interviewed. 90% did not believe they were having a stroke. Only 50% sought help immediately. 70% were taken to hospital by ambulance and 30% were taken by car. 20 different symptoms were reported by participants. Loss of balance was the most prevalent symptom, followed by being unable to walk unaided, dizziness, vision disturbance and headache. 60% had prodromal symptoms prior to the onset of their stroke. Qualitative analysis created three main themes: 1) Physical Disturbance, 2) Visual and Spatial Disturbance and 3) Dismissal.

Conclusion: PCS is a difficult condition for patients to recognize, which affects their help seeking behavior, delays treatment and negatively affects outcomes. These patients described a wide variety of symptoms and their reasons for dismissing them. These results may help inform future paramedic educational programs for PCS awareness and recognition in the prehospital environment.

RESEARCH REPORTS

SUPPORTING PERSONS WITH SENSORY NEEDS THROUGH THE CREATION AND IMPLEMENTATION OF BEARY CALM BAGS IN CONJUNCTION WITH A LOCAL FIRE DEPARTMENT

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ABSTRACT

First responders represent the initial point of contact within the healthcare system, playing a vital role in providing timely care. Sensory dysregulation and communication challenges can affect individuals across the lifespan, often resulting in barriers to accessing and receiving effective care. This pilot study examined the implementation of BEary Calm Bags, sensory regulation bags containing various sensory and communication tools created by occupational therapists, for use by first responders during emergencies with individuals with these challenges. First responders received educational interventions focused on supporting people experiencing sensory and/or communication needs during emergencies. Quantitative and qualitative data were collected from eight first responders to determine perceptions regarding use, effectiveness, and sustainability of the bags. Approximately 87% of participants found the bags beneficial, with 75% using them multiple times. These findings suggest the BEary Calm Bags may support first responders in moving towards delivering more equitable, patient-centered care, while helping to reduce barriers related to healthcare inequities.

RESEARCH REPORTS

SLEEP DYSFUNCTION, ACCIDENTS, AND INTENT TO LEAVE AMONG EMERGENCY MEDICAL SERVICES PROVIDERS: A CROSS-SECTIONAL STUDY

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ABSTRACT

Emergency medical services (EMS) providers operate under occupational conditions that carry substantial risk for sleep disruption and fatigue-related impairment. Extended shifts, overnight assignments, rotating schedules, and secondary employment are structural features of many EMS systems that consistently interfere with adequate sleep. The relationships among sleep quality, daytime sleepiness, sleep disturbance, occupational fatigue, fatigue-related safety outcomes, and workforce retention were examined among a cross-sectional sample of 254 EMS providers. Sleep quality was assessed using self-report measures, daytime sleepiness was measured using the Epworth Sleepiness Scale (ESS), and sleep disturbance was assessed using a sleep disturbance index derived from the Pittsburgh Sleep Quality Index (PSQI). Results indicated that poor sleep quality and fatigue were widespread: 63.7% of participants rated their sleep quality as bad or fairly bad, and 47.6% reported considerable or intense sleepiness while at work. Providers who reported fatigue-related driving accidents or near-miss incidents demonstrated significantly higher ESS scores than those who did not ($M = 9.33$ vs. 7.28 , $p = .001$, $d = 0.49$). Regression analyses revealed that sleep variables explained limited variance in intent to leave, though work-related sleepiness approached significance as a predictor of turnover intentions in both models. Shift length emerged as a significant independent predictor of intent to leave EMS ($p = .033$), with providers working longer shifts reporting lower turnover intentions. Findings suggest that fatigue within EMS extends beyond wellness concerns to carry meaningful implications for operational safety and, to a lesser extent, workforce sustainability.

RESEARCH REPORTS

FACILITATED VIDEO CASE-BASED LEARNING: AN EXPLORATORY SINGLE-CASE STUDY OF PARAMEDIC WORKPLACE LEARNING

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ABSTRACT

The purpose of this exploratory single-case study was to explore whether facilitated video case-based learning might provide an alternative teaching and learning solution to high-fidelity patient simulation for paramedic workplace learning. The study was informed by the New Kirkpatrick Model® for training evaluation and Bloom's revised taxonomy for the identification of higher-order thinking skills. Five paramedics who work in a city fire department within a high-performance EMS system in the midwestern United States participated in the study. The participants engaged in a facilitated video case-based learning intervention that presented a novel case of a medical emergency. Through observation of participant behavior and thematic analysis of post-intervention interviews, the study examined the influence of this learning approach on the development of higher-order thinking skills. Findings revealed that facilitated video case-based learning was perceived as highly engaging and relevant and contributed meaningfully to knowledge acquisition and the development of higher-order thinking skills. The results influence our understanding of paramedic learning and can address policy and practice issues that make ongoing paramedic education more accessible, especially in resource-poor areas globally.

RESEARCH REPORTS

EXPLORING UNIVERSITY EDUCATION VARIATION: A MIXED-METHODS SURVEY OF AUSTRALIAN AND AOTEAROA NEW ZEALAND UNDERGRADUATE PARAMEDICAL ELECTROCARDIOGRAPHY CONTENT

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Keywords: curriculum, electrocardiography, patient safety, universities, emergency medical services, EMS, paramedicine

Disclosures: SM is an editor at IJOP; there was no author involvement in editorial decisions for this manuscript, and peer review was double blinded. All authors have previously been involved in the education of undergraduate paramedics, including having previously taught electrocardiography. The institutions SM and NB are affiliated with were participants in this project, with their responses anonymized at point of collection. To minimize any perception of conflict, analysis was primarily conducted by a researcher from a non-participating institution, MWS, and both data and R code for reproducibility of analysis are available online. Ethical approval was granted by the University of the Sunshine Coast Human Research Ethics Committee (approval A242245).

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Presentation: This work was presented in Poster format at the Australasian College of Paramedicine International Conference, 10-12 September 2025, Brisbane, Australia.

Data Availability: All data and software code are available. The dataset can be found on FigShare (<https://figshare.com/articles/dataset/Dataset.xlsx/29387729>). R Code, including brief instructions on how readers can reproduce the analysis for themselves, is provided in the Appendix.

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ABSTRACT

In Australia and Aotearoa New Zealand, statutory registration bodies define the capabilities expected of graduate paramedics but do not prescribe a minimum curriculum. Consequently, the extent to which universities differ in the content they teach is unknown.

Aim: To determine the depth of teaching and degree of overlap in electrocardiography content across university paramedicine programs.

Methods: A custom-designed mixed-methods survey comprising 377 electrocardiography topics and free-text questions was developed through a five-stage design and pretesting process. Fourteen of the eighteen eligible university programs participated (78%). Quantitative curriculum overlap was assessed using Simple Matching Coefficients, while qualitative responses underwent content analysis.

Results: Considerable variation was identified across university curricula. 66% of topics were taught by some universities and not by others, 30% were taught by all universities but to differing depths, and 4% were approached the same across all universities. Average university curriculum overlap was modest (52%, IQR 47%-60%). Qualitative responses reflected uncertainty regarding the appropriate breadth of undergraduate electrocardiography education, with participants describing it as "hard to know if we are teaching too much or not enough" and calling for a "standardized minimally accepted practice level."

Conclusion: There is a high level of heterogeneity in electrocardiography education in undergraduate paramedicine programs in Australia and Aotearoa New Zealand. This includes content with significant patient safety risks. Development of a standardized minimum curriculum would provide educators and employers with certainty about expected graduate electrocardiography capabilities and may improve patient safety.

RESEARCH REPORTS

THE PAIRED LEARNER MODEL FOR PARAMEDIC PRACTICUM: A TWO-YEAR MIXED METHODS IMPLEMENTATION STUDY IN A CANADIAN PARAMEDIC PROGRAM

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Keywords: clinical, educational model, preceptor, social learning, paramedic service, practicum, emergency medical services, EMS, paramedicine

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ABSTRACT

Introduction: To address training constraints related to the need to train more paramedics and concurrent limited placement opportunities, as well as enhance learning, the Paired Learner Model (PLM), informed by social and constructivist learning theories, pairs two students with two preceptors in a single ambulance. The PLM maintains a 1:1 preceptor–student ratio. Throughout the practicum an ambulance placement will have two students and two preceptors who complete the practicum together.

Methods: A two-year (2023–2024) quasi-experimental, convergent parallel mixed-methods design compared the PLM with traditional practicum. Data forms were integrated through “narrative weaving” to evaluate learning outcomes, operational feasibility, and participant perceptions.

Results: The study included 33 participants: 12 PLM students, 9 single learners, 10 preceptors, and 2 program coordinators. All groups reported high preparedness for practice and positive overall practicum experiences. Preceptors unanimously reported that students were safe to practice and competent to care for a loved one. Student experiences aligned with social and constructivist learning theories. Preceptors noted reduced workload and increased capacity for student placements. Post-practicum, 9/10 preceptors thought the PLM should continue. No safety issues were reported.

Conclusion: The PLM is a feasible, educationally sound, effective, and acceptable alternative to the traditional practicum model. Interpersonal dynamics challenges can be addressed through planning and preparation. Findings support continued implementation and further multi-institutional research, with a larger sample size beyond the present single-site study, to explore long-term outcomes and refine best practices.



REVIEWS

CHEMICAL RIOT CONTROL AGENTS: A NARRATIVE REVIEW FOR PREHOSPITAL PROVIDERS

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ABSTRACT

Background: There may be situations in which a prehospital provider may encounter a scene where certain chemical riot control agents (RCA) may be employed as a mode to produce rapid sensory and respiratory impairment during crowd-control operations. Recent years has seen an increase in utilization of RCAs by law enforcement agencies meaning prehospital providers may be called to respond to these situations, underscoring the importance of proper training and a fundamental understanding of the various RCAs that may be employed, their effect on biological systems, and how to protect themselves from secondary exposure in the field. In this review we cover the most common RCAs, their mechanism of action, biological effects and how to protect themselves in the field.

Methods: The PubMed and Cochrane Reviews databases were queried for articles related to protests, riot control agents, emergency medical services, and medical care from inception to January 2026. A narrative review methodology was employed to facilitate a broad overview of the most common RCA used today, their mechanism of action and effects on biologic systems, their potential to exacerbate pre-existing medical illnesses, and specifically how the prehospital providers should protect themselves during contact with these substances.

Results: The most common RCAs are chlorobenzilidinemalononitrile (CS), chloroacetophenone (CN), dibenzyl [b, F]- [1, 4] – oxazepane (CR), and oleoresin capsicum (OC) referred to in aggregate as ‘tear gas’ (CS, CN, CR) or ‘pepper spray’ (OC). Ocular, dermal, respiratory, and GI symptoms are usually mild and self-limited, although more severe reactions can occur. Treatment is focused on the safety of the prehospital provider first and foremost, and then extrication of the patient to a safe area free of exposure to any RCA. Ocular and skin effects are treated with copious irrigation with water, while respiratory and GI effects are treated symptomatically. Most symptoms should subside in 15 to 30 minutes, although persistent symptoms may indicate more serious complications. There is no known antidote to RCA exposure.

REVIEWS

HOW DO NEWLY QUALIFIED PARAMEDICS EXPERIENCE THE TRANSITION TO AUTONOMOUS PRACTICE, AND WHAT ROLE DO FORMAL SUPPORT STRUCTURES PLAY IN THIS TRANSITION? A SCOPING REVIEW

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Keywords: challenges, newly qualified paramedics, preceptorship, transition, emergency medical services, EMS, paramedicine

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ABSTRACT

The objective of this scoping review is to understand the extent and type of evidence in relation to graduate paramedic transition into autonomous practice and what role formal support structures such as preceptorship play in this process.

Healthcare graduates experience a range of challenges on transition into the work-place. Many organizations provide formal support to mitigate some of these challenges. This review sought to understand the evidence related to the 2 concepts.

A PCC framework was used to frame the review question, inclusion criteria being English language, peer reviewed studies which included paramedics with less than 3 years' experience post qualification, the years 1997-2026 were chosen for inclusion also.

EBSCO, Web of Science and Scopus databases were searched on 30th May 2026. English language and the years 1997-2026 applied as limiters. Titles and abstracts were used for the first stage of screening before remaining studies were scrutinized using inclusion / exclusion criteria applied independently by 2 reviewers. Data was extracted independently by 2 reviewers before being written up by the first author.

5 themes were identified: professional socialization, emotional burden, relational perspective, theory-practice gap, and workplace culture. Graduates experienced a range of challenges, barriers, and facilitators during transition. Formal support structures were noted to form part of this.

Formal support structures such as preceptorship can help graduates overcome challenges faced in their transition into autonomous practice. Further research is required from a graduate's perspective to design robust preceptorship systems

RESEARCH REPORTS

GLOBAL PARAMEDICINE AND EMS DOCTORATES: A REGISTRY-BASED ANALYSIS

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Keywords: graduate education, professional education, dissertations, academic, emergency medical service, EMS, paramedicine

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ABSTRACT

Background: Doctoral education is an indicator of research capacity and professional maturation. However, the global scope and characteristics of paramedicine/EMS doctorates have not previously been systematically described.

Methods: A global registry-based study of completed doctoral dissertations authored by paramedics, EMTs, or other health professionals working in the out-of-hospital setting was undertaken using systematic searches of dissertation databases, repositories, registry sources, and stakeholder verification.

Results: A total of 406 completed paramedicine/EMS doctoral dissertations were identified. Completions increased substantially after 2010, with most conferred in the USA, Australia, and the UK. PhDs accounted for the majority ($n=305$; 75.1%), while professional doctorates comprised 81 dissertations (20.0%) and were concentrated in the USA ($n=63$; 77.8% of professional doctorates).

Conclusion: Paramedicine/EMS doctoral output has grown substantially but remains clustered in a small number of countries and institutions. The registry offers a practical baseline for showing where doctoral activity is already established, identifying where supervision capacity remains limited, and where future doctoral pathways may need support.



REVIEWS

DEFINING ENTRY-TO-PRACTICE COMPETENCE IN PARAMEDICINE: A SCOPING REVIEW

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ABSTRACT

Objectives: Paramedics play a key role in unplanned, emergent, and episodic out-of-hospital health care. A comprehensive description of the minimally expected competencies (knowledge, skills, and attributes) necessary to perform the duties of a paramedic is required to build effective education programs and credentialing systems. This scoping review aimed to map and synthesize the literature describing entry-to-practice competence in paramedicine, including professional expectations and approaches used to assess readiness for independent practice.

Methods: A structured search of MEDLINE, EMBASE, Scopus, CINAHL, Google Scholar, and greyLit.org was undertaken for literature published between 1996 and 2026. The search included peer-reviewed literature published between 1 January 1996 and 1 January 2026.

Results: The four databases identified 8,231 records. After duplicates were removed, 6,755 records were screened and 99 full-text reports assessed. Twenty studies were identified through database searching and two additional studies through supplementary searching, resulting in 22 included studies. Three domains were identified: desirable non-technical attributes and professionalism, scope of practice, and assessment of competency. Secondary domains were assigned where studies addressed more than one area.

Conclusions: Entry-to-practice paramedic competence is consistently described across three interrelated domains: desirable non-technical attributes and professionalism, scope of practice, and assessment of competency. These findings can inform curriculum design, accreditation, and workplace-based assessment approaches in paramedicine.



REVIEWS

STAKEHOLDER ACCEPTANCE OF DRONES IN PREHOSPITAL EMERGENCY CARE: AN INTEGRATIVE REVIEW

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ABSTRACT

Objectives: Drones are increasingly examined as tools to strengthen prehospital emergency care through rapid supply delivery, improved scene access, and situational support. Successful integration depends not only on technical performance, but on how drones are perceived by clinicians, telecommunicators, bystanders, patients, and communities. This integrative review, informed by the Technology Acceptance Model (TAM), synthesized empirical evidence on stakeholder perspectives regarding drone integration in prehospital emergency care to identify perceived benefits, concerns, and implications for practice and policy.

Methods: Five databases were searched in November 2025: CINAHL, PubMed, Web of Science, Embase, and Google Scholar. English-language peer-reviewed studies from the previous 10 years were included if they examined stakeholder perceptions of drones in prehospital or emergency contexts. Studies without perceptual data or unrelated to prehospital care were excluded. Included studies were appraised using the Mixed Methods Appraisal Tool (MMAT) and synthesized thematically.

Results: Eighteen empirical studies were included, reflecting perspectives of bystanders, health care professionals, telecommunicators, patients, and community members. Five themes emerged: perceived value and acceptance; safety and ethical concerns; usability experiences; operational feasibility and system readiness; and training needs. Perceived usefulness was the strongest driver of acceptance; perceived ease of use was more variable and shaped by communication, preparation, and contextual readiness.

Conclusions: Drone adoption in prehospital emergency care requires human and organizational readiness alongside technical capability. Implementation should prioritize drone-integrated workflows, telecommunicator and community training, and equitable deployment planning.



REVIEWS

OCCUPATIONAL VIOLENCE IN PARAMEDICINE: AN INTEGRATIVE REVIEW OF PREVALENCE, PREDICTORS, MEASUREMENT GAPS, AND IMPACTS

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ABSTRACT

Background: Violence toward paramedics is a critical international occupational risk, undermining workforce safety, wellbeing, and system sustainability. Occupational violence (OV) includes verbal and psychological aggression, threats, physical assault, and harassment. The WHO identifies paramedics as a high-risk group, linking OV to physical and psychological harm and compromised care quality. Divergent definitions, variable recall windows, and under-documentation produce wide variation in reported prevalence.

Aim: To synthesize international and Australasian evidence on OV prevalence and typology in paramedicine; clarify how denominator choices and reporting behaviors shape observed rates; identify risk contexts and operational predictors; and examine consequences for clinicians, patients, and health systems.

Methods: A structured integrative review searched PubMed, Scopus, Web of Science, CINAHL, and Google Scholar (2000–2026), plus gray literature from WHO, ILO, Safe Work Australia, and national ambulance reports. Quantitative, qualitative, and mixed-methods studies of paramedics and EMS personnel from North America, Europe, Australasia, and selected Asian and Middle Eastern jurisdictions were included. Approximately 60 sources were narratively synthesized, addressing definitional variation, design heterogeneity, and denominator effects.

Results: Lifetime OV exposure among EMS personnel commonly exceeds 60%; 12-month prevalence ranges from 50% to 75%, depending on definitions and sampling. Administrative datasets under-capture incidents, particularly verbal abuse, intimidation, and identity-targeted aggression, whereas point-of-event reporting in electronic patient care records captures more. Violence is mostly patient-initiated, associated with intoxication, acute behavioral disturbance, mental health crises, urban settings, and weekend or night-time operations. Consequences include injury, post-traumatic stress disorder, burnout, emotional exhaustion, reduced therapeutic engagement, and turnover.

Conclusions: OV in paramedicine is common, patterned, and substantially under-documented. Observed prevalence is sensitive to definitions, recall period, and denominator choice, limiting unadjusted incident counts for benchmarking. Prevention and surveillance require standardized definitions, mission-based denominators, point-of-event reporting within clinical workflow, and paired leading and lagging indicators including reporting completeness.



REVIEWS

RETHINKING PREHOSPITAL FLUID RESUSCITATION FOR MASSIVE PULMONARY EMBOLISM: A NARRATIVE LITERATURE REVIEW

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Keywords: pulmonary embolism, fluid resuscitation, right ventricular dysfunction, hemodynamics, emergency medical services, EMS, paramedicine

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ABSTRACT

Background: Massive pulmonary embolism (PE) is characterized by sustained hypotension and right ventricular (RV) dysfunction, resulting in high morbidity and mortality. Although these patients present hemodynamically unstable, hypotension arises from obstructive shock rather than hypovolemia. Despite this, fluid resuscitation (FR) remains common in prehospital care, and its role in massive PE remains controversial.

Objective: This review aimed to evaluate the efficacy of FR in adult patients with massive PE, with consideration of its implications for prehospital care.

Methods: A narrative literature review was conducted in April 2026 using Ovid MEDLINE and EMBASE (1950–April 2026). Due to the paucity of prehospital data, both human and animal studies examining any form of fluid therapy in massive PE were included. Non-peer-reviewed literature, unrelated conditions, and systematic reviews were excluded. Nine peer-reviewed studies met inclusion criteria.

Results: Fluid administration in massive PE was associated with worsened RV dysfunction, reduced cardiac output (CO), and increased hemodynamic instability. In contrast, alternative interventions, including positive inotropes and diuretic therapy (DT), were associated with improved RV function, stroke volume (SV), and hemodynamic stability.

Conclusion: The available evidence, although derived largely from animal, retrospective, and hospital-based studies, suggests routine FR in hypotensive patients with massive PE may exacerbate RV failure and compromise CO. Prehospital management should therefore consider strategies that support RV function and hemodynamic stability. These findings support reconsideration of FR as a primary intervention in massive PE and highlight the need for evidence-informed prehospital guidelines.

CASE REPORTS

PENETRATING ABDOMINAL INJURY IN PREHOSPITAL CARE: EXPECTATIONS AND LIMITATIONS RELATED TO CURRENT TREATMENT GUIDELINES IN POLISH EMERGENCY MEDICAL SERVICES SYSTEM PRESENTED AS A CASE REPORT

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Keywords: penetrating injury, foreign body immobilization, fluid resuscitation, tranexamic acid, emergency medical services, EMS, paramedicine

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ABSTRACT

Introduction: Among multiple organ trauma, abdominal injuries occupy a special place, as they are associated with a high risk of severe complications and frequently require careful prehospital treatment and urgent surgical intervention. This type of injury carries a high risk of damage to the organs located not only in the abdominal cavity but also in the chest – depending on the angle of penetration. This increases the risk of complications during treatment. One of the modern methods used in the prehospital care to control bleeding is tranexamic acid, which has been used for years in other clinical settings. Taking into account the variety of treatment protocols, the indications for its use deserve a broader perspective in prehospital care.

Methods: We performed detailed description of a case study of a 60-year-old woman with a penetrating abdominal injury resulting from a self-inflicted stab wound with suicidal intent. We also describe the treatment implemented in prehospital care with tranexamic acid administration and the use of a non-obvious method of immobilization of a foreign body in an existing wound.

Aim: The aim of our study was to evaluate the prehospital management of a woman with a penetrating abdominal injury, with particular attention to the administration of tranexamic acid and improvised method of foreign body immobilization.

Findings: The prehospital treatment described in this paper enabled the inhibition of the progression of hypovolemic shock, securing the foreign body in the wound and safe transport of the patient to the trauma center, where she was admitted in a stable condition.

Conclusion: Efficient teamwork, proper immobilization of the foreign body and appropriate, targeted medication administration enabled the patient's safe transport to the hospital. In this particular case, prehospital administration of tranexamic acid and restrictive fluid resuscitation did not worsen the patient's condition.



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SPECIAL REPORTS

QUALITATIVE INVESTIGATION OF EMS PROVIDER EXPERIENCES WITH A FLOW-REGULATING SAFETY DEVICE FOR MANUAL VENTILATION: A PRELIMINARY REPORT

José G. Luiggi-Hernández, PhD, MPH^{*1}; James J. Menegazzi, PhD¹

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ABSTRACT

Background: Over-ventilation during bag-valve-mask (BVM) ventilation (and manual ventilation in general) is a well-documented hazard in prehospital emergency care. It is associated with increased intrathoracic pressure, reduced cardiac output, gastric insufflation, and decreased survival in cardiac arrest and traumatic brain injury. The Sotair® (SafeBVM Corp., Boston, MA), is a flow-regulating safety device (FRSD) designed to prevent over-ventilation by limiting tidal volume during manual ventilation. Despite its potential clinical utility, provider-level experiences with the device in the real-world EMS clinical settings remain unreported.

Objective: We sought to explore experiences of EMS providers using the Sotair® device in clinical and training settings, with attention to perceived usability, clinical outcomes, barriers to consistent use, and recommendations for improvement.

Methods: Seven semi-structured interviews were conducted with EMS providers (EMTs, paramedics, training officers, and rescue chiefs) who have used the FRSD clinically. Interviews were analyzed using standard rapid thematic analysis. Thematic saturation was assessed iteratively and confirmed by convergence across all seven interviews.

Results: Six themes emerged: (1) Device Understanding and Simplicity: all participants described the device as intuitive, and required minimal training; (2) Training Value: the device demonstrated unexpected utility as a training instrument, with novice providers who trained with the device outperformed experienced peers on a ventilation feedback platform, with retained technique after device removal; (3) Clinical Experiences: primary use was cardiac arrest; participants reported anecdotal improvements in ROSC rates and reductions in gastric insufflation; (4) Cognitive Load Reduction and Anxiety Management: participants described reduced mental burden during resuscitation, freeing attention for scene management; (5) Barriers to Consistent Use: forgetting to deploy the device, resistance from experienced providers, cost concerns, and uncertainty in specific clinical scenarios (head trauma, drowning, pediatric patients) were identified; (6) Recommendations: pre-integration with BVM was endorsed by all participants; additional recommendations included a pediatric version, peer-to-peer marketing, and usage tracking research.

Conclusions: EMS providers reported favorable experiences with the FRSD across clinical and training contexts. The device's simplicity, cognitive load benefits, and emergent value as a training tool suggests both direct clinical and educational applications. Barriers to adoption, most notably forgetting to deploy, may be addressable through pre-implementation with standard BVM equipment.