International Journal of Paramedicine

An Official Journal of the National EMS Management Association
Produced in collaboration with the Portuguese Prehospital Emergency Society
(Sociedade Portuguesa de Emêrgencia Pré-Hospitalar)

Number 13 — January-March, 2026
https://internationaljournalofparamedicine.com/index.php/ijop/issue/view/N13
https://doi.org/10.56068/JBWU4159

International Journal of Paramedicine

An Official Journal of the National EMS Management Association (USA)

Produced in collaboration with the Portuguese Prehospital Emergency Society (Sociedade Portuguesa de Emêrgencia Pré-Hospitalar)

Editorial and Production Team

Editorial Advisory Board Members

Reviewers

Rateb A. Abuzeid, PhD — *Researcher, EMS Faculty, Prince Sultan College for EMS; Head, Community Relations Unit, King Saud University:* Riyadh, Central, Saudi Arabia

Nawfal Aljerian, MD — *Chief Executive Officer, Medical Referrals Center, Saudi Arabia Ministries of Health; Associate Professor of Emergency Medicine , King Saud bin Abdulaziz University for Health Sciences (KSAU-HS):* Ryadh , Saudi Arabia

David Beckerley, MPA, NRP — *Commander, Emergency Communications, Austin-Travis County EMS:* Austin, TX, USA

Deepak L. Bhatt, MD, MPH, FACC, FAHA — *Director, Heart Institute, Mount Sinai Hospital; Professor of Cardiovascular Medicine, Icahn School of Medicine at Mount Sinai:* Boston, MA, USA

Matthew Black — *Area Manager, QuikMedic:* Salem, OR, USA

Ron Bowles, PhD — *Justice Institute of British Columbia:* New Westminster, BC, Canada

Jane H. Brice, MD, MPH — *Professor & Chair, Department of Emergency Medicine, University of North Carolina:* Chapel Hill, NC, USA

Elliot Carhart, EdD, RRT, NRP, FAEMS — *Professor, Radford University:* Seminole, FL, USA

Alix Carter, MD, MPH, FRCPC — *Director, Division of EMS, Dalhousie University:* Halifax, NS, Canada

Sally Cascio — *Chief Flight Nurse, NorthSTAR, University Hospital:* Monroe, NJ, USA

Julie D. Charbonneau, RN, MS — *Executive Director, Sioux Falls Regional EMS Authority (REMSA):* Sioux Falls, SD, USA

Jamie Chebra, MS, FACPE, NRP — *Chief Executive Officer , Harris County ESD 11 Mobile Healthcare:* Spring, TX, USA

Brad Chernock, MD, MS, PA-C, NRP — *Surgical Critical Care Fellow, Robert Wood Johnson Medical School, Rutgers University:* Morristown, NJ, USA

Sheldon Cheskes, MD, CCFP(EM), FCFP, DRCPSC — *Medical Director, Sunnybrook Centre for Prehospital Medicine ; Professor, University of Toronto:* Toronto, ON, Canada

Vlad Chiriac, PhD, MEd, ACP — *Professor, Durham College:* Oshawa, ON, Canada

Lance Corey, BS, EMT-P, EMS I/C — *New Era, MI, USA*

Jon M. Crownover, NRP, EMSI, CCEMTP — *Advanced Care Paramedic & EMS Instructor, University of Pittsburg Medical Center (UPMC); Paramedic, Ross / West View EMS & Rescue:* Pittsburgh, PA, USA

Carol A. Cunningham, MD, FAAEM, FAEMS — *State Medical Director, Division of EMS, Ohio Department of Public Safety; Professor, Emergency Medicine, Northeast Ohio Medical University:* Kirtland, OH, USA

Ian R. Drennan, ACP, PhD — *Associate Professor, Department of Family & Community Medicine, University of Toronto; Professor, Georgian College:* Toronto, ON, Canada

Rommie L. Duckworth, MPA, LP, EFO, FO — *Chief, Ridgefield Fire Department; Director, New England Center for Rescue & Emergency Medicine, LLC:* Sherman, CT, USA

Bram Duffee, PhD, EMT-P — *Assistant Professor of Communication, School of Communication & Media, Norman J. Radow College of Humanities & Social Sciences, Kennesaw State University; Chair of Graduate Studies Research, Graduate Studies, First Responder Behavioral Health Institute:* Houston, TX, USA

Peter I. Dworsky, MPH, NRP, CEM, FACPE — *Paramedic, JFK EMS, Hackensack Meridian Health University Medical Center; Senior Risk Solutions Specialist, Risk Solutions, Markel Insurance:* Edison, NJ, USA

Katherine L. Elkins, MPH, CPH, NRP — *DrPH Student, Bloomberg School of Public Health, Johns Hopkins University; Captain Lifemember Paramedic, Wheaton Volunteer Rescue Squad :* Kensington, MD, USA

Craig Evans, DHSc Student, MEd, Paramedic — *Assistant Professor, EMT Program Manager, School of Medicine & Health Sciences, George Washington University:* Higganum, CT, USA

Mary E. Fallat, MD — *Professor of Surgery, University of Louisville; Director of Surgical Quality, Norton Childrens Hospital:* Louisville, KY, USA

Rob Farmer, MBA, FACPE — *Tomball, TX, USA*

Antonio R. Fernandez, PhD, NRP — *Research Scientist, ESO; Adjunct Assistant Professor, University of North Carolina:* Apex, NC, USA

Jay Fitch, PhD — *Founding Partner, Fitch & Associates; Board Member, American College of Paramedic Executives:* Natchez, MS, USA

Paul M. Gallo, BS, EMT-P, EMSI — *Assistant Chief (Ret), Reading Fire Department; Paramedic, UCHealth, University of Cincinnati:* Reading, OH, USA

Erik S. Gaull, NRP, CEM — *Paramedic/ Firefighter III, Cabin John Park VFD:* Cabin John, MD, USA

Mary George, MD, MSPH, FACS — *Decatur, GA, USA*

Daniel R. Gerard, MS, RN, NRP — *President, International Association of EMS Chiefs; EMS Coordinator, Alameda Fire Department:* Washington, DC, USA

Stacy Gerlich, MA, EMT-P — *Battalion Chief (Ret), Los Angeles City Fire Department:* Westlake Village, CA, USA

Judah P. Goldstein, PCP, PhD — *Research Coordinator, Emergency Health Services, Department of Health & Wellness, Government of Nova Scotia; Assistant Professor , Dalhousie University:* Halifax , NS, Canada

Sean Graham, BS, NRP, CCP-C — *Bothell, WA, USA*

Mike Grill, MS, NRP, EFO — *Larkspur, CO, USA*

Jacob E. Guillott-Creel, MS, FP-C, CMTE — *Clinical Administration Coordinator, PHI Air Medical, LLC:* Phoenix, AZ, USA

Todd Heffern, MD, FACEP, FAEMS, NRP — *EMS Medical Director, Covenant Health; EMS Medical Director, Hawkins County EMS; EMS Medical Director, Grainger County EMS:* Knoxville, TN, USA

Arthur Hsieh, MA, NRP — *Faculty Coordinator, Santa Rosa Junior College:* Windsor, CA, USA

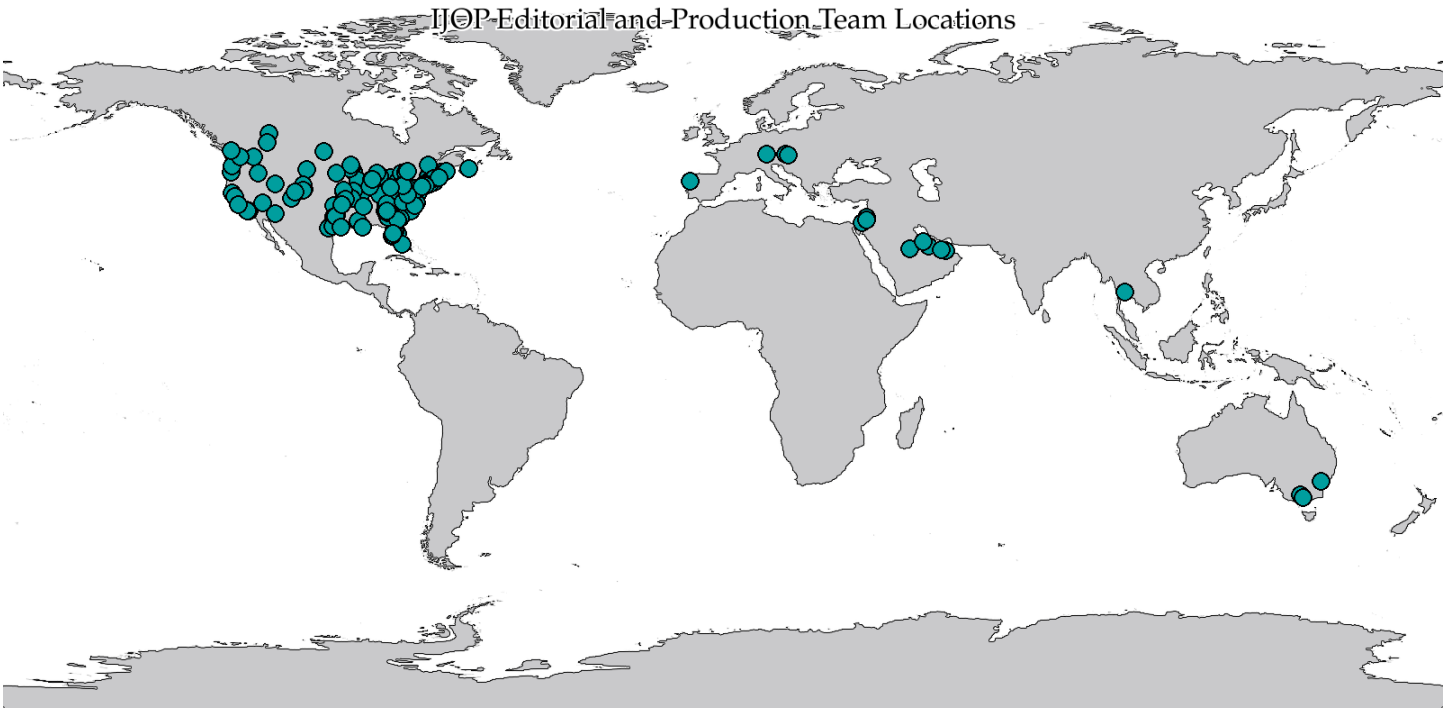
Jeffrey L. Jarvis, MD, MS, EMT-P — *Chief Medical Officer & System Medical Director, Metropolitan Area EMS Authority (MedStar911):* Fort Worth, TX, USA

Jan L. Jensen, ACP, MAHSR — *Executive Director, Emergency Health Services, Department of Health & Wellness, Government of Nova Scotia; Assistant Professor, Dalhousie University:* Dartmouth, NS, Canada

Randy D. Kearns, DHA, MSA, FACHE, FRSPH — *Dean, Henry Bernstein College of Business, University of New Orleans; Research Associate Professor (Gratis), Health Sciences Center, Department of Surgery, Louisiana State University (LSU); Clinical Assistant Professor Emeritus, School of Medicine, University of North Carolina:* New Orleans, LA, USA

Adam Kipust — *MD/MPH Candidate , Miller School of Medicine, University of Miami; EMT, Key Largo EMS:* Miami, FL, USA

Judah A. Kreinbrook, BS, EMT-P — *Medical Student, School of Medicine, Duke University:* Durham, NC, USA



International Journal of Paramedicine (online ISSN 2831-6967) is an official journal of the National EMS Management Association. It is published quarterly by the National EMS Management Association, 2901 Williamsburg Terrace, Suite G, PO Box 472, Platte City, MO 64079. This journal is published exclusively online as an open-access resource at https://internationaljournalofparamedicine.com. Information on submissions is available at https://internationaljournalofparamedicine.com/index.php/ijop/about/submissions. Editorial query letters may be addressed to Mic Gunderson, Editor-In-Chief, at mic.gunderson@internationaljournalofparamedicine.com. For inquiries about sponsorships or advertising, please contact Pat Songer, Executive Director, National EMS Management Association; +01 816-858-6172; info@nemsma.org.

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

Table of Contents

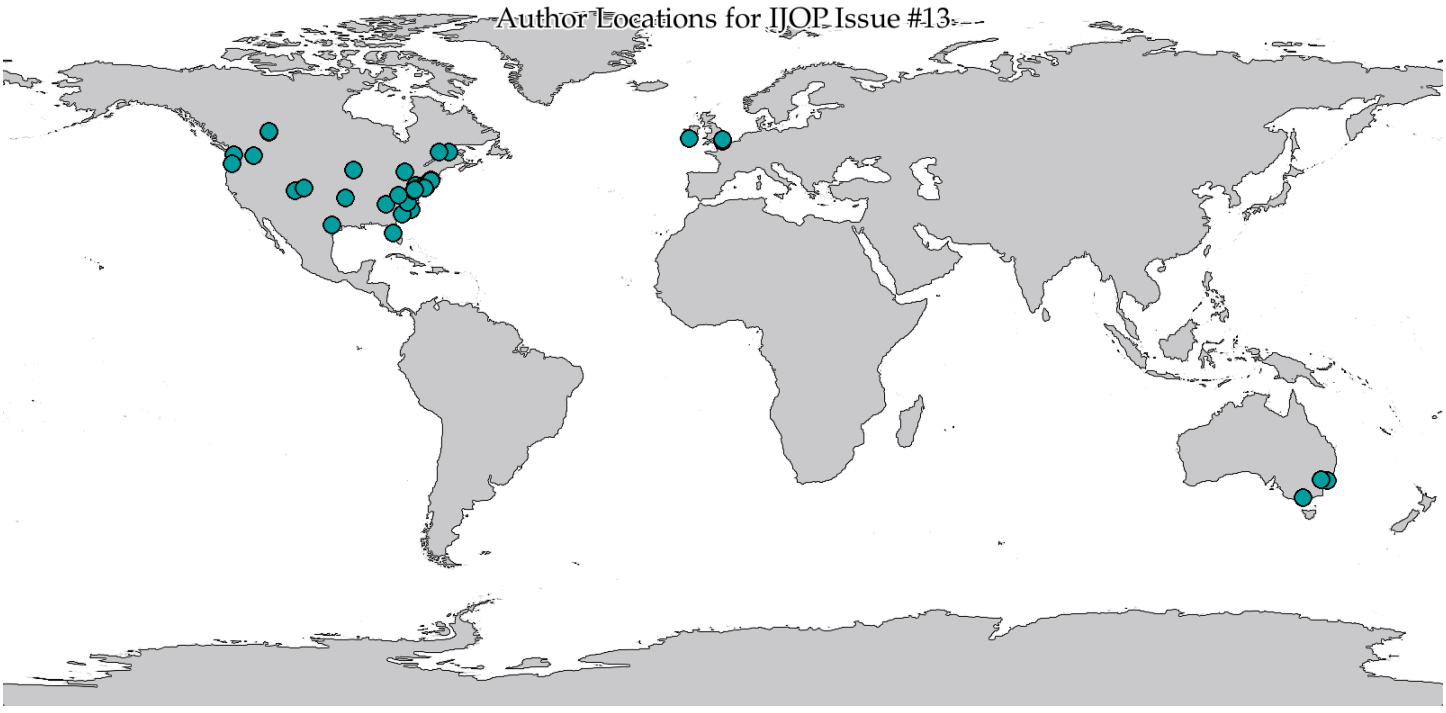
January-March, 2026 *Number 13*

RESEARCH REPORTS

REVIEWS

CASE REPORTS

CONCEPTS



International Journal of Paramedicine

Published by the National EMS Management Association (USA)

RESEARCH REPORTS

PREHOSPITAL PAIN MANAGEMENT FOR INJURED PATIENTS AT THE INTERSECTION OF SEX AND OBESITY: A RETROSPECTIVE OBSERVATIONAL STUDY

Joshua Kimbrell, BA, NRP, CLI*[1]; Christopher Villani, BS, NRP[2]; Kyle Rice, NRP[3]; Adam Wagner, MSc[4,5]; Amelia Breyre, MD[6]; Scott S. Bourn, PhD, RN[7]; Alison Treichel, MPH[7]; Jamie Kennel, PhD, NRP[8]

Author Affiliations: 1. Pre-Hospital Care, MediSys Health Network, Queens, NY, USA; 2. Durham County Emergency Medical Services, Durham, NC, USA; 3. EMS, Saint Francis Hospital, Wilmington, DE, USA; 4. Oregon Health and Science University (OHSU), Portland, OR, USA; 5. Oregon Institute of Technology, Klamath Falls, OR, USA; 6. Emergency Medicine, Yale University, New Haven, CT, USA; 7. ESO, Austin, TX, USA; 8. Elson S Floyd College of Medicine, Washington State University, Spokane, WA, USA.

Recommended Citation: Kimbrell, J., Villani, C., Rice, K., Wagner, A., Breyre, A., Bourn, S., Treichel, A., & Kennel, J. (2026). Prehospital pain management for injured patients at the intersection of sex and obesity: A retrospective observational study. *International Journal of Paramedicine*. (13). 10-23. https://doi.org/10.56068/TLSR7258. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3319

Keywords: health inequities, obesity, pain management, gender bias, emergency medical services, EMS, paramedicine

Disclosures: Scott Bourn and Alison Treichel are employees of ESO, the company who provided the dataset used for this study. No other authors report any disclosures.

Funding: This study was funded by GMR's grant to the UCLA/ESO Prehospital Care Research Forum.

Received: January 11, 2025
Revised: February 23, 2025
Accepted: June 3, 2025
Pre-Issue: November 13, 2025
Published: January 13, 2026

**Corresponding Author:* jkimbre57@gmail.com

ABSTRACT

Objectives: We investigated the association of obesity with analgesia administration and pain reduction for prehospital patients with traumatic injuries.

Methods: Using the 2022 ESO Data Collaborative, we analyzed emergency medical services (EMS) records for 9-1-1 transports of adult patients with injuries. Patients with primary impressions related to behavioral, neurologic, respiratory, and cardiac emergencies, Glasgow Coma Scale of < 15, non-alert on AVPU scale, or no race/weight documented were excluded. Weight status was categorized using the Center for Disease Control (CDC) Body Mass Index (BMI) thresholds, with BMI calculated from documented weight, race/ethnicity, and gender using CDC height averages. We analyzed the relationship between BMI category, analgesia administration, and pain reduction using bivariate and multivariable logistic regression.

Results: Of 482,592 patients in the analysis, 164,175 (34.0%) were classified as obese (BMI ≥ 30 kg/m2). Analgesia administration and pain reduction were more likely for patients with obesity (aOR 1.13, 95% CI: 1.10-1.17; aOR 1.06, 95% CI: 1.02-1.10) than those without obesity. Men with obesity were more likely than men without obesity to receive analgesia (aOR 1.21, 95% CI: 1.17-1.24) but women with obesity were not more likely than women without obesity to receive analgesia (aOR 0.97, 95% CI: 0.95-1.00).

Conclusions: Patients with obesity were more likely to receive analgesia by EMS than those without obesity, but this advantage did not exist for women. Limitations to this study include using a convenience sample and calculating a BMI from epidemiological data on average height. Further research should explore the mechanisms underpinning the treatment advantage for men with obesity that does not extend to not women with obesity.

INTRODUCTION

Background

In the past several decades, the prevalence of obesity in the general population has climbed. Globally, over one-third of patients

are classified as overweight or obese (Chooi, 2018). In the United States, 73.8% of the population is estimated to be overweight or obese, and recent increases have been noted in adolescent youths, particularly non-Hispanic Black and Mexican American children (Li, 2022; Ogden, 2020).

People with obesity are more likely to face institutional discrimination, discriminatory employment practices, and lower levels of self-acceptance than people without obesity (Carr, 2005; Agerstrom, 2011; Flint, 2016). Even children with obesity experience stigma related to their weight, with lower levels of acceptance in the classroom for larger children (Latner, 2003). Weight bias has been described as the last socially acceptable form of discrimination in modern cultures today, with a profound obesity stigma alienating people and reducing their quality of life (Puhl, 2008).

This bias also extends into the health care setting. Patients with obesity have reported less time with physicians, lower levels of physician respect, negative tones from clinicians (Huizinga, 2009; Stone, 2012), and are less likely to receive colorectal or gynecological cancer screenings despite higher risk for disease (Ferrante, 2006; Amy, 2006). Health care clinicians have been shown to hold negative attitudes towards patients with obesity, holding a belief that patients with obesity are weaker willed than other patients and attributing the condition to a deficiency in their personality (Harvey, 2001; Schwartz, 2003; Brown, 2007; Pantenburg, 2012; Puhl, 2014; Phelan, 2014; Tanneberger, 2018). Despite evidence that willpower-focused approaches to patients with obesity are ineffective, clinicians continue to focus on personal accountability over more effective strategies for weight loss, likely exacerbating disparities (Owen-Smith, 2018).

While there has been significant research demonstrating the impact of obesity stigma and weight bias on employment discrimination, wage disparities, and hospital-based health care clinician bias, there has been less exploration of its role in the prehospital setting. One study found that injured female patients with obesity and severe pain were less likely to receive analgesia than any other demographic, but that male patients with obesity had a treatment advantage in the prehospital setting (Kennel, 2022). This study, however, was limited to a specific geographical region and has not been replicated in a national dataset. Several studies have examined other stigmatized conditions associated with bias in the prehospital setting, including race/ethnicity and socioeconomically disadvantaged patients who experience treatment inequities, but the investigation of patient size or weight bias influencing prehospital treatment remains understudied (Michael, 2007; Hewes, 2018; Crowe, 2023).

Aims

This study evaluated the association between a patient's weight status and the administration of analgesia and reduction of pain in the setting of a traumatic injury. Secondarily, it assessed whether this association is impacted by the intersection of race/ethnicity and gender.

METHODS

Study Design and Setting

This was a retrospective observation study using a large dataset (ESO Data Collaborative, Austin, TX) that has de-identified prehospital encounter data with hospital outcome information available that conforms to the National EMS Information System 3.4 standard (National EMS Information System, 2009). We report findings in alignment with the Strengthening the Reporting of Observational Studies in Epidemiology guidelines (von Elm, 2007). This study was deemed exempt by an institutional review board with a waiver of informed consent.

Selection of Participants

All prehospital patient encounters originating from a 9-1-1 call involving patients 18 years and older with a documented injury were included. Any encounters without patient transport to a hospital were excluded. Any patient with a primary or secondary impression related to behavioral health emergencies, shock, cardiac arrest, and obstetric emergencies were excluded because these conditions can be contraindications or may affect patterns of analgesia administration. Patients with an initial Glasgow Coma Scale score less than 14 or an initial A-V-P-U (alert - verbal - pain - unresponsive) assessment of responsive to verbal stimuli, responsive to painful stimuli, or unresponsive were also excluded as these patients may have a limited ability to communicate their pain or have experienced more serious injuries that required prioritization of life-saving interventions over analgesic administration. Prehospital encounters provided by basic life support (BLS) clinicians were excluded to limit the influence of scope of practice restrictions on analgesic administration. Lastly, patients without documented race and ethnicity and those without a documented weight were excluded as this was a factor in our BMI categorization.

Exposures

Our primary exposure was weight status defined using the Center for Disease Control (CDC) Body Mass Index (BMI) categories that identify patients with a BMI of <30 as underweight, healthy weight, or overweight and those with a BMI of 30+ as obese. BMI was calculated for each patient using data available from the EMS record coupled with the CDC height average following methodology established in previous work (Kennel, 2022; Centers for Disease Control and Prevention). First, we assigned each patient an approximate height based on their documented race/ethnicity and gender and then used the assigned height and the recorded weight to calculate an approximate BMI. We acknowledge that BMI is a poor indicator of health and use this solely as a proxy of patient size to determine the potential impact of weight bias on pain management. In analyzing disparities of care, we felt that the approximate weight listed by prehospital clinicians was a valid proxy to determining whether their perception led to a disparity in care. Patient race and ethnicity have been shown to influence EMS pain management practices (Hewes, 2018; Kennel, 2019; Crowe, 2023), so we included EMS-documented patient race and ethnicity into our analysis using the method and definition described by Crowe et al (2023). To better understand and isolate the impact of patient size in the context of social determinants of health, we included socioeconomic status (SES) of the geographic area where the EMS encounter occurred as a proxy for patient access to financial resources.

Socioeconomic status was measured using the CDC's Social Vulnerability Index for the EMS encounter scene location at the Census tract level (Agency for Toxic Substances and Disease Registry). Specifically, we used the CDC's socioeconomic status theme, which is computed using several measures including: the population below poverty, unemployment, income, and the proportion of the population without a high school diploma for each US Census tract. Socioeconomic status rankings were based on percentiles with values ranging from 0 to 1. Higher values indicate greater socioeconomic vulnerability. Previous work has linked higher values from the socioeconomic status theme to increased health conditions, treatment inequities, and worse health outcomes for individual patients (Crowe, 2023; Bevan, 2023; Herra-Escobar, 2022). For analysis, we classified encounters in the 1 to 25th percentile as Q1 (least vulnerable), 26 to 50th percentile Q2, 51 to 75th percentile Q3, and >75th percentile as Q4 (most vulnerable). We defined urbanicity using urban, rural, and super-rural distinctions linking patients to urbanicity by zip code.

We identified additional potentially confounding variables: age in years, sex, race/ethnicity, SES, urbanicity, initial pain score, and EMS transport interval. As shorter EMS transport times may be associated with clinician decision-making and choice to withhold analgesic administration in the prehospital setting and are also associated with urban settings where racial and ethnic diversity is increased, we included EMS transport interval as a potential confounder in our models. We defined EMS transport interval as the difference in minutes from the time the ambulance departed the scene of the encounter and arrival at the hospital (Browne, 2016).

Outcomes

Our primary outcome measure included any analgesic medication administered in the out-of-hospital setting by any route. Analgesic medications used by EMS clinicians in this dataset included opioids (fentanyl, morphine, hydromorphone), ketamine, nonsteroidal anti-inflammatory drugs (ketorolac, ibuprofen), and acetaminophen. Secondarily, in alignment with existing out-of-hospital pain management research, we analyzed a secondary outcome of a clinically meaningful pain reduction as a decrease of 2 or more points on the 0 to 10 pain scale between the final and initial EMS pain assessments (Crowe, 2023).

Statistical Analysis

To evaluate potential systematic differences in patient and encounter characteristics, we first described patients based on weight status according to BMI category calculated using race/ethnicity, documented weight, and gender. Then, we compared unadjusted rates of analgesia and pain reduction by BMI category. We then performed a multivariable logistic regression model to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI) for analgesia administration by weight category adjusting for race/ethnicity, gender, socioeconomic status, rurality, and pain score. We performed this same analysis for pain reduction. We excluded patients with missing data from the multivariable analyses. We also performed a sub analysis at the intersection of obesity with race/ethnicity and another sub analysis at the intersection of obesity with gender. We used Stata v15.1 (College Station, TX) for all analyses (Stata).

RESULTS

Characteristics of Study Subjects

We included 482,592 patients in the analysis (Figure 1). 34.0% (n=164,175) of patients were classified as obese. The mean age was 60 years (IQR 41, 79) and patients were 53.9% (n=260,108) female. Patients were 28.1% non-White (n=135,695). Nineteen percent (n=96,351) of patients were classified as living in rural or super-rural areas and 23.1% (n=111,357) were classified as living in areas in the most socioeconomically vulnerable quartile. 21.0% (n=101,101) received analgesia and of those with multiple pain scores (n=278,266), 27.7% (n=77,083) experienced a reduction in pain of at least 2 points. Descriptive statistics stratified by primary exposure can be seen in Table 1.

Main Results

When accounting for age, gender, urbanicity, socioeconomic status, EMS transport time, and initial pain score, patients with obesity were more likely to receive pain medication (aOR 1.13, 95% CI: 1.10-1.17) and pain reduction (aOR 1.06, 95% CI: 1.02-1.10) than those without obesity. Black non-Hispanic patients were less likely than White non-Hispanic patients to receive analgesia (aOR 0.57, 95% CI: 0.55-0.59) and experience a reduction in pain (aOR 0.70, 95: CI: 0.68-0.72).

Statistical models were also performed at the intersection of race/ethnicity and obesity. White patients with obesity were more likely to receive analgesia than White patients without obesity (aOR 1.04, 95% CI: 1.02-1.07), and Black non-Hispanic patients with obesity were more likely to receive analgesia than Black non-Hispanic patients without obesity (aOR 1.14, 95% CI: 1.09-1.20).

At the intersection of gender and obesity, men with obesity were more likely to receive analgesia (aOR 1.21, 95% CI: 1.17-1.24) than men without obesity. There was no difference

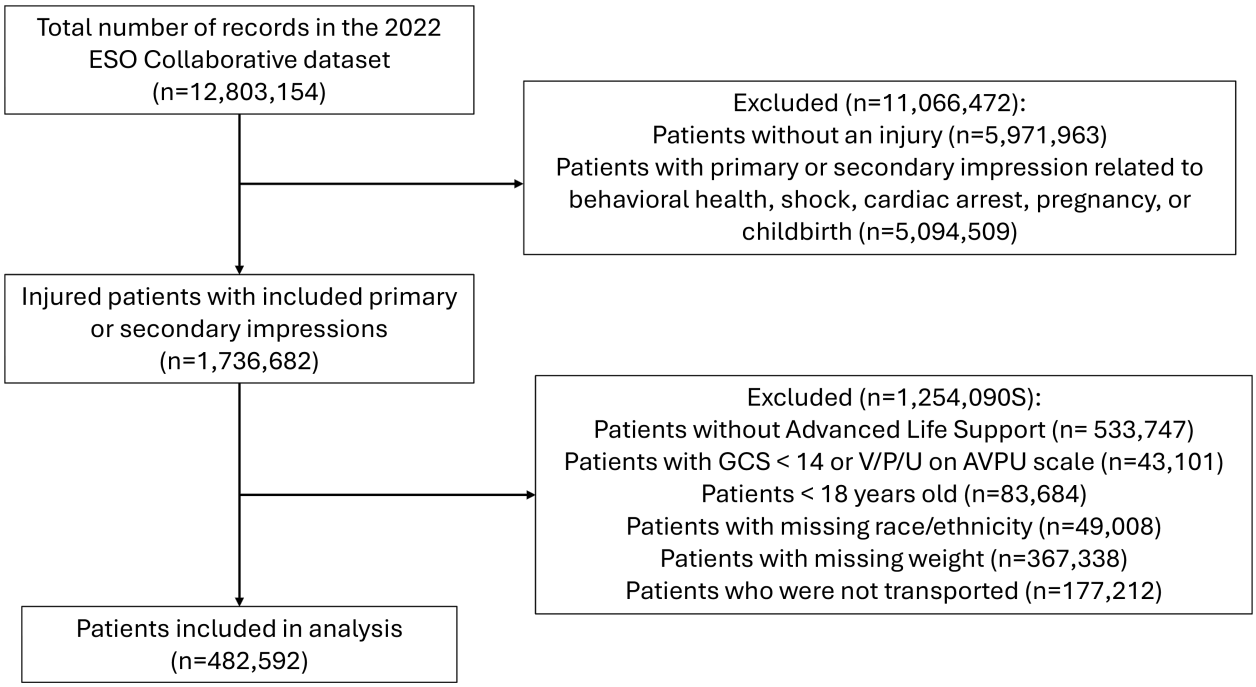


Figure 1. A flow diagram shows how the patient sample was selected for analysis.

Characteristic	Weight Status		
	All patients n=482,592	Patients without Obesity n=318,417 (66%)	Patients with Obesity n=164,175 (34%)
Age			
Median (IQR)	63 (41-79)	67 (41-82)	59 (40-72)
Gender			
Female	54% (260,108)	53% (169,913)	55% (90,195)
Male	46% (222,484)	47% (148,504)	45% (73,980)
Race/Ethnicity			
Black, non-Hispanic	15% (70,744)	13% (41,992)	18% (28,752)
Hispanic	11% (54,168)	10% (33,228)	13% (20,940)
Other	2% (10,783)	2% (7,921)	2% (2,862)
White, non-Hispanic	72% (346,897)	74% (235,276)	68% (111,621)
Census Region			
Northeast	7% (33,131)	8% (23,315)	6% (9,816)
Midwest	27% (117,649)	25% (75,830)	27% (41,819)
South	53% (242,756)	52% (155,800)	55% (86,956)
West	14% (64,945)	15% (45,758)	12% (19,187)
Urbanicity			
Urban	80% (386,079)	81% (257,829)	78% (128,250)
Rural	17% (80,321)	16% (50,263)	18% (30,058)
Super Rural	3% (16,030)	3% (10,216)	4% (5,814)
Scene Socioeconomic Quartile			
Q1	25% (122,460)	27% (86,548)	22% (35,912)
Q2	24% (117,669)	24% (77,589)	24% (40,080)
Q3	27% (130,301)	26% (83,348)	29% (46,953)
Q4	23% (111,357)	22% (70,382)	25% (40,975)
EMS Transport Time, min			
Median(IQR)	13 (8-20)	13 (8-19)	13 (8-20)
First Pain Score Category			
None (0)	16% (62,614)	17% (45,089)	13% (17,525)
Mild (1-3)	17% (69,479)	18% (47,758)	16% (21,721)
Moderate (4-6)	34% (133,615)	33% (86,771)	34% (46,844)
Severe (7-10)	33% (132,610)	31% (80,930)	38% (51,680)

Table 1. Patient and encounter characteristics stratified by weight status.

in analgesia rates between women with obesity and women without obesity (aOR 0.97, 95% CI: 0.95-1.00). Men and women with obesity had higher rates of pain reduction than those without obesity, but the odds ratio was higher for men (aOR 1.25, 95% CI: 1.21-1.28]) than women (aOR 1.1, 95: CI 1.08-1.13). Table 2 shows analgesia and pain reduction rates at the intersection of race and gender with obesity.

Figure 2 shows a panel of forest plots showing the adjusted odds ratios with the multi-variable models for patients with obesity overall and Figure 3 shows them stratified by gender.

DISCUSSION

We found that patients with obesity were more likely to receive analgesia and pain reduction than those without obesity when adjusting for confounders. This did not vary by race and ethnicity, with a persistent advantage for patients with obesity across racial and ethnic categories. At the intersection of gender, however, the treatment advantage of obesity was not present for women. These findings suggest that there is a treatment

Characteristic	Analgesia Administration aOR (95% CI)	Pain Reduction (2+/10) aOR (95% CI)
Weight Status		
Patients with obesity	1.07 [1.05-1.09]	1.16 [1.14-1.18]
Patients without obesity	Referent	Referent
Race and Ethnicity		
Black, non-Hispanic	0.56 [0.55-.58]	0.70 [.0.68-.0.72]
Hispanic	0.84 [0.82-0.87]	1.00 [0.98-1.03]
Other	0.79 [.74-.84]	0.88 [0.83-0.93]
White, non-Hispanic	Referent	Referent
Gender		
Female	0.99 [0.98-1.01]	1.30 [1.28 - 1.32]
Male	Referent	Referent
Obesity Status with Race and Ethnicity		
Black non-Hispanic with obesity	0.62 [0.60-0.65]	0.80 [0.77-0.83]
Hispanic with obesity	0.93 [0.89-0.97]	1.19 [1.14-1.24]
Other with obesity	0.83 [0.74-0.93]	1.10 [0.96-1.19]
White, non-Hispanic with obesity	1.04 [1.02-1.07]	1.16 [1.14-1.19]
Black non-Hispanic without obesity	0.54 [0.53-0.56]	0.72 [0.69-0.75]
Hispanic without obesity	0.82 [0.79-0.85]	0.99 [0.96-1.03]
Other without obesity	0.79 [0.73-0.85]	0.87 [0.81-0.93]
White non-Hispanic without obesity	Referent	Referent
Obesity Status and Gender for Male Patients		
Males with obesity	1.21 [1.17-1.24]	1.25 [1.21-1.28]
Males without obesity	Referent	Referent
Obesity Status and Gender for Female Patients		
Females with obesity	0.97 [0.95-1.00]	1.1 [1.08-1.13]
Females without obesity	Referent	Referent

Table 2. Multivariable generalized estimating equation odds ratios and 95% CI for analgesia administration and pain reduction (defined as a decrease by 2 or greater on documented pain scale) with adjustments for race/ethnicity, gender, rurality, socioeconomic vulnerability, and initial pain score. We did not adjust for initial pain score in the pain reduction model.

advantage for pain management of patients with obesity, but that the advantage is gendered. While men with obesity were nearly 20% more likely to receive analgesia than men without obesity, women with obesity did not receive any advantage or disadvantage based on weight status. We hypothesized that patients with obesity would be less likely to receive analgesia than their not-obese counterparts, but these findings reveal the opposite. Given the large body of research demonstrating discrimination in the hospital setting for patients with obesity, it remains unclear why this did not also translate to prehospital analgesia administration. One potential mechanism for this could be weight concordance between EMS clinician and the patient. Several studies have demonstrated that EMS clinicians have high rates of obesity, cardiac disease, and metabolic syndrome (Tsismenakis, 2009; Hegg-Deloye, 2015; Brice, 2019; Cash, 2019; Supples, 2023). If there is concordance between EMS clinicians and patients with obesity, perhaps it mitigates disparities in treatment, as suggested in previous literature (Kennel 2022). It is unclear whether this weight concordance may be different for men and women.

Racial disparities were also present in these analyses, further validating previous work demonstrating that non-White patients receive disparate pain management (Hewes, 2018; Kennel, 2019; Crowe, 2023). Patients who were non-White and obese still had a treatment advantage when compared to their non-obese counterparts of the same race and eth-

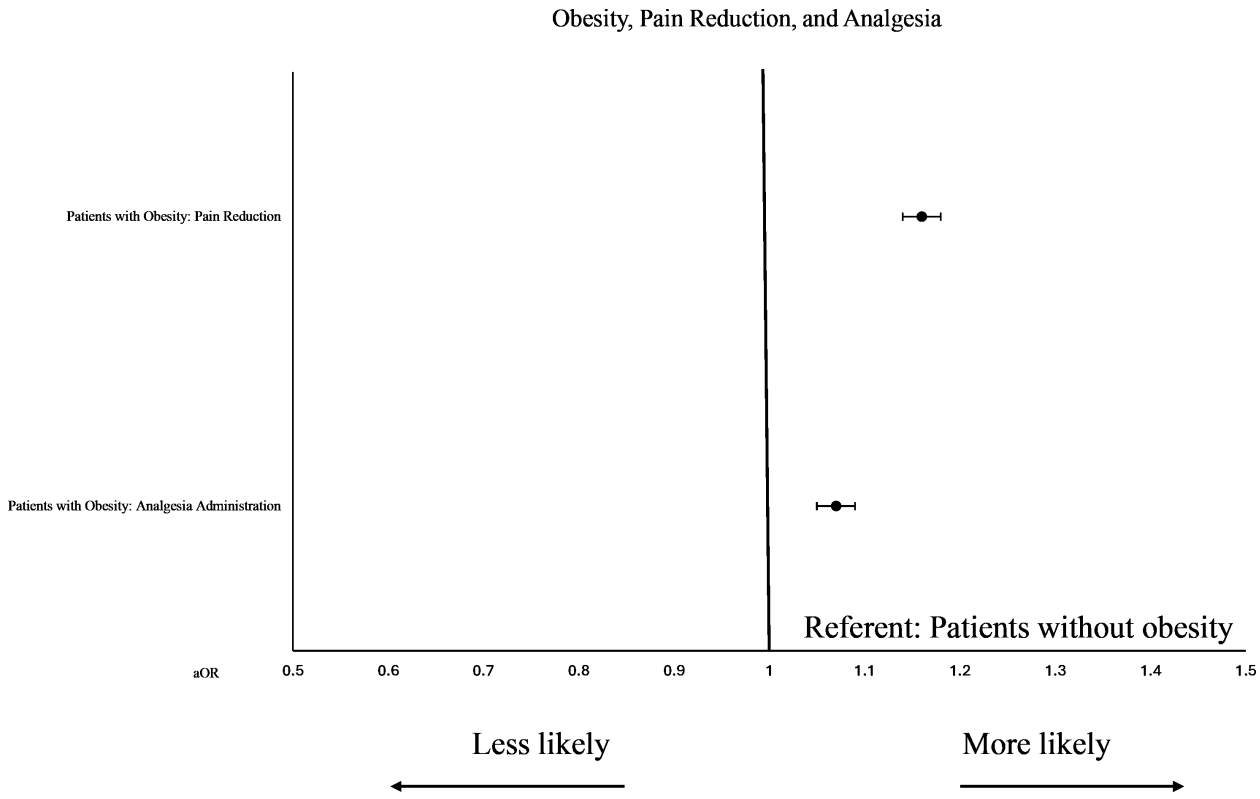


Figure 2. A forest plot represents the primary outcomes stratified by patients with and without obesity. The adjusted odds ratios (aOR) reflect the likelihood of the event on the y axis and the listed referent.

nicity, but the advantage varied more for Black non-Hispanic patients than with White non-Hispanic patients, demonstrating that the intersection of race/ethnicity with obesity had a different impact on our outcome variables. Further research in health care inequities should more consistently explore the intersections of race, ethnicity, gender, and SES when evaluating treatment disparities.

Our results indicated that obesity provided a treatment advantage for men, but no advantage for women that was consistent with past literature (Kennel, 2022). Several hospital-based studies have also shown that the influence of obesity stigma can be more profound for women, as clinicians are more likely to encourage weight loss at lower BMI scores than men, and women with obesity were more likely to be described as "cold" and "defensive" than men with obesity (Puhl, 2008; Anderson, 2001; Fikkan, 2012). This gendered weight bias also extends outside of health care settings and has been seen in wage disparities, and women with obesity are less likely to be hired for public-interfacing jobs when compared to their male counterparts with obesity (Sinall, 2015).

It may be tempting for EMS clinicians and leaders to review the results of this study, among others, showing disparities in care and not know where to start in effectively addressing the difficult problem of health care inequity. A recent position statement from the National Association of EMS Physicians describes why health equity should be a strategic priority for EMS systems, how to examine quality metrics for disparities, and how to implement improvement strategies to tackle inequities in prehospital care (Farcas, 2024). We urge readers to use these tools to evaluate and combat disparities in their own systems, tackling difficult problems like underperformance in ECG acquisition for women, undertreatment of females with obesity in pain, and underdiagnosis of stroke

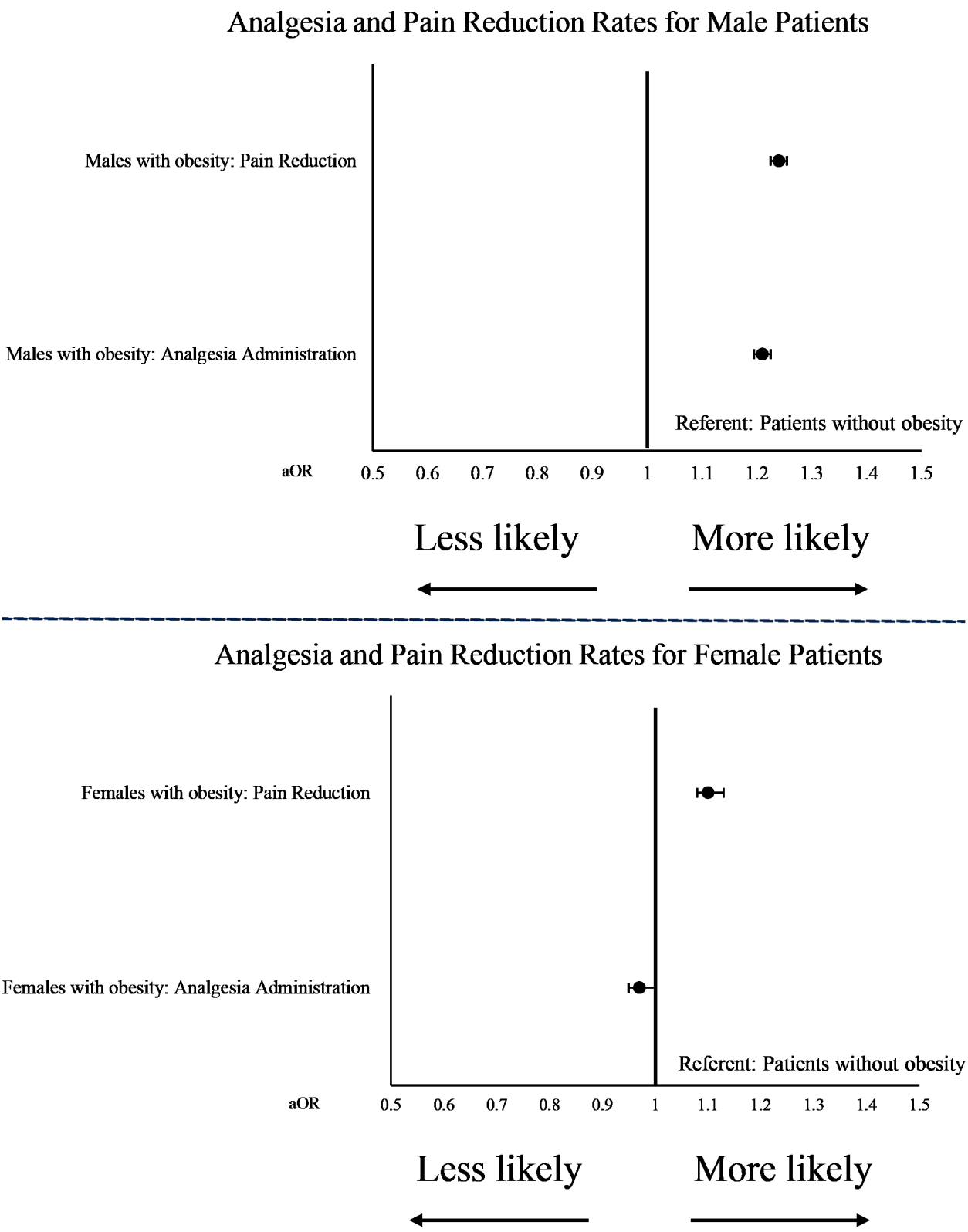


Figure 3. A forest plot represents the primary outcomes stratified by patients with and without obesity for men and then for women in a panel. The adjusted odds ratios (aOR) reflect the likelihood of the event on the y axis and the listed referent.

in female patients the same way they would improve system performance in everyday issues like rapidly decompensating patients, house fires with multiple patients, and patients with difficult airways.

LIMITATIONS

There are several limitations to this study. We used a convenience sample of injured patients in the ESO Collaborative dataset, which does not contain all the EMS responses in a given year and has an uncertain degree of missingness that may bias results and limit generalizability. Additionally, we calculated an approximate BMI by taking the weight in kilograms documented in EMS patient care records and calculating a BMI based on the average height by race and sex. This is not an accurate representation of the patient's health or actual BMI but rather serves as a proxy for the clinician's perception of the patient's weight. The methodology used to approximate BMI has been established in previous studies on disparities in patients with obesity (Kennel, 2022; Kennel, 2018). The weight recorded in the EMS records are rarely taken from a recent weight and are likely crude approximations based on EMS clinician judgment. While documented weights may be inaccurate, the focus of our study was on the potential disparity in care based upon the clinician's perception of patient weight, not the literal weight of the patient. To validate this proxy for weight status, we analyzed ICD-10 codes for patients with discharge information available in the dataset for diagnoses related to obesity. We found that 74% of patients with this diagnosis (n=1,340) were classified as obese by our inferred BMI. Furthermore, we compared our calculated rate of obesity at 34% to 42% in national CDC data, showing that our sample was a conservative estimate of the national population (Stierman, 2021).

Another limitation of this study and prehospital research more broadly is data quality. We could not know precisely the weight or height of the patient but instead rely on approximate weights recorded by prehospital clinicians. Future efforts should be made to improve the quality of EMS data by using stretchers with the ability to assess weight, direct analysis of defibrillator files to assess resuscitation quality, and more.

Additionally, the race and ethnicity designation in the prehospital records are also based on EMS clinician perception, not the patient's reported identity, and are subject to missingness and error. Refusals of pain management were unable to be distinguished due to feasibility, but previous literature demonstrates that refusal of care does not appear to be a mediating variable for disparities in prehospital pain management (Crowe, 2023).

CONCLUSIONS

In summary, these findings show that patients with obesity were more likely to receive analgesia and have a reduction in pain than those without obesity. When looking at the intersection with gender, men with obesity received this treatment advantage but women with obesity did not. Further research in health disparities should examine the intersections of race, gender, and other identities subject to bias and the possible role of clinician concordance in mitigating disparities. EMS leaders should gain visibility to and address inequities in their own systems for patients with obesity.

DECLARATION OF GENERATIVE AI IN SCIENTIFIC WRITING

We did not use a generative artificial intelligence (AI) tool or service to assist with preparation or editing of this work. We take full responsibility for the content of this publication.

REFERENCES

Agency for Toxic Substances and Disease Registry. (n.d.). *CDC/ATSDR social vulnerability index*. Retrieved from https://www.atsdr.cdc.gov/

Agerström, J., & Rooth, D.-O. (2011). The role of automatic obesity stereotypes in real hiring discrimination. *Journal of Applied Psychology, 96*(4), 790–805. https://doi.org/10.1037/a0021594

Amy, N. K., Aalborg, A., Lyons, P., & Keranen, L. (2005). Barriers to routine gynecological cancer screening for White and African-American obese women. *International Journal of Obesity, 30*(1), 147–155. https://doi.org/10.1038/sj.ijo.0803105

Anderson, C., Peterson, C. B., Fletcher, L., Mitchell, J. E., Thuras, P., & Crow, S. J. (2001). Weight loss and gender: An examination of physician attitudes. *Obesity Research, 9*(4), 257–263. Portico. https://doi.org/10.1038/oby.2001.30

Bevan, G., Pandey, A., Griggs, S., Dalton, J. E., Zidar, D., Patel, S., Khan, S. U., Nasir, K., Rajagopalan, S., & Al-Kindi, S. (2023). Neighborhood-level social vulnerability and prevalence of cardiovascular risk factors and coronary heart disease. *Current Problems in Cardiology, 48*(8), 101182. https://doi.org/10.1016/j.cpcardiol.2022.101182

Brice, J. H., Cyr, J. M., Hnat, A. T., Wei, T. L., Principe, S., Thead, S. E., Delbridge, T. R., Winslow, J. E., Studnek, J. R., Fernandez, A. R., & Forrest, E. E. (2018). Assessment of key health and wellness indicators among North Carolina emergency medical service providers. *Prehospital Emergency Care, 23*(2), 179–186. https://doi.org/10.1080/10903127.2018.1489017

Brown, I., Stride, C., Psarou, A., Brewins, L., & Thompson, J. (2007). Management of obesity in primary care: Nurses' practices, beliefs and attitudes. *Journal of Advanced Nursing, 59*(4), 329–341. Portico. https://doi.org/10.1111/j.1365-2648.2007.04297.x

Browne, L. R., Studnek, J. R., Shah, M. I., Brousseau, D. C., Guse, C. E., & Lerner, E. B. (2016). Prehospital opioid administration in the emergency care of injured children. *Prehospital Emergency Care, 20*(1), 59–65. https://doi.org/10.3109/10903127.2015.1056897

Carr, D., & Friedman, M. A. (2005). Is obesity stigmatizing? Body weight, perceived discrimination, and psychological well-being in the United States. *Journal of Health and Social Behavior, 46*(3), 244–259. https://doi.org/10.1177/002214650504600303

Cash, R. E., Crowe, R. P., Bower, J. K., Foraker, R. E., & Panchal, A. R. (2019). Differences in cardiovascular health metrics in emergency medical technicians compared to paramedics: A cross-sectional study of emergency medical services professionals. *Prehospital and Disaster Medicine, 34*(03), 288–296. https://doi.org/10.1017/s1049023x19004254

Centers for Disease Control and Prevention. (n.d.) *About obesity*. Retrieved from https://www.cdc.gov/obesity/php/about/index.html

Chooi, Y. C., Ding, C., & Magkos, F. (2019). The epidemiology of obesity. *Metabolism, 92*, 6–10. https://doi.org/10.1016/j.metabol.2018.09.005

Crowe, R. P., Kennel, J., Fernandez, A. R., Burton, B. A., Wang, H. E., Van Vleet, L., Bourn, S. S., & Myers, J. B. (2023). Racial, ethnic, and socioeconomic disparities in out-of-hospital pain management for patients with long bone fractures. *Annals of Emergency Medicine, 82*(5), 535–545. https://doi.org/10.1016/j.annemergmed.2023.03.035

Farcas, A. M., Crowe, R. P., Kennel, J., Little, N., Haamid, A., Camacho, M. A., Pleasant, T., Owusu-Ansah, S., Joiner, A. P., Tripp, R., Kimbrell, J., Grover, J. M., Ashford, S., Burton, B., Uribe, J., Innes, J. C., Page, D. I., Taigman, M., & Dorsett, M. (2024). Achieving equity in EMS care and patient outcomes through quality management systems: A position statement. *Prehospital Emergency Care, 28*(6), 871–881. https://doi.org/10.1080/10903127.2024.2352582

Fikkan, J. L., & Rothblum, E. D. (2011). Is fat a feminist issue? Exploring the gendered nature of weight bias. *Sex Roles, 66*(9–10), 575–592. https://doi.org/10.1007/s11199-011-0022-5

Ferrante, J. M., Ohman-Strickland, P., Hudson, S. V., Hahn, K. A., Scott, J. G., & Crabtree, B. F. (2006). Colorectal cancer screening among obese versus non-obese patients in primary care practices. *Cancer Detection and Prevention, 30*(5), 459–465. https://doi.org/10.1016/j.cdp.2006.09.003

Flint, S. W., adek, M., Codreanu, S. C., Ivi , V., Zomer, C., & Gomoiu, A. (2016). Obesity discrimination in the recruitment process: "You're not hired!" *Frontiers in Psychology, 7*. https://doi.org/10.3389/fpsyg.2016.00647

Harvey, E., & Hill, A. (2001). Health professionals' views of overweight people and smokers. *International Journal of Obesity, 25*(8), 1253–1261. https://doi.org/10.1038/sj.ijo.0801647

Hebl, M. R., Xu, J., & Mason, M. F. (2003). Weighing the care: patients' perceptions of physician care as a function of gender and weight. *International Journal of Obesity, 27*(2), 269–275. https://doi.org/10.1038/sj.ijo.802231

Hegg-Deloye, S., Brassard, P., Prairie, J., Larouche, D., Jauvin, N., Poirier, P., Tremblay, A., & Corbeil, P. (2015). Prevalence of risk factors for cardiovascular disease in paramedics. *International Archives of Occupational and Environmental Health, 88*(7), 973–980. https://doi.org/10.1007/s00420-015-1028-z

Herrera-Escobar, J. P., Uribe-Leitz, T., Wang, J., Orlas, C. P., Moheb, M. E., Lamarre, T. E., Ahmad, N., Hau, K. M., Jarman, M., Levy-Carrick, N. C., Sanchez, S. E., Kaafarani, H. M. A., Salim, A., & Nehra, D. (2022). The social vulnerability index and long-term outcomes after traumatic injury. *Annals of Surgery, 276*(1), 22–29. https://doi.org/10.1097/sla.0000000000005471

Hewes, H. A., Dai, M., Mann, N. C., Baca, T., & Taillac, P. (2017). Prehospital pain management: Disparity by age and race. *Prehospital Emergency Care, 22*(2), 189–197. https://doi.org/10.1080/10903127.2017.1367444

Huizinga, M. M., Cooper, L. A., Bleich, S. N., Clark, J. M., & Beach, M. C. (2009). Physician respect for patients with obesity. *Journal of General Internal Medicine, 24*(11), 1236–1239. https://doi.org/10.1007/s11606-009-1104-8

Kennel, J., Withers, E., Parsons, N., & Woo, H. (2019). Racial/ethnic disparities in pain treatment. *Medical Care, 57*(12), 924–929. https://doi.org/10.1097/mlr.0000000000001208

Kennel, J., Woo, H., & Garcia-Alexander, G. (2022). Treatment and outcome disparities for patients with obesity in emergency medical services. *International Handbook of the Demography of Obesity*, 239–254. https://doi.org/10.1007/978-3-031-10936-2_14

Latner, J. D., & Stunkard, A. J. (2003). Getting worse: The stigmatization of obese children. *Obesity Research, 11*(3), 452–456. Portico. https://doi.org/10.1038/oby.2003.61

Li, M., Gong, W., Wang, S., & Li, Z. (2022). Trends in body mass index, overweight and obesity among adults in the USA, the NHANES from 2003 to 2018: A repeat cross-sectional survey. *BMJ Open, 12*(12), e065425. https://doi.org/10.1136/bmjopen-2022-065425

Michael, G. E., Sporer, K. A., & Youngblood, G. M. (2007). Women are less likely than men to receive prehospital analgesia for isolated extremity injuries. *The American Journal of Emergency Medicine, 25*(8), 901–906. https://doi.org/10.1016/j.ajem.2007.02.001

National EMS Information System. *NEMSIS Data Dictionary* NHTSA v3.4.0 Build 200910 EMS Data Standard.

Ogden, C. L., Fryar, C. D., Martin, C. B., Freedman, D. S., Carroll, M. D., Gu, Q., & Hales, C. M. (2020). Trends in obesity prevalence by race and hispanic origin—1999-2000 to 2017-2018. *JAMA, 324*(12), 1208. https://doi.org/10.1001/jama.2020.14590

Owen-Smith, A., Coast, J., & Donovan, J. L. (2018). Self-responsibility, rationing and treatment decision making – Managing moral narratives alongside fiscal reality in the obesity surgery clinic. *Health Expectations, 21*(3), 606–614. Portico. https://doi.org/10.1111/hex.12651

Pantenburg, B., Sikorski, C., Luppa, M., Schomerus, G., König, H.-H., Werner, P., & Riedel-Heller, S. G. (2012). Medical students' attitudes towards overweight and obesity. *PLoS ONE, 7*(11), e48113. https://doi.org/10.1371/journal.pone.0048113

Phelan, S. M., Dovidio, J. F., Puhl, R. M., Burgess, D. J., Nelson, D. B., Yeazel, M. W., Hardeman, R., Perry, S., & van Ryn, M. (2014). Implicit and explicit weight bias in a national sample of 4,732 medical students: The medical student CHANGES study. *Obesity, 22*(4), 1201–1208. Portico. https://doi.org/10.1002/oby.20687

Puhl, R. M., Andreyeva, T., & Brownell, K. D. (2008). Perceptions of weight discrimination: prevalence and comparison to race and gender discrimination in America. *International Journal of Obesity, 32*(6), 992–1000. https://doi.org/10.1038/ijo.2008.22

Puhl, R. M., Luedicke, J., & Grilo, C. M. (2013). Obesity bias in training: Attitudes, beliefs, and observations among advanced trainees in professional health disciplines. *Obesity, 22*(4), 1008–1015. Portico. https://doi.org/10.1002/oby.20637

Schwartz, M. B., Chambliss, H. O., Brownell, K. D., Blair, S. N., & Billington, C. (2003). Weight bias among health professionals specializing in obesity. *Obesity Research, 11*(9), 1033–1039. Portico. https://doi.org/10.1038/oby.2003.142

Shinall, J. B. (2014). Occupational characteristics and the obesity wage penalty. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2379575

Stata v15.1. (n.d.). College Station, Texas: StataCorp.

Stierman, B., Afful, J., Carroll, M., Te-Ching, C., Orlando, D., Fink, S., & Fryar, C. (2021). *NHSR 158. National Health and Nutrition Examination Survey 2017–March 2020 Pre-pandemic Data Files*. National Center for Health Statistics (U.S.). https://doi.org/10.15620/cdc:106273

Supples, M. W., Glober, N. K., Lardaro, T. A., Mahler, S. A., & Stopyra, J. P. (2022). Emergency medical services clinicians have a high prevalence of metabolic syndrome. *Prehospital Emergency Care, 27*(4), 449–454. https://doi.org/10.1080/10903127.2022.2138655

Stone, O., & Werner, P. (2012). Israeli dietitians' professional stigma attached to obese patients. *Qualitative Health Research, 22*(6), 768–776. https://doi.org/10.1177/1049732311431942

Tanneberger, A., & Ciupitu-Plath, C. (2017). Nurses' weight bias in caring for obese patients: Do weight controllability beliefs influence the provision of care to obese patients? *Clinical Nursing Research, 27*(4), 414–432. https://doi.org/10.1177/1054773816687443

Tsismenakis, A. J., Christophi, C. A., Burress, J. W., Kinney, A. M., Kim, M., & Kales, S. N. (2009). The obesity epidemic and future emergency responders. *Obesity, 17*(8), 1648–1650. Portico. https://doi.org/10.1038/oby.2009.63

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: Guidelines for reporting observational studies. *The Lancet, 370*(9596), 1453–1457. https://doi.org/10.1016/s0140-6736(07)61602-x

With nearly 800 members, NEMSMA represent CEO's, chiefs, and managers from every state and type of service, offering voice and vision for professional development and leadership.

NEMSMA is a frequent participant in panels, workgroups, and boards involving EMS in both governmental and non-governmental sectors.

NATIONAL EMS MANAGEMENT ASSOCIATION

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

RESEARCH REPORTS

AN INTERPRETIVE DESCRIPTIVE STUDY ON THE IMPACT OF NEGATIVE WORKPLACE BEHAVIORS ON PARAMEDICS ACROSS AUSTRALIA AND CANADA

Annabella Knight, BParamedicine (Honours), RP*[1]; Graham G. Munro, PhD, MHSM, BHSc[1]; Brian Sengstock, PhD[1]; Judith Anderson, PhD, BN, MN[1]

Author Affiliations: 1. Charles Sturt University, Bathurst, NSW, Australia.

Recommended Citation: Knight, A., Munro, G., Sengstock, B., & Anderson, J. (2025). An interpretive descriptive study on the impact of negative workplace behaviors on paramedics across Australia and Canada. *International Journal of Paramedicine*. (13). 25-46. https://doi.org/10.56068/PZCD3162. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3336

Keywords: mental health, psychological wellbeing, bullying, harrassment, organizational culture, emergency medical services, EMS, paramedicine

Disclosures: The ethics approval number is H23533 (see Appendix A).

Funding: No funding was required nor sought for this research project.

Received: January 31, 2025
Revised: May 1, 2025
Accepted: July 12, 2025
Pre-Issue: November 18, 2025
Published: January 13, 2026

**Corresponding Author:* annabellaknight2003@gmail.com

ABSTRACT

Introduction/purpose: Workplace bullying and harassment are pervasive issues that have detrimental effects on the well-being and productivity of individuals. A literature review conducted for this study demonstrated that workplace bullying and harassment was under researched amongst paramedics.

Methods: A qualitative interpretive methodology was implemented, involving convenience sampling which resulted in six working paramedics from Australia and Canada becoming participants. Individual semi-structured interviews were conducted with each participant, lasting approximately one hour. This allowed for a deep exploration of the personal experiences and perspectives by the paramedics. The interview data collected was thematically analysed using Braun and Clarke's (2006) six-step framework. By utilising this method, this study contributed to a better understanding of impacts of workplace bullying and harassment amongst paramedics.

Results: Two core themes were identified from interview data which were the impact of negative behaviours and organisational culture. The research identified some impacts that workplace bullying and harassment can have on paramedics.

Conclusion: This study explores workplace bullying, harassment, and organisational culture within the paramedic profession. Through interviews with six paramedics, the research highlights the varied nature of negative behaviours, disparities, and effects on job satisfaction, performance, and mental health. Organisational culture such as power dynamics, diversity, and generational change was found to influence workplace behaviours.

INTRODUCTION

Overview

This paper was derived from an honours research project that examined the management of bullying and harassment in the workplace and the coping mechanisms employed by paramedics, over a period of 18 months. The decision to embark on this project stemmed from the recognition of a limited body of research in workplace bullying and harassment in paramedicine.

The research question guiding this study was: What is the impact of workplace bullying and harassment amongst paramedics, and how does organisational culture affect it?

Literature Review

Prior to beginning this study, a literature review was conducted exploring workplace bullying and harassment within the paramedicine profession, focusing on the experiences of paramedics in Australia, Canada, the United Kingdom, and the United States. The literature uncovered a limited body of research, with only four peer-reviewed studies identified. Further research was required to comprehensively address these challenges and ensure the holistic well-being of paramedic professionals.

Rationale

Paramedicine, as an emerging profession, has a dearth of literature in workplace bullying and harassment. This research was aimed at filling this gap by further identifying some of the impacts of workplace bullying and harassment and organisational culture's role in these issues. This research focused primarily on Canadian and Australian paramedics' workplaces.

Outcomes

This study's outcomes built on the information identified by the literature review and shed light on the impacts of workplace bullying and harassment and organisational culture. Participants shared varied insights, utilising their own definitions, and highlighted a notable shift in paramedicine culture and its impact on these issues. While this research offers valuable insights, this research used small sample sizes which were unable to be generalised to the greater population but rather provide examples that the population can resonate with and build on. This underscores the need for further exploration to gain a more comprehensive understanding of these complex challenges in the paramedicine profession.

METHODS

The chosen methodology was a qualitative interpretive description (Thorne et al., 1997). This approach recognised the multiple subjective realities experienced by participants, creating relevant themes that identified the impact of workplace bullying and harassment and impact of organisational culture. Terms throughout this paper were not explicitly defined by the researchers, as participants described these concepts based on their own experiences and understandings.

Rationale for Cross-Country Analysis

This research focused on paramedics in Australia and Canada. The choice to include both countries stemmed from the aim of obtaining a broader perspective on workplace bullying and harassment in paramedicine. Despite geographical distance, these countries share similar cultural and healthcare workplace backgrounds (Dixit & Sambasivan, 2018), making them likely to have encountered comparable issues in this context.

Recruitment Strategy

In accordance with ethical considerations, approval was obtained prior to recruitment efforts (Appendix A). The study was advertised on social media platforms (Facebook, Twitter, LinkedIn) and paramedic notice boards (specifically, the Australasian College of Paramedicine (2023) and the McNally Project for Paramedicine Research in Canada (2023)), that led participants to provide information in a Google Form. Thirteen individuals responded to the Google Form, with six meeting the inclusion criteria and proceeding to participate in the study. Convenience sampling was used (Elfil and Negida, 2017), which recruited six qualified paramedics who have experienced workplace bullying and/or harassment based on availability. This sample size was determined following the guidance of Braun and Clarke (2019), which suggested that six participants is appropriate for a thematic analysis. Participants who volunteered for this research and provided their information in the Google Form, were provided with a consent form (Appendix B) and information sheet (Appendix C). Participants were then given a pseudonym as they were anonymised. Table 1 provides details about the participants including their pseudonym, length of service, and country of work.

Pseudonym	Length of service	Country
Jules	10 - 20 years	Australia (Rural)
Mary	>20 years	Canada (Metropolitan)
Alex	<10 years	Canada (Metropolitan)
Mark	<10 years	Australia (Metropolitan)
Kelly	10 - 20 years	Canada (Rural)
Robin	>20 years	Canada (Metropolitan)

Table 1. Participant table.

Data Generation Procedure

Semi-structured interviews lasting approximately one hour were conducted. These interviews asked questions that addressed the research question and allowed participants to divulge relevant information and co-construct themes (Thorne et al., 1997). The semi-structured interviews enabled deeper insights into participants' lived experiences by asking open-ended questions and probing further based on their responses (Peters & Halcomb, 2015). To maintain integrity of the information, interviews were recorded using Zoom© and manually transcribed to ensure accuracy. The transcripts were subsequently deidentified to ensure participant confidentiality. Post-interview, each participant was provided a debrief statement (Appendix D and Appendix E) specific to their country, which identified support services.

Data Analysis

Thematic analysis, as recommended by Braun and Clarke (2006), was used to analyse the data collected during the study. This method involved six key steps as shown in Table 2.

Thematic analysis is an efficient approach when working with qualitative data and is a widely accepted method for data analysis (Braun & Clarke, 2006). By employing this methodology, the researchers gained a comprehensive understanding of paramedics' experiences with workplace bullying and harassment and identified organisational culture's role. To enhance trustworthiness, the analysis involved ongoing reflexive discussions and debriefing. Triangulation of findings was supported through the inclusion of multiple researchers during analysis, helping to mitigate individual bias.

Braun and Clarke (2006) six step method	What was done for this study
Familiarisation with the data	Researchers reviewed the transcripts and gained understanding of the paramedics' experiences.
Initial coding of data	Identifying patterns and noting relevant quotes. These patterns were then provided an initial code.
Generating themes based on the coded data	Patterns and quotes were categorised into themes.
Reviewing and refining themes	A review of themes ensuring they accurately reflect the data. Any discrepancies or overlaps were identified and refined.
Defining and naming the final themes	Themes were defined based on the understanding of the data.
Writing the report based on the thematic analysis	The final report was created around the defined themes. The report presented a narrative, integrating quotes and examples from the coded data to support and illustrate each theme.

Table 2. Braun and Clarke's (2006) six-step thematic analysis.

FINDINGS

Upon analysis of the data, two major themes emerged. These were the impact of negative behaviours, and organisational culture.

Impact of Negative Behaviours

The theme of negative behaviours and their impact was based on participant descriptions and definitions of what they considered to be a "negative behaviour." Often, participants described these behaviours in terms of their impact on personal well-being, mental health, and job satisfaction and performance, which is why they are discussed together. Overall, this included types of behaviours that occurred in different settings, the impact of these behaviours, and any support available.

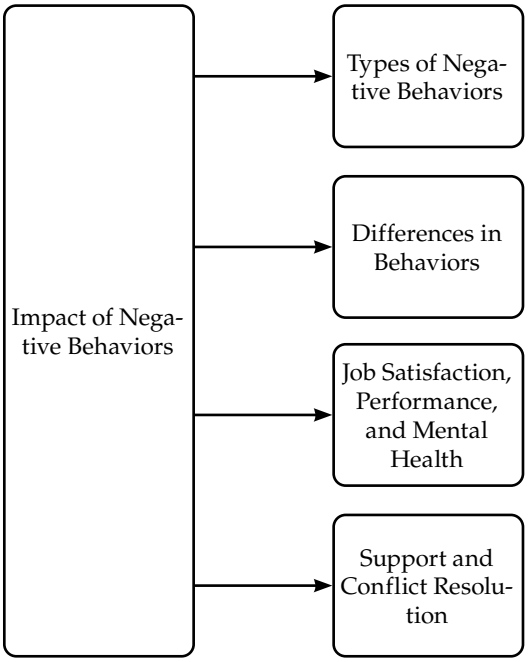


Figure 1. Impact of negative behaviors.

Negative behaviours and their impact varied between settings. These included regional, rural/remote, and metropolitan areas. The variation suggested that contextual factors related to location may have influenced the manifestation of negative behaviours. One participant pointed out that in regional areas, staff frequently stayed in the same station for longer and were less accepting of newcomers:

> *The bigger regional towns definitely have had their staff there for a very long time so the bullying culture hasn't had time to be replenished or replaced. - Jules (Australia)*

Another participant underscored the self-perpetuating nature of such cultures, stating:

> *It's definitely a self-reinforcing culture because you have a relatively small group of people in the station, and how those people behave and interact with each other will create a culture that sustains itself and that can be very hard to change. - Mark (Australia)*

These statements suggested that staff in the service or the same station for longer were set in their ways. A poor workplace culture then tended to imbed these practices that were often seen as negative.

Disparities in behaviours between people of different genders and stereotypes also existed. Some participants reported that female and LGBTQIA+ (lesbian, gay, bisexual, transgender, queer (or questioning), intersex, and asexual) people experienced different behaviours compared to their heterosexual male counterparts. For instance, one participant stated:

> *Bullying towards females tended to be more verbal, and the bullying towards males would start verbal, but it could end quite severely. - Jules (Australia)*

This quote indicated that both males and females are bullied within the service, although behaviours varied. Another participant stated in regard to the difference in behaviours:

> *I've often suspected whenever I work with my female colleagues, they just cop a lot more than I do, constantly from everyone–from patients, from managers, from coworkers–just across the board. There's not a doubt in my mind that it's harder to be a paramedic and be female just because of the way that other people treat you. - Mark (Australia)*

This quote from Mark suggested that gender could influence behaviours. Mark particularly highlighted that bullying and harassment faced by paramedics was not only from people within the workforce but also from patients. This demonstrated disparities in behaviours towards individuals considered part of a stereotypical groups, such as people of colour, religious minorities, LGBTQIA+, and those of different ethnicities.

One participant stated:

> *Everyone who didn't fit into a mould. So if you were a religious minority, person of colour, or someone who didn't fit the general description of what a man was supposed to act like, they were definitely targeted. - Mary (Canada)*

Although this was initially the case, when diversity increased in paramedicine, this situation changed. Mary also stated:

> *When people start to interact more with other groups, they humanise other groups, so they don't attract quite the same behaviours as perhaps they did. You know, when you work with 50% women, we're not quite the unicorns that we were in the first place. - Mary (Canada)*

Mary highlighted the increasing diversity within paramedicine may reduce such behaviours.

The impact of negative behaviours on job satisfaction, performance, and mental health was mentioned by participants. Participants reported lowered job satisfaction, decreased performance, and effects on mental health due to their experiences of negative behaviours. When discussing job satisfaction, one participant shared her disappointment:

> *I would literally get in the car every day, and by the time I got home at night, I was in tears. - Jules (Australia)*

This example of poor job satisfaction was not unique amongst the participants. Mary expanded on the impact that this had on her performance stating:

> *It's hard to come to work every day when everybody hates you, when they don't want to work with you because they don't think you can do your half of the job, when they treat you like a horrible person just because of the skin you showed up in. - Mary (Canada)*

Such firsthand accounts display the debilitating effects of bullying and harassment on well-being and job satisfaction. It is important to note that all participants reported a decline in job satisfaction after experiencing workplace bullying and/or harassment. Three participants revealed negative experiences deterred them from asking questions, creating a significant hinderance to their learning process. One participant described the impact, stating:

> *If the person who's in a teaching role is in a critical frame of mind and responds to everything you do negatively, that's going to obviously create a disincentive for you to ever ask for assistance… I spent the next few weeks sitting in terrified silence, that I might accidentally do something to annoy these people who are in a position of power. That definitely put me on the back foot. - Mark (Australia)*

This underscores Mark's perception of the vital role of support in the mentorship process, enhancing the learning experience.

Participants indicated that the effects of negative behaviours not only affected them in the workplace, but also outside of the work environment. One participant expressing:

> *You go through a period where you're pretty angry, when you'd fight all the time in one place [work]; it's hard not to have that confrontational mentality elsewhere as well. - Mary (Canada)*

In this way participants reported that the experience of negative behaviours within the workplace resulted in negative attitudes towards family and friends, personal health, and lifestyle choice adversities. One participant shared:

> *It affected my want to go to work, like I would sit by the phone and want to call in sick every day. I lost 10 pounds because I wasn't eating from the stress of going to work, which I've never experienced in my life. - Alex (Canada)*

This participant expressed the desire of absenteeism from the situation and thereby the job. This comment displayed the nature of these issues, and how far the impact can extend.

Negative effects on mental health reported by participants included depression, anxiety, stress, and burnout. One participant shared:

> *I feel like I experienced my first ever anxiety attack, something that I hadn't dealt with before in my entire adult life… I think it just puts a lot more stress on an already incredibly stressful situation. - Kelly (Canada)*

This underscores the consequences that negative behaviours in the workplace can have and how these behaviours can impact mental wellbeing.

Lastly, participants expressed difficulties in accessing support services. Some participants noted a gap in the availability of support services, specifically around a decade ago. During interviews, participants expressed a lack of knowledge about the support

services for bullying and harassment that were available when they experienced these negative behaviours around that time. One participant stated:

> *There weren't any support services when I started. There was no such thing as EAP [Employee Assistance Program], or counselling, or any of that. It was back in the day; when you would push that feeling down low and pretend it never happened. Thankfully that's changed. - Mary (Canada)*

This quote highlights the current awareness of support services available for paramedics. It suggests that around a decade ago, there was minimal awareness of support services and a lack of guidance on how to manage these issues.

Overall, the analysis of negative behaviours and their impact reveals the complexity and multi-dimensional nature of this issue. It underscores the levels of negative behaviours, including different types of behaviours and the impact of these behaviours.

Organisational Culture

During participant interviews, a recurrent theme emerged about organisational culture which was made up of power differentials, generational tensions, and normalised culture and societal norms in relation to negative behaviours. This shed light on the complex interplay of factors influencing workplace bullying and harassment amongst paramedics.

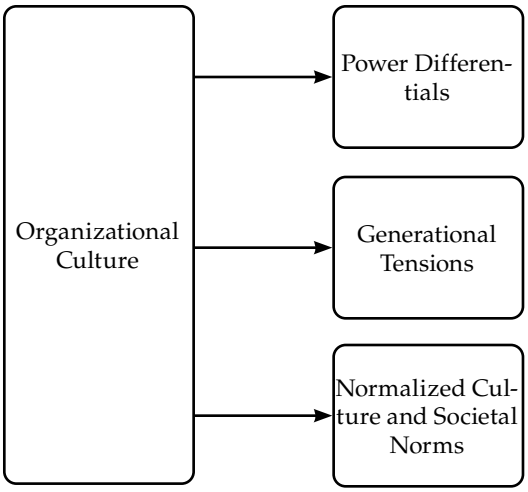


Figure 2. Organizational culture.

Power differentials were mentioned by participants as a contributing factor to negative behaviours. They underscore the significance of hierarchical power dynamics in precipitating negative behaviours. Participants recounted instances where individuals in positions of authority inappropriately exercised their power, resulting in the manifestation of bullying behaviours. Notably, some participants emphasised that it was uncommon to see negative behaviours from people hierarchically equal or below another person, with one participant mentioning:

> *There has to be an imbalance of power in order for one person to be vulnerable to another. - Mark (Australia)*

This indicated that perpetrators of negative behaviours tended to have power to negatively influence others.

In all six interviews, it was mentioned that negative behaviours in the paramedic environment were very common. It was a common sentiment amongst participants that bullying or harassment had been a prevalent experience over the course of their careers. One participant mentioned:

> *Culturally, in emergency services, there still is a fair amount of bullying that occurs even today. - Mary (Canada)*

This underscores the persistence of a culture that has normalised such behaviours.

Another participant stated:

> *My worry is that back then it was very open and in some ways, that watered it down a bit. And now, because it's not as systemic, it's gone a little bit more underground and a little bit more targeted, which I actually think can be more detrimental. - Jules (Australia)*

This participant emphasised their concern that due to existing social norms, such behaviours were still common, just less openly demonstrated, due to the pressures the perpetrator would face if the behaviour was more transparent. This highlighted generational tensions that emerged throughout interviews, shedding light on the conflicts arising from these differences in generational perspectives. Some participants mentioned a common culture of "eat your young." This was mentioned a few times in regard to why individuals may behave negatively towards newer paramedics. This culture was described as prevalent approximately a decade ago. However, participants also noted a positive shift over the years, driven by societal pressures and evolving norms with one participant stating:

> *As more people come in and the system's diluted a bit more some of the people who have been in the service for 30 to 40 years start to change how they're behaving because everybody else around them is behaving differently. - Jules (Australia)*

This demonstrates that old practices being phased out to align with current societal norms, and individuals who engaged in those practices are beginning to align with current societal norms. Individuals who engage in such actions more recently face social disapproval and rejection, contributing to a decline in the prevalence of such behaviours.

One participant mentioned:

> *You'll get some person who says something, and the young guys are looking at him going, that's not funny and that's not okay. - Mary (Canada)*

This demonstrated the social disapproval of these behaviours, and participants felt that this change had positively influenced the prevalence of such behaviours, making it less normalised. They attributed some of this positive shift to increased awareness and education, with one participant mentioning:

> *I think that as newer people come through and there is more training on bullying and dealing with those conflicts, it's being dealt with better. - Jules (Australia)*

This reflects the positive impact of heightened awareness and education on the effects of these behaviours. These changes in behaviours have addressed power differentials, generational tensions and normalised culture which have been altered to align with current societal norms.

DISCUSSION

This study investigated the relationship between negative behaviours and paramedic well-being, addressing their implications on job satisfaction, mental health, and patient care quality. The exploration spanned the evolution of negative workplace behaviours, the influence of diversity and education, and power dynamics within the paramedic profession.

Impact of Negative Behaviours

During this study, participants noted a significant effect on their well-being due to the impact of negative behaviours. The well-being of paramedics is intricately tied to their job satisfaction (Orgambídez et al., 2022), an aspect significantly affected by the prevalence of negative workplace behaviors. As evidenced by the experiences shared by participants in this study, negative workplace behaviors contributed to a complex web of challenges, amplifying the demanding nature of paramedic work. This discussion explores the multifaceted repercussions of negative behaviors on paramedics, with a focus on the enduring effects on job satisfaction, mental health, and organisational culture.

All participants in this study reported diminished job satisfaction as a result of their experience of negative workplace behaviours. Negative workplace behaviours as a key contributor to reduced job satisfaction was also documented (Khan et al., 2021). Furthermore, Al-Ali et al. (2019) stated a significant relationship between job satisfaction and both performance and job happiness. Participants in this study mentioned experiencing anxiety, depression, and burnout as additional outcomes of these behaviours. MN and El Mahalli (2020) agree that implications of low job satisfaction can extend further, manifesting as emotional burnout, heightened anxiety, and increased susceptibility to depression. This is particularly alarming in the context of healthcare, where practitioners are already predisposed to elevated levels of burnout (MN & El Mahalli, 2020).

The experience of negative behaviours at work was not isolated to immediate effects but extended to long-term consequences. Participants in this study reported contemplating absenteeism due to these behaviours. Absenteeism is common when there is a negative impact on job satisfaction (Lever et al., 2019). Additionally, participants recounted lack of confidence after experiencing negative behaviours. This confirmed findings of Ariza-Montes et al. (2014) who described negative workplace behaviours led to increased errors, decreased quality, and loss of productivity. In paramedicine, where confidence and quality of work are paramount for ensuring optimal patient safety, negative behaviours hinder these traits. Confidence is essential for effective decision-making and, if compromised, can impact the ability of paramedics to navigate high-pressure situations (Bijani et al., 2021). This not only diminishes their overall job satisfaction but also quality of care provided.

Participants in this study emphasised the demanding nature of paramedic work, characterised by traumatic events and heavy workloads, which was supported by Ariza-Montes et al. (2013) as amplifying the risk of mental health issues. Chen et al. (2022) emphasise that high-stress work, defined by factors like high job demands, low job control, and low social support, can trigger mental health issues over time. This is particularly relevant to paramedics who routinely encounter highly stressful situations in their line of duty. Tatar and Yüksel (2019) assert that negative behaviours within the workplace can lead to severe psychological harm including depression, anxiety, and post-traumatic stress disorder (PTSD). Meadley et al. (2020) highlight the multifaceted challenges faced by paramedics, including the risk of developing mental health problems, sleep disturbances, poor nutrition, and limited physical activity. Given these pre-existing complexities, negative workplace behaviours possess the potential to exacerbate these symptoms, detrimentally affecting the ability of paramedics to cope with the inherent stressors of their job. Mental health problems not only affect the well-being of paramedics but also

have a direct impact on their focus and performance (Hennekam et al., 2020). The stress induced by negative behaviours required additional effort from paramedics to adapt, leading to emotional exhaustion, decreased work satisfaction, and, ultimately, diminished performance (Khamisa et al., 2016).

The results of this study, underscore the need to address negative workplace behaviours, which significantly impact overall performance and well-being of paramedics. The study highlights the consequences of these behaviours, emphasising the heightened vulnerability of paramedics, already exposed to the demanding nature of their profession. Recognising the role of organisational culture, particularly the shared behaviours amongst paramedics.

Organisational Culture

Organisational culture plays a significant role in influencing the impact of negative behaviours on the well-being of paramedics. Participants in this study noted that when paramedics at the same station share similar mindsets, the organisational culture remains stagnant and resistant to change. This aligned with research indicating that organisational culture is a key factor in either facilitating or preventing uncivil and bullying behaviours (Carter et al., 2013).

Some participants of this study noted a growing diversity within the paramedic profession. Participants reported a positive association between increased diversity and reduced negative behaviours. Workplace environments with high diversity were linked to heightened worker engagement and greater acceptance of others (Sliter et al., 2014). As mentioned by participants, a stronger diversity minimised negative behaviours within the workplace.

Participants in this study mentioned a positive shift in organisational acceptance of negative behaviours over the years, highlighting an increase in the implementation of prevention measures for workplace bullying and harassment. They reported that this had contributed to a decrease in negative behaviours, which they felt were driven by potential consequences outlined in these prevention measures. The development and strict enforcement of anti-bullying measures emerged as crucial tools for reducing the likelihood of violence and cultivating a positive workplace culture in a study by Filipova (2018).

Moreover, the results of this study underscore the pivotal role of increased education and awareness in fostering diversity and reducing instances of negative behaviours within paramedicine. Drawing from the experiences of nurses, Skehan (2015) highlighted the benefits of education programs focused on conflict resolution and reducing negative behaviour within the workplace, noting a decrease in violence and aggression, contributing to a healthier work environment. Additionally, participants in this study mentioned experiencing negative behaviours from superiors. The impact of educational workshops showed that heightened awareness of lateral violence and improved assertive communication were associated with better working environments, reduction in turnover, and decreased incidence of lateral violence (Ceravolo et al., 2012). This demonstrates the importance of education programs in reducing negative workplace behaviours, and more particularly lateral violence.

Some participants highlighted gender as a contributing factor to negative behaviours, and others pointed out that near-equal gender ratios in paramedicine have resulted in reduced negative behaviours related to gender. Supporting these participant insights, Fink-Samnick (2016) suggests that the minority gender in a workplace is more likely to be bullied. Therefore, when equal gender ratios are achieved, it is plausible that instances of gender-related bullying become less common, aligning with participant claims in this study of evolving gender dynamics within the paramedic profession.

The theme of negative behaviours and how they impact workers is not new, but this research adds weight to the literature on this topic and relates specifically to paramedics in Canada and Australia. It provides a unique insight into their lives and the impact that bullying and harassment has on them. A positive sign is the change in organisational culture that some of these participants experienced with growing diversity in the workplace.

LIMITATIONS

This study's primary limitation is the small sample size of six participants. This limitation may affect the generalisability of findings to the broader paramedic profession and limit the diversity of experiences captured. Additionally, participants volunteered to take part in the study, introducing potential self-selection bias. These limitations underscore the importance of future research with larger, more diverse samples to enhance validity and provide a comprehensive understanding of negative workplace behaviours in paramedicine and their impact.

CONCLUSION

This research contributes to a further understanding of the impacts of workplace bullying and harassment as well as organisational culture on these issues. This research focuses specifically on the paramedic community, given the limited exploration of this emerging profession.

The research findings revealed key insights into workplace bullying and harassment among paramedics. In terms of the impact of negative behaviours, the study identifies varied behaviours across different locations, including metropolitan, regional, and rural/remote areas, with gender and stereotype disparities evident. The adverse effects of negative behaviours on job satisfaction, performance, and mental health are highlighted as crucial factors.

Exploring organisational culture, the study identifies power differentials, diversity, and generational change as influencers to workplace behaviours, underlining the importance of inclusivity and low acceptance of negative behaviours. These insights shed light on the complex dynamics that shape the work environment for paramedics.

This research not only enhances our understanding of workplace bullying and harassment but also delves into the intricate and evolving dynamics of this pervasive issue. This study illuminates the impacts of negative workplace behaviours on the participants, shedding light on their experiences.

REFERENCES:

Al-Ali, W., Ameen, A., Isaac, O., Khalifa, G. S., & Shibami, A. H. (2019). The mediating effect of job happiness on the relationship between job satisfaction and employee performance and turnover intentions: A case study on the oil and gas industry in the United Arab Emirates. *Journal of Business and Retail Management Research, 13*(4). https://doi.org/10.24052/JBRMR/V13IS04/ART-09

Ariza-Montes, A., Muniz, N. M., Montero-Simó, M. J., & Araque-Padilla, R. A. (2013). Workplace bullying among healthcare workers. *International Journal of Environmental Research and Public Health, 10*(8), 3121-3139. https://doi.org/10.3390/ijerph10083121

Ariza-Montes, J. A., Muniz, R. N., Leal-Rodríguez, A. L., & Leal-Millán, A. G. (2014). Workplace bullying among managers: a multifactorial perspective and understanding. *International Journal of Environmental Research and Public Health, 11*(3), 2657-2682. https://doi.org/10.3390/ijerph110302657

Bijani, M., Abedi, S., Karimi, S., & Tehranineshat, B. (2021). Major challenges and barriers in clinical decision-making as perceived by emergency medical services personnel: A qualitative content analysis. *BMC Emergency Medicine, 21*(1), 11. https://doi.org/10.1186/s12873-021-00408-4

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health, 11*(4), 589-597. https://doi.org/10.1080/2159676X.2019.1628806

Carter, M., Thompson, N., Crampton, P., Morrow, G., Burford, B., Gray, C., & Illing, J. (2013). Workplace bullying in the UK NHS: A questionnaire and interview study on prevalence, impact and barriers to reporting. *BMJ Open, 3*(6), e002628. https://doi.org/10.1136/bmjopen-2013-002628

Ceravolo, D. J., Schwartz, D. G., Foltz-Ramos, K. M., & Castner, J. (2012). Strengthening communication to overcome lateral violence. *Journal of Nursing Management, 20*(5), 599-606. https://doi.org/10.1111/j.1365-2834.2012.01402.x

Chen, B., Wang, L., Li, B., & Liu, W. (2022). Work stress, mental health, and employee performance. *Frontiers in Psychology, 13*, 1006580. https://doi.org/10.3389/fpsyg.2022.1006580

Dixit, S. K., & Sambasivan, M. (2018). A review of the Australian healthcare system: A policy perspective. *SAGE Open Medicine, 6*, 2050312118769211. https://doi.org/10.1177/2050312118769211

Elfil, M., & Negida, A. (2017). Sampling methods in Clinical Research; An educational review. *Emergency (Tehran), 5*(1), e52.

Filipova, A. A. (2018). Countering unprofessional behaviors among nurses in the workplace. *Journal of Nursing Administration, 48*(10), 487-494. https://doi.org/10.1097/nna.0000000000000656

Fink-Samnick, E. (2016). The new age of bullying and violence in health care: Part 2: Advancing professional education, practice culture, and advocacy. *Professional Case Management, 21*(3), 114-126; quiz E111-112. https://doi.org/10.1097/ncm.0000000000000146

Hennekam, S., Richard, S., & Grima, F. (2020). Coping with mental health conditions at work and its impact on self-perceived job performance. *Employee Relations, 42*(3), 626-645. https://doi.org/10.1108/ER-05-2019-0211

Khamisa, N., Peltzer, K., Ilic, D., & Oldenburg, B. (2016). Work related stress, burnout, job satisfaction and general health of nurses: A follow-up study. *International Journal of Nursing Practice, 22*(6), 538-545. https://doi.org/10.1111/ijn.12455

Khan, M. S., Elahi, N. S., & Abid, G. (2021). Workplace incivility and job satisfaction: Mediation of subjective well-being and moderation of forgiveness climate in health care sector. *European Journal of Investigationg in Health, Psychology and Education, 11*(4), 1107-1119. https://doi.org/10.3390/ejihpe11040082

Lever, I., Dyball, D., Greenberg, N., & Stevelink, S. A. M. (2019). Health consequences of bullying in the healthcare workplace: A systematic review. *Journal of Advanced Nursing, 75*(12), 3195-3209. https://doi.org/10.1111/jan.13986

McKay, P. F., Avery, D. R., & Morris, M. A. (2008). Mean racial ethnic differences in employee sales performance: The moderating role of diversity climate. *Personnel Psychology, 61*(2), 349-374. https://doi.org/10.1111/j.1744-6570.2008.00116.x

McNally Project for Paramedicine Research. (2023). The McNally Project for Paramedicine Research in Canada. http://mcnallyproject.ca/

Meadley, B., Caldwell, J., Perraton, L., Bonham, M., Wolkow, A. P., Smith, K., Williams, B., & Bowles, K.-A. (2020). The health and well-being of paramedics - A professional priority. *Occupational Medicine, 70*(3), 149-151. https://doi.org/10.1093/occmed/kqaa039

MN, A. L., & El Mahalli, A. A. (2020). Burnout and coping methods among emergency medical services professionals. *Journal of Multidisciplinary Healthcare, 13*, 271-279. https://doi.org/10.2147/jmdh.S244303

Orgambídez, A., Almeida, H., & Borrego, Y. (2022). Social support and job satisfaction in nursing staff: Understanding the link through role ambiguity. *Journal of Nursing Management, 30*(7), 2937-2944. https://doi.org/10.1111/jonm.13675

Peters, K., & Halcomb, E. (2015). Interviews in qualitative research. *Nurse Researcher, 22*(4), 6-7. https://doi.org/10.7748/nr.22.4.6.s2

Skehan, J. (2015). Nursing leaders: Strategies for eradicating bullying in the workforce. *Nurse Leader, 13*(2), 60-62. https://doi.org/10.1016/j.mnl.2014.07.015

Sliter, M., Boyd, E., Sinclair, R., Cheung, J., & McFadden, A. (2014). Inching toward inclusiveness: Diversity climate, interpersonal conflict and well-being in women nurses. *Sex Roles, 71*(1), 43-54. https://doi.org/10.1007/s11199-013-0337-5

Tatar, Z. B., & Yüksel, . (2019). Mobbing at workplace–Psychological trauma and documentation of psychiatric symptoms. *Nöro Psikiyatri Arşivi, 56*(1), 57-62. https://doi.org/10.29399/npa.22924

The Australasian College of Paramedicine. (2023). Paramedics.org. https://paramedics.org/research

Thorne, S., Kirkham, S. R., & MacDonald-Emes, J. (1997). Interpretive description: A noncategorical qualitative alternative for developing nursing knowledge. *Research in Nursing & Health, 20*(2), 169-177. https://doi.org/10.1002/(sici)1098-240x(199704)20:2<169::aid-nur9>3.0.co;2-i

APPENDIX A: ETHICS APPROVAL

Dear Miss Knight,

Project title: Managing bullying and harassment in the workplace: Coping mechanisms and management strategies used by paramedics

Protocol number: H23533 (Please refer to this number in all contact or correspondence relating to this application)

Approved until: 03/05/2024

Final report due: 03/05/2024

Thank you for submitting your research proposal detailed above to the Charles Sturt University Human Research Ethics Committee.

Based on the guidelines in the National Statement on Ethical Conduct in Human Research the Committee has approved your research proposal.

You must report to the Committee at least annually, and as soon as possible in relation to the following:

- anything that might impact on the ethical acceptability of the project (including, but not limited to, adverse events, unexpected outcomes or additional information coming to light);
- amendments to the research design and/or any changes to the project (Committee approval required);
- extensions to the approval period (Committee approval required); and
- notification of project completion. If this research relates to a students thesis or dissertaiton a final report must be submitted at the point of submission for examination.

This approval constitutes ethical approval in relation to humans only. If your research involves the use of radiation, biochemical materials, chemicals or animals, separate approval is required by the appropriate University Committee.

Please contact the HREC Secretary on (02) 6933 4213 or ethics@csu.edu.au if you have any queries. Further information regarding human research ethics at CSU can be found at the HREC webpages https://research.csu.edu.au/ethics-and-compliance/human

The Committee wishes you well with your research.

Sincerely,

Presiding Officer,
Charles Sturt University Human Research Ethics Committee

APPENDIX B: CONSENT FORM

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795

Email: annabellaknight2003@gmail.com

CONSENT FORM

Managing bullying and harassment in the workplace: Coping mechanisms and management strategies used by paramedics

Researchers:

1. *Chief investigator – Student*
   Annabella Knight
   Bachelor of Paramedicine (Honours)
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   annabellaknight2003@gmail.com

2. *Primary Supervisor*
   Dr Judith Anderson
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   juanderson@csu.edu.au

3. *Co-Supervisor*
   Dr Graham Munro
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   gmunro@csu.edu.au

4. *Co-Supervisor*
   Dr Brian Sengstock
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   bsengstock@csu.edu.au

1. I agree to participate in the above research project and give my consent freely.
2. I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.
3. I consent to participating in a semi structured individual interview which will be audio and/or video recorded.
4. I understand that I am under no obligation to participate in this research project and that I can withdraw my participation up to two weeks post interview.
5. I understand that I may stop the interview at any time, and that unless I indicate otherwise any recordings will be erased. I also understand that I may refuse to answer any questions that I do not wish to answer.
6. I understand that the interview will take up to approximately one hour.
7. I have had the opportunity to have any questions I may have about the research answered to my satisfaction.
8. I consent that the data gained from this interview may be used in future projects.
9. I consent that other researcher may be able to cite this project if it were to be published.
10. I consent to the investigator/s contacting myself to arrange an interview and to forward a 1 page summary of the project findings upon completion of the project.
11. I understand that if I have any questions about the project, I can contact Annabella Knight via email at annabellaknight2003@gmail.com

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795

Email: annabellaknight2003@gmail.com

Print Name: _____

Contact phone: _____ or Email: _____

Signature: _____ Date: _____

Please return completed consent form to Annabella Knight via email to annabellaknight2003@gmail.com

Charles Sturt University's Human Research Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the HREC Secretary on (02) 6933 4213 or ethics@csu.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

APPENDIX C: INFORMATION SHEET

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795
Email: annabellaknight2003@gmail.com

PARTICIPANT INFORMATION SHEET

Managing bullying and harassment in the workplace: Coping mechanisms and management strategies used by paramedics.

Researchers:

1. *Chief Investigator – Student*
   Annabella Knight
   Bachelor of Paramedicine (Honours)
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   annabellaknight2003@gmail.com

2. *Primary Supervisor*
   Dr Judith Anderson
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   juanderson@csu.edu.au

3. *Co-Supervisor*
   Dr Graham Munro
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   gmunro@csu.edu.au

4. *Co-Supervisor*
   Dr Brian Sengstock
   School of Nursing, Paramedicine and Healthcare Sciences
   Charles Sturt University, Bathurst campus
   bsengstock@csu.edu.au

Invitation

You are invited to participate in a research study on identifying the impacts of workplace bullying and harassment amongst paramedics and how is it managed by paramedics. The study is being conducted by Annabella Knight, a Bachelor of Paramedicine (Honours) student from the School of Nursing, Paramedicine and Healthcare Sciences at the Charles Sturt University. This study will be supervised by Dr Judith Anderson, Dr Graham Munro, and Dr Brian Sengstock.

Before participating in this study, it is important to understand why the research is being done and what it will involve. Please read the following information carefully.

Purpose of this study

V2

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795

Email: annabellaknight2003@gmail.com

The purpose of this study is to identify impacts of workplace bullying and harassment, and some strategies used by paramedics to manage it. It will explore the strategies used to manage workplace bullying and harassment by paramedics and the impacts that workplace bullying and harassment have on paramedics. The data from this study will be utilised for the Chief Investigator's honours thesis and possibly future studies such as a PhD. This study may be presented at conferences and used to assist in future research.

Why have you been invited to participate in this study?

You have been invited to participate in this study because you are an Australian/Canadian paramedic, and you are the ideal candidate for this study.

What does this study involve?

If you consent to participate in this study, you will participate in an interview with a duration of approximately one hour. This interview will take place via virtual platforms to avoid any Covid-19, environmental, or travel concerns. During this interview, you will be asked questions based on an experience you may have had or your perception of workplace bullying and harassment.

The interview will be recorded and transcribed to assist in data analysis. The interview responses will be de-identified to allow for confidentiality.

Are there risks and benefits in participating in this study?

Taking part in this study allows you to support the analysis of workplace bullying and harassment among paramedics and how it is managed.

The risk of participating in this study is that discussing your experiences may trigger distressing feelings. Participation of this study is voluntary and if you believe this could be a concern, then you may wish to not participate. If you do wish to participate, you do not have to discuss any distressing experiences unless you choose to. The researchers acknowledge that this could occur and have provided a debrief statement with relevant support services that you can access if you wish to. If you show any signs of distress whilst in the interview, support will be provided and if you would like the interview to stop, it will be ceased. If you would like to continue, then you may do so. Participants are also able to stop the interview at any time if they wish to do so.

V2

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795

Email: annabellaknight2003@gmail.com

How is this study being funded?

There is no funding provided to support this study.

Will taking part of this study cost anything.

The interviews will be conducted over virtual platforms and will not incur any cost to you.

Can you participate then withdraw?

You may withdraw from this study and your data will be removed immediately. For this reason, data analysis will not begin until two weeks after the interview takes place. This is because once data analysis begins, the data will have been deidentified and you will no longer be able to withdraw it.

How will your confidentiality be protected?

The research team listed above will be the only people who have access to your details. These details will be secured on a password-protected computer. The data you provided in your interview will be transcribed then all your personal details and identifiable data will be deidentified. Participants will be assigned pseudonyms to ensure confidentiality is kept. If you are concerned that you may be identifiable, you do not have to share any personal information. If you have any further concerns, you may contact the above researchers for removal of any information or complete withdrawal of participation up until the point of data analysis which will be two weeks after the interview process.

If you do not withdraw, data will be stored securely as per Charles Sturt University's Research Data Management Policy. Data will be retained for at least 5 years on a secure online server. Only those listed on the research team will have access to this data for 5 years, and after this period, the data will be securely destroyed.

What should you do if you want to discuss this study further before participating.

V2

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795
Email: annabellaknight2003@gmail.com

If you have any questions or concerns, please contact the Chief Investigator, Annabella Knight via email at annabellaknight2003@gmail.com . Additionally, you can contact any of the above researchers.

Charles Sturt University's Human Research Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the HREC Secretary on (02) 6933 4213 or ethics@csu.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

Conclusion

Thank you for considering this invitation. This information sheet is for you to keep and refer to in the future.

Disclaimer: Please do not provide specific evidence of bullying that could identify someone or an employer. Please do not mention names. Please do not provide information that could incriminate yourself in any way.

V2

APPENDIX D: DEBRIEF STATEMENT (AUSTRALIA)

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795

Email: annabellaknight2003@gmail.com

DEBRIEF STATEMENT

Managing bullying and harassment in the workplace: Coping mechanisms and management strategies used by paramedics.

Participating in this study carries the risk that distressing thoughts may arise from discussing your experiences. Although the research questions are not designed or intended to cause distress or discomfort, the researchers acknowledge that such outcomes are possible. Should the interview have provoked any distressing thoughts, please refer to this debrief sheet which contains details of available support services.

In case of questions or further information, please contact one of the members of the research team (see information sheet for contact information).

Australian support services:

- Beyond Blue
  - 1300 224 636 (24 hours, 7 days)
  - https://www.beyondblue.org.au/
- The Black Dog Institute
  - https://www.blackdoginstitute.org.au/
- MensLine Australia
  - 1300 78 99 78 (24 hours, 7 days)
  - https://mensline.org.au/
- Phoenix Australia – Centre for Posttraumatic Mental Health
  - https://www.phoenixaustralia.org/
- Head to Health
  - https://headtohealth.gov.au/
- SANE Australia
  - https://www.sane.org/
- Your local General Practitioner

If urgent support is needed, phone Mental Health Line (1800 011 511) for information on 24-hour counselling services in your area or 000 for emergency.

Charles Sturt University's Human Research Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the HREC Secretary on (02) 6933 4213 or ethics@csu.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

APPENDIX E: DEBRIEF STATEMENT (CANADA)

FACULTY OF SCIENCE | Nursing, Paramedicine and Healthcare Sciences

Charles Sturt University

353 Panorama Avenue
Bathurst, NSW 2795

Email: annabellaknight2003@gmail.com

DEBRIEF STATEMENT

Managing bullying and harassment in the workplace: Coping mechanisms and management strategies used by paramedics

Participating in this study carries the risk that distressing thoughts may arise from discussing your experiences. Although the research questions are not designed or intended to cause distress or discomfort, the researchers acknowledge that such outcomes are possible. Should the interview have provoked any distressing thoughts, please refer to this debrief sheet which contains details of available support services.

In case of questions or further information, please contact one of the members of the research team (see information sheet for other contacts).

Canadian support services:

- Mental health Helpline (24/7)
  - 1-866-531-2600
- Talk Suicide Canada (24/7)
  - 1-833-456-4566
- Hope for Wellness Help Line (24/7, for First Nations, Inuit, and Metis Peoples)
  - 1-855-242-3310 or connect to the online Hope for Wellness chat at https://www.hopeforwellness.ca
- Regional Warm Line (from 6pm to 12am, 7 nights per week)
  - 1-866-856-9276
- Wellness Together Canada
  - 1-866-585-0445 or text WELLNESS to 741741
- Call your local family physician, psychologist, mental health nurse or social worker. You may also want to contact another trusted professional such as a counsellor or spiritual leader.

If urgent support is needed, phone 24-hour Crisis Line at 1-877-841-1101 for information on 24-hour counselling services or 911 for emergency.

Charles Sturt University's Human Research Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the HREC Secretary on (02) 6933 4213 or ethics@csu.edu.au. Any issues you raise will be treated in confidence and investigated fully, and you will be informed of the outcome.

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

RESEARCH REPORTS

VISUAL SEARCH WHILE AMBULANCE DRIVING: EFFECTS OF DRIVING CONTEXTS

Virginie Tutenuit, MSc[1]; Mathieu Tremblay, PhD*[2]; Jerome Range, MSc[2]; Martin Lavallière, PhD[2]

Author Affiliations: 1. Department of Health Sciences at Rimouski, Université du Québec (University of Quebec), Quebec, Canada; 2. Department of Health Sciences, Lab BioNR, and CISD at Chicoutimi, Université du Québec (University of Quebec), Quebec, Canada..

Recommended Citation: Tutenuit , V., Tremblay, M., Range, J., & Lavallière, M. (2025). Visual search while ambulance driving: Effects of driving contexts. *International Journal of Paramedicine*. (13). 47-62. https://doi.org/10.56068/ZUDP9682. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3419

Keywords: work-related collisions, driving simulator, first responders, visual search strategies, emergency driving, intervention, emergency medical services, EMS, paramedicine

Disclosures: The authors declare that they have no competing interests.

Funding: No external funding was used to support this work.

Received: June 17, 2025
Revised: August 25, 2025
Accepted: September 16, 2025
Published: January 13, 2026

**Corresponding Author:* mathieu_tremblay2@uqar.ca

ABSTRACT

This study aims to document the visual search of experienced ambulance drivers in different simulated driving task scenarios. The cohort consisted of 16 experienced paramedics (4 women and 12 men, aged 38 ± 8.3 years, 16 ± 9 years of experience). Each participant completed fifteen minutes of simulation driving tasks. Ten visual regions of interest and 12 driving situations, divided into three driving contexts (one non-urgent and two urgent), were selected. The findings suggested that the ambulance drivers' strategies were adaptive, assisting them in detecting potential hazards. It was observed that when the driving demands increase, experienced ambulance drivers had longer fixation times, more frequent scanning, and a greater variety of search patterns. The study also suggests that experienced ambulance drivers may employ similar visual search strategies to those used by other experienced drivers, as the literature shows. Tailored interventions should be developed to enhance this important skill.

Ambulance drivers are part of a group that can be defined as emergency vehicle drivers and are exposed to high risks of collisions due to secondary tasks such as speeding, necessary conversing, monitoring messages, violating normal driving rules under certain circumstances, and activating emergency equipment (Hsiao et al., 2018; Kun et al., 2015). An ambulance driver refers to the person who operates an ambulance, and this role is not limited to paramedics (e.g. EMT, firefighters). Ambulance drivers are also exposed to a higher risk of work-related collisions and road fatalities than the general population (Maguire et al., 2002) and other commercial or similarly sized vehicles (Delavary et al., 2023). For the past twenty years, several studies reviewed collisions involving ambulance vehicles (Custalow & Gravitz, 2004; Delavary et al., 2023; Delavaryforoutaghe & Lavallière, 2022; Maguire et al., 2002; Ray & Kupas, 2007; Sanddal et al., 2010; Watanabe et al., 2019). Unfortunately, there has been little progress in enhancing ambulance driving safety. Human factors continue to be the primary cause of ambulance collisions (e.g.

inadequate urgent driving training, lack of urgent driving experience, driver distraction) (Delavary et al., 2023). For many years, one important cause identified in the literature was the drivers' strategies of visual search (Chapman & Underwood, 1998; Crundall & Underwood, 1998; Mourant & Rockwell, 1972; Recarte & Nunes, 2003; Strayer & Johnston, 2001). It was documented that novice drivers, as well as high perception of hazards or high traffic density, and high level of cognitive workload or distraction, can lead to a reduction of visual scanning and a quicker fixation time (Chapman & Underwood, 1998; Crundall et al., 2003; Crundall & Underwood, 1998). Consequently, drivers cannot accurately detect or decode road information (e.g., interactions with other road users, road conditions, road signs) to adequately estimate collision risk (Mourant & Rockwell, 1972; Underwood, 2007). To our knowledge, no recent data is available on ambulance drivers' visual search patterns. Documenting these visual behaviors could be useful for improving ambulance driving safety through proper training interventions.

The aim of this study was to document the visual search of experienced ambulance drivers in different simulated driving task scenarios. More specifically, the visual search of the current study reported the average fixation time per region of interest (ROI) per driving situation, the average number of ROI changes per driving situation, the percentage of time spent per ROI in each situation, and the frequency of occurrence between each ROI per driving situation. It was expected that visual search would be more diverse and that horizontal scanning would be more important when approaching intersections or in areas with high traffic density compared to straight-line driving (Crundall & Underwood, 1998). It was also expected that changes would be observed when dispatchers called or when patients were being transported. Similarly to a study conducted by Crundall et al. (Crundall et al., 2003), where results showed an increase in fixation times in emergency and pursuit situations, it was expected that fixation times would be shorter and horizontal scanning would increase when patients were being transported.

METHODOLOGY

Study Design

This study employed a quasi-experimental design to evaluate visual search while experienced ambulance drivers drove an ambulance simulator through three simulated driving tasks: a non-urgent driving task and two urgent driving tasks (pre- and post-patient care intervention).

Participants

Recruitment emails were sent throughout the province of New Brunswick (Canada) with the cooperation of the Ambulance New Brunswick organization. Twenty-five paramedics volunteered for this project (n = 25). All experienced ambulance drivers recruited were paramedics. Among these paramedics, three left at the beginning of the data collection, three left after familiarization with the ambulance simulator due to simulation sickness and three were removed from the analysis due to equipment failure, resulting in data loss. Thus, a total of sixteen paramedics were considered in this study (n = 16). The cohort consisted of 4 women and 12 men, aged 38 ± 8.3 years (M ± SD), with 16 ± 9.0 years of paramedic experience. All paramedics took the day off before participating in the study to ensure they had a whole night's sleep.

Procedures

The assessment was conducted at the university's driving laboratory. Upon arrival, each participant was briefed on the data collection process, read an information letter, and signed a consent form approved by the university's research ethics board to participate in this study (approval number 1213-059). Afterward, all participants completed a demographic survey (sex, age, and years of experience). Before data collection began, participants were familiarized with the ambulance simulator through a 10-minute driving session, which allowed them to adapt to the simulated driving environment and controls. At this point, three participants prone to simulator sickness were excluded from the study (Mackrous et al., 2014).

Simulated Driving Tasks

The simulation driving tasks battery was developed in partnership with a paramedic instructor from New Brunswick ambulance services to ensure that the tasks were stressful and challenging. All participants underwent the same driving simulation. The simulation was divided into three sections. The first section was composed of 5 minutes of non-urgent driving (on a highway) followed by a second section consisting of 5 minutes of urgent driving to the location of a fictitious patient. Finally, the third section consisted of 5 minutes of urgent driving from the patient's location to the hospital. Simulated driving scenarios took place on clear days with full daylight and long-range visibility. The non-urgent driving occurred mostly on a highway with low traffic density (without potential risks of collisions). In contrast, both urgent driving scenarios were set in city environments with varying levels of traffic density, leading to an increased number of potentially conflicting situations with other road users. None of these scenarios required evasive maneuvers (e.g. hard braking, significant steering adjustments). Participants were guided through the driving simulations by a pre-recorded dispatcher's voice, which provided information along the route, whether heading to the scene or the hospital. Additionally, the dispatcher's voice delivered updates on the status of a fictitious patient. Since the call involved an unstable cardiac patient, urgent driving to the hospital (post-care) was accompanied by the added distraction and stress of a loud, irregular heartbeat noise from a cardiac monitor attached to a manikin. This protocol was fully detailed in a previous study (Tremblay et al., 2020;)

Apparatus

The driving simulations were conducted using a driving simulator (VS600M, Virage Simulation, Canada) with a virtual ambulance taking the form of a cube truck ambulance. The ambulance simulator consisted of a driver's seat, steering column, pedals, automatic transmission and a dashboard, all of which were mounted on a hydraulic three-axis motion/vibration platform that provides force feedback and vibration. Three 52' LCD displays provided a 180 front view with a 1920 X 1080-pixel resolution per display. Rear-view and side-view mirrors were simulated through these screens. It should be noted that the ambulance vehicle used in the simulation did not have a central rear-view mirror. One touchscreen (Elo Touchsystems 2700 Intellitouch USB) located to the driver's right provided additional control for the ambulance sirens. Two synchronized webcams (QuickCam Pro for notebook, Logitech, Switzerland) were installed on the driving simulator to record the 180 front view ('what the participant was seeing') and the partici-

pant's face (head, eye positions). The resolution and frequency of these video recordings were 640 X 360 pixels and 30 frames per second.

Visual Search while Driving

By analyzing the participants' head and eye positioning from the face video, it was possible to determine which regions of interest (ROI) they were focused on while watching and driving throughout the simulation (Lavallière et al., 2012). Ten ROIs were identified in the ambulance simulator. Nine ROIs were located within the driving environment of the participants (Figure 1), and one was identified as an 'indeterminate area' (IND), which was used when information was unavailable or impossible to extract.

The visual search analysis was done a posteriori. Throughout the driving scenario, 12 situations were selected and analyzed frame by frame to identify the start and end of each scenario, considering a specific distance for standardized evaluation between evaluations. Table 1 presents the 12 driving situations divided into three driving contexts (one non-urgent, two urgent ('en route', 'to the hospital')).

ANALYSIS

To report the visual search among experienced ambulance drivers in different driving situations, the current study compares:

- The average fixation time per ROI per driving situation.
- The average number of ROI changes per driving situation.
- The percentage of time spent per ROI in each situation.
- The frequency of occurrence of links between each ROI per driving situation.

Prior to conducting the inferential tests, a visual inspection of the frequency distribution histogram was performed, followed by the Shapiro-Wilk and Levene tests to evaluate normality and homogeneity of variance, respectively. This preliminary step confirmed the use of non-parametric tests throughout the analysis. Results were significant when

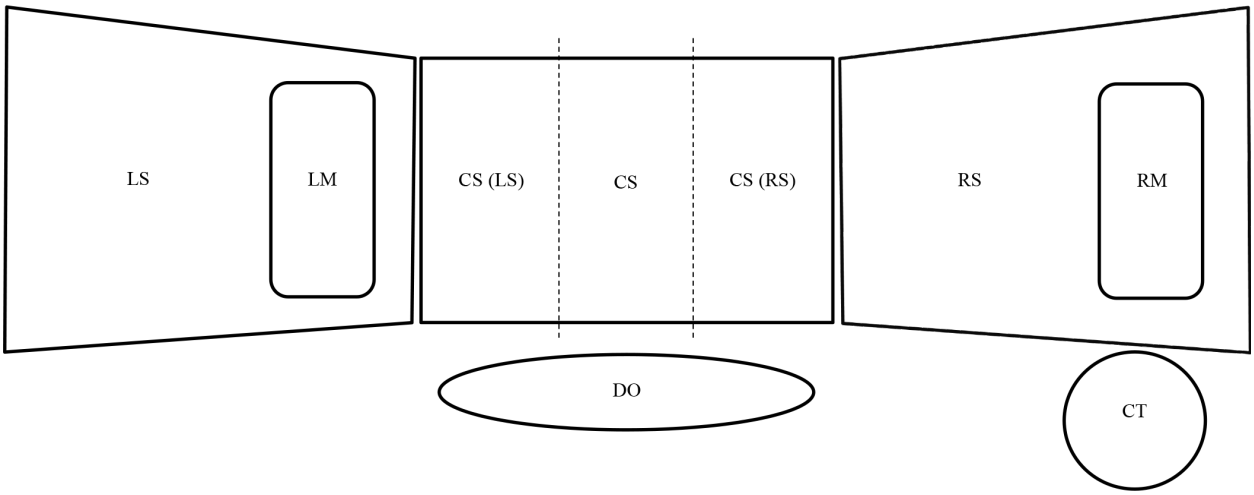


Figure 1. Scheme of the driving environment of the driving simulator divided into 9 regions of interest (ROI).

Note: LS: left screen, LM: left mirror, CS (RS): right section of central screen, CS: central screen, CS (LS): left section of central screen, RS: right screen, RM: right mirror, DO: area with the dashboard and the odometer, CT: command terminal (light and siren control).

the p was less than 0.05. Since Kruskal-Wallis tests could not be used due to missing data in some participants, this study proceeded with paired-wise Wilcoxon tests. Thus, Wilcoxon tests were performed on the first two objectives and chi-squared tests were performed on the third objective. More specifically, nine comparisons of interest were computed among the driving situations to compare similar situations as defined in Table 1:

- Straight line: 1 vs. 2, 1 vs. 8, 2 vs. 3, 2 vs. 8, 3 vs. 8.
- Pedestrian crossing: 4 vs. 12.
- Left and right turns: 5 vs. 10, 6 vs. 11.
- Red light: 7 vs. 9.

Driving situations		Context		
		Non-Urgent	Urgent	
#	Descriptions		'en route'	'to hospital'
1	Straight line without traffic	X		
2	Straight line without traffic		X	
3	Straight line with traffic		X	
4	Pedestrian crossing		X	
5	Left turn at an intersection		X	
6	Right turn at an intersection		X	
7	Red light at an intersection		X	
8	Straight line without traffic			X
9	Red light at an intersection			X
10	Left turn at an intersection			X
11	Right turn at an intersection			X
12	Pedestrian crossing			X

Table 1. Driving situations organized by context.

For the fourth objective, similarly to Olsen et al. (Olsen et al., 2005), a calculation of the occurrence frequency of the link between ROI was carried out for driving situations that were significantly different in the number of ROI changes. Missing data were due to malfunctions with video or simulator equipment; thus, some participants' video segments could not be used. The number of missing data per participant and per driving situation is provided in Appendices A1 and A2. Data were processed and computed with MS Excel version 16 and SPSS version 26.0.

RESULTS

Average Fixation Time per ROI per Driving Situation and Average Number of ROI Changes per Driving Situation

The duration of gaze on the ROI varies according to the driving situation and the driving context (see Table 2 and Appendix A for more details). There were several differences in straight-line driving situations (refer to Table 1 for a detailed description). In fact, there were three ROIs with notable differences between the straight line without traffic before (non-urgent) versus after dispatcher call ('en route') (LM, CS (LS) and DO). Also, four ROIs had notable differences between the straight line without traffic non-urgent context and the straight line without traffic 'to hospital' context (LM, CS(LS), DO and CT). Some differences were observed in gaze towards the central screen and the left side of the central screen between the two driving situations when approaching a crosswalk (CS (LS) and CS). The ROI with the most differences between driving situations were the left section of the central display. Three significant differences appear with a median fixation time value of 0.00 because the difference between them is in their third quartile (see Appendix A for more details). Table 3 shows that the average number of ROI changes per driving situation was significantly different only between the two left-turn situations and the two right-turn situations (see Appendix B for more details).

ROI	Straight Line					Pedestrian	Turns		Red Light
	1 vs 2	1 vs 8	2 vs 3	2 vs 8	3 vs 8	4 vs 12	5 vs 10	6 vs 11	7 vs 9
LS	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00
LM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CS (LS)	0.00	0.18	0.00	0.175	0.18	0.43	0.04	0.41	-0.28
CS	0.18	-0.66	-0.99	-0.84	0.16	0.59	-0.33	-0.13	0.04
CS (RS)	0.00	0.17	0.08	0.17	0.08	-0.16	-0.05	0.02	0.09
RS	0.00	0.00	0.00	0.00	0.00	-0.23	-0.27	-0.99	0.11
RM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DO	-0.48	-0.47	0.00	0.017	0.02	0.00	0.00	0.00	0.00
CT	0.00	0.24	0.00	0.24	0.24	0.00	0.00	0.00	0.00
IND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 2. Median fixation time differences (in seconds) between driving situations related to ten regions of interest (ROI).

Note: Values are presented in the difference of median (in seconds). Grey shade values indicate significant differences ($p < 0.050$). CS: central screen, CS(LS): left section of central screen, CS(RS): right section of central screen, CT: command terminal (light and siren control), DO: area with the dashboard and the odometer, IND: indeterminate, LM: left mirror, LS: left screen, RM: right mirror, RS: right screen

Straight Line					Pedestrian	Turns		Red Light
1 vs 2	1 vs 8	2 vs 3	2 vs 8	3 vs 8	4 vs 12	5 vs 10	6 vs 11	7 vs 9
0	2	0	2	0	1	12	4.5	3.5

Table 3. Comparison of the average number of regions of interest (ROIs) that change per driving situation

Percentage of Time Spent per ROI per Driving Situation

The proportion of time allocated to each ROI varied according to the driving situation (Figure 2). Significant differences in these proportions were obtained in three comparisons:

1. The difference between the two pedestrian crossing driving situation:. The main differences were between the central screen and the left section of the central screen, which was viewed more in the 'to hospital' context and the right section of the central screen and the right screen, which was viewed more in 'en route' context.
2. The difference between straight-line driving situations without traffic in non-urgent context and straight-line driving situations without traffic in 'to hospital' context: The main differences were between the dashboard mainly observed in straight-line driving without traffic in non-urgent context and the right section of the central screen and the command terminal more observed in the driving section without traffic in 'to hospital' context.
3. The difference between straight-line driving situations with traffic in 'en route' context and straight-line driving situations without traffic in 'en route' context: Most of the differences were between the central screen and the dashboard, which were viewed more in straight-line driving without traffic, and the right section of the central screen, which was viewed more in straight-line driving with traffic.

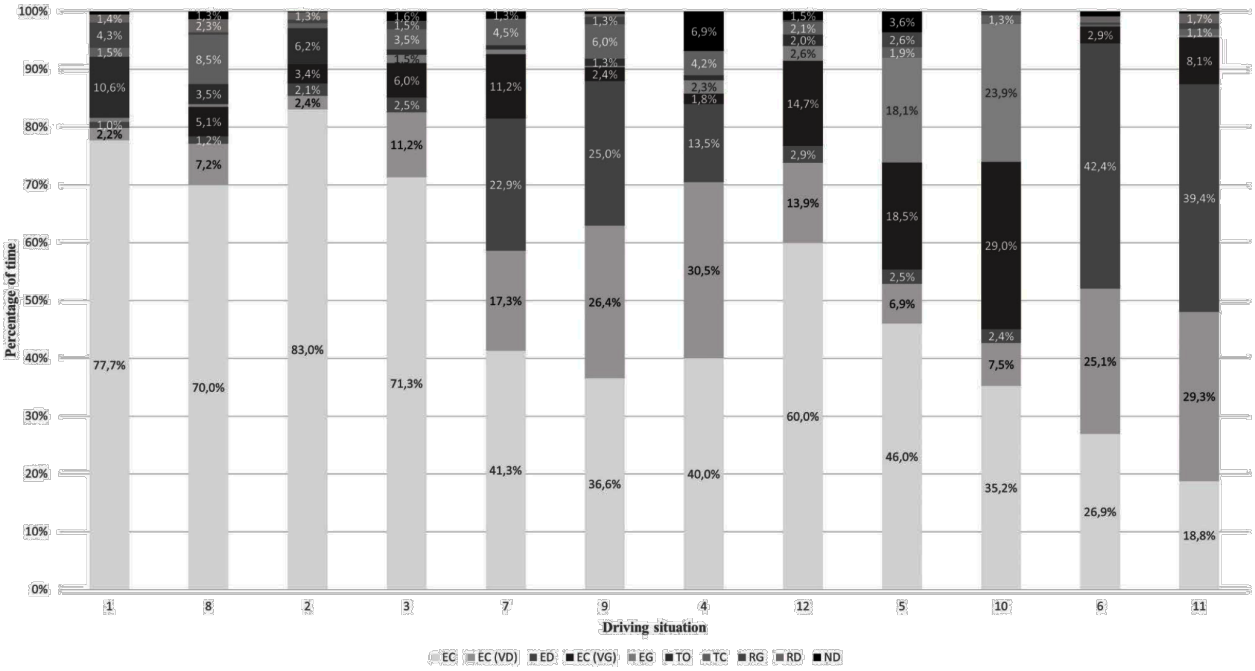


Figure 2. Percentage of time spent by ROI per driving situation.

Note: CS: central screen, CS(LS): left section of central screen, CS(RS): right section of central screen, CT: command terminal (light and siren control), DO: area with the dashboard and the odometer, IND: indeterminate, LM: left mirror, LS: left screen, RM: right mirror, RS: right screen. Values below 1% are not displayed on the figure.

Frequency of Occurrence of Links Between ROI per Driving Situation

Some links between ROI were specific to certain driving situations (see Figure 3). For example, return trips between the central and right screens were observed in both driving situations after patient recovery ('to hospital'), but not in both situations before patient recovery ('en route'). Certain links were also stronger in some contexts than in others. When comparing both left turns driving situations, we observed a link transfer when switching from driving 'en route' to driving 'to hospital' (such as the existing links between the central screen and the right screen) to new links such as the right screen to the left screen or the left screen to the dashboard. Additionally, when comparing two driving situations during a right-hand turn, it was noticed that some links present in 'en route' context disappear in favor of new links in 'to hospital' context. In both cases, the number of links increased between driving situations (three more between left turns and seven more between right turns). It is worth noting that the most significant number of links were found on the side where the driver was about to turn.

DISCUSSION

The aim of this research was to document experienced ambulance drivers' visual search in different driving situations on an ambulance simulator, and to study whether there was a difference in visual search according to work contexts (non-urgent vs. urgent). The results show that differences do exist between driving situations and that the contexts also influence visual search parameters. Overall, 13 significant differences were identified in average fixation time per region of interest across various driving situations. Nine of these differences concern straight-line driving situations. In these, fixation times

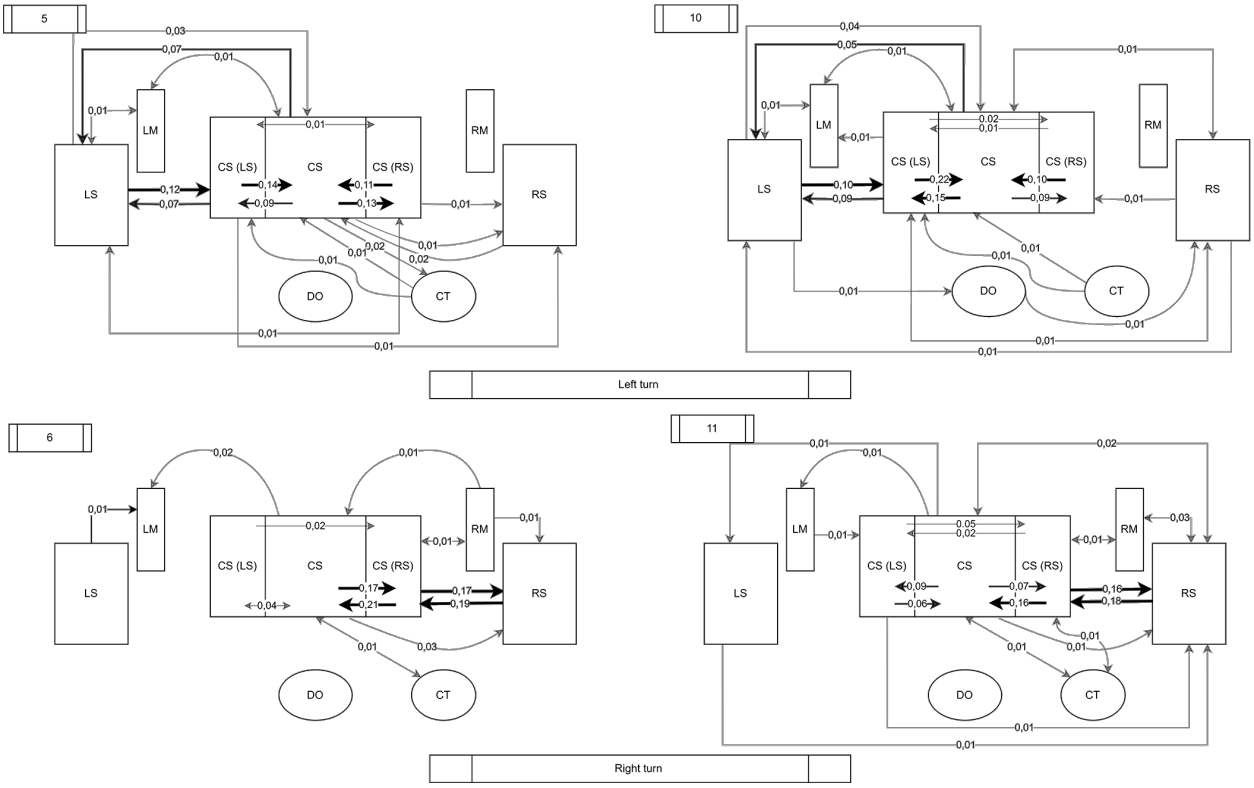


Figure 3. Frequency of linkage between ROIs as a function of driving situation.

Note. LS: left screen, LM: left mirror, CS(RS): right section of central screen, CS: central screen, CS(LS): left section of central screen, RS: right screen, RM: right mirror, DO: area with the dashboard and the odometer, CT: command terminal (light and siren control), IND: indeterminate (the link with indeterminate area doesn't appear).

decreased when the ambulance driver received the dispatcher's call ('en route') compared with before the call was received (two longer fixation times in the non-emergency situation compared to one longer fixation time in the 'en route' situation.), then increased when the ambulance drivers crossed a densely trafficked area (a longer fixation time in the presence of traffic) and remained higher when the patient had been recovered (a longer fixation time when driving 'to hospital'). Fixation times were similar for the 'en route' straight-line driving situation with traffic and the 'to hospital' straight-line driving situation without traffic. Of the five significant differences found in fixation time between situations in 'en route' and 'to hospital' contexts, three showed longer fixation times in 'to hospital' contexts. These results align with those of Crundall et al. (Crundall et al., 2003) and support our hypothesis, indicating that in emergency situations, all drivers presented longer fixation times compared to control situations (non-urgent) in an ambulance simulator. Horizontal scanning increased in 'to hospital' left- and right-turn situations compared with 'en route' situations. Indeed, an increase in the number of links and the creation of new links between ROI were also measured in these situations (Figure 3). These results also highlight that even in an urgent mode of driving.

In straight-line situations, the left-hand mirror and the dashboard/odometer were looked at the longest, in proportion of time (Figure 2), in the situation before the dispatcher is called. The right-hand mirrors and the control panel were most frequently used in the 'to hospital' context. Furthermore, the central screen was viewed at the highest percentage

in the 'en route' situation without traffic, while the right and left screens and the right and left sections of the central screen were viewed more when traffic was present. This indicates that when traffic is present, the time spent in peripheral areas increases, suggesting a search strategy with more scanning in these zones but a longer fixation time (Table 2) to detect potential hazards, as expected and demonstrated by Robinson et al. (Robinson et al., 1972). Regardless of the straight-line driving situation, the central screen zones (EC, EC (VG), and EC (VD)) remained the most viewed zones, although the percentage of time allocated to them varied.

Olsen et al. (Olsen et al., 2005) showed that in a straight-line on-road driving situation (highway context), participants mainly viewed straight ahead (85.9% of the time) and spent the remaining time scanning the area containing the odometer and dashboard (4% of the time). In comparison to this study, while the time spent viewing straight ahead (84.8% of the time) was relatively similar, the time spent scanning the odometer and dashboard in the pre-dispatcher driving situation was higher (14.9% of the time). This time difference may be explained by the fact that the ambulance drivers spent less time looking at the central screen and perhaps they had a poorer appreciation of their speed on the simulator, despite the pre-simulation adaptation period. Also, in the study by Olsen et al., the left rear-view mirror and the left window were slightly looked at, with 2.1% and 1.5% of the time spent looking at them, respectively, whereas these areas represented 7% and 1.4% of the time among ambulance drivers, respectively. The right-hand mirror and right-hand screen were scanned 2.7% and 1.9% of the time for ambulance drivers, respectively, compared with 0.24% and 0.06% of the time for the Olsen et al. (2005) study sample, respectively. Finally, this Olsen et al., showed that participants spent 4.7% of their time looking at their rear-view mirror. Compared to the current study, it can be hypothesized that the distribution of attention is different for ambulance drivers. Since they do not have a rear-view mirror, the drivers must rely on their side mirrors to stay aware of the situation behind them. This situation becomes even more complex considering the blind spots that exist in comparison to a standard-sized vehicle.

The differences in the number of ROI changes between left-turn and right-turn driving situations were significant ($p = 0.007$ and $p = 0.025$, respectively). For left-turn situations, the number of ROI changes is higher in the 'en route' context. However, the number of links between ROI is higher in the 'to hospital' driving situation (Figure 3). This rise may indicate an increase in the diversity of visual search patterns, despite the time spent on each ROI not being significantly different (Figure 2). In the case of right-turn situations, the number of changes is higher in the 'to hospital' context. In addition, after patient recovery, ambulance drivers make new links between ROI (Figure 3). In the case of left-turn situations, the links between the central screen and the control panel and between the central screen and the right-hand mirror disappear once the patient has recovered ('to hospital') (Figure 3). During left turns, ambulance drivers of the current study showed a higher percentage of time looking at the left and right sections of the screens than drivers aged 25 to 55 with at least 10 years of driving experience (Romoser et al., 2013). Indeed, they passed 39.2% of their time to watch left sections of the screen (LS, LM and EC (LS)) and 9.4% of their time to watch right sections of the screen (RS, RM and EC (RS)) comparatively to 30.5% and 7.7% Respectively for drivers in Romoser et al.'s study. This indicates that ambulance drivers had a greater scan of peripheral areas, providing them with a stronger sense of scanning hazardous areas outside their intended path of

travel than the general public. During right turns, in comparison to a study with drivers of all ages (18 to 80 years old) (Bao & Boyle, 2009) that were found to scan the left-hand section of the road was looked at for 35% of the time and the right-hand section for only 1% of the time, compared with less than 1% of the time for our ambulance drivers and over 42% of the time respectively. These differences can be explained by the fact that the two right turns are not identical. In the Bao and Boyle (2009) study, drivers turned right at a stop sign in a cross intersection, whereas in our study, ambulance drivers turned right at an intersection without a stop sign, in an intersection with only one street on the right (t-shape intersection).

Practical Implications

This study is the first of its kind to investigate visual search patterns in ambulance drivers while they are driving. Our observations indicate that experienced ambulance drivers adapt their visual search strategies in proportion to the driving demands. Among our cohort of experienced paramedics, we noted longer fixation times, more frequent visual scanning, and a greater variety of visual search patterns while driving in more demanding contexts, suggesting adaptive strategies related to the detection of potential hazards around the vehicle. The findings from our cohort are consistent with previous research, indicating that novice ambulance drivers should perform similarly to other novice drivers and can also be effectively trained. By using an ambulance simulator for training novice drivers, for instance, we ensured consistency, comparability and safety between scenarios used. Based on results from experienced drivers, it is reasonable to assume that optimal visual search patterns and strategies can be taught and practiced within a simulator.

Although the impact of the ambulance simulator on drivers remains largely unexplored, a recent study conducted in Germany found no negative training effects and some positive outcomes, particularly a reduction in speed that did not adversely affect driving times to operational sites (Prohn & Herbig, 2020). Given the cognitive load and occupational stress related to ambulance driving tasks, assessing and training in managing this cognitive load and stress could help mitigate their negative effects (Malone et al., 2024). For example, police officers who can often be compared to ambulance drivers due to stress, workloads, fatigue, and declining professional well-being (Bevan et al., 2022; Zimmerman, 2012), can undergo either standard or advanced driver training, depending on their position (Dorn, 2005). Advanced training for police officers encompasses all the elements of standard training, supplemented by practical training in high-speed driving techniques to achieve a high level of general proficiency. Additionally, advanced training places greater emphasis on hazard awareness and maintaining visual contact with the target vehicle, while sharpening observation skills to anticipate potential dangers. Advanced training for police officers enables them to make more confident decisions about speed than drivers with standard training (Dorn, 2005). Standard-trained drivers tend to overestimate their abilities and rate their chances of being involved in a collision lower than drivers with advanced training, while standard drivers are more at risk of being involved in a collision than experienced drivers (Dorn, 2005). For this reason, advanced training for experienced drivers should perhaps be extended to all emergency drivers. According to recommendations based on the needs of police forces (Tiesman & Heick, 2014), it would be beneficial to offer more regular training in the use of ambulance driving. Video or simulator-based training could already help improve ambulance drivers'

driving skills (Horswill et al., 2013). If this training were repeated over time with ambulance drivers, it would be expected to provide feedback on errors and improvements made by participants over time (Hua et al., 2016).

Future Research

Further studies are necessary to understand better the visual search and detection of road elements, particularly in comparing and documenting the peripheral vision of ambulance drivers across different situations and driving contexts. It would also be valuable to repeat these measurements with other first responders to determine if they share common visual search strategies, as well as whether these strategies are related to driving performance and safety issues. Additionally, there is an opportunity to utilize an oculometric system to lessen the workload associated with image-by-image analysis. It may be beneficial to explore potential enhancements to ambulance driving aids to improve visibility.

Study Limitations

The study involved a small sample size, and it would have been preferable to include a larger representation, particularly among a broader spectrum of driving experience (in terms of years (novice vs. experienced), as well as urban, suburban, and rural settings), as well as EMTs and firefighter drivers, to enhance the generalizability of the results. The authors exercise caution in making broad claims based on these findings, emphasizing that further research is necessary to validate these observations.

While simulations enable us to repeat and control driving conditions, it would also be beneficial to compare and confirm our results with a field study. Additionally, the simulation used was the same scenario for all participants, which introduces the possibility of bias from that protocol.

Manual extraction was conducted without validation by the oculometry system. However, this process followed the established best practices and recommendations for this type of protocol and data. The extraction was carried out meticulously by a research assistant under the supervision of experienced researchers. The authors acknowledge the potential risk of false-positive or false-negative errors occurring during this process.

CONCLUSION

The current study focused on documenting the visual search patterns of experienced ambulance drivers in relation to their work context and driving situations. The findings indicate that experienced ambulance drivers adjust their visual search strategies in response to driving demands. Specifically, when driving demand increases, drivers exhibit longer fixation times, more frequent scanning, and a greater variety of search patterns. It was suggested that these visual search strategies were adaptive and helped the driver detect potential hazards. The study also suggests that experienced ambulance drivers may use similar visual search strategies to those used by other experienced drivers, as demonstrated in the literature. These strategies can be enhanced through training, particularly by utilizing ambulance simulators that replicate urgent driving scenarios, thereby minimizing risks for ambulance drivers and other road users.

REFERENCES

Bao, S., & Boyle, L. N. (2009). Age-related differences in visual scanning at median-divided highway intersections in rural areas. *Accident Analysis & Prevention, 41*(1), 146-152. https://doi.org/10.1016/j.aap.2008.10.007

Bevan, M. P., Priest, S. J., Plume, R. C., & Wilson, E. E. (2022). Emergency First Responders and Professional Wellbeing: A Qualitative Systematic Review. *International Journal of Environmental Research and Public Health, 19*(22), 14649. https://doi.org/10.3390/ijerph192214649

Chapman, P. R., & Underwood, G. (1998). Visual search of driving situations: danger and experience. *Perception, 27*(8), 951-964. https://doi.org/10.1068/p270951

Crundall, D., Chapman, P., Phelps, N., & Underwood, G. (2003). Eye movements and hazard perception in police pursuit and emergency response driving. *Journal of Experimental Psychology: Applied, 9*(3), 163-174. https://doi.org/10.1037/1076-898x.9.3.163

Crundall, D. E., & Underwood, G. (1998). Effects of experience and processing demands on visual information acquisition in drivers. *Ergonomics, 41*(4), 448-458. https://doi.org/10.1080/001401398186937

Custalow, C. B., & Gravitz, C. S. (2004). Emergency medical vehicle collisions and potential for preventive intervention. *Prehospital Emergency Care, 8*(2), 175-184. https://doi.org/10.1016/s1090-3127(03)00279-x

Delavary, M., Ghayeninezhad, Z., & Lavallière, M. (2023). Prevalence and Characteristics of Ambulance Collisions, a Systematic Literature Review. *Safety, 9*(2), 24. https://www.mdpi.com/2313-576X/9/2/24

Delavaryforoutaghe, M., & Lavallière, M. (2022). *Characteristics of paramedics' collisions for the Quebec province CARSP Conference 2022 Collaborating on the United Nations' (UN) Decade of Action for Road Safety*, sudbury, Ontario.

Dorn, L. (2005). Professional driver training and driver stress: Effects on simulated driving performance. *Traffic and Transport Psychology*.

Horswill, M. S., Taylor, K., Newnam, S., Wetton, M., & Hill, A. (2013). Even highly experienced drivers benefit from a brief hazard perception training intervention. *Accident Analysis & Prevention, 52*, 100-110. https://doi.org/10.1016/j.aap.2012.12.014

Hsiao, H., Chang, J., & Simeonov, P. (2018). Preventing Emergency Vehicle Crashes: Status and Challenges of Human Factors Issues. Human Factors: *The Journal of the Human Factors and Ergonomics Society, 60*(7), 1048-1072. https://doi.org/10.1177/0018720818786132

Hua, A., Williams, H., Nordin, N., & Haire, K. (2016). Simulation Training in the Intensive Care Unit. *Key Topics in Management of the Critically Ill*, 1-11. https://doi.org/10.1016/j.chest.2019.07.011

Jeong, E., & Oh, C. (2017). Evaluating the effectiveness of active vehicle safety systems. *Accident Analysis & Prevention, 100*, 85-96. https://doi.org/10.1016/j.aap.2017.01.015

Kun, A. L., Wachtel, J., Miller, W. T., Son, P., & Lavallière, M. (2015). User interfaces for first responder vehicles: views from practitioners, industry, and academia *Proceedings of the 7th International Conference on Automotive User Interfaces and Interactive Vehicular Applications*, Nottingham, United Kingdom. https://doi.org/10.1145/2799250.2799289

Lavallière, M., & Bellavance, F. (2020). *Perceptions et attitudes face à la conduite automobile dans un contexte de travail chez les policiers et fonction et les aspirants policiers*. https://www.irsst.qc.ca/publications-et-outils/publication/i/101070/n/perceptions-etattitudes-face-a-la-conduite-automobile-dans-un-contexte-de-travail-chez-les-policiers-en-fonction-et-les-aspirants-policiers

Lavallière, M., Simoneau, M., Tremblay, M., Laurendeau, D., & Teasdale, N. (2012). Active training and driving-specific feedback improve older drivers' visual search prior to lane changes. *BMC Geriatrics, 12*, 5. https://doi.org/10.1186/1471-2318-12-5

Mackrous, I., Lavallière, M., & Teasdale, N. (2014). Adaptation to simulator sickness in older drivers following multiple sessions in a driving simulator. *Gerontechnology, 12*(2). https://doi.org/10.4017/gt.2013.12.2.004.00

Maguire, B. J., Hunting, K. L., Smith, G. S., & Levick, N. R. (2002). Occupational fatalities in emergency medical services: A hidden crisis. *Annals of Emergency Medicine, 40*(6), 625-632. https://doi.org/10.1067/mem.2002.128681

Malone, D. F., Sims, A., Irwin, C., Wishart, D., MacQuarrie, A., Bell, A., & Stainer, M. J. (2024). Lights, Sirens, and Load: Anticipatory emergency medical treatment planning causes cognitive load during emergency response driving among paramedicine students. *Accident Analysis & Prevention, 204*, 107646. https://doi.org/10.1016/j.aap.2024.107646

Mourant, R. R., & Rockwell, T. H. (1972). Strategies of Visual Search by Novice and Experienced Drivers. Human Factors: *The Journal of the Human Factors and Ergonomics Society, 14*(4), 325-335. https://doi.org/10.1177/001872087201400405

Olsen, E. C. B., Lee, S. E., & Wierwille, W. W. (2005). Eye Glance Behavior during Lane Changes and Straight-Ahead Driving. *Transportation Research Record, 1937*(1), 44-50. https://doi.org/10.1177/0361198105193700107

Prohn, M. J., & Herbig, B. (2020). Evaluating the effects of a simulator-based training on knowledge, attitudes and driving profiles of German ambulance drivers. *Accident Analysis & Prevention, 138*, 105466. https://doi.org/10.1016/j.aap.2020.105466

Range, J., Delavary, M., Ghayeninezhad, Z., Castellucci, H. I., Tremblay, M., Lavallière, M. . (2018). Autonomous vehicles and Active Safety Systems: Implications for First Responder Vehicles. *CARSP Conference 2024*, Ottawa, Ontario.

Ray, A. M., & Kupas, D. F. (2007). Comparison of rural andurban ambulance crashes in Pennsylvania. *Prehospital emergency care, 11*(4), 416-420. https://doi.org/10.1080/10903120701536966

Recarte, M. A., & Nunes, L. M. (2003). Mental workload while driving: Effects on visual search, discrimination, and decision making. *Journal of Experimental Psychology: Applied, 9*(2), 119-137. https://doi.org/10.1037/1076-898x.9.2.119

Robinson, G. H., Erickson, D. J., Thurston, G. L., & Clark, R. L. (1972). Visual Search by Automobile Drivers. *Human Factors, 14*(4), 315-323. https://doi.org/10.1177/001872087201400404

Romoser, M. R. E., Pollatsek, A., Fisher, D. L., & Williams, C. C. (2013). Comparing the glance patterns of older versus younger experienced drivers: Scanning for hazards while approaching and entering the intersection. *Transportation Research Part F: Traffic Psychology and Behaviour, 16*, 104-116. https://doi.org/10.1016/j.trf.2012.08.004

Sanddal, T. L., Sanddal, N. D., Ward, N., & Stanley, L. (2010). Ambulance Crash Characteristics in the US Defined by the Popular Press: A Retrospective Analysis. *Emergency Medicine International, 2010*, 1-7. https://doi.org/10.1155/2010/525979

Strayer, D. L., & Johnston, W. A. (2001). Driven to Distraction: Dual-Task Studies of Simulated Driving and Conversing on a Cellular Telephone. *Psychological Science, 12*(6), 462-466. https://doi.org/10.1111/1467-9280.00386

Tiesman, H. M., & Heick, R. J. (2014). *Law enforcement officer motor vehicle safety: findings from a statewide survey.* [Report; Public Safety Canada, National Institute for Occupational Safety and Health]. https://www.publicsafety.gc.ca/lbrr/archives/cnmcs-plcng/cn36060-eng.pdf

Tremblay, M. (2020). *Exploring paramedic health status and simulated occupational performance* [Doctoral dissertation, University of New Brunswick]. https://unbscholar.lib.unb.ca/items/9b188f74-074b-4346-ad4b-b4322cc6b834

Tremblay, M., Albert, W. J., Fischer, S. L., Beairsto, E., & Johnson, M. J. (2020). Physiological responses during paramedics' simulated driving tasks. *Work, 66*, 445-460. https://doi.org/10.3233/WOR-203184

Underwood, G. (2007). Visual attention and the transition from novice to advanced driver. *Ergonomics, 50*(8), 1235-1249. https://doi.org/10.1080/00140130701318707

Watanabe, B. L., Patterson, G. S., Kempema, J. M., Magallanes, O., & Brown, L. H. (2019). Is Use of Warning Lights and Sirens Associated With Increased Risk of Ambulance Crashes? A Contemporary Analysis Using National EMS Information System (NEMSIS) Data. *Annals of Emergency Medicine, 74*(1), 101-109. https://doi.org/10.1016/j.annemergmed.2018.09.032

Zahabi, M., & Kaber, D. (2018). Identification of task demands and usability issues in police use of mobile computing terminals. *Appl Ergon, 66*, 161-171. https://doi.org/10.1016/j.apergo.2017.08.013

Zahabi, M., Nasr, V., Mohammed Abdul Razak, A., Patranella, B., McCanless, L., & Maredia, A. (2023). Effect of Secondary Tasks on Police Officer Cognitive Workload and Performance Under Normal and Pursuit Driving Situations. *Hum Factors, 65*(5), 809-822. https://doi.org/10.1177/00187208211010956

Zahabi, M., Pankok, C., Jr., & Park, J. (2020). Human factors in police mobile computer terminals: A systematic review and survey of recent literature, guideline formulation, and future research directions. *Appl Ergon, 84*, 103041. https://doi.org/10.1016/j.apergo.2019.103041

Zimmerman, F. H. (2012). Cardiovascular disease and risk factors in law enforcement personnel: a comprehensive review. *Cardiol Rev, 20*(4), 159-166. https://doi.org/10.1097/CRD.0b013e318248d631

APPENDIX A

Complementary data from average fixation time (in seconds) by driving situations related regions of interest (ROIs)

ROI	Percentile (th)	Driving Situations											
		1	2	3	4	5	6	7	8	9	10	11	12
n		16	16	14	15	15	16	16	14	14	14	14	11
Missing Value		0	0	2	1	1	0	0	2	2	2	2	5
LS	25	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.54	0.00	0.00
	50	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00	0.00	1.05	0.00	0.00
	75	0.00	0.00	0.08	0.20	0.87	0.00	0.00	0.00	0.00	2.10	0.00	0.30
LM	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	75	0.45	0.00	0.00	0.00	0.30	0.00	0.00	0.00	0.35	0.03	0.00	0.00
CS (LS)	25	0.00	0.00	0.00	0.00	0.35	0.00	0.18	0.00	0.00	0.39	0.15	0.21
	50	0.00	0.00	0.00	0.00	0.49	0.00	0.37	0.18	0.08	0.54	0.41	0.43
	75	0.00	0.37	0.28	0.13	0.67	0.33	0.49	0.34	0.32	0.62	0.55	1.00
CS	25	0.84	1.06	0.79	0.33	0.61	0.47	0.45	0.89	0.37	0.41	0.34	0.67
	50	1.68	1.85	0.86	0.42	0.91	0.58	0.52	1.02	0.56	0.58	0.45	1.01
	75	2.25	2.33	2.19	0.64	1.24	0.79	0.65	1.30	0.72	0.78	0.71	1.46
CS (RS)	25	0.00	0.00	0.00	0.37	0.23	0.43	0.22	0.00	0.29	0.00	0.37	0.15
	50	0.00	0.00	0.08	0.48	0.30	0.53	0.33	0.17	0.42	0.25	0.55	0.32
	75	0.05	0.17	0.54	0.82	0.38	0.67	0.40	0.42	0.97	0.36	0.74	0.49
RS	25	0.00	0.00	0.00	0.22	0.00	1.15	0.26	0.00	0.56	0.00	0.75	0.00
	50	0.00	0.00	0.00	0.33	0.22	2.18	0.69	0.00	0.80	0.00	1.19	0.10
	75	0.00	0.03	0.07	0.42	0.50	2.57	0.88	0.00	0.99	0.11	1.52	0.30
RM	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.20	0.00
DO	25	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
	75	0.56	0.43	0.00	0.00	0.00	0.00	0.00	0.37	0.15	0.00	0.00	0.30
CT	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00
	75	0.00	0.00	0.18	0.00	0.30	0.00	0.53	0.65	0.58	0.00	0.00	0.00
IND	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	75	0.00	0.00	0.05	0.17	0.07	0.00	0.13	0.03	0.00	0.00	0.00	0.10

Note: CS: central screen, CS(LS): left section of central screen, CS(RS): right section of central screen, CT: command terminal (light and siren control), DO: area with the dashboard and the odometer, LM: left mirror, LS: left screen, RM: right mirror, RS: right screen.

APPENDIX B

Complementarity data from the average number of regions of interest changes related to regions of interest (ROIs)

Percentile (th)	Driving Situations											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
n	16	16	14	15	15	16	16	14	14	14	14	11
Missing Value	0	0	2	1	1	0	0	2	2	2	2	5
25	3.25	3.00	4.00	7.00	13.00	7.00	9.00	4.75	*7.75*	*9.00*	*8.00*	*7.00*
50	4.50	4.50	6.50	10.00	23.00	7.00	13.00	6.50	*16.50*	*11.00*	*11.50*	*11.00*
75	7.00	6.50	8.00	12.00	25.00	10.00	18.75	9.25	*20.75*	*16.00*	*14.00*	*13.00*

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

RESEARCH REPORTS

PERCEIVED BARRIERS TO PARTICIPATION IN EMERGENCY MEDICAL SERVICES RESEARCH

Emily L. Larson, MD*[1]; Kelly Jiang, MS[1]; Ruben Troncoso Jr., MD, MPH[1]; Eric Garfinkel, DO[1]; Asa Margolis, DO, MPH, MS[1]

Author Affiliations: 1. School of Medicine, Department of Emergency Medicine, Johns Hopkins University, Baltimore, MD, USA.

Recommended Citation: Larson, E., Jiang, K., Troncoso, R., Garfinkel, E., & Margolis, A. (2026). Perceived barriers to participation in emergency medical services research. *International Journal of Paramedicine*. (13). 63-70. https://doi.org/10.56068/JCHL2384. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3435

Keywords: research, barriers, collegiate EMS, education, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: No external funding supported this project.

Acknowledgment: The authors would like to acknowledge the National Collegiate Emergency Medical Services Foundation (NCEMSF) for their support in the distribution of the survey.

Received: June 20, 2025
Revised: October 27, 2025
Accepted: November 3, 2025
Published: January 13, 2026

**Corresponding Author:* elarso16@jhmi.edu

ABSTRACT

Background: Research is essential to guide evidence-based practice in emergency medical services (EMS), but the barriers to performing EMS research remain poorly characterized. Therefore, this study aimed to identify barriers to EMS research participation using a survey of collegiate EMS affiliates.

Materials and Methods: The mixed methods cross-sectional survey was distributed virtually through the National Collegiate Emergency Medical Services Foundation's social media. Questions were multiple choice and free-text and asked about participants' training background, demographics, and perspectives on EMS research. Results were stratified by respondents' prior EMS research experience and compared via a Chi-Square test.

Results: Seventy responses were included. Mean age was 32±12 years. The population was predominantly male (60.9%) and white (86.8%). Educational levels and professional certifications were most commonly bachelor's degrees (56.5%) and EMT (38.6%), respectively. Thirty (43.5%) participants reported EMS research experience. Those with prior EMS involvement reported easier access to EMS research (p=0.008). Value of EMS research (p=0.56), barriers to participation (p=0.50), and resources to increase involvement (p=0.66) for EMS research were similar between groups. Open-ended responses on barriers to research revealed three themes: lack of research experience, temporal/financial limitations, and insufficient institutional support. Among those without EMS research experience, 91.2% reported interest in pursuing EMS research. In free-text responses, participants characterized current gaps in EMS research and offered solutions.

Conclusions: The most common barriers to EMS research were lack of research experience, financial/temporal difficulties, and insufficient institutional support. Understanding these barriers guides solutions such as structured research education for EMS providers, EMS research fellowships, and team-centered research approaches.

Relevant and current research is essential for the ongoing evolution and improvement of evidence-based medicine. Current and ongoing research is vital in both the prehospital and hospital settings (Djulbegovic and Guyatt, 2017). Despite a recent increase in prehospital research (Chua et al., 2021; Mausz and Cheskes, 2015), ongoing study is needed to address current limitations in narrow topic focus and common methods (Cavanagh et al., 2023). Prior studies have found data availability, regulations, funding,

and cultural barriers to contribute to difficulty in performing EMS research (Vianen et al., 2024).

With over 16 million patients transported in the prehospital setting for 911 responses annually (National Association of State EMS Officials, 2020), this relative paucity of literature in EMS affects an enormous population. The need for further EMS research is well characterized (Chua et al., 2021; Tate, 2015; Whitley et al., 2020; Jeppesen and Wiig, 2020; Lockey, 2017; Carpenter et al., 2011). A prime opportunity to expand research is through the involvement and mentorship of students and/or young professionals with interest in this field. However, there is a gap in knowledge of the barriers contributing to the lack of EMS research and involvement of interested young professionals. Improved understanding of barriers to EMS research can guide solutions aimed at increasing participation in EMS research.

Collegiate EMS providers are uniquely positioned at the intersection of academia and EMS, providing them a prime opportunity to contribute to EMS research. Collegiate EMS services provide emergency medical care at over 145 institutions throughout the country (Fisher et al., 2006). Emergency Medical Services provide clinical experience that can support college students in application to medical school and other healthcare programs, and this same motivation may drive research done by this population. Collegiate EMS-focused publications reflect the research interest of collegiate EMS affiliates (Friedman et al., 2019; Friedman et al., 2020; Friedman et al., 2022; Friedman et al., 2022; Monahan et al., 2021; Gaeta, 2020; Stefos and Nable, 2016; Jeffrey et al., 2017). Understanding barriers to further EMS research in this population will lay the groundwork for future study and interventions to improve EMS research more broadly. We hypothesized there were common barriers to performing EMS research. The aim of this study was to explore barriers to EMS research among collegiate EMS affiliates.

METHODS

A cross-sectional mixed methods survey was distributed for a one-month period in August 2022. The survey was distributed virtually through the social media platforms of the National Collegiate Emergency Medical Services Foundation, including Facebook (Menlo Park, CA) and Twitter (San Francisco, CA), with multiple groups resharing and distributing to attempt to increase responsiveness. The resulting convenience sample of participants was invited to complete a voluntary, anonymous survey coded through Qualtrics (Provo, UT).

The survey consisted of three sections: background and training, demographics, and perspectives on EMS research (Supplementary Figure 1). Participants were given unique questions based on prior EMS research involvement. Responses were excluded if participants did not consent to participation, were younger than 18, completed less than 30% of the survey, or reported no prior involvement with EMS. Question types included single-option multiple choice, multi-selection multiple choice, and free text responses.

Results were reported as n (%) for categorical variables and mean ± standard deviation for continuous variables. Perspectives on research were stratified by whether respondents had prior EMS research experience. Descriptive statistics were performed to compare groups using a Chi-Square test. All statistical analyses were performed using R statistical software version 3.6.2 (R Foundation for Statistical Computing) within RStudio

statistical software version 1.2.5033 (RStudio). All open-ended responses were reported, with modifications for grammar and brevity, and analyzed for shared themes by two authors (EL and KJ).

RESULTS

The survey received a total of 72 responses. Two responses were excluded based on the exclusion criteria, and 70 responses were included.

The demographic distributions of the study population are detailed in Table 1. The mean age of participants was 32 ± 12 years. The sample was predominantly male (60.1%), white (86.8%), and not Hispanic or Latino (90.5%). Most respondents reside in the eastern region of the United States (72.4%).

Variable	Survey Participants (n = 70)
Age	32 ± 12
Gender	
Female	27 (39.1%)
Male	42 (60.1%)
Race	
Asian	6 (8.8%)
White	59 (86.8%)
American Indian and Alaska Native	1 (1.5%)
Black	0 (0%)
Two or more races	2 (2.9%)
Ethnicity	
Hispanic or Latino	6 (9.5%)
Not Hispanic or Latino	57 (90.5%)
US Region of Residence	
East	50 (72.4%)
Midwest	11 (15.9%)
South	3 (4.3%)
West	5 (7.2%)
Continuous variables reported as mean ± standard deviation, and categorical variables reported as n (%).	

Table 1. Demographics of survey participants.

Educational background varied among participants (Table 2). Level of education ranged from some high school (1.4%) to doctorate degrees (14.5%), with a bachelor's degree as the most common (56.5%). All respondents were or had been certified at the state or national level as a healthcare provider. Sixty-four (91.4%) were currently practicing. There was a range of provider types represented, including EMT (38.6%), AEMT (7.1%), paramedic (28.6%), nurse (14.2%), nurse practitioner (2.9%), medical student (4.2%), resident physician (2.9%), and attending physician (1.4%). Mean duration of EMS involvement was 13 ± 11 years. Fifty-eight (85.3%) participants reported current or prior involvement with collegiate EMS.

Variable	Survey Participants (n = 70)
Highest level of education	
Some high school	1 (1.4%)
High school	5 (7.2%)
Trade school	3 (4.3%)
Associate's degree	3 (4.3%)
Bachelor's degree	39 (56.5%)
Master's degree	8 (11.6%)
Doctorate degree	10 (14.5%)
Highest level of training	
EMT	27 (38.6%)
AEMT	5 (7.1%)
Paramedic	20 (28.6%)
Nurse	10 (14.2%)
Nurse practitioner	2 (2.9%)
Medical student	3 (4.2%)
Resident physician	2 (2.9%)
Attending physician	1 (1.4%)
National- or state-certified healthcare provider	70 (100%)
Current healthcare provider	64 (91.4%)
Collegiate EMS involvement	58 (85.3%)
Years EMS experience	13 ± 11
Continuous variables reported as mean ± standard deviation, and categorical variables reported as n (%).	

Table 2. Educational and career background of survey participants.

Participation in EMS research was reported by 30 (43.5%) participants (Table 3). Ease of involvement in EMS research was the only EMS research perspective with significant differences between groups, with those having prior EMS research experience finding involvement easier than those without prior EMS research experience (p = 0.008). Those with and without prior research experience reported similar barriers to participation (p = 0.50) and resources that would increase involvement (p = 0.66) for EMS research.

Open-ended responses on barriers to participation in EMS research revealed three key themes: lack of research experience, temporal/financial barriers, and lack of institutional support (Figure 1).

Of those who participated in EMS research (Table 4), 9 (37.5%) used a state or national database and 13 (54.2%) used institutional data. Among those who answered "other", surveys and literature reviews were reported as data sources. Fourteen (58.3%) participants used data analysis software in their EMS research, including R (16.7%), SAS (12.5%), Stata (8.3%), and Python (8.3%). Participation was productive, with 18 (75.0%) reporting research output such as abstracts (20.8%), posters (12.5%), presentations (37.5%), and publications (41.7%). Career benefit of EMS research experience was equally divided, with 50.0% reporting a positive impact, and 50.0% reporting neutral or no impact. Among those without EMS research experience, 31 (91.2%) reported interest in pursuing EMS research.

Variable	Prior EMS research experience (n = 30)	No prior EMS research experience (n = 39)	P
Importance of EMS research			0.56
Very important	24 (80.0%)	26 (66.7%)	
Important	4 (13.3%)	7 (17.9%)	
Neutral	0 (0.0%)	1 (2.6%)	
Unimportant	0 (0.0%)	0 (0.0%)	
Very unimportant	2 (6.7%)	5 (12.8%)	
Ease of EMS research involvement			0.008
Very easy	1 (4.0%)	0 (0.0%)	
Easy	5 (20.0%)	0 (0.0%)	
Neutral	6 (24.0%)	8 (24.2%)	
Difficult	12 (48.0%)	14 (42.4%)	
Very difficult	1 (4.0%)	11 (33.3%)	
Barriers to EMS research			0.50
Lack of mentorship	7 (29.2%)	15 (45.5%)	
Difficulty accessing data	12 (50.0%)	15 (45.5%)	
Unaware of opportunities	14 (58.3%)	29 (87.9%)	
Lack of prior research experience	5 (20.8%)	16 (48.5%)	
Resources that would increase involvement in EMS research			0.66
Data access	15 (62.5%)	19 (59.4%)	
Data analysis support	12 (50.0%)	16 (50.0%)	
Mentorship	15 (62.5%)	27 (84.4%)	
Funding	17 (70.8%)	17 (53.1%)	
Categorical variables reported as n (%) and compared via Chi-Square test. Some questions allowed multi-selection, so percentages may sum to greater than 100%.			

Table 3. EMS research experience.

Theme 1: Lack of research experience
"No idea where to start"
"Not knowing where to look"
"Not sure where to start"
"Lack of methods education"
Theme 2: Temporal and financial barriers
"Unsure of funding resources available"
"Time restraints. I work multiple jobs to afford to live where I am"
Theme 3: Lack of institutional support
"Not in the urban core, busy but small service"
"No PI, or no instruction on how to be (or find) a PI; many EMS services do not have an IRB or the necessary relationships to "chair" the research (beyond, perhaps, the medical director)"
"Lack of EMS research unlike the multitude of nursing research"
"Lack of willingness to excel among leadership, lack of wanting to learn above what is expected"
"No opportunities available nearby"
"Lack of access to research institutions that care about EMS research"
Responses were grouped by theme in qualitative analysis.

Figure 1. Free-text responses on barriers to EMS research for survey participants.

Among the open-ended responses to general comments on EMS research (Supplementary Figure 2), participants characterized current gaps in EMS research and offered solutions, including more accessible Institutional Review Boards (IRBs), better patient follow-up, and improved connection of the EMS research community.

Variable	Survey Participants (n = 70)
Data	
National database	8 (33.3%)
State database	6 (25.0%)
Institutional data	13 (54.2%)
Other	6 (25.0%)
Software	
R	4 (16.7%)
SAS	3 (12.5%)
Stata	2 (8.3%)
Python	2 (8.3%)
Other	4 (16.7%)
None	10 (41.7%)
Outcome of research	
None	6 (25.0%)
Abstract	5 (20.8%)
Poster	3 (12.5%)
Presentation	9 (37.5%)
Publication	10 (41.7%)
Benefit to career	
Very useful	7 (29.2%)
Useful	5 (20.8%)
Neutral	7 (29.2%)
Not useful	5 (20.8%)
Very not useful	0 (0.0%)
Categorical variables reported as n (%). Some questions allowed multi-selection, so percentages may sum to greater than 100%.	

Table 4. Outcomes for survey participants with EMS research experience .

DISCUSSION

This mixed methods survey of EMS providers yielded new information about perspectives on and barriers to EMS research. The highly variable educational levels and clinical certifications of the participants provides a range of perspectives. The relatively high rate of participation in EMS research among this population, at 43.5%, reflects an increasing interest in EMS research. Even among those who had not performed EMS research, 91.2% reported interest in it. Finally, we identified key themes in the barriers to EMS research, including experience, resources, and institutional support. Together, these findings build a foundation to further EMS research participation.

Barriers to EMS research were similar between those with and without prior research experience. The most identified barrier on the multiple-choice response was being unaware of opportunities (prior EMS research experience: 58.3%, no prior EMS research experience: 87.9%). Lack of research experience was also commonly cited as a barrier, especially for those without prior EMS research experience (prior EMS research experience: 20.0%, no prior EMS research experience: 48.5%). These were reflected in four open-ended responses focused on lack of research experience. These findings align with literature from other fields, such as otolaryngology, medicine, and pharmacy, identifying research education as a key barrier to research participation (Eyigör and Kara, 2021; Nair et al., 2019; Murray et al., 2020). Structured research education programs have been characterized (Boninger et al., 2001; Ward, 2013) and demonstrated to be successful in increasing productivity (Ahmad et al., 2013). As such, design and implementation of structured research education programs in EMS may play an important role in increasing participation in EMS research.

The second theme of financial/temporal barriers continued among the multiple choice and open-ended responses. “Funding” was selected by over 50% of participants in both groups as a resource that would increase their participation in EMS research (prior EMS research experience: 70.8%, no prior EMS research experience: 53.1%), and two participants cited time and money as barriers in the free-text response. Time and funding have been well-reported to limit research participation in clinicians, agreeing with the findings of this study (Nair et al., 2019; Murray et al., 2020; AlSardi et al., 2021; Rubagumya et

al., 2019). Research fellowships specific to EMS may help address this barrier, providing both dedicated time as well as funding to perform, improve, and teach research (Cronholm et al., 2009; Carter et al., 2020; Wilson et al., 2019). These findings also demonstrate need and interest for access national databases to facilitate EMS research that can answer clinical questions.

Additionally, institutional support, such as data access and analysis, mentorship, and research resources were suggested to improve EMS research participation in both the multiple choice and free-text questions. Administrative difficulties and inefficient team communication have been described to limit research productivity (Sanjari et al., 2015; Chambers et al., 2021). Finally, the ability to navigate institutional hierarchy may also pose a challenge for those looking to gain research experience and unintentionally limit both the flow of ideas and collaboration among those without institutional ties. These resources are often accessible to providers with more training but may not be readily available for EMS providers interested in research. In this study, 85.5% of respondents did not have a doctorate degree, and multiple participants reported not having relationships with faculty involved in research, access to opportunities, or institutions with research focuses. This highlights the importance of identifying entry points to research participation for students.

LimitationsThe major limitation of our study is selection bias and convenience sampling. We suspect that people who are interested in EMS research, who find EMS research important, or who have had difficulty with getting involved were more likely to participate in the survey. We expect that our survey overestimates interest in EMS research and underestimates barriers and difficulty of involvement in research. Similarly, our survey was distributed to collegiate EMS affiliates who do not represent the broader overall population of EMS providers, as reflected by education levels and prior research experiences, which again may falsely increase apparent interest in EMS research. In addition, due to the nature of distribution through social media, it is unclear how many people viewed the survey and decided not to respond. Our study was also limited in racial and geographic diversity, which may impact the broader applicability of its findings. Finally, the small sample size may cause differences in groups to be statistically insignificant due to insufficient power and may limit conclusions that can be drawn from this study.

CONCLUSIONS

There is a shortage of EMS literature to guide evidence-based practice. This study used a mixed methods survey distributed to collegiate EMS affiliates to identify barriers to EMS research. Lack of research experience, financial and time constraints, and insufficient institutional support were identified to be the most common barriers to performing EMS research. Understanding these barriers can guide solutions such as structured research education for EMS providers, EMS research fellowships, and team-centered research approaches.

REFERENCES

Ahmad, S., De Oliveira, G. S., & McCarthy, R. J. (2013). Status of anesthesiology resident research education in the United States: Structured education programs increase resident research productivity. *Anesthesia & Analgesia, 116*(1), 205–210. https://doi.org/10.1213/ANE.0b013e31826f087d

AlSardi, M., AlAskar, D., Alsahafi, M., AlAmeel, T., & Al Sulais, E. (2021). Barriers to research productivity among gastroenterologists and hepatologists in Saudi Arabia. *Saudi Journal of Gastroenterology, 27*(2), 73–78. https://doi.org/10.4103/sjg.SJG_332_20

Boninger, M. L., Chan, L., Harvey, R., et al. (2001). Resident research education in physical medicine and rehabilitation: A practical approach. *American Journal of Physical Medicine & Rehabilitation, 80*(9), 706–712. https://doi.org/10.1097/00002060-200109000-00013

Carpenter, C. R., Shah, M. N., Hustey, F. M., Heard, K., Gerson, L. W., & Miller, D. K. (2011). High yield research opportunities in geriatric emergency medicine: Prehospital care, delirium, adverse drug events, and falls. *The Journals of Gerontology: Series A, 66*(7), 775–783. https://doi.org/10.1093/gerona/glr040

Cavanagh, N., Blanchard, I. E., Weiss, D., & Tavares, W. (2023). Looking back to inform the future: A review of published paramedicine research. *BMC Health Services Research, 23*(1), 108. https://doi.org/10.1186/s12913-022-08893-4

Chua, W. J., Alpern, E. R., & Powell, E. C. (2021). Emergency medical services for children: Pediatric emergency medicine research. *Pediatric Annals, 50*(4), e155–e159. https://doi.org/10.3928/19382359-20210317-01

Cronholm, P. F., Straton, J. B., & Bowman, M. A. (2009). Methodology and outcomes of a family medicine research fellowship. *Academic Medicine, 84*(8), 1111–1117. https://doi.org/10.1097/ACM.0b013e3181ace6bc

Djulbegovic, B., & Guyatt, G. H. (2017). Progress in evidence-based medicine: A quarter century on. *The Lancet, 390*(10092), 415–423. https://doi.org/10.1016/S0140-6736(16)31592-6

Eyigör, H., & Kara, C. O. (2021). Otolaryngology residents' attitudes, experiences, and barriers regarding the medical research. *Turkish Archives of Otorhinolaryngology, 59*(3), 215–222. https://doi.org/10.4274/tao.2021.2021-4-11

Fisher, J., Ray, A., Savett, S. C., Milliron, M. E., & Koenig, G. J. (2006). Collegiate-based emergency medical services (EMS): A survey of EMS systems on college campuses. *Prehospital and Disaster Medicine, 21*(2), 91–96. https://doi.org/10.1017/s1049023x00003411

Friedman, N. M. G., O'Connor, E. K., Munro, T., & Goroff, D. (2019). Mass-gathering medical care provided by a collegiate-based first response service at an annual college music festival and campus-wide celebration. *Prehospital and Disaster Medicine, 34*(1), 98–103. https://doi.org/10.1017/S1049023X18001103

Friedman, N. M. G., Dingler, B. J., Gorstein, L. N., & Epstein, J. A. (2020). Implementation of a mental health task force in a collegiate-based emergency medical services organization. *Journal of American College Health, 68*(5), 460–464. https://doi.org/10.1080/07448481.2019.1583654

Friedman, N. M. G., Koenig, G. J., Marks, J. A., Hilton, M. T., & Glick, J. E. (2022). Characteristics and outcomes of cardiac arrests reported in the national collegiate emergency medical services foundation data registry. *Journal of American College Health*, 1–4. https://doi.org/10.1080/07448481.2022.2066976

Friedman, N. M. G., Bartho, M. J., & Koenig, G. J. (2022). Promoting a health-centered approach to acute mental health crises on college campuses: The case for collegiate-based emergency medical services. *Journal of American College Health*, 1–3. https://doi.org/10.1080/07448481.2022.2104616

Gaeta, C. (2020). Collegiate EMS providers' role in vaping education. *American Journal of Emergency Medicine, 38*(8), 1691–1692. https://doi.org/10.1016/j.ajem.2020.01.008

Jeffery, R. M., Dickinson, L., Ng, N. D., DeGeorge, L. M., & Nable, J. V. (2017). Naloxone administration for suspected opioid overdose: An expanded scope of practice by a basic life support collegiate-based emergency medical services agency. *Journal of American College Health, 65*(3), 212–216. https://doi.org/10.1080/07448481.2016.1277730

Jeppesen, E., & Wiig, S. (2020). Resilience in a prehospital setting: A new focus for future research? *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 28*(1), 104. https://doi.org/10.1186/s13049-020-00803-z

Lockey, D. J. (2017). Research questions in pre-hospital trauma care. *PLoS Medicine, 14*(7), e1002345. https://doi.org/10.1371/journal.pmed.1002345

Mausz, J., & Cheskes, S. (2015). The impact of prehospital resuscitation research on in-hospital care. *Canadian Journal of Emergency Medicine, 17*(5), 551–557. https://doi.org/10.1017/cem.2015.84

Monahan, B. V., Reid, M. J., Houser, C. S., Day, C. R., & Nable, J. V. (2021). Medical emergencies on a medium-sized urban university campus with collegiate-based EMS. *Journal of American College Health, 69*(8), 971–975. https://doi.org/10.1080/07448481.2019.1709475

Murray, M. M., Kolanczyk, D. M., Phatak, A., et al. (2020). Barriers to and factors influencing the pursuit of pharmacy student research. *Currents in Pharmacy Teaching and Learning, 12*(11), 1297–1303. https://doi.org/10.1016/j.cptl.2020.06.007

Nair, S. C., Ibrahim, H., Almarzoqi, F., Alkhemeiri, A., & Sreedharan, J. (2019). Addressing research barriers and facilitators in medical residency. *Journal of Family Medicine and Primary Care, 8*(3), 1145–1150. https://doi.org/10.4103/jfmpc.jfmpc_38_19

National Association of State EMS Officials. (2020). *2020 national emergency medical services assessment*. https://nasemso.org/wp-content/uploads/2020-National-EMS-Assessment_Reduced-File-Size.pdf

Rubagumya, F., Nyagabona, S. K., Msami, K. H., et al. (2019). Attitudes and barriers to research among oncology trainees in East Africa. *The Oncologist, 24*(9), e864–e869. https://doi.org/10.1634/theoncologist.2018-0805

Stefos, K. A., & Nable, J. V. (2016). Implementation of a high-performance cardiopulmonary resuscitation protocol at a collegiate emergency medical services program. *Journal of American College Health, 64*(4), 329–333. https://doi.org/10.1080/07448481.2016.1138480

Tate, R. C. (2015). The need for more prehospital research on language barriers: A narrative review. *Western Journal of Emergency Medicine, 16*(7), 1094–1105. https://doi.org/10.5811/westjem.2015.8.27621

Vianen, N. J., Maissan, I. M., den Hartog, D., Stolker, R. J., Houmes, R. J., Gommers, D. A. M. P. J., Van Meeteren, N. L. U., Hoeks, S. E., Van Lieshout, E. M. M., Verhofstad, M. H. J., & Van Vledder, M. G. (2024). Opportunities and barriers for prehospital emergency medical services research in the Netherlands: Results of a mixed-methods consensus study. *European Journal of Trauma and Emergency Surgery, 50*(1), 221–232. https://doi.org/10.1007/s00068-023-02240-w

Ward, D. S. (2013). Anesthesiology resident research education. *Anesthesia & Analgesia, 117*(1), 284. https://doi.org/10.1213/ANE.0b013e318292f79c

Whitley, G. A., Munro, S., Hemingway, P., et al. (2020). Mixed methods in pre-hospital research: Understanding complex clinical problems. *British Paramedic Journal, 5*(3), 44–51. https://doi.org/10.29045/14784726.2020.12.5.3.44

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

RESEARCH REPORTS

A PHENOMENOLOGY STUDY INTO EXPERIENCES OF PARAMEDIC POSTGRADUATE INTERNS WITHIN THE IRISH NATIONAL AMBULANCE SERVICE

Ivan O'Grady, MPhil Ed, MSc, H-Dip-AP*[1,2]; Eoin Coughlan, MA, MSc, PhD[2]; Fintan Feerick, MSc, H-Dip-AP[1,2]; Scott Devenish, PhD, FACP, FHEA[3,4,5]; Shane Knox, PhD, MSc, H-Dip-AP[1,2]; Adrian Murphy, MB, BCh, MRCS[2]; Conor Deasy, MB, BAO, BCH[2]

Author Affiliations: 1. National Ambulance Service College, Tallaght, Dublin, Ireland; 2. University College Cork, University College, Cork, Ireland; 3. School of Nursing, Midwifery, and Paramedicine, Australian Catholic University, Melbourne, VIC, Australia; 4. Australasian Council of Paramedicine Deans, Australia; 5. Institute of Health, Centre for Paramedic Practice, University of Cumbria, Lancaster, LA, United Kingdom.

Recommended Citation: O'Grady, I., Coughlan, E., Feerick, F., Devenish, S., Knox, S., Murphy, A., & Deasy, C. (2025). A phenomenology study into experiences of paramedic postgraduate interns within the irish national ambulance service. *International Journal of Paramedicine*. (13). 71-84. https://doi.org/10.56068/MTDZ5050. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3464

Keywords: intern, transition, education, experiences, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Presentation: The work presented in this manuscript was presented in an oral presentation at the PHECC Research Conference 15th November 2023

Received: July 25, 2025
Revised: September 17, 2025
Accepted: November 16, 2025
Published: January 13, 2026

**Corresponding Author:* ivanogrady@gmail.com

ABSTRACT

Background: Transitioning from college to the workforce, paramedic postgraduate interns experience feelings of excitement but also feelings of anxiety and insecurity. These emotions come under the term transition shock, which has been identified with other healthcare professions. This study aims to explore the experiences of paramedic postgraduate interns as part of a two-person crew within the Irish National Ambulance Service.

Methods: This research employed a qualitative method using Gadamerian hermeneutics methodology. The data was collected through semi-structured interviews. Eighteen interviews were conducted between October 2022 and January 2023. Attride–Stirling's framework for thematic network analysis was used to identify themes.

Results: Three organizing themes of Emotions, Education, and Support emerged to form the overall global theme 'Experiences of the Paramedic Intern'. Participants stated that the Ambulance College prepared them well, however, education in mental health could have been better. Participants found that the college setting can be very different from the real-world complexities. There was excitement about starting their new role but also feelings of fear and worry and realization of the responsibilities the job entails. Previous life experience appears to benefit the participants in dealing with the emotional challenges of the job. Participants stated that introducing a support program may benefit new interns as they transition into the workplace for a period of time.

Conclusion: In this sample group of newly qualified paramedics, three themes of emotions, education, and support were identified from their experiences of being a postgraduate paramedic intern. Interns appeared to have mixed emotions starting their internship, highlighting that more education in managing mental health presentations may be beneficial. Also, the introduction of a clinical support system for new interns in the form of mentorship may also help ease the transition into paramedic practice.

Paramedics form an integral part of the healthcare system, providing out-of-hospital care in unpredictable and stressful environments with limited resources, and their scope of practice is continuously evolving (O'Hara et al., 2015; Perona et al., 2019). The out-of-hospital environment can be exceptionally challenging, especially for new paramedics first entering the workforce with little experience. New graduates have described the transition experience to the workforce as 'feeling out of my depth', 'nerve-racking', 'a big learning curve', and 'stressful' (Kennedy et al., 2015; Phillips et al., 2013).

BACKGROUND

Unlike many other jurisdictions, the National Ambulance Service (NAS) in the Republic of Ireland presently follows the traditional model of paramedic training, where a student paramedic's training commences with the National Ambulance Service College (NASC) in partnership with a university (University College Cork, UCC) that accredits the course. The Prehospital Emergency Care Council (PHECC) also accredits the paramedic program. PHECC is an independent statutory agency responsible for standards, education, and training in the field of prehospital emergency care in Ireland.

That is, they are employed by the ambulance service while completing their university obligations, unlike other full-time degree programs. During the first year of training, the education program comprises classroom-based learning in NASC, work-based learning in hospitals, and ambulance-based settings as a third person.

The second year of the program begins with what is classed by PHECC as a postgraduate internship (although the students are not postgraduate), facilitating a period of adaptation where the paramedic postgraduate intern enters the workforce on a relief roster where they will work as part of a two-person crew. Being on the relief roster means interns could work with a different paramedic every shift. The postgraduate internship aims to consolidate the intern's clinical knowledge and competence as a prehospital emergency care practitioner. While working, the student intern must complete reflective logs (jot forms) after each patient contact and assignments from the university. Furthermore, interns must successfully complete three on-the-road assessments to fulfil the PHECC requirements. At the end of year two of the program and completion of all PHECC requirements, the paramedic intern qualifies as a PHECC-registered paramedic. The third year of the program involves ongoing academic assignments from the university while concurrently working as a paramedic to complete their Bachelor of Science Honors degree. Currently, Paramedics in Ireland do not deliver Advanced Life Support (ALS) like in other jurisdictions. ALS is delivered by PHECC-registered Advanced Paramedics (Knox et al., 2014).

When a paramedic intern attains a licence to practice in Ireland, there is an expectation that they are ready to commence practice on the road as a qualified paramedic. Even though interns have undergone a rigorous training program, paramedic interns are novice practitioners or advanced beginners in a profession when they join the workforce (Benner, 1984; Graf et al., 2020b).

No research has been found focusing on the experiences and clinical development of paramedic postgraduate interns in Ireland. As such, this research aims to explore the experiences of paramedic postgraduate interns as they transition from college to the

workforce and identify opportunities to enhance this transition process for the benefit of patients and practitioners.

METHODS

Study Design

To meet the study's aim, an interpretive philosophy using a Gadamerian hermeneutic methodology was used to conduct this research (Gadamer, 1989). Utilizing a qualitative methodology that emphasized language and narrative for data collection allowed for a thorough exploration of the phenomena and facilitated the development of an understanding of meaning from the participant's perspective. Additionally, this methodology allowed the researcher to genuinely participate in the research process as a co-participant, as both the participant and the researcher may have individual perspectives on the phenomenon, given that the principal researcher is an experienced advanced paramedic and educator (Holloway & Galvin, 2023).

The template for semi-structured interviews was adapted from extant research examining the transition support for new graduate paramedics from a Canadian context (Huot, 2013) and the experiences of Australian and UK university students transitioning to practicing paramedics through a professional socialization pathway (Devenish, 2014; Devenish et al., 2016). An invitation was sent to Education and Competency Assurance Officers (ECAO), educational managers in Ireland's National Ambulance Service. Nine ECAOs from both NASC and the operational areas within NAS reviewed the proposed set of questions. Each participant was invited to give their views on the proposed questions relating to the subject matter. The interview guide enabled a structure and sequence to the questions posed while at the same time offering scope for development and clarification.

Reflexivity

The principal researcher has over 25 years of experience in the National Ambulance Service Ireland, including 9 years as an ECAO. The researcher has observed many new graduates entering the workforce overwhelmed and lacking confidence in their clinical skills and judgments required to provide safe and competent care. This experience in clinical practice and in the education of paramedics might prejudice some of the issues that the participants may be facing. While this background may influence the interpretation of data and questioning during interviews, the hermeneutic researcher acknowledges their biases instead of trying to eliminate them. Memos were made by the researcher throughout the research, making notes of ideas that occurred during the process of data collection (Appendix A). This process revealed underlying assumptions to the researcher, enabling the revisiting of research notes at various stages of data collection and analysis.

Participants

To be eligible for inclusion in the study, participants needed to have successfully completed their postgraduate internship year. A purposive sampling strategy was used in this study with a total of five classes invited to participate in this part of the research, consisting of 103 possible participants. These participants were emailed by their local

ECAO on behalf of the researcher. Participation in this research project was voluntary, and participants were free to withdraw at any stage.

Ethics Approval and Consent to Participate

Ethical approval was granted by University College Cork Social Research Ethics Committee (log number 2022-128).

Data Collection

The interviews were carried out between October 2022 and January 2023. The primary researcher conducted all interviews. Initially, only (n=10) participants replied and consented to participate in the research study. A further two participant requests were sought, and data collection ended when data saturation was reached. A total of 18 interviews were conducted. Where possible, interviews were conducted face-to-face (n=6), and the remaining interviews were carried out over Microsoft Teams (n=12) due to the geographical location of the participants. Before commencing the interview, written consent was obtained from each participant. Interviews lasted a mean time of 32 minutes. Interviews were audio recorded to ensure accuracy and transcribed verbatim by the primary researcher using Microsoft software and subsequently uploaded into NVivo12 to assist with data analysis.

Data Analysis

The thematic network analysis framework by Attride-Stirling was employed to analyze transcripts from the semi-structured interviews. This process involved consolidating quotations into 'codes', 'basic themes', and 'organizing themes', leading to a 'global theme' (Attride-Stirling, 2001). These were visually represented as web-like maps showing the prominent themes and their relationships (Figure 1). The primary researcher selected four transcripts and reviewed them in isolation with a co-author. Codes were generated,

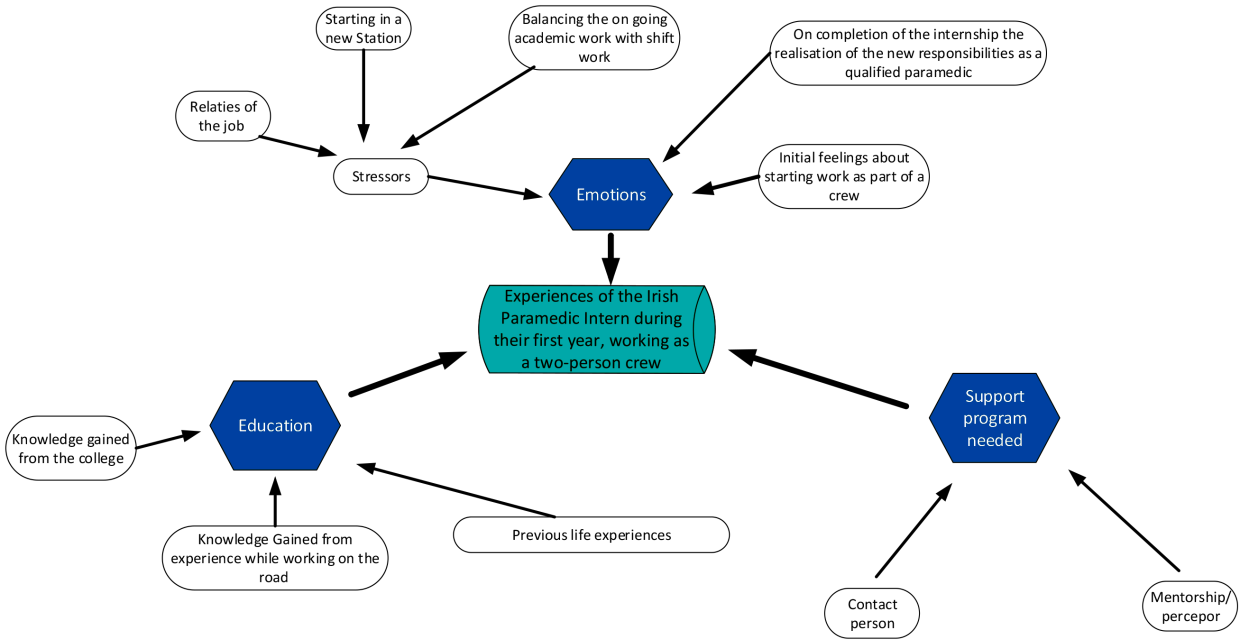


Figure 1. Emergence of the global theme: "Experiences of the Irish Paramedic Intern."

and once a consensus was reached between the primary researcher and the co-author, the remaining transcripts were coded, and data were collected.

RESULTS

Out of the 103 invitation emails, 18 participants (17.4%) were interviewed, reflecting a wide geographical area served by NAS. Most participants were men (61.1%). A total of 38.8% were already employed by NAS as Intermediate Care Operatives (ICOs) before starting the paramedic program. Their main responsibilities included inter-hospital transfers and lower acuity emergency calls. At the time of the interviews, most participants had completed their internship within the past six to nine months. Specifically, 33.3% had finished their internship in less than six months, 55.6% in less than nine months, and 11.1% had just completed the third year of the paramedic program.

Three organizing themes, emotions, education, and support, emerged to form the overall global theme of the 'Experiences of the Paramedic Intern'.

Participants are identified by participant number (e.g., P.1)

Emotions (Organizing Theme 1)

Emotions ranged from initial feelings of excitement at completing their first year of college/placements to stressors resulting from the realities of clinical practice and the ongoing academic requirements from NASC and UCC.

Initial Feelings About Starting Work as Part of a Crew (Basic Theme 1.1)

When participants completed the college phase of their training and transitioned to the workplace, there was a sense of enthusiasm and excitement experienced by the graduates as they were now eager to apply their knowledge in the practical setting. "I felt excited, you look at the board and you see your name next to a paramedic or an advanced paramedic… now you have your big boy pants on." (P.5)

Even though there was excitement about starting their postgraduate internship phase of their training, participants also acknowledged feelings of being overwhelmed, scared, and full of doubt and fear of being clinically inadequate and failing to provide appropriate care to their patients. "I suppose I was afraid [pause] I was afraid I let myself down, my family down, and ultimately do something that was detrimental to the patient, you know?" (P18)

Now that participants were about to be the second crew person (part of a two-person crewed ambulance), they expressed fear and apprehension about being on their own in the back of an ambulance as they started their clinical practice. "Will I make the right decision? Uh, am I going to do the right thing for this patient because this patient doesn't look on at the epaulettes, on my shoulders." (Interns have different colour epaulettes to qualified paramedics) (P.3)

Completion of the Internship (Basic Theme 1.2)

On the completion of their internship, participants were asked how they felt when they initially qualified as operational paramedics. A range of emotions was discussed, from excitement to pride in their achievement of having completed their internship. However,

feelings of being anxious and nervous were discussed, because there was an expectation for them to be preceptors for interns, despite still learning their roles and possibly being only slightly more experienced than their interns. "In the first week when I had them on (navy epaulettes worn by qualified paramedics) they gave me an intern. I was anxious because you are technically now responsible for everything " (P.10)

Stressors (Basic Theme 1.3)

Entering the workplace as an intern is challenging, particularly working with senior colleagues. One concern is encountering imposter syndrome, feeling both inexperienced and inadequate compared to seasoned paramedic professionals. Additionally, establishing effective communications and building relationships with colleagues was a challenging experience. "I found that stressful because I just didn't know if they trusted me? Can I trust them? Were they thinking 'What's this one like?'" [laughs]. (P11)

As the interns entered the second year of the paramedic program as operational paramedics, the adaptation to shift work was identified as challenging, especially when changing from days to nights on the roster. Additionally, trying to meet the academic requirements of NASC and the university (University College Cork, UCC) while balancing shift work and family commitments was an exigent experience. "Night shifts… they're not nice". (P5)

> *It was a stressful year because you have the workload, you have your jot forms, your UCC stuff, your portfolio to put things together and also you still have your home life … if I can put it on a scale like… zero to 10 as you say. I'll put at least a seven or eight on busyness and stress. (P10)*

When the student paramedics started the internship, the realities of the paramedic role soon became apparent. At college, their focus was on dealing with high acuity calls, such as trauma, cardiac arrest, and life-threatening scenarios. Whereas most calls they attended were to patients with a non-life-threatening, low acuity illness or injury. Due to the perception and the lack of preparation for low acuity work, participants expressed frustration, as they felt patients in these categories would benefit from an alternative pathway instead of having to go to the Emergency Department by ambulance.

> *No, I didn't think that I'd be going into a 35-year-old man that had toothache, to be honest. But those things unfortunately have happened more than once. So yeah, there has been a bit of an eye opener and some of the low acuity calls, yeah. (P12)*

Education (Organizing Theme 2)

Education was derived from basic themes of knowledge gained in college, as well as from the experience of dealing with patient contacts on the road and observing and learning from their colleagues. Participants stated their previous life experiences had helped them with resilience and communication with patients.

College (Basic Theme 2.1)

Paramedics found that the college education provided a good foundation both in knowledge and skills, to enable them to carry out the necessary patient assessment and technical skills. However, during the internship, participants identified gaps in their training. Participants highlighted that more education in the area of mental health would be of

great benefit due to the high call volume in dealing with mental health crisis or patients who have a history of mental health issues.

> *We go and we spend a lot of time on cardiovascular stuff and other acute medical stuff and we spent a lot of time on trauma, but we don't spend a lot of time on mental health stuff…. it's just unfortunate…, you know, and we're probably doing as many mental health calls as we are chest pain calls, if not more…. At 4:00 a.m., there is no other service for them. So the ambulance service has to do it and these calls can be quite harrowing. (P.9)*

Paramedic students appreciated the rigor of the training program, despite acknowledging limitations the college had about what they could teach. What was clear from the findings is the discord between the reality of practice, where participants had to deal with complex scenarios involving real patients and the emotional challenges associated with them, unlike the classroom environment. "In the college, you deal with the mannequin. It's in one spot, and it doesn't move and it doesn't cry or get upset... I think the sort of emotional aspects is very hard to replicate in college." (P.1)

On-road Learning (Basic Theme 2.2)

As the internship progressed, the participants stated that the workplace provided valuable learning opportunities, allowing interns to develop and refine their clinical judgement. Paramedic interns identified that their patient management and clinical decision-making confidence levels increased as the internship progressed. The increase in confidence can be attributed to experiencing a wide variety of caseload types. "After six months, I suppose you're kind of going out, and I've dealt with it, I've done it, I've got through a call like this before. It will be fine." (P.2)

The use of reflection after calls was acknowledged as a beneficial method of learning that identified gaps in the participants' knowledge, highlighting areas for improvement. This would often be done in the back of an ambulance outside the Emergency Department or at the station, depending on who they were rostered with. However, interns realized not every paramedic wanted to engage in debriefing activities related to cases the intern had attended. "I like being on with a crewmate that does reflect… because I think it's a learning process." (P.7)

"I suppose some people, it's just not part of their thinking (reflection). You know, they don't really talk much about calls . . . there's not really much chat". (P.9)

Life Experience (Basic Theme 2.3)

Participants who were more mature, or had previous experience in healthcare, believed their previous life experiences were invaluable to building their resilience and coping mechanisms, especially when dealing with people in stressful and highly emotional situations.

> *I don't know if I'd be able to cope with what I've seen since I come out (on the road), if I was 20 years younger . . . would I be able to do it, I don't know whether I would have been mature enough to deal with it. [sigh] (P.4)*

Support (Organizing Theme 3)

Participants unanimously identified the need for some form of support to assist with their transition to the workplace. Findings indicate the first few weeks to months were identified as the most significant period of time.

> *There is nothing there at the moment, you have not a clue. Well, I did not have a clue anyway. I think you're going to these calls and if you could just have someone that says listen… the next time you do that, maybe consider this or whatever . . ." (P.4)*

Mentorship/Preceptorship (Basic Theme 3.1)

When asked to make recommendations about what support would look like from their experiences, participants offered several suggestions, which included on-road mentors/preceptors, who would be with the intern for the first couple of weeks into their internship.

> *I would say definitely yes, there should be a little bit more support. I suppose some sort of preceptorship or something. It's good having that knowledge there to support someone through their first little bit of their career. (P.2)*

Contact Person (Basic Theme 3.2)

As an alternative to on-the-road mentors, some participants suggested a contact person who could be at the end of the phone if issues arose during patient contacts, or they could meet regularly to discuss issues that have arisen. "Having someone who would check in with you on a regular basis or someone that's at the end of the phone that you can ring." (P.18)

DISCUSSION

Transitioning from college to practice is an essential milestone in a student's educational journey. It marks the shift from acquiring knowledge in the classroom to applying it in real-world scenarios. The term "reality shock" was initially used in the literature to describe a nurse's transition from college to practice, in which an initial honeymoon phase is present where new graduates are full of enthusiasm and excitement for a brief period (Kramer, 1975). The honeymoon period of excitement is rapidly replaced by feelings of being overwhelmed, scared, and full of doubt and fear. New staff are concerned about being viewed as clinically inadequate and failing to provide appropriate care to their patients (Duchscher, 2009; Kramer et al., 2013). Similarly, new graduate paramedics in the UK and Australia described their experience of transitioning into the workforce as feeling out of their depth, nerve-racking, a large learning curve, and being "thrown in the deep end" (Devenish et al., 2016).

Workplace dynamics can significantly stress new graduates as they navigate unfamiliar social norms and unwritten rules, leading to feelings of uncertainty (Duchscher & Cowin, 2004; Kramer, 1975). This study found that interns often worried about how colleagues perceived them and fear inadvertently offending others. In contrast, ICOs, who had prior experience with NAS before the paramedic program, were less likely to feel this way, as they were more aware of workplace dynamics.

Managing shift work posed significant challenges while also attempting to fulfil the academic requirements of their course and juggling family responsibilities and other social commitments. The challenges of shift work in the research confirmed findings similar to those of the nursing literature (Duchscher, 2009).

Frustration resulting from the high volume of low-acuity calls was another important finding in this study. The high volume of low-acuity calls was referred to as an "eye-opener" (P12) and something interns did not expect in the paramedic role. The majority of their training focused on high-acuity scenarios and not the reality of practice. The high proportion of low acuity calls is not unique to the Irish EMS over the past two to three decades, many ambulance services internationally have seen an increase in low acuity calls which can also increase the frustration among paramedics in the rise of unnecessary workload (Ericsson et al., 2022; Lowthian et al., 2011; Todd et al., 2022).

When dealing with patients, even though the college provided a good foundation of education, findings highlighted a discord in classroom content compared to the realities encountered on the road. Even with simulation, preparation for highly emotional situations is not easily replicated in the classroom environment. As new paramedics transition into the workforce, much debate revolves around the topic of the theory-practice gap (Lazarsfeld-Jensen et al., 2011). It can be described as the discrepancy between theory and practice, which becomes apparent to novice practitioners as they wrestle with the reality of practically applying their theoretical knowledge to the complexity of the workplace (Kennedy et al., 2015). As a result, this can leave the new intern in a stressful environment, as they have to make many clinical decisions for patients, including clinical judgments, treatment and transport decisions. Research has shown that graduates have a sound theoretical basis of clinical practice with well-developed practical skills (Reid et al., 2019b). However, knowledge gaps in human factors, including leadership, clinical decision-making and 'putting it all together', were identified as areas of weakness (Kennedy et al., 2015; Reid et al., 2019a; Williams, 2012). Another factor in the discord between the classroom and the reality of practice is the curriculum. The paramedic transition literature refers to a hidden curriculum, which can be more powerful than the formal curriculum, especially in emphasizing high acuity case types despite these forming the minority of the paramedic workload (Devenish et al., 2016).

Of concern to participants in this research was the lack of education in mental health emergencies, as paramedics are often the first point of contact for patients experiencing a mental health emergency. This is not unique to Ireland, as Parent 2020, in a scoping review into paramedic management of mental health emergencies in Australia, documented that paramedics perceived a lack of sufficient training in dealing with mental health emergencies. (Parent et al., 2020). However, Parent's research occurred before course accreditation through the Paramedicine Board of Australia and the Australian Health Practitioners Registration Agency (AHPRA) which highlights the need for engagement with mental health stakeholders and consumer groups in curriculum development, as per the program accreditation standards and the professional capabilities for registered paramedics.

When the participants began their internship, they described their patient assessments as slow and robotic, relying on the knowledge they had acquired in college. Wyatts (2003) described the novice practitioner's clinical decision-making as rigid and uncompromis-

ing, driven mainly by established guidelines. This can lead to interventions being initiated step-wise only after gathering all the necessary information (Wyatt, 2003). It needs to be acknowledged that graduates require time to develop their level of competence before they can master the skills and expectations of a competent practitioner (Benner, 1984).

As the internship progressed, participants noted that confidence in their patient assessment skills developed after about five to six months, especially when dealing with similar patient cases. Duchscher (2008) referred to this as the transition crisis stage, where graduates begin to confidently handle tasks and take responsibility for clinical decisions (Graf et al., 2020a). This confidence arises from the knowledge gained in college and practical experience with patients, as well as observing other practitioners work, thus encouraging development process through exploration, experience, and reflection (McHaney et al., 2018).

Many participants acknowledged that after attending to a patient, they would reflect on the experience and debrief with their paramedic crewmate either in the back of the ambulance or back at the station to identify what went well and what could be improved. It was clear that it depended on the intern/paramedic relationship with some staff members not wanting to debrief and reflect on calls. Unanswered questions and poor case debriefs have been negative factors that impacted the transition of interns to the workplace. At this stage in their career of independent clinical practice, reflective practice is an important tool for clinical development (Benner, 1984; Hanna et al., 2018; Howlett, 2019; Perona et al., 2019; Sandars, 2009). A possible solution is to have a dedicated colleague serve as a preceptor who interacts closely with the intern to discuss issues surrounding calls or station-level concerns, which is an important mechanism in their development (Duchscher & Windey, 2018; Huot, 2013).

Along with the challenges of dealing with the clinical aspects of the job and the academic requirements, interns have to deal with the soft skills that encompass the profession, for example, communication with patients. All participants in this research had previous experience working in other occupations or in a previous healthcare setting, such as ICO.

Participants stated that when they joined the ambulance service, they were older and had "life experience", meaning they had more resilience with the emotions of traumatic situations or could communicate with patients in challenging situations, such as bereavement. These perceptions were also identified in a study in Australia in 2011, where paramedic graduates who did not struggle with communication and patient interaction had some previous life experience or clinical background, such as nursing, before becoming a paramedic (Lazarsfeld-Jensen et al., 2011). Those with less life experience may need to develop maturity or the capacity to cope with their patients' stressful social realities, indicating that subtle attributes such as resilience, teamwork, maturity and the ability to communicate with compassion and without prejudice are lacking (Willis et al., 2010).

Participants in this research stated that easing the transition from college to the workforce is possible by supporting new practitioners through either mentorship, preceptorship, or clinical supervision. Reid et al. compared perceptions of Australian and UK paramedics regarding graduate preparedness and noted that no matter how long students spend in clinical practice, new graduates require a period of supervised practice essential for developing clinical decision-making skills and organizational understanding (Reid et

al., 2019b). Properly introduced support can reduce staff stress and burnout, fostering resilience in complex environments (Duchscher & Windey, 2018; Duchscher, 2009). New graduates who are less supported are more likely to feel overwhelmed, scared, self-doubt, and fearful, which was amplified within the first four months of the transition period (Wakefield, 2018).

After completing their internships, participants expressed relief and excitement about becoming qualified paramedics, despite understanding the responsibilities of their new roles with limited experience. Devenish described the postformal stage of socialization, where newly qualified paramedics enter a "second honeymoon phase," which is quickly overshadowed by the challenges of being clinical leaders and mentoring new interns (Devenish et al., 2016). Therefore, mentoring education should be included in undergraduate programs, as it's not guaranteed that these skills will develop in the field (O'Brien et al., 2013).

LIMITATIONS

The differences between working in a rural and urban setting could have been explored further, which could have provided valuable insights for interns acquiring experience in the prehospital setting. This has highlighted an area for further research.

CONCLUSION

In this sample group of newly qualified paramedics, three themes—emotions, education, and support — were identified from their experiences as postgraduate paramedic interns. Interns appeared to have mixed emotions about starting their internship, highlighting that more education in managing mental health presentations may be beneficial. Additionally, the introduction of a clinical support system for new interns, such as mentorship, may also help ease the transition into paramedic practice.

REFERENCES

Attride-Stirling, J. (2001). Thematic networks: An analytic tool for qualitative research. *Qualitative Research, 1*(3), 385–405. https://doi.org/10.1177/146879410100100307

Benner, P. (1984). From novice to expert: Excellence and power in clinical nursing practice. *American Journal of Nursing, 84*, 1480. https://doi.org/10.1097/00000446-198412000-00025

Devenish, A. S., Clark, M. J., & Flemming, ML. (2016). Experiences in becoming a paramedic: The professional socialization of university qualified paramedics. *Creative Education, 07*(06), 786–801. https://doi.org/10.4236/ce.2016.76081

Duchscher, J. B., & Windey, M. (2018). Stages of transition and transition shock. *Journal for Nurses in Professional Development, 34*(4), 228–232. https://doi.org/10.1097/nnd.0000000000000461

Duchscher, J. E. B. (2009). Transition shock: The initial stage of role adaptation for newly graduated registered nurses. *Journal of Advanced Nursing, 65*(5), 1103-1113. https://doi.org/10.1111/j.1365-2648.2008.04898.x

Boychuk Duchscher, J. E., & Cowin, L. S. (2004). The experience of marginalization in new nursing graduates. *Nursing Outlook, 52*(6), 289–296. https://doi.org/10.1016/j.outlook.2004.06.007

Ericsson, C. R., Lindström, V., Rudman, A., & Nordquist, H. (2022). Paramedics' perceptions of job demands and resources in Finnish emergency medical services: A qualitative study. *BMC Health Services Research, 22*(1). https://doi.org/10.1186/s12913-022-08856-9

Gadamer, H.-G. (1989). *Truth and Method, 2nd (revised) ed.* English translation revised by Joel Weinsheimer and Donald G. Marshall, New York: Grossroad.

Graf, A. C., Jacob, E., Twigg, D., & Nattabi, B. (2020). Contemporary nursing graduates' transition to practice: A critical review of transition models. *Journal of Clinical Nursing, 29*(15–16), 3097–3107. Portico. https://doi.org/10.1111/jocn.15234

Hanna, H., Jordan, Z., & Peters, M. D. J. (2018). Experiences of learning, development and preparedness for clinical practice among undergraduate paramedicine students, graduate/intern paramedics and their preceptors: A systematic review protocol. *JBI Database of Systematic Reviews and Implementation Reports, 16*(12), 2253–2259. https://doi.org/10.11124/jbisrir-2017-003618

Holloway, I., & Galvin, K. (2023). *Qualitative research in nursing and healthcare*. John Wiley & Sons.

Howlett, G. (2019). Nearly qualified student paramedics' perceptions of reflection and use in practice. *Journal of Paramedic Practice, 11*(6), 258–263. https://doi.org/10.12968/jpar.2019.11.6.258

Huot, K. (2013). *Transition support for new graduate paramedics.*

Kennedy, S., Kenny, A., & O'Meara, P. (2015). Student paramedic experience of transition into the workforce: A scoping review. *Nurse Education Today, 35*(10), 1037–1043. https://doi.org/10.1016/j.nedt.2015.04.015

Knox, S., Cullen, W., & Dunne, C. (2014). Continuous Professional Competence (CPC) for Irish paramedics and advanced paramedics: a national study. *BMC Medical Education, 14*(1). https://doi.org/10.1186/1472-6920-14-41

Kramer, M. (1975). Reality shock: Why nurses leave nursing. *American Journal of Nursing, 75*(5), 891. https://doi.org/10.1097/00000446-197505000-00041

Kramer, M., Brewer, B. B., & Maguire, P. (2013). Impact of healthy work environments on new graduate nurses' environmental reality shock. *Western Journal of Nursing Research, 35*(3), 348-383. https://doi.org/10.1177/0193945911403939

Lazarsfeld-Jensen, A., Bridges, D., & Loftus, S. (2011). Transitions: Command culture and autonomous paramedic practice. *The Transitions Project Report*. Bathurst: Charles Sturt University.

Lowthian, J. A., Cameron, P. A., Stoelwinder, J. U., Curtis, A., Currell, A., Cooke, M. W., & McNeil, J. J. (2011). Increasing utilisation of emergency ambulances. *Australian Health Review, 35*(1), 63. https://doi.org/10.1071/ah09866

McHaney, R., Reiter, L., & Reychav, I. (2018). Immersive simulation in constructivist-based classroom e-learning. *International Journal on E-Learning.*

O'Brien, K., Moore, A., Hartley, P., & Dawson, D. (2013). Lessons about work readiness from final year paramedic students in an Australian university. *Australasian Journal of Paramedicine, 10*, 1–13. https://doi.org/10.33151/ajp.10.4.52

O'Hara, R., Johnson, M., Siriwardena, A. N., Weyman, A., Turner, J., Shaw, D., Mortimer, P., Newman, C., Hirst, E., Storey, M., Mason, S., Quinn, T., & Shewan, J. (2014). A qualitative study of systemic influences on paramedic decision making: Care transitions and patient safety. *Journal of Health Services Research & Policy, 20*(1_suppl), 45–53. https://doi.org/10.1177/1355819614558472

Parent, A., Smith, R., Townsend, R., & Johnston, T. (2020). Mental health education in Australian paramedic curriculum: A scoping review. *Australasian Journal of Paramedicine, 17*, 1–9. https://doi.org/10.33151/ajp.17.791

Perona, M., Rahman, M. A., & O'Meara, P. (2019). Paramedic judgement, decision-making and cognitive processing: A review of the literature. *Australasian Journal of Paramedicine, 16*, 1-12. https://doi.org/10.33151/ajp.16.586

Phillips, C., Esterman, A., Smith, C., & Kenny, A. (2012). Predictors of successful transition to registered nurse. *Journal of Advanced Nursing, 69*(6), 1314–1322. Portico. https://doi.org/10.1111/j.1365-2648.2012.06123.x

Reid, D., Street, K., Beatty, S., Vencatachellum, S., & Mills, B. (2019). Preparedness of graduate paramedics for practice: A comparison of Australian and United Kingdom education pathways. *Australasian Journal of Paramedicine, 16*, 1–11. https://doi.org/10.33151/ajp.16.666

Sandars, J. (2009). The use of reflection in medical education: AMEE Guide No. 44. *Medical Teacher, 31*(8), 685–695. https://doi.org/10.1080/01421590903050374

Todd, V. F., Swain, A., Howie, G., Tunnage, B., Smith, T., & Dicker, B. (2021). Factors associated with emergency medical service reattendance in low acuity patients not transported by ambulance. *Prehospital Emergency Care*, 1–17. https://doi.org/10.1080/10903127.2020.1862943

Wakefield, E. (2018). Is your graduate nurse suffering from transition shock? *Journal of Perioperative Nursing, 31*(1), 47–50. https://doi.org/10.26550/311/47-50

Williams, A. (2012). Emotion work in paramedic practice: The implications for nurse educators. *Nurse Education Today, 32*(4), 368–372. https://doi.org/10.1016/j.nedt.2011.05.008

Willis, E., Williams, B., Brightwell, R., O'Meara, P., & Pointon, T. (2010). Road-ready paramedics and the supporting sciences curriculum. *Focus on Health Professional Education, 11*(2), 1–13. https://search.informit.org/doi/10.3316/informit.103581668838354

Wyatt, A. (2003). Paramedic practice: Knowledge invested in action. *Australasian Journal of Paramedicine, 1*, 1–9. https://doi.org/10.33151/ajp.1.3.211

APPENDIX A

Memo

Memo (P3) "Before these interviews I was aware of the lack of education surrounding mental health emergencies, but seeing the frustration in the participant surrounding significant issue being highlighted this warrants further discovery with other participants."

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

RESEARCH REPORTS

GATHERING EVIDENCE FOR MODIFYING PARAMEDIC PRACTICUM WITH SIMULATION: A PAN-CANADIAN SURVEY

Efrem M. Violato, PhD*[1]; Jakki Lea, ACP[2]; Benjamin Rauschning, RRT[2]

Author Affiliations: 1. Centre for Advanced Medical Simulation, Northern Alberta Institute of Technology, Edmonton, Alberta, Canada; 2. Northern Alberta Institute of Technology, Edmonton, Alberta, Canada.

Recommended Citation: Violato, E., Lea, J., & Rauschning, B. (2025). Gathering evidence for modifying paramedic practicum with simulation: A pan-canadian survey. *International Journal of Paramedicine*. (13). 85-103. https://doi.org/10.56068/KDMU0573. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3480

Keywords: simulation-based education, high-quality simulation, clinical practicum, health workforce, competency assessment, emergency medical services, EMS, paramedicine

Disclosures: The authors have no disclosures or conflicts of interests to declare.

Funding: External funding was not used to support this work.

Received: August 18, 2025
Accepted: November 16, 2025
Published: January 13, 2026

**Corresponding Author:* efremv@nait.ca

ABSTRACT

Clinical practicum placements are a cornerstone of paramedic education, yet Canadian programs consistently face challenges in securing sufficient, high-quality placements due to workforce shortages, increasing student enrolment, and logistical constraints. Simulation-based education (SBE), particularly high-quality simulation (HQS), has demonstrated effectiveness as a partial replacement for clinical time in other health professions, but its role in paramedicine remains underexplored. This study conducted a national needs analysis to assess current perceptions, gaps, and opportunities for integrating HQS into paramedic training as a supplement or replacement for practicum.

A cross-sectional survey was distributed across Canadian paramedic programs and professional networks between March and June 2025. Fifty-seven respondents representing multiple provinces and diverse professional roles completed the survey. Quantitative data were analyzed using descriptive and inferential statistics, and qualitative data were thematically analyzed.

Findings revealed that while practicum remains highly valued, significant gaps exist, including inconsistent preceptor engagement, variable case exposure, and limited opportunities to assess rare, high-acuity, low-occurrence (HALO) events. Respondents reported that simulation is already widely used (88%), though fewer institutions are implementing HQS (63%). Simulation was most valued for teaching technical skills, assessment and diagnostics, and communication. A plurality of respondents agreed that HQS could replace some practicum time, with an ideal curriculum balance approximating 50% SBE and 50% practicum. However, real patient interactions, cultural complexity, and communication under stress were consistently viewed as irreplaceable. Barriers identified included student buy-in, instructor readiness, and resource constraints.

This study provides the first pan-Canadian evidence of educator and stakeholder perspectives on using HQS to modify paramedic practicum. Results suggest that HQS has significant potential to address gaps in practicum by standardizing learning opportunities and enhancing competency development. Future research should examine targeted competencies and best practices for systematically integrating HQS as a partial practicum replacement.

INTRODUCTION

Clinical practicum placements are a cornerstone of paramedic education, providing students with essential real-world experience necessary for developing clinical competence, deci-

sion-making abilities, and professional skills (Brown et al., 2025). Paramedic students rely on these placements to become ready to enter professional practice, while educators rely on practicum to assess student competence (Batt et al., 2025; Brown et al., 2025). However, paramedic programs in Canada and globally consistently face significant challenges in securing sufficient practicum spots for students. These challenges stem from logistical constraints, limited clinical sites, and growing student enrolment, factors that can jeopardize the quality and consistency of paramedic training (Bellefontaine, 2023; National Union of Public and General Employees (NUPGE, 2023).

Simulation-based education (SBE) may be a modality that can address the clinical practicum challenge. SBE involves using diverse modalities, ranging from standardized patient encounters and high-fidelity manikin simulations to virtual and screen-based platforms to provide learning experiences that replicate the clinical environment with appropriate verisimilitude for the level of learner (Bienstock et al., 2022; Oshust et al., 2025). Evidence from multiple healthcare disciplines, particularly nursing and medicine, demonstrates that high-quality simulation (HQS) can effectively replace a substantial proportion of clinical hours without compromising student competency or patient safety (Bogossian et al., 2019). HQS is SBE that is designed and supported by evidence-based best practices and guidelines with clear educational goals, facilitated by trained instructors, to enhance learner outcomes and ensure safety in healthcare training (Hayden et al., 2014). In a landmark study in nursing, it was found that up to 50% of clinical time for nursing students can be replaced with HQS (Hayden et al., 2014). Research in other professions, from medicine to occupational therapy, has similarly found the HQS can be used to replace clinical time (Bogossian et al., 2019). Simulation may provide advantages over traditional clinical time in certain areas, such as inter- and intra-professional communication and collaboration (Bogossian et al., 2019). Based on the accumulating evidence and professional consensus, using HQS to augment, supplement, or replace portions of practicum time appears to be a potentially viable educational method worthy of exploration in paramedicine (Bridge et al., 2022).

Despite findings in other healthcare disciplines, evidence directly addressing the feasibility and effectiveness of simulation as a replacement or supplement to clinical practicum in paramedicine is limited. A recent systematic review examining available literature specifically related to paramedicine found minimal research investigating practicum replacement with simulation (Violato et al., 2025). The three existing studies found suggested receptivity among paramedic educators and students toward partial replacement of practicum time with simulation, particularly in scenarios involving high-acuity, low-frequency events and critical interpersonal or communication skills (Violato et al., 2025). It was also found that simulation is currently being used to replace some portions of practicum experience or to fulfill competencies not met during practicum (Violato et al., 2025). However, the existing research is descriptive and lacks an in-depth examination of replacing clinical hours with simulation, leaving a significant gap in the evidence. The shortage of studies indicates a need for further investigation of HQS to replace practicum time in paramedicine. To guide investigation and design studies to directly investigate the replacement of practicum time systematically, it is necessary to understand current perceptions of the concept, gather insights, and determine what aspects of paramedic practicum are most amenable to replacement.

To address this knowledge gap and assess the potential for HQS replacement, the current study was designed as a national needs analysis to gather expert input from educators and stakeholders within Canadian paramedic training programs. Specifically, the objectives of this study are to:

1. Evaluate receptivity toward engaging in the implementation of simulation-based clinical replacement.
2. Understand perceptions regarding the effectiveness of current clinical practicum experiences, including perceived strengths, weaknesses, and overall adequacy for preparing students for professional practice.
3. Explore views on the effectiveness and utility of simulation-based education for both skill development and competency assessment.
4. Identify competencies considered by educators as either appropriate or inappropriate for replacement or supplementation via SBE, thus establishing clear targets for further research.

METHODS

Study Design

This study employed a cross-sectional survey design, distributed nationally, to conduct a needs analysis, specifically a gap analysis, to assess the current perspectives and educational needs related to practicum and simulation in paramedic education. The survey was used to identify if and how simulation could be used to replace clinical time in paramedicine. The survey was constructed de-novo to address the current state of clinical practicum and SBE in paramedic programs, an ideal state for the use of SBE, and gaps in clinical practicum and SBE for training paramedics. The survey was pilot tested with input from paramedic educators and was estimated to require approximately 20 minutes for completion. The survey included a combination of ranking, closed-ended, and open-ended questions designed to gather quantitative and qualitative data on perceived educational gaps.

Competencies and aspects of practice were derived from the 2011 National Occupational Competency Profile for Paramedics (NOCP), with a 2014 addition on the use of high-fidelity simulation to supplement evaluation of specific competencies in the clinical or preceptorship performance environments (Paramedic Association of Canada, 2011, 2014). There has since been an update to the NOCP competency profile that was not available at the time of development. The prior NOCP, generally, can be mapped to the new NOCP. To provide a common conception of the constructs being addressed, definitions were provided for simulation-based education, high quality simulation, and replacing practicum with simulation (see Supplemental Materials). Ethics approval was provided by the Northern Alberta Institute of Technology Research Ethics Board (REB#: 2024-27).

Sample and Distribution

Direct and snowball sampling targeted educators and administrators in paramedic programs across Canada. A search was conducted to estimate the number of paramedic programs in Canada. Programs listed on Accreditation Canada and CourseCompare.ca were extracted and cross-referenced, producing a list of 35 paramedic programs across Canada (Accreditation Canada, n.d.; Paramedic Programs, n.d.). Respondents from as many schools as possible were targeted, aiming for a response rate of approximately 50%

(16 schools) from at least six provinces. Distribution was extended beyond schools to include Colleges of Paramedicine, professional networks, and associations, as well as direct distribution to individuals. While a minimum of 16 responses was targeted, as many respondents as possible were included; as such no upper bound on responses was set. Due to the use of snowball sampling and distribution through organizational emails, it is not possible to determine the exact distribution rate. It was expected that this sampling frame would adequately cover the range and diversity of paramedic programs in Canada and the different perceptions and experiences with simulation. The survey was administered using Qualtrics (Qualtrics, 2024). An invitation to participate, along with a link to the survey, was sent via email to potential respondents. Upon accessing the survey link, participants were first directed to an informed consent page. All participants provided informed consent. Data was collected from March to June 2025.

Data Analysis

Quantitative data were analyzed using descriptive and inferential statistics to identify patterns and trends related to using simulation to replace/augment clinical practicum. Qualitative responses were analyzed using thematic analysis to identify recurring themes and insights into the educational needs of the target population. Both data forms were synthesized to provide a comprehensive picture of the current educational landscape and potential areas where HQS can be most readily implemented.

RESULTS

Sample

Fifty-seven participants provided adequate data for inclusion in the study. The survey had an average completion rate of 77.7% (SD = 31.4%), ranging from 25% to 100%, with most incomplete items being constructed response items. Participants spent a median of 29 minutes completing the survey, indicating careless responding was not an issue.

Geographically, the majority of respondents were from Alberta (n = 24, 42.1%), followed by Ontario (n = 8, 14.0%), Manitoba and Saskatchewan (n = 6, 10.5% each), British Columbia (n = 5, 8.8%), Nova Scotia (n =4, 7.0%), New Brunswick (n = 3, 5.3%), and Quebec (n = 1, 1.8%).

An educational role related to direct instruction was reported by 82.5% (n = 47) of respondents, while 17.5% (n = 10) indicated another role in paramedic education. Other roles were categorized as regulatory and accreditation, instructional and curriculum development, leadership, and student coordination.

Thirty-nine (69.6%) participants reported currently practicing as a paramedic, while 17 (30.4%) indicated they were not currently practicing. Among current practitioners, most identified as on-road frontline paramedics (n = 20, 51.3%), with others serving in managerial, or administrative capacities (n = 11, 28.2%), supervisory roles (on road with PRU; n = 4, 10.3%), hospital-based emergency paramedics (n = 2, 5.1%), and industrial paramedics (n = 2, 5.1%). Of those not currently practicing, ten indicated previous paramedic practice, all as on-road frontline paramedics, with the last year of previous practice ranging from 2011-2023.

Respondents' primary employers were Public Post Secondary Institutions (n = 25, 43.9%), followed by a Public Health Service (n = 18, 31.6%), Private Paramedic Service (n = 4, 7.0%), Private Post Secondary Institution (n = 4, 7.0%), and other (n = 6, 10%). Other included regulatory colleges, integrated fire services, and graduate education. Fourteen respondents (24.6%) indicated currently working as preceptors. Of the 43 not currently working as preceptors, 36 (83.8%) had previously worked as a preceptor, with the last year of precepting ranging from 2005-2024.

Professions Trained

Respondents most frequently reported working at institutions that trained two (n = 20) or three (n = 15) professions, with others indicating training one (n = 11), four (n = 4), and five (n = 3) professions. Professions trained included Primary Care Paramedics (PCP, n = 49), Advanced Care Paramedics (ACP, n = 42), Emergency Medical Responders (EMR, n = 23), Critical Care Paramedics (CCP, n = 8), and Medical First Responders (MFR, n = 5).

Following a similar pattern, most respondents were involved in training PCP (n = 42), ACP (n = 29), EMR (n = 14), MFR (n = 5), and CCP (n = 3). Respondents frequently reported training multiple professions (n = 32), with twelve indicating only training PCPs.

Simulation Experience

Forty-three participants (76.8%) reported being involved in conducting simulations, with 40 (71.5%) participants involved in preparing simulations. Conducting simulations primarily involved facilitation pre/debriefing with other responses, including evaluation and assessment, and technical support. For those involved in preparing simulations, most respondents indicated being involved in simulation design and writing, followed by coordination and scheduling. Other responses included oversight and leadership, quality assurance, and review.

Current State

Practicum Experience

Participants indicated that the average number of weeks of practicum for students they instruct was 10.7 weeks (SD = 7.13, Median = 10.0, Range = 0 -25). Participants were evenly split (23/23) on whether this was an adequate number of weeks, with a mean ideal number of weeks of practicum being 15.7 weeks (SD = 7.79, Median = 15.0, Range = 2-25).

The value of practicum for teaching aspects of paramedic practice was rank-ordered (Table 1). The value of practicum for teaching various aspects of paramedic practice based on average rank was evenly distributed for most aspects of practice, with a difference of only 0.67 for the top 5. For the rank ordering of teaching and assessing different competencies, average ranks were again closely grouped, with consistent competencies comprising the top and bottom ranks across both areas.

When considering what could only be assessed during practicum and could not be assessed using HQS, Integration was most frequently indicated (n = 21), followed by Professional Responsibilities (n = 16), Transportation, Communication, Health Promotion, and Public Safety (n = 15). Assessment and Diagnostics (n = 6) and Therapeutics (n = 5), which were ranked as the competencies for which practicum was most valuable to teach

and assess, were the lowest ranked for only being able to be assessed in practicum, indicating that relative to the other competencies, these competencies may be more amenable to assessment in simulation.

Simulation Use

All participants agreed with the definitions of SBE and HQS that were provided. While 88.1% of respondents indicated that their institutions use SBE, according to the definition provided, only 62.5% thought that their institutions use HQS. Simulation-based education was estimated on average to comprise 34.2% (SD = 20, Median = 30, Range = 1-91) of the curriculum. The average amount of time spent on SBE during the program was estimated at a mean of 180 hours (SD = 185, Median = 160, Range = 0-800). The majority, 61.3%, indicated that the amount of time for SBE was inadequate, and 38.7% indicated it was adequate. No respondents thought too much time was spent on SBE. Most respondents (86.5%) indicated that if resources were not a constraint, they would increase the amount of simulation time, and 13.5% would keep the same amount of simulation time. No respondents would decrease the amount of simulation time.

The value of simulation for teaching aspects of paramedic practice showed a wider distribution of average rank than practicum, with Practicing the Technical Skills of Paramedicine being the highest ranked (Table 1). Like practicum, simulation was ranked as most effective for teaching and assessing Assessment and Diagnostics, with Transportation and Health Promotion and Public Safety being the lowest ranked (Table 2). Simulation was used for a variety of purposes within programs, with the most common being Experiential Learning and the least common being Competency Assessment, exclusive of Practicum (Table 3).

		Average Rank	Final Rank
Practicum	Practicing the communication skills of paramedicine	3.22	1
	Practicing the technical skills of paramedicine	3.72	2
	Understanding the practical day-to-day work of paramedicine	3.81	3
	Understanding expectations and requirements of paramedicine	3.89	4
	Understanding professionalism in paramedicine	3.89	4
	Practicing the interpersonal (emotional intelligence) skills of paramedicine	4.06	6
	Understanding how paramedicine operates in the healthcare system	5.42	7
Simulation	Practicing the technical skills of paramedicine	1.82	1
	Understanding expectations and requirements of paramedicine	3.24	2
	Practicing the communication skills of paramedicine	3.30	3
	Understanding the practical day-to-day work of paramedicine	4.12	4
	Understanding professionalism in paramedicine	4.79	5
	Practicing the interpersonal (emotional intelligence) skills of paramedicine	5.06	6
	Understanding how paramedicine operates in the healthcare system	5.67	7

Table 1. Value of practicum and simulation for teaching aspects of paramedic practice.

	Practicum			Simulation		
	Competency	Average Rank	Final Rank	Competency	Average Rank	Final Rank
Teaching	Assessment and Diagnostics	2.78	1	Assessment and Diagnostics	2.11	1
	Communication	3.1	2	Therapeutics	3.14	2
	Therapeutics	3.73	3	Communication	3.61	3
	Professional Responsibilities	3.88	4	Professional Responsibilities	4.39	4
	Integration	4.23	5	Health and Safety	4.56	5
	Health and Safety	5.1	6	Integration	4.58	6
	Transportation	6.15	7	Transportation	6.58	7
	Health Promotion and Public Safety	7.05	8	Health Promotion and Public Safety	7.03	8
Assessing	Assessment and Diagnostics	1.9	1	Assessment and Diagnostics	2.17	1
	Therapeutics	2.9	2	Therapeutics	2.74	2
	Communication	3.5	3	Communication	3.57	3
	Integration	4.13	4	Professional Responsibilities	4.49	4
	Professional Responsibilities	4.75	5	Integration	4.54	5
	Health and Safety	5.5	6	Health and Safety	5.03	6
	Transportation	5.75	7	Transportation	6.31	7
	Health Promotion and Public Safety	7.58	8	Health Promotion and Public Safety	7.14	8

Table 2. Effectiveness of practicum and simulation for teaching and assessing competencies.

Use of Simulation	Frequency of Responses
Experiential Learning	26
Preparation for Clinical Practicum	22
Meeting competencies not met during Practicum	21
Formative Evaluation	20
Summative Assessment	18
Competency Assessment exclusive of Practicum	18

Table 3. Uses of simulation in paramedic programs.

Ideal State

Amount of Training

A variety of perspectives emerged on the ideal balance between simulation to clinical experience in paramedicine training. The most frequently cited ratio was 1:2, followed by 1:3 and 1:1. In only three responses, simulation was dominant.

When asked the extent to which simulation could be used to develop the professional competencies required for entry to practice, respondents most frequently indicated Quite a Bit and Somewhat (n = 15, 40.5% and n = 16, 43.2%). Participants rarely used the extreme ends of the scale with Completely (n = 3), Not At All (n = 1), and A Little Bit (n = 2) infrequently used.

Respondents indicated that the ideal percentage of SBE for their program would be approximately half of curriculum time (M = 47.5, SD = 15,6, Median = 50, Range = 20-83) with the mean ideal number of SBE hours being 217 (SD = 181, Median = 235, Range = 3-500), almost 40 hours more than the estimated current mean hours of SBE time.

Replacing Practicum Time

Respondents' opinions on whether some practicum time can be replaced with HQS showed varying levels of agreement to disagreement. Fifty percent Somewhat Agreed or Agreed that simulation can replace some practicum time, while 39.5% Somewhat or Strongly Disagreed, 10.5% Neither Agreed nor Disagreed. For the professions for which HQS could most effectively replace some clinical time, responses were approximately evenly distributed across professions: EMR (16), ACP (14), PCP (13), MFR (13), CCP (10).

Gap

Practicum

A slight majority of respondents (58.6%) indicated that there are specific knowledge, skills, or attitudes (KSA) required for entry to practice that clinical practicum is unable to teach, with a broad range of KSAs indicated. Some of the most frequently noted included communication/interpersonal skills, HALO skills, professionalism, emotional intelligence, and cultural and contextual awareness (see Supplemental Table 1 for a full list of KSAs).

Of the respondents who thought there were KSAs that practicum could not teach, a majority (84.2%) thought that simulation could be used to teach some of those KSAs. Some of the most frequently noted KSAs amenable to simulation were communication and teamwork skills, decision-making, situational awareness, professionalism, and HALO events. Several responses emphasized that simulation is valuable because it removes inconsistency, particularly in exposure to rare events and for standardization of preceptor experience level (see Supplemental Table 2 for a full list of KSAs).

Aspects of practicum identified as challenges for students' learning included variable preceptor engagement, inadequate and inconsistent teaching, and a lack of exposure to different calls and "idle time." Assessment challenges included preceptors untrained or undereducated in assessment, a lack of exposure to assess rare or complex skills, and a "luck of the draw" for exposure to cases (see Supplemental Table 3).

Similar to the KSAs, the most frequent struggle for students on practicum was an inadequate opportunity to see certain cases, including HALO-type calls (e.g., intubation/ventilation, labour and delivery, MCI), followed by a lack of preceptor support/inadequate teaching by the preceptor. Conversely, repetitive and one-dimensional call exposure was also included as an issue. Stress management and face-to-face communication were also noted issues (see Supplemental Table 3).

A plurality of respondents (69.2%) thought that simulation could be a solution to many of the issues identified. The most frequent aspects of practicum that were seen to be irreplaceable with simulation were real patient interactions and rapport, communication with patients, families, or colleagues in real contexts, and exposure to emotional, cultural, and social complexity in real patient encounters (see Supplemental Table 4).

Simulation

Students struggled the most with buying into simulation, believing simulation would transfer to "real-life," and low-fidelity decreasing buy-in. Instructors struggled with cre-

ating adequate fidelity to obtain learner buy-in, troubleshooting IT issues, and familiarity with equipment, and facilitating pre-briefing and debriefing sessions. These findings highlight the challenges of technical execution affecting learner perception, emphasizing the need for alignment between the quality of simulation and student experience (see Supplemental Table 5).

The competencies most frequently selected that could never be replaced with simulation, in order, were Communication, Integration, Health Promotion and Public Safety, Assessment and Diagnosis, Therapeutics, Professional Responsibilities, Health and Safety, and Transportation. Respondents overwhelmingly emphasized that real human interaction, especially communication under pressure, cannot be replicated through simulation. Many stressed that simulated urgency lacks emotional and psychological impact, making certain kinds of judgment, empathy, and regulation impossible to fully teach outside of practicum.

When asked to list the biggest challenges that come to mind with replacing clinical time with HQS, respondents provided multiple responses with similar frequency, with the most frequent being: Lack of Real Human Interaction, Cost and Resource Constraints, Fidelity and Realism Issues, Limited Instructor Capacity, Student Engagement, and Buy-in. Least frequently noted was Inadequate Research and Benchmarking (see Supplemental Table 6).

Respondents most frequently Somewhat or Strongly Agreed (78.3%) that practicum offers learning that can not be replicated in simulation, to a lesser extent, respondents Somewhat Agreed (43.2%) or Neither Agreed nor Disagreed (27.0%) that simulation offered learning that can not be replicated in practicum. Almost half the sample (48.6%) Somewhat Agreed that some of the learning that occurs during practicum could be replaced with simulation, with only 18.9% indicating Disagreement. Correspondingly, 72.9% indicated some level of disagreement that clinical practicum alone is the only method that can adequately prepare paramedics for entry to practice, with 21.6% indicating Agreement.

In a free-response section, respondents overwhelmingly emphasized that HQS is a valuable educational tool, particularly for preparing students for rare, high-acuity scenarios and bridging classroom learning to clinical application. However, respondents opposed the idea of using simulation to replace clinical time, citing the irreplaceable value of real patient interactions, emotional complexity, and dynamic, high-pressure environments. Concerns were also raised about resource limitations, the need for realism, and instructor readiness. Overall, simulation is seen as a supplement, but not a substitute, for authentic clinical experience.

DISCUSSION

Though Alberta was most represented, responses were gathered from multiple provinces, providing a diversity of perspectives from across Canada. The professional and educational roles, as well as the professions trained, and experience in conducting SBE, indicate that the sample was appropriately positioned to respond to the survey questions. Responses to each section of the survey provide adequate information to address the study objectives:

1. There is an openness, though couched in a degree of skepticism, towards the idea that simulation could be used as a method to replace some clinical time, which is already being done, though it should not be a complete replacement.
2. Clinical practicum was perceived to be the most effective method of preparing students for professional practice, and while adequate overall, there were areas of weakness identified.
3. SBE was seen to be an effective instructional modality for skill development and competency assessment. The primary perspective was that the use of HQS should be increased.
4. Multiple aspects of practice, competencies, and KSAs were identified that can be appropriate to explore for replacement or supplementation with SBE.

Current State

Respondents believed that both the amount of time spent in practicum and SBE could be increased to improve training, though more participants thought the amount of time spent on SBE was inadequate compared to practicum. Similar rank orderings in the value of simulation and practicum for teaching and assessing the different aspects of paramedicine and competencies required were observed, though with a narrower average rank for practicum. Less dispersion in opinion for the value of practicum indicates that more value is placed on practicum for teaching and assessing each aspect and competency, while indicating where there may be greater value for simulation to be used to address current shortcomings in training. The areas where simulation was thought to be the best for teaching and assessment were technical skills, with the opportunity for repeated practice in HQS. Assessment and Diagnostics, Therapeutics, and Communication were the top three ranked competencies for both teaching and assessment in simulation and practicum. Based on the overlap, these competencies and related sub-competencies could be amenable to greater coverage through SBE, possibly for competency sign-off.

Based on reports of the uses of simulation in paramedic programs, many programs are using simulation for competency assessment, whether for meeting competencies not met during practicum or for assessment exclusive of practicum. Simulation is also being used for other forms of summative assessment, such as OSCEs, indicating that the systems and processes for high-stakes assessment in simulation exist.

Ideal State

With access to HQS, respondents believed that more simulation time should be offered, that it should make up half of the curriculum time, with nearly 50% agreement that HQS could replace some clinical time for all paramedic professions. Though there is disagreement about whether HQS could be used to replace some practicum time, and that the ideal is to maintain a greater ratio of practicum to simulation time, there is support in general for SBE and for using HQS to replace some practicum time. In an ideal state, some aspects of practicum could be replaced with simulation time.

Gaps

Several KSAs were identified that could be taught in simulation versus in practicum. The main value of simulation would be to address these KSAs in a manner that was more consistent in terms of exposure to cases and the level of proficiency of the precep-

tor overseeing the learner. The struggles students faced were reflective of the KSAs that were not addressed in practicum. Overall, respondents believed that simulation could be a solution to these challenges. Through these findings, a set of situations and skills was identified that could be explored for replacement with simulation.

Challenges existed for the use of HQS for both students and instructors, which is informative for how to improve or bolster the simulation experience if it is to be used for replacing clinical time. The challenges of buy-in for students and technical challenges for instructors reflect each other. If the challenges that instructors face, whether through better equipment or training, can be resolved buy-in for students may be increased. A major drawback of simulation identified for replacing practicum time were the affective components, particularly the stress of a real call and human interaction under pressure. With well-designed simulations in high-fidelity environments focusing on the primary relevant stressors of practice, the level of real-life stress may be approached in simulation. Overall, responses were somewhat ambivalent about what could be offered in simulation compared to practicum, though most did not agree that practicum is the only method that can adequately prepare paramedics for entry to practice. Simulation was acknowledged to offer learning that was not available in a practicum.

Implications

The findings from this study help to directly inform and guide future research as to which areas of practicum training are most amenable to simulation, and specific skills for investigation and the feasibility, efficacy, and best practices of using HQS as a clinical replacement in paramedic education. To continue to explore the use of simulation to supplement, modify, augment, or replace some amount of clinical time in paramedicine, appropriate aspects, competencies, and KSAs identified in this study can be selected for use in research that examines replacing practicum time with simulation. Technical skills, Communication Skills, Assessment and Diagnostics, and Therapeutics were areas of practice and competency identified where simulation was most useful for training and assessment. KSAs that were not effectively addressed during practicum, and that could be effectively addressed in simulation included cultural awareness, HALO events, interpersonal communication, professionalism, and respect.

Simulation could also offer a more standardized experience to ensure that learners are being exposed to a baseline level of cases and the required skills, as well as receive more consistent oversight and assessment from preceptors.

Future Directions

The findings from this study can be used to begin to focus further research on specific areas of paramedic practice and experience that can be investigated for replacement, in some form, in simulation. The identification of various aspects, competencies, and KSAs of paramedic practicum experience and practice allows for the beginning of the development of a curriculum and simulations that can be examined as a replacement for practicum time. Doing this does not imply that all, or even most, practicum time will be replaced with simulation, but rather certain competencies can be assessed through simulation, mitigating the need for the student to have the competency assessed in practicum. By obtaining competencies in simulation, it will allow the student and preceptor during practicum to focus on learning the holistic aspect of paramedic practice.

With the current constraints on available practicum time and experience, the idea of replacement may also be implemented as an augmentation to practicum time. When there are gaps or breaks between education and practicum, or breaks during practicum placements, simulation can be used to not only maintain competency but also assess competency so that students do not require repeated extensions or delays in completing their practicum. The unpredictability and challenges of pre-hospital practice have been previously identified as barriers to clinical experience during placement; the use of simulation may be one method that can help to standardize this experience (Cimino & Braun, 2023).

Limitations

There were two primary limitations to this study. 1) The sampling method leads to potential sampling bias; the convenience sampling meant that it is possible some opinions or perspectives were missed that may provide different insights to practicum and simulation. However, the narrow variance for responses, broad sampling frame, and demographic characteristics indicate a representative sample was likely obtained. 2) Though definitions were provided for the constructs addressed, it is possible that personal interpretation, primarily of replacing clinical time with high-quality simulation, may have skewed responses if respondents were interpreting replacement as a total replacement of practicum with simulation.

CONCLUSION

This needs assessment provides an understanding of the current state of practicum and simulation education for paramedics across Canada. A potential ideal state for the amount of simulation training and replacement of practicum time, and the current gaps in practicum and SBE were identified. Based on responses specific aspects of practicum can be selected for the development of further research that directly examines the replacement of some amount of practicum time with HQS.

REFERENCES

Accreditation Canada. (n.d.). Educational programs. *Accreditation Canada*. Retrieved August 6, 2025, from https://accreditation.ca/assessment-programs/health-education-accreditation/programs

Batt, A. M., Bolster, J. L., Lysko, M., Poirier, P., Cassista, D., Austin, M., Cameron, C., Donnelly, E. A., Donelon, B., Dunn, N., Johnston, W., Lanos, C., Leyenaar, M. S., Lunn, T. M., Mason, P., Osinga, M., Steary, D., Teed, S., Vacon, C., & Tavares, W. (2025). Representing contemporary paramedic practice in Canada: Development of the national competency framework for paramedics. *Paramedicine, 22*(3), 111-126. https://doi.org/10.1177/27536386241284092

Bellefontaine, M. (2023, January 22). High EMS workloads creating problems for paramedic students seeking work placements. *CBC News*. https://www.cbc.ca/news/canada/edmonton/high-ems-workloads-creating-problems-for-paramedic-students-seeking-work-placements-1.6721689

Bienstock, J., Heuer, A., & Zhang, Y. (2022). Simulation-based training and its use amongst practicing paramedics and emergency medical technicians: An evidence-based systematic review. *International Journal of Paramedicine, (*1), 12-28. https://doi.org/10.56068/VWHV8080

Bogossian, F. E., Cant, R. P., Ballard, E. L., Cooper, S. J., Levett Jones, T. L., McKenna, L. G., Ng, L. C., & Seaton, P. C. (2019). Locating "gold standard" evidence for simulation as a substitute for clinical practice in prelicensure health professional education: A systematic review. *Journal of Clinical Nursing, 28*(21-22), 3759-3775. https://doi.org/10.1111/jocn.14965

Bridge, P., Adeoye, J., Edge, C. N., Garner, V. L., Humphreys, A.-L., Ketterer, S.-J., Linforth, J. G., Manning-Stanley, A. S., Newsham, D., Prescott, D., Pullan, S. J., & Sharp, J. (2022). Simulated placements as partial replacement of clinical training time: A Delphi consensus study. *Clinical Simulation In Nursing, 68*, 42-48. https://doi.org/10.1016/j.ecns.2022.04.009

Brown, J. J. H., Ortega, M., & Whitley, G. A. (2025). Student paramedic and practice educator experiences of ambulance placements. A rapid evidence review. *Health Science Reports, 8*(3), e70552. https://doi.org/10.1002/hsr2.70552

Cimino, J., & Braun, C. (2023). Clinical research in prehospital care: Current and future challenges. *Clinics and Practice, 13*(5), 1266-1285. https://doi.org/10.3390/clinpract13050114

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN National Simulation Study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), S3–S40. https://doi.org/10.1016/s2155-8256(15)30062-4

National Union of Public and General Employees (NUPGE). (2023). *Paramedics in crisis: A report on the working conditions of emergency medical services (EMS) workers*. https://nupge.ca/wp-content/uploads/2023/05/Paramedics-In-Crisis-1.pdf

Oshust, K., Violato, E., & Rose, B. (2025). *Advancing simulation: Professionalization and the need for definitional clarity of simulation-based education*. https://doi.org/10.2139/ssrn.5009111

Paramedic Association of Canada. (2011). *National occupational competency profile for paramedics*. https://paramedic.ca/competencies/nocp

Paramedic Association of Canada. (2014). *Supplement to the national occupational competency profile*. https://paramedic.ca/competencies/nocp

Paramedic programs. (n.d.). *Course Compare*. Retrieved August 6, 2025, from https://www.coursecompare.ca/subject/paramedic-program

Qualtrics. (2024). [Computer software]. *Qualtrics*. https://www.qualtrics.com

Violato, E., Virostek, L., Ragasa, J. P., Lewis, M., & Violato, E. (2025). A systematic review of the evidence for using simulation to replace clinical experience for paramedic students: Simulation to replace clinical experience. *International Journal of Paramedicine*, (9), 30-42. https://doi.org/10.56068/GXSE4776

SUPPLEMENTAL TABLE 1

KSAs not effectively addressed during practicum.

Knowledge Area
Scope of practice (especially in hospital settings)
Job roles and professional responsibilities
Cultural awareness
Rare case knowledge (e.g., pediatrics, obstetrics, mass casualty)
Operational realities of paramedic work
How paramedicine fits in the larger healthcare system
Social/environmental determinants of health
Specific conditions in realistic patient contexts
Skill Area
Interpersonal communication (with patients, colleagues, and health teams)
High Acuity, Low Occurrence (HALO) technical skills
Tactical/non-violent crisis communication
Decision-making under stress
Situational awareness
Performing clinical procedures on real patients
Critical thinking
Death notification
Ventilation skills (e.g., using a BVM)
Working in chaotic/high-stimulus environments
Driving and transport navigation skills
Crisis management
Attitude
Emotional intelligence
Professionalism
Empathy
Resilience and adaptability
Respect (for peers, patients, organizations, public)
Emotional maturity
Patient-first mindset
Willingness to learn from real experiences
General positive personality traits

SUPPLEMENTAL TABLE 2

KSAs that could be addressed with simulation.

Knowledge Area
Cultural awareness
Social justice / hidden curriculum / bias awareness
Professional identity and role formation
Skill Area
Communication (general, team-based, and patient interaction)
Team dynamics and collaboration
Decision-making
Situational awareness
HALO (High Acuity, Low Occurrence) procedures
Tactical and respectful communication
Cricothyrotomy and advanced airway management
Integration (applying multiple skills in complex scenarios)
Stress inoculation (performing under pressure)
Attitude
Professionalism and identity development
Respect (for patients, team, system)
Readiness to learn from structured, consistent experience

SUPPLEMENTAL TABLE 3

Ineffective aspects of practicum for teaching and assessment.

Teaching Issue	Assessment Issue
Preceptor engagement varies widely (some disinterested or untrained)	Preceptors are untrained or undereducated in assessment practices
Lack of exposure to diverse or rare calls ("luck of the draw")	Inability to assess rare or complex skills due to limited exposure (e.g., obstetrics)
Wasted or idle time (e.g., offload delays, slow areas)	"Luck of the draw" limits what students are exposed to and can be assessed on
Time constraints / insufficient time in practicum	Subjectivity in assessment (e.g., communication, emotional traits)
Preceptor attitudes (e.g., mistreatment, overworked staff, poor interpersonal skills)	Skills are observed, but not adequately evaluated (checkbox-style assessments)
Lack of preceptor training or standardization	Lack of opportunity to demonstrate skills due to case variety
Low call volume or repetitive patient scenarios	Preceptors unaware or unclear about learning outcomes
Inadequate or inconsistent teaching of health & safety, legal, documentation	Inconsistency in preceptorship across placements
Checklist-driven learning (overemphasis on sign-offs)	Preceptors not hired or formally prepared for their teaching/assessment role
Lack of clarity around the term “clinical practicum” (vs. field practicum)	Wasted or idle time reduces number of observable performance events
Hospital placements (e.g., ICU, diagnostic imaging) not optimal for novice learners	Limited experience makes valid assessment of competence difficult
Driving skills not effectively taught	Personality traits or emotions difficult to measure objectively
Limited integration/teamwork opportunities due to individual performance focus	Inconsistent skill application across different call types
Simulation can deliver more consistent skill coverage than clinical practicum	Preceptor personality conflicts impacting fair assessment
Preceptor influence on learning (students mimic their preceptors)	Assessment inconsistency across sites (e.g., labor shortages, different resources)
Paramedics not adequately prepared to serve as expert clinicians/preceptors	Gender-based barriers in specific contexts (e.g., male students in L&D environments)
	Public health and health promotion not routinely assessed

SUPPLEMENTAL TABLE 4

Aspects of practicum irreplicable in simulation.

Irreplaceable Aspect
Real patient interaction and rapport
Communication with patients, families, or colleagues in real contexts
Exposure to emotional, cultural, and social complexity of real patient encounters
Interprofessional collaboration (e.g., with nurses, EMS, other providers)
Empathy, emotional regulation, and dealing with loss or death
Performing under real pressure or urgency
Working in dynamic, uncontrolled, or chaotic environments
Exposure to diverse settings (e.g., weather, base life, late-night shifts)
Fatigue management and stress regulation
Scene safety and hazard assessment
Hands-on clinical skills on real humans (e.g., IVs, airways)
Real-world integration of assessment, diagnosis, therapeutics
Performing procedures “in vivo” rather than on mannequins
Professional maturity and accountability
Experiencing consequences of real-world errors or decisions
"Job-readiness" and adaptation to the actual work environment
Exposure to mundane but essential aspects of practice (e.g., base life)

SUPPLEMENTAL TABLE 5

Instructor and student challenges with simulation.

Student		Instructor	
Challenge	**Count**	**Challenge**	**Count**
Buying into simulation	29	Creating adequate fidelity to create learner buy-in	27
Not believing that simulation will transfer to 'real-life'	21	Troubleshooting IT issues	22
Low fidelity decreasing buy-in	17	Facilitating debriefing discussions	16
Lack of instructor experience in facilitating simulation	17	Familiarity with equipment/technologies (e.g. manikins, software)	16
Pressure of simulations	13	Facilitating pre-briefing	14
Lack of experience doing simulation	10	Preference for other teaching and learning methods	13
Participating in debriefing discussions	7	Developing applicable scenarios	10
Applicability of scenarios	5	Buying into simulation	9
Team collaboration	4	Facilitating simulations	9
Other (please list)	4	Teaching team collaboration	6
		Believing that simulation will transfer to 'real-life'	6
		Other (please list)	3

SUPPLEMENTAL TABLE 6

Primary challenges to replacing clinical time with simulation.

Challenge	Frequency
Lack of Real Human Interaction	7
Cost and Resource Constraints	6
Fidelity and Realism Issues	6
Limited Instructor Capacity	5
Student Engagement and Buy-in	5
Lack of Industry and Institutional Support	4
Psychological and Situational Gaps	4
Augmentation vs. Replacement	4
Logistics and Implementation Barriers	3
Inadequate Research and Benchmarking	2

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

REVIEWS

ELECTROCARDIOGRAM CHARACTERISTICS AS PROGNOSTIC INDICATORS IN PULSELESS ELECTRICAL ACTIVITY: A SYSTEMATIC REVIEW

Brad Gander, MSc, CCP*[1]; Samantha Laws[2]

Author Affiliations: 1. NHS South East Coast Ambulance Service, Crawley, UK; 2. City of St Georges, University of London, London, UK.

Recommended Citation: Gander, B., & Laws, S. (2025). Electrocardiogram characteristics as prognostic indicators in pulseless electrical activity: A systematic review. *International Journal of Paramedicine*. (13). 104-119. https://doi.org/10.56068/JOQV0260. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3469

Keywords: resuscitation, ECG, pulseless electrical activity, prognostication, cardiac arrest, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Received: July 30, 2025
Revised: October 23, 2025
Accepted: October 23, 2025
Pre-Issue: November 25, 2025
Published: January 13, 2026

**Corresponding Author:* bradley.gander@secamb.nhs.uk

ABSTRACT

Background: The incidence of patients presenting with pulseless electrical activity (PEA) is increasing. Much existing research has focused upon guidance for the termination of resuscitation, rather than to identify indicators of survivability. ECG-based phenotyping of PEA may aid clinicians with prognostication during resuscitation.

Methods: Systematic literature searches for articles containing key words within the MEDLINE, EMBASE, and CINAHL Plus databases were undertaken to identify literature investigating the relationship between ECG characteristics and prognosis in PEA. Risk of bias assessments were performed for each included study.

Findings: Ten studies were identified, containing a total of 9,979 patients. A narrow QRS width was demonstrated to be associated with ROSC in four out of the seven studies investigating this component. An increased QRS amplitude was also associated with ROSC, however, this was only investigated within one study. The relationship between QRS rate and ROSC was variable. Assessing combined ECG components may offer some prognostic insight with the presence of P waves, a QRS rate < 60 and QRS width < 120 ms linked to an increased likelihood of survival. A moderate risk of bias was found within all included studies.

Conclusion: The presence of ECG component changes may assist decision-making with the ongoing resuscitation strategy for patients with PEA. Several studies had missing ECG or patient outcome data therefore were at risk of bias due to incomplete patient inclusion. Further prospective research is needed to evaluate the use of ECG components to identify subgroups of PEA with a high likelihood of survival.

INTRODUCTION

In comparison to other cardiac arrest rhythms, the incidence of patients presenting to emergency medical services with pulseless electrical activity (PEA) is increasing. An audit of 48,707 patients with out-of-hospital cardiac arrest (OHCA) by Bergstrom et al. (2018) revealed in 1990-1995 12.5% of patients presented with PEA, which increased to 15.5% between 1996-2000, 18.2% in 2001-2005, 19.8% in 2006-2010, and finally 21.6% In 2011-2016 ($p < 0.0001$). Numerous reasons for this increase have been

postulated, including increased beta-blocker and implantable cardioverter defibrillator use (Bunch et al., 2004; Youngquist et al., 2008), and the implementation of primary and secondary coronary artery disease prevention strategies decreasing incidence of ventricular fibrillation (VF) (Wang et al., 2009). Despite this, much existing research has focused upon the development of guidance for the termination of resuscitation, rather than to identify indicators of survivability (Coppola et al., 2021a).

PEA and asystole are often grouped together as "non-shockable rhythms" and consequently their treatment and associated outcomes are often reported together. There is now emerging consensus that differentiation should be made between these presentations to aid with the identification of patients with a favourable prognosis (Rabjohns et al., 2020; Elhalwagy et al., 2024). Furthermore, differentiation may also be possible in patients who present with PEA, as this represents a spectrum of underlying electrical and cardiovascular function (Elhalwagy et al., 2024). This ranges from pseudo-PEA–a low-output state with echocardiographic evidence of cardiac motion but no manually palpable pulses (Rabjohns et al., 2020), to "true PEA" with no mechanical cardiac activity (Elhalwagy et al, 2024). Point-of-care ultrasound (POCUS) is required to make a diagnosis of pseudo-PEA and is becoming frequently utilised in prehospital resuscitation. However, this is often limited to use by enhanced care resources and may not always be available in the initial stages of resuscitation. PEA differentiation through ECG-based phenotyping may provide clinicians with information to guide prognostication and decision-making during resuscitation, when other diagnostic tools are not available.

This systematic review aimed to determine and explore how ECG characteristics can serve as prognostic indicators in patients with PEA by identifying studies that examined the relationship between ECG features in PEA and clinical outcomes.

METHODS

This systematic review adheres to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). Electronic searches for articles containing key words within the MEDLINE, EMBASE, and CINAHL Plus databases were undertaken. The search terms used are displayed in Table 1. Inclusion and exclusion criteria are displayed in Table 2. These terms were validated by ensuring articles already known to be relevant to the subject could be identified. All search results were imported into Mendeley™ reference management software. Following duplicate removal, titles and abstracts were screened to identify articles for full-text review. Articles were selected for final inclusion following full-text review. A full-text review of all selected articles was undertaken by one reviewer to determine articles for final inclusion. Instances of unclear eligibility were discussed with the second reviewer. When consensus on inclusion could not be established, a third reviewer was available to decide on inclusion. The flow chart in Figure 1 provides a schematic of the screening process. The findings of articles selected for final inclusion were subjected to thematic analysis and discussed within a narrative synthesis

Data Items

The following data items were collected from articles that were selected for final inclusion: study type, number of participants, ECG components assessed, outcome data.

Search	Terms
S1	'pulseless electrical activity' OR PEA OR 'electromechanical dissociation'OR EMD
S2	tachy* OR brady* OR rate OR complex* OR wide OR narrow OR QRS OR 'p wave' OR 't wave' OR activity OR ECG OR EKG OR electrocard*
S3	'ECG characteristics OR components
S4	'narrow QRS' OR 'narrow complex' OR 'wide QRS' OR 'wide complex'
S5	prognos* OR outcome OR surviv* OR mortality OR death OR ROSC OR 'return of spontaneous circulation'
S6	S5 AND S1
S7	S6 AND S2 AND S3 OR S4
S8	S6 AND S2 OR S3 OR S4

Table 1. Search strategy.

Included	Excluded
Case series, observational studies, randomised controlled trials, empirical research	Single-patient case reports
Adult patients	Neonatal or paediatric patients
English language	Animal studies
Within peer-reviewed journals	Use of non-standard ECG components
Published since 1 January 2014	Use of electrical or mechanical cardiac support during resuscitation
Describing ECG characteristics recorded during PEA cardiac arrest	Investigating the effects of medications
	Grey literature

Table 2. Inclusion and exclusion criteria.

ECG Component Normal Values

The following definitions were used: Normal heart rate (60-100 bpm), QRS duration (80-120 ms), PR interval (120-200 ms), QRS amplitude (3.0 mV), QTc interval (<500 ms).

Risk of Bias Assessment

The risk of bias of these studies was evaluated with the use of the relevant JBI risk of bias assessment tool for the study methodology (https://jbi.global/).

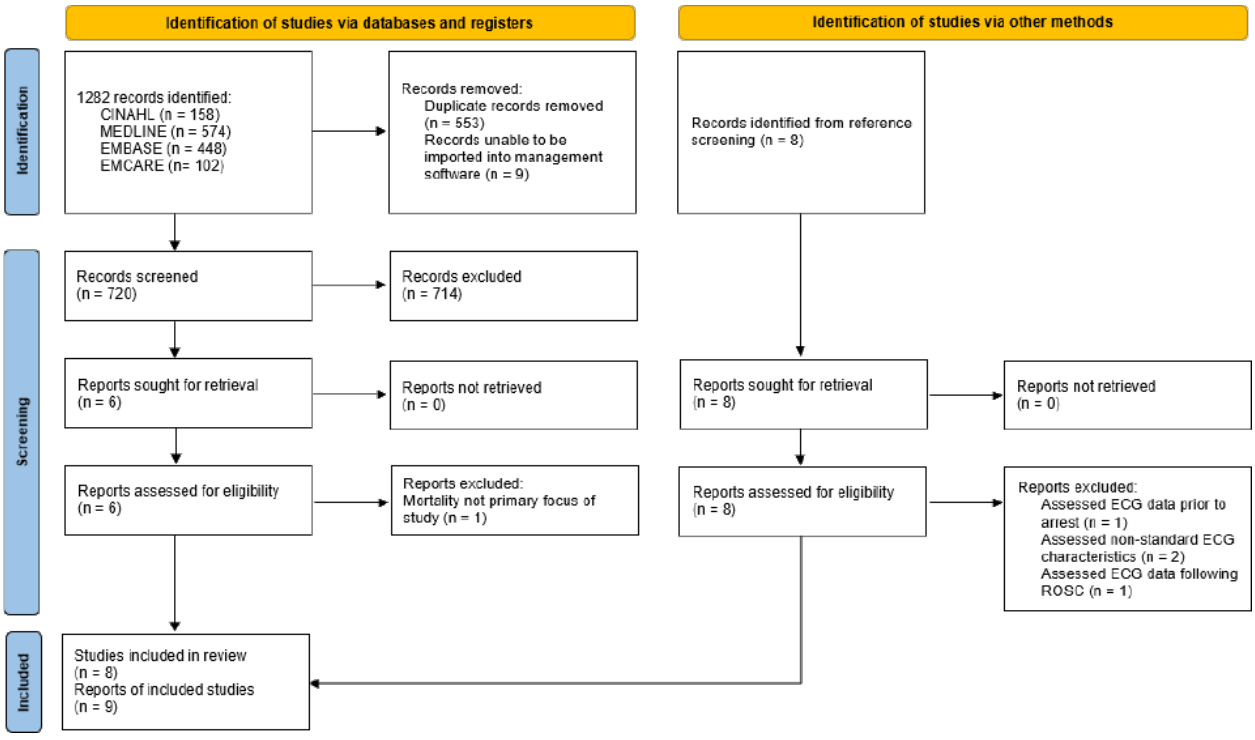


Figure 1: PRISMA flowchart.

Study	Study Type	Period	Sample Size	Setting	Age	% Female
Hauck et al. (2015)	Case series	2010 - 2013	262	OHCA	67 (mean)	48%
Bergum et al. (2016)	Case series	2009 - 2013	51	IHCA	75 (median [IQR 65–82])	43%
Ho et al. (2016)	Case series	2007- 2009	332	OHCA	71.8 (mean)	41.6%
Skjeflo et al. (2018)	Case series	2009 - 2012	74	IHCA	ROSC 65, No ROSC 78 (median)	24%
Weiser et al. (2018)	Case series	2013 - 2015	504	OHCA	70 ± 16 (mean ± SD)	45%
Nguyen et al. (2020)	Cohort study	2013 - 2017	176	IHCA	60 (mean)	30%
Kim et al. (2020)	Case series	2016 - 2018	576	OHCA	73 (median [IQR 61–81])	42%
Cournoyer et al. (2022)	Cohort study	2011 - 2015	7089	OHCA	70.7 (mean)	39.5%
Norvik et al. (2023)	Case series	2008 - 2021	298	IHCA	68 (median [IQR 57–78])	44%
IHCA = in-hospital cardiac arrest, OHCA = out-of-hospital cardiac arrest, SD = standard deviation, IQR = interquartile range, ROSC = return of spontaneous circulation						

Table 3. Study demographic details.

RESULTS

Study Characteristics

Application of the electronic database search strategy yielded a total of 1282 records. MEDLINE produced 574 results, EMCARE produced 102, and CINAHL Plus and EMBASE produced 158 and 448 results, respectively. After importing and duplicate screening using RefWorks™ (ProQuest, 2023), a total of 720 records were available for title and abstract screening. 714 records were removed via title and abstract screening. After obtaining the full texts of all articles, five were selected for final inclusion. One was excluded as mortality was not the primary focus of the study. Manual reference screening identified 8 additional articles, with four removed following full-text review. A total of nine reports from eight studies, comprising seven case series and two cohort studies, were identified. Study demographic details are displayed within Table 3. Two were cohort studies with comparator groups; Nguyen et al. (2020) compared patients with bradycardic and non-bradycardic PEA, and Cournoyer et al. (2022) compared the outcomes of patients with PEA and shockable rhythms. Bergum et al. (2016), Skjeflo et al. (2018) and Norvik et al. (2023) all reported on patients from the St. Olav's University Hospital cardiac arrest database. Five studies contained data on patients with out-of-hospital cardiac arrest, and four used data from inpatient cardiac arrest.

Risk of Bias

Overall, the risk of bias within all included studies was moderate. A detailed summary of their assessments is included within Appendix A and B. All but one study was unable to demonstrate complete inclusion of eligible patients due to missing data, and several were unable to clearly evidence consecutive inclusion of patients. The cohort study by Cournoyer et al. (2022) was the only study found to be at low risk of bias.

Synthesis

QRS Rate

The rate of QRS complexes was the most frequently evaluated ECG component of PEA, with nine reports assessing this (see Table 5). Four studies provided the QRS complex rates of survivors and non-survivors, and the remaining studies grouped results by variable intervals. The largest study identified was undertaken by Cournoyer et al. (2022),

Reference	Study aims (outcomes assessed)	Results/Findings	Study Strengths	Study Weaknesses
Hauck et al. (2015)	To determine if rate or QRS width correlated with outcome (STD with CPC 1 or 2)	• No statistically significant difference in HR or QRS width of survivors vs non-survivors	• Utilised a method that can be applied in the pre-hospital setting	• Retrospective. • 152 patients in initial database excluded due to missing data. • QRS >200 ms excluded. • Small total no. of survivors.
Bergum et al. (2016)	To evaluate the association between early ECG patterns and survival (ROSC, 1-hour survival, STD)	• No unique ECG patterns were associated with survival	• Prospective	• Single centre. • Small sample size.
Ho et al. (2016)	To assess the prognostic value of initial ECG characteristics (ROSC at admission, STD)	• No correlation found between ECG characteristics and survival	• Multi-centre. • Prospective enrolment	• Excluded trauma patients
Skjeflo et al. (2018)	To describe the development of ECG characteristics during ALS and their association with ROSC	• QRS width decreased and HR increased prior to ROSC • HR decreased and QRS width increased in those without ROSC	• Provides insight on dynamic changes to ECG components during resuscitation	• Single-centre, retrospective study
Weiser et al. (2018)	To evaluate the relationship between HR and survival (30-day survival, 30-day CPC 1 or 2)	• Higher initial HR (> 60) associated with increased odds of 30-day survival and CPC 1 or 2	• Adjusted for confounders. • Statistical significance reached	• Retrospective
Nguyen et al. (2020)	To determine the prevalence of bradycardic PEA and the relationship between this and respiratory arrest (survival of arrest event, STD)	• Bradycardic PEA arrests had higher STD than non-bradycardic PEA arrests.	• Used multiple hospital settings. • Comprehensive review of causes of arrest.	• Only one ECG characteristic assessed
Kim et al. (2020)	To investigate the relationship between QRS characteristics and outcomes (STD, STD with CPC 1 or 2)	• Narrow QRS and higher QRS amplitude associated with STD with good neurological function. • No difference seen in HR between groups	• Large sample size	• Undertaken in BLS-only system
Cournoyer et al. (2022)	To evaluate the association between initial PEA rate and favourable clinical outcomes (STD, STD with MRS 0-2)	• Higher initial HR is associated with STD and STD with good neurological function	• Multi-centre. • Large sample size.	• Non-cardiac aetiologies excluded. • Only HR assessed
Norvik et al. (2023)	To investigate how HR and QRS duration are related to the probability of ROSC	• Higher initial HR and increasing HR during ALS were associated with increased probability of ROSC. • Lower QRS width and decreasing QRS width during ALS associated with increased probability of ROSC.	• Multi-centre. • Prospective study.	• Difficulties in determining between episodes of ROSC/PEA without other signs of circulation may have overestimated ROSC

Table 4. Results of included studies.

which contained a total of 12,477 patients. These were grouped by rate in denominators of 20, from 1-20 up to > 120. A linear increase in odds ratio (OR) for survival with good neurological function was seen as QRS rate increased. Patients with a presenting QRS rate between 1 and 20 had an OR of survival with good neurological function (Modified Rankin Score 1-2) of 0.06 (95% CI [0.03, 0.11], $p < 0.001$). Conversely, those with a rate > 120 had an OR of 0.90 (95% CI [0.45, 1.81], $p = 0.77$), albeit this finding did not reach statistical significance. Interestingly, patients with a QRS rate greater than 100 shared a similar

Reference	QRS Rate	P Waves	QRS Width	QT Interval	QRS Amplitude
Hauck et al. (2015)	Assessed	Not Assessed	Assessed	Not Assessed	Not Assessed
Bergum et al. (2016)	Assessed	Assessed	Assessed	Assessed	Not Assessed
Ho et al. (2016)	Assessed	Assessed	Assessed	Not Assessed	Not Assessed
Skjeflo et al. (2018)	Assessed	Not Assessed	Assessed	Not Assessed	Not Assessed
Weiser et al. (2018)	Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Nguyen et al. (2020)	Assessed	Not Assessed	Assessed	Not Assessed	Assessed
Kim et al. (2020)	Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Cournoyer et al. (2022)	Assessed	Not Assessed	Not Assessed	Not Assessed	Not Assessed
Norvik et al. (2023)	Assessed	Not Assessed	Assessed	Not Assessed	Not Assessed

Table 5. ECG components assessed.

likelihood of survival with good neurological function to those presenting in shockable rhythms.

Weiser et al. (2018) compared the rate of QRS complexes recorded during the first 60 seconds of available ECG data with the neurological function (Cerebral Performance Category [CPC] 1-2) of survivors of PEA at 30 days following cardiac arrest. Patients were stratified into four groups: 10-24 bpm, 25-39 bpm, 40-59 bpm and >60 bpm. 504 patients with PEA were included in the study, and 32 (6%) survived with a CPC score of 1-2. No survivors with good neurological function were seen in those with a QRS rate of 10-24. The number of survivors from the remaining groups were 7 (4%), 14 (9%) and 11 (15%) respectively ($p = 0.001$). After adjusting for confounding clinical factors, the odds of survival with good neurological function increased by 0.48 (95% CI [0.3, 0.77], $p = 0.001$) per 20 bpm grouping.

Conversely to the studies reporting an association between a faster HR and survival, Nguyen et al. (2020) demonstrated patients with bradycardic PEA, defined as a rate less than 60, had a higher incidence of both ROSC and survival to discharge than patients with non-bradycardic PEA (66.7%, n = 44 vs. 55.5%, n = 61 and 33.3%, n = 22 vs. 14.5%, n = 16). Following multivariate analysis, bradycardic PEA had an OR of 3.31 for survival to discharge (95% CI [1.41, 7.79], $p = 0.006$).

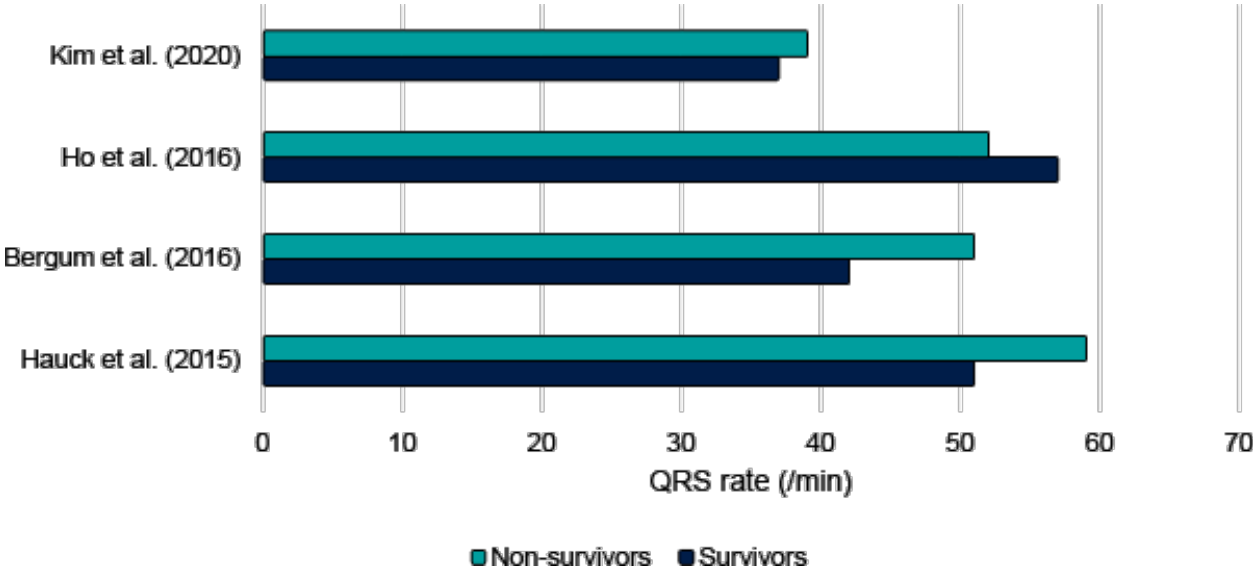


Figure 2: Studies reporting QRS rate (ungrouped).

In their analysis of 58 episodes of in-hospital PEA arrest, Bergum et al. (2016) reported a no-ROSC incidence of 60% (n = 35), with 29% (n = 17) 1-hour survival and 10% (n = 6) survival to discharge. The median QRS rate for those with no-ROSC was 51 (IQR 39-63), compared to 45 (IQR 41-54) in those who survived for 1 hour and 42 (IQR 34-94) in those who survived to discharge. Additionally, Hauck et al. (2015) also reported a lower QRS rate in survivors in 262 OHCA patients with PEA. Survivors were found to have a mean rate of 51 (95% CI [38.8, 63.2]) with non-survivors having a mean rate of 59.2 (95% CI [54.8, 63.6]).

A non-significant difference between the QRS rate of survivors and non-survivors was reported by Kim et al. (2020) in their evaluation of 576 OHCA patients. The median QRS rate for survivors was 37 (IQR 30-54) and 39 (IQR 29-55) in non-survivors (p = 0.770). Ho et al. (2016) also reported a non-significant difference (56.8 vs. 52.0, p = 0.53) in their study of 332 patients with PEA who were attended by EMS in Ottawa, Canada.

QRS Duration

QRS duration was assessed in seven studies. Three studies provided mean or median QRS duration, and four dichotomised their samples as greater or less than 120 ms. In their study of 576 patients Kim et al. (2020) reported survivors were more likely to have a QRS duration of less than 120 ms. 42 patients survived to hospital discharge, with 23 surviving with a favourable neurological outcome (CPC 1-2). 320 (55.6%) patients were found to have a median QRS width > 120 ms and 256 (44.4%) had a median QRS width < 120 ms. A QRS duration < 120 ms was associated with survival to discharge (71.4% vs 28.6%) and a favourable neurological outcome (69.6% vs 30.4%). After adjustment for variables, in patients with a QRS duration < 120 ms, the odds ratios for survival were 3.371 (95% CI [1.633, 6.960]), and 4.634 (95% CI [1.562, 13.144]) for survival with favourable neurological outcomes.

A prospective, multi-centre study of 332 patients by Ho et al. (2016) found no significant differences between the QRS duration of survivors and non-survivors (128.7 vs. 129.6 ms, p = 0.95). In patients with a QRS duration of > 120 ms the univariate odds ratio of ROSC

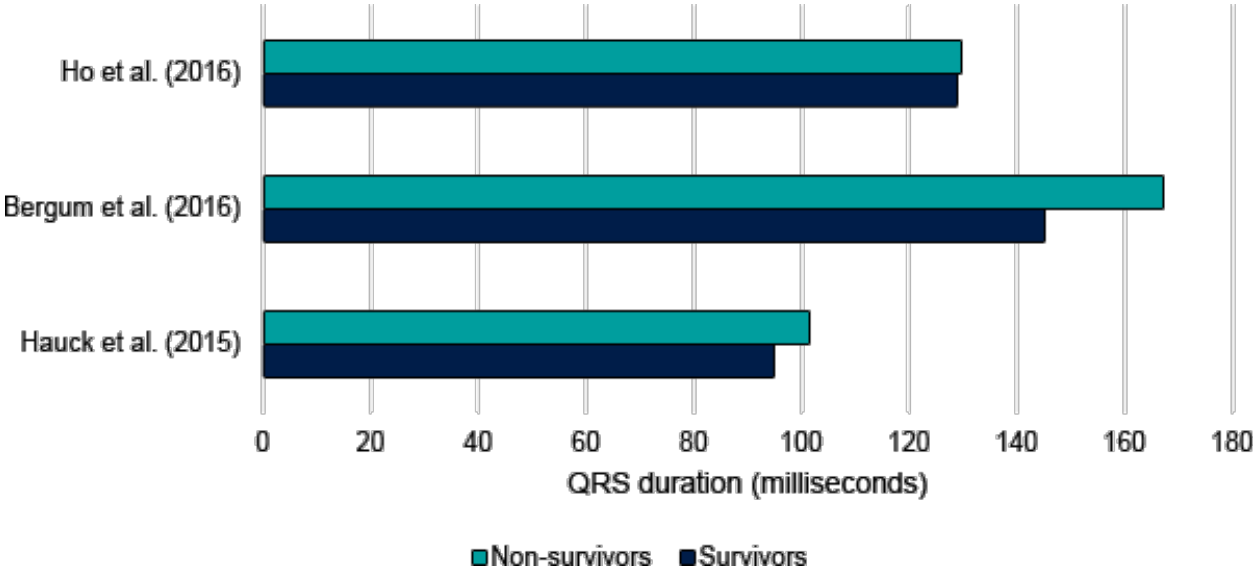


Figure 3: Studies reporting QRS duration (ungrouped).

was 0.67 (95% CI [0.41, 1.09], p = 0.11) and 0.98 (95% CI [0.38, 2.52], p = 0.97). Hauck et al. (2015) found the mean QRS duration of survivors was 94.8 ms (95% CI [79, 110.6]) compared to 101.4 ms (95% CI [95.3, 107.4]) in non-survivors. A similar finding of wider QRS widths in non-survivors was also demonstrated by Bergum et al. (2016), who reported a median QRS duration of 167 ms (95% CI [125, 209]) in non-survivors, 182 ms (95% CI [150, 235]) in those with 1-hour survival and 145 ms (95% CI [140, 174]) in those who survived to hospital discharge.

Changes in QRS Rate or Duration During Resuscitation

Skjeflo et al. (2018) studied 74 patients with in-hospital cardiac arrest and demonstrated decreasing QRS duration during ALS was significantly more frequent in patients who obtained ROSC compared to those declared dead. Patients from this study were also included in a larger multi-centre study of 298 patients analysed by Norvik et al. (2023), who extracted 559 ECG segments of PEA from ECG recordings taken during resuscitation and assessed QRS the duration within these to determine the likelihood of PEA transitioning to sustained ROSC (lasting > 20 minutes), temporary ROSC (lasting < 20 minutes) or other cardiac arrest rhythms. 145 segments ended with sustained ROSC, and 137 ended with temporary ROSC. This investigation found a decreasing QRS duration during resuscitation increased the odds of ROSC. The OR of ROSC was 1.26 (95% CI [1.13, 1.40], p < 0.001) per 40 ms decrease in QRS duration, with no differences seen between the QRS durations of patients who sustained a temporary or sustained ROSC.

Akin to the findings of studies investigating changes to QRS width during resuscitation, a similar relationship was seen between dynamic changes to QRS rate and patient outcome. When comparing the ECG characteristics of the initial monitored rhythm and final monitored rhythms of survivors, Skjeflo et al. (2018) found increasing QRS rate during resuscitation was a positive prognostic indicator for ROSC on scene. Finally, Norvik et al. (2023) found for every 40 bpm increase above 80 bpm, the OR of ROSC increased by 1.39 (95% CI [1.21, 1.58], p <0.001).

Other Components

An association between P waves and survival was demonstrated by Ho et al. (2016), who reported the presence of P waves in 67% (n = 12/18) of survivors and 52% (n = 163/314) of non-survivors. Conversely, a difference between survivors and non-survivors was not demonstrated by Bergum et al. (2016), who found P waves were present in 63% of patients with no ROSC, 76% of patients who survived for 1 hour, and 67% of patients who survived to discharge.

Bergum et al. (2016) was the only study to evaluate the QT interval and found a median QT interval of 494 (IQR 409-569) in patients with no ROSC, 540 (IQR 465-602) in patients who survived for 1 hour, and 528 (IQR 377-670) in those that survived to discharge. Similarly, median QTc intervals were 439 (IQR 376-508), 475 (IQR 426-509), and 513 (IQR 448-550) respectively.

Kim et al. (2020) found the median QRS amplitude of all survivors was 13 mm (95% CI [11, 18]) and was 10 mm (95% CI [7, 15]) in non-survivors. Subgroup analysis also revealed the median QRS amplitude of survivors with favourable neurological outcomes was

greater than the median of all survivors (16 mm, 95% CI [12, 19] vs. 13 mm, 95% CI [11, 18], $p < 0.001$).

Combined Components

Ho et al. (2016) assessed the survival rate of 332 patients when QRS rate and width were combined. The survival rate of patients with a QRS rate of 60 or greater, in combination with a QRS duration of less than 120 ms, was 7.2% (95% CI [1.1, 13.4]). In comparison, in patients with a rate of less than 60 and a QRS duration of greater than 120 ms, the survival rate was 3.7% (95% CI [0.5, 6.9]). This study also evaluated the outcomes of patients with these two groups with or without P waves. 27.8% (n = 5/18) of survivors had a QRS rate > 60, duration < 120 ms and P waves present, compared to 17.2% (n = 53/314) of non-survivors. Similarly, patients with no P waves, QRS rate < 60 and QRS duration > 120, made up 11.1% (n = 2/18) of survivors and 30.3% (n = 90/314) of non-survivors.

No statistical details were provided by Bergum et al. (2016) who displayed their findings in a scatter plot. No discernible differences were seen, with a tendency towards slower rates (< 60) and QRS durations of greater than 120 ms in both survivors and non-survivors.

DISCUSSION

This systematic review found there is inconsistency amongst the findings of studies investigating the utility of ECG characteristics as outcome indicators. Patients with a normal or "narrow" QRS duration (< 120 ms) during initial presentation may have an increased likelihood of ROSC compared to those with "wide" QRS complexes (> 120 ms). An association between increased HR and survival was observed in several studies, however the numbers of survivors were low overall, thus limiting the statistical precision of these findings. Contradictory results favouring a lower HR were also reported in several studies. Similarly, the presence of P waves produced variable results. An increased amplitude of QRS complexes correlated with survival in the single study that evaluated this component.

The results of this review partly reflect the findings of a systematic review and meta-analysis of the association between QRS characteristics in PEA and patient outcomes by Kim et al. (2024), who reported a wide QRS (> 120 ms) was associated with greater odds of mortality than a narrow QRS (< 120 ms) (OR = 1.86, 95% CI [1.11, 3.11]). Conversely, the odds of mortality for patients with a QRS rate < 60/min was significantly higher than those with a QRS frequency > 60/min (OR = 1.90, 95% CI [1.19, 3.02]), whereas our review found variability in the association between QRS rate and prognosis. Whilst their analysis provides valuable insight and an indication that some ECG components may have an association with patient outcomes, it did not include studies assessing other ECG components of PEA, the relationship between combined ECG components, or the relevance of dynamic ECG changes during resuscitation and patient outcomes.

Our previous review on the use of ECG component assessment in PEA demonstrated they should not be used to determine the aetiology or requirement for specific interventions (Gander and Laws, 2025). Nonetheless, dynamic changes occurring during resuscitation may hold some potential for use in clinical decision-making. Patients who display a pattern of increasing HR and decreasing QRS width may be more likely to obtain a

ROSC. Additionally, the presence, or development of, P waves may also indicate a higher likelihood of ROSC. These findings may support the theory that QRS width represents the "the underlying physiological state of the myocardium" as proposed by Skjeflo et al. (2019), and decreasing QRS width during resuscitation may therefore represent improving myocardial condition and function in response to treatment. Further research should explore the assessment of ECG components in PEA at regular intervals throughout resuscitation to determine their accuracy as indicators of an impending ROSC or the impact of ALS interventions on these. The inclusion of adult patients with a known or highly suspected cardiac aetiology may help to evaluate the relationship between myocardial condition, ECG components and prognosis.

This review partly supports the observations of a mixed-methods study by Coppola et al. (2021b), who explored how senior clinical advisors made decisions regarding futility and the cessation of resuscitation in patients with PEA. Participants stated that ECG morphology was one aspect considered when making such decisions, with narrow complex PEA considered to be associated with survival and wide complex bradycardic PEA felt to be an indicator of a poor prognosis. Our study supports the role of QRS width assessment as a factor to support decision-making, however, the predictive value of HR is less well defined due to small sample sizes and conflicting results within the literature. Although singular observations of QRS width do not provide an adequate indication of survivability, observation of the trajectory of QRS width throughout resuscitation, by comparing the presenting width of complexes in the initial rhythm with subsequent recordings, may provide an easily assessable source of information prognostic information for clinicians. This information should be interpreted in conjunction with other clinical findings when informing decisions regarding ongoing resuscitation. Additionally, ECG component assessment should not detract from the delivery of high-quality CPR and other procedures during resuscitation. Therefore, when possible, it is advised that these are obtained by obtaining a rhythm printout during pulse checks for interpretation after CPR is resumed.

An additional factor to consider in the relationship between ECG characteristics and survival is the presence of pseudo-PEA. As a degree of coronary perfusion is maintained in this state, it may be hypothesised that the presence of "normal" ECG components is more likely. This subset of PEA carries a higher survival rate than true PEA (Tsou et al., 2017; Elhalwagy et al., 2024). Therefore, it is possible some survivors of PEA had pseudo-PEA and thus contributed to higher survival rates in cases with ECG characteristics closer to normal values. Further studies should be undertaken using ultrasonography to evaluate the relationship between ECG characteristics and the presence or absence of mechanical cardiac activity.

When interpreted during resuscitation, QRS complex rate may also be influenced by other factors including the administration of medications. Adrenaline administration every 3-5 minutes is a recommended treatment for patients with PEA (Soar et al., 2021). Skjeflo et al. (2019) demonstrated patients with PEA who received adrenaline during resuscitation displayed a pattern of increasing HR prior to both ROSC and death. In cases of pseudo-PEA due to low cardiac output, the chronotropic and inotropic effects of adrenaline may improve systemic blood pressure and generate a palpable pulse. This may explain the correlation seen between increasing HR and ROSC in several studies.

Patients presenting with PEA often have a different clinical course and mortality rate to those with asystolic presentations (Norvik et al., 2022; Unneland et al., 2023; Elhalwagy et al. 2024). This review has highlighted several subgroups of PEA, such as those with narrow QRS complexes, have higher survival rates than others and may benefit from tailored resuscitation attempts. For example, if QRS duration represents the physiological condition of the myocardium, as proposed by Skjeflo et al. (2018), distinction between phenotypes of PEA stratified by ECG characteristics, may help to identify patients who will benefit from physiology-guided resuscitation. This may include titrated vasopressin or noradrenaline to augment cardiac output in cases of pseudo-PEA (Elhalwagy et al., 2024).

LIMITATIONS

Due to time and resource constraints, only literature published in the English language was included. Whilst this did not lead to the exclusion of any articles during the screening process, the use of English-language search terms may have led to the omission of relevant articles. Furthermore, due to time constraints, subject matter experts were not contacted to identify further literature. To aid with understanding practical application, this systematic review excluded reports utilising complex ECG component assessment that is not traditionally available to clinicians or easy to assess during resuscitation, such as techniques also involving transthoracic impedance or impedance circulation component assessment. This led to the exclusion of four studies that may offer further diagnostic or predictive insight. The inclusion of both IHCA and OHCA may have introduced significant clinical and methodological heterogeneity in several areas including patient presentation, bystander CPR, and intra-arrest diagnostics or treatments. This may therefore limit the comparability of findings across studies. Finally, the definitions of ROSC varied between studies. This may create additional inconsistency in the reported relationships between ECG characteristics and ROSC, as patients may have received additional interventions before the outcome was measured.

CONCLUSION

This review has found the QRS width and rate are the most frequently investigated ECG components in PEA. A narrow QRS width during resuscitation was demonstrated to be associated with ROSC in four of the seven studies evaluating this component. Studies evaluating the relationship between QRS rate and ROSC produced variable results. Combinations of ECG components may also offer some prognostic insight. A pattern of an increasing rate with decreasing QRS width during resuscitation was reported to be more prevalent in survivors. Additionally, a higher QRS amplitude was also found to be associated with survival within one study. The presence of these ECG changes may assist decision-making with the ongoing resuscitation strategy for patients with PEA. Overall, the level of evidence of studies included within this systematic review was low, due to their retrospective, non-comparative methodologies. Most studies were also at risk of bias due to incomplete patient inclusion due to missing ECG or patient outcome data. Further prospective research is needed to evaluate the use of ECG components to identify subgroups of PEA with a high likelihood of survival.

REFERENCES

Aufderheide, T. (2007). Etiology, electrophysiology, and myocardial mechanics of pulseless electrical activity. *Cardiac arrest: The science and practice of resuscitation medicine (2nd ed.)*, p. 426. http://ndl.ethernet.edu.et/bitstream/123456789/4168/1/434.pdf#page=461

Bergström, M., Schmidbauer, S., Herlitz, J., Rawshani, A., & Friberg, H. (2018). Pulseless electrical activity is associated with improved survival in out-of-hospital cardiac arrest with initial non-shockable rhythm. *Resuscitation, 133*, 147–152. https://doi.org/10.1016/j.resuscitation.2018.10.018

Bergum, D., Skjeflo, G. W., Nordseth, T., Mjølstad, O. C., Haugen, B. O., Skogvoll, E., & Loennechen, J. P. (2016). ECG patterns in early pulseless electrical activity—Associations with aetiology and survival of in-hospital cardiac arrest. *Resuscitation, 104*, 34–39. https://doi.org/10.1016/j.resuscitation.2016.03.029

Bunch, T. J., White, R. D., Friedman, P. A., Kottke, T. E., Wu, L. A., & Packer, D. L. (2004). Trends in treated ventricular fibrillation out-of-hospital cardiac arrest: A 17-year population-based study. *Heart Rhythm, 1*(3), 255-259. https://doi.org/10.1016/j.hrthm.2004.04.017

Coppola, A., Black, S., & Endacott, R. (2021b). How senior paramedics decide to cease resuscitation in pulseless electrical activity out of hospital cardiac arrest: A mixed methods study. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine, 29*, 1–13. https://doi.org/10.1186/s13049-021-00946-7

Coppola, A., Smyth, M., Black, S., Johnston, S., & Endacott, R. (2021a). The regional resuscitation guidelines for pulseless electrical activity in emergency medical services in the United Kingdom: A systematic review. *Australasian Journal of Paramedicine, 18*. https://doi.org/10.33151/ajp.18.928

Cournoyer, A., Cavayas, Y. A., Albert, M., Segal, E., Lamarche, Y., Potter, B. J., de Montigny, L., Chauny, J. M., Paquet, J., Marquis, M., & Cossette, S. (2022). Association of initial pulseless electrical activity heart rate and clinical outcomes following adult non-traumatic out-of-hospital cardiac arrest. *Prehospital Emergency Care, 27*(6), 1–8. https://doi.org/10.1080/10903127.2022.2096160

Elhalwagy, O., Singer, B., Grier, G., & Wong, A. (2024). Contextualizing pseudo-pulseless electrical activity in cardiac arrest: A meta-analysis and systematic review. *Air Medical Journal, 44*(1), 83-92. https://doi.org/10.1016/j.amj.2024.11.010

Gander, B., & Laws, S. (2025). ECG characteristics as indicators of the aetiology of pulseless electrical activity: A systematic review. *British Paramedic Journal, 9*(4), 27-36. https://doi.org/10.29045/14784726.2025.3.9.4.27

Hauck, M., Studnek, J., Heffner, A. C., & Pearson, D. A. (2015). Cardiac arrest with initial arrest rhythm of pulseless electrical activity: Do rhythm characteristics correlate with outcome? *The American Journal of Emergency Medicine, 33*(7), 891–894. https://doi.org/10.1016/j.ajem.2015.03.050

Ho, M., Gatien, M., Vaillancourt, C., Whitham, V., & Stiell, I. G. (2016). The utility of ECG characteristics as prognostic markers in pulseless electrical activity arrests: A retrospective observational cohort study. *Canadian Journal of Emergency Medicine, 18*(S1), S36. https://doi.org/10.1017/cem.2016.55

JBI (n.d.). *JBI Critical Appraisal Tools*. https://jbi.global/critical-appraisal-tools

Kim, J. H., Ryoo, H. W., Kim, J. Y., Ahn, J. Y., Moon, S., Lee, D. E., Mun, Y. H., & Son, J. W. (2020). QRS complex characteristics and patient outcomes in out-of-hospital pulseless electrical activity cardiac arrest. *Emergency Medicine Journal, 38*(1), 53–58. http://dx.doi.org/10.1136/emermed-2020-209623

Kim, J. H., Lee, J., Shin, H., Lim, T. H., Jang, B. H., Cho, Y., Kim, W., Choi, K. S., Kim, J. G., Ahn, C., & Lee, H. (2024). Association between QRS characteristics in pulseless electrical activity and survival outcome in cardiac arrest patients: A systematic review and meta-analysis. *Prehospital Emergency Care, 29*(2), 1–12. https://doi.org/10.1080/10903127.2024.2360139

Nguyen, D., Kritek, P. A., Greco, S. A., & Prutkin, J. M. (2020). Bradycardia at the onset of pulseless electrical activity arrests in hospitalized patients is associated with improved survival to discharge. *Heliyon, 6*(2), e03491. https://doi.org/10.1016/j.heliyon.2020.e03491

Norvik, A., Unneland, E., Bergum, D., Buckler, D. G., Bhardwaj, A., Eftestøl, T., Aramendi, E., Nordseth, T., Abella, B. S., Kvaløy, J. T., & Skogvoll, E. (2022). Pulseless electrical activity in in-hospital cardiac arrest—A crossroad for decisions. *Resuscitation, 176*, 117–124. https://doi.org/10.1016/j.resuscitation.2022.04.024

Norvik, A., Kvaløy, J. T., Skjeflo, G. W., Bergum, D., Nordseth, T., Loennechen, J. P., Unneland, E., Buckler, D. G., Bhardwaj, A., Eftestøl, T., & Aramendi, E. (2023). Heart rate and QRS duration as biomarkers predict the immediate outcome from pulseless electrical activity. *Resuscitation, 185*, 109739. https://doi.org/10.1016/j.resuscitation.2023.109739

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., & Chou, R. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery, 88*, 105906. https://doi.org/10.1016/j.ijsu.2021.105906

Rabjohns, J., Quan, T., Boniface, K., & Pourmand, A. (2020). Pseudo-pulseless electrical activity in the emergency department: An evidence-based approach. *The American Journal of Emergency Medicine, 38*(2), 371–375. https://doi.org/10.1016/j.ajem.2019.158503

Skjeflo, G. W., Nordseth, T., Loennechen, J. P., Bergum, D., & Skogvoll, E. (2018). ECG changes during resuscitation of patients with initial pulseless electrical activity are associated with return of spontaneous circulation. *Resuscitation, 127*, 31–36. https://doi.org/10.1016/j.resuscitation.2018.03.039

Skjeflo, G. W., Skogvoll, E., Loennechen, J. P., Olasveengen, T. M., Wik, L., & Nordseth, T. (2019). The effect of intravenous adrenaline on electrocardiographic changes during resuscitation in patients with initial pulseless electrical activity in out-of-hospital cardiac arrest. *Resuscitation, 136*, 119–125. https://doi.org/10.1016/j.resuscitation.2019.01.021

Soar, J., Böttiger, B. W., Carli, P., Couper, K., Deakin, C. D., Djärv, T., Lott, C., Olasveengen, T., Paal, P., Pellis, T., & Perkins, G. D. (2021). European Resuscitation Council guidelines 2021: Adult advanced life support. *Resuscitation, 161*, 115–151. https://doi.org/10.1016/j.resuscitation.2021.02.010

Tsou, P. Y., Kurbedin, J., Chen, Y. S., Chou, E. H., Lee, M. T. G., Lee, M. C. H., Ma, M. H. M., Chen, S. C., & Lee, C. C. (2017). Accuracy of point-of-care focused echocardiography in predicting outcome of resuscitation in cardiac arrest patients: A systematic review and meta-analysis. *Resuscitation, 114*, 92–99. https://doi.org/10.1016/j.resuscitation.2017.02.021

Unneland, E., Norvik, A., Bergum, D., Buckler, D. G., Bhardwaj, A., Eftestøl, T. C., Aramendi, E., Nordseth, T., Abella, B. S., Kvaløy, J. T., & Skogvoll, E. (2023). Non-shockable rhythms: A parametric model for the immediate probability of return of spontaneous circulation. *Resuscitation, 191*, 109895. https://doi.org/10.1016/j.resuscitation.2023.109895

Wang, H., Tang, W., Ristagno, G., Li, Y., Sun, S., Wang, T., & Weil, M. H. (2009). The potential mechanisms of reduced incidence of ventricular fibrillation as the presenting rhythm in sudden cardiac arrest. *Critical Care Medicine, 37*(1), 26-31. https://doi.org/10.1097/CCM.0b013e3181928914

Weiser, C., Poppe, M., Sterz, F., Herkner, H., Clodi, C., Schriefl, C., Warenits, A., Vossen, M., Schwameis, M., Nürnberger, A., & Spiel, A. (2018). Initial electrical frequency predicts survival and neurological outcome in out-of-hospital cardiac arrest patients with pulseless electrical activity. *Resuscitation, 125*, 34–38. https://doi.org/10.1016/j.resuscitation.2018.01.041

Youngquist, S. T., Kaji, A. H., & Niemann, J. T. (2008). Beta-blocker use and the changing epidemiology of out-of-hospital cardiac arrest rhythms. *Resuscitation, 76*(3), 376-380. https://doi.org/10.1016/j.resuscitation.2007.08.022

APPENDIX A: RISK OF BIAS ASSESSMENT RESULTS – CASE SERIES

Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Overall Risk of Bias
Hauck et al. (2015)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Moderate
Bergum et al. (2016)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Moderate
Ho et al. (2016)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Moderate
Skjeflo et al. (2018)	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes	Yes	Yes	Moderate
Weiser et al. (2018)	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes	Yes	Yes	Moderate
Kim et al. (2020)	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes	Yes	Yes	Moderate
Norvik et al. (2023)	Yes	Yes	Yes	Unclear	No	Yes	Yes	Yes	Yes	Yes	Moderate

- Q1: Were there clear criteria for inclusion in the case series?
- Q2: Was the condition measured in a standard, reliable way for all participants included in the case series?
- Q3: Were valid methods used for identification of the condition for all participants included in the case series?
- Q4: Did the case series have consecutive inclusion of participants?
- Q5: Did the case series have complete inclusion of participants?
- Q6: Was there clear reporting of the demographics of the participants in the study?
- Q7: Was there clear reporting of clinical information of the participants?
- Q8: Were the outcomes or follow up results of cases clearly reported?
- Q9: Was there clear reporting of the presenting site(s)/clinic(s) demographic information?
- Q10: Was statistical analysis appropriate? (Munn et al., 2020)

APPENDIX B: RISK OF BIAS ASSESSMENT RESULTS - COHORT STUDIES

Reference	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Overall Risk of Bias
Nguyen et al. (2020)	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Moderate
Cournoyer et al. (2022)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Unclear	Yes	Low

- Q1: Were the two groups similar and recruited from the same population?
- Q2: Were the exposures measured similarly to assign people to both exposed and unexposed groups?
- Q3: Was the exposure measured in a valid and reliable way?
- Q4: Were confounding factors identified?
- Q5: Were strategies to deal with confounding factors stated?
- Q6: Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?
- Q7: Were the outcomes measured in a valid and reliable way?
- Q8: Was the follow up time reported and sufficient to be long enough for outcomes to occur?
- Q9: Was follow up complete, and if not, were the reasons to loss to follow up described and explored?
- Q10: Were strategies to address incomplete follow up utilized?
- Q11: Was appropriate statistical analysis used? (Moola et al., 2020)

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

REVIEWS

BACHELOR'S DEGREE AS ENTRY-TO-PRACTICE: A LITERATURE REVIEW OF PARAMEDICINE AND OTHER HEALTH PROFESSIONS

Cameron A. Rimstad[1]; Jasmine M. Kayanja[2]; Sidney L. Newman[2]; Efrem M. Violato, PhD*[3]

Author Affiliations: 1. MacEwan University, Edmonton, Alberta, Canada; 2. University of Alberta, Edmonton, Alberta, Canada; 3. Centre for Advanced Medical Simulation, Northern Alberta Institute of Technology, Edmonton, Alberta, Canada.

Recommended Citation: Rimstad, C., Kayanja, J., Newman, S., & Violato, E. (2026). Bachelor's degree as entry-to-practice: A literature review of paramedicine and other health professions. *International Journal of Paramedicine.* (13). 120-132. https://doi.org/10.56068/HRSG6460.

Keywords: diploma, transition, degree, allied health, professional education, emergency medical services, EMS, paramedicine

Disclosures: The authors report there are no competing interests to declare. During the preparation of this work, the authors used ChatGPT to locate and summarize relevant articles during the literature retrieval stage of the paper. After using this artificial intelligence (AI) tool, the authors reviewed and edited the content as needed. The authors take full responsibility for the content of this paper

Funding: Not applicable.

Received: October 1, 2025
Revised: October 20, 2025
Accepted: October 20, 2025
Published: January 13, 2026
Addendum Published: Febrary 10, 2026

**Corresponding Author:* efremv@nait.ca

Interview:
https://youtu.be/YOphJNQhUI4

ABSTRACT

Background: The evolving scope of paramedicine has prompted debate regarding the suitability of diploma programs as entry-to-practice, with increasing attention on transitioning to bachelor's degree qualifications. Other health professions have undergone similar shifts, offering valuable insights for paramedicine.

Objective: To examine the reported outcomes of transitioning from diploma- to degree-level entry-to-practice in paramedicine and comparable health professions.

Methods: A narrative literature review was conducted in July 2025 using four academic databases and hand searches. Elements of the PRISMA framework were adapted to illustrate the search and screening process. As the review was a narrative review no risk of bias assessment tool was used. Inclusion criteria were full text academic articles on degree transition published from 1980-2025; exclusion criteria were non-English, non-peer reviewed, and non-healthcare professions. Eighteen peer-reviewed articles met inclusion criteria, encompassing nursing, dental hygiene, respiratory therapy, and paramedicine. Data were extracted and thematically analyzed to identify positive and negative impacts of degree-level entry.

Results: Positive outcomes included enhanced patient care, expanded career opportunities, improved cognitive and clinical competencies, and strengthened interpersonal attributes. Reported drawbacks included increased financial and geographic barriers, extended program duration, and perceptions of limited necessity for practice. Paramedicine-specific literature was scarce, though evidence from nursing and dental hygiene indicated significant professional and clinical advantages.

Conclusions: Transitioning to bachelor's degree entry-to-practice offers potential benefits for paramedicine but may also restrict accessibility and exacerbate workforce challenges. Policymakers and educators should balance these factors, drawing on international and cross-disciplinary experiences, before adopting degree-based entry requirements.

INTRODUCTION

Over the past several years, paramedics have grown rapidly within their professional scope and responsibilities. What began as a soldier transport system has matured into a professional career that provides lifesaving emergency medicine (Makrides et al., 2022), while adjusting to aging populations, chronic con-

ditions, and technological advancements (O'Meara et al., 2017). A common concern in paramedicine is that advancements in the field have not only reached but surpassed the educational needs that can be addressed through a traditional diploma. One response to this rapid development is transitioning entry-to-practice education to a bachelor's degree (Egnatovich, 2022; O'Meara et al., 2017).

Countries such as Australia, New Zealand, and the United Kingdom have implemented higher paramedic education and observed benefits for both students and the profession overall (Brooks et al., 2018). Beyond paramedicine, other healthcare disciplines such as respiratory therapy (Becker & Nguyen, 2014), dental hygiene (DeRosa et al., 2021; Reid et al., 2021; Sunell et al., 2017), and nursing and midwifery (Jinks, 1994; Roets et al., 2016; Swindells & Willmott, 2003) have also explored the transition to support their growing scope and expectations. By transitioning from the traditional diploma, paramedic students could develop deeper theoretical knowledge and cognitive skills to enhance patient care and practical skills (Egnatovich, 2022). As Canadian and American associations for paramedicine call for and begin exploring the transition to degree programs (Caffrey et al., 2019), it is necessary to understand outcomes from countries and professions where the transition to a degree program has occurred. By examining findings from other countries and professions, Canadian and American paramedic groups, from colleges to schools, can make better-informed decisions about transitioning and prepare for potential outcomes that may occur post-transition.

A literature review was conducted to examine the available academic literature on the transition to a bachelor's degree program from other credentials, such as diplomas, certificates, and lower-level degrees, to inform policymakers, institutions, educators, and the paramedic profession in general about how paramedicine may be affected.

METHODS

Review Approach

The present study employs a literature review, an approach that seeks consolidation, summation, or synthesis of existing publications to identify what is known about a topic without necessarily including formal quality appraisal, exhaustive searching, and which is typically presented narratively (Grant & Booth, 2009). Narrative literature reviews are particularly appropriate for synthesizing evidence in fragmented or emerging fields where conceptual clarity is needed (Snyder, 2019). The literature review method was selected over more structured methods, such as a scoping or systematic review, for two reasons: 1) Inclusion; based on the narrow scope of the topic (degree transition) and subject (paramedicine), it was expected that much evidence exists outside higher levels of the "hierarchy of evidence." More stringent methods risk excluding relevant literature (Murad et al., 2016). 2) Utility; the review aims to gather information about the educational implications of transitioning to a degree program, rather than evaluate the effectiveness of an intervention. As such, formal critical appraisal may exclude relevant literature and descriptive and contextual insights relevant to informing educators, policy makers, and stakeholders about the decision to transition.

Search Strategy

A preliminary search of the literature was performed to develop key terms, leading to the inclusion of various professions in the search. The final search terms were based on plain-text keywords and Boolean operators (AND, OR). No controlled vocabulary (e.g., MeSH or CINHAL headings) was used. Table 1 presents the search terms and Boolean combinations used; all searches were performed on all databases. Database searches were conducted in: Medline (Ovid), CINAHL, PubMed, and Wiley Online Library in July 2025. Searches were limited to English-language, peer-reviewed, full-text journal articles published between 1980 and 2025. For searches returning more than 400 results, a practical screening limitation based on relevance saturation was set where the first 200 results were screened in chronological order. PubMed was not included in search 4 due to the retrieval of more than 2 million records. A review of references from selected articles, a hand search, and artificial intelligence, specifically ChatGPT (OpenAI, 2025), was also used to search for additional literature after the initial screening. ChatGPT was used after initial database screening to identify additional potentially relevant articles by suggesting titles or journals. All citations were managed using Zotero (Corporation for Digital Scholarship, 2025), which was also used for de-duplication. Ethics approval was not required for this study.

Inclusion/Exclusion Criteria

Inclusion criteria: academic articles addressing the transition to higher education in healthcare professions, full-text articles, and an article publication date range from 1980 to 2025. Exclusion criteria: non-English articles, articles not concerning healthcare professions, and articles that were not scholarly or peer reviewed were excluded (e.g., editorials, commentaries).

Extraction

Elements of the PRISMA framework were adapted to illustrate the search and screening process (Moher et al., 2009). Figure 1 presents the PRISMA flow diagram showing the number of records identified, screened, excluded, and included in the final synthesis. Three authors (CR, SN, JK) independently screened all identified articles' titles and abstracts for inclusion before comparing selected articles for retrieval and eligibility based on inclusion/exclusion criteria to determine a final set of articles for review. After the final selection of articles for review, three authors (CR, SN, JK) independently read articles to extract findings and themes, before engaging in an iterative review process with all authors to identify a final set of primary and sub-themes.

Because this was a narrative review, no formal critical appraisal tool (e.g., CASP or JBI) was applied. However, quality and potential bias were addressed through inclusion criteria and screening procedures. Only peer-reviewed, scholarly articles were included, and non-research or editorial pieces were excluded. Studies lacking sufficient methodological detail or providing weak or anecdotal evidence were categorized as "poor evidence" and excluded during screening. The review team also considered factors such as study design, sample size, and clarity of reporting when assessing the quality of included studies.

RESULTS

Eighteen articles were selected for review. The number of articles per profession was dental hygiene = 7, nursing = 7, paramedicine = 3, and respiratory therapy = 1. Two primary themes were developed: positive and negative effects of implementing a degree program. Positive effects were subdivided into four themes: improved patient care, improved career opportunities, improved cognitive and clinical practice, and personal and relational attributes. The negative aspects were subdivided into inaccessibility and a lack of necessity.

Search	Terms
1	bachelor's degree OR baccalaureate degree AND paramedicine AND effects AND associate degree
2	dental hygiene AND baccalaureate OR diploma AND associate degree AND education
3	respiratory therapy AND baccalaureate AND associate degree AND education
4	nursing AND baccalaureate AND associate degree AND education OR educational

Table 1. Search terms used.

Positive Outcomes

Improved Patient Care

Patient outcomes and care were heavily discussed in the nursing literature. Several studies found a relationship between a greater proportion of baccalaureate-prepared nurses in hospitals and reduced "failure to rescue," patient mortality rates, re-admissions, and length of stay (Aiken et al., 2003; Lasater et al., 2021; Melnyk et al., 2015; Simpson et al., 2012). One study on surgical nurses found that a 10% organizational increase in employment of higher degree nurses resulted in a 5% decrease in "failure to rescue" and mortality rates (Aiken et al., 2003). Another review found that nurses holding bachelor's degrees had more highly developed skills, such as professionalism, leadership, and critical thinking, which enhanced patient satisfaction and outcomes (Lane & Kohlenberg, 2010). One paramedic study found that advanced education was perceived to improve interpersonal "soft skills," potentially enhancing patient experience and operational efficiency (Egnatovich, 2022).

Improved Cognitive Skills and Clinical Practice

The improvement of cognitive abilities was identified throughout the literature as a key reason to transition to a bachelor's degree education (Egnatovich, 2022). A study of sixteen dental hygienists in Canada who had achieved diplomas before pursuing bachelor's degrees found participants reported growth of critical thinking, evidence-based decision-making, comprehensive care skills, and an increase in ability to use research in practice after completing their bachelor's degrees (Kanji et al., 2011). Confidence in critiquing research increased with exposure to scientific literature during the degree program, which facilitated communication with patients and more readily making informed practice decisions (Snyder, 2019). The same study found 86% of students agreed that bachelor's degree-level education leads to increased knowledge, and 85% agreed that critical thinking and research use are increased due to a bachelor's degree educa-

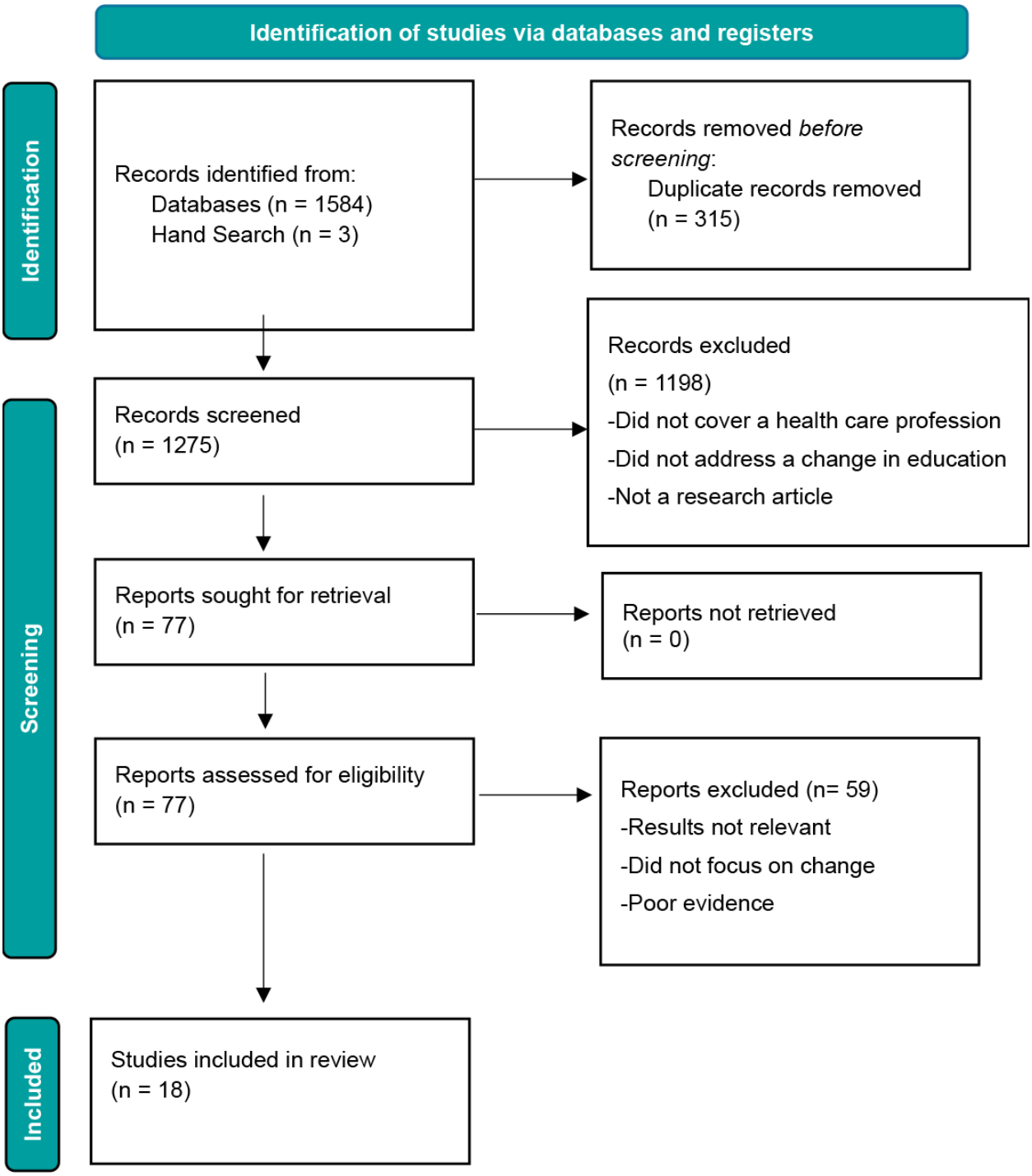


Figure 1. PRISMA diagram for literature search.

tion. Sixty-nine percent indicated that increasing their critical thinking skills was a factor in choosing a degree program over a diploma, while 83% stated wanting to increase their knowledge base contributed to their decision to pursue bachelor's degrees (Snyder, 2019).

A cross-sectional survey of nursing and midwifery graduates (completed an academic program) and diplomates (board-certified) in England (n = 448) assessed the differences between the graduates and diplomates using a measure of 42 different cognitive skills

and qualities (Swindells & Willmott, 2003). Skills assessed included problem-solving, evaluating care approaches, accountability, leadership, and teamwork. Of the 42 items, graduates scored significantly higher than diplomates on 21. Evidence-based practice (EBP) is using the most recent and relevant research with clinical skills and experience to improve patient care (Melnyk et al., 2015). In a survey of paramedics in Australia (n = 892) Simpson et al. (2012) found that 98% of respondents supported integrating EBP in practice, with higher support among those with a bachelor's degree (Simpson et al., 2012). The increased perceived value of and support for EBP was also linked to viewing research as important in paramedicine. The same survey showed that 97% of respondents viewed research as important in paramedicine, while 98% said they would change their practice based on research. Conversely, longer-serving paramedics were less likely to value research and the importance of participating in research. While most of the literature supported the advancement of cognitive abilities and skills, this theme was challenged in other research that found no differences in the cognitive abilities of diplomates and graduates (Clinton et al., 2005).

Personal And Relational Attributes

Interpersonal competencies emerged as a ubiquitous theme in literature. Bachelor's degree-prepared nurses scored significantly higher on networking and collaboration, adaptability, accountability, and teamwork compared to diploma-prepared nurses (Swindells & Willmott, 2003). Among diploma dental hygienists who completed a bachelor's degree, the most prominent change was increased self-perception of confidence and credibility (Kanji et al., 2011). Additional research with dental hygienists found that knowledge obtained from a bachelor's degree increased self-confidence, which was associated with improved ability, decision-making, and action-taking (Sunell et al., 2017). Literature for paramedicine was limited; however, one New Zealand study investigating anxiety among paramedic students found that those whose highest previous education was a diploma program had significantly higher anxiety than those with degree qualifications (Wills & Asbury, 2019).

Improved Career Opportunities

Career mobilization may become easier with higher levels of education in a desired profession. In dental hygiene, increased access to career opportunities was a key theme identified across several studies, with broader career opportunities in academia and research motivating students considering a bachelor's degree (Benbow & Kanji, 2019; Kanji et al., 2011; Kanji & Laronde, 2018). Students who completed their dental hygienist degree identified enhanced skill in retrieving scientific information (Kanji & Laronde, 2018). Bachelor's degree dental hygienists were more likely to practice or work outside the traditional clinical setting, such as public health and community practice. A study of 5 first-year Bachelor of Dental Science student cohorts (n = 127) in British Columbia found that 82% of students chose a degree program rather than a diploma due to access to broader career opportunities (Katyal & Kanji, 2021). A survey of dental hygiene students (n = 401) found that 75% of students counted expanded access to career opportunities and a better capacity to work with underserved groups as a motivating factor in pursuing a degree program rather than a diploma (Benbow & Kanji, 2019). Higher education has also been linked to greater access to leadership roles, higher salaries, and more advanced professional roles. Becker and Nguyen (2014) found that respiratory therapists with a bachelor's

degree (n = 3139) at entry-to-practice were more likely to have roles as educators (12%) and leaders (40%) than those with associate degrees (Becker & Nguyen, 2014).

Negative Outcomes

Inaccessibility

Across several healthcare disciplines, recurring critiques regarding the accessibility of higher education and how secondary factors impact individuals' decisions to pursue specific career paths emerged. One study investigating dental hygiene students' attitudes towards bachelor's degrees and factors that affected program choice identified three major concerns in choosing the program: proximity to the institution (74%), costs (68%), and time to completion (47.7%) (Reid et al., 2021). Proximity concerns have also been observed in nursing (Haron et al., 2014). Lack of time and finances is also a hindrance; in a survey of 61 nurses, 28 associate degree nurses indicated lack of time and finances as a reason for not pursuing a bachelor's degree despite seeing value in higher education (Thielmann et al., 2019). Lower socio-economic status (SES) individuals were less likely to complete a bachelor's degree compared to higher SES individuals and were more likely to base educational choices on available financial aid rather than credential type (Becker & Nguyen, 2014).

Lack of Necessity

The perspective of bachelor's degree education as unnecessary for practice emerged relatively frequently in the literature. Research with nursing students found that though bachelor's degrees are perceived as beneficial, alternative pathways are viewed as sufficient for entry to practice (Thielmann et al., 2019). Similarly, a 2021 survey of 384 dental hygiene students found 73.7% of respondents felt an associate degree was sufficient for entry to practice (Reid et al., 2021). Practicing dental hygienists also felt their associate degree adequately prepared them to practice (Anderson & Smith, 2009). A survey of Pennsylvania diploma and associate degree nursing students found that even if the state nursing board was to mandate a BSN degree within 10 years post qualification, 78.9% would still have enrolled in their current program, indicating they consider their educational level sufficient (Maneval & Teeter, 2010). A study in England assessed the competencies of 166 graduate and 188 diplomate nurses using a modified version of the Nursing Competencies Questionnaire and found almost no differences in competency between the two groups (Clinton et al., 2005). The authors argue that there is no difference in skills or competencies between diplomates and graduates and that attaining higher education is not a direct cause of improvement in practice. It has also been argued that higher education in paramedicine is only necessary for specialized practice, like community or flight paramedics (Caffrey et al., 2019).

Research has found that transitioning to higher education can impact workplace professionalism due to disparities between experiential learning and theoretical knowledge. A UK study investigating the effects of transitions to higher education in paramedicine found substantial tension between the pre-reform/transition and post-reform/transition individuals (Givati et al., 2018). In-depth interviews showed that pre-reform individuals felt that they were being pushed out by new academic recruits and expressed feelings of frustration and resentment if they were unable to pursue similar higher education. Conflict in practice was also highlighted; post-reform individuals who held higher-ranked

positions due to completing a bachelor's degree recalled instances of professional authority being disregarded by more experienced, though lower-ranked colleagues.

DISCUSSION

The literature review identified positive and negative outcomes of transitioning education/training to bachelor's degree-based education. Though paramedic-specific information was minimal, evidence from other health professions helps inform what outcomes may occur with different entry-to-practice pathways. Shifting towards a bachelor's degree can potentially have practice and professional benefits (Benbow & Kanji, 2019; Caffrey et al., 2019; Katyal & Kanji, 2021; Sunell et al., 2017; Williams et al., 2015); however, a bachelor's degree can be a time and financial impediment for potential students (Burke, 2018; DeRosa et al., 2021; Graf, 2006; Reid et al., 2021; Thielmann et al., 2019). It is imperative to consider the findings from all professions, with both the positive and negative outcomes presenting multiple considerations related to a transition in paramedicine.

The primary benefit of transitioning to a degree-based program is potential improvements to patient care. While the evidence found in this review for patient care is primarily from nursing, it may be inferred that similar benefits will exist for paramedicine when considered in conjunction with cognitive and clinical skills development and research engagement.

Better critical thinking and integration of relevant knowledge can improve patient safety and reduce errors (Kim & Kwak, 2024; Zhang et al., 2025) and may benefit clinical practice overall (Berg et al., 2023; Scott et al, 2021). Critical thinking relates to the ability to identify a patient's needs and find the appropriate response (Lawn et al., 2020). Students completing a four-year undergraduate degree program advance critical thinking skills through in-class experiences, such as curriculum and spending more time learning and interacting with faculty, and out-of-class experiences, with greater exposure to opportunities to develop critical thinking skills compared to shorter programs (Becker & Nguyen, 2014; Terenzini et al., 1995). With more education time, paramedics will have more knowledge and develop stronger systems of thought and cognitive skills such as critical thinking and problem-solving skills, which can result in deeper and better applied mental models and cognitive schemas that may lead to better patient care.

The development of knowledge and cognitive skills can also support patient care through engagement in EBP. Comprehension of available knowledge is crucial for implementing EBP, which is facilitated by teaching fundamental skills, including critical thinking, to understand and critique research. While evidence-based decision-making is not specific to degree holders (Kanji et al., 2011), higher education may facilitate a deeper understanding and utilization of research that advances overall EBP. Engaging with research can encourage professionals to challenge prior practices and link the academic and clinical sides of paramedicine. Relatedly, engaging in research and developing analytical skills may spur an interest and open doors to careers in education and research (Burke, 2018; Kanji et al., 2011; Kanji & Laronde, 2018).

Another potential benefit of a degree program is an increase in curriculum time to address current shortcomings in paramedic education. For example, with more curriculum time, topics such as empathy training and topics of psychological distress and mental health issues can be better addressed. Paramedicine has previously been urged to apply

empathy training to students due to a correlation between reduced empathy and burnout in nurses and physicians (Williams et al., 2017).

A key drawback of implementing higher-level entry-to-practice in paramedicine is the inevitable increase in tuition costs and financial burden that comes with the extended duration of a degree. Diplomas provide students with a more cost-effective approach to post-secondary education. Further indirect costs may also come from transitioning to higher education. Degree programs typically exist in larger post-secondary institutions in larger urban centers. Smaller post-secondary schools, such as community colleges, that exist in smaller communities and do not offer degree programs may discontinue programs, forcing more students to move to complete their studies (DeRosa et al., 2021). Relocation also adds costs like rent, transportation, and groceries. Moreover, diplomas allow students to enter the workforce earlier while gaining professional exposure.

Although higher education is often linked to a salary increase, an advanced degree is not necessarily related to a rise in salary or SES during the entrance-to-practice period (Becker & Nguyen, 2014). Salary increases often come from leadership roles, making it less beneficial for those who do not wish to pursue a leadership position. Earlier workforce entry can enable students to earn an income, which they can invest in further education if desired. The importance of the financial aspect of transitioning into a degree program and potential barriers to students entering the profession during a time of workforce shortages is important to consider (Canada Parliament House of Commons Standing Committee on Health, 2023).

While professional standards and scope of practice are set by colleges and regulatory bodies, the level of willingness to attain the requisite level of practice by a potential learner may limit the number of people who choose to pursue paramedicine as a profession. Pursuing a bachelor's degree may seem irrelevant if a student's desired career in paramedicine, or perception of paramedicine, only requires a fundamental understanding of basic knowledge and skills. Potential paramedic students who want to master skills and feel disinterested in academics might not enter the profession if a bachelor's degree is the standard for entry to practice. Experiential learning advocates may support current models, that after developing an adequate knowledge base, students should prioritize their skills and growth through practice-based experiential learning rather than further education (Dewey, 1997).

Another major consideration is the lack of educators with a bachelor's degree in paramedicine. A limited number of North American post-secondary institutions offer a Bachelor's of Paramedicine or similar, and none offer this degree via direct entry into the program post high school or equivalent. Those that do offer this program require applicants to be practicing paramedics. The only alternative is obtaining this education in a different country. This means only a small number of paramedics in North America hold this higher education standard (Caffrey et al., 2019). With a higher standard and requirement for practice, the requirement to be an educator will rise, necessitating a bachelor's degree to teach, which could escalate educator shortages. If a transition from diploma to degree programs is implemented, post-secondary institutions should thoroughly plan for an inevitable imbalance in faculty considered "qualified" to teach.

Limitations & Future Directions

There were three primary limitations to this review. 1) Lack of literature specific to paramedicine, of the 18 sources, only 3 were focused on the paramedic profession. 2) Search terms, databases searched, academic literature, and reviews not in English were not used in this literature review. 3) No systematic evaluation method of the research quality was used for this review. However, as a literature review intended to provide a higher-level perspective on transitioning to degree-based education, rather than examining specific or explicit outcomes, the current approach was deemed appropriate.

There is a significant need for further research in paramedicine regarding the shift to higher education and paramedic education in general (Caffrey et al., 2019). The articles found for this review were largely studies or surveys based on self-reported data, thus allowing for subjectivity. Further research and evaluation should take a holistic approach, including exploring students', educators', and programs' views, opinions, and experiences while understanding educational, practice, and performance outcomes. Additionally, measuring areas such as patient outcomes or cost changes is important to fully understand the effect of a shift to a bachelor's degree. If a transition is undertaken, rigorous change management must be implemented, paired with ongoing evaluation and assessment of the process and outcomes after transition.

CONCLUSION

Based on the results of this review, clear benefits and drawbacks to implementing higher entry-level education in a profession were identified across multiple professions. Though most of the evidence exists outside of paramedicine, the consistency of positive and negative outcomes across professions, including paramedicine, and global regions indicates that it is likely the findings of this review are applicable to paramedicine in general. The decision to transition to a bachelor's level for entry to practice must consider how factors such as patient outcomes, clinical and cognitive ability, personal and relational attributes, and professional opportunity weigh against factors of accessibility, equity, and necessity for safe practice. Based on the evidence identified, it is incumbent on the profession to weigh the benefits and drawbacks of transitioning to determine what approach will provide the best overall patient, professional, and societal outcomes.

REFERENCES

Aiken, L.H., Clarke, S.P., Cheung, R.B., Sloane, D.M., & Silber, J.H. (2003). Educational levels of hospital nurses and surgical patient mortality. *JAMA, 290*(12), 1617-1623. https://doi.org/10.1001/jama.290.12.1617

Anderson, K.L., & Smith, B.S. (2009). Practicing dental hygienists' perceptions about the Bachelor of Science in Dental Hygiene and the oral health practitioner. *Journal of Dental Education, 73*(10), 1222-1232. https://doi.org/10.1002/j.0022-0337.2009.73.10.tb04814.x

Becker, E.A, & Nguyen, X.T. (2014). The current impact of entry-level associate and baccalaureate degree education on the diversity of respiratory therapists. *Respiratory Care, 59*(12), 1817-1824. https://doi.org/10.4187/respcare.03106

Benbow, P., & Kanji, Z. (2019). Dental hygiene baccalaureate education: A national study of students' perceived value and intentions. *Canadian Journal of Dental Hygiene, 53*(2), 89-99. https://www.cjdh.ca/

Berg, C., Philipp, R., & Taff, S.D. (2023). Scoping review of critical thinking literature in healthcare education. *Occupational Therapy in Health Care, 37*(1), 18-39. https://doi.org/10.1080/07380577.2021.1879411

Brooks, I.A., Grantham, H., Spencer, C., & Archer, F. (2018). A review of the literature: The transition of entry-level paramedic education in Australia from vocational to higher education (1961–2017). *Australasian Journal of Paramedicine, 15*, 1-11. https://doi.org/10.33151/ajp.15.2.584

Burke, L.M. (2018). Is higher education worth the cost? It depends. *Counterpoints, 517*, 361-374.

Caffrey, S.M., Barnes, L.C., & Olvera, D.J. (2019). Joint position statement on degree requirements for paramedics. *Prehospital Emergency Care, 23*(3), 434-437. https://doi.org/10.1080/10903127.2018.1519006

Canada Parliament House of Commons Standing Committee on Health. (2023). *Addressing Canada's health workforce crisis*. https://publications.gc.ca/site/eng/9.921706/publication.html

Clinton, M., Murrells, T., & Robinson, S. (2005). Assessing competency in nursing: A comparison of nurses prepared through degree and diploma programmes. *Journal of Clinical Nursing, 14*(1), 82-94. https://doi.org/10.1111/j.1365-2702.2004.01015.x

Corporation for Digital Scholarship. (2025). *Zotero* (7.0.27) [Software]. https://www.zotero.org/

DeRosa Hays, R., & Moglia Willis, S. (2021). The baccalaureate as the minimum entry-level degree in dental hygiene. *Journal of Dental Hygiene, 95*(6), 46-53. https://pubmed.ncbi.nlm.nih.gov/34949682/

Dewey, J. (1997). *Experience and education*. Free Press. http://ebookcentral.proquest.com/lib/ualberta/detail.action?docID=4934956

Egnatovich, J. (2022). *The perceived necessity by paramedics and paramedic employers for a college degree in the paramedic profession* (Publication No. 29398834) [Doctoral dissertation, Caldwell University]. ProQuest Dissertations & Theses. https://dokumen.pub/the-perceived-necessity-by-paramedics-and-paramedic-employers-for-a-college-degree-in-the-paramedic-profession.html

Givati, A., Markham, C., & Street, K. (2018). The bargaining of professionalism in emergency care practice: NHS paramedics and higher education. *Advances in Health Sciences Education, 23*(2), 353-369. https://doi.org/10.1007/s10459-017-9802-1

Graf, C.M. (2006). ADN to BSN: Lessons from human capital theory. *Nursing Economic$, 24*(3), 135-142. https://pubmed.ncbi.nlm.nih.gov/16786828/

Grant, M.J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Info Libraries Journal, 26*(2), 91-108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Haron, Y., Reicher, S., & Riba, S. (2014). Factors influencing nursing career choices and choice of study program. *Health Marketing Quarterly, 31*(2), 167-177. https://doi.org/10.1080/07359683.2014.907126

Jinks, A.M. (1994). Conceptualization of differing levels of educational attainment: What are the characteristics of nurses and midwives who have undertaken diploma and degree educational programmes? *Journal of Nursing Management, 2*(6), 279-285. https://doi.org/10.1111/j.1365-2834.1994.tb00169.x

Kanji, Z., & Laronde, D. (2018). Motivating influences and ability-based outcomes of dental hygiene baccalaureate education in Canada. *International Journal of Dental Hygiene, 16*(3), 329-339. https://doi.org/10.1111/idh.12330

Kanji, Z., Sunell, S., Boschma, G., Imai, P., & Craig, B.J. (2011). Outcomes of dental hygiene baccalaureate degree education in Canada. *Journal of Dental Education, 75*(3), 310-320. https://doi.org/10.1002/j.0022-0337.2011.75.3.tb05044.x

Katyal, S., & Kanji, Z. (2021). Students' motivating influences for selecting dental hygiene and a 4-year degree: A retrospective study. *International Journal of Dental Hygiene, 19*(1), 114-120. https://doi.org/10.1111/idh.12472

Kim, N.Y., & Kwak, S.J. (2024). Relationship between nurses' critical thinking disposition and patient safety incident reporting: The mediating role of patient safety culture in a comprehensive nursing service ward. *PLOS ONE, 19*(12), e0315679. https://doi.org/10.1371/journal.pone.0315679

Lane, S.H., & Kohlenberg, E. (2010). The future of baccalaureate degrees for nurses. *Nursing Forum, 45*(4), 218-227. https://doi.org/10.1111/j.1744-6198.2010.00194.x

Lasater, K.B., Sloane, D.M., McHugh, M.D., Porat-Dahlerbruch, J., & Aiken, L.H. (2021). Changes in proportion of bachelor's nurses associated with improvements in patient outcomes. *Research in Nursing & Health, 44*(5), 787-795. https://doi.org/10.1002/nur.22163

Lawn, S., Roberts, L., Willis, E., Couzner, L., Mohammadi, L., & Goble, E. (2020). The effects of emergency medical service work on the psychological, physical, and social well-being of ambulance personnel: A systematic review of qualitative research. *BMC Psychiatry, 20*(1), 348. https://doi.org/10.1186/s12888-020-02752-4

Makrides, T., Ross, L., Gosling, C., Acker, J., & O'Meara, P. (2022). From stretcher bearer to practitioner: A brief narrative review of the history of the Anglo-American paramedic system. *Australasian Emergency Care, 25*(4), 347-353. https://doi.org/10.1016/j.auec.2022.05.001

Maneval, R.E., & Teeter, M.M. (2010). The student perspective on RN-Plus-10 legislation: A survey of associate degree and diploma nursing program students. *Nursing Education Perspectives, 31*(6), 358-361. https://pubmed.ncbi.nlm.nih.gov/21280441/

Melnyk, B.M., Buck, J., & Gallagher-Ford, L. (2015). Transforming quality improvement into evidence-based quality improvement: A key solution to improve healthcare outcomes. *Worldviews on Evidence-Based Nursing, 12*(5), 251-252. https://doi.org/10.1111/wvn.12112

Moher, D., Liberati, A., Tetzlaff, J., Altman D.G., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine, 6*(7), e1000097. https://doi.org/10.1371/journal.pmed.1000097

Murad, M.H., Asi, N., Alsawas, M., & Alahdab, F. (2016). New evidence pyramid. BMJ Evidence-Based Medicine, 21(4), 125-127. https://doi.org/10.1136/ebmed-2016-110401

O'Meara, P.F., Furness, S., & Gleeson, R. (2017). Educating paramedics for the future: A Holistic Approach. *Journal of Health and Human Services Administration, 40*(2), 219-251. https://doi.org/10.1177/107937391704000204

OpenAI. (2025). *ChatGPT* (July 28 version) [Large language model]. https://chatgpt.com

Reid, H.L., Boyd, L.D., & Vineyard, J. (2021). Dental hygiene student attitudes about benefits of baccalaureate degree and factors impacting entry-level program choice. *Journal of Dental Education, 85*(9), 1453-1461. https://doi.org/10.1002/jdd.12626

Roets, L., Botma, Y., & Grobler, C. (2016). Scholarship in nursing: Degree-prepared nurses versus diploma-prepared nurses. *Health SA Gesondheid, 21*, 422–430. https://doi.org/10.1016/j.hsag.2016.08.002

Scott, I.A., Hubbard, R.E., Crock, C., Campbell, T., & Perera, M. (2021). Developing critical thinking skills for delivering optimal care. *Internal Medicine Journal, 51*(4), 488-493. https://doi.org/10.1111/imj.15272

Simpson, P.M., Bendall, J.C., Patterson, J., & Middleton, P.M. (2012). Beliefs and expectations of paramedics towards evidence-based practice and research. *International Journal of Evidence-Based Healthcare, 10*(3), 197-203. https://doi.org/10.1111/j.1744-1609.2012.00273.x

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research, 104*, 333-339. https://doi.org/10.1016/j.jbusres.2019.07.039

Sunell, S., McFarlane, R., & Biggar, H. (2017). Differences between diploma and baccalaureate dental hygiene education in British Columbia: A qualitative perspective. *International Journal of Dental Hygiene, 15*(3), 236-248. http://doi.org/10.1111/idh.12208

Swindells, C., & Willmott, S. (2003). Degree vs diploma education: Increased value to practice. *British Journal of Nursing, 12*(18), 1096-1104. https://doi.org/10.12968/bjon.2003.12.18.11774

Terenzini, P.T., Springer, L., Pascarella, E.T., & Nora, A. (1995). Influences affecting the development of students' critical thinking skills. *Research in Higher Education, 36*(1), 23-39. https://doi.org/10.1007/BF02207765

Thielmann, B., Parker, K.K., Post, J.M., & Abraham, S.P. (2019). Factors influencing nurses' perceptions of the baccalaureate degree in nursing as minimum requirement for professional practice. *Nursing Education Perspectives, 40*(1), 25. https://doi.org/10.1097/01.NEP.0000000000000391

Williams, B., Fielder, C., Strong, G., Acker, J., & Thompson, S. (2015). Are paramedic students ready to be professional? An international comparison study. *International Emergency Nursing, 23*(2), 120-126. https://doi.org/10.1016/j.ienj.2014.07.004

Williams, B., Lau,R., Thornton, E., & Olney, L.S. (2017). The relationship between empathy and burnout–Lessons for paramedics: A scoping review. *Psychology Research and Behavior Management, 10*, 329-337. https://doi.org/10.2147/PRBM.S145810

Wills, H.L., & Asbury, E.A. (2019). The incidence of anxiety among paramedic students. *Australasian Journal of Paramedicine, 16*, 1-6. https://doi.org/10.33151/ajp.16.649

Zhang, P., Xu, R., Cao, S., Mo, L., Liu, Y., Gao, C., Wu, Y., & Yu, G. (2025). Relationship between critical thinking ability and medication safety competence among clinical nurses: A multicenter cross-sectional study. *Journal of Clinical Nursing, 34*(6), 2107-2116. https://doi.org/10.1111/jocn.17361

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

CASE REPORTS

UNCOVERING BRUGADA SYNDROME AFTER CARDIOVASCULAR INSULT THROUGH AMIODARONE INFUSION

Emma Lipschutz*[1]; Matthew Myers, DO, MSMED[2]

Author Affiliations: 1. Drexel University, MD, ; 2. University of Pittsburg Medical Center (UPMC) Harrisburg, Harrisburg, PA, USA.

Recommended Citation: Lipschutz, E., & Myers, M. (2025). Uncovering brugada syndrome after cardiovascular insult through amiodarone infusion. *International Journal of Paramedicine*. (13). 133-137. https://doi.org/10.56068/GZOO1697. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3374

Keywords: brugada, wide complex tachycardia, lidocaine, amiodarone, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Received: March 31, 2025
Revised: October 8, 2025
Accepted: October 11, 2025
Pre-Issue: November 18, 2025
Published: January 13, 2026

**Corresponding Author:* el694@drexel.edu

ABSTRACT

You could ask many pre-hospital providers which medication you routinely use for Wide Complex Tachycardia (WCT) and many of them will say amiodarone without an explanation. There are pros and cons to both amiodarone and lidocaine. Over the past ten to fifteen years there has been a push to administer amiodarone over lidocaine for stable Wide Complex Tachycardias. This may be due to increased efficacy in treatment of tachycardia and/or simplicity of dosing in comparison to lidocaine. Although amiodarone has become more favorable, its mechanism of action causes QT prolongation so should be used cautiously. This case explores a rare cause of Wide Complex Tachycardia precipitated by underlying Brugada Syndrome.

CASE REPORT

A 59-year-old male presented to EMS from a rehabilitation facility for heart problems. He was at the rehabilitation facility for physical therapy and occupational therapy following a myocardial infarction. The patient had complained to nursing staff that he was having shortness of breath and a productive cough that developed that morning. Staff at the facility had obtained lab work in the interim. Abnormalities that were noted included a potassium of 5.9. On EMS arrival, the patient was found to have an oxygen saturation of 96% on supplemental oxygen. Initial vital signs included a heart rate of 187, blood pressure 129/61, and respirations of 26. A 12 lead EKG was obtained and found to be a wide complex tachycardia, shown as Figure 1.

The initial EMS crew administered 6 mg of adenosine followed by 12 mg of adenosine, achieving a transient decrease in heart rate without change in rhythm. Medical Control at the hospital ordered amiodarone 150 mg and calcium chloride 1 g to be administered. After administration of amiodarone, the patient EKG converted to the rhythm shown in Figure 2.

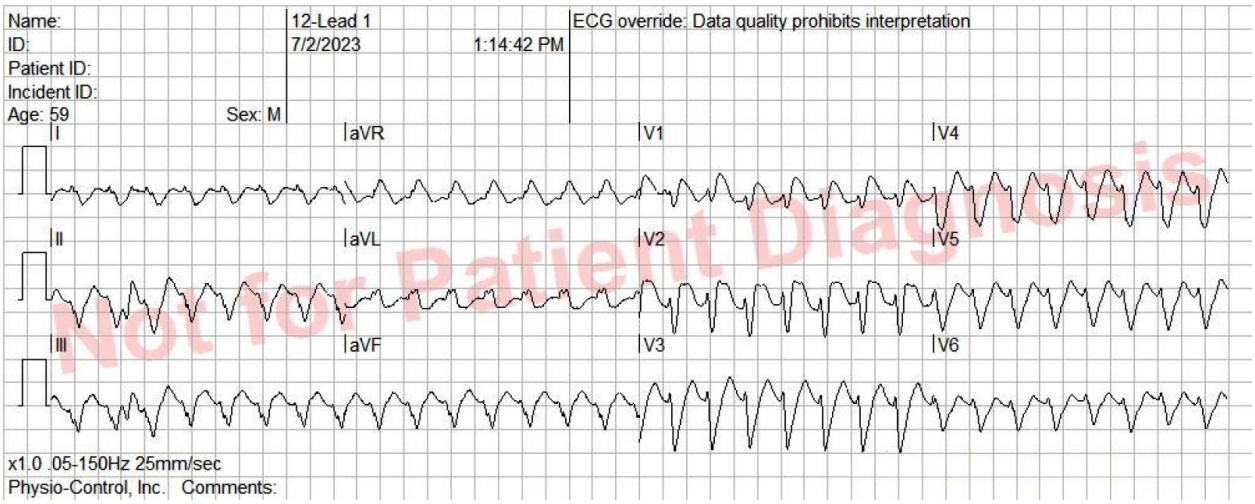


Figure 1. 12 lead EKG showing a wide complex tachycardia.

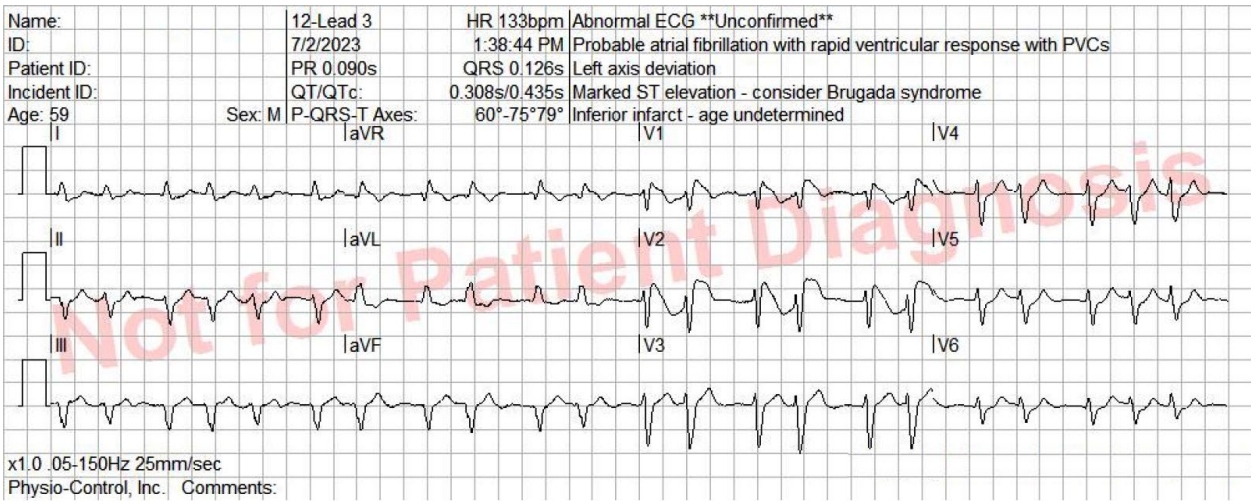


Figure 2. 12 lead EKG showing Atrial Fibrillation with Brugada Pattern in V1 and V2.

The patient was then transported to the hospital where he underwent evaluation by Cardiology and had an Automatic Implantable Cardioverter Defibrillator (AICD) placed. Upon review of the patient's record at the receiving facility, he had three stents placed in his left anterior descending artery (LAD) one week prior with normal EKGs post-revascularization. There was no family history of previous channelopathies.

DISCUSSION

Wide complex tachycardia (WCT) can be defined as a QRS complex duration of greater than or equal to 0.12 seconds, resulting in a heart rate that exceeds 100 beats per minute. For many patients, this condition may manifest symptomatically as chest pain, palpitations, shortness of breath, dizziness, nausea, and/or loss of consciousness. As Wide Complex Tachycardia has the potential to cause rapid deterioration, a methodical approach must be taken upon initial assessment to optimize care for these patients. Once hemodynamically stable, the first line diagnostic technique for this condition is to perform an electrocardiogram (ECG) with or without WCT algorithms to differentiate ventricular versus supraventricular causes of tachycardia (Kashou, 2020).

This distinction is important for guiding medical decision making and management. While there are many causes of WCT, ventricular tachycardia (VT) is the most common, comprising about 80% of all WCT cases (Garmel, 2008).

This patient presented to EMS from a rehabilitation facility after recently sustaining a myocardial infarction. Studies have demonstrated that patients with a history of cardiovascular disease are up to four times more likely to develop ventricular tachycardia (VT) compared to supraventricular tachycardia (SVT) (Garmel, 2008). One research study found that patients who had a history of previous myocardial infarction, recent episode of chest pain, or congestive heart failure demonstrated a positive predictive value of 95% for VT (Baerman, 1987). Based on history alone, this patient's recent cardiac event puts him at increased risk of developing WCT secondary to VT and should prompt further workup and treatment for this dysrhythmia.

In addition to causing QT prolongation, amiodarone also has the potential to "unmask" Brugada syndrome phenotype. Brugada Syndrome is a disorder that can predispose patients to an increased risk of fatal arrythmias and sudden cardiac death. This condition is characterized by ECG findings of ST-segment elevations in right precordial leads and right bundle branch block. A significant proportion of cases (15-30%) are associated with loss of function mutations in the SCN5A gene which codes for a voltage gated sodium channel. However, others, like this patient, discover Brugada syndrome incidentally because of interventions for VT (Robinson, 2019). Amiodarone has been proposed to reveal this condition through its hypothesized ability to act as a sodium channel blocker in vitro (Lalevée, 2003). Although Brugada syndrome has a wide spectrum of clinical presentations, its presence should prompt further evaluation and intervention to reduce the chance of fatal complications. This includes placement of an Automatic Implantable Cardioverter Defibrillator (AICD) and genetic screening for relatives to investigate their risk for developing Brugada Syndrome.

There are three general hypotheses behind Brugada syndrome: Repolarization, Depolarization, and Neural Crest hypothesis. In the Repolarization hypothesis, it is believed that a decrease in sodium current results in augmentation of ITo bypassing ionized calcium activity (Vlachos, 2020). This is likely what showed the pattern in this patient with amiodarone having underlying sodium channel blocking properties. In the Depolarization hypothesis, a right ventricular outflow tract obstruction exists. This coupled with depolarization phase will show the positive deflections seen on EKG (Nagase, 2002). In the Neural Crest hypothesis, during cardiac cell development there is inappropriate expression of neural crest cells causing aberrant expression in the cells resulting

in abnormal conduction in the right ventricular outflow tract (Cerrone, 2022). The last two hypotheses are less likely to have caused the presentation for this patient.

CONCLUSION

This case demonstrates the development of Wide Complex Tachycardia and subsequent Brugada Syndrome in a patient with known cardiovascular risk factors. Initial assessment of past medical history and medication regimens can aid EMS providers in identifying and managing the etiology of the patient's WCT. Additionally, amiodarone has been demonstrated as an effective agent for uncovering Brugada Syndrome as a consequence of treating WCT secondary to VT. As Brugada Syndrome can assume a variety of

clinical presentations, providers should be alert for signs and symptoms of this condition while administering amiodarone or medications with sodium channel blockade abilities. This incidental finding may also prompt additional investigations into alternative classes of antiarrythmics as potential treatment options for VT and can potentially guide hospital course for need for an AICD.

REFERENCES

Baerman, J. M., Morady, F., DiCarlo, L. A., & de Buitleir, M. (1987). Differentiation of ventricular tachycardia from supraventricular tachycardia with aberration: Value of the clinical history. *Annals of Emergency Medicine, 16*(1), 40–43. https://doi.org/10.1016/s0196-0644(87)80283-4

Cerrone, M., Costa, S., & Delmar, M. (2022). The Genetics of Brugada Syndrome. *Annual Review of Genomics and Human Genetics, 23*(1), 255–274. https://doi.org/10.1146/annurev-genom-112921-011200

Garmel, G. M. (2008). Wide Complex Tachycardias: Understanding this Complex Condition: Part 1 - Epidemiology and Electrophysiology. *The Western Journal Of Emergency Medicine, 9*(1), 28–39. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC2672229/

Kashou, A. H., Noseworthy, P. A., DeSimone, C. V., Deshmukh, A. J., Asirvatham, S. J., & May, A. M. (2020). Wide Complex Tachycardia Differentiation: A Reappraisal of the State-of-the-Art. *Journal of the American Heart Association, 9*(11). https://doi.org/10.1161/jaha.120.016598

Lalevée, N., Barrère-lemaire, S., Gautier, P., Nargeot, J., & Richard, S. (2003). Effects of Amiodarone and Dronedarone on voltage-dependent sodium current in human cardiomyocytes. *Journal of Cardiovascular Electrophysiology, 14*(8), 885–890. Portico. https://doi.org/10.1046/j.1540-8167.2003.03064.x

Mahanta, D. S., Barik, R. C., & acharya, D. (2023). R on T phenomenon, a dangerous ECG sign. *Visual Journal of Emergency Medicine, 32*, 101790. https://doi.org/10.1016/j.visj.2023.101790

Nagase, S., Kusano, K. F., Morita, H., Fujimoto, Y., Kakishita, M., Nakamura, K., Emori, T., Matsubara, H., & Ohe, T. (2002). Epicardial electrogram of the right ventricular outflow tract in patients with the brugada syndrome. *Journal of the American College of Cardiology, 39*(12), 1992–1995. https://doi.org/10.1016/s0735-1097(02)01888-0

Panchal, A. R., Bartos, J. A., Cabañas, J. G., Donnino, M. W., Drennan, I. R., Hirsch, K. G., Kudenchuk, P. J., Kurz, M. C., Lavonas, E. J., Morley, P. T., O'Neil, B. J., Peberdy, M. A., Rittenberger, J. C., Rodriguez, A. J., Sawyer, K. N., Berg, K. M., Arafeh, J., Benoit, J. L., Chase, M., … Magid, D. J. (2020). Part 3: Adult Basic and Advanced Life Support: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation, 142*(16_suppl_2). https://doi.org/10.1161/cir.0000000000000916

Robinson, D., Hand, G., Ausman, J., & Hackett, A. (2019). Brugada pattern exposed with administration of amiodarone during emergent treatment of ventricular tachycardia. *The American Journal of Emergency Medicine, 37*(2), 376.e3-376.e7. https://doi.org/10.1016/j.ajem.2018.10.050

Vlachos, K., Mascia, G., Martin, C. A., Bazoukis, G., Frontera, A., Cheniti, G., Letsas, K. P., Efremidis, M., Georgopoulos, S., Gkalapis, C., Duchateau, J., Parmbrun, T., Derval, N., Hocini, M., Haissaguerre, M., Jais, P., & Sacher, F. (2020). Atrial fibrillation in Brugada syndrome: *Current perspectives. Journal of Cardiovascular Electrophysiology, 31*(4), 975–984. Portico. https://doi.org/10.1111/jce.14361

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

CONCEPTS

AN OVERVIEW OF THE TREATMENT OF NAUSEA AND VOMITING AND AN ARGUMENT FOR THE PREHOSPITAL USE OF DIPHENHYDRAMINE

Isaac Wm. Adelberg, NRP*[1]

Author Affiliations: 1. Mobile Healthcare, Trinity Health of New England, Waterbury, CT, USA.

Recommended Citation: Adelberg, I. (2025). An overview of the treatment of nausea and vomiting and an argument for the prehospital use of diphenhydramine. *International Journal of Paramedicine*. (13). 138-144. https://doi.org/10.56068/WNNS4280. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3418

Keywords: diphenhydramine, antiemetics, nausea, vomiting, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Acknowledgements: This paper is an expansion of a proposal submitted to the Connecticut OEMS Protocol Committee in 2024 which affected a protocol change in v.2025.1. Thanks to Dr. Rob Weiner for copyediting.

Received: June 1, 2025
Revised: October 16, 2025
Accepted: October 16, 2025
Pre-Issue: December 2, 2025
Published: January 13, 2026

**Corresponding Author:* isaac.adelberg@trinityhealthofne.org

ABSTRACT

Treatment of nausea and vomiting is among the most frequent treatments provided by out-of-hospital providers with the pharmacologic agents in common use displaying varying pharmacologies and potential interactions. The most commonly administered anttiemetic— ondansetron— targets only one of the four main nausea receptors, with the antidopaminergic agents targeting another receptor. This creates an opportunity for the use of diphenhydramine— an antihistamine with anticholinergic properties— as it targets the third and fourth nausea receptors, providing an inexpensive option for the treatment of nausea without requiring the expansion of supply chains or equipment lists. The following concept paper will provide an overview of the relevant pharmacology and an argument that diphenhydramine is logistically suitable for prehospital medicine.

INTRODUCTION

The treatment of nausea and vomiting is among the most common treatments provided prehospitally, with the NEMSIS database finding that ondansetron was administered to 9% of patients and nausea/vomiting being the sixth most common chief complaint afflicting 6% of patients (National EMS Information System, 2024). That an antiemetic is the third most commonly administered medication in the United States implies the large scope of the problem and the importance which prehospital clinicians place on treating nausea/vomiting. However, the literature supporting the efficacy of any of our current antiemetics is slim in the prehospital setting (Verma et al, 2019). The use of guidelines and literature from other domains of medicine is potentially beneficial, but this should be caveated that the development of evidence-based guidelines specifically devalues the use of literature on patients not part of the population being discussed in the guideline (Prasad, 2024).

PHARMACOLOGIC REVIEW

Nausea is typically induced by activation of receptors in the chemoreceptor trigger zone (CTZ) of the medulla oblongata, with several receptors relevant to prehospital emergency care, including the serotonin (5HT3), dopamine (D2), histamine (H1), and both the nicotinic and especially the muscarinic acetylcholine (M1) receptors. The treatment of nausea involves a combination of both treating the underlying causes of nausea and blocking the stimulation of these nausea receptors. Opioids have both agonist and antagonist effects on the CTZ, and the cytokine substance P's effects on the NK-1 receptor is relevant in the treatment of chemotherapy-induced nausea and vomiting (Zhong et al, 2021). The mechanisms by which these receptors may be stimulated are not entirely understood but the literature in post-operative care, oncology, obstetrics, and the limited research which has been performed in the emergency department setting provides guidance on treatment regimens and the efficacy of different solutions (Shaikh et al, 2016, Singh et al, 2015).

Serotonin is one of the most common causes of nausea, being released primarily from the gut and able to stimulate nausea both directly in the CTZ and through the stimulation of abdominal afferent neurons (Terry & Margolis, 2017). The primary antiserotoninergic medication in EMS is ondansetron, which can be administered intravenously, intramuscularly, or orally/oromucosally, and it is the first-line treatment for chemotherapy/radiation induced nausea, opioid-induced nausea/vomiting, and is highly effective in gastroenteritis (Aapro et al, 2021 Athavale et al, 2020). Ondansetron is a second-line medication in the treatment of morning sickness due to a mildly increased risk of oral cleft deformities when given to pregnant patients in their first trimester (Huybrechts et al, 2019).

Dopamine is a neurotransmitter affecting nausea both centrally in the CTZ as well as in the GI tract. Several classes of antidopaminergics are already in use both prehospitally and in the hospital. The butyrophenone class contains haloperidol and droperidol (both of which have an antihistamine effect at higher doses) while the phenothiazine class contains prochlorperazine (with antihistamine and anticholinergic effects at higher doses) (Farkas, 2024). Metoclopramide— a benzamide with an antiserotinergic side-effect profile— is particularly suited to the treatment of gastroparesis and migraines (Rao & Camilleri, 2009, Becker, 2015). While particularly effective in treating nausea of GI origin and potentially effective in nausea of all kinds, the side-effect profile of antidopaminergics limits their potential use. All the antidopaminergic medications have the potential to cause drug-induced parkinsonism with increased occurrence at higher doses and in patients who already have Parkinson's disease (Alvarez & Evidente, 2008). Of note, the immediate treatment of drug-induced parkinsonism may include treatment with anticholinergics including diphenhydramine (Vanegas-Arroyave, 2024).

Histamine and acetylcholine are two different neurotransmitters whose antiemetic benefits are primarily based in vestibular causes (i.e., motion sickness and vertigo) as well as being beneficial in pregnancy as a first-line pharmacologic agent (Paine, 2005, Committee on Practice Bulletins- Obstetrics, 2018). The treatment of motion sickness is of particular importance in EMS and prehospital medicine as vestibularly derived nausea can be caused by many factors inherent to ambulance transport. Motion sickness is likely caused by a mismatch between expected sensory inputs and actually perceived inputs,

such as unexpected changes in acceleration or direction (particularly when there isn't a fixed visual reference point) and may be exacerbated by stress or sitting backwards, all factors present in ambulance transport (Takov & Tadi, 2023). While the two neurotransmitters are distinct, they are grouped together in this article due to first-generation antihistamines having anticholinergic properties (Church & Church, 2013). More to the point, diphenhydramine — the medication focused on in the second section of this paper — is the prototypical first-generation antihistamine. Diphenhydramine is administered intravenously, intramuscularly, orally, or as an elixir — and its most clinically relevant side effects are sedation, dry mucus membranes, and decreased GI/GU motility (Sicari et al, 2025).

Of note, there are potential serious side effects of diphenhydramine, the most immediately dangerous being its potential to cause sedation that may impact the ability to drive safely after discharge (Verster & Volkerts, 2004). This is compounded when administered alongside the sedative antiemetics, especially droperidol and haloperidol, with diphenhydramine being concomitantly administered alongside haloperidol and lorazepam for sedation purposes greatly increasing its duration of sedation and potential side effects, notably hypotension (Jeffers et al, 2022). Patients should be advised against driving following administration of diphenhydramine for any purpose including as an antiemetic, with particular caution and need for monitoring in patients treated with both diphenhydramine and antidopaminergic medications. There is also a cumulative risk of Alzheimer's disease and other forms of dementia from patients taking anticholinergics of any sort, a risk that has largely contributed to diphenhydramine's being increasingly not recommended for regular treatment of allergies in favor of newer generations of antihistamines (Clark et al, 2025).

There are two further agents relevant in the treatment of nausea, with mechanisms not directly linked to the aforementioned receptors: isopropyl alcohol and parenteral fluids. While the mechanism by which inhalation of isopropyl alcohol vapors is unknown— and may be as straightforward as being a way to prompt patients to breathe calmly and distract from external stimuli— that does not change that the inhalation of isopropyl alcohol is clinically effective in the reduction of nausea (Amaya et al, 2023). Parenteral fluids similarly relieve nausea without having a pharmacologic effect on the patient, either through the treatment of dehydration as cause of the nausea or due to a placebo effect (Taylor et al, 2025, Egarton-Warburton et al, 2018).

LOGISTICS AND RESEARCH DISCUSSION

There are three main arguments supporting the use of diphenhydramine prehospitally in the treatment of nausea. The first, that it is especially suited for the treatment of motion sickness- has been discussed above, with the second being its ease of use in EMS systems. Diphenhydramine is already used prehospitally due to its role in the treatment of anaphylaxis and allergic reactions, which has several implications to the ease of its use for a second indication. Diphenhydramine is a medication which medical directors and paramedics are already familiar: they know the dosing of 25-50 mg for adults, the routes, and the side effect profiles. The training burden for familiarizing providers with a "new" medication would therefore be minimal, likely limited to a single continuing education class or video on the mechanism of action and how it is related to nausea.

From an agency perspective, the benefit of diphenhydramine's current widespread availability continues to manifest as the supply lines are already established for advanced life support agencies, with the only necessary change being to order an increased quantity the next time an order is placed. A cursory search of a nationwide EMS supplier found that one vial of diphenhydramine costs $2.42, while by comparison ondansetron costs $3.04, metoclopramide costs $6.68, haloperidol costs $7.40, prochlorperazine costs $7.50, and droperidol— currently only manufactured by a single company— costs $60.40 per dose (as of October 13, 2025), as much as an entire box of diphenhydramine vials (Bound Tree). While agency-specific cost breakdowns are beyond the scope of this article, the cost of stocking additional diphenhydramine can be readily offset by the potential decreased use of more expensive agents. On the other hand, diphenhydramine has occasionally been in short supply in the US, most recently in May 2025, due to one supplier discontinuing their generic supply It's possible that the increased use of diphenhydramine for another indication may exacerbate future shortages (Wheeler).

This is not a recommendation for agency supply departments to stock diphenhydramine as the sole antiemetic, rather it is a recommendation to include it in the list of antiemetics available on hand. Having multiple antiemetics for the paramedic to choose from prevents the situation in which a patient with a known hypersensitivity to one class having a delay in the treatment of their nausea until arrival at the hospital when another medication can be administered. In addition, the current recommendations from the post-operative literature and the obstetric literature for the treatment of nausea are to administer a second antiemetic of a different class should the first prove ineffective (Gan et al, 2020, Committee on Practice Bulletins-Obstetrics 2018). Regrettably, there is currently no consensus guideline available for prehospital or even emergency-department treatment of nausea and vomiting, and evidence is mixed on any interventions' superiority to placebo (Furyk et al, 2015).

Regarding prehospital literature, a recent meta-analysis published in Emergency Medicine Australasia found only seven pieces of original research on administration of antiemetics and found that none were particularly robust either in terms of methodology or sample size; consequently no conclusions as to the efficacy of any antiemetic either against others or against placebo could be drawn (Verma et al, 2018). Of the seven studies identified by Verma et al (2018), only one assessed diphenhydramine. This study, published in Prehospital and Disaster Medicine, found that in a sample size of seven patients who received diphenhydramine (out of a total of 22, with eight receiving metoclopramide and seven receiving placebo), the diphenhydramine group was indistinguishable from the placebo group at fifteen minutes and there were no statistically significant differences between the three at twenty-five minutes (Rubio et al, 2011). The lack of rigorous data from which guidelines can be based indicates a strong need for further research and severely limits the ability to draw conclusions or offer recommendations.

The current standard for developing evidence-based guidelines for EMS is the use of the multi-step GRADE tool, which evaluates literature based on "study design, risk of bias, inconsistency, indirectness, imprecision, and publication bias" (Martin-Gill et al, 2016, Prasad, 2024). Of note is the criteria of precision, which in this context refers to whether a piece of literature evaluates the population for which a recommendation is being developed. Outside of the recommendations from the obstetrics literature which pertain directly to the recommendation for diphenhydramine as a non-teratogenic agent

in pregnant patients, the reliance on literature outside of prehospital care weakens its already-low strength. GRADE's process for evaluating recommendations is a binary strong-weak system, in which weak recommendations are made due to low-certainty evidence, with weak recommendations providing variability in treatment options for patients (Prasad, 2024). In the same spirit, due to the aforementioned lack of evidence in nausea and emesis treatment prehospitally, this article can only weakly recommend diphenhydramine as a prehospital antiemetic until there are robust comparisons from which an evidence-based guideline can be drawn.

CONCLUSIONS

Given the varying mechanisms by which antiemetic medications work, and with the distinct possibility that they may not work or may not work better than placebo, the ability to provide multimodal treatment for nausea and vomiting is of great practical concern. Further research is needed to compare antiemetics administered prehospitally, and to reinforce what medications are most suited to treat which modalities in the prehospital arena. As a stopgap, the availability of medications of each class approaches the standard of care available to treat nausea. With the additional logistic benefits of diphenhydramine as an already-available medication in most ALS formularies, altering system protocols to permit its use may benefit patients due to its safety profile being comparable to that of the other second-line antiemetics and providers' existing comfort with the medication.

REFERENCES

Aapro, M., Scotté, F., Escobar, Y., Celio, L., Berman, R., Franceschetti, A., Bell, D., Jordan, K. (2021). Practice patterns for prevention of chemotherapy-induced nausea and vomiting and antiemetic guideline adherence based on real-world prescribing data. *The Oncologist, 26*(6) e1073-e1082. https://doi.org/10.1002/onco.13716

Alvarez, M. V. G. & Evidente, V. G. H. (2008). Understanding drug-induced parkinsonism: Separating pearls from oysters. *Neurology 70*(8) e32-e34. https://doi.org/10.1212/01.wnl.0000302255.49113

Amaya, S., Kalsotra, S., Tobias, J. D., & Olbrecht, V. A. (2023). Clinical experience with the use of inhaled isopropyl alcohol to treat nausea and vomiting: A narrative review. *Saudi journal of Anaesthesia, 17*(3), 383–390. https://doi.org/10.4103/sja.sja_151_23

Athavale, A., Athavale, T., & Roberts, D. M. (2020). Antiemetic drugs: What to prescribe and when. *Australian Prescriber, 43*(2), 49–56. https://doi.org/10.18773/austprescr.2020.011

Becker, W. J. (2015). Acute migraine treatment in adults. *Headache 55*(6) 778-793. https://doi.org/10.1111/head.12550

Bound Tree. (2025, May 2). *Rx Pharmaceuticals*. https://www.boundtree.com/rx-pharmaceuticals/c/236

Church, M. K., & Church, D. S. (2013). Pharmacology of antihistamines. *Indian Journal of Dermatology, 58*(3), 219–224. https://doi.org/10.4103/0019-5154.110832

Clark, J. H., Meltzer, E. O., & Naclerio, R. M. (2025). Diphenhydramine: It is time to say a final goodbye. *The World Allergy Organization Journal, 18*(2), 101027. https://doi.org/10.1016/j.waojou.2025.101027

Committee on Practice Bulletins-Obstetrics (2018). ACOG Practice Bulletin No. 189: Nausea And Vomiting Of Pregnancy. *Obstetrics and Gynecology, 131*(1), e15–e30. https://doi.org/10.1097/AOG.0000000000002456

Egerton-Warburton, D., Meek, R., Mee, M. J., & Braitberg, G. (2014). Antiemetic use for nausea and vomiting in adult emergency department patients: Randomized controlled trial comparing ondansetron, metoclopramide, and placebo. *Annals of Emergency Medicine, 64*(5), 526–532.e1. https://doi.org/10.1016/j.annemergmed.2014.03.017

Furyk, J. S., Meek, R. A., & Egerton-Warburton, D. (2015). Drugs for the treatment of nausea and vomiting in adults in the emergency department setting. *The Cochrane Database of Systematic Reviews, 2015*(9), CD010106. https://doi.org/10.1002/14651858.CD010106.pub2

Gan, T. J., Belani, K. G., Bergese, S., Chung, F., Diemunsch, P., Habib, A. S., Jin, Z., Kovac, A. L., Meyer, T. A., Urman, R. D., Apfel, C. C., Ayad, S., Beagley, L., Candiotti, K., Englesakis, M., Hedrick, T. L., Kranke, P., Lee, S., Lipman, D., Minkowitz, H. S., … Philip, B. K. (2020). Fourth consensus guidelines for the management of postoperative nausea and vomiting. *Anesthesia and Analgesia, 131*(2), 411–448. https://doi.org/10.1213/ANE.0000000000004833

Huybrechts, K. F., Hernández-Díaz, S., Straub, L., Gray, K. J., Zhu, Y., Patorno, E., Desai, R. J., Mogun, H., & Bateman, B. T. (2018). Association of maternal first-trimester ondansetron use with cardiac malformations and oral clefts in offspring. *JAMA, 320*(23), 2429–2437. https://doi.org/10.1001/jama.2018.18307

Jeffers, T., Darling, B., Edwards, C., & Vadiei, N. (2022). Efficacy of combination haloperidol, lorazepam, and diphenhydramine vs. combination haloperidol and lorazepam in the treatment of acute agitation: A multicenter retrospective cohort study. *The Journal of Emergency Medicine, 62*(4), 516–523. https://doi.org/10.1016/j.jemermed.2022.01.009

Martin-Gill, C., Gaither, J.B., Bigham, B.L., Myers, B., Kupas, D.F., & Spaite, D.W. (2016). National prehospital evidence-based guidelines strategy: A summary for EMS stakeholders. *Prehospital Emergency Care, 20*(2) 175-183. https://doi.org/10.3109/10903127.2015.1102995

National EMS Information System. (2024). *NEMSIS data report 2023*. NHTSA Office of EMS, Department of Transportation. https://nemsis.org/wp-content/uploads/2024/08/NEMSIS-Annual-Public-Data-Report-2023.pdf

Paine, M. (2005). Dealing with dizziness. *Australian Prescriber, 28*(4), 94–97. https://doi.org/10.18773/austprescr.2005.075

Rao, A. S. & Camilleri, M. (2009). Review article: Metoclopramide and tardive dyskinesia. *Alimentary Pharmacology and Therapeutics, 31*(1) 11-19. https://doi.org/10.1111/j.1365-2036.2009.04189.x

Prasad, M. (2024). Introduction to the GRADE tool for rating certainty in evidence and recommendations. *Clinical Epidemiology and Global Health, 25*. https://doi.org/10.1016/j.cegh.2023.101484

Rubio, S., Weichenthal, L., & Andrews, J. (2011). Motion sickness: Comparison of metoclopramide and diphenhydramine to placebo. *Prehospital and Disaster Medicine, 26*(4), 305–309. https://doi.org/10.1017/S1049023X11006431

Shaikh, S. I., Nagarekha, D., Hegade, G., & Marutheesh, M. (2016). Postoperative nausea and vomiting: A simple yet complex problem. *Anesthesia Essays and Researches, 10*(3), 388–396. https://doi.org/10.4103/0259-1162.179310

Sicari, V., Patel, P., Zabbo, C. P. (2025). *Diphenhydramine* (PMID 30352266). National Library of Medicine, National Center for Biotechnology Information. https://www.ncbi.nlm.nih.gov/books/NBK526010/

Singh, P., Yoon, S. S., & Kuo, B. (2015). Nausea: A review of pathophysiology and therapeutics. *Therapeutic Advances in Gastroenterology, 9*(1), 98–112. https://doi.org/10.1177/1756283x15618131

Takov, V. & Tadi, P. (2023). *Motion sickness* (PMID 30969528). National Library of Medicine, National Center for Biotechnology Information. https://www.ncbi.nlm.nih.gov/books/NBK539706/

Taylor, K. Tripathi, A. K., & Jones, E. B. (2025). *Adult Dehydration* (PMID 32310416). National Library of Medicine, National Center for Biotechnology Information. https://www.ncbi.nlm.nih.gov/books/NBK555956/

Terry, N., & Margolis, K. G. (2017). Serotonergic mechanisms regulating the GI tract: Experimental evidence and therapeutic relevance. *Handbook of Experimental Pharmacology, 239*, 319–342. https://doi.org/10.1007/164_2016_103

Vanegas-Arroyave, N., Caroff, S. N., Citrome, L., Crasta, J., McIntyre, R. S., Meyer, J. M., Patel, A., Smith, J. M., Farahmand, K., Manahan, R., Lundt, L., & Cicero, S. A. (2024). An evidence-based update on anticholinergic use for drug-induced movement disorders. *CNS Drugs, 38*(4), 239–254. https://doi.org/10.1007/s40263-024-01078-z

Verma, R., Matich, P., Symmons, D., & Vangaveti, V. (2019). Review article: Antiemetics in the pre-hospital setting: A systematic review of efficacy and safety. *Emergency Medicine Australasia: EMA, 31*(2), 174–182. https://doi.org/10.1111/1742-6723.13136

Verster, J. C., & Volkerts, E. R. (2004). Antihistamines and driving ability: Evidence from on-the-road driving studies during normal traffic. *Annals of Allergy, Asthma & Immunology, 92*(3), 294–355. https://doi.org/10.1016/S1081-1206(10)61566-9

Wheeler, M. (2025, May 14). Drug shortage detail: Diphenhydramine injection. *American Society of Healthsystems Pharmacists*. https://www.ashp.org/drug-shortages/current-shortages/drug-shortage-detail.aspx?id=814&loginreturnUrl=SSOCheckOnly

Zhong, W., Shahbaz, O., Teskey, G., Beever, A., Kachour, N., Venketaraman, V., & Darmani, N. A. (2021). Mechanisms of nausea and vomiting: Current knowledge and recent advances in intracellular emetic signaling systems. *International Journal of Molecular Sciences, 22*(11), 5797. https://doi.org/10.3390/ijms22115797

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

IMPROVEMENT PROJECT REPORTS

MEETING PATIENTS IN THE FIELD: OPIOID USE INTERVENTION FROM EMERGENCY SERVICE PERSONNEL

Meghan Stough, DNP, FNP-BC*[1]; Rebecca Sutter, DNP, FNP-BC, PMHNP-C[1]

Author Affiliations: 1. George Mason University, Fairfax, VA, USA.

Recommended Citation: Stough, M. & Sutter, R. (2026). Meeting patients in the field: Opioid use intervention from emergency service personnel. *International Journal of Paramedicine*. (13). 145-154. https://doi.org/10.56068/BJDX4322. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3392

Keywords: opioid use disorder, medications, interventions, referral pathways, emergency medical services, EMS, paramedicine

Disclosures: There are no conflicts of interest to declare.

Funding: Funding for this project was internal; no external funding was received.

Received: April 27, 2025
Revised: December 8, 2025
Accepted: December 8, 2025
Published: January 13, 2026

**Corresponding Author:* mlstough@gmail.com

ABSTRACT

Introduction: Over the past two decades, the opioid epidemic has posed a major public health crisis in the United States, with significant economic, physical, and societal burdens. This quality improvement (QI) initiative aimed to address gaps in opioid use disorder (OUD) management by enhancing emergency medical services (EMS) personnel's ability to support medications for opioid use disorder (MOUD) access and connection to outpatient services.

Methods: The project was implemented in a small suburban fire department in Virginia. Using the Donabedian Model, Theory of Planned Behavior, and Knowledge-to-Action framework, a structured educational intervention was delivered to EMS personnel across four operational shifts. Pre- and post-intervention surveys assessed knowledge, attitudes, and confidence using validated tools. Paired t-tests and descriptive statistics were used for quantitative analysis, and thematic analysis was applied to stakeholder meeting notes and qualitative feedback.

Results: Post-training surveys showed statistically significant increases in EMS provider confidence. Confidence in identifying appropriate patients for MOUD increased by 24.9%, $t(28) = -5.01$, $p < .001$, and confidence in providing resources to patients with OUD increased by 37.5%, $t(28) = -4.93$, $p < .001$. Thematic analysis revealed six primary themes: improved training effectiveness, increased resource awareness, barriers to implementation, sustainability planning, community engagement, and enhanced data tracking.

Conclusion: This QI initiative demonstrated that brief, targeted EMS training on MOUD significantly improved provider confidence and readiness to support OUD patients. The project highlights EMS's potential to act as upstream intervention partners in the continuum of care. Broader implementation and system-level integration are recommended.

INTRODUCTION

Situated at the intersection of public health and hospital care, emergency medical services (EMS) personnel are often the first responders to opioid overdoses. National EMS data shows that the administration of naloxone by EMS personnel has continued to rise, with more than 207,000 naloxone administrations recorded in 2021 alone, a 43% increase since 2017 (CDC, 2023; NEMSIS, 2022). However, a persistent gap remains in EMS protocols and training for managing opioid use disorder (OUD) beyond acute

overdose reversal. While EMS providers are well-equipped to administer naloxone and manage immediate crises, many report limited formal education on the chronic nature of OUD and the use of medications for opioid use disorder (MOUD). In a recent evaluation of EMS personnel in Baltimore County, providers expressed a strong need for additional training on opioid overdose prevention, stigma reduction, and post-overdose care strategies (Ali et al., 2023).

This quality improvement project aimed to address that gap by delivering targeted education and developing system-level supports to expand EMS engagement beyond emergency stabilization and into the continuum of care for individuals with OUD.

METHODS

Setting and Participants

This quality improvement initiative was implemented in a small suburban fire department in Northern Virginia. The setting was selected due to its high burden of opioid-related calls and its commitment to collaborative public health strategies. EMS personnel at this department often serve as first responders to opioid overdoses, placing them in a critical position to bridge emergency care and ongoing treatment. All field paramedics and emergency medical technicians (EMTs) across four operational shifts (A–D) were included. A total of 29 EMS personnel participated in the training and evaluation components of the project.

Ethics and Institutional Review Determination

This project underwent review by the institution's research ethics authority to determine whether it met criteria for human subjects' research. Following consultation and submission of project materials, the initiative was formally classified as a quality improvement (QI) activity and therefore did not require full research ethics board (REB) approval. Participation in pre- and post-surveys was voluntary, anonymous, and included information about the purpose of the project, the option to withdraw, and the absence of anticipated risks. No patient-level data were collected, and no identifying information was obtained from EMS personnel. The QI designation is acknowledged as a limitation in the interpretation of findings, particularly concerning generalizability.

Project Design

The project was guided by two sequential Plan-Do-Study-Act (PDSA) cycles following established QI methodology (Taylor et al., 2014). The first cycle ('Cycle 1') focused on establishing baseline understanding and identifying operational gaps. Resources used to shape the intervention included the NACCHO First Responder Substance Use Stigma Toolkit, Washington State DOH stigma modules, and regional harm reduction guidelines. Cycle 1 also involved co-developing the educational curriculum, refining leave-behind materials, and piloting early variations of the referral QR code. The second cycle ('Cycle 2') used feedback from the initial trainings and stakeholder observations to refine content, streamline referral workflows, and prepare for broader adoption. This included updating documentation templates, troubleshooting Narcan distribution delays, and ensuring alignment with leadership priorities.

Stakeholder collaboration was central to the design and execution of the intervention. Meetings with EMS leadership, clinical mentors, and MOUD providers were held regularly to guide planning, adapt content, and ensure operational feasibility. Training sessions were delivered on-site over four consecutive days to ensure coverage across all shifts. Attendance was mandatory per department leadership, while participation in the pre- and post-surveys was voluntary.

Frameworks

Three frameworks informed project development and evaluation. Donabedian's Structure-Process-Outcome Model provided the overarching evaluation framework, emphasizing infrastructure readiness, intervention delivery, and provider-level outcomes (McDonald et al., 2007). The Theory of Planned Behavior (TPB) guided survey development and training content by addressing EMS personnel's attitudes, subjective norms, and perceived behavioral control related to MOUD referrals (Lamorte, 2022). Finally, the Knowledge-to-Action (KTA) framework supported evidence translation into practice and structured iterative feedback and adaptation (University of Illinois Chicago, 2024).

Measures

Quantitative measures included pre- and post-intervention surveys that assessed EMS personnel's confidence, familiarity, comfort, and attitudes regarding OUD and MOUD. Survey items were adapted from the validated First Responder Substance Use Stigma Measures Toolkit developed by the Washington State Department of Health and the National Association of County and City Health Officials (NACCHO, 2025). Following the intervention, participants also completed the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) to assess the training's acceptability, appropriateness, and feasibility (Weiner et al., 2017).

Qualitative measures included field notes and transcripts collected during stakeholder meetings and post-training discussions. Observations captured reflections on training effectiveness, barriers to implementation, and suggestions for future adaptation.

Data Analysis

Quantitative survey data were exported from Qualtrics into Microsoft Excel for analysis. Microsoft Excel was selected as a practical and accessible tool for conducting descriptive statistics and paired t-tests, particularly given the small sample size and quality improvement context of the project. Paired t-tests were used to compare pre- and post-training responses for each survey item, with statistical significance set at $p < .005$. Two negatively worded items were reverse-coded to ensure consistency in directional interpretation. Descriptive statistics were also used to analyze responses from the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM).

Qualitative data were analyzed using an AI-assisted coding tool to support initial theme generation. The tool generated preliminary open codes based on recurring concepts within meeting notes and transcripts, which were then manually reviewed by two independent DNP-prepared reviewers. Reviewers compared code lists, identified areas of

discrepancy, and reconciled differences through discussion. For example, one disagreement involved whether comments such as 'I didn't know what the clinic did' represented a lack of resource awareness or reduced perceived behavioral control; the team ultimately created a merged subtheme to reflect both dimensions. The use of AI assistance accelerated the initial sorting of data, while human-based review ensured analytic rigor. Triangulation was conducted across meeting minutes, post-training discussions, and survey write-in comments to enhance trustworthiness and confirmability.

RESULTS

Quantitative Findings

A total of 29 EMS personnel completed both the pre- and post-training surveys, yielding a 100% response rate. Survey responses were rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Paired t-tests were conducted using Microsoft Excel's Data Analysis Toolpak to evaluate changes across key domains: confidence, familiarity, comfort, and attitudes regarding OUD and MOUD. Statistical significance was defined as $p < .005$.

EMS personnel's confidence in identifying patients appropriate for MOUD increased by 24.9%, from a mean of 3.41 (SD = 0.66) pre-training to 4.26 (SD = 0.52) post-training, $t(28) = -5.01$, $p < .001$. Confidence in providing resources to patients experiencing opioid use rose by 37.5%, from a mean of 3.28 (SD = 0.69) to 4.51 (SD = 0.46), $t(28) = -4.93$, $p < .001$. Familiarity with MOUD and comfort in discussing treatment options also demonstrated statistically significant improvements (see Table 1).

Two survey items did not reach statistical significance (list survey items for clarity). Notably, both were negatively worded statements, which may have introduced response bias or participant confusion. This highlights the importance of clear survey construction and supports plans to refine evaluation tools in future phases.

Following the intervention, participants completed the Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM). Responses were overwhelmingly positive, with more than 90% of participants selecting "Agree" or "Completely Agree" across all three domains, indicating that the intervention was viewed as acceptable, appropriate, and feasible for continued integration into EMS practice (see Figure 1).

Qualitative Findings

Thematic analysis was conducted on notes and transcripts from stakeholder planning meetings, post-training discussions, and ongoing implementation check-ins. Open coding, combined with a Theory of Planned Behavior-guided lens, revealed six major themes.

Participants consistently reported that the educational content improved their understanding of MOUD and shifted their perspectives on the treatability of OUD in the field. EMS personnel became more familiar with the MOUD clinic, peer recovery supports, and the local referral network. Several participants noted they "didn't know what the clinic did" prior to the training.

Survey Statement	Pre Mean	Post Mean	t(28)	p-value	Signif-icant?	% In-crease**	Interpretation
I am familiar with Medication Assisted Treatment (MAT) or Medications for Opioid Use Disorder (MOUD).	3.38	4.07	-3.58	<0.01	yes	20.4%	Significant improvement in MOUD familiarity
I am confident in identifying appropriate patients for MAT/MOUD services.	3.34	4.17	-5.01	<0.01	yes	24.9%	Significant gain in confidence identifying patients
I am confident in providing resources for patients with Opioid use Disorder (OUD).	2.93	4.03	-4.93	<0.01	yes	37.5%	Significant improvement in ability to provide resources
I feel comfortable effectively communicating with patients with Opioid Use Disorder (OUD).	3.59	3.97	-2.17	0.04	yes	10.6%	Moderate but significant increase in communication comfort
MOUD is effective at reducing overdoses.	3.41	3.9	-3.13	<0.01	yes	14.4%	Significant increase in belief in MOUD's effectiveness
MOUD is effective at reducing future crime.	3.14	3.83	-3.99	<0.01	yes	22.0%	Significant improvement in understanding MOUD's societal impact
*MOUD puts more drugs on the streets.	3.31	3.48	-0.76	0.46	no	5.1%	No significant change in attitude
*Persons who use heroin/opioids do not need to use MAT to get "clean."	3.1	3.38	-1.19	0.25	no	9.0%	No significant change
MOUD is a good investment for society.	3.52	4.07	-3.42	<0.01	yes	15.6%	Significant improvement in perception of MOUD's societal value

**Reverse-coded item. Higher scores indicate more favorable attitudes.*

***Percent increase calculated using reverse-coded values for negatively worded items. Percent increases represent the relative change in mean score from pre- to post-survey.*

Table 1. Pre- and post-intervention mean scores, paired sample t-test results, and statistical significance for EMS provider survey responses (N=29)

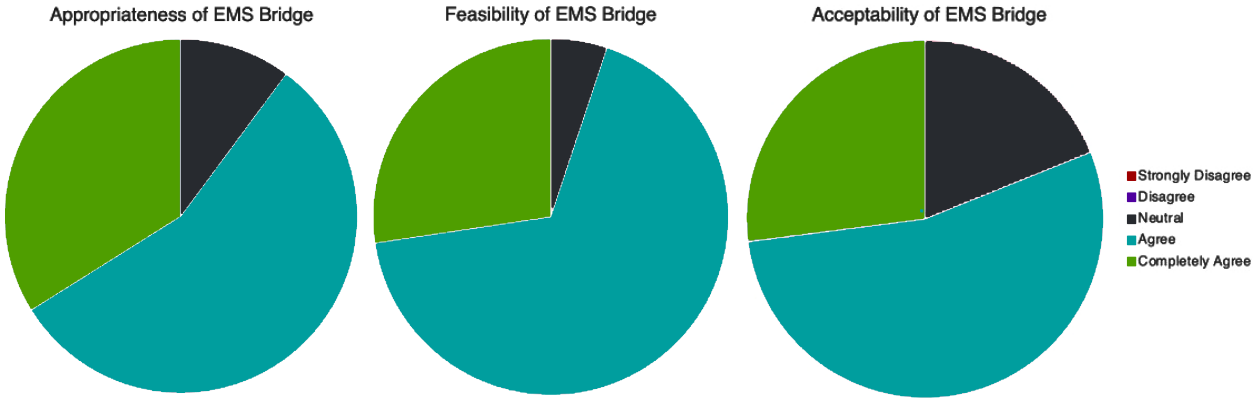


Figure 1. EMS personnel perceptions of the EMS Bridge Program's feasibility, appropriateness, and acceptability (N = 29)

System-level challenges were also identified, including delays in Narcan distribution, incomplete memoranda of understanding (MOUs), and restrictions on patient data sharing. These were perceived as primary barriers to full referral implementation.

Many EMS staff expressed interest in sustaining the initiative and incorporating OUD training into ongoing departmental education. Participants also valued the harm reduction focus of the leave-behind materials and expressed interest in outreach-based roles through community paramedicine. Additionally, staff emphasized the need for stream-

lined documentation processes, requesting integration of referral and Narcan tracking fields into existing EMS reporting software.

These themes align with constructs of the Theory of Planned Behavior. Improvements in attitudes toward MOUD, evolving departmental norms, and increased perceived behavioral control suggest greater readiness for behavior change.

Coder discrepancies were resolved through consensus meetings in which both reviewers compared interpretations and justified code assignments. When disagreements arose, such as classifying comments about confusion over treatment resources, the team revisited transcript excerpts together and examined contextual cues. These discussions led to the creation of blended subthemes, ensuring that themes accurately reflected EMS personnel's perspectives while honoring TPB constructs. This approach strengthened the reliability of the qualitative findings.

Integration of Findings

Quantitative and qualitative results jointly suggest that the intervention successfully enhanced EMS provider confidence, preparedness, and openness to adopting new OUD protocols. Survey improvements were supported by stakeholder feedback, which highlighted personal growth as well as structural needs for sustainability. Together, these findings indicate that targeted training combined with workflow-integrated tools has strong potential to shift EMS practice toward upstream intervention.

DISCUSSION

This quality improvement initiative demonstrated that targeted training for emergency medical services (EMS) personnel on opioid use disorder (OUD) and medications for opioid use disorder (MOUD) can significantly improve provider confidence, knowledge, and readiness to engage in upstream interventions. Statistically significant improvements across key survey domains—especially confidence in identifying appropriate patients for MOUD and providing resources—are consistent with prior evidence that EMS personnel are both capable of, and willing to, expand their role in addressing the opioid crisis when adequately supported (Ali et al., 2023; Barefoot et al., 2021; Hern et al., 2023).

The findings suggest that brief, evidence-informed educational sessions, when paired with operational tools such as leave-behind resource kits and referral QR codes, can meaningfully influence EMS personnel's attitudes and behaviors. These results align with evaluations of other EMS-led harm reduction efforts, which similarly found that targeted education contextualized to local practice, combined with practical pathways for action, increased provider readiness (Belden et al., 2024; Dahlem et al., 2021).

The Theory of Planned Behavior (TPB) provided a valuable framework for interpreting these changes. Post-training feedback reflected a shift in provider mindset, with participants describing an enhanced sense of responsibility to connect patients with ongoing treatment rather than focusing solely on immediate crisis management. Increased familiarity with community MOUD resources and growing support for post-overdose care reflect progress across all three TPB domains—attitudes, subjective norms, and perceived behavioral control—reinforcing existing literature that highlights the critical

role of stigma reduction and systemic support in facilitating provider behavior change (Ali et al., 2023).

The Knowledge-to-Action (KTA) framework similarly highlighted the importance of stakeholder engagement and iterative adaptation throughout the project. Regular meetings with EMS leadership, paramedics, and clinical mentors enabled the team to adjust the training content and workflows based on real-time feedback. This approach strengthened implementation fidelity and helped identify key operational barriers, such as delays in Narcan distribution and limited data-sharing infrastructure, that may have otherwise gone unaddressed. These experiences mirror findings from other EMS-based initiatives emphasizing the need for strong administrative support and ongoing quality feedback loops (Hern et al., 2023).

Donabedian's Structure-Process-Outcome model also framed the project's successes and ongoing challenges. Structural interventions—such as the introduction of updated leave-behind kits, referral QR codes, and stakeholder partnerships—produced measurable improvements in process outcomes at the provider level. Although patient-level outcome data could not yet be collected due to legal and technological barriers, the foundation for future outcome evaluation has been laid through planned documentation templates, reporting dashboards, and enhanced peer recovery integration efforts.

Findings should also be considered within the broader variability of EMS treatment authority across jurisdictions. While some EMS agencies are authorized to initiate buprenorphine or provide comprehensive post-overdose interventions, others may face regulatory or scope-of-practice constraints. Treatment availability, naloxone access, referral pathways, and MOUD clinic partnerships differ widely across states and regions. Future researchers should explore how models like the EMS Bridge Program can be adapted across diverse operational contexts and potentially standardized to support generalizability.

Overall, the results demonstrate the potential for EMS to serve as a critical bridge between overdose reversal and sustained treatment engagement. As public health approaches to the opioid epidemic evolve, integrating EMS personnel into broader systems of care will be essential to improving access to treatment and reducing overdose-related morbidity and mortality.

LIMITATIONS

Several limitations must be considered when interpreting the results of this quality improvement initiative. First, the project was implemented at a single suburban fire department in Northern Virginia, limiting generalizability. Although the department's high call volume and leadership engagement made it an ideal pilot site, broader implementation across diverse EMS systems—particularly in rural or urban settings—may reveal different challenges and outcomes.

Second, although all 29 EMS personnel participated in the training, the small sample size limits the statistical power of the quantitative findings. Future phases would benefit from multicenter participation and a larger cohort to strengthen external validity and allow for subgroup analyses.

Third, due to legal and technological constraints, patient-level outcome tracking was not feasible during the intervention period. At the time of implementation, formal data-sharing agreements and memoranda of understanding (MOUs) between the EMS agency and the outpatient MOUD clinic had not been finalized. As a result, the number of patients referred via the QR code and their subsequent engagement in treatment could not be monitored in real time. Addressing this limitation remains a priority for future project phases, with ongoing collaboration focused on secure data dashboard development and information-sharing agreements.

Additional logistical barriers included delays in distributing updated leave-behind kits containing naloxone and referral materials, which limited the synchronization of training with immediate field deployment. Furthermore, some survey items—particularly negatively worded statements—may have introduced participant confusion or response bias, potentially affecting internal consistency. Revisions to these items are planned for future iterations to improve reliability.

It is also possible that the Hawthorne effect influenced participants' survey responses, with EMS personnel reporting greater improvements in confidence and attitudes because they were aware of being observed and evaluated during the intervention period (Oswald et al., 2014).

While qualitative data collection provided important insights into implementation experiences, it was limited to field notes and informal discussions rather than structured interviews or focus groups. Expanding qualitative inquiry methods in future phases could deepen understanding of EMS perspectives and inform further adaptations to training and referral processes.

Finally, although the project underwent formal ethics consultation and was deemed exempt as a QI initiative, this determination limits the extent to which findings can be generalized or replicated using research-level conditions. The absence of patient-level data, restrictions related to data-sharing agreements, and voluntary survey participation further constrain interpretation. Future evaluations incorporating REB-approved protocols and patient outcome tracking could strengthen rigor and expand understanding of the program's impact.

Despite these limitations, the project successfully established a strong foundation for continued evaluation and expansion. The barriers encountered, particularly those related to legal infrastructure and referral tracking, underscore the importance of system-level alignment when implementing EMS-public health partnerships.

CONCLUSION

This quality improvement initiative demonstrated that equipping EMS personnel with targeted education and practical referral tools can significantly improve their confidence and preparedness to support patients with opioid use disorder (OUD). By addressing gaps in knowledge, reducing stigma, and enhancing perceived behavioral control, the intervention positioned EMS providers not only as emergency responders but as proactive agents in connecting patients to long-term care.

The project advances the role of EMS in harm reduction and public health, showing that with the right training, resources, and system-level support, field personnel are well-positioned to bridge the gap between overdose reversal and treatment engagement. Although full implementation of the EMS-to-clinic referral pathway was limited by infrastructural and legal barriers, the groundwork for sustainable change has been established through the development of leave-behind kits, a secure data tracking framework, and plans for ongoing quality assurance.

Implications for practice include the integration of OUD and MOUD education into routine EMS onboarding and annual recertification processes, as well as formal incorporation of referral documentation into existing EMS reporting systems. The initiative also highlights the importance of strong interagency collaboration, policy alignment, and the use of structured implementation frameworks—such as Donabedian's model, the Theory of Planned Behavior, and the Knowledge-to-Action cycle—to guide adaptation and scale.

Future efforts should focus on evaluating patient-level outcomes following EMS engagement, refining referral workflows, and expanding into community paramedicine models that allow EMS personnel to follow up with high-risk patients outside of acute emergencies. As overdose-related morbidity and mortality continue to pose critical public health concerns, integrating EMS personnel into long-term solutions remains essential.

REFERENCES

Ali, B., Ali, R., Sharfstein, J. M., & Felsen, U. R. (2023). Opioid overdose prevention training needs: Findings from emergency medical services providers in Baltimore County, Maryland. *Evaluation and Program Planning, 101*, 102353. https://doi.org/10.1016/j.evalprogplan.2023.102353

Banta-Green, C. J., Kingston, S., Shandro, J., Shoemaker, R., Tsui, J. I., & Merrill, J. O. (2024). Community-based medications first for opioid use disorder – care utilization and mortality outcomes. *Substance Abuse and Rehabilitation, 15*, 1–11. https://doi.org/10.2147/SAR.S475807

Barefoot, E. H., Irvin, N. A., & Saloner, B. (2021). Opportunities for emergency medical services intervention to prevent opioid overdose mortality. *Prehospital Emergency Care, 25*(2), 234–240. https://doi.org/10.1080/10903127.2020.1740363

Belden, C. M., Townsend, L., & Greene, B. (2024). Building bridges to outpatient treatment services for post-overdose care via paramedic buprenorphine field initiation. *Journal of Substance Use and Addiction Treatment, 162*, 209364. https://doi.org/10.1016/j.josat.2024.209364

Carroll, G. G., O'Malley, G. F., & Richards, C. T. (2023). Impact of administering buprenorphine to overdose survivors using emergency medical services. *Annals of Emergency Medicine, 81*(2), 142–150. https://doi.org/10.1016/j.annemergmed.2022.07.006

CDC. (2023). *Nonfatal drug overdose data: Naloxone administration trends*. Centers for Disease Control and Prevention.

Dahlem, C. H., King-Schultz, L. W., & Lindstrom, H. A. (2021). Recovery Opioid Overdose Team (ROOT) pilot program evaluation: A community-wide post-overdose response strategy. *Substance Abuse, 42*(4), 1038–1044. https://doi.org/10.1080/08897077.2020.1847239

Fidacaro, G. A., Hodge, B. L., & Leming, K. D. (2020). Do patients require emergency department interventions after prehospital naloxone? *Journal of Addiction Medicine, 14*(3), 188–193. https://doi.org/10.1097/ADM.0000000000000563

Hern, H. G., Mahadevan, S. V., Alter, H. J., & Claudius, I. (2023). Prehospital buprenorphine treatment for opioid use disorder by paramedics: First-year results of the EMS buprenorphine use pilot. *Prehospital Emergency Care, 27*(3), 395–402. https://doi.org/10.1080/10903127.2022.2061661

Joiner, A. P., Gabel, J. A., & Broida, R. I. (2020). The role of emergency medical services in the opioid epidemic. *Prehospital Emergency Care, 25*(4), 496–503. https://doi.org/10.1080/10903127.2020.1810372

Lamorte, W. W. (2022). *The theory of planned behavior.* Boston University School of Public Health. https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/BehavioralChangeTheories3.html

McDonald, K. M., Graham, I. D., & Grimshaw, J. M. (2007). Closing the quality gap: A critical analysis of quality improvement strategies. *Technical Review, 7.* Agency for Healthcare Research and Quality. https://www.ncbi.nlm.nih.gov/books/NBK44008/

NEMSIS. (2022). *National EMS data report*. National Emergency Medical Services Information System.

Oswald, D., Sherratt, F., & Smith, S. (2014). Handling the hawthorne effect: The challenges surrounding a participant observer. *Review of Social Studies, 1*(1). https://www.pure.ed.ac.uk/ws/portalfiles/portal/21376155/Hawthone_RoSS_copy.pdf

Taylor, M. J., McNicholas, C., Nicolay, C., Darzi, A., Bell, D., & Reed, J. E. (2013). Systematic review of the application of the plan–do–study–act method to improve quality in healthcare. *BMJ Quality & Safety, 23*(4), 290–298. https://doi.org/10.1136/bmjqs-2013-001862

University of Illinois Chicago. (2024). *Nursing experts: Translating the evidence – public health nursing*. https://researchguides.uic.edu/c.php?g=252564&p=3977492

Weiner, B. J., Lewis, C. C., Stanick, C., Powell, B. J., Dorsey, C. N., Clary, A. S., ... & Halko, H. (2017). Psychometric assessment of three newly developed implementation outcome measures. *Implementation Science, 12*, 108. https://doi.org/10.1186/s13012-017-0635-3

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

PERSPECTIVES

DEBATE: AN ASSOCIATE DEGREE SHOULD BE REQUIRED FOR ENTRY LEVEL PARAMEDICS

Michael (Mic) Gunderson, EMT-P, FAEMS*[1,2,3]; Edward "Ted" Lee, EdD, NRP[4,3]; Edward Bauter, MBA, MHL, FP-C[5]; Sean Caffrey, MBA, FACPE, NR-P[6,7,3]; Louis Imperatrice, NRP[8,9]; Gregg Margolis, PhD[10,11,3]; Micheal D. Thomas, DrPH, MHA, FACPE[12,3]; John Todaro, BA, NRP, RN[13,2]

Author Affiliations: 1. Center for Systems Improvement, Madisonville, TN, USA; 2. Cambridge Consulting Group, Wayne, PA, USA; 3. International Journal of Paramedicine (IJOP), Hagerstown, MD, USA; 4. Impact EMS, USA; 5. Overrun Productions, Toms River, NJ, USA; 6. Crested Butte Fire Protection District, Crested Butte, CO, USA; 7. National EMS Management Association (NEMSMA), Hagerstown, MD, USA; 8. Clinical Excellence, DocGo, New York, NY, USA; 9. JFK EMS, Hackensack Meridian Health University Medical Center, Hackensack, NJ, USA; 10. Health Policy Fellowships and Leadership Programs, National Academy of Medicine, Washington, DC, USA; 11. University of Pittsburgh, Pittsburgh, PA, USA; 12. Jan-Care Ambulance, Inc., Beckley, WV, USA; 13. Eagle Emergency Education Consultants, Land O Lakes, FL, USA.

Recommended Citation: Gunderson, M., Lee, E., Bauter, E., Caffrey, S., Imperatrice, L., Margolis, G., Thomas, M., & Todaro, J. (2026). Debate: An associate degree should be required for entry level paramedics. *International Journal of Paramedicine.* (13). 155-175. https://doi.org/10.56068/YAZI5535. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3543

Keywords: debate, education, associate degree, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Published: January 13, 2026

**Corresponding Author:* mic.gunderson@internationaljournalofparamedicine.com

Video:
https://youtu.be/9I6XpppA6yw

EDITOR'S INTRODUCTION

This paper is the first for a new section of the Journal called Perspectives – a venue for the debate of topics of interest to the paramedicine community. A link to the video recording of the of the debate is shown elsewhere on this page. This paper is a transcript of that debate. More details on the format and the process used for conducting the debate, producing the video and generating the transcript are described in my opening remarks below.

-- M. Gunderson, Editor-In-Chief

DEBATE TRANSCRIPT

Mic Gunderson:

> Welcome to Perspectives: Debates in Paramedicine. Perspectives is a section of IJOP, the International Journal of Paramedicine, which is published by the National EMS Management Association here in the United States in collaboration with the Portuguese Pre-Hospital Emergency Society. I'm Mic Gunderson, the Editor-In-Chief of the Journal, and I'll be serving as the host and moderator for this debate, which will explore the arguments for and against the proposition that an associate degree should be required for entry-level paramedics. But before we get into the debate, let me provide a bit of background on our debate process so you can better understand what you're about to hear.

The format of our debates is different from what you may be accustomed to with the typical competitive debate format. Competitive debates are designed to determine which team won a debate. In contrast, we use a modified Socratic debate format. Socratic debates are designed to gain a deeper understanding on controversial topics by exploring them from different perspectives rather than just trying to prove the other side wrong.

Debates typically are done with live debate teams making their arguments and rebuttals in a back and forth through several debate rounds. That approach tends to place a lot of value on the participants' debate skills rather than the actual merits of the arguments and rebuttals. To place the emphasis back on the merits, we give the debate teams time to reflect on the other teams' arguments before their presentations, allowing them to adjust their arguments and craft their rebuttals accordingly.

So with that in mind, this debate was conducted asynchronously on 8 recording days across a two-week time frame. Before the presentations were recorded, a coin toss determined which team would be Team A and got to present first. The other team, Team B, got to have the last word with the final presentation and the final round. Each presentation and each debate round was recorded with just myself and one debate team member on a video interview platform.

So on day one, team A's first presenter was given up to 5 minutes to make their presentation for round one. Shortly after that recording was completed, it was shared online with all of the members of both debate teams. This allowed the other team to have time to huddle and consider making rebuttals or adjusting their arguments in the team's presentation be given on the next recording day.

On the second recording day, the five-minute round one presentation was recorded from Team B. This cycle was repeated for the round two presentations on day three and four.

Now, Ted Lee was the perspective section editor leading the organization of this debate. And he and I got together after the round two recording was released to the teams so that we could craft a question for each team to respond to in their round three presentations, which were recorded on days five and six respectively.

For the fourth round, each team made their final presentations where they could summarize and include any other counter-arguments or rebuttals if they so chose. These were recorded on the 7th and 8th recording days.

So after all eight video recordings were made from the four rounds of debates, the clips were edited together along with the introduction, between presentation transitions, and closing sections, to create the final product that you are now reading, watching, or listening to. A transcript was created from the recording and edited for clarity, and that transcript was then used to produce the article that appears in the Perspectives section of IJOP.

So now that you can understand the process used for the debate, you can appreciate that scheduling was a significant challenge in producing this event. This

impacted who was available to participate based on having sufficient availability during the time that was scheduled for orienting the teams to the debate process, conducting the team huddles between rounds, and the presentation recording sessions.

So a list of people that had shown interest in this debate topic and things like publications, conference presentations, or other mechanisms was put together. We also asked for some other suggestions from members of the IJOP editorial team. And from that list, we reached out to several individuals, engaged them as we could in the planning and scheduling, to finally end up with four people on the team arguing for the proposition, and two people on the team arguing against the proposition.

I need to point out something that is very important to bear in mind as you read, hear, or watch this debate. These are Socratic debates that seek to educate, not to choose a winning or losing team or argument. The people participating could probably argue very well for either team. With that in mind, I want to emphasize that they participated as individuals. What they presented may or may not reflect their own personal opinions, the positions of their employers, or the positions of any organizations that they may be affiliated with. They were asked to do their best to make arguments and rebuttals from a specific perspective, as members of the team arguing for the proposition or on the team arguing against the proposition - all with the objective of informing the audience on the topic through the format of a Socratic debate.

It is now my pleasure to introduce the distinguished members of our two debate teams.

On the team arguing AGAINST the proposition that an associate's degree should be required for entry-level paramedics, we have Lewis Imperatrice and Ed Bauder.

Lewis Imperatrice is an experienced paramedic, educator, and leader with over 15 years of experience in pre-hospital, 911, and critical care transport. In his current role as National Manager of Clinical Excellence with DocGo, Lewis manages BLS, ALS, and critical care EMS education, and clinical quality for DocGo EMS agencies in eight U.S. states. Lewis is a dedicated EMS educator, a featured lecturer at various EMS conferences, a published author, as well as affiliate faculty with the NAEMT and AHA. Lewis is a course director for the difficult airway course, as well as several other EMS education programs. Lewis continues to work clinically as a per diem paramedic with Hackensack Meridian Health's JFK EMS in New Jersey. Lewis is also a 2024 graduate of the NAEMT Lighthouse Leadership Program and now serves as a mentor with that program.

Also on the AGAINST the proposition team is Ed Bauder. He is a paramedic, educator, and healthcare leader focused on improving EMS through innovation and evidence-based practice. He is the founder of Overrun Productions, where he develops digital education and hosts the Overrun Podcast. With over 20 years of EMS experience, Ed has worked as a clinician, trainer, and conference speaker. His recent work explores leadership, choice architecture, and the use of new media in pre-hospital care. He's currently completing his PhD in Health Sciences at

Seton Hall University, studying how leadership and behavioral economics shape EMS practice and education.

On the team arguing FOR the proposition that an associate's degree should be required for entry-level paramedics, we have Sean Caffrey, Gregg Margolis, Mike Thomas, and John Todaro.

Sean Caffrey is the Chief Executive Officer of the Crested Butte Fire Protection District and a past president of the National EMS Management Association and the EMS Association of Colorado. He has over 35 years of EMS leadership experience and has spent more than two decades working in mountain resort areas of Colorado. Sean graduated from the George Washington University EMS degree program in 1992 and also holds a Master of Business Administration degree from the University of Denver. He's worked as a paramedic, a frontline supervisor, program manager, and senior executive. His experience includes multiple EMS organizations, the Colorado State EMS office, and the University of Colorado School of Medicine.

Gregg Margolis is the Director of Health Policy Fellowships and Leadership Programs at the National Academy of Medicine here in the United States. Prior to joining the National Academy of Medicine, Gregg served as the Director of the Division of Health System Policy for the Office of the Assistant Secretary of Preparedness and Response at the U.S. Department of Health and Human Services. Prior to his federal service, he held leadership and faculty physicians at the University of Pittsburgh, the George Washington University, and the National Registry of EMTs. In 2009-2010, he was the first paramedic to be a Robert Wood Johnson Foundation Health Policy Fellow, where he served as a health staffer in the U.S. Senate. Gregg holds a Ph.D. in Administrative Policy Studies from the University of Pittsburgh and has over 20 years of clinical experience as a field and flight paramedic.

Mike Thompson currently serves as the Chief of Government Affairs, Director of Safety, and Deputy Director of Human Resources for JanCare Ambulance, the largest ground EMS provider in the state of West Virginia, with additional operations in Durham / Raleigh, North Carolina - and with over 14 years of dedicated service at JanCare, Mike has played a pivotal role in advancing the organization's mission to deliver high-quality pre-hospital care across diverse communities. Mike holds a bachelor's degree in sports medicine, a master's degree in healthcare administration, and a doctorate in public health. His academic background and field experience uniquely positions him to lead in both operational oversight and strategic advocacy within the EMS sector. In addition to his leadership at JanCare, Mike is a board member of the American Ambulance Association, where he helps shape national policy and industry standards.

Rounding out the team is John Todaro. John is the director of Eagle Emergency Education Consultants and a senior advisor with Cambridge Consulting Group. His paramedic career spans 49 years, and he holds a baccalaureate degree in business administration and healthcare management - and associate's degrees in paramedicine and nursing. He is a nationally certified EMS educator, healthcare

simulation educator, and simulation operations specialist. In 2009, John was honored by the National Association of EMS Educators when he was awarded their prestigious Legends That Walk Among Us award. He is a charter member and past president of the National Association of EMS Educators and Florida Association of EMS Educators. John has presented at regional and national conferences now for over 41 years.

We are now ready to present the content of the debate. Again, a coin toss determined which team presented first, and that went to the team arguing against the proposition.

Presenting for the team arguing AGAINST the proposition that an associate's degree should be required for entry-level paramedics, we will now hear that team's round one presentation from Lewis Imperatrice.

Louis Imperatrice:

I don't believe that an associate's degree for an entry level paramedic should be required.

We know that there is a significant recruitment issue currently with paramedics throughout the country. And I think that by adding an associate's degree requirement for an entry level paramedic only creates an additional barrier to entry into the EMS profession, specifically on the paramedic level.

We know that associate's degree education is expensive. Times are tough when it comes to inflation, money, et cetera - and this is an additional financial barrier, as well as a time barrier.

We know that paramedic programs in general take anywhere from 12 to 18 months, sometimes two years. Adding the additional associate's degree is only going to bind us more timewise in getting these individuals into the entry-level paramedic field. So we're not in a position, in my opinion, to be adding additional barriers to entry into the paramedic field.

A recent article published in 2025 in the Biomed Central Health Research Consortium actually said that one of the biggest barriers to entry into the EMS field is cost and time. And by adding an associate's level degree to enter into the field of paramedicine only adds to that barrier of getting into the field of paramedicine.

We need paramedics on the street. We need paramedics staffing the truck. We can get them onto the truck through a certificate program in 12 to 18 months. Why do we need to add an additional time constraint and barrier to get them into the field, practicing their medicine and taking care of patients? So I believe strongly that an associate's level degree as an entry level paramedic is just an additional barrier that we have among many other barriers - financial, time constraint.

Some individuals - excellent, excellent clinicians – not good students - and are not gonna be successful in passing, and it's gonna be discouraging for them to get into the field.

Additionally, I think that a very strong point is that most of the learning we do when it comes to clinical learning is in the field. We learn this from experience. We learn this from continuing education classes, whether it be up-to-date alphabet courses, attendance at conferences, various CME or CEU educational programs that we attend. This is where the basis of our learning is. Medicine changes every day. You finish your associate's degree program. The medicine you learned over the course of that two years is probably outdated by the time you hit the field. Getting that baseline knowledge through this certificate program - enough to learn how to assess a patient, evaluate your assessment, and perform the basic clinical care that's under practice. And then, let the additional learning take place hands-on in the field in real time through up-to-date continuing education. That initial associate's degree, really, by the time you hit the field as a clinician in an entry-level position, is going to be null and void almost or outdated or just a baseline of learning - where the continuing education and the growth in our career happens in real time.

You know, I think that the barriers - that an associate's degree holds and constrains an entry level paramedic - as well as the fact that most of the learning, at least from my experience and clinicians that I work with, is done in real time in the field through continuing education. So I don't believe that a associate's degree is going to set an entry level paramedic up to be a better clinician or a smarter clinician or better prepared to work work in the field on that entry-level basis.

So those two points are really where I want to focus initially is - we don't need additional barriers, and continuing education occurs in real time as medicine changes, as the field changes, and as we as providers grow and become more experienced.

Mic Gunderson:

We will now hear the round one presentation from the team arguing FOR the proposition that an associate's degree should be required for entry-level paramedics. That presentation comes from Mike Thomas.

Mike Thomas:

Today we stand in strong support of the motion that paramedics should be required to obtain an associate degree. Let's begin with the fundamental truth - paramedics save lives. They're the first line of medical intervention in emergencies - administering medications, performing life-saving procedures, interpreting complex symptoms, and making rapid decisions under extreme pressure. The question before us isn't whether paramedics are essential. We feel that's undeniable. The question is, are we adequately preparing them for the increasing demands of this profession? And we believe that answer is no, not unless we raise the education standard to an associate degree. Now let's discuss raising those clinical and critical thinking standards.

Modern paramedicine is no longer about bandages and backboards. It requires advanced clinical knowledge, critical thinking, and diagnostic reasoning. An associate degree offers structured coursework in anatomy, physiology, pharma-

cology, and pathophysiology - all crucial for safe, effective patient care. In fact, research published in the Journal of Emergency Medical Services has shown that paramedics with a higher level of education perform better in clinical decision-making and patient assessment, especially in complex or high-stress scenarios.

We're not talking about adding unnecessary hurdles here. We're talking about giving paramedics the tools they deserve to do their job safely and competently. This debate is not about education, it's about outcomes. Paramedics with broader medical education are more likely to correctly identify strokes, sepsis, and other time sensitive conditions in the field. Conditions where every minute matters.

In some regions, expanded training has led to lower rates of hospital readmissions and better handoffs in emergency departments. When a person dials 911, they don't just want someone fast, they want someone skilled - and requiring an associate degree ensures a baseline of quality and consistency across this profession.

Now let's shift to paramedicine as a career and not a stepping stone. Requiring an associate degree sends a clear message. Paramedicine is a respected, skilled healthcare profession, not just a stepping stone or temporary job. Currently, many paramedics face burnout, low wages, and limited advancement. A degree requirement not only raises the bar for training, but also opens doors for better pay, professional development, and long-term career goals - including pathways to advanced roles such as community paramedics or critical care transport specialists. By investing in education, we invest in the workforce and help paramedics stay in the field longer with better support.

Furthermore, this team feels that alignment with current healthcare trends is of utmost salience. Nearly every other healthcare profession, from nurses to respiratory therapists, require at least an associate degree. Why should paramedics be the exception when their responsibilities are just as critical?

Healthcare is evolving. Paramedics are now being asked to do more, manage chronic conditions in the field, reduce ER overcrowding, and participate in mobile integrated healthcare programs. These new expectations demand a higher level of training - and a degree ensures paramedics can adapt to these expanded roles.

Now, let's talk about the elephant in the room-- access and equity. Now, some of you may and have argued that a degree requirement could limit access to the profession. And that's a valid concern. But here's something that is often overlooked. When we raise the education standard, colleges are forced to respond. And that's a good thing for all of us. So this challenge we can and should address through scholarships, partnerships with community colleges, tuition reimbursement, and flexible learning options. With a degree requirement in place, colleges and technical programs begin to allocate more resources toward paramedic education. That means updated equipment, better simulation labs, access to more experienced instructors, and stronger clinical partnerships with hospitals and EMS agencies. It means programs that prepare paramedics not just to pass the NREMT, but to thrive in the real world, high-stakes environments.

And remember, we aren't talking about current paramedics retroactively enrolling in associate programs. We are talking about the paramedics of the future. We shouldn't lower the bar because of barriers. We should break down the barriers so that everyone can reach the bar.

To conclude, requiring an associate degree for paramedics is not about gatekeeping. It's about respecting the complexity of the job, protecting patients, and supporting professionals in their development. When we elevate the standard of care, everyone benefits, paramedics, patients, and the healthcare system as a whole. Thank you.

Mic Gunderson:

So that completes our first round of the debate. We will now go into the second round and hear again from the team arguing against the proposition that an associate's degree should be required for entry-level paramedics. Presenting again for the Against Team, here is Luis Imperatrice.

Louis Imperatrice

So I appreciate the arguments made in regards to a degree for paramedics, and I actually agree that degrees do offer many of the benefits discussed. However, I believe the initial point of an associate's degree requirement for entry level paramedics was missed for two main reasons.

The first being, if a prospective paramedic attends an associate's degree program in paramedicine, the actual clinical content, the medicine, the skills, the assessment, are identical to that of a certificate paramedic - all in accordance with the national EMS education standards. You don't learn any additional clinical skills, whether you have an associate's degree, bachelor's degree, master's degree, et cetera. The additional education you receive from a degree program is entry-level college courses such as English, math, et cetera. Do these courses required to obtain your associate's degree make someone a better prepared entry-level paramedic? The answer is a resounding no.

As paramedics progress in their careers and want to grow into supervisory, managerial, or leadership roles, I agree - degrees specific to the career path, such as business degrees, public health degrees, emergency management degrees - they have an absolute place and an absolute benefit. But again, we have to remember, we're talking about entry-level paramedics here.

My second point is what type of degree are we actually talking about for entry-level paramedics? The question posed does not specify, and I'll use this example. Hypothetically, I have an associate's degree in English. I became a writer and decided this isn't for me. I want to be a paramedic. I attend an 18-month certificate program in paramedicine, pass my NREMT, and become a licensed paramedic. Is my English degree going to have any benefit for me as a clinician? Again, the answer is a resounding no.

So I can truly appreciate, and I do support degrees for paramedics as they advance in their career - and the benefit of these degrees is tenfold. However, the

folks on the opposite side of this argument need to remember we're talking about entry-level paramedics. So I believe my original point still stands. An associate's degree - whether in paramedicine, English, education, basket weaving, who cares - has no bearing on an individual entering the field as a day one entry level paramedic.

Many of the clinically skilled paramedics I know, many of my mentors in this field, are simply certificate paramedics. I think back to a quote from a former preceptor of mine. She said, "There's nothing wrong with being just a paramedic. Keep learning every day, keep an open mind, and love what you do."

I think the argument of paramedicine as a career stepping stone fails completely on its merits. Pay was mentioned, but this is a whole different argument because in many areas of the country, and I can speak specifically to where I work, entry-level certificate paramedics are entering the field at the same pay scale as nurses, with many of them few years into their career making close to, if not over, six figures as certificate paramedics.

So we have to remember that we're talking about these entry-level paramedics, and what we want entry-level paramedics to have is clinical competence to take care of a patient - and a degree does not teach you that. A degree teaches you the soft skills, the leadership skills, the finance, the budget, the management level skills of business. And if you think back for decades, there was never any type of nursing degree. There were certificate nurses who got their RN, went into the hospital, learned while they worked, and then advanced in their career through a clinical ladder. Only in the relative recent future or so have we seen nursing degrees and these requirements for nursing degrees. In fact, most of the nurses working in the hospital right now are probably certificate nurses, especially your senior nurses.

The research on this topic was already done. Jeffrey Ignatovich talked about this and wrote about this in his dissertation where he said that clinical skills are not taught through degrees in the field of paramedicine. They are taught through the National EMS Education Standards, which can be obtained by an entry-level paramedic through a certificate program. College degrees, according to Jeffrey's research, teach you the soft skills, the leadership skills, the managerial skills, and entry-level paramedics simply do not need this level of education to begin working as a paramedic. I'm not saying they don't need it. They don't need it to enter the field.

So I'll end this with a question. When you entered the field as an entry-level paramedic, did you have an associate's degree? And can you directly correlate with proof - your clinical success as an entry-level paramedic to your associate's degree? Or did you obtain your clinical excellence and experience through real life clinical practice and continuing education? And remember, we're talking about entry-level paramedics, not experienced paramedics who are growing through their careers in EMS.

Mic Gunderson:

We will now hear the round two presentation from the team arguing for the proposition that an associate's degree should be required for entry-level paramedics. Here's Sean Caffrey.

Sean Caffrey:

I'd like to thank the International Journal of Paramedicine and my colleagues on both sides of this discussion for participating in this important debate. As the lead author of the 2018 joint position statement on this topic, I've been asked to respond to a few of the arguments that have been made.

Let's start with what it means to be a profession. A profession isn't just a job. It's a field defined by specialized knowledge, rigorous training, experiential learning, standards of practice, and a commitment to the public trust. Professions like nursing, respiratory therapy, radiation technology, and others have long been recognized for meeting these obligations. Paramedicine is no different. To live up to the idea of professionalism, we must get past the notion that the goal is simply to find the cheapest, fastest way to put a patch in a seat. That might fill a roster, but it does not build a profession - and it does not improve care. The public deserves better, and so do the men and women who choose paramedicine as their career.

Paramedics, by and large, deliver advanced medical care in unpredictable, high-stakes environments. We make rapid, complex decisions, perform critical interventions, and integrate into the larger healthcare system. Increasingly, our role extends into critical care transport, interdisciplinary care teams, and helping patients navigate the healthcare system itself. These evolving trends show that paramedics are not only emergency responders, they are essential healthcare professionals whose scope continues to broaden. That combination of knowledge, adaptability, and accountability is what defines a profession. Because paramedicine is a profession, we have a responsibility to prepare our next generation to succeed. not just today, but in a rapidly evolving healthcare system. We owe it to our patients, our communities, and our field to ensure new paramedics have the education and critical thinking skills needed to carry them through an entire career.

An associate's degree is a realistic and appropriate baseline, but let's be clear about what kind of degree we mean. The most common path will be an associate of science in paramedicine, not unrelated fields of study. About 2/3rds of accredited programs already offer this pathway - and for many, the gap between a certificate and a degree is only a semester, or even less, of additional coursework. For those who suggest this somehow means we're requiring a degree in basket weaving or some other irrelevant discipline, that's simply a distractor put forth by the unserious. This is a serious discussion, and it deserves serious arguments, not distractions. As it turns out, there are no degrees in basket weaving. What we're talking about is a degree directly tied to paramedicine, which includes all of the content and prerequisites we already expect, simply organized and delivered as a degree program.

Furthermore, additional coursework matters. Classes in writing, psychology, and the sciences sharpen communication, broaden perspective, and strengthen the

decision-making. These aren't extras. They're essential tools for healthcare professionals who must lead and adapt over time. It is also important to understand that degree programs receive more institutional support than certificate programs. Colleges and universities provide better access to simulation labs, faculty development, financial aid, and student resources. This infrastructure, particularly in community colleges, is optimized to provide the education our workforce needs. This access to resources means students graduate more prepared and the programs themselves are ready to evolve with medical science.

Employers will benefit directly as well. Paramedics with degrees enter the workforce with stronger communication skills, a broader understanding of the healthcare system, and the confidence to take on complex roles. They are better equipped to meet today's challenges, from complex responses to integrated care models and public health crises.

In summary, this step is overdue. An associate's degree is an appropriate and realistic standard to advance our profession. It is a step from which other degrees and specializations can be built. That was the position of multiple national organizations in 2018, and it has become even more apparent today. It is time to make this standard a reality for the future of our profession and the patients we serve. Thank you.

Mic Gunderson:

That completes round two of the debate. For round three, each team was asked to respond to a question, which was, what does the future of paramedicine look like with your team's stated approach? Specifically, what does it look like for the individual clinician, the paramedic profession, the healthcare system, and for patients? As with other rounds, each team has 5 minutes for their presentation here in round three. We will first hear the response to the question from the team arguing against the proposition, which will be presented by Ed Bauter.

Ed Bauter:

Hey everybody, my name is Ed Bauter, and I'm really excited to be part of this debate here. So the first part, where we're talking about this degree program, we have to talk about how it affects the individual clinician. Right now, making an associate's degree program gives one on-ramp for providers to enter EMS. Where really what we're looking for is multiple on-ramps with paid up skilling so that we're not gatekeeping EMS as an industry. Now, this isn't to say that someone who gains a certificate can't later go on to an associate's program or to a bachelor's program or a master's program. But what we want to do, given the recruitment issues and retention issues, is to open up the availability for people to come in and become EMS providers. So going along with NASEMSO, we want to do multiple on ramps and then have different licensure accreditations and employer paid bachelor's or master's pathways.

We also want to have targeted curriculums that can lead to measurable outcomes. NREMT already leads the accreditation part here with pass rates, retention rates, and placement. We can codify simulation hours, have structured precepting. And

all of this is kind of a way to focus more on the EMS centric skills and not necessarily the broad scope of an associate's degree.

For the clinicians, we want to have better wellness and retention levers. So again, we want to be able to kind of focus this training on EMS and how it provides to the patients in the field and how it pertains to the actual providers. And then we also want to make sure that we have a stable job with growing demand. Again, we know that we have between 5% and 7% attrition, depending on where you look. So we want to make sure that we improve retention and we also improve recruitment so that we can kind of backfill the people that will be leaving.

As far as the profession is concerned, we want to professionalize by outcomes, not by abstract credentials. Which is to say that we wanna change the question from, do you have a degree? - to - Can your system prove safer, faster, and more accurate care as it pertains to NEMSIS and the national standards? Ambulance patient offloading time is something that fits into this and additional metrics here.

We also want to create ladders that can actually move people up in their career. So this is where the degree program really gets involved, where we can have someone who is certified and then they get an associate's, a bachelor's and master's and kind of move up that ladder into management.

And we also want data literate paramedics. So this is building a system that's built on QI, data use, and research literacy. There are elements into an associate's degree program that can build to this, but we want to really focus on how it affects EMS.

Then we lead into the healthcare system, where we know that there are shortages and churn, so we need to design the system around them. In an ideal world, we would have a perfect environment where we can build and fix everything at our whim - that is not necessarily the world that we're living in. So we need to address the current attrition and loss rates, and we need to build toward the future. So we need to work around the systems that currently exist.

One easy metric is to standardize and change the patient offloading times within the hospitals. This is something that's being worked on in California, and also publishing the offload performance as they do in Georgia. We can track these times and we can improve ambulance availability, which will improve patients receiving EMS care.

We also have to plan for demand growth and also we have to align our funding to real costs. So this is something that the system needs to deal with. It's not something that we can necessarily deal with.

But as far as the patients are concerned, which this is the priority here, shorter waits through this APOT standard where we're offloading people faster and getting EMS to the patients will change outcomes better than diplomas will have. We already see increased response times in different places like New York City, so we need to have more units on the road and more providers.

And then we also haven't even addressed rural access, where there might be people who are trying to become EMTs, become paramedics, who don't have the same availability that we might have in a suburban or an urban area. So we have to worry and look at what that is going to do to rural environments as well.

And then the big picture we need to look at is quality improvement for the patients and quality improvements for our systems.

So all of these things that I've talked about can work to improve EMS. From the provider side, we want to have these career ladders. We want to have good QI. We want to have a good EMS-specific training.

And then from a societal standpoint, we want to have organizations that have built trust within the community that may be attained through degree programs, but that's not necessarily the most important thing.

So the most important things here is we know that the supply of EMS workers is dwindling, so we have to work to build that up. We also have to work on ambulance deployment and offloading times. We have to build transparency for our outcomes and for credentialing, and we also have to work on career ladders for the providers that are entering EMS.

Whether or not we have a degree program, we have to work on a longer career opportunity for EMS providers, and that can start with a certificate, and it can build up to a degree program.

Thank you so much for listening, and I appreciate all your time, and I look forward to hearing your responses.

Mic Gunderson:

We will now hear from the team arguing for the proposition with reply to the question, what does the future of paramedicine look like with your team's stated approach? Specifically, what does it look like for the individual clinician, the paramedic profession, and the healthcare system, and for patients? Presenting on behalf of the team arguing for the proposition, here is John Todaro.

John Todaro:

Hi, I'm John Tonaro, and I'm here to talk about the future of paramedicine and what the vision is from our group.

So first off, establishing paramedicine as a profession through higher education, self-regulation, and professional representation is that goal for what we want to see with paramedicine in the future.

Now, there's a couple of things that are specific, and what I'd like to do is turn the question around and start with how the profession will affect patients.

So one of the things that we're going to see is paramedicine clinicians providing more patient-centered primary healthcare - doing things like health promotions, disease management, clinical assessments, even palliative care - based on needs-

based interventions for patients without transporting them to hospitals. This is gonna be, you know, pre-hospital.

We're also gonna see clinicians conducting medical, social, and even environmental assessments for patients to help with their preventative care. Paramedic clinicians providing primary care in public health deserts and in primary care deserts is something that we'd like to see in the very near future. And of course, the integration of advanced practice paramedics into the profession will help with patient care and expanding the role of paramedicine professionals in patient care.

Now, when we talk about the health care system, we want to talk about how important it will be to implement a more public health model for the provision of paramedicine care, because we want to be able to include all the continuums of health care, from clinical to academic to administrative.

The establishment of professional opportunities for paramedics in federal government, such as the US Public Health Service, is also a goal we'd like to see with a designated ranking within the Public Health Service. Advanced practice paramedicine professionals working as independent clinicians in primary care and public health agencies, especially in those areas, those desert areas where primary care and public health are hard to come by, we feel like advanced practice paramedicine practitioners would be able to help with that.

The profession itself - what do we see in the future for the profession? Well, we know that associate degrees are something we're very interested in for initial training, but bachelor's degrees as a required pathway for paramedicine supervisors, education and administrative specialty certifications is something we're looking for. We'd like to see paramedicine professionals have bachelor's degrees as a minimum requirement for those paramedicine supervisory and administrative and clinical opportunities. So we'd like to see those certificates, and we'd like to see the degrees flow into those certificates. Master's and doctorate degrees should be added as pathways for advanced practice paramedicine professionals in the areas of clinical medicine, education, and, of course, leadership and management.

One of the really important things we'd like to see is the expansion of the capacity of paramedicine research being done by paramedicine professionals and adding that to the academic community of health care.

We'd like to see a national standardized lifelong learning and continuing education requirement program that has maintenance on a national scale for national paramedic certification, as well as state licensure across all 50 states, the US territories, and the US military.

Now, paramedicine as a clinician is another issue. We already said we'd like to see associate degrees as the entry level requirement for paramedics with a minimum requirement of an associate's degree to sit for the National Registry. And we'd like to see that as a requirement.

We'd like to see bachelor's degrees as a pathway to paramedicine clinical specialties, community paramedicine, mobile and integrated healthcare, primary care,

critical care, flight medics, tactical medics, wilderness medics - all of those specialty areas. We'd like to see those embedded in the bachelor's degree program.

Of course, we'd like to see federal recognition and financial support of paramedicine as a component of healthcare - and representation in HHS, DHS, the United States Public Health Service, FEMA, DOD, et cetera, are all valuable components of this desire for paramedic clinicians to be recognized as paramedicine professionals.

One of the final things that I'd like to say is - it's kind of important to understand that we need to take action. Remember, Norman Vincent Peale said, "Action is a great restorer and builder of confidence. Inaction is not only the result, but the cause of fear." Perhaps the action you take will be successful, perhaps different actions or adjustments will need to follow, but any action is better than no action at all. We've had a very long time in the paramedicine profession here to discuss degrees, to discuss the advancement of the profession. It's time to act. And that is how we feel, that is what we see for the future of paramedicine. Thank you.

Mic Gunderson:

Thank you. Well, that completes round three, the question round. Now for the final round, round four. With the closing round four presentation on behalf of the team arguing against the proposition, here again is Ed Bauder.

Ed Bauter:

Hey everybody, welcome to the closing round of this debate. So just to clarify and to kind of round out this argument, our position is not anti-education. Rather, we're contending that entry-level paramedics should not be required to have an associate's degree, which is not the same thing as opposing higher education. Instead, we strongly support focused EMS-specific educational improvement, and there's evidence that shows that is supported in healthcare. So not so much that you just need an associate's, that this can be an associate's, and if we want to expand this program. But right now there's no EMS-specific evidence that suggests that generic degrees improve outcomes.

The National EMS research agendas explicitly identify this as an unmet need - and right now there's just no evidence to justify this policy. We do already see significant workforce bottlenecks and shortages. EMS is already facing really significant shortages and high turnover. This is per the Bureau of Labor Statistics. We have about 19,000 annual openings in EMS roles, and that's looking at, that's not even counting the 5% to 6% attrition rates that we see.

Also NAEMT and ASEMSO, they talk about high burnout pay and scheduling as problems and drivers of turnover, not lack of degrees. So we have these national organizations that are trying to build EMS that also don't necessarily support a degree as an entry level barrier.

Another concern where we already have problems with people not making enough money and pays pay scales not being sufficient is we have to worry about the barrier of payment into these programs. Do we have providers that are al-

ready working as EMTs that have the dispensable $4,000 to $12,000 on average that we see to get into a paramedic program? This can create financial and time barriers. And also if a program is two years long, what is that EMT going to do during that time to maintain their employment? So that this is another program that needs to be addressed.

I mentioned in the last video, there's also issue with rural EMS, where rural EMS has enormous staffing and financing problems, and degree mandates can risk closing that pipeline and shutting down entire departments. There's a difference between the system we would like to have and the system we do have. Adding this additional barrier poses the risk of agencies having to slow down their services or shut down their services because they can't provide enough providers that have associate's degrees.

What we've learned from nursing is, and nursing is probably our closest and best parallel, is that higher percentages of BSN prepared nurses correlates with lower patient mortality and better outcomes, which is great, but these are degrees in nursing itself, not in unrelated fields. So applying this to paramedicine, we would have to invest in paramedic-specific curricula, which has more simulation, more clinical preceptorship, and outcome-linked QA, not simply requiring just an associate's degree. So when we bring this point up, we know that there's already better alternatives that exist. We already have accreditation through NREMT and COAMPS. That they already are showing pass rates, job placement, and student satisfaction - we can strengthen those standards and immediately that would improve our quality.

We have to look at our patient offloading times as well and our operational concerns and use our system levers to actually activate these systems and improve how the system works. So I talked last time about APOD handoffs, better reimbursement through CMS is something that we have to have and we have to get more involved in lobbying and with the government, and we also have to have better wellness initiatives to have our employees stay longer and find out what these actual performance gaps are. And these are these specific training opportunities that we actually see.

In closing, our specific argument would be that our professionalization can be realized through outcomes, not necessarily through credentialing. The public and healthcare partners that trust EMS, trust EMS because EMS works. We can show safer, faster, more accurate care through transparent decisions and through dashboards, through NEMSIS or APOT reports. We can have professional status reports showing demonstrable results and not necessarily credentials disconnecting us from our practice.

So in general, requiring an associate's degree for entry-level paramedics is a blunt tool that risks worsening staffing shortages. It raises barriers, and it fails to improve care. The future in paramedicine lies in targeted, discipline-aligned education, similar to nursing's BSN model, combined with workforce investment, outcome transparency, and continued professional development.

Thank you so much, and we look forward to your responses.

Mic Gunderson:

Now we will hear the closing round four presentation. On behalf of the team arguing for the proposition, here is Gregg Margolis.

Gregg Margolis:

It is my honor to wrap up our team's strong support of an associate's degree as the educational standard for paramedics of the future. Thank you to the International Journal of Paramedicine and both teams for joining this lively debate. It's been really fun and I've learned a lot. But despite the many great points made by the other team, we remain convinced that an associate's degree in paramedicine is the appropriate educational preparation for an entry-level paramedic of tomorrow.

Let me start by clarifying a few things. First, this will not affect current paramedics in any way. This change will impact future generations of paramedics, not anyone in the field.

Second, we too are concerned about the current paramedic workforce short crisis, but we reject the notion that requiring an associate's degree will make it worse. In fact, we think that it may increase access and reduce cost of EMS education for many people.

Third, we are not denigrating anyone without an associate's degree. We have the utmost respect for many spectacular clinicians, problem solvers, and critical thinkers that we have in our profession today. Unfortunately, we believe that they've achieved excellence despite our educational system, not because of it.

Now, our colleagues on the other side have raised legitimate concerns that requiring an associate's degree might decrease access and increase the cost of paramedic education. We disagree. The U.S. community college system is the envy of the world, having educated millions and improved the lives and careers of countless Americans. According to the United States Department of Education, there are over a thousand community colleges in the U.S. with thousands more satellite campuses in virtually every county in the country. Community colleges have enormous resources and robust online educational offerings that make education much more accessible than certificate programs. Community colleges are designed to make education affordable. They offer reasonable tuition with many options for needs-based grants, scholarships, tuition assistance, student loans, and in fact, many students are able to earn their associate's degree at very low or no cost. And with all due respect to the much referenced and maligned basket weaving profession, we are deeply concerned about the implication that you need more math and education to make baskets than you do to be a paramedic. We believe that general education requirements like math, English, psychology, anatomy, and physiology are directly applicable to the job of a paramedic.

Finally, the other team acknowledges that the current paramedic training takes about 12 to 18 months. But most two-year degrees take about 16 to 20 months from start to finish. So the modest increase over what they're doing now, the paramedic of the future will have a recognized degree. And perhaps we should be more con-

cerned about how the current system cheats students out of valuable, transferable college credits should they desire to continue their formal education. So we think the workforce arguments are moot, and we didn't find anything offered by the other side to change our minds on this point.

So once we take the associate's degree as a barrier off the table, our argument boils down to two things, credibility and adaptability. Credibility, let's be honest. Our profession has long suffered from a lack of respect and recognition by our healthcare colleagues and many of our employers. We have been plagued by low pay, poor morale, high turnover, limited opportunities for advancement, difficulty recruiting, and dangerous working conditions. And while formal education won't solve all of these issues, we do believe it will help.

And adaptability. Yes, you can train the paramedic of yesterday using our current model. There are hundreds of thousands of examples of that. This proposal is about making our profession more adaptable and future ready. We believe that a broader educational foundation will enable our profession to take advantage of opportunities to improve the health of communities we serve. We're at the beginning of this trend with things like community paramedicine, mobile integrated health care, flight paramedicine, and others. And we see a bright future where well-educated paramedics will have multiple options for growth, upward mobility, increased career satisfaction, and greater earning potential.

We know this is a big change and it'll take time. We encourage you to take the long view. We propose a phased implementation over the next five to 10 years, but let's start now to forge a new future.

So in conclusion, despite the great points of our friends on the other side of this debate, we continue to believe that moving paramedic education into community colleges will increase access to education and that making an associate's degree the entry-level educational standard will improve our profession's credibility and the paramedics of the future will be more adaptable and be able to take advantage of opportunities to grow and succeed.

Thank you for listening and for keeping an open mind.

Mic Gunderson:

You have now heard from both teams arguing for and against the proposition that an associate's degree should be required for entry-level paramedics. In the pages of the Journal with the transcript of this debate, we have included references provided by members of both teams to help you further explore this topic. But this conversation is not over. We want to hear from you. What do you think about this?

For that, you're invited to join the discussion on this topic that has been started on the NEMSMA e-mail discussion groups, where hundreds of EMS professionals go to talk about issues confronting our discipline. Go to https://groups.google.com/g/NEMSMA.

All EMS professionals and other interested individuals can join this discussion group. There are no charges to join or participate. Once you're in the group, look for a message thread starting with 3543 in brackets and entitled, Perspectives Debate: An Associate Degree Should be Required for Entry-Level Paramedics.

Please keep your comments professional and courteous in line with the decorum of a professional and scholarly discussion forum, but please do make your voice heard. This discussion will be seen by people who make EMS policy decisions at the local, regional, state, and national levels. While presentations in this debate came from participants in the United States, this has implications for other countries as well. So please join the discussion and help shape policy by expressing your views in a venue that can truly make a difference.

On behalf of the International Journal of Paramedicine, I'm Mic Gunderson. Thank you for listening.

REFERENCES

Aiken, L. H., Cimiotti, J. P., Sloane, D. M., Smith, H. L., Flynn, L., & Neff, D. F. (2011). Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments. *Medical Care, 49*(12), 1047–1053. https://doi.org/10.1097/MLR.0b013e3182330b6e

American Association of Colleges of Nursing. (2025, June 1). *Degree completion programs for registered nurses: RN to master's degree and RN to baccalaureate programs*. https://www.aacnnursing.org/news-data/fact-sheets/degree-completion-programs-for-rns

Aston-Mourney, K., McLeod, J., Rivera, L. R., McNeill, B. A., & Baldi, D. L. (2022). Prior degree and academic performance in medical school: Evidence for prioritising health students and moving away from a biomedical science-focused entry stream. *BMC Medical Education, 22*(1), Article 768. https://doi.org/10.1186/s12909-022-03768-y

Ball, M., Powell, J. R., Gage, C. B., Kapalo, K. A., Kurth, J. D., Collard, L., Miller, M. G., & Panchal, A. R. (2023). Paramedic educational program attrition accounts for significant loss of potential EMS workforce. *Journal of the American College of Emergency Physicians Open, 4*(2), e12917. https://doi.org/10.1002/emp2.12917

Ball, M. T., Powell, J. R., Collard, L., York, D. K., & Panchal, A. R. (2022). Administrative and educational characteristics of paramedic programs in the United States. *Prehospital and Disaster Medicine, 37*(2), 1–5. https://doi.org/10.1017/S1049023X22000115

Bureau of Labor Statistics. (2024, August 29). *EMTs and paramedics*. U.S. Department of Labor. https://www.bls.gov/ooh/healthcare/emts-and-paramedics.htm

Caffrey, S. M., Barnes, L. C., & Olvera, D. J. (2019). Joint position statement on degree requirements for paramedics. *Prehospital Emergency Care, 23*(3), 434–437. https://doi.org/10.1080/10903127.2018.1519006

CAAHEP. (2015). *Standards and guidelines for the accreditation of educational programs in the emergency medical services professions*. https://emsa.ca.gov/wp-content/uploads/sites/71/2019/07/CAAHEP-Standards-and-Guidelines-for-the-Accreditation-of-Educational-Programs-in-the-Emergency-Medical-Services-Professions-2015.pdf

Cary, R. R., Geller, J. E., Rallo, M. S., Teichman, A. L., Englert, Z. P., Pierre, P., Murphy, T., Falcon, L., Narayan, M., & Choron, R. L. (2024). Implementation of an education module to improve emergency medical service provider accuracy and confidence in trauma triage. *Journal of Surgical Research, 303*, 241–247. https://doi.org/10.1016/j.jss.2024.09.014

Egnatovich, J. P., & Jasmine, J. (2025). Soft skills and the perceived necessity of a college degree for the paramedic profession. *Journal of Paramedic Practice, 17*(2). https://doi.org/10.12968/jpar.2024.0034

Elendu, C., Amaechi, D. C., Okatta, A. U., Amaechi, E. C., Elendu, T. C., Ezeh, C. P., & Elendu, I. D. (2024). The impact of simulation-based training in medical education: A review. *Medicine, 103*(27), e38813. https://doi.org/10.1097/MD.0000000000038813

Hsieh, A. (2016, October 16). The need for higher education in EMS is greater than ever. *EMS1*. https://www.ems1.com/ems-education/articles/the-need-for-higher-education-in-ems-is-greater-than-ever-hrunP5ID16TORkvW

International Association of Fire Chiefs. (2018, October 6). *Position: Oppose proposed degree requirements for accredited paramedic programs*. https://www.iafc.org/about-iafc/positions/position/oppose-proposed-degree-requirements-for-accredited-paramedic-programs

International Association of Fire Chiefs, International Association of Fire Fighters, National Fire Protection Association, & National Volunteer Fire Council. (2018, December 30). *Joint position statement: Opposition to proposed degree requirements for accredited paramedic programs*. https://www.iafc.org/docs/default-source/1ems/iafc-iaff-nfpa-nvfc-joint-position-statement-on-paramedic-education-requirements-12-30-18.pdf

Jardine, D. L., McKenzie, J. M., & Wilkinson, T. J. (2017). Predicting medical students who will have difficulty during their clinical training. *BMC Medical Education, 17*(1), Article 43. https://doi.org/10.1186/s12909-017-0879-2

Lancaster, S., Leggio, W., Ashford, S., Carhart, E., McKenna, K. D., & Crowe, R. P. (2023). Defining priorities for emergency medical services education research: A modified Delphi study. *Journal of the American College of Emergency Physicians Open, 4*(1), e12882. https://doi.org/10.1002/emp2.12882

Mathew, R. E., Riehs, M., Blenda, A. V., Chosed, R. J., & Wright, W. S. (2023). Student performance on course objectives in a first-year medical school foundational science course correlate with USMLE Step 1 scores. *Advances in Medical Education and Practice, 14*, 61–69. https://doi.org/10.2147/AMEP.S389785

MedicMindset Podcast. (2019, January 10). *Shock the system: An EMS World collaboration*. https://medicmindset.com/2019/01/10/24-shock-the-system-an-emsworld-collaboration

NEMSAC Committee. (2016). *Strategy for the transition of EMS providers into a more formalized educational and credentialing process*. https://www.ems.gov/assets/NEMSAC_Final_Advisory_Formalized_EMS_Education_Credentialing_Transition.pdf

Phelps, S. (2015, July 15). Length of professional education of paramedics and nurses at community colleges in the Northeast United States. *Paramedic Practice*. https://www.paramedicpractice.com/content/features/length-of-professional-education-of-paramedics-and-nurses-at-community-colleges-in-the-Northeast-United-States

Sirr, K. (2024, February 21). To degree or not to degree? The paramedic question. *JEMS*. https://www.jems.com/ems-training/paramedic-training/to-degree-or-not-to-degree-the-paramedic-question

U.S. Department of Education. (n.d.). *Community college facts at a glance*. https://www.ed.gov/higher-education/find-college-or-educational-program/community-college/facts-at-a-glance

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

LITERATURE SURVEILLANCE

PARAMEDICINE CONTENTS: SEPTEMBER-NOVEMBER 2025

SECTION EDITORS: Julius McAdams, BME, FP-C, CCP-C*[1,2,3]; Brad Buck, BS, NRP, CP[4,5,3]

Section Editor Affiliations: 1. AirLink/VitaLink, Novant Health, Wilmington, NC, USA; 2. International College of Advanced Practice Paramedics (I-CAPP), Washington, DC, USA; 3. International Journal of Paramedicine (IJOP), Hagerstown, MD, USA; 4. Mayo Clinic Ambulance Service, Rochester, MN, USA; 5. Board of Directors, American Paramedic Association (APA), Windsor, CO, USA.

Recommended Citation: McAdams, J., & Buck, B. (2026). Paramedicine tables of contents: September-November 2025. *International Journal of Paramedicine*. (13). 176-183. https://doi.org/10.56068/YPVB8165. Retrieved from https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3587

Keywords: tables of contents, literature search, literature surveillance, paramedicine, EMS, emergency medical services

Disclosures: None.

Funding: External funding was not used to support this work.

Published: October 7, 2025

**Corresponding Author:* jmcadamsnc@gmail.com

To help paramedicine professionals keep current with the literature in our discipline, the 'Paramedicine Contents' section shares recent tables of contents of scholarly journals that are primarily focused on the paramedicine discipline.

BRITISH PARAMEDIC JOURNAL

https://www.ingentaconnect.com/content/tcop/bpj

September 2025

A qualitative exploration of behaviours and lifestyle factors impacting levels of vitamin D within a UK ambulance service workforce (EVOLVED). https://www.ingentaconnect.com/contentone/tcop/bpj/2025/00000010/00000002/art00001

Delayed adrenaline administration prolongs adrenaline-to-ROSC interval in out-of-hospital cardiac arrest. https://www.ingentaconnect.com/contentone/tcop/bpj/2025/00000010/00000002/art00002

Investigating pre-hospital troponin testing in the diagnosis of acute myocardial infarction: a systematic review. https://www.ingentaconnect.com/contentone/tcop/bpj/2025/00000010/00000002/art00003

Exploratory study comparing a single episode of feedback with regular feedback and no feedback on BVM ventilation during a simulated cardiac arrest over a six-month time frame: a research protocol. https://www.ingentaconnect.com/contentone/tcop/bpj/2025/00000010/00000002/art00005

PARAMEDICINE

https://journals.sagepub.com/home/PAM

VOLUME 22, ISSUE 5, SEPTEMBER 2025

VOLUME 22, ISSUE 5, NOVEMBER 2025

JOURNAL OF EMS MEDICINE

https://jemsmed.org/

Volume 4, Number 3, September 2025

Intra-hospital factors affecting survival to admission in out-of-hospital cardiac arrest: an exploratory cross-sectional study. https://doi.org/10.35616/jemsm.2025.00136

Response rate of the community first responder notification system for out-of-hospital cardiac arrest patients: an experience from Thailand. https://doi.org/10.35616/jemsm.2025.00171

JOURNAL OF PARAMEDIC PRACTICE

https://www.paramedicpractice.com/

September 2025

Diabetes mellitus and postural hypotension in prehospital care. https://www.paramedicpractice.com/content/cpd-postural-hypotension/diabetes-mellitus-and-postural-hypotension-in-prehospital-care

A note to you. https://www.paramedicpractice.com/content/editorial/a-note-to-you

The pharmacology of psychoactive drug abuse and overdose. https://www.paramedicpractice.com/content/pharmacology-series/the-pharmacology-of-psychoactive-drug-abuse-and-overdose

Sickle cell crisis: presenting a patient case report. https://www.paramedicpractice.com/content/clinical-practice/sickle-cell-crisis-presenting-a-patient-case-report

Migraines: diagnosis, management and red flags. https://www.paramedicpractice.com/content/clinical-practice/migraines-diagnosis-management-and-red-flags

Presence of family members during CPR in the prehospital setting: a review. https://www.paramedicpractice.com/content/research/presence-of-family-members-during-cpr-in-the-prehospital-setting-a-review

ECG case series for paramedics: September 2025. https://www.paramedicpractice.com/content/research/ecg-case-series-for-paramedics-september-2025

From mentee to mentor. https://www.paramedicpractice.com/content/nqp-perspective/from-mentee-to-mentor

Navigating curve balls. https://www.paramedicpractice.com/content/mastery-in-writing/navigating-curve-balls

October 2025

A regulator failing to uphold its own standards. https://www.paramedicpractice.com/content/editorial/a-regulator-failing-to-uphold-its-own-standards

Paramedic use of the AVPU and Glasgow Coma Scale. https://www.paramedicpractice.com/content/fundamental-skills/paramedic-use-of-the-avpu-and-glasgow-coma-scale

Respiratory distress and air quality: healthcare and socioeconomic implications. https://www.paramedicpractice.com/content/research/respiratory-distress-and-air-quality-healthcare-and-socioeconomic-implications

Physiological demands of rescue roles in real life and simulations: a review. https://www.paramedicpractice.com/content/research/physiological-demands-of-rescue-roles-in-real-life-and-simulations-a-review

PREHOSPITAL AND DISASTER MEDICINE

https://www.cambridge.org/core/journals/prehospital-and-disaster-medicine

VOLUME 40, ISSUE 5, OCTOBER 2025

Assessing the Predictive Value of mREMS in Patients with Trauma from the Syrian Civil War: A Retrospective Epidemiological Study. https://doi.org/10.1017/S1049023X25101428

Prehospital Aspirin Delivery: Emergency Medical Dispatcher-Directed versus Emergency Medical Services Field Provider-Directed Aspirin Administration. https://doi.org/10.1017/S1049023X25101490

Physiological Impacts of Cold Conditions during Moderate Intensity Activity while Wearing Firefighter Protective Clothing. https://doi.org/10.1017/S1049023X25101491

A Modified Delphi Process to Develop Consensus Definitions of Time-Dependent Care by Paramedic Services Systems. https://doi.org/10.1017/S1049023X25101492

Coping Strategies Related to Posttraumatic Stress Disorder in First Responders. https://doi.org/10.1017/S1049023X25101493

Multiple-Casualty Incident Following Lightning Strike at Mount Giewont: An Analysis of Disaster Rescue Response. DOI: https://doi.org/10.1017/S1049023X25101494

Emergency Medical Team Deployment in Response to Cyclones Judy and Kevin in Vanuatu: Coordination, Challenges, and Outcomes – CORRIGENDUM. https://doi.org/10.1017/S1049023X25101495

Stayin' Alive: Examining Gender-Based Differences in Bystander Cardiopulmonary Resuscitation for Out-of-Hospital Cardiac Arrest – CORRIGENDUM. https://doi.org/10.1017/S1049023X25101496

PREHOSPITAL EMERGENCY CARE

https://www.tandfonline.com/journals/ipec20

VOLUME 29, ISSUE 7, 2025

Benefits of Virtual Reality Training for Cardiopulmonary Resuscitation Skill Acquisition and Maintenance. https://doi.org/10.1080/10903127.2024.2416971

Community Disparities in Out-of-Hospital Cardiac Arrest Prehospital Antiarrhythmic Practices https://doi.org/10.1080/10903127.2024.2436051

Accuracy of Automated External Defibrillator Pad Placement During Out-of-Hospital Cardiac Arrest Resuscitation Simulations. https://doi.org/10.1080/10903127.2024.2438394

Establishing Outcome Parameters for Helicopter Emergency Medical Services Research in The Netherlands: Results of a Mixed-Methods Delphi Consensus Study. https://doi.org/10.1080/10903127.2024.2413038

Coffee and Cases (C&C) - Enhancing Knowledge Creation and Sharing for Organizational Learning From Clinical Debriefs in a Helicopter Emergency Medical Service: A Quality Improvement Study. https://doi.org/10.1080/10903127.2024.2417842

Burden of Non-Protocolized Patient Transport Outside of Response Area on a Rural Emergency Medical Services System. https://doi.org/10.1080/10903127.2024.2412837

An Analysis of 24-Hour Survival Based on Arrival by Atypical Ground Transport Versus Ground Emergency Medical Services. https://doi.org/10.1080/10903127.2024.2436048

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

LITERATURE SURVEILLANCE

PARAMEDICINE LITERATURE SEARCH: SEPTEMBER-NOVEMBER 2025

SECTION EDITORS: Shaughn Maxwell, PsyM, EMT-P[1,2]; Brenda M. Morrissey, DPA, FP-C, FACPE*[3,4,2]

Section Editor Affiliations: 1. South County Fire and Rescue, Everett, WA, USA; 2. International Journal of Paramedicine (IJOP), Hagerstown, MD, USA; 3. Northwell Health, Great Neck, NY, USA; 4. Second Chance Safety, LLC, Floral Park, NY, USA.

Recommended Citation: Maxwell, S. & Morrissey, B. M. (2025). Paramedicine literature search: March-May 2025. *International Journal of Paramedicine*, (11), 184-237. https://doi.org/10.56068/VGXW1674. Retrieved from: https://internationaljournalofparamedicine.com/index.php/ijop/article/view/3451

Keywords: literature search, emergency medical services, EMS, paramedicine

Disclosures: None.

Funding: External funding was not used to support this work.

Published: July 8, 2025

**Corresponding Author:* drbrendamorrissey@gmail.com

To help paramedicine professionals to keep abreast of the literature in our discipline, the Paramedicine Literature Search provides the results of a standardized search of the PubMed database. This search results will include articles from journals that many paramedicine professionals may already be familiar with. The search strategy is also designed to include articles in journals they may not be commonly monitoring, such an article about ambulance care for cancer patients that appeared in an oncology journal.

The formatting of the Paramedicine Literature Search allows the reader to scan the titles of articles and click into the article link, when provided, for additional details.

The authors have made a diligent effort in designing of the search strategy to balance sensitivity (i.e., getting all relevant articles in paramedicine) with the specificity (i.e., excluding articles not relevant to paramedicine). The balance is imperfect. As a result, it should be noted that the results do not include every relevant article and includes some non-relevant articles.

The search strategy is filtered to only include articles published in a time frame listed below. This will include articles with electronic and print publication dates in that date range. Some of the publication dates may fall outside of this range due to how the article metadata was indexed by the publisher.

The following results were obtained on January 4, 2026 from the PubMed website (https://pubmed.ncbi.nlm.nih.gov/) using the following search terms and Boolean logic:

"paramedic"[Text Word] OR "paramedics"[Text Word] OR "prehospital"[Text Word] OR "pre-hospital"[Text Word] OR "emergency medical technician"[Text Word] OR "emergency medical technicians"[Text Word] OR "Ambulance"[Text Word] OR "emergency medical services"[Text Word] OR "fire-rescue"[Text Word] OR "fire-rescue"[Text Word]

Search Filter: Publication range of September 1, 2025 to November 30, 2025.

We need to talk about Annie. Weber EJ. Emerg Med J. 2025 Oct 20;42(11):694-695. doi: 10.1136/emermed-2025-215559. https://doi.org/10.1136/emermed-2025-215559

Tranexamic Acid in Trauma. Barrett WJ. Ann Emerg Med. 2025 Sep;86(3):e73-e80. doi: 10.1016/j.annemergmed.2025.03.007. https://doi.org/10.1016/j.annemergmed.2025.03.007

The road ahead: transforming New Zealand ambulance (out-of-hospital) services. Mordaunt DA. N Z Med J. 2025 Sep 19;138(1622):9-13. doi: 10.26635/6965.6911. https://doi.org/10.26635/6965.6911

Integrating point-of-care ultrasound into prehospital care. Soliman Aboumarie H. Saudi Med J. 2025 Oct;46(10):1115-1116. doi: 10.15537/smj.2025.10.20250675. https://doi.org/10.15537/smj.2025.10.20250675

Determinants of emergency medical services utilization among older adults: a comprehensive scoping review. Günay Tuzcu G. Geriatr Nurs. 2025 Nov-Dec;66(Pt B):103623. doi: 10.1016/j.gerinurse.2025.103623. Epub 2025 Sep 16. https://doi.org/10.1016/j.gerinurse.2025.103623

Cardiac Arrest Care in Resource-Limited Settings. Okonkwo NE. Crit Care Clin. 2026 Jan;42(1):107-130. doi: 10.1016/j.ccc.2025.08.010. Epub 2025 Oct 15. https://doi.org/10.1016/j.ccc.2025.08.010

Emergency Medical Services Clinician Accuracy Using the Pediatric Observation Priority Score. Ward CE. Pediatr Emerg Care. 2025 Sep 1;41(9):e129-e135. doi: 10.1097/PEC.0000000000003425. Epub 2025 Jun 5. https://doi.org/10.1097/PEC.0000000000003425

Prehospital resuscitative hysterotomy: a practice review. Leech C. Emerg Med J. 2025 Nov 13:emermed-2025-215327. doi: 10.1136/emermed-2025-215327. Online ahead of print. https://doi.org/10.1136/emermed-2025-215327

Prehospital locoregional anesthesia: a case series. Vizzolo L. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):153. doi: 10.1186/s13049-025-01460-w. https://doi.org/10.1186/s13049-025-01460-w

EMS Telemedicine in the Prehospital Setting. Su JSShanes AQuinn E. 2025 Sep 14. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan–. https://doi.org/

Prehospital Interventions Provided by Helicopter Emergency Medical Services Teams: A Scoping Review. Hu X. J Emerg Nurs. 2025 Nov 21:S0099-1767(25)00426-X. doi: 10.1016/j.jen.2025.10.011. Online ahead of print. https://doi.org/10.1016/j.jen.2025.10.011

Impact of prehospital delay on postoperative complications and 5-year mortality in older adults with hip fractures. Jiang Y. Injury. 2025 Nov;56(11):112727. doi: 10.1016/j.injury.2025.112727. Epub 2025 Aug 25. https://doi.org/10.1016/j.injury.2025.112727

Emergency medical technician experiences of assignments with women in labour. Hågensen K. Sex Reprod Healthc. 2025 Sep;45:101118. doi: 10.1016/j.srhc.2025.101118. Epub 2025 May 31. https://doi.org/10.1016/j.srhc.2025.101118

[Prehospital Disaster Medicine and Civil Protection]. Kippnich M. Anasthesiol Intensivmed Notfallmed Schmerzther. 2025 Sep;60(9):467-478. doi: 10.1055/a-2582-8352. Epub 2025 Sep 4. https://doi.org/10.1055/a-2582-8352

FPHC Wellbeing Charter: The 'Whys' and 'Hows' of the Charter. Morton S. Scand J Trauma Resusc Emerg Med. 2025 Nov 22;33(1):187. doi: 10.1186/s13049-025-01503-2. https://doi.org/10.1186/s13049-025-01503-2

Evaluation of paramedics education in emergency health services. Polat M. BMC Med Educ. 2025 Nov 26;25(1):1649. doi: 10.1186/s12909-025-08268-3. https://doi.org/10.1186/s12909-025-08268-3

Survey of the situation of the prehospital emergency medical services system in Iran. Abandansari MET. BMC Emerg Med. 2025 Oct 29;25(1):219. doi: 10.1186/s12873-025-01350-5. https://doi.org/10.1186/s12873-025-01350-5

Physiological targets for prehospital adult post-ROSC management. Bray JE. Curr Opin Crit Care. 2025 Dec 1;31(6):707-712. doi: 10.1097/MCC.0000000000001320. Epub 2025 Sep 5. https://doi.org/10.1097/MCC.0000000000001320

Mental Health Safety Challenges Among Pre-Hospital Emergency Medical Service Providers: A Scoping Review. McGlynn C. IISE Trans Occup Ergon Hum Factors. 2025 Oct 31:1-32. doi: 10.1080/24725838.2025.2572580. Online ahead of print. https://doi.org/10.1080/24725838.2025.2572580

Obesity: a challenge for emergency medical teams-a narrative review. Czapla M. Front Public Health. 2025 Sep 29;13:1659924. doi: 10.3389/fpubh.2025.1659924. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1659924

Emergency Medical Services Policies and Perspectives Leading to Ambulance Engine Idling. Lyons M. West J Emerg Med. 2025 Sep 25;26(5):1280-1290. doi: 10.5811/westjem.47186. https://doi.org/10.5811/westjem.47186

Prehospital Aspirin Delivery: Emergency Medical Dispatcher-Directed versus Emergency Medical Services Field Provider-Directed Aspirin Administration. Scott G. Prehosp Disaster Med. 2025 Oct;40(5):251-258. doi: 10.1017/S1049023X25101490. Epub 2025 Nov 4. https://doi.org/10.1017/S1049023X25101490

Temporal Patterns in Out-of-Hospital Cardiac Arrest Incidence and Outcome. McBride O. JAMA Cardiol. 2025 Sep 1;10(9):922-931. doi: 10.1001/jamacardio.2025.2247. https://doi.org/10.1001/jamacardio.2025.2247

Variation in Prehospital Trauma Triage Protocols. Larson EL. Prehosp Emerg Care. 2025 Oct 30:1-6. doi: 10.1080/10903127.2025.2570822. Online ahead of print. https://doi.org/10.1080/10903127.2025.2570822

Age-Based Trends in Opioid Overdose-Related Emergency Medical Services Encounters, 2017-2023. Burns A. J Public Health Manag Pract. 2025 Nov-Dec 01;31(6):E347-E350. doi: 10.1097/PHH.0000000000002199. Epub 2025 Oct 21. https://doi.org/10.1097/PHH.0000000000002199

Reorganization of the Danish out-of-hours primary care - a descriptive study. Søvsø MB. Scand J Prim Health Care. 2025 Sep;43(3):639-648. doi: 10.1080/02813432.2025.2490915. Epub 2025 Apr 20. https://doi.org/10.1080/02813432.2025.2490915

Do not resuscitate (DNR) emergency medical services (EMS) protocol variation in the United States. Breyre AM. Am J Emerg Med. 2025 Nov;97:123-128. doi: 10.1016/j.ajem.2025.07.035. Epub 2025 Jul 16. https://doi.org/10.1016/j.ajem.2025.07.035

Impact of Pre-Hospital and in-Hospital Optimization on the Management of Intravenous Thrombolysis in Hyperacute Ischemic Stroke: A Scoping Review. Kharisma TEA. Risk Manag Healthc Policy. 2025 Nov 19;18:3689-3712. doi: 10.2147/RMHP.S553410. eCollection 2025. https://doi.org/10.2147/RMHP.S553410

Gender discrimination in the emergency services: Female paramedic experiences in South Africa. Makkink AW. Afr J Prim Health Care Fam Med. 2025 Sep 3;17(1):e1-e11. doi: 10.4102/phcfm.v17i1.4945. https://doi.org/10.4102/phcfm.v17i1.4945

Epidemiological characteristics and trends of pre-hospital emergency care in Handan, China from 2011 to 2024. Tian F. Front Public Health. 2025 Sep 8;13:1651467. doi: 10.3389/fpubh.2025.1651467. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1651467

Utilization, awareness, and predictors of emergency medical services use in India: a prospective observational study. Lingappa DJ. BMC Emerg Med. 2025 Nov 25;25(1):243. doi: 10.1186/s12873-025-01394-7. https://doi.org/10.1186/s12873-025-01394-7

Tranexamic acid in trauma: A joint position statement and resource document of NAEMSP, ACEP, and ACS-COT. Barrett WJ. J Trauma Acute Care Surg. 2025 Sep 1;99(3):357-363. doi: 10.1097/TA.0000000000004727. Epub 2025 Aug 18. https://doi.org/10.1097/TA.0000000000004727

[Management of convulsive status epilepticus in childhood]. Glatter S. Wien Klin Wochenschr. 2025 Sep;137(Suppl 7):233-241. doi: 10.1007/s00508-025-02570-2. Epub 2025 Sep 16. https://doi.org/10.1007/s00508-025-02570-2

Prehospital Triage of Pediatric Emergencies Treated by Helicopter Emergency Medical Services: A Population-Based Cohort Study. Tsuchiya EA. Air Med J. 2025 Sep-Oct;44(5):365-371. doi: 10.1016/j.amj.2025.05.008. Epub 2025 Jun 13. https://doi.org/10.1016/j.amj.2025.05.008

BE-FAST vs FAST in prehospital stroke recognition: a systematic review. Hilditch M. Br J Community Nurs. 2025 Sep 2;30(9):439-447. doi: 10.12968/bjcn.2025.0119. https://doi.org/10.12968/bjcn.2025.0119

Sex Differences in Prehospital Stroke Medicine (SESAME): A Systematic Review and Meta-Analysis. Wells B. Stroke. 2025 Oct;56(10):2976-2987. doi: 10.1161/STROKEAHA.124.050414. Epub 2025 Aug 4. https://doi.org/10.1161/STROKEAHA.124.050414

Revitalizing Emergency Medical Services in the United States: A perspective from frontline workers. Singh S. J Emerg Manag. 2025 Sep-Oct;23(5):631-636. doi: 10.5055/jem.0936. https://doi.org/10.5055/jem.0936

Under Recognized Toxicity of Flecainide Overdose. Diederich T. Prehosp Emerg Care. 2025 Nov 17:1-6. doi: 10.1080/10903127.2025.2589459. Online ahead of print. https://doi.org/10.1080/10903127.2025.2589459

Examining the experiences of prehospital emergency workers in emergency medical intervention during terrorist attacks: a qualitative study. Günay Tuzcu G. Eur J Trauma Emerg Surg. 2025 Oct 28;51(1):313. doi: 10.1007/s00068-025-02998-1. https://doi.org/10.1007/s00068-025-02998-1

Characterization and Application of Statewide Emergency Medical Services Advanced Life Support Protocols. Devanarayan P. Cureus. 2025 Sep 11;17(9):e92053. doi: 10.7759/cureus.92053. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92053

Contemporary issues in pediatric prehospital airway management. Wang HE. Expert Rev Respir Med. 2025 Sep 22:1-8. doi: 10.1080/17476348.2025.2562632. Online ahead of print. https://doi.org/10.1080/17476348.2025.2562632

How we implement a prehospital transfusion program. Coberly E. Transfusion. 2025 Oct;65(10):1771-1779. doi: 10.1111/trf.18389. Epub 2025 Aug 29. https://doi.org/10.1111/trf.18389

Analysis of Helicopter Emergency Medical Services Metrics-Altmetrics Score Perspective: HEMS-MAP. Çetin M. Air Med J. 2025 Nov-Dec;44(6):497-504. doi: 10.1016/j.amj.2025.07.008. https://doi.org/10.1016/j.amj.2025.07.008

Overview of the prevalence of job satisfaction and turnover intention among emergency medical services personnel: a meta-analysis. Huang G. J Glob Health. 2025 Nov 28;15:04320. doi: 10.7189/jogh.15.04320. https://doi.org/10.7189/jogh.15.04320

Paramedic assessment and referral of patients with suspected or confirmed COVID-19 in the out-of-hospital environment: a scoping review. Gleeson-Hammerton T. Australas Emerg Care. 2025 Oct 27:S2588-994X(25)00076-4. doi: 10.1016/j.auec.2025.10.002. Online ahead of print. https://doi.org/10.1016/j.auec.2025.10.002

Ambulance Emergency Medical Services Professionals' Perspectives on Collaboration With Helicopter Emergency Medical Services Physicians. Panula E. Air Med J. 2025 Sep-Oct;44(5):409-415. doi: 10.1016/j.amj.2025.06.018. Epub 2025 Jul 16. https://doi.org/10.1016/j.amj.2025.06.018

Rural rendezvous: How multiple EMS transfers impact trauma outcomes. Rhodes-Lyons HX. Am J Emerg Med. 2025 Sep;95:195-199. doi: 10.1016/j.ajem.2025.05.052. Epub 2025 May 30. https://doi.org/10.1016/j.ajem.2025.05.052

Variation in global trauma care: a survey of 187 hospitals across 51 countries. Edmiston T. BMJ Glob Health. 2025 Nov 9;10(11):e021784. doi: 10.1136/bmjgh-2025-021784. https://doi.org/10.1136/bmjgh-2025-021784

Children brought to the pediatric emergency department by emergency medical services: an evaluation of the PECARN registry. Ramgopal S. Acad Pediatr. 2025 Oct 28:103156. doi: 10.1016/j.acap.2025.103156. Online ahead of print. https://doi.org/10.1016/j.acap.2025.103156

Emergency Medical Services Perception of the Use of Wearables in Patient Management During Mass Casualty Incident Management. Tambini SS. Disaster Med Public Health Prep. 2025 Nov 24;19:e325. doi: 10.1017/dmp.2025.10256. https://doi.org/10.1017/dmp.2025.10256

A 'Direct to operating room' approach improves critically injured patient outcomes. Bohan PMK. Curr Opin Crit Care. 2025 Oct 1;31(5):557-565. doi: 10.1097/MCC.0000000000001278. Epub 2025 May 2. https://doi.org/10.1097/MCC.0000000000001278

Utilisation of an emergency medical services pathway into a virtual emergency department and the impact on non-transports and patient safety. Mahony E. Emerg Med J. 2025 Nov 23:emermed-2025-214861. doi: 10.1136/emermed-2025-214861. Online ahead of print. https://doi.org/10.1136/emermed-2025-214861

An experimental comparison and user evaluation of three different dried plasma products. Ehn K. Vox Sang. 2025 Nov;120(11):1058-1065. doi: 10.1111/vox.13798. Epub 2025 Jan 27. https://doi.org/10.1111/vox.13798

Violence Exposure Status of Prehospital Care Emergency Medical Services Personnel and the Effects of Violence on the System. Ek i A. Arch Iran Med. 2025 Sep 1;28(9):522-529. doi: 10.34172/aim.34623. Epub 2025 Sep 1. https://doi.org/10.34172/aim.34623

Use of Muscle Relaxants in Emergency Medicine: A Review. Radkowski P. Med Sci Monit. 2025 Sep 11;31:e949876. doi: 10.12659/MSM.949876. https://doi.org/10.12659/MSM.949876

[Arrival times of emergency services in out-of-hospital cardiac arrest-Survival-relevant differences between federal states in Germany]. Fischer M. Anaesthesiologie. 2025 Oct;74(10):634-645. doi: 10.1007/s00101-025-01592-9. Epub 2025 Sep 16. https://doi.org/10.1007/s00101-025-01592-9

Intraarterial blood pressure monitoring in prehospital emergency care: a scoping review. Eichlseder M. Scand J Trauma Resusc Emerg Med. 2025 Oct 14;33(1):166. doi: 10.1186/s13049-025-01473-5. https://doi.org/10.1186/s13049-025-01473-5

The 'traffic dilemma': Rethinking emergency medical logistics in megacities. Paché G. Future Healthc J. 2025 Aug 20;12(3):100456. doi: 10.1016/j.fhj.2025.100456. eCollection 2025 Sep. https://doi.org/10.1016/j.fhj.2025.100456

Contemporary prehospital Emergency Medical Services in the United States: An overview and considerations for the Transfusion Medicine Community. Levy MJ. Transfusion. 2025 Sep;65(9):1738-1745. doi: 10.1111/trf.18348. Epub 2025 Jul 27. https://doi.org/10.1111/trf.18348

No Pulse, No Panic! Navigating Cardiac Arrest in LVAD-Supported Patients. Rahmanian M. Crit Care Clin. 2026 Jan;42(1):183-192. doi: 10.1016/j.ccc.2025.08.011. Epub 2025 Oct 14. https://doi.org/10.1016/j.ccc.2025.08.011

The Role of the Emergency Medical Services Medical Director and Natural Disasters: The Sarasota, Florida Experience During Hurricane Milton. Nackley GM. Prehosp Emerg Care. 2025 Sep 16:1-5. doi: 10.1080/10903127.2025.2551893. Online ahead of print. https://doi.org/10.1080/10903127.2025.2551893

Patient presentations at large-scale events: a thematic analysis of the literature. Shelswell R. Emerg Nurse. 2025 Nov 4;33(6):29-34. doi: 10.7748/en.2025.e2229. Epub 2025 May 7. https://doi.org/10.7748/en.2025.e2229

Access to emergency medical services and associated barriers among war-affected patients evacuated from Gaza: a cross-sectional study. Çamcı M. Arch Public Health. 2025 Oct 1;83(1):234. doi: 10.1186/s13690-025-01734-w. https://doi.org/10.1186/s13690-025-01734-w

Impact of Emergency Medical Services Call-to-Hospital Arrival Time on Outcomes of Cardiac Arrest: A Nationwide Prospective Cohort. Lee OH. Mayo Clin Proc. 2025 Oct;100(10):1719-1730. doi: 10.1016/j.mayocp.2025.06.025. https://doi.org/10.1016/j.mayocp.2025.06.025

Mental health struggles among newly qualified paramedics. Mosiane A. Sci Rep. 2025 Nov 22. doi: 10.1038/s41598-025-28150-y. Online ahead of print. https://doi.org/10.1038/s41598-025-28150-y

Expedited transfer from the scene for refractory out-of-hospital cardiac arrest in Australia: a prospective, multicentre, parallel, open label, randomised clinical trial. Burns B. Lancet Respir Med. 2025 Oct;13(10):921-932. doi: 10.1016/S2213-2600(25)00130-4. Epub 2025 Aug 22. https://doi.org/10.1016/S2213-2600(25)00130-4

Artificial Intelligence in Prehospital Emergency Care: Advancing Triage and Destination Decisions for Time-Critical Conditions. Zarei R. Cureus. 2025 Sep 3;17(9):e91542. doi: 10.7759/cureus.91542. eCollection 2025 Sep. https://doi.org/10.7759/cureus.91542

Optimizing extracorporeal cardiopulmonary resuscitation delivery for out-of-hospital cardiac arrest: a Monte Carlo simulation study. Leroux L. Resuscitation. 2025 Oct;215:110743. doi: 10.1016/j.resuscitation.2025.110743. Epub 2025 Aug 5. https://doi.org/10.1016/j.resuscitation.2025.110743

Discrepancies Between Emergency Transport Modality and Emergency Department Outcomes: An Epidemiological Analysis. Zaboli A. J Public Health Manag Pract. 2025 Nov-Dec 01;31(6):E338-E346. doi: 10.1097/PHH.0000000000002196. Epub 2025 Oct 21. https://doi.org/10.1097/PHH.0000000000002196

Prehospital Prediction of Cardiogenic Shock Among Patients With ST-Segment-Elevation Myocardial Infarction: The EARLY SHOCK Score. Yang C. J Am Heart Assoc. 2025 Oct 7;14(19):e040681. doi: 10.1161/JAHA.124.040681. Epub 2025 Aug 12. https://doi.org/10.1161/JAHA.124.040681

EMS Professionals sleep disturbance: a cross-sectional study. Al Amiry A. J Occup Environ Med. 2025 Oct 31. doi: 10.1097/JOM.0000000000003595. Online ahead of print. https://doi.org/10.1097/JOM.0000000000003595

Frequent callers to the emergency medical services: A mixed-methods study of call patterns, reasons for calling, and wellbeing. Gehrt TB. Soc Sci Med. 2025 Oct;382:118326. doi: 10.1016/j.socscimed.2025.118326. Epub 2025 Jun 18. https://doi.org/10.1016/j.socscimed.2025.118326

Advocating for the Prehospital Administration of Low-Titer O+ Whole Blood: Dispelling Myths and Misinformation. Wood SP. J Spec Oper Med. 2025 Sep 1;25(3):101-103. doi: 10.55460/NA4R-BK7R. https://doi.org/10.55460/NA4R-BK7R

Target temperature management: a review and new prospect of cooling methods and devices. Wang Y. Expert Rev Med Devices. 2025 Sep;22(9):1009-1020. doi: 10.1080/17434440.2025.2537393. Epub 2025 Jul 23. https://doi.org/10.1080/17434440.2025.2537393

REBOA or resuscitative thoracotomy, different tools for different patients. A real-life analysis from the AORTA registry. Coccolini F. Injury. 2025 Sep;56(9):112601. doi: 10.1016/j.injury.2025.112601. Epub 2025 Jul 8. https://doi.org/10.1016/j.injury.2025.112601

Deep learning-based in-ambulance speech recognition and generation of prehospital emergency diagnostic summaries using LLMs. Chen C. Int J Med Inform. 2025 Nov;203:106029. doi: 10.1016/j.ijmedinf.2025.106029. Epub 2025 Jul 7. https://doi.org/10.1016/j.ijmedinf.2025.106029

SWOT analysis of prehospital ultrasound use and its practical implications. Azapo lu Kaymak B. Medicine (Baltimore). 2025 Sep 26;104(39):e44868. doi: 10.1097/MD.0000000000044868. https://doi.org/10.1097/MD.0000000000044868

Frequent Emergency Medical Services Utilization Among Older Patients: Exploration and Automatic Identification Using Natural Language Processing. Pouw MA. J Am Med Dir Assoc. 2025 Nov;26(11):105814. doi: 10.1016/j.jamda.2025.105814. Epub 2025 Sep 25. https://doi.org/10.1016/j.jamda.2025.105814

Selatogrel: Potential to redefine timely anti-platelet intervention. Zalzal RN. Br J Pharmacol. 2025 Nov;182(22):5435-5452. doi: 10.1111/bph.70203. Epub 2025 Sep 19. https://doi.org/10.1111/bph.70203

Prehospital paediatric trauma: equipping prehospital providers to deliver high-quality care. Kocierz L. Arch Dis Child. 2025 Sep 18;110(10):773-777. doi: 10.1136/archdischild-2024-328229. https://doi.org/10.1136/archdischild-2024-328229

Patient and mission characteristics of helicopter emergency medical services in the Republic of Ireland: a retrospective analysis. Hennelly D. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):158. doi: 10.1186/s13049-025-01459-3. https://doi.org/10.1186/s13049-025-01459-3

Factors facilitating pre-hospital delays in stroke patients' presentation to hospital by their caretakers in Uganda and suggested interventions. Ssemmanda S. BMC Neurol. 2025 Oct 3;25(1):409. doi: 10.1186/s12883-025-04360-9. https://doi.org/10.1186/s12883-025-04360-9

Why do patients seek emergency care for problems that could be managed in primary care? A scoping review. Chao KYA. Fam Pract. 2025 Oct 21;42(6):cmaf088. doi: 10.1093/fampra/cmaf088. https://doi.org/10.1093/fampra/cmaf088

Artificial intelligence in prehospital emergency care systems in low- and middle-income countries: cure or curiosity? Insights from a qualitative study. Mallon O. Front Public Health. 2025 Oct 1;13:1632029. doi: 10.3389/fpubh.2025.1632029. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1632029

Criteria codes for unrecognized stroke/TIA patients by Emergency Medical Services dispatchers in Copenhagen, Denmark. Andreasen PB. BMC Emerg Med. 2025 Sep 26;25(1):191. doi: 10.1186/s12873-025-01335-4. https://doi.org/10.1186/s12873-025-01335-4

Association of safety climate with safety performance in pre-hospital emergency health services. Oruç M. Front Public Health. 2025 Oct 30;13:1624747. doi: 10.3389/fpubh.2025.1624747. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1624747

The Expanding Role of the U.S. Army Paramedic. Greener RK. Mil Med. 2025 Nov 1;190(11-12):e2242-e2245. doi: 10.1093/milmed/usae569. https://doi.org/10.1093/milmed/usae569

Exploring competence in mental health crisis management: a qualitative study of Norwegian prehospital emergency medical personnel. Skundberg-Kletthagen H. BMJ Open. 2025 Oct 6;15(10):e098877. doi: 10.1136/bmjopen-2025-098877. https://doi.org/10.1136/bmjopen-2025-098877

Prehospital stroke care in low- and middle-income countries: A World Stroke Organization (WSO) scientific statement. Bosch J. Int J Stroke. 2025 Oct;20(8):918-927. doi: 10.1177/17474930251351867. Epub 2025 Jun 11. https://doi.org/10.1177/17474930251351867

Prehospital management of accidental hypothermia: A nationwide survey among Italian helicopter emergency medical services. Leuci L. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):156. doi: 10.1186/s13049-025-01474-4. https://doi.org/10.1186/s13049-025-01474-4

Factors of emergency medical services call delay and its impact on prognosis in STEMI patients: Findings from the CCA database-chest pain center registry. Xu Q. Int J Cardiol. 2025 Oct 1;443:133944. doi: 10.1016/j.ijcard.2025.133944. Online ahead of print. https://doi.org/10.1016/j.ijcard.2025.133944

Pre-hospital blood transfusion in non-traumatic major haemorrhage: a retrospective observational study. Kodakadath H. Scand J Trauma Resusc Emerg Med. 2025 Nov 28;33(1):191. doi: 10.1186/s13049-025-01495-z. https://doi.org/10.1186/s13049-025-01495-z

Prehospital factors of survival to hospital admission in blunt traumatic out-of-hospital cardiac arrest: a nationwide 11-year study. Laksanamapune T. Resusc Plus. 2025 Sep 4;26:101086. doi: 10.1016/j.resplu.2025.101086. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101086

The nordic and baltic EMS data - quality indicators and benchmarking 2025. Lindskou TA. Scand J Trauma Resusc Emerg Med. 2025 Oct 24;33(1):174. doi: 10.1186/s13049-025-01488-y. https://doi.org/10.1186/s13049-025-01488-y

Prehospital Management of Spinal Cord Injuries. Calland JF. Prehosp Emerg Care. 2025 Nov 17:1-3. doi: 10.1080/10903127.2025.2588618. Online ahead of print. https://doi.org/10.1080/10903127.2025.2588618

The lived experience of dual-qualified emergency nurse-paramedics working for Australian jurisdictional ambulance services: A phenomenological study. Fitzgibbon C. Australas Emerg Care. 2025 Nov 17:S2588-994X(25)00089-2. doi: 10.1016/j.auec.2025.11.002. Online ahead of print. https://doi.org/10.1016/j.auec.2025.11.002

Young men's anxiety presentations to Australian ambulance services. Fisher K. J Affect Disord. 2025 Sep 1;384:98-106. doi: 10.1016/j.jad.2025.05.003. Epub 2025 May 5. https://doi.org/10.1016/j.jad.2025.05.003

Impact of emergency fast track on treatment time and outcomes in acute stroke: a systematic review and meta-analysis. Shen Y. BMC Emerg Med. 2025 Sep 24;25(1):186. doi: 10.1186/s12873-025-01336-3. https://doi.org/10.1186/s12873-025-01336-3

Transmission of Vital Data in Emergencies Using the International Standard Accident Number. Upadhyay S. Stud Health Technol Inform. 2025 Oct 2;332:160-164. doi: 10.3233/SHTI251518. https://doi.org/10.3233/SHTI251518

Stroke Management in Critical Care Transport Medicine: A Consensus Statement. Jasumback M. Air Med J. 2025 Nov-Dec;44(6):511-515. doi: 10.1016/j.amj.2025.08.002. Epub 2025 Sep 14. https://doi.org/10.1016/j.amj.2025.08.002

A nationwide analysis of emergency medical services' responses during six waves of COVID-19. Alpert EA. J Public Health Res. 2025 Nov 28;14(4):22799036251396738. doi: 10.1177/22799036251396738. eCollection 2025 Oct. https://doi.org/10.1177/22799036251396738

It's Time to Engage Teens in Suicide Prevention in the Emergency Department. Haasz M. J Am Acad Child Adolesc Psychiatry. 2025 Sep;64(9):984-987. doi: 10.1016/j.jaac.2024.09.010. Epub 2024 Nov 28. https://doi.org/10.1016/j.jaac.2024.09.010

Service utilisation and outcomes of transfers by a specialised paediatric and neonatal retrieval service in the Western Cape, South Africa. Patel S. Afr J Emerg Med. 2025 Dec;15(4):100925. doi: 10.1016/j.afjem.2025.100925. Epub 2025 Nov 21. https://doi.org/10.1016/j.afjem.2025.100925

The impact of emergency nurse practitioners on short-term survival in out-of-hospital cardiac arrest. Kaewpaengchan W. Australas Emerg Care. 2025 Sep;28(3):163-166. doi: 10.1016/j.auec.2025.02.002. Epub 2025 Feb 17. https://doi.org/10.1016/j.auec.2025.02.002

Beyond the Beats: Disparities in Prehospital Cardiac Care. Wleklinski NP. J Emerg Med. 2025 Oct 22;80:23-32. doi: 10.1016/j.jemermed.2025.10.017. Online ahead of print. https://doi.org/10.1016/j.jemermed.2025.10.017

Regional disparities in 119 Emergency medical services response times in South Korea: A focus on Busan. Kwon H. Spat Spatiotemporal Epidemiol. 2025 Nov;55:100761. doi: 10.1016/j.sste.2025.100761. Epub 2025 Oct 15. https://doi.org/10.1016/j.sste.2025.100761

Association Between Intraosseous Access Establishment and Prehospital Vasopressor Administration in Patients With Out-of-Hospital Cardiac Arrest in Helicopter Emergency Medical Services: Analysis of the Japanese Society for Aeromedical Services Registry. Kudo H. Air Med J. 2025 Sep-Oct;44(5):399-403. doi: 10.1016/j.amj.2025.06.016. Epub 2025 Jul 13. https://doi.org/10.1016/j.amj.2025.06.016

Emergency response in resource-constrained settings: A scoping review of prehospital trauma care in LMICs. Widiyawati K. Am J Emerg Med. 2025 Nov;97:220-226. doi: 10.1016/j.ajem.2025.08.005. Epub 2025 Aug 5. https://doi.org/10.1016/j.ajem.2025.08.005

Out-of-Hospital Cardiac Arrest: From the Field to Discharge: A Contemporary Cohort. Fisher L. Isr Med Assoc J. 2025 Nov;27(11):725-730. https://doi.org/

Airway management by ambulance nurses during out-of-hospital cardiac arrest. Doeleman LC. Resusc Plus. 2025 Jun 8;25:100999. doi: 10.1016/j.resplu.2025.100999. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.100999

Can Real-Time Prehospital Medical Record Data Presented on A Screen Enhance Team Readiness in the Emergency Department? A Pilot Study. Bleeg RC. J Emerg Med. 2025 Oct 22;80:199-210. doi: 10.1016/j.jemermed.2025.10.020. Online ahead of print. https://doi.org/10.1016/j.jemermed.2025.10.020

The PULSE Study: Paramedic Upgrade and Life Support Evaluation. McGraw M. CJEM. 2025 Nov 5. doi: 10.1007/s43678-025-01047-5. Online ahead of print. https://doi.org/10.1007/s43678-025-01047-5

Prehospital Postintubation Hypotension and Survival in Severe Traumatic Brain Injury. Price J. JAMA Netw Open. 2025 Nov 3;8(11):e2544057. doi: 10.1001/jamanetworkopen.2025.44057. https://doi.org/10.1001/jamanetworkopen.2025.44057

Alcohol-related encounter surveillance using emergency medical service records in Massachusetts, 2013-2023. Bettano A. Drug Alcohol Depend. 2025 Oct 1;275:112819. doi: 10.1016/j.drugalcdep.2025.112819. Epub 2025 Aug 6. https://doi.org/10.1016/j.drugalcdep.2025.112819

Lung Ultrasound in Pediatric and Neonatal Pre-Hospital Care: An Observational Study. Becerra-Hervás J. J Ultrasound Med. 2025 Nov;44(11):2031-2038. doi: 10.1002/jum.16754. Epub 2025 Jul 16. https://doi.org/10.1002/jum.16754

Video triage by emergency medical service secondary triage clinicians in Victoria, Australia. Nehme E. J Telemed Telecare. 2025 Oct 15:1357633X251383395. doi: 10.1177/1357633X251383395. Online ahead of print. https://doi.org/10.1177/1357633X251383395

Injectable hemostatic foam hydrogel for traumatic intra-abdominal hemorrhage. Guo Y. Mater Today Bio. 2025 Oct 2;35:102364. doi: 10.1016/j.mtbio.2025.102364. eCollection 2025 Dec. https://doi.org/10.1016/j.mtbio.2025.102364

Debriefing in Physician-Staffed Helicopter Emergency Medical Services: A Quality Improvement Study. Willoch E. Air Med J. 2025 Nov-Dec;44(6):459-464. doi: 10.1016/j.amj.2025.06.013. Epub 2025 Aug 26. https://doi.org/10.1016/j.amj.2025.06.013

Prehospital Whole Blood in Trauma-A Scoping Review. Kuza CM. Air Med J. 2025 Nov-Dec;44(6):530-538. doi: 10.1016/j.amj.2025.07.009. Epub 2025 Aug 27. https://doi.org/10.1016/j.amj.2025.07.009

Severe mental illness, chest pain, and emergency response. Nørskov AS. Eur J Prev Cardiol. 2025 Nov 24:zwaf745. doi: 10.1093/eurjpc/zwaf745. Online ahead of print. https://doi.org/10.1093/eurjpc/zwaf745

Comparison of Palliative Knowledge and Self-Efficacy Expectation of German Paramedics Between a Rural and an Urban Structured Emergency Medical Service Area. Chwallek D. J Palliat Care. 2025 Oct;40(4):329-335. doi: 10.1177/08258597231221916. Epub 2024 Feb 19. https://doi.org/10.1177/08258597231221916

Performance and development trends of ultrasound diagnostic systems in military settings: a review. Lu C. Ultrasound J. 2025 Nov 4;17(1):54. doi: 10.1186/s13089-025-00458-w. https://doi.org/10.1186/s13089-025-00458-w

Early diagnosis and treatment of acute heart failure in prehospital and emergency settings. Part 1 of the International Expert Opinion Series on acute heart failure management. Miró . Eur J Emerg Med. 2025 Dec 1;32(6):392-404. doi: 10.1097/MEJ.0000000000001270. Epub 2025 Sep 29. https://doi.org/10.1097/MEJ.0000000000001270

Impact of the Paramedic Role on Athlete Care, Emergency Response, and Injury Prevention in Sports Medicine: A Scoping Review. Almukhlifi Y. Healthcare (Basel). 2025 Sep 14;13(18):2301. doi: 10.3390/healthcare13182301. https://doi.org/10.3390/healthcare13182301

Evaluating Gulf Cooperation Council Trauma Care Infrastructure: A Scoping Review of Key Components and Gaps. Khan L. World J Surg. 2025 Oct;49(10):2921-2932. doi: 10.1002/wjs.70019. Epub 2025 Jul 29. https://doi.org/10.1002/wjs.70019

Factors determining the means of suicide among suicidal patients treated by mobile emergency medical services in Brazil. Meneguin S. BMC Psychiatry. 2025 Nov 11;25(1):1077. doi: 10.1186/s12888-025-07444-5. https://doi.org/10.1186/s12888-025-07444-5

Special care services delivery at disaster scenes: a systematic review. Masbi M. Int J Emerg Med. 2025 Oct 16;18(1):206. doi: 10.1186/s12245-025-01041-9. https://doi.org/10.1186/s12245-025-01041-9

Fatigue monitoring tool usage in operational paramedics. Ferris M. Int J Occup Saf Ergon. 2025 Sep 16:1-7. doi: 10.1080/10803548.2025.2552540. Online ahead of print. https://doi.org/10.1080/10803548.2025.2552540

Comparative Clinical Outcomes of Trauma Transport: Emergency Medical Services vs. Police Transport, A Systematic Review and Meta-Analysis. Shapovalov V. J Emerg Med. 2025 Oct 10;80:8-19. doi: 10.1016/j.jemermed.2025.10.013. Online ahead of print. https://doi.org/10.1016/j.jemermed.2025.10.013

Attitudes of medical professionals towards high-risk suicidal patients. Kashiwagi T. Front Psychiatry. 2025 Nov 11;16:1654240. doi: 10.3389/fpsyt.2025.1654240. eCollection 2025. https://doi.org/10.3389/fpsyt.2025.1654240

Benchmarking speech-to-text robustness in noisy emergency medical dialogues: an evaluation of models under realistic acoustic conditions. Moser D. JAMIA Open. 2025 Nov 19;8(6):ooaf147. doi: 10.1093/jamiaopen/ooaf147. eCollection 2025 Dec. https://doi.org/10.1093/jamiaopen/ooaf147

The Association of Exposure to Traumatic Events With Binge Drinking in Paramedics and EMTs. Gabay O. Workplace Health Saf. 2025 Oct;73(10):496-502. doi: 10.1177/21650799251339584. Epub 2025 May 21. https://doi.org/10.1177/21650799251339584

One Team: Identifying Prehospital Provider Needs for Burn Patient Outreach and Education. Adams R. J Burn Care Res. 2025 Nov 5;46(6):1243-1248. doi: 10.1093/jbcr/iraf110. https://doi.org/10.1093/jbcr/iraf110

ASSESSING PARAMEDICS' PERSPECTIVES ON AN EMERGENCY DEPARTMENT VIRTUAL OBSERVATION UNIT FALL PREVENTION PROGRAM. Wang G. Int J Paramed. 2025 Oct-Dec;2025(12):100-114. doi: 10.56068/ewfw9489. Epub 2025 Oct 8. https://doi.org/10.56068/ewfw9489

European perspectives on pre-hospital interagency collaboration during terrorist incidents: a focus group study. Raub D. Scand J Trauma Resusc Emerg Med. 2025 Oct 15;33(1):168. doi: 10.1186/s13049-025-01482-4. https://doi.org/10.1186/s13049-025-01482-4

Prehospital management of the airway in trauma. Mockridge A. BJA Educ. 2025 Sep;25(9):348-356. doi: 10.1016/j.bjae.2025.05.002. Epub 2025 Jun 30. https://doi.org/10.1016/j.bjae.2025.05.002

Prehospital Shock Index as a Predictive Metric for In-Hospital Outcomes in Children. Bhargava R. J Surg Res. 2025 Oct 24;315:747-754. doi: 10.1016/j.jss.2025.09.059. Online ahead of print. https://doi.org/10.1016/j.jss.2025.09.059

Management of Agitation in Emergency Medical Services for Older Adults: A Qualitative Exploration. Shah FI. Acad Emerg Med. 2025 Nov 7. doi: 10.1111/acem.70183. Online ahead of print. https://doi.org/10.1111/acem.70183

Supporting the well-being of nurses, paramedics, and firefighters during external crises by managing workload: an umbrella review. Karhula K. Ind Health. 2025 Sep 20;63(5):414-430. doi: 10.2486/indhealth.2024-0211. Epub 2025 Mar 14. https://doi.org/10.2486/indhealth.2024-0211

A qualitative needs assessment of Lima's prehospital emergency trauma system: Identifying challenges and opportunities for improvement. VanDerWal JA. Surgery. 2025 Sep;185:109519. doi: 10.1016/j.surg.2025.109519. Epub 2025 Jun 24. https://doi.org/10.1016/j.surg.2025.109519

Prevalence of Exposures and Moral Injury in First Responders. Maguen S. J Am Coll Emerg Physicians Open. 2025 Oct 9;6(6):100259. doi: 10.1016/j.acepjo.2025.100259. eCollection 2025 Dec. https://doi.org/10.1016/j.acepjo.2025.100259

Artificial intelligence to improve patient care in emergency medicine: a workflow-based analysis. Franceschi F. Intern Emerg Med. 2025 Nov 14. doi: 10.1007/s11739-025-04155-3. Online ahead of print. https://doi.org/10.1007/s11739-025-04155-3

Cutaneous Chemical Burns: Water Irrigation First Aid Improves Short-term Outcomes. Chai H. J Burn Care Res. 2025 Sep 19;46(5):1085-1090. doi: 10.1093/jbcr/iraf079. https://doi.org/10.1093/jbcr/iraf079

A comparison of the pre-hospital 12-lead electrocardiogram transmission protocol and the pre-hospital ambulance notification protocol for patients with acute myocardial infarction. Ishikura K. J Cardiol. 2025 Oct 30:S0914-5087(25)00265-5. doi: 10.1016/j.jjcc.2025.10.008. Online ahead of print. https://doi.org/10.1016/j.jjcc.2025.10.008

Ventricular arrhythmias in acute heart failure. A clinical consensus statement of the Association for Acute CardioVascular Care (ACVC), the European Heart Rhythm Association (EHRA) and the Heart Failure Association (HFA) of the ESC. Gorenek B. Eur J Heart Fail. 2025 Sep;27(9):1606-1621. doi: 10.1002/ejhf.3645. Epub 2025 Mar 19. https://doi.org/10.1002/ejhf.3645

Medical Direction Needs Analysis: Codifying a Medical Directors Course to Meet the Demands of Modern Combat Care. Lowe J. Mil Med. 2025 Nov 1;190(11-12):e2586-e2592. doi: 10.1093/milmed/usaf245. https://doi.org/10.1093/milmed/usaf245

Stroke alert: Examining demographic disparities in prehospital stroke care. McGlynn E. Am J Emerg Med. 2025 Oct;96:116-121. doi: 10.1016/j.ajem.2025.06.038. Epub 2025 Jun 16. https://doi.org/10.1016/j.ajem.2025.06.038

Search and Rescue Missions Conducted by the French Army Between 2015 and 2019. Gines E. J Spec Oper Med. 2025 Sep 1;25(3):40-44. doi: 10.55460/I75R-778O. https://doi.org/10.55460/I75R-778O

Nurses' perspectives on providing analgesia in the Italian prehospital emergency setting: A phenomenological study. Sandroni F. Int Emerg Nurs. 2025 Dec;83:101696. doi: 10.1016/j.ienj.2025.101696. Epub 2025 Oct 6. https://doi.org/10.1016/j.ienj.2025.101696

Evaluation of paediatric palliative care ambulance plans: A retrospective study. Wan J. J Child Health Care. 2025 Sep;29(3):554-573. doi: 10.1177/13674935231225714. Epub 2024 Jan 23. https://doi.org/10.1177/13674935231225714

Determination of the beliefs and attitudes of pre-hospital emergency health service workers towards obese individuals as a vulnerable group: The case of Adana Provincial Ambulance Service. Aslan R. Int Emerg Nurs. 2025 Sep;82:101668. doi: 10.1016/j.ienj.2025.101668. Epub 2025 Aug 27. https://doi.org/10.1016/j.ienj.2025.101668

Exploring Maternity Related Emergencies in Prehospital Settings and Available Obstetric Training for Emergency Medical Services Personnel: An Integrative Review of Literature. Almubarak A. Birth. 2025 Sep 12. doi: 10.1111/birt.70014. Online ahead of print. https://doi.org/10.1111/birt.70014

Impact of Mode of Arrival to Hospital on Early Mortality in Adults With Penetrating Trauma: A Systematic Review, Meta-Analysis, and Narrative Synthesis. McCutcheon MMR. World J Surg. 2025 Oct;49(10):2959-2967. doi: 10.1002/wjs.70087. Epub 2025 Sep 8. https://doi.org/10.1002/wjs.70087

Impact of collective orientation on the quality of teamwork of emergency medical personnel in simulated prehospital emergency medical care - a prospective observational study. Meyer L. BMC Emerg Med. 2025 Nov 7;25(1):225. doi: 10.1186/s12873-025-01399-2. https://doi.org/10.1186/s12873-025-01399-2

Association of ambulance and helicopter response times with patient survival: A systematic literature review and meta-analysis. Hansen PM. PLoS One. 2025 Nov 17;20(11):e0335665. doi: 10.1371/journal.pone.0335665. eCollection 2025. https://doi.org/10.1371/journal.pone.0335665

Army Flight Paramedic Perceptions and Beliefs in the Current Medical Sustainment Model. Sovine MA. Mil Med. 2025 Nov 4:usaf518. doi: 10.1093/milmed/usaf518. Online ahead of print. https://doi.org/10.1093/milmed/usaf518

Air Medical Prehospital Triage Score and Racial and Ethnic Disparities in Air Transport After Injury. Byrd T. JAMA Surg. 2025 Nov 5:e254716. doi: 10.1001/jamasurg.2025.4716. Online ahead of print. https://doi.org/10.1001/jamasurg.2025.4716

Sex differences in rural prehospital ST-segment elevation myocardial infarction care. Supples MW. Emerg Med J. 2025 Nov 20:emermed-2025-215309. doi: 10.1136/emermed-2025-215309. Online ahead of print. https://doi.org/10.1136/emermed-2025-215309

Lessons Observed from Early Rehabilitation in the Armenia 2023 Emergency Response and the Emergency Medical Teams Deployment. Harutyunyan Z. Disaster Med Public Health Prep. 2025 Oct 16;19:e296. doi: 10.1017/dmp.2025.10228. https://doi.org/10.1017/dmp.2025.10228

Association of prehospital vs. in-hospital intubation with mortality in hemorrhagic shock after severe trauma: a propensity-matched study. Clavier T. Eur J Emerg Med. 2025 Dec 1;32(6):421-429. doi: 10.1097/MEJ.0000000000001278. Epub 2025 Oct 14. https://doi.org/10.1097/MEJ.0000000000001278

Epidemiology of prehospital traumatic cardiac arrest in Geneva: a retrospective cohort study. Midez R. Scand J Trauma Resusc Emerg Med. 2025 Oct 15;33(1):169. doi: 10.1186/s13049-025-01484-2. https://doi.org/10.1186/s13049-025-01484-2

Impact of a rapid blood warmer on the quality and function of cold-stored platelets. Goatson S. Vox Sang. 2025 Nov;120(11):1143-1152. doi: 10.1111/vox.70094. Epub 2025 Aug 17. https://doi.org/10.1111/vox.70094

Ambulance deserts and inequities in access to emergency medical services care: Are injured patients at risk for delayed care in the prehospital system?. Berry C. J Trauma Acute Care Surg. 2025 Sep 1;99(3):484-488. doi: 10.1097/TA.0000000000004579. Epub 2025 May 23. https://doi.org/10.1097/TA.0000000000004579

Investigating pre-hospital troponin testing in the diagnosis of acute myocardial infarction: a systematic review. Alexanders J. Br Paramed J. 2025 Sep 1;10(2):17-23. doi: 10.29045/14784726.2025.9.10.2.17. https://doi.org/10.29045/14784726.2025.9.10.2.17

Addressing the mental health crisis by enhancing paramedics' training in Wales. Jones M. Emerg Nurse. 2025 Nov 18. doi: 10.7748/en.2025.e2248. Online ahead of print. https://doi.org/10.7748/en.2025.e2248

Prehospital blood transfusion-experience from a specialized prehospital response vehicle-a retrospective cohort study. Weilbacher F. Front Med (Lausanne). 2025 Sep 1;12:1666713. doi: 10.3389/fmed.2025.1666713. eCollection 2025. https://doi.org/10.3389/fmed.2025.1666713

EMCON: A Comprehensive Emergency Response System for Low- and Middle-Income Countries. Rafaqat W. Disaster Med Public Health Prep. 2025 Nov 19;19:e324. doi: 10.1017/dmp.2025.10253. https://doi.org/10.1017/dmp.2025.10253

Systematic review of prediction models for post-traumatic hypothermia risk. Dandan Z. Injury. 2025 Dec;56(12):112883. doi: 10.1016/j.injury.2025.112883. Epub 2025 Nov 8. https://doi.org/10.1016/j.injury.2025.112883

Energy levels in manual defibrillation after prior AED shock. Dammers F. Resuscitation. 2025 Nov;216:110841. doi: 10.1016/j.resuscitation.2025.110841. Epub 2025 Sep 23. https://doi.org/10.1016/j.resuscitation.2025.110841

Using geographic information systems (GIS) to assess response intervals for diffuse community bystander-driven (Tier-1) emergency medical services integrated with emergency medical dispatch in Tanzania: an 8-year analysis. Delaney PG. Injury. 2025 Nov 26:112910. doi: 10.1016/j.injury.2025.112910. Online ahead of print. https://doi.org/10.1016/j.injury.2025.112910

Primary Care Utilization and Prehospital Emergency Demand Among Patients with Multimorbidity in Spain. Coca-Boronat E. Nurs Rep. 2025 Oct 24;15(11):377. doi: 10.3390/nursrep15110377. https://doi.org/10.3390/nursrep15110377

Patient and caregiver knowledge of pediatric testicular torsion: A scoping review. MacNevin W. J Pediatr Urol. 2025 Oct;21(5):1313-1328. doi: 10.1016/j.jpurol.2025.05.015. Epub 2025 May 16. https://doi.org/10.1016/j.jpurol.2025.05.015

[Sustainability in practices and thought processes in prehospital emergency medicine : A survey of emergency service personnel]. Grannemann JJ. Med Klin Intensivmed Notfmed. 2025 Nov;120(8):669-676. doi: 10.1007/s00063-024-01246-5. Epub 2025 Feb 11. https://doi.org/10.1007/s00063-024-01246-5

The Association of Prehospital Care Level and Triage Accuracy with Trauma Outcomes: A Multi-Country, Multicenter Cohort Study. Nogueira LS. J Trauma Nurs. 2025 Sep-Oct 01;32(5):252-259. doi: 10.1097/JTN.0000000000000869. Epub 2025 Sep 5. https://doi.org/10.1097/JTN.0000000000000869

The impacts of extreme weather events on health services and systems: A systematic review of reviews. Valente M. Public Health. 2025 Nov 21;250:106049. doi: 10.1016/j.puhe.2025.106049. Online ahead of print. https://doi.org/10.1016/j.puhe.2025.106049

Hyperthermia during open water swimming: risks, monitoring and mitigation strategies. Ramos da Silva E. Eur J Appl Physiol. 2025 Dec;125(12):3441-3462. doi: 10.1007/s00421-025-05945-5. Epub 2025 Sep 1. https://doi.org/10.1007/s00421-025-05945-5

Pragmatic Early Predictors of Survival After Trauma. Brito AMP. J Surg Res. 2025 Oct;314:245-254. doi: 10.1016/j.jss.2025.07.017. Epub 2025 Aug 7. https://doi.org/10.1016/j.jss.2025.07.017

Prehospital coagulation management and fluid replacement therapy in patients with multiple and/or severe injuries - A systematic review and clinical practice guideline update. Hussmann B. Eur J Trauma Emerg Surg. 2025 Nov 14;51(1):328. doi: 10.1007/s00068-025-02984-7. https://doi.org/10.1007/s00068-025-02984-7

Interpersonal Factors in the Emergency Care of Injured Children and Youth With Special Health Care Needs. Lillvis DF. Acad Pediatr. 2025 Nov-Dec;25(8):102796. doi: 10.1016/j.acap.2025.102796. Epub 2025 Feb 11. https://doi.org/10.1016/j.acap.2025.102796

Factors Influencing Hospitalization Among Older Adults in Tokyo's Emergency Medical Services: The Role of Cerebral Disease and Seasonal Variations. Megumi K. Geriatr Gerontol Int. 2025 Oct 22. doi: 10.1111/ggi.70195. Online ahead of print. https://doi.org/10.1111/ggi.70195

Examining a Stabilization Center for Patients with Alcohol or Opioid Intoxication Transported by Paramedics: A Cohort Study of an Emergency Department Diversion Model. Strum RP. Prehosp Emerg Care. 2025 Oct 9:1-7. doi: 10.1080/10903127.2025.2566820. Online ahead of print. https://doi.org/10.1080/10903127.2025.2566820

Comparative Efficacy and Safety of Intravenous Vasopressors in Pre-Hospital Cardiac Arrest: A Systematic Review and Meta-Analysis. Shaban EE. J Emerg Med. 2025 Nov;78:105-131. doi: 10.1016/j.jemermed.2025.05.014. Epub 2025 Jun 9. https://doi.org/10.1016/j.jemermed.2025.05.014

Seconds Matter: Novel Transport Solutions in Urban Settings Reduce Transport Times. Miles Z. J Emerg Med. 2025 Oct 22;80:20-22. doi: 10.1016/j.jemermed.2025.10.016. Online ahead of print. https://doi.org/10.1016/j.jemermed.2025.10.016

Review of current knowledge regarding usage of pre-hospital heart rate variability and complexity in triage and added value for predicting the need for life-saving interventions. Hedegaard CB. Int J Emerg Med. 2025 Sep 23;18(1):169. doi: 10.1186/s12245-025-00967-4. https://doi.org/10.1186/s12245-025-00967-4

Prehospital care: Lessons learned from 311 mortalities at level I trauma center. Dar PMUD. Chin J Traumatol. 2025 Sep 25:S1008-1275(25)00116-6. doi: 10.1016/j.cjtee.2025.02.011. Online ahead of print. https://doi.org/10.1016/j.cjtee.2025.02.011

Cardiac troponin at the point of care in acute and chronic coronary syndromes. McDermott M. Diabetes Obes Metab. 2025 Sep;27 Suppl 8(Suppl 8):47-58. doi: 10.1111/dom.16503. Epub 2025 Jun 16. https://doi.org/10.1111/dom.16503

Regional retrospective observational analysis of the impact of enhanced care teams on trauma morbidity and mortality outcomes. Smith C. Scand J Trauma Resusc Emerg Med. 2025 Oct 24;33(1):175. doi: 10.1186/s13049-025-01481-5. https://doi.org/10.1186/s13049-025-01481-5

Factors associated with CPR quality in out-of-hospital cardiac arrest. Villani M. Resuscitation. 2025 Oct 30;217:110877. doi: 10.1016/j.resuscitation.2025.110877. Online ahead of print. https://doi.org/10.1016/j.resuscitation.2025.110877

Analysis of Disease-Specific Outcomes According to Time of Doctor Helicopter Dispatch Request. Yanagawa Y. Air Med J. 2025 Sep-Oct;44(5):354-359. doi: 10.1016/j.amj.2025.05.004. Epub 2025 Jun 19. https://doi.org/10.1016/j.amj.2025.05.004

Moral sensitivity and professional quality of life in EMS personnel: a cross-sectional multicenter study. Dadashzadeh A. BMC Emerg Med. 2025 Sep 26;25(1):190. doi: 10.1186/s12873-025-01349-y. https://doi.org/10.1186/s12873-025-01349-y

Paramedic nursing students' experiences of clinical placement in an ambulance where the teacher is another clinical supervisor - A qualitative study. Seppänen K. Int Emerg Nurs. 2025 Dec;83:101698. doi: 10.1016/j.ienj.2025.101698. Epub 2025 Oct 7. https://doi.org/10.1016/j.ienj.2025.101698

Time-and-motion study of community paramedics in an Australian ambulance service. Wilkinson-Stokes M. Australas Emerg Care. 2025 Nov 19:S2588-994X(25)00090-9. doi: 10.1016/j.auec.2025.11.003. Online ahead of print. https://doi.org/10.1016/j.auec.2025.11.003

Emergency Medical Service Responses for Older Adults: A Retrospective Observational Study Comparing Nursing Homes and the Community. Gaik C. Healthcare (Basel). 2025 Nov 5;13(21):2806. doi: 10.3390/healthcare13212806. https://doi.org/10.3390/healthcare13212806

Pre-hospital THRIVE score predicts the thrombolysis in cerebral infarction outcome post endovascular thrombectomy: an emergency medical service study. Lin HA. BMC Emerg Med. 2025 Sep 29;25(1):195. doi: 10.1186/s12873-025-01352-3. https://doi.org/10.1186/s12873-025-01352-3

Voices from the frontline: The day-to-day experiences of ambulance service providers. Dartey AF. Int J Risk Saf Med. 2025 Nov;36(4):270-280. doi: 10.1177/09246479251358120. Epub 2025 Jul 3. https://doi.org/10.1177/09246479251358120

The role of human factors in paramedics' clinical judgement - A modified Delphi study. Poranen A. PLoS One. 2025 Sep 15;20(9):e0332311. doi: 10.1371/journal.pone.0332311. eCollection 2025. https://doi.org/10.1371/journal.pone.0332311

LVO TRUST EMS - Large vessel occlusion triage and routing utilized for long-distance stroke transports by emergency medical services. Chionatos RA. J Clin Neurosci. 2025 Sep;139:111440. doi: 10.1016/j.jocn.2025.111440. Epub 2025 Jul 1. https://doi.org/10.1016/j.jocn.2025.111440

Oleander poisoning: Two cases with contrasting cardiac presentations. Kelly S. Australas Emerg Care. 2025 Nov 17:S2588-994X(25)00088-0. doi: 10.1016/j.auec.2025.11.001. Online ahead of print. https://doi.org/10.1016/j.auec.2025.11.001

Understanding the need for and use of analgesics in the emergency department. Groenveld TD. Int Emerg Nurs. 2025 Sep;82:101648. doi: 10.1016/j.ienj.2025.101648. Epub 2025 Jul 17. https://doi.org/10.1016/j.ienj.2025.101648

"Are prehospital shock, modified shock, age-adjusted shock indices and some scoring systems effective in predicting the prognosis of high-energy trauma Patients?". Yüksel M. Int Emerg Nurs. 2025 Dec;83:101678. doi: 10.1016/j.ienj.2025.101678. Epub 2025 Sep 17. https://doi.org/10.1016/j.ienj.2025.101678

The Staff Observation Aggression Scale - Revised for Ambulance Services (SOAS-RA). Haug MEJ. Scand J Trauma Resusc Emerg Med. 2025 Oct 9;33(1):163. doi: 10.1186/s13049-025-01472-6. https://doi.org/10.1186/s13049-025-01472-6

Paramedic assessment of carotid artery pulsation using pre-recorded ultrasound videos: a comparative analysis of three ultrasound modes. Gaik C. Resusc Plus. 2025 Jul 11;25:101028. doi: 10.1016/j.resplu.2025.101028. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101028

Prehospital plasma transfusion versus standard of care following traumatic injury: a review of the systematic reviews and a meta-analysis. El-Menyar A. Eur J Trauma Emerg Surg. 2025 Nov 27;51(1):354. doi: 10.1007/s00068-025-03033-z. https://doi.org/10.1007/s00068-025-03033-z

Prehospital Fibrinolysis in High-Risk Pulmonary Embolism - Observational Data on Clinical Picture and Outcome. Harjola J. Prehosp Emerg Care. 2025 Nov 14:1-5. doi: 10.1080/10903127.2025.2582671. Online ahead of print. https://doi.org/10.1080/10903127.2025.2582671

Spontaneous and Unplanned Mass Gathering Events: A Scoping Review of Health Considerations for Riots, Civil Unrest, and Protest. Ranse J. Disaster Med Public Health Prep. 2025 Sep 22;19:e269. doi: 10.1017/dmp.2025.10189. https://doi.org/10.1017/dmp.2025.10189

Statewide and Regional Variation in Hospice and Palliative Care Protocols in Emergency Medical Services in the United States. Gunaga S. Prehosp Emerg Care. 2025 Nov 21:1-11. doi: 10.1080/10903127.2025.2589960. Online ahead of print. https://doi.org/10.1080/10903127.2025.2589960

Smart Hospital Infrastructure: Enhancing Parking Management and Ambulance Accessibility in Urban Healthcare Systems. Tendolkar KB. Ann Afr Med. 2025 Sep 16. doi: 10.4103/aam.aam_293_25. Online ahead of print. https://doi.org/10.4103/aam.aam_293_25

The Misuse of Normality Tests as Gatekeepers for Research in Prehospital and Disaster Medicine. Franc JM. Prehosp Disaster Med. 2025 Oct;40(5):241-242. doi: 10.1017/S1049023X25101465. Epub 2025 Nov 5. https://doi.org/10.1017/S1049023X25101465

4.5 % incidence of accidental hypothermia in a German HEMS service - A retrospective 14-year analysis. Werner D. Am J Emerg Med. 2025 Nov 12;100:46-53. doi: 10.1016/j.ajem.2025.10.053. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.10.053

Comparison of Esketamine and Propofol for Prehospital Emergency Anaesthesia in Patients With Traumatic Brain Injury-A Retrospective Observational Study. Laamanen J. Acta Anaesthesiol Scand. 2025 Nov;69(10):e70131. doi: 10.1111/aas.70131. https://doi.org/10.1111/aas.70131

Physician Attitudes on Integration of Prehospital Patient Care Report into Hospital Electronic Health Record. Smith M. West J Emerg Med. 2025 Sep 2;26(5):1274-1279. doi: 10.5811/westjem.41540. https://doi.org/10.5811/westjem.41540

Impact of a Pediatric Prehospital Destination Decision Support Tool (PDTree) on Emergency Medical Services Transport Patterns and Destination Choice. Fratta KA. Prehosp Emerg Care. 2025 Sep 17:1-7. doi: 10.1080/10903127.2025.2551172. Online ahead of print. https://doi.org/10.1080/10903127.2025.2551172

Emergency field amputation in a resource-limited setting: a case report. Khuraijam S. Int J Emerg Med. 2025 Sep 30;18(1):178. doi: 10.1186/s12245-025-00986-1. https://doi.org/10.1186/s12245-025-00986-1

Anatomical mapping of traumatic pneumothoraces missed by prehospital ultrasonography - a retrospective cohort study. Marie I. Injury. 2025 Sep 30:112778. doi: 10.1016/j.injury.2025.112778. Online ahead of print. https://doi.org/10.1016/j.injury.2025.112778

Comparison of dispatching after motor vehicle accidents - effects of the TPS-eCall system on dispatching time. Brune B. BMC Emerg Med. 2025 Sep 23;25(1):184. doi: 10.1186/s12873-025-01361-2. https://doi.org/10.1186/s12873-025-01361-2

Association between initial patient acuity and the predictive performance of the MREMS: A nationwide retrospective cohort study. Astasio-Picado Á. Am J Emerg Med. 2025 Nov;97:84-90. doi: 10.1016/j.ajem.2025.07.022. Epub 2025 Jul 12. https://doi.org/10.1016/j.ajem.2025.07.022

Prehospital invasive vs. non-invasive blood pressure monitoring: Impact on shock index at hospital admission in critically ill patients - a prospective intervention study. Ule J. Scand J Trauma Resusc Emerg Med. 2025 Oct 15;33(1):167. doi: 10.1186/s13049-025-01467-3. https://doi.org/10.1186/s13049-025-01467-3

Planning and Execution of an EMS-Based Field Hospital: A Case Report. Spigner MF. Prehosp Emerg Care. 2025 Oct 7:1-9. doi: 10.1080/10903127.2025.2556442. Online ahead of print. https://doi.org/10.1080/10903127.2025.2556442

Prehospital 12-lead ECG and outcomes in acute coronary syndrome. Driscoll TJ. Heart. 2025 Sep 10:heartjnl-2025-325780. doi: 10.1136/heartjnl-2025-325780. Online ahead of print. https://doi.org/10.1136/heartjnl-2025-325780

Pre-Hospital Artificial Intelligence-Guided, Focused Echocardiography in Patients with Acute Chest Pain for Diagnosis of Acute Coronary Syndrome. El Kadi S. J Clin Med. 2025 Nov 9;14(22):7938. doi: 10.3390/jcm14227938. https://doi.org/10.3390/jcm14227938

Flight-Crew Administration Speeds Time to Tranexamic Acid: FAST TXA Study. Fritz CL. Air Med J. 2025 Sep-Oct;44(5):379-385. doi: 10.1016/j.amj.2025.06.001. Epub 2025 Jun 29. https://doi.org/10.1016/j.amj.2025.06.001

Feasibility and optimization of a second-tier prehospital critical care response for major trauma in a North American urban and suburban area: A geospatial analysis and modelling study. Stephenson R. Am J Emerg Med. 2025 Nov;97:35-44. doi: 10.1016/j.ajem.2025.07.025. Epub 2025 Jul 10. https://doi.org/10.1016/j.ajem.2025.07.025

Waiting time ambulances in the Emergency Department; a Dutch single center study (WAITED study). Mol S. Int J Emerg Med. 2025 Nov 26;18(1):251. doi: 10.1186/s12245-025-01068-y. https://doi.org/10.1186/s12245-025-01068-y

Developing a clinical decision tool to support paramedics when assessing and managing children with minor head injury. Proctor A. BMC Emerg Med. 2025 Oct 9;25(1):203. doi: 10.1186/s12873-025-01362-1. https://doi.org/10.1186/s12873-025-01362-1

Paramedic-Delivered Prehospital Thrombolysis Reduces the Time to Reperfusion Therapy in Patients Suffering ST Elevation Myocardial Infarction in Rural and Regional NSW. Faddy SC. Heart Lung Circ. 2025 Dec;34(12):1417-1423. doi: 10.1016/j.hlc.2025.05.085. Epub 2025 Nov 1. https://doi.org/10.1016/j.hlc.2025.05.085

Prehospital transfusion: an 8-year descriptive retrospective monocenter study. Coisy F. BMC Emerg Med. 2025 Oct 14;25(1):206. doi: 10.1186/s12873-025-01366-x. https://doi.org/10.1186/s12873-025-01366-x

Geriatric "lift-assist" EMS calls with transport refusal: Characteristics of short-term repeat calls and hospitalizations. Moore EA. Am J Emerg Med. 2025 Sep;95:77-82. doi: 10.1016/j.ajem.2025.05.041. Epub 2025 May 22. https://doi.org/10.1016/j.ajem.2025.05.041

Trauma Care in Angola: Highlights and Strategic Insights from the 2nd Angolan Trauma Surgery Congress. Gaspar MTDC. Surg Pract Sci. 2025 Aug 5;22:100300. doi: 10.1016/j.sipas.2025.100300. eCollection 2025 Sep. https://doi.org/10.1016/j.sipas.2025.100300

Part 8: Pediatric Advanced Life Support: 2025 American Heart Association and American Academy of Pediatrics Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Lasa JJ. Circulation. 2025 Oct 21;152(16_suppl_2):S479-S537. doi: 10.1161/CIR.0000000000001368. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001368

A multidisciplinary emergency protocol reduces revascularization time in major upper and lower limb replantations. Jin Q. Injury. 2025 Nov;56(11):112729. doi: 10.1016/j.injury.2025.112729. Epub 2025 Aug 28. https://doi.org/10.1016/j.injury.2025.112729

The comparison of endotracheal intubation and laryngeal tube insertion with face-to-face method in in-vehicle traffic accidents. Arslan M. Intern Emerg Med. 2025 Nov;20(8):2531-2539. doi: 10.1007/s11739-025-03885-8. Epub 2025 Feb 17. https://doi.org/10.1007/s11739-025-03885-8

Preparedness and ethical challenges of Czech fire rescue service in radiological response operations. Kavan S. J Radiol Prot. 2025 Nov 28. doi: 10.1088/1361-6498/ae258b. Online ahead of print. https://doi.org/10.1088/1361-6498/ae258b

Occupational ergonomic risks among ambulance personnel: insights from REBA-based assessment. Gülsoy Altinta E. Int J Occup Saf Ergon. 2025 Oct 18:1-9. doi: 10.1080/10803548.2025.2565915. Online ahead of print. https://doi.org/10.1080/10803548.2025.2565915

AI-guided refinement of coronary revascularization need in patients suspected of acute coronary syndrome. Sigle M. Eur Heart J Digit Health. 2025 Oct 6;6(6):1169-1180. doi: 10.1093/ehjdh/ztaf106. eCollection 2025 Nov. https://doi.org/10.1093/ehjdh/ztaf106

Airway management analysis in the rescue environment of the emergency service Zug: a retrospective real-world evaluation. Brinkmann F. Scand J Trauma Resusc Emerg Med. 2025 Oct 22;33(1):171. doi: 10.1186/s13049-025-01489-x. https://doi.org/10.1186/s13049-025-01489-x

Hypokalemia Masquerading as Large Vessel Occlusion Stroke: A Case Report. Nawrocki PS. Cureus. 2025 Oct 9;17(10):e94179. doi: 10.7759/cureus.94179. eCollection 2025 Oct. https://doi.org/10.7759/cureus.94179

Improving Door-to-Balloon Times in STEMI: A Review of Quality Improvement Initiatives Across Healthcare Systems. Tran HH. Cardiol Rev. 2025 Sep 18. doi: 10.1097/CRD.0000000000001061. Online ahead of print. https://doi.org/10.1097/CRD.0000000000001061

A contemporary analysis of prehospital crystalloid resuscitation after trauma. Nordstrom NK. Injury. 2025 Sep;56(9):112614. doi: 10.1016/j.injury.2025.112614. Epub 2025 Jul 15. https://doi.org/10.1016/j.injury.2025.112614

Characteristics of a revised quick sequential organ failure assessment score (RqSOFA) to predict in-hospital mortality of patients visiting the emergency department via ambulance: an observational cohort study. Kamikawa Y. Intern Emerg Med. 2025 Oct;20(7):2185-2192. doi: 10.1007/s11739-024-03833-y. Epub 2024 Dec 5. https://doi.org/10.1007/s11739-024-03833-y

A National Analysis on Statewide Prehospital Adult Behavioral Sedation Protocols with a Focus on Trends in Ketamine Administration. Mearkle B. J Emerg Med. 2025 Nov;78:324-335. doi: 10.1016/j.jemermed.2025.08.010. Epub 2025 Aug 21. https://doi.org/10.1016/j.jemermed.2025.08.010

Peripheral perfusion index versus NEWS score in prehospital non-trauma adults: A prospective cohort study. Siber V. Am J Emerg Med. 2025 Nov;97:103-110. doi: 10.1016/j.ajem.2025.07.040. Epub 2025 Jul 18. https://doi.org/10.1016/j.ajem.2025.07.040

Impact of Education for Paramedic-Performed Point-of-Care Ultrasound for Cardiac Function Evaluation: A Pilot Study Assessing Imaging Quality and Interpretation. Thorne JL. J Emerg Med. 2025 Sep;76:33-40. doi: 10.1016/j.jemermed.2025.07.015. Epub 2025 Jul 5. https://doi.org/10.1016/j.jemermed.2025.07.015

Prehospital analgesia for trauma-related pain by paramedics: a comparative retrospective observational study of paracetamol, nalbuphine plus paracetamol, and piritramide. Lohmann J. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):152. doi: 10.1186/s13049-025-01470-8. https://doi.org/10.1186/s13049-025-01470-8

Development of a prehospital clinical prediction score for predicting massive blood transfusion in patients with trauma. Huabbangyang T. Resusc Plus. 2025 Oct 10;26:101128. doi: 10.1016/j.resplu.2025.101128. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101128

Disparities in Access to the Northwest Ambulance Service during pregnancy, birth and postpartum period and its association with neonatal and maternal outcomes [DiAAS]: a retrospective cohort study and qualitative framework analysis. Heys S. BMC Pregnancy Childbirth. 2025 Oct 17;25(1):1109. doi: 10.1186/s12884-025-08108-8. https://doi.org/10.1186/s12884-025-08108-8

Emergency management in primary health care clinics in the Northern region of Saudi Arabia: cross-sectional study. Basnawi AM. Front Public Health. 2025 Oct 29;13:1626854. doi: 10.3389/fpubh.2025.1626854. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1626854

Prehospital thrombolysis with tenecteplase in out-of-hospital cardiac arrest: a retrospective cohort study. Cowley A. Scand J Trauma Resusc Emerg Med. 2025 Nov 26. doi: 10.1186/s13049-025-01522-z. Online ahead of print. https://doi.org/10.1186/s13049-025-01522-z

Adherence to ambulance performance indicators and patient outcomes after stroke: An Australian data linkage study. Eliakundu AL. Australas Emerg Care. 2025 Sep;28(3):233-239. doi: 10.1016/j.auec.2025.04.002. Epub 2025 Jul 4. https://doi.org/10.1016/j.auec.2025.04.002

Mapping Adolescent Suicidal and Non-Suicidal Self-Injurious Behaviours Across Eastern Australia. Baldwin R. J Community Health. 2025 Nov 19. doi: 10.1007/s10900-025-01523-0. Online ahead of print. https://doi.org/10.1007/s10900-025-01523-0

Public Recognition of Emergencies and Appropriate Ambulance Use in Riyadh: A Cross-Sectional Survey. Binhotan MS. Healthcare (Basel). 2025 Nov 4;13(21):2801. doi: 10.3390/healthcare13212801. https://doi.org/10.3390/healthcare13212801

Multidimensional determinants of disaster response in prehospital emergency dispatch centers: content analysis of expert perspectives. Shafiei M. BMC Emerg Med. 2025 Oct 21;25(1):208. doi: 10.1186/s12873-025-01354-1. https://doi.org/10.1186/s12873-025-01354-1

Prognostic value of lactate in patients with cardiogenic shock with and without cardiac arrest. Zeymer U. Clin Res Cardiol. 2025 Sep 29. doi: 10.1007/s00392-025-02762-w. Online ahead of print. https://doi.org/10.1007/s00392-025-02762-w

Considerations for Regional Anaesthesia in the Prehospital Environment. Lewandowski-Barrett LJ. Air Med J. 2025 Nov-Dec;44(6):525-529. doi: 10.1016/j.amj.2025.07.007. Epub 2025 Aug 27. https://doi.org/10.1016/j.amj.2025.07.007

Damage Control Resuscitation Ukraine: Small Unit Training in Large Scale Combat Operations, Lessons Learned/Shared and Future Directions. Quinn J. Mil Med. 2025 Sep 1;190(Supplement_2):431-436. doi: 10.1093/milmed/usaf210. https://doi.org/10.1093/milmed/usaf210

Clinical outcomes of sharp esophageal foreign bodies in elderly patients: a retrospective study from Wuhan, China. Xu J. Front Med (Lausanne). 2025 Oct 28;12:1653609. doi: 10.3389/fmed.2025.1653609. eCollection 2025. https://doi.org/10.3389/fmed.2025.1653609

Feasibility and utilization of point-of-care ultrasound devices in a prehospital setting in Riyadh, Saudi Arabia. Alanazi MH. Saudi Med J. 2025 Oct;46(10):1240-1248. doi: 10.15537/smj.10.20250286. https://doi.org/10.15537/smj.10.20250286

Bridging the blue: narrative review of neurosurgical access, aeromedical retrieval, and telehealth in Fiji and the pacific. Singh A. J Clin Neurosci. 2025 Oct 30;143:111715. doi: 10.1016/j.jocn.2025.111715. Online ahead of print. https://doi.org/10.1016/j.jocn.2025.111715

Current Practices in Prehospital Ultrasound: A Systematic Evaluation of Prehospital Protocols Within the United States. Warren J. Prehosp Emerg Care. 2025 Oct 30:1-7. doi: 10.1080/10903127.2025.2574852. Online ahead of print. https://doi.org/10.1080/10903127.2025.2574852

Characteristics of patients repeatedly presenting to the emergency department for self-harm injuries: a 6-year retrospective study. Jung KY. Inj Epidemiol. 2025 Nov 24. doi: 10.1186/s40621-025-00636-3. Online ahead of print. https://doi.org/10.1186/s40621-025-00636-3

Prehospital PAT - Real World Data; EMS Use of the Pediatric Assessment Triangle in the Prehospital Environment. Heyming T. Prehosp Emerg Care. 2025 Nov 12:1-15. doi: 10.1080/10903127.2025.2581753. Online ahead of print. https://doi.org/10.1080/10903127.2025.2581753

[S3 guidelines on intensive care medicine following polytrauma : Aspects regarding definitive surgical treatment]. Horst K. Unfallchirurgie (Heidelb). 2025 Oct;128(10):783-791. doi: 10.1007/s00113-025-01626-2. Epub 2025 Sep 5. https://doi.org/10.1007/s00113-025-01626-2

Exploring the impact of road-based intensive care paramedic crewing configurations in Anglo-American paramedic systems: A scoping review. Davis RG. Australas Emerg Care. 2025 Oct 17:S2588-994X(25)00075-2. doi: 10.1016/j.auec.2025.10.001. Online ahead of print. https://doi.org/10.1016/j.auec.2025.10.001

Relationship between neighbourhood deprivation and ethnicity with attendance of prehospital critical care to out-of-hospital cardiac arrest patients. Boulton AJ. Resuscitation. 2025 Oct;215:110663. doi: 10.1016/j.resuscitation.2025.110663. Epub 2025 Jun 4. https://doi.org/10.1016/j.resuscitation.2025.110663

Predictive modelling in times of public health emergencies: patients' non-transport decisions during the COVID-19 pandemic. Farhat H. BMC Emerg Med. 2025 Sep 11;25(1):181. doi: 10.1186/s12873-025-01340-7. https://doi.org/10.1186/s12873-025-01340-7

Prehospital advanced versus basic life support: A cohort study comparing survival to hospital for major trauma patients in New Zealand. Campbell N. Australas Emerg Care. 2025 Oct 11:S2588-994X(25)00074-0. doi: 10.1016/j.auec.2025.09.008. Online ahead of print. https://doi.org/10.1016/j.auec.2025.09.008

Prehospital management of supraventricular tachycardia: a multicentre study of current practices with a subgroup propensity score-based comparison of adenosine and electrical cardioversion in unstable patients. Gamberini L. Resuscitation. 2025 Oct;215:110707. doi: 10.1016/j.resuscitation.2025.110707. Epub 2025 Jul 7. https://doi.org/10.1016/j.resuscitation.2025.110707

Patient-Reported Symptoms of Acute Coronary Syndrome in the Prehospital Period in a Prospective Study: Implications for Emergency Nurse Triage, Diagnosis, and Clinical Outcomes. Zègre-Hemsey JK. J Emerg Nurs. 2025 Nov;51(6):1070-1083. doi: 10.1016/j.jen.2025.04.016. Epub 2025 Jun 2. https://doi.org/10.1016/j.jen.2025.04.016

Comparison of Prehospital Versus Arrival Glasgow Coma Scale Scores Among Trauma Patients: A Retrospective Analysis. Attride TM. Cureus. 2025 Sep 15;17(9):e92364. doi: 10.7759/cureus.92364. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92364

The impact of the COVID-19 pandemic and post-pandemic economic crisis on snakebite patterns in rural Sri Lanka. Waiddyanatha S. Toxicon. 2025 Oct;265:108502. doi: 10.1016/j.toxicon.2025.108502. Epub 2025 Jul 24. https://doi.org/10.1016/j.toxicon.2025.108502

Soundwaves of innovation: a qualitative exploration of POCUS in Australasian ambulance and retrieval services. Donovan J. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):157. doi: 10.1186/s13049-025-01471-7. https://doi.org/10.1186/s13049-025-01471-7

Hemothorax and needle thoracostomies in prehospital traumatic cardiac arrest: An autopsy series of 172 cases. von Vopelius-Feldt J. Resusc Plus. 2025 Jun 21;25:101012. doi: 10.1016/j.resplu.2025.101012. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101012

When do emergencies happen? Exploring circadian, weekly, and seasonal trends in ambulance calls in Cyprus. Protopapas A. Int Emerg Nurs. 2025 Dec;83:101686. doi: 10.1016/j.ienj.2025.101686. Epub 2025 Sep 25. https://doi.org/10.1016/j.ienj.2025.101686

Selection of helicopter bases and transport modes to minimize pre-hospital times in Iceland. Nguyen P. Scand J Trauma Resusc Emerg Med. 2025 Nov 27;33(1):190. doi: 10.1186/s13049-025-01504-1. https://doi.org/10.1186/s13049-025-01504-1

Prehospital 12-Lead ECG Use for Suspected Acute Coronary Syndrome Varies by Community Social Vulnerability. Ward MJ. Prehosp Emerg Care. 2025 Nov 12:1-11. doi: 10.1080/10903127.2025.2587172. Online ahead of print. https://doi.org/10.1080/10903127.2025.2587172

A novel training program for enhancing paramedics' electrocardiogram interpretation skills: pre-post-evaluation. Iyama K. Front Med (Lausanne). 2025 Oct 6;12:1643572. doi: 10.3389/fmed.2025.1643572. eCollection 2025. https://doi.org/10.3389/fmed.2025.1643572

The apnea interval: Ventilation interruption during tracheal intubation and its association with cardiac arrest resuscitation care and outcome. Murphy DL. Resuscitation. 2025 Sep;214:110588. doi: 10.1016/j.resuscitation.2025.110588. Epub 2025 Mar 17. https://doi.org/10.1016/j.resuscitation.2025.110588

From Training to Reality: System-Level Barriers and Behavioral Gaps in Prehospital Cardiopulmonary Resuscitation Among Emergency Medical Technicians in Taiwan. Huang WH. J Contin Educ Health Prof. 2025 Oct 16. doi: 10.1097/CEH.0000000000000625. Online ahead of print. https://doi.org/10.1097/CEH.0000000000000625

Power outages increase the risk of ambulance attendances associated with non-optimal temperatures. Xu Z. Environ Res. 2025 Nov 15;285(Pt 2):122396. doi: 10.1016/j.envres.2025.122396. Epub 2025 Jul 19. https://doi.org/10.1016/j.envres.2025.122396

[Exploring novel strategies and models for the management of obstructive sleep apnea]. Ou Q. Zhonghua Jie He He Hu Xi Za Zhi. 2025 Oct 12;48(10):915-918. doi: 10.3760/cma.j.cn112147-20250611-00321. https://doi.org/10.3760/cma.j.cn112147-20250611-00321

Emergency Nursing and Staff Experiences With Visitation Restrictions During the Coronavirus Disease 2019 Pandemic: A Qualitative Descriptive Study. Urban RW. J Emerg Nurs. 2025 Sep;51(5):868-878.e3. doi: 10.1016/j.jen.2025.03.010. Epub 2025 Apr 20. https://doi.org/10.1016/j.jen.2025.03.010

The impact of airway assistants on prehospital endotracheal intubations - a subgroup analysis of data from anaesthesiologist-staffed helicopter critical care teams. Broms J. Scand J Trauma Resusc Emerg Med. 2025 Nov 25;33(1):194. doi: 10.1186/s13049-025-01515-y. https://doi.org/10.1186/s13049-025-01515-y

Readiness for self-directed learning among paramedic students in Jordan: A multi-institutional study. Alwidyan MT. BMC Med Educ. 2025 Nov 11;25(1):1575. doi: 10.1186/s12909-025-07717-3. https://doi.org/10.1186/s12909-025-07717-3

Patient profiles and P-HEMS specific interventions performed by a HEMS team in the netherlands; A retrospective cohort study of 18,199 patients. Badaoui M. Eur J Trauma Emerg Surg. 2025 Oct 14;51(1):299. doi: 10.1007/s00068-025-02976-7. https://doi.org/10.1007/s00068-025-02976-7

Association of prehospital optimal blood pressure and peripheral oxygen saturation with hospital outcomes in sports-related and recreation-related traumatic brain injury (SRR-TBI) in Asia. Chantanakomes J. Emerg Med J. 2025 Oct 28:emermed-2024-214031. doi: 10.1136/emermed-2024-214031. Online ahead of print. https://doi.org/10.1136/emermed-2024-214031

Exploring the Role of FCHVs in Trauma Case Management in Nepal: A Qualitative Study. Pathak M. R I Med J (2013). 2025 Oct 1;108(10):25-28. https://doi.org/

Correction: Prehospital respiratory interventions during six waves of COVID-19: results from Israel's Emergency Medical Services system. Nerlander MP. BMC Emerg Med. 2025 Nov 4;25(1):222. doi: 10.1186/s12873-025-01374-x. https://doi.org/10.1186/s12873-025-01374-x

Pre-hospital proton pump inhibitor use and clinical outcomes in hospitalized COVID-19 patients: A retrospective case-control study. Shanmugavel Geetha H. World J Virol. 2025 Sep 25;14(3):109170. doi: 10.5501/wjv.v14.i3.109170. https://doi.org/10.5501/wjv.v14.i3.109170

Global job satisfaction among emergency medicine professionals: results from the 2025 Emergency Medicine Day Survey. Petrino R. Eur J Emerg Med. 2025 Dec 1;32(6):445-453. doi: 10.1097/MEJ.0000000000001272. Epub 2025 Sep 29. https://doi.org/10.1097/MEJ.0000000000001272

Comparison of Cardiopulmonary Resuscitation Quality in a Simulated Model: At Incident Scene vs During EMS Transport. Çetin M. West J Emerg Med. 2025 Sep 25;26(5):1322-1327. doi: 10.5811/westjem.40234. https://doi.org/10.5811/westjem.40234

Factors related to mortality in patients with acute respiratory distress syndrome (ARDS) in a lower middle-income country: A retrospective observational study. Dao CX. PLoS One. 2025 Nov 18;20(11):e0337071. doi: 10.1371/journal.pone.0337071. eCollection 2025. https://doi.org/10.1371/journal.pone.0337071

Does Delayed Response Due to Busy Ambulances Impact Risk of Death and Hospital Service Use?: A Cohort Study of 240,000 Medical Emergencies. Asheim A. Epidemiology. 2025 Nov 1;36(6):830-840. doi: 10.1097/EDE.0000000000001894. Epub 2025 Jul 4. https://doi.org/10.1097/EDE.0000000000001894

"Epileptic seizure code in the region of Madrid": A process-based healthcare network for the acute management of epileptic seizures. García Morales I. Epilepsia Open. 2025 Nov 18. doi: 10.1002/epi4.70177. Online ahead of print. https://doi.org/10.1002/epi4.70177

Fielding an Expeditionary Prolonged Casualty Care Kit: What We Carry Matters. Dawood ZS. Mil Med. 2025 Sep 1;190(9-10):e2032-e2038. doi: 10.1093/milmed/usaf129. https://doi.org/10.1093/milmed/usaf129

Prehospital transfusion of allogeneic blood products: Erratum. Alomar-Dominguez C. Curr Opin Anaesthesiol. 2025 Oct 1;38(5):702. doi: 10.1097/ACO.0000000000001556. Epub 2025 Aug 26. https://doi.org/10.1097/ACO.0000000000001556

Development and evaluation of a novel prehospital antidote service providing methylthioninium chloride (methylene blue) for sodium nitrite poisoning. Davies G. Emerg Med J. 2025 Oct 8:emermed-2024-214777. doi: 10.1136/emermed-2024-214777. Online ahead of print. https://doi.org/10.1136/emermed-2024-214777

How mode of evacuation, roadway environment, and traffic conditions relate to injury severity score? Untangling the role of pre-hospital time in road crashes. Rehman ZU. Injury. 2025 Oct;56(10):112668. doi: 10.1016/j.injury.2025.112668. Epub 2025 Aug 8. https://doi.org/10.1016/j.injury.2025.112668

Prehospital CPR for Traumatic Arrest: Can Prehospital Variables Help Identify Futile Transport?. Garcia L. Am Surg. 2025 Oct;91(10):1792-1797. doi: 10.1177/00031348251359121. Epub 2025 Jul 10. https://doi.org/10.1177/00031348251359121

Association between endotracheal intubation and outcomes of nonshockable out-of-hospital cardiac arrest in Japan. Nakai-Uchida M. BMC Emerg Med. 2025 Sep 24;25(1):185. doi: 10.1186/s12873-025-01341-6. https://doi.org/10.1186/s12873-025-01341-6

Comparing definitions of pediatric out-of-hospital cardiac arrests using a national EMS database. Kelly C. Am J Emerg Med. 2025 Oct 24;100:1-5. doi: 10.1016/j.ajem.2025.10.049. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.10.049

An observational study of pre-hospital central venous access for patients with haemorrhagic shock due to major trauma. Pallavicini P. Anaesthesia. 2025 Sep 14. doi: 10.1111/anae.16778. Online ahead of print. https://doi.org/10.1111/anae.16778

Improving decision-making for prehospital Resuscitative Thoracotomy in traumatic cardiac arrest: a data-driven approach. Ter Avest E. Crit Care. 2025 Nov 13;29(1):485. doi: 10.1186/s13054-025-05705-z. https://doi.org/10.1186/s13054-025-05705-z

Effectiveness of the Situation-Background-Assessment-Recommendation method in emergencies with simulation-based education for nursing and paramedic students. Erba A. Int Emerg Nurs. 2025 Sep;82:101666. doi: 10.1016/j.ienj.2025.101666. Epub 2025 Aug 29. https://doi.org/10.1016/j.ienj.2025.101666

Effect of Optimised Single Role Versus Multirole Physician Response Model on Time to Contact in Patients Requiring Advanced Interventions in Greater Sydney, Australia. Garner AA. Emerg Med Australas. 2025 Oct;37(5):e70151. doi: 10.1111/1742-6723.70151. https://doi.org/10.1111/1742-6723.70151

Neonatal transport ground ambulance: the Italian perspective toward a European consensus. Bellini C. Eur J Pediatr. 2025 Oct 13;184(11):682. doi: 10.1007/s00431-025-06536-4. https://doi.org/10.1007/s00431-025-06536-4

Triage in Action: A Principles-Based Approach to Mass Casualty Management in Tactical Combat Casualty Care. Remley MA. J Spec Oper Med. 2025 Sep 1;25(3):127-131. doi: 10.55460/ZC6P-YS4G. https://doi.org/10.55460/ZC6P-YS4G

Clinical characteristics and risk factors for pathological fractures in children with Staphylococcus aureus osteoarticular infections: a retrospective cohort study. Cui Y. Ital J Pediatr. 2025 Oct 31;51(1):298. doi: 10.1186/s13052-025-02138-w. https://doi.org/10.1186/s13052-025-02138-w

A Modified Delphi Process to Develop Consensus Definitions of Time-Dependent Care by Paramedic Services Systems. de Montigny L. Prehosp Disaster Med. 2025 Oct;40(5):266-273. doi: 10.1017/S1049023X25101519. Epub 2025 Nov 19. https://doi.org/10.1017/S1049023X25101519

Infection control practices among EMS providers in prehospital settings: a scoping review of compliance and barriers. Alsaleem AN. Antimicrob Steward Healthc Epidemiol. 2025 Oct 17;5(1):e274. doi: 10.1017/ash.2025.10194. eCollection 2025. https://doi.org/10.1017/ash.2025.10194

Management of Polytraumatized Patients: Challenges and Insights into Air Transfer. Anghele M. Healthcare (Basel). 2025 Sep 1;13(17):2181. doi: 10.3390/healthcare13172181. https://doi.org/10.3390/healthcare13172181

How do I implement a whole blood program with low blood wastage?. Bäckström D. Transfusion. 2025 Nov;65(11):2014-2020. doi: 10.1111/trf.18402. Epub 2025 Sep 5. https://doi.org/10.1111/trf.18402

Effect of the score predicting imminent delivery on the management of unexpected out-of-hospital obstetrical deliveries: a cluster randomized clinical trial. Ricard-Hibon A. Eur J Emerg Med. 2025 Oct 1;32(5):335-343. doi: 10.1097/MEJ.0000000000001264. Epub 2024 Aug 4. https://doi.org/10.1097/MEJ.0000000000001264

Stroke knowledge and attitudes influence early hospital arrival in acute ischemic stroke: a multicenter cross-sectional survey from Hubei Province, China. Wu X. Front Neurol. 2025 Sep 25;16:1669361. doi: 10.3389/fneur.2025.1669361. eCollection 2025. https://doi.org/10.3389/fneur.2025.1669361

Influences on ambulance staff's understandings and safeguarding of ethical values. Björklund S. Nurs Ethics. 2025 Nov;32(7):2431-2444. doi: 10.1177/09697330251344170. Epub 2025 May 26. https://doi.org/10.1177/09697330251344170

Metal ion-protein-based liquid hemostatic foam for prehospital emergency treatment of incompressible hemorrhage. Yang X. Acta Biomater. 2025 Nov 12:S1742-7061(25)00838-4. doi: 10.1016/j.actbio.2025.11.015. Online ahead of print. https://doi.org/10.1016/j.actbio.2025.11.015

What Factors Could Create a More Comfortable Waiting Experience for Patients on Emergency Department Ramps? A Scoping Review. Binnie V. Emerg Med Australas. 2025 Oct;37(5):e70125. doi: 10.1111/1742-6723.70125. https://doi.org/10.1111/1742-6723.70125

[Resuscitative endovascular balloon occlusion of the aorta-REBOA for bleeding control in the prehospital context : Overview of available cases and evaluation of the evidence]. Hilbert-Carius P. Anaesthesiologie. 2025 Dec;74(12):843-849. doi: 10.1007/s00101-025-01608-4. Epub 2025 Oct 29. https://doi.org/10.1007/s00101-025-01608-4

Prehospital versus Emergency Department Glasgow Coma Scale in Blunt Traumatic Brain Injury: A Retrospective Review of the National Trauma Data Bank. Messick-Ngo TE. Am Surg. 2025 Oct;91(10):1778-1785. doi: 10.1177/00031348251359122. Epub 2025 Jul 8. https://doi.org/10.1177/00031348251359122

Austrian Emergency Day: a single-day audit of the call profiles of physician-staffed prehospital emergency medical services in Austria. Trimmel H. Emerg Med J. 2025 Oct 20;42(11):744-746. doi: 10.1136/emermed-2025-214968. https://doi.org/10.1136/emermed-2025-214968

Reviewing Australian paramedic clinical practice guidelines for persons experiencing a mental health crisis. Roberts L. Australas Emerg Care. 2025 Oct 14:S2588-994X(25)00073-9. doi: 10.1016/j.auec.2025.09.007. Online ahead of print. https://doi.org/10.1016/j.auec.2025.09.007

Neighborhood-level variation in prehospital care of patients with suspected stroke in Rhode Island. Karb R. Acad Emerg Med. 2025 Sep;32(9):966-974. doi: 10.1111/acem.70046. Epub 2025 May 2. https://doi.org/10.1111/acem.70046

Strategies to manage emergency ambulance telephone callers with sustained high needs: the STRETCHED mixed-methods evaluation with linked data. Watkins A. Health Soc Care Deliv Res. 2025 Oct;13(37):1-76. doi: 10.3310/PWGF6008. https://doi.org/10.3310/PWGF6008

Using a structured process for patient assessment and triage to reduce ambulance handover delays and enhance patient outcomes. Evans C. Emerg Nurse. 2025 Oct 28. doi: 10.7748/en.2025.e2246. Online ahead of print. https://doi.org/10.7748/en.2025.e2246

Pre-hospital heparin improves coronary flow in STEMI: insights and implications from the HELP-PCI trial. Wang M. Eur Heart J. 2025 Oct 30:ehaf850. doi: 10.1093/eurheartj/ehaf850. Online ahead of print. https://doi.org/10.1093/eurheartj/ehaf850

Pre-hospital vs Cath-Lab heparin in STEMI: a reappraisal based on the HELP-PCI trial findings. Zhang B. Eur Heart J. 2025 Oct 30:ehaf849. doi: 10.1093/eurheartj/ehaf849. Online ahead of print. https://doi.org/10.1093/eurheartj/ehaf849

Association of prehospital pupillary diameter with return of spontaneous circulation and neurological outcome after out-of-hospital cardiac arrest: A multicenter retrospective analysis. Takeda M. Resusc Plus. 2025 Sep 26;26:101112. doi: 10.1016/j.resplu.2025.101112. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101112

Effectiveness of the educational-operational intervention of the crisis management in earthquake simulation conditions in prehospital emergency personnel: a randomized controlled trial study. Farahmandnia I. BMC Health Serv Res. 2025 Sep 2;25(1):1173. doi: 10.1186/s12913-025-13376-3. https://doi.org/10.1186/s12913-025-13376-3

Efficacy and safety of intravenous sufentanil administration in low-severity acute trauma as a competence of paramedics: a follow-up observational study. Sykora R. Eur J Trauma Emerg Surg. 2025 Sep 9;51(1):289. doi: 10.1007/s00068-025-02953-0. https://doi.org/10.1007/s00068-025-02953-0

Incidence and Predictors of Referral for Coronary Angiography and Revascularization in Non-ST-Segment Elevation Myocardial Infarction. Warren J. Catheter Cardiovasc Interv. 2025 Oct;106(4):2713-2723. doi: 10.1002/ccd.70111. Epub 2025 Aug 25. https://doi.org/10.1002/ccd.70111

A dataset of healthcare road accessibility in Australia: service-based grouping and residential reachability. Adhinugraha K. Data Brief. 2025 Sep 12;62:112068. doi: 10.1016/j.dib.2025.112068. eCollection 2025 Oct. https://doi.org/10.1016/j.dib.2025.112068

The risk factors of plasma transfusions during resuscitation in pediatric burn patients: a retrospective study from 2010 to 2021. Zhu L. Front Pediatr. 2025 Nov 13;13:1608479. doi: 10.3389/fped.2025.1608479. eCollection 2025. https://doi.org/10.3389/fped.2025.1608479

Improving Quality in Cardiac Arrest via Resuscitation Academy Training (IQ-CART): Study Protocol for a Mixed-Methods Study With a Focus on Low-Performing EMS Agencies. Chan PS. Circ Cardiovasc Qual Outcomes. 2025 Nov 19:e012571. doi: 10.1161/CIRCOUTCOMES.125.012571. Online ahead of print. https://doi.org/10.1161/CIRCOUTCOMES.125.012571

Parental Knowledge and Perceptions of the First Episode of Seizure in Children: A Single-Center Cross-Sectional Study. Agarwal A. Sage Open Pediatr. 2025 Sep 24;12:30502225251374941. doi: 10.1177/30502225251374941. eCollection 2025 Jan-Dec. https://doi.org/10.1177/30502225251374941

A Live Human Model Comparison Evaluating ThoraSite® Accuracy for Needle Thoracostomy. Warren J. Prehosp Emerg Care. 2025 Nov 26:1-12. doi: 10.1080/10903127.2025.2592880. Online ahead of print. https://doi.org/10.1080/10903127.2025.2592880

Protocol for a multicenter, cluster-randomized, stepped-wedge, implementation trial of a prehospital sepsis protocol. Das S. Trials. 2025 Nov 11;26(1):491. doi: 10.1186/s13063-025-09172-3. https://doi.org/10.1186/s13063-025-09172-3

Implementing prehospital invasive arterial blood pressure monitoring in critically ill patients-a prospective observational first year analysis. Ule J. Scand J Trauma Resusc Emerg Med. 2025 Sep 2;33(1):145. doi: 10.1186/s13049-025-01461-9. https://doi.org/10.1186/s13049-025-01461-9

Workplace violence and burnout among emergency medical service workers and nurses in Germany: a cross-sectional study. Roth K. Hum Resour Health. 2025 Nov 20;23(1):66. doi: 10.1186/s12960-025-01026-y. https://doi.org/10.1186/s12960-025-01026-y

Enhancing door-in-door-out time in a rural primary stroke centre using a large vessel occlusion alert: a quality improvement project. Cannoy A. Emerg Med J. 2025 Oct 20;42(11):728-735. doi: 10.1136/emermed-2024-214263. https://doi.org/10.1136/emermed-2024-214263

'Every day was a learning curve': implementing COVID-19 triage protocols in UK ambulance services-a qualitative study of staff experiences. Porter A. Emerg Med J. 2025 Oct 20;42(11):747-751. doi: 10.1136/emermed-2024-214495. https://doi.org/10.1136/emermed-2024-214495

Importance of early prehospital intervention in crush injury and compartment syndrome: a case report. Seah Z. J Med Case Rep. 2025 Oct 29;19(1):550. doi: 10.1186/s13256-025-05598-0. https://doi.org/10.1186/s13256-025-05598-0

A novel rendezvous approach between mobile stroke units and EMS improves timely thrombolysis in rural areas. Wu X. Int J Stroke. 2025 Oct 24:17474930251393555. doi: 10.1177/17474930251393555. Online ahead of print. https://doi.org/10.1177/17474930251393555

Statewide Prehospital Buprenorphine in Delaware: Two-Years of Paramedic-Initiated Medication for Opioid Use Disorder After Overdose. Wanner GK. Dela J Public Health. 2025 Sep 26;11(3):24-28. doi: 10.32481/djph.2025.09.06. eCollection 2025 Sep. https://doi.org/10.32481/djph.2025.09.06

Emergency department perspective of patients with heat stroke in a tertiary care centre of western Rajasthan: An observational study. Sharma A. Trop Doct. 2026 Jan;56(1):21-24. doi: 10.1177/00494755251389720. Epub 2025 Oct 30. https://doi.org/10.1177/00494755251389720

Developing a culturally adapted competency framework for community paramedicine practice in Saudi Arabia. Algosaibi EA. Sci Rep. 2025 Nov 12;15(1):39572. doi: 10.1038/s41598-025-24624-1. https://doi.org/10.1038/s41598-025-24624-1

Near Field Communication (NFC) -assisted prehospital extracorporeal cardiopulmonary resuscitation activation: a novel tool to reduce cognitive load on emergency medical technicians. Huang YB. Resusc Plus. 2025 Aug 17;26:101067. doi: 10.1016/j.resplu.2025.101067. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101067

Comparison of the Social Vulnerability Index, Area Disadvantage Index, and Social Deprivation Index for Adults With Out-of-Hospital Emergencies. Ramgopal S. Public Health Rep. 2025 Sep-Oct;140(5-6):522-530. doi: 10.1177/00333549251357818. Epub 2025 Aug 21. https://doi.org/10.1177/00333549251357818

Prehospital Vital Signs, Including SpO(2), Are Significantly Associated With Mortality and Mechanical Circulatory Support Requirement in Acute Myocardial Infarction Patients. Kurita T. Circ J. 2025 Oct 24;89(11):1833-1835. doi: 10.1253/circj.CJ-25-0584. Epub 2025 Sep 30. https://doi.org/10.1253/circj.CJ-25-0584

Construction and preliminary trial test of a decision-making app for pre-hospital damage control resuscitation. Yang H. Chin J Traumatol. 2025 Sep;28(5):313-318. doi: 10.1016/j.cjtee.2024.11.001. Epub 2025 Feb 18. https://doi.org/10.1016/j.cjtee.2024.11.001

The effect of the information systems literacy of emergency health employees on their technology acceptance levels. Aydin A. Work. 2025 Oct;82(2):424-432. doi: 10.1177/10519815251341164. Epub 2025 Jun 26. https://doi.org/10.1177/10519815251341164

Are pelvic binders an effective measure to lower mortality and decrease blood loss after high energy pelvic ring injuries? A systematic review. Papaleontiou A. Surgeon. 2025 Dec;23(6):371-380. doi: 10.1016/j.surge.2025.08.002. Epub 2025 Sep 15. https://doi.org/10.1016/j.surge.2025.08.002

Response by Stamm et al to Letter Regarding Article, "Disparities in Emergency Medical Services Use, Prehospital Notification, and Symptom Onset to Arrival in Patients With Acute Stroke". Stamm B. Circulation. 2025 Sep 16;152(11):e112-e113. doi: 10.1161/CIRCULATIONAHA.125.074585. Epub 2025 Sep 15. https://doi.org/10.1161/CIRCULATIONAHA.125.074585

Letter by Zhu et al Regarding Article, "Disparities in Emergency Medical Services Use, Prehospital Notification, and Symptom Onset to Arrival in Patients With Acute Stroke". Zhu Z. Circulation. 2025 Sep 16;152(11):e110-e111. doi: 10.1161/CIRCULATIONAHA.124.072934. Epub 2025 Sep 15. https://doi.org/10.1161/CIRCULATIONAHA.124.072934

Morgagni-Stewart-Morel Syndrome Presenting as Acute Neurological and Respiratory Distress. Ben Abdallah M. Eur J Case Rep Intern Med. 2025 Oct 22;12(11):005836. doi: 10.12890/2025_005836. eCollection 2025. https://doi.org/10.12890/2025_005836

Patterns and characteristics of 'calls of despair': a service evaluation using Yorkshire Ambulance Service data. Bellamy V. Br Paramed J. 2025 Sep 1;10(2):40-48. doi: 10.29045/14784726.2025.9.10.2.40. https://doi.org/10.29045/14784726.2025.9.10.2.40

Extracorporeal Cardiopulmonary Resuscitation in Dementia: Neurologically Favorable Survival After 110 Minutes of Resuscitation. Sipahi NF. Cureus. 2025 Oct 30;17(10):e95783. doi: 10.7759/cureus.95783. eCollection 2025 Oct. https://doi.org/10.7759/cureus.95783

Pre-arrest oral anticoagulants' impact on cardiac arrest mortality: MIMIC-IV cohort retrospect. Nie X. Front Cardiovasc Med. 2025 Nov 3;12:1599318. doi: 10.3389/fcvm.2025.1599318. eCollection 2025. https://doi.org/10.3389/fcvm.2025.1599318

Assessment of Electrocardiogram (ECG) Interpretation Proficiency Among Paramedics in a Tertiary Care Teaching Hospital. Vishnupriya C. Cureus. 2025 Nov 1;17(11):e95881. doi: 10.7759/cureus.95881. eCollection 2025 Nov. https://doi.org/10.7759/cureus.95881

Assessing Pediatric CPR Practices in the Prehospital Setting: EMS Clinician Experience, Perceptions, and Resource Utilization. Kleinman K. Pediatr Emerg Care. 2025 Oct 31. doi: 10.1097/PEC.0000000000003503. Online ahead of print. https://doi.org/10.1097/PEC.0000000000003503

Association Between Collar Type and Incidence of Cervical Spinal Cord Injury in Trauma Patients. Shaw MR. Air Med J. 2025 Sep-Oct;44(5):394-398. doi: 10.1016/j.amj.2025.06.015. Epub 2025 Jul 10. https://doi.org/10.1016/j.amj.2025.06.015

Balancing care needs - a qualitative study on prehospital emergency nurses' experiences of providing self-care advice and home referrals for frail older patients. Norberg Boysen G. BMC Emerg Med. 2025 Sep 22;25(1):183. doi: 10.1186/s12873-025-01355-0. https://doi.org/10.1186/s12873-025-01355-0

Evaluation of "Real BVM Help" for Improving Manual Ventilation Quality in the Prehospital Setting: A Before-After Manikin Study. Krammel M. Open Access Emerg Med. 2025 Sep 11;17:257-265. doi: 10.2147/OAEM.S520921. eCollection 2025. https://doi.org/10.2147/OAEM.S520921

Triage criteria for trauma centers and in-hospital mortality of victims of external causes: a Brazilian cohort. Vieira RCA. Cien Saude Colet. 2025 Oct;30(10):e13702025. doi: 10.1590/1413-812320253010.13702025. Epub 2025 Jul 23. https://doi.org/10.1590/1413-812320253010.13702025

Comparison of discharge disposition and AHA prehospital stroke compliance among urban, suburban, and rural EMS agencies. Nicke DS. J Stroke Cerebrovasc Dis. 2025 Sep;34(9):108402. doi: 10.1016/j.jstrokecerebrovasdis.2025.108402. Epub 2025 Jul 18. https://doi.org/10.1016/j.jstrokecerebrovasdis.2025.108402

Frailty Status and Dysphagia Trajectory Among Hospitalized Nursing Home Residents With Advanced Dementia. Loy RD. J Am Med Dir Assoc. 2025 Oct 6;26(12):105860. doi: 10.1016/j.jamda.2025.105860. Online ahead of print. https://doi.org/10.1016/j.jamda.2025.105860

Using simulation stethoscopes to support physical exam skill development in health professionals education: A scoping review of educational applications and outcomes. Chan F. Curr Pharm Teach Learn. 2025 Dec;17(12):102466. doi: 10.1016/j.cptl.2025.102466. Epub 2025 Sep 12. https://doi.org/10.1016/j.cptl.2025.102466

A CHARACTERIZATION OF PEDIATRIC BURN INJURY PATIENTS PRESENTING TO A ZONAL REFERRAL HOSPITAL IN NORTHERN TANZANIA. Vlasic K. J Burn Care Res. 2025 Sep 30:iraf184. doi: 10.1093/jbcr/iraf184. Online ahead of print. https://doi.org/10.1093/jbcr/iraf184

A field test of the EMS LiftKit: Validating its usability, usefulness, and desirability. Lavender SA. Appl Ergon. 2025 Sep;127:104519. doi: 10.1016/j.apergo.2025.104519. Epub 2025 Apr 8. https://doi.org/10.1016/j.apergo.2025.104519

Feasibility of Telementoring for Cricothyroidotomy in Critical Care Transport Team Members. Goebel M. Air Med J. 2025 Nov-Dec;44(6):485-487. doi: 10.1016/j.amj.2025.07.004. Epub 2025 Aug 16. https://doi.org/10.1016/j.amj.2025.07.004

Coordinating First Aid Provision: A Qualitative Study Exploring the Multiplicity of Categories at the Great North Run. Stoddart H. Sociol Health Illn. 2025 Nov;47(8):e70086. doi: 10.1111/1467-9566.70086. https://doi.org/10.1111/1467-9566.70086

Challenges faced by the Iranian health system in response process to terrorist explosive attacks: a descriptive phenomenology qualitative study of live experiences. Tavan A. BMC Emerg Med. 2025 Sep 1;25(1):175. doi: 10.1186/s12873-025-01338-1. https://doi.org/10.1186/s12873-025-01338-1

Flame-Retardant Ionogel Enabled by Lignin Molecular Networks for Fire Rescue. Ye Z. Adv Sci (Weinh). 2025 Sep;12(35):e06901. doi: 10.1002/advs.202506901. Epub 2025 Jun 25. https://doi.org/10.1002/advs.202506901

Acquisition of Prehospital Stroke Severity Scale is associated with shorter door-to-puncture times in patients with prehospital notifications transported directly to a thrombectomy center. Bhatt NR. J Neurointerv Surg. 2025 Oct 16;17(11):1201-1206. doi: 10.1136/jnis-2024-022122. https://doi.org/10.1136/jnis-2024-022122

Early Advanced Airway Management and Clinical Outcomes in Out-of-Hospital Cardiac Arrest: A Nationwide Observational Study. Lee JH. J Clin Med. 2025 Oct 28;14(21):7652. doi: 10.3390/jcm14217652. https://doi.org/10.3390/jcm14217652

Prehospital Treatment With Dried Plasma in Patients With Major Bleeding-A Prospective Randomised Controlled Multicentre Trial: Statistical Analysis Protocol. Skallsjö G. Acta Anaesthesiol Scand. 2025 Oct;69(9):e70120. doi: 10.1111/aas.70120. https://doi.org/10.1111/aas.70120

Mobile stroke unit treatment times and transport frequency in a suburban setting. Vargas A. Neurol Sci. 2025 Nov;46(11):5879-5884. doi: 10.1007/s10072-025-08449-4. Epub 2025 Aug 25. https://doi.org/10.1007/s10072-025-08449-4

Exploring the perceived impact of pediatric simulations and pre-simulation activities in paramedic education: A quantitative post-intervention study. Badawi AA. Qatar Med J. 2025 Sep 15;2025(3):86. doi: 10.5339/qmj.2025.86. eCollection 2025. https://doi.org/10.5339/qmj.2025.86

Understanding Program Attrition: The Influence of Entry Requirements and Student Resources. van den Bergh SL. J Am Coll Emerg Physicians Open. 2025 Nov 11;7(1):100276. doi: 10.1016/j.acepjo.2025.100276. eCollection 2026 Feb. https://doi.org/10.1016/j.acepjo.2025.100276

Utilisation of a GP-staffed emergency response unit: an observational study from Norway. Rønning A. BJGP Open. 2025 Oct 15:BJGPO.2025.0101. doi: 10.3399/BJGPO.2025.0101. Online ahead of print. https://doi.org/10.3399/BJGPO.2025.0101

Factors affecting disaster preparedness in prehospital emergency dispatch centers: mapping of expert perspectives. Shafiei M. Int J Emerg Med. 2025 Nov 22;18(1):246. doi: 10.1186/s12245-025-01053-5. https://doi.org/10.1186/s12245-025-01053-5

Machine learning for triage of strokes with large vessel occlusion using photoplethysmography biomarkers. Goda MÁ. Physiol Meas. 2025 Nov 27. doi: 10.1088/1361-6579/ae2562. Online ahead of print. https://doi.org/10.1088/1361-6579/ae2562

A novel scoring algorithm for chest pain can effectively support the diagnosis of acute coronary syndrome in prehospital settings: a cross-sectional study. Iyama K. Int J Emerg Med. 2025 Oct 31;18(1):224. doi: 10.1186/s12245-025-01019-7. https://doi.org/10.1186/s12245-025-01019-7

Protocol for a parallel-group, superiority randomized controlled trial of the PulsePoint mobile application to increase bystander resuscitation in out-of-hospital cardiac arrest. Brooks SC. Resusc Plus. 2025 Jul 24;25:101036. doi: 10.1016/j.resplu.2025.101036. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101036

The Predictive Value of Prehospital Simple Shock Index for Hypoperfusion in Trauma Patients. Chen J. J Surg Res. 2025 Sep;313:285-290. doi: 10.1016/j.jss.2025.06.044. Epub 2025 Jul 17. https://doi.org/10.1016/j.jss.2025.06.044

Prehospital thrombolytic treatment of acute ischemic stroke using a remotely controlled CT scanner. Ingebrigtsen SG. Sci Rep. 2025 Oct 14;15(1):35846. doi: 10.1038/s41598-025-19782-1. https://doi.org/10.1038/s41598-025-19782-1

The influence of real-time feedback on the quality of resuscitation: A prospective study comparing bystanders, paramedic course participants, and emergency physician trainees. Krispin SK. GMS J Med Educ. 2025 Nov 17;42(5):Doc66. doi: 10.3205/zma001790. eCollection 2025. https://doi.org/10.3205/zma001790

Impact of the COVID-19 pandemic on favourable neurological outcome after EMS-witnessed out-of-hospital cardiac arrest: a prospective nationwide observational study. Tsunemitsu T. Resuscitation. 2025 Oct;215:110758. doi: 10.1016/j.resuscitation.2025.110758. Epub 2025 Aug 7. https://doi.org/10.1016/j.resuscitation.2025.110758

Role of alcohol in urgent ambulance contacts in the Capital Region of Denmark: a 9-year population-based study across sex and age groups. Curtis AB. BMJ Public Health. 2025 Nov 21;3(2):e003411. doi: 10.1136/bmjph-2025-003411. eCollection 2025. https://doi.org/10.1136/bmjph-2025-003411

Unstable pelvic fractures in patients with hemodynamic instability: global treatment controversies. Balogh ZJ. OTA Int. 2025 Oct 13;8(6 Suppl):e436. doi: 10.1097/OI9.0000000000000436. eCollection 2025 Oct. https://doi.org/10.1097/OI9.0000000000000436

Knowledge, attitude and practice of emergency care providers on obstetric haemorrhage in KwaZulu-Natal, South Africa: A cross-sectional study. Govender S. Afr J Emerg Med. 2025 Dec;15(4):100909. doi: 10.1016/j.afjem.2025.100909. Epub 2025 Sep 27. https://doi.org/10.1016/j.afjem.2025.100909

Unveiling the Determinants of Prehospital Delay in Patients With Acute Myocardial Infarction: A Cross-Sectional Study. Lv W. Nurs Res Pract. 2025 Sep 28;2025:7096059. doi: 10.1155/nrp/7096059. eCollection 2025. https://doi.org/10.1155/nrp/7096059

The quality of CPR delivered by EMS personnel wearing enhanced personal protective equipment during the COVID-19 pandemic: a retrospective cohort study from Perth, Australia. Talikowska M. Resusc Plus. 2025 Aug 14;26:101062. doi: 10.1016/j.resplu.2025.101062. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101062

Impact of ECPR initiation time and age on survival in out-of-hospital cardiac arrest patients: do not underestimate pre-hospital time!. Jouffroy R. Crit Care. 2025 Oct 29;29(1):459. doi: 10.1186/s13054-025-05721-z. https://doi.org/10.1186/s13054-025-05721-z

Evaluation of the delta shock index as an indicator of outcomes in patients with trauma who did not receive prehospital intravenous fluid infusion: a Japanese, nationwide, database study. Mishima H. Eur J Trauma Emerg Surg. 2025 Nov 25;51(1):343. doi: 10.1007/s00068-025-03013-3. https://doi.org/10.1007/s00068-025-03013-3

Short-term prognosis analysis of critically ill patients entering the emergency department by different ways based on propensity score matching. Ji X. Medicine (Baltimore). 2025 Nov 28;104(48):e45502. doi: 10.1097/MD.0000000000045502. https://doi.org/10.1097/MD.0000000000045502

Parental Leave and Lactation Policy for EMS Clinicians - A Position Statement and Resource Document of NAEMSP. Breyre AM. Prehosp Emerg Care. 2025 Sep 11:1-6. doi: 10.1080/10903127.2025.2537244. Online ahead of print. https://doi.org/10.1080/10903127.2025.2537244

Assessing the Importance of Prehospital Interventions on Shock Index and Patient Outcomes at a Rural Appalachian Level 1 Trauma Center. Brahmbhatt VV. Am Surg. 2025 Sep 18:31348251380173. doi: 10.1177/00031348251380173. Online ahead of print. https://doi.org/10.1177/00031348251380173

Developing a high-quality patient-centric integrated model for emergency care system in selected districts of India: An implementation research protocol (INDIA-EMS Study). Ayyan S M. PLoS One. 2025 Sep 3;20(9):e0331290. doi: 10.1371/journal.pone.0331290. eCollection 2025. https://doi.org/10.1371/journal.pone.0331290

Predicting macrolide resistance in pediatric Mycoplasma pneumoniae pneumonia: A machine learning modeling study. Yang S. Eur J Clin Microbiol Infect Dis. 2025 Nov 15. doi: 10.1007/s10096-025-05354-8. Online ahead of print. https://doi.org/10.1007/s10096-025-05354-8

Improving Utstein accuracy: concordance of bystander CPR reporting by paramedic documentation vs. telecommunicator audio review. Palatinus HN. Resusc Plus. 2025 Oct 10;26:101122. doi: 10.1016/j.resplu.2025.101122. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101122

Age- dependent injury patterns, management and impact on mortality of severe thoracic trauma in severely injured children: a retrospective study from the TraumaRegister DGU(®). Fichtel I. Scand J Trauma Resusc Emerg Med. 2025 Nov 15;33(1):183. doi: 10.1186/s13049-025-01510-3. https://doi.org/10.1186/s13049-025-01510-3

Colorimetric capnography adjunct during prehospital needle decompression of tension pneumothorax improves decompression success and reduces need for repeat prehospital decompression. Dubroc Z. Am J Emerg Med. 2025 Dec;98:256-261. doi: 10.1016/j.ajem.2025.08.065. Epub 2025 Sep 2. https://doi.org/10.1016/j.ajem.2025.08.065

Sources of Discomfort and Treatment Strategies for Trauma Patients in the Pre-Hospital Setting-A Scoping Review. Melo F. J Emerg Nurs. 2025 Oct 3:S0099-1767(25)00315-0. doi: 10.1016/j.jen.2025.08.014. Online ahead of print. https://doi.org/10.1016/j.jen.2025.08.014

Effect of an Educational Intervention on Knowledge and Skills of Police Officers Towards Prehospital Care for Road Traffic Accident Victims in Southwestern Uganda. Kyarikunda L. Open Access Emerg Med. 2025 Oct 17;17:301-311. doi: 10.2147/OAEM.S522213. eCollection 2025. https://doi.org/10.2147/OAEM.S522213

Simulation as a foundation for experiential learning among ambulance nursing students: A qualitative observation study. Andersson U. Nurse Educ Today. 2025 Sep;152:106759. doi: 10.1016/j.nedt.2025.106759. Epub 2025 Apr 26. https://doi.org/10.1016/j.nedt.2025.106759

Impact of Acoustic Gunshot Detection Technology on Prehospital Transport and Time to Treatment: A Narrative Review With Directions for Future Military Conflicts. Remondelli MH. Mil Med. 2025 Oct 22:usaf505. doi: 10.1093/milmed/usaf505. Online ahead of print. https://doi.org/10.1093/milmed/usaf505

Pediatric prehospital intubation: the persistent challenge of first-attempt success. Maia IWA. Eur J Emerg Med. 2025 Dec 1;32(6):385-386. doi: 10.1097/MEJ.0000000000001265. Epub 2025 Oct 28. https://doi.org/10.1097/MEJ.0000000000001265

Comparison of inhalational methoxyflurane, intranasal fentanyl, and intravenous morphine for treatment of prehospital acute pain in Norway (PreMeFen): a randomised, non-inferiority, three-arm, phase 3 trial. Simensen R. Lancet. 2025 Nov 20:S0140-6736(25)01575-2. doi: 10.1016/S0140-6736(25)01575-2. Online ahead of print. https://doi.org/10.1016/S0140-6736(25)01575-2

Prehospital extracorporeal cardiopulmonary resuscitation for refractory out-of-hospital cardiac arrest in goat with severe primary blast lung Injury-a pilot study. Wu ZB. J Cardiothorac Surg. 2025 Oct 15;20(1):355. doi: 10.1186/s13019-025-03593-6. https://doi.org/10.1186/s13019-025-03593-6

[Correction: Palliative Patients and Prehospital Emergency Medicine - Which Aspects Should the Prehospital Emergency Physician Know?]. Wiese CHR. Anasthesiol Intensivmed Notfallmed Schmerzther. 2025 Nov 13. doi: 10.1055/a-2746-8882. Online ahead of print. https://doi.org/10.1055/a-2746-8882

The Use of TRAUMAGEL(®) for Hemorrhage Control in a Complex Head Laceration: A Case Report. Kleiman DJ. Open Access Emerg Med. 2025 Nov 11;17:339-343. doi: 10.2147/OAEM.S546914. eCollection 2025. https://doi.org/10.2147/OAEM.S546914

Impact of the COVID-19 pandemic on the emergency transportation of older patients: a population-based descriptive study in Osaka prefecture, Japan. Tanaka K. Front Public Health. 2025 Oct 3;13:1515635. doi: 10.3389/fpubh.2025.1515635. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1515635

Association between ambient temperature and injuries: A time series analysis using emergency ambulance dispatches in Shanghai. Hu Y. Prev Med Rep. 2025 Jul 18;57:103177. doi: 10.1016/j.pmedr.2025.103177. eCollection 2025 Sep. https://doi.org/10.1016/j.pmedr.2025.103177

Evaluation of interventions for trauma care in older adults: a consensus study. Ferrah N. Intern Med J. 2025 Oct;55(10):1647-1655. doi: 10.1111/imj.70171. Epub 2025 Aug 13. https://doi.org/10.1111/imj.70171

CBRNe Personal Protective Equipment Is Not a Hindrance to Lifesaving Procedures in Prehospital Settings: A Prospective, Repeated-Measures Observational Study. Innocenzi S. Epidemiologia (Basel). 2025 Sep 23;6(4):57. doi: 10.3390/epidemiologia6040057. https://doi.org/10.3390/epidemiologia6040057

Accuracy of Published Screening Tools for Large Vessel Occlusion in Patients With Suspected Acute Ischemic Stroke: A Prospective Cohort Study. Desmeules F. Ann Emerg Med. 2025 Sep 19:S0196-0644(25)01092-3. doi: 10.1016/j.annemergmed.2025.07.030. Online ahead of print. https://doi.org/10.1016/j.annemergmed.2025.07.030

Community willingness to participate in prehospital injury care: A cross-sectional survey of injury-prone areas along the national 3 highway in Cameroon. Tanue EA. PLoS One. 2025 Sep 11;20(9):e0332179. doi: 10.1371/journal.pone.0332179. eCollection 2025. https://doi.org/10.1371/journal.pone.0332179

Successful prehospital extracorporeal cardiopulmonary resuscitation in pediatric cardiac arrest - a case report. Breitkopf M. Scand J Trauma Resusc Emerg Med. 2025 Nov 3;33(1):177. doi: 10.1186/s13049-025-01505-0. https://doi.org/10.1186/s13049-025-01505-0

Mode of transport and prehospital interventions in urban penetrating trauma: A systematic review and practice management guideline from the Eastern Association for the Surgery of Trauma. Taghavi S. J Trauma Acute Care Surg. 2025 Sep 19. doi: 10.1097/TA.0000000000004796. Online ahead of print. https://doi.org/10.1097/TA.0000000000004796

Two simultaneous cases of exertional heat stroke during a trail run in Guadeloupe (French West Indies): exceptional presentations or emerging trend?. Monpierre M. Int J Emerg Med. 2025 Nov 14;18(1):240. doi: 10.1186/s12245-025-01023-x. https://doi.org/10.1186/s12245-025-01023-x

Turkish adaptation, validity and reliability study of the "erlangen team cohesion at work scale": team cohesion of paramedics from healthcare professionals. Uysal D. BMC Psychol. 2025 Sep 26;13(1):1038. doi: 10.1186/s40359-025-03399-0. https://doi.org/10.1186/s40359-025-03399-0

A motorcycle ambulance with detachable seat: A solution for swift emergency patient transport. Livatyalı H. Proc Inst Mech Eng H. 2025 Dec;239(11-12):1133-1146. doi: 10.1177/09544119251395344. Epub 2025 Nov 17. https://doi.org/10.1177/09544119251395344

The impact of paramedics working in primary care teams on other professionals and patient experiences: a qualitative study. Eaton G. BJGP Open. 2025 Oct 27;9(3):BJGPO.2024.0152. doi: 10.3399/BJGPO.2024.0152. Print 2025 Oct. https://doi.org/10.3399/BJGPO.2024.0152

Patient characteristics of medical encounters at the Olympic Stadium during the Tokyo 2020 Olympic and Paralympic games. Sekizaki Y. Front Public Health. 2025 Oct 27;13:1674017. doi: 10.3389/fpubh.2025.1674017. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1674017

Opioid Epidemic Through the Lens of Prehospital Emergency Care: A 5-Year Descriptive Analysis of the Statewide Opioid Response Directive (SWORD) Surveillance Program. Canning P. Prehosp Emerg Care. 2025 Sep 30:1-6. doi: 10.1080/10903127.2025.2559909. Online ahead of print. https://doi.org/10.1080/10903127.2025.2559909

Clinical and laboratory predictors of 28-day survival and neurologic outcome in out-of-hospital cardiac arrest: A prospective cohort study. Akdemir T. Ir J Med Sci. 2025 Oct 20. doi: 10.1007/s11845-025-04121-0. Online ahead of print. https://doi.org/10.1007/s11845-025-04121-0

Agency-Level Factors Associated with EMS Volume for High-Impact Clinical Conditions and Patient Populations. Ramgopal S. Prehosp Emerg Care. 2025 Sep 11:1-7. doi: 10.1080/10903127.2025.2550598. Online ahead of print. https://doi.org/10.1080/10903127.2025.2550598

Bracing for the next wave: A critical incident study of frontline decision-making, adaptation and learning in ambulance care during COVID-19. Hedqvist AT. J Adv Nurs. 2025 Sep;81(9):5442-5457. doi: 10.1111/jan.16340. Epub 2024 Jul 17. https://doi.org/10.1111/jan.16340

Effect of night-time onset on neurologically favourable survival between patients with and without bystander cardiopulmonary resuscitation. Tateishi K. J Cardiol. 2025 Dec;86(6):586-591. doi: 10.1016/j.jjcc.2025.09.015. Epub 2025 Sep 20. https://doi.org/10.1016/j.jjcc.2025.09.015

Effect of prehospital advanced airway management on arterial blood gases in the pragmatic airway resuscitation trial. Sullivan GC. Resusc Plus. 2025 Jun 26;25:101018. doi: 10.1016/j.resplu.2025.101018. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101018

Optimizing CPR performance: the role of body composition and ergonomic positioning. Aygun T. BMC Emerg Med. 2025 Sep 25;25(1):187. doi: 10.1186/s12873-025-01348-z. https://doi.org/10.1186/s12873-025-01348-z

[A target rate for resuscitation attempted by bystanders for patients experiencing out-of-hospital cardiac arrest in China]. Wang YM. Zhonghua Xin Xue Guan Bing Za Zhi. 2025 Oct 24;53(10):1146-1152. doi: 10.3760/cma.j.cn112148-20250830-00617. https://doi.org/10.3760/cma.j.cn112148-20250830-00617

Patient safety attitudes and their predictors among emergency healthcare providers in a military medical city in the Kingdom of Saudi Arabia: a cross-sectional study. Alotaibi ASS. Front Med (Lausanne). 2025 Sep 22;12:1541273. doi: 10.3389/fmed.2025.1541273. eCollection 2025. https://doi.org/10.3389/fmed.2025.1541273

A pilot experimental study of cold-chain management, haemolysis and oxidative stress of packed red blood cells in early blood transfusion: toward a blood viability model in the out-of-hospital setting. Zeenat A. Sci Rep. 2025 Oct 13;15(1):35613. doi: 10.1038/s41598-025-18923-w. https://doi.org/10.1038/s41598-025-18923-w

Multidisciplinary collaborative treatment of 48 cases of village cluster acute nitrite poisoning: A case series study. Huang Y. Medicine (Baltimore). 2025 Nov 21;104(47):e45959. doi: 10.1097/MD.0000000000045959. https://doi.org/10.1097/MD.0000000000045959

"Humans Don't Do That to People": A Qualitative Study of the Experience of Paramedics Providing Care to a Patient Who Has Just Allegedly Committed a Violent Crime. McCormick AJ. Prehosp Emerg Care. 2025 Sep 25:1-10. doi: 10.1080/10903127.2025.2553740. Online ahead of print. https://doi.org/10.1080/10903127.2025.2553740

Coping Strategies Related to Posttraumatic Stress Disorder in First Responders. Díaz-Tamayo AM. Prehosp Disaster Med. 2025 Oct;40(5):274-279. doi: 10.1017/S1049023X25101453. Epub 2025 Nov 3. https://doi.org/10.1017/S1049023X25101453

Bougie versus endotracheal tube alone on first-attempt intubation success in prehospital emergency intubation in patients without predictors of difficult intubation: protocol for the BETA randomized controlled trial. Le Bastard Q. Trials. 2025 Sep 1;26(1):327. doi: 10.1186/s13063-025-09046-8. https://doi.org/10.1186/s13063-025-09046-8

The Challenges of Designing a Rescue Pack Carrying Blood Transfusion Bags in Disasters and Emergencies by Rescue Drones. Rafat ME. Disaster Med Public Health Prep. 2025 Sep 4;19:e255. doi: 10.1017/dmp.2025.10168. https://doi.org/10.1017/dmp.2025.10168

Assessing urgent care centres as alternatives to emergency departments for paramedic transported non-emergent patients: implications for length of stay. Strum RP. Emerg Med J. 2025 Sep 24;42(10):652-653. doi: 10.1136/emermed-2024-214592. https://doi.org/10.1136/emermed-2024-214592

Management of Hypothermic Cardiac Arrest with Hemoperitoneum from LUCAS Device: A Case Report. Hopper W. Am J Case Rep. 2025 Oct 6;26:e949607. doi: 10.12659/AJCR.949607. https://doi.org/10.12659/AJCR.949607

Delays in Cardiopulmonary Resuscitation, Defibrillation, and Epinephrine Administration in Out-of-Hospital Cardiac Arrest- Composite Time-Dependent Effects of Prehospital Interventions on 30-Day Favorable Neurological Outcomes and Social Implications From a Prospective Nationwide Population-Based Cohort Study. Izumida T. Circ J. 2025 Oct 24;89(11):1768-1777. doi: 10.1253/circj.CJ-24-0638. Epub 2024 Oct 24. https://doi.org/10.1253/circj.CJ-24-0638

The impact of perceived social support on psychological capital of firefighters: the chain mediating role of exercise self-efficacy and psychological resilience. Zhao B. Front Public Health. 2025 Oct 16;13:1691496. doi: 10.3389/fpubh.2025.1691496. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1691496

The relationship between components of the biosafety incident response competence for clinical nursing staff: a network analysis. Wu C. BMC Psychiatry. 2025 Oct 9;25(1):956. doi: 10.1186/s12888-025-07438-3. https://doi.org/10.1186/s12888-025-07438-3

Paramedic-performed multiorgan ultrasound suggestive of acute pulmonary embolism in the prehospital setting. Czerwiec J. Pol Arch Intern Med. 2025 Oct 28;135(10):17078. doi: 10.20452/pamw.17078. Epub 2025 Aug 8. https://doi.org/10.20452/pamw.17078

Evaluation of the protective efficacy of a user seal check for N95 respirators through quantitative fit testing in an ambulance crew. Sawada H. Sci Rep. 2025 Oct 2;15(1):34451. doi: 10.1038/s41598-025-17616-8. https://doi.org/10.1038/s41598-025-17616-8

Women's experiences with long journeys to the nearest birthing facility and midwife accompaniment service: A qualitative study. Voll A. Sex Reprod Healthc. 2025 Sep;45:101131. doi: 10.1016/j.srhc.2025.101131. Epub 2025 Aug 5. https://doi.org/10.1016/j.srhc.2025.101131

The Effects of Progressive Relaxation Exercises on COVID-19-Related Fear, Anxiety, and Sleep Quality in Emergency Aid Station Employees. Gündo an R. Holist Nurs Pract. 2025 Sep-Oct 01;39(5):304-316. doi: 10.1097/HNP.0000000000000524. Epub 2025 Aug 13. https://doi.org/10.1097/HNP.0000000000000524

Improving the interface for information transfer in acute stroke care: a mixed-methods process evaluation of the emergency use case within the CAEHR project. Wendel J. BMJ Open. 2025 Nov 4;15(11):e105332. doi: 10.1136/bmjopen-2025-105332. https://doi.org/10.1136/bmjopen-2025-105332

The odds and costs of ambulance attendances associated with heatwave severity in older adults of queensland, Australia. Xu Z. Int J Biometeorol. 2025 Oct;69(10):2661-2668. doi: 10.1007/s00484-025-02981-w. Epub 2025 Jul 8. https://doi.org/10.1007/s00484-025-02981-w

A Composite Sponge Based on Carboxymethyl Chitosan- Panax Notoginseng Polysaccharides for Rapid Hemostasis and Wound Healing. Zhang M. Macromol Biosci. 2025 Oct 14:e00466. doi: 10.1002/mabi.202500466. Online ahead of print. https://doi.org/10.1002/mabi.202500466

Implementing an integrated multidisciplinary telehealth platform: a case study at Taichung Veterans General Hospital. Tu PJ. BMJ Health Care Inform. 2025 Oct 15;32(1):e101484. doi: 10.1136/bmjhci-2025-101484. https://doi.org/10.1136/bmjhci-2025-101484

A machine learning approach for predicting 72-hour mortality of hypothermic patients only using non-invasive parameters: A multi-center retrospective cohort study. Jiang C. PLoS One. 2025 Oct 22;20(10):e0334526. doi: 10.1371/journal.pone.0334526. eCollection 2025. https://doi.org/10.1371/journal.pone.0334526

A defence-focused mental health curriculum for GPs: a Delphi study. Hucks AM. BMJ Mil Health. 2025 Nov 16:military-2025-003174. doi: 10.1136/military-2025-003174. Online ahead of print. https://doi.org/10.1136/military-2025-003174

Post-Traumatic Stress, Workplace Violence, Resilience, and Burnout: A Path Analysis Among Korean Paramedics. Sung J. Healthcare (Basel). 2025 Oct 4;13(19):2519. doi: 10.3390/healthcare13192519. https://doi.org/10.3390/healthcare13192519

Correction: Early stroke detection through machine learning in the prehospital setting. Ríos Delgado M. Front Cardiovasc Med. 2025 Oct 23;12:1708205. doi: 10.3389/fcvm.2025.1708205. eCollection 2025. https://doi.org/10.3389/fcvm.2025.1708205

Prehospital Care in Fatal Food Anaphylaxis: A Nationally Representative Case Series. Coveney J. Clin Exp Allergy. 2025 Nov 25. doi: 10.1111/cea.70189. Online ahead of print. https://doi.org/10.1111/cea.70189

Prehospital time indicators before and after the implementation of an electronic information management system (EIMS): a cross-sectional study. Ghanbari V. BMC Emerg Med. 2025 Nov 24. doi: 10.1186/s12873-025-01418-2. Online ahead of print. https://doi.org/10.1186/s12873-025-01418-2

Can a volunteer-based service create an effective, locally appropriate and scalable model of prehospital care for traffic injury victims on the national highways of Bangladesh? Operational outcomes after 10 years of TraumaLink. Moussally JS. BMJ Public Health. 2025 Nov 27;3(2):e003482. doi: 10.1136/bmjph-2025-003482. eCollection 2025. https://doi.org/10.1136/bmjph-2025-003482

Assessing the performance of the updated 2021 Field Triage Guidelines with the Need For Trauma Intervention (NFTI) metric. Johnston TJ. Am J Surg. 2025 Nov 21;252:116729. doi: 10.1016/j.amjsurg.2025.116729. Online ahead of print. https://doi.org/10.1016/j.amjsurg.2025.116729

Alcohol poisoning, in the shadow of a COVID-19 pandemic: a 5-year review of methanol/ethanol toxicity in Northern Iran. Salehtabari Y. BMC Emerg Med. 2025 Oct 6;25(1):199. doi: 10.1186/s12873-025-01346-1. https://doi.org/10.1186/s12873-025-01346-1

Drowning incidents treated by the Danish Royal Air Force's Search and Rescue helicopters: a 10-year nationwide registry-based cohort study. Breindahl N. Scand J Trauma Resusc Emerg Med. 2025 Nov 11;33(1):180. doi: 10.1186/s13049-025-01494-0. https://doi.org/10.1186/s13049-025-01494-0

Development of a nurse-led mHealth intervention framework for patients with chronic diseases: A systematic review and Delphi study. Hua J. Digit Health. 2025 Oct 17;11:20552076251387050. doi: 10.1177/20552076251387050. eCollection 2025 Jan-Dec. https://doi.org/10.1177/20552076251387050

Impact of Real-Time Feedback Devices on Paramedic Bag-Valve-Mask Ventilation Performance. Lasik J. Prehosp Emerg Care. 2025 Sep 11:1-6. doi: 10.1080/10903127.2025.2552354. Online ahead of print. https://doi.org/10.1080/10903127.2025.2552354

The Use of Ultrasound for Diagnosing and Guiding Successful Transcutaneous Electrostimulation in Pseudo Pulseless Electrical Activity in a Prehospital Emergency Setting: A Case Study. Czerwiec J. Prehosp Emerg Care. 2025 Oct 15:1-4. doi: 10.1080/10903127.2025.2569639. Online ahead of print. https://doi.org/10.1080/10903127.2025.2569639

Implementing In Situ Simulation of High-Risk/Low-Volume Emergency Situations for Pediatric Transport Teams. Qurashi JN. Air Med J. 2025 Nov-Dec;44(6):488-491. doi: 10.1016/j.amj.2025.07.005. Epub 2025 Aug 29. https://doi.org/10.1016/j.amj.2025.07.005

Early clinical evaluation of a machine-learning system for risk prediction of trauma-induced coagulopathy in the prehospital setting. Marsden MER. Emerg Med J. 2025 Sep 24;42(10):654-661. doi: 10.1136/emermed-2024-214396. https://doi.org/10.1136/emermed-2024-214396

A Correlational Study on CALLY Index as a Potential Predictive Indicator for Postoperative in-Hospital Mortality in Acute Aortic Dissection Patients. Zhang H. J Inflamm Res. 2025 Nov 11;18:15833-15846. doi: 10.2147/JIR.S552987. eCollection 2025. https://doi.org/10.2147/JIR.S552987

Prehospital neuroprotective intervention: A critical imperative evidenced by the FRONTIER trial outcomes. Zhao M. J Transl Int Med. 2025 Jul 30;13(5):387-389. doi: 10.1515/jtim-2025-0037. eCollection 2025 Oct. https://doi.org/10.1515/jtim-2025-0037

Clinicopathological Presentations and Management Outcomes of Unilateral Sinonasal Masses at a Tertiary Institution in Nigeria. Adegbiji WA. Niger Postgrad Med J. 2025 Oct 1;32(4):392-397. doi: 10.4103/npmj.npmj_316_24. Epub 2025 Oct 27. https://doi.org/10.4103/npmj.npmj_316_24

Comparative statistical performance of prehospital scoring systems with and without incorporating age for predicting multiple trauma outcomes: an observational study. Watts L. Eur J Trauma Emerg Surg. 2025 Nov 25;51(1):346. doi: 10.1007/s00068-025-03032-0. https://doi.org/10.1007/s00068-025-03032-0

Designing Digital Mental Health Support for Paramedics Exposed to Trauma: Qualitative Study of Lived Experiences and Design Preferences. Cogan N. JMIR Hum Factors. 2025 Sep 12;12:e76158. doi: 10.2196/76158. https://doi.org/10.2196/76158

Reducing STEMI Treatment Delays: A Quality Improvement Project at a Rural Community Hospital. Langenhorst S. JACC Case Rep. 2025 Nov 12;30(36):105658. doi: 10.1016/j.jaccas.2025.105658. Epub 2025 Oct 7. https://doi.org/10.1016/j.jaccas.2025.105658

Assessing the effectiveness of an occupational musculoskeletal □njury prevention program for paramedic students: A quasi-experimental, pretest-posttest study. Tok F. Int Emerg Nurs. 2025 Sep;82:101658. doi: 10.1016/j.ienj.2025.101658. Epub 2025 Jul 12. https://doi.org/10.1016/j.ienj.2025.101658

Case Report: Dynamic J-point elevation as a novel precursor to torsade de pointes: electrocardiographic markers for proactive management. Zhang H. Front Cardiovasc Med. 2025 Nov 11;12:1613757. doi: 10.3389/fcvm.2025.1613757. eCollection 2025. https://doi.org/10.3389/fcvm.2025.1613757

Changes in Ejection Fraction After Coronary Artery Bypass Grafting for Ischemic Cardiomyopathy: Impact on Survival and Determinants of Improvement. Patlolla SH. J Thorac Cardiovasc Surg. 2025 Oct 29:S0022-5223(25)00957-2. doi: 10.1016/j.jtcvs.2025.10.029. Online ahead of print. https://doi.org/10.1016/j.jtcvs.2025.10.029

Prehospital Trauma Compendium: Management of Geriatric Trauma Patients - A Position Statement and Resource Document of NAEMSP. Haussner WK. Prehosp Emerg Care. 2025 Sep 25:1-10. doi: 10.1080/10903127.2025.2557006. Online ahead of print. https://doi.org/10.1080/10903127.2025.2557006

Standardized Rapid Sequence Intubation (RSI) Improves Effectiveness and Safety in Mixed Physician and Paramedic Hungarian EMS. Burány B. Life (Basel). 2025 Nov 7;15(11):1725. doi: 10.3390/life15111725. https://doi.org/10.3390/life15111725

The influence of preexisting coronary artery disease on long-term follow up and neurological outcome in patients receiving out of hospital extracorporeal membrane oxygenation. Stadlbauer A. Resusc Plus. 2025 Jul 14;25:101033. doi: 10.1016/j.resplu.2025.101033. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101033

Supplying whole blood with drones for prehospital transfusion at trauma sites in Finland: A simulation. Erästö P. Vox Sang. 2025 Oct;120(10):1015-1024. doi: 10.1111/vox.70092. Epub 2025 Aug 13. https://doi.org/10.1111/vox.70092

Utilising a refractory ventricular fibrillation bundle to improve outcome in out of hospital cardiac arrest: A case report. Horne I. Resusc Plus. 2025 Aug 14;26:101063. doi: 10.1016/j.resplu.2025.101063. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101063

TMR Paper for Issue on "Technologies in Transfusion Medicine" Dried Plasma - Where Are We and Where Next?. Ellington M. Transfus Med Rev. 2025 Oct 19;39(4):150931. doi: 10.1016/j.tmrv.2025.150931. Online ahead of print. https://doi.org/10.1016/j.tmrv.2025.150931

A qualitative exploration of behaviours and lifestyle factors impacting levels of vitamin D within a UK ambulance service workforce (EVOLVED). Duncan E. Br Paramed J. 2025 Sep 1;10(2):1-7. doi: 10.29045/14784726.2025.9.10.2.1. https://doi.org/10.29045/14784726.2025.9.10.2.1

Development of a method to identify aquatic locations using GPS data for ambulance-attended drowning. Mead E. Inj Prev. 2025 Oct 17:ip-2025-045858. doi: 10.1136/ip-2025-045858. Online ahead of print. https://doi.org/10.1136/ip-2025-045858

Impact of secondary anterior-posterior defibrillator pad placement on chest compression interruptions: a three-arm randomised manikin-based simulation study among Dutch ambulance teams. Coumou F. Resusc Plus. 2025 Aug 15;26:101064. doi: 10.1016/j.resplu.2025.101064. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101064

Development and validation of a dynamic nomogram of prehospital delay in patients with first-episode acute ischemic stroke. Li F. Geriatr Nurs. 2025 Nov-Dec;66(Pt B):103632. doi: 10.1016/j.gerinurse.2025.103632. Epub 2025 Sep 22. https://doi.org/10.1016/j.gerinurse.2025.103632

Cardiac MRI in Identifying Myopericarditis Mimicking STEMI in a Patient with HIV: A Case Report. Bharaj IS. Am J Case Rep. 2025 Oct 8;26:e949659. doi: 10.12659/AJCR.949659. https://doi.org/10.12659/AJCR.949659

Rewriting the Rules of the Road by Embedding Equity in Prehospital Trauma Care. Bailey JA. JAMA Surg. 2025 Nov 5. doi: 10.1001/jamasurg.2025.4723. Online ahead of print. https://doi.org/10.1001/jamasurg.2025.4723

Generative AI-enhanced nomogram predicts left without being seen among ambulance-transported emergency department patients. Wang H. Am J Emerg Med. 2025 Nov 13;100:62-69. doi: 10.1016/j.ajem.2025.11.010. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.11.010

Impact of different preferred functional outcomes on the results of the pre-hospital antifibrinolytics for traumatic coagulopathy and hemorrhage (PATCH-trauma) trial. Zampieri FG. J Crit Care. 2025 Sep 12;91:155255. doi: 10.1016/j.jcrc.2025.155255. Online ahead of print. https://doi.org/10.1016/j.jcrc.2025.155255

Exploring the usability and perceived benefits and barriers of portable lift assist devices among paramedic workers. Nestor HM. Appl Ergon. 2025 Sep 30;130:104651. doi: 10.1016/j.apergo.2025.104651. Online ahead of print. https://doi.org/10.1016/j.apergo.2025.104651

Factors related to 30-day survival rate following accidental hypothermia - a retrospective single-center study from Northern Finland. Pirnes J. Scand J Trauma Resusc Emerg Med. 2025 Nov 7;33(1):179. doi: 10.1186/s13049-025-01491-3. https://doi.org/10.1186/s13049-025-01491-3

Pilot implementation of an online program for family and friends supporting the mental health of paramedics in Australia: Lessons learned. Ditton-Phare P. Compr Psychiatry. 2025 Oct;142:152614. doi: 10.1016/j.comppsych.2025.152614. Epub 2025 Jun 15. https://doi.org/10.1016/j.comppsych.2025.152614

Effect of Air Exposure Time Under Room-Temperature Conditions on the Performance of Chemical Heat Blankets Intended for Use in Prehospital Accidental Hypothermia. Helgø M. Wilderness Environ Med. 2025 Sep;36(3):310-315. doi: 10.1177/10806032251325562. Epub 2025 Mar 28. https://doi.org/10.1177/10806032251325562

Point-of-care ultrasonography supports for decision-making during a complex mountain rescue operation of 10 h of a trauma patient complicated by multiple cardiac arrests: a case report. Coha M. Resusc Plus. 2025 Oct 31;26:101148. doi: 10.1016/j.resplu.2025.101148. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101148

Correction: Overcoming Language Barriers in Paramedic Care With an App Designed to Improve Communication With Foreign-Language Patients: Nonrandomized Controlled Pilot Study. Müller F. JMIR Form Res. 2025 Oct 21;9:e83353. doi: 10.2196/83353. https://doi.org/10.2196/83353

Developments in public health paramedicine: exploring the professional practice of ambulance clinicians in palliative and end-of-life care in a remote and rural setting. Kamphausen L. Br Paramed J. 2025 Sep 1;10(2):49-54. doi: 10.29045/14784726.2025.9.10.2.49. https://doi.org/10.29045/14784726.2025.9.10.2.49

Impact of initial rhythm, rhythm at hospital admission and cause of arrest on the outcome of extracorporeal cardiopulmonary resuscitation in out-of-hospital cardiac arrest. Foszcz P. Am J Emerg Med. 2025 Sep 18;99:90-96. doi: 10.1016/j.ajem.2025.09.032. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.09.032

Optic nerve sheath diameter and Pcv-aCO(2)/Ca-cvO(2) for predicting outcomes in traumatic brain injury patients during prehospital care: a prospective cohort study in China. Jiang H. BMJ Open. 2025 Sep 26;15(9):e101977. doi: 10.1136/bmjopen-2025-101977. https://doi.org/10.1136/bmjopen-2025-101977

CE Module: The Association of Exposure to Traumatic Events With Binge Drinking in Paramedic and EMTs. . Workplace Health Saf. 2025 Oct;73(10):503. doi: 10.1177/21650799251358498. Epub 2025 Sep 15. https://doi.org/10.1177/21650799251358498

Innovative Wound Care Education to Support the Expanding Role of Community Care Paramedics. LeBlanc K. J Wound Ostomy Continence Nurs. 2025 Nov-Dec 01;52(6):510-511. doi: 10.1097/WON.0000000000001238. Epub 2025 Nov 11. https://doi.org/10.1097/WON.0000000000001238

Correction: Diabetes rescue, engagement, and management (D-REM) for hypoglycemia: Clinical trial protocol of a community paramedic program to improve diabetes management among adults with severe hypoglycemia. Bhagra S. PLoS One. 2025 Nov 3;20(11):e0336047. doi: 10.1371/journal.pone.0336047. eCollection 2025. https://doi.org/10.1371/journal.pone.0336047

Electrocardiogram Diagnosis: ST-Depression With T Wave Inversion in Lead Augmented Vector Left as Harbinger of Inferior ST-Elevation Myocardial Infarction. Heringer GV. Perm J. 2025 Sep 30:1-5. doi: 10.7812/TPP/25.093. Online ahead of print. https://doi.org/10.7812/TPP/25.093

Helicopter Transport of Trauma Patients Continues to be Overutilized: A Call for Universal Transport Criterion. Srivatsa S. Am Surg. 2025 Sep 13:31348251378910. doi: 10.1177/00031348251378910. Online ahead of print. https://doi.org/10.1177/00031348251378910

Critical care transfers of ventilator-dependent patients from operating theatres to Critical Care Units in a South African Metropole. Cloete E. Afr J Emerg Med. 2025 Dec;15(4):100908. doi: 10.1016/j.afjem.2025.100908. Epub 2025 Sep 18. https://doi.org/10.1016/j.afjem.2025.100908

Prehospital Plasma Is Not Associated With an Increase in Orthopedic Trauma Patients With Hemorrhagic Shock That Meet Early Appropriate Care Criteria. Wynn MS. J Surg Res. 2025 Oct 28;315:798-802. doi: 10.1016/j.jss.2025.09.082. Online ahead of print. https://doi.org/10.1016/j.jss.2025.09.082

A Simulation-Based Measurement of Emergency Department Readiness for Neonatal Resuscitation: Is the Staff Ready?. Bruno CJ. Pediatr Emerg Care. 2025 Nov 1;41(11):891-895. doi: 10.1097/PEC.0000000000003454. Epub 2025 Aug 20. https://doi.org/10.1097/PEC.0000000000003454

How do nurses enable effective ambulance handovers?: Patient handovers are time-critical, complex processes and structured methods are essential to preserve key information. Evans C. Emerg Nurse. 2025 Nov 4;33(6):12-13. doi: 10.7748/en.33.6.12.s5. https://doi.org/10.7748/en.33.6.12.s5

Moral distress and musculoskeletal disorders in Iranian prehospital EMS workers. Sheikhi H. BMC Emerg Med. 2025 Sep 2;25(1):177. doi: 10.1186/s12873-025-01342-5. https://doi.org/10.1186/s12873-025-01342-5

The association of workload during healthcare service disruption with the mental health of prehospital emergency medical service providers in Korea. Moon Y. Prev Med Rep. 2025 Nov 12;60:103311. doi: 10.1016/j.pmedr.2025.103311. eCollection 2025 Dec. https://doi.org/10.1016/j.pmedr.2025.103311

Peoria Posterior Fossa Stroke Scale: A New Scale to Assess the Severity of Posterior Fossa Stroke Symptoms and Outcomes. Blackbourn LW. Cureus. 2025 Oct 8;17(10):e94115. doi: 10.7759/cureus.94115. eCollection 2025 Oct. https://doi.org/10.7759/cureus.94115

Futility indications in resuscitative thoracotomy: A retrospective observational study evaluating practice guidelines. Kalantar GH. Injury. 2025 Oct;56(10):112673. doi: 10.1016/j.injury.2025.112673. Epub 2025 Aug 6. https://doi.org/10.1016/j.injury.2025.112673

The Short-Term Impacts of Decriminalisation of Personal Possession of Select Illegal Drugs on Drug Poisonings in British Columbia, Canada (2015-2023). Imtiaz S. Drug Alcohol Rev. 2025 Nov;44(7):1856-1865. doi: 10.1111/dar.70036. Epub 2025 Sep 11. https://doi.org/10.1111/dar.70036

Reframing Prehospital Termination of Resuscitation as Withdrawal of Life Support: Applying Lessons from the ICU in the Prehospital Setting. Braude D. Prehosp Emerg Care. 2025 Oct 15:1-6. doi: 10.1080/10903127.2025.2554914. Online ahead of print. https://doi.org/10.1080/10903127.2025.2554914

A Mixed-Methods Study to Identify the Barriers and Enablers to Psychological Safety of Individuals in Interprofessional Team Simulation Exercises in India. Rajendran G. Simul Healthc. 2025 Oct 21. doi: 10.1097/SIH.0000000000000892. Online ahead of print. https://doi.org/10.1097/SIH.0000000000000892

Characteristics and outcomes of out-of-hospital cardiac arrest due to drowning - a nationwide registry-based study. Hüser C. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):151. doi: 10.1186/s13049-025-01469-1. https://doi.org/10.1186/s13049-025-01469-1

Establishing a lifeline: the first publicly-managed ambulance dispatch system and advanced cardiac life support (ACLS) resuscitation in Somaliland, East Africa. Abdillahi YM. Resusc Plus. 2025 Sep 18;26:101106. doi: 10.1016/j.resplu.2025.101106. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101106

Time To Tighten Up on Prehospital Tourniquets: An EAST Multicenter Trial of Prehospital Procedures in Penetrating Trauma Shows No Benefit With Current Tourniquet Practices for Extremity Trauma in Urban Settings. Taghavi S. Am Surg. 2025 Oct 17:31348251388954. doi: 10.1177/00031348251388954. Online ahead of print. https://doi.org/10.1177/00031348251388954

Treating status epilepticus in clinical practice-a multi-national survey in Germany, Austria, and Switzerland. Möller L. Front Neurol. 2025 Nov 3;16:1685993. doi: 10.3389/fneur.2025.1685993. eCollection 2025. https://doi.org/10.3389/fneur.2025.1685993

Structure-based design of therapeutics to control hemostasis. Tucker LJ. Blood. 2025 Sep 18;146(12):1431-1439. doi: 10.1182/blood.2024025323. https://doi.org/10.1182/blood.2024025323

Assessment of benzodiazepine dosing in status epilepticus patients in the emergency department. Aljadeed RI. Front Neurol. 2025 Oct 9;16:1645435. doi: 10.3389/fneur.2025.1645435. eCollection 2025. https://doi.org/10.3389/fneur.2025.1645435

Determinants of invasive ventilation in infants with acute bronchiolitis: an observational study of pre-hospital and in-hospital treatments. Carvalho CHA. Einstein (Sao Paulo). 2025 Nov 17;23:eAO1512. doi: 10.31744/einstein_journal/2025AO1512. eCollection 2025. https://doi.org/10.31744/einstein_journal/2025AO1512

Point-of-Care Ultrasound Imaging for Automated Detection of Abdominal Haemorrhage: A Systematic Review. Zgool T. Ultrasound Med Biol. 2025 Nov;51(11):1888-1900. doi: 10.1016/j.ultrasmedbio.2025.07.024. Epub 2025 Aug 17. https://doi.org/10.1016/j.ultrasmedbio.2025.07.024

The impact of individual and regional socioeconomic identity on pediatric extremity fracture management: A scoping review. Shenoy DA. Injury. 2025 Oct;56(10):112674. doi: 10.1016/j.injury.2025.112674. Epub 2025 Aug 6. https://doi.org/10.1016/j.injury.2025.112674

Polytrauma-related deaths in Moscow: Retrospective analysis of 969 autopsy studies. Korobushkin GV. Chin J Traumatol. 2025 Sep;28(5):319-323. doi: 10.1016/j.cjtee.2025.01.003. Epub 2025 Jun 2. https://doi.org/10.1016/j.cjtee.2025.01.003

A program to improve sepsis management in the Emergency Department: a multicenter prospective study in France. Nardot A. Intern Emerg Med. 2025 Nov;20(8):2523-2530. doi: 10.1007/s11739-025-03877-8. Epub 2025 Jan 31. https://doi.org/10.1007/s11739-025-03877-8

CORRIGENDUM to "Exploring the reliability and profile of frequent mental health presentations using different methods: An observational study using statewide ambulance data over a 4-year period". . Aust N Z J Psychiatry. 2025 Oct;59(10):NP1. doi: 10.1177/00048674251353417. Epub 2025 Jun 29. https://doi.org/10.1177/00048674251353417

How to plan for prehospital ECPR, and move mountains. Drabek T. Resuscitation. 2025 Oct;215:110790. doi: 10.1016/j.resuscitation.2025.110790. Epub 2025 Aug 25. https://doi.org/10.1016/j.resuscitation.2025.110790

Characterizing the Use of Emergency Department Resources and Dispositions of Hospice Patients in an Appalachian Region of the United States. Abrego AH. Am J Hosp Palliat Care. 2025 Nov 16:10499091251399808. doi: 10.1177/10499091251399808. Online ahead of print. https://doi.org/10.1177/10499091251399808

Declining incidence and severity of hypoglycaemia in prehospital care. Osborne CC. Emerg Med J. 2025 Nov 23:emermed-2025-215653. doi: 10.1136/emermed-2025-215653. Online ahead of print. https://doi.org/10.1136/emermed-2025-215653

Incidence, Diagnoses, and Outcomes of Pediatric Nontraumatic Chest Pain Attended by Ambulance. Okyere D. JAMA Netw Open. 2025 Sep 2;8(9):e2533962. doi: 10.1001/jamanetworkopen.2025.33962. https://doi.org/10.1001/jamanetworkopen.2025.33962

Impact of Point-of-Care Ultrasound in Medicalized Prehospital Setting on Diagnostic Workup: A Prospective Observational Cohort Study. Balen F. J Ultrasound Med. 2025 Nov 21. doi: 10.1002/jum.70134. Online ahead of print. https://doi.org/10.1002/jum.70134

Demographics and clinical outcomes of patients with acute heart failure : The Acute Heart Failure Registry from the Clinic Ottakring (AHF-COR Registry). Kaufmann CC. Wien Klin Wochenschr. 2025 Sep 8. doi: 10.1007/s00508-025-02597-5. Online ahead of print. https://doi.org/10.1007/s00508-025-02597-5

Comment on "Prehospital Trauma Quality Improvement: Database-Driven Opportunities for Timely Access". Hansen W. World J Surg. 2025 Nov;49(11):3296-3297. doi: 10.1002/wjs.70133. Epub 2025 Oct 6. https://doi.org/10.1002/wjs.70133

Content Validity Assessment of a Newly Developed Emergency Medical Dispatch and Triage Protocol in Thailand. Huabbangyang T. J Clin Med. 2025 Oct 9;14(19):7125. doi: 10.3390/jcm14197125. https://doi.org/10.3390/jcm14197125

Implementation of remote units in two large out-of-hours emergency primary care districts in Norway. Zakariassen E. Scand J Prim Health Care. 2025 Sep;43(3):538-545. doi: 10.1080/02813432.2025.2470470. Epub 2025 Feb 28. https://doi.org/10.1080/02813432.2025.2470470

Management of persistent shockable rhythms during cardiac arrest: a national survey from the REVIVE group (REVIVE-2). Sidebottom DB. Resusc Plus. 2025 Jun 18;25:101008. doi: 10.1016/j.resplu.2025.101008. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101008

Designing Prehospital Care That is Optimised for Older Adult Patients: A Critical Opportunity to Reduce Harm. Haussner W. Prehosp Emerg Care. 2025 Oct 15:1-4. doi: 10.1080/10903127.2025.2563875. Online ahead of print. https://doi.org/10.1080/10903127.2025.2563875

Structural and Clinical Factors Associated with Physical Restraint Use in a Pediatric Emergency Department. Rolison MJ. J Am Coll Emerg Physicians Open. 2025 Nov 11;7(1):100277. doi: 10.1016/j.acepjo.2025.100277. eCollection 2026 Feb. https://doi.org/10.1016/j.acepjo.2025.100277

Stroke recognition and early care pathways following telephone triage in out-of-hours primary care: a register-based study from the Central Denmark Region. Gude MF. Scand J Prim Health Care. 2025 Nov 17:1-13. doi: 10.1080/02813432.2025.2588126. Online ahead of print. https://doi.org/10.1080/02813432.2025.2588126

Geospatial mapping of disparities in out-of-hospital cardiac arrests in the Swiss canton of Fribourg, 2018-2022: A retrospective observational study. Gay C. Resusc Plus. 2025 Aug 23;26:101075. doi: 10.1016/j.resplu.2025.101075. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101075

Pain Management Among People with Limited English Proficiency Treated by Emergency Medical Services. Ding ML. J Gen Intern Med. 2025 Nov;40(15):3812-3815. doi: 10.1007/s11606-025-09621-4. Epub 2025 May 27. https://doi.org/10.1007/s11606-025-09621-4

Something Old and Something New: Measles, Candida auris, and Infection Prevention in the Prehospital Setting. Liang SY. Air Med J. 2025 Sep-Oct;44(5):333-335. doi: 10.1016/j.amj.2025.06.024. Epub 2025 Jul 16. https://doi.org/10.1016/j.amj.2025.06.024

Demographics of paediatric trauma at a zonal referral hospital for northwestern Tanzania: A cross-sectional study. Kozhumam A. Afr J Emerg Med. 2025 Dec;15(4):100902. doi: 10.1016/j.afjem.2025.100902. Epub 2025 Sep 17. https://doi.org/10.1016/j.afjem.2025.100902

Recognition and Management of Pseudo-Pulseless Electrical Activity in the Prehospital Setting. Tillotson KM. Air Med J. 2025 Nov-Dec;44(6):449-451. doi: 10.1016/j.amj.2025.08.011. Epub 2025 Sep 18. https://doi.org/10.1016/j.amj.2025.08.011

Accuracy and Timeliness of Prehospital Global Triage System Protocols in Mass Disasters: A Systematic Review of Systematic Reviews. Shaltout AE. Cureus. 2025 Sep 20;17(9):e92796. doi: 10.7759/cureus.92796. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92796

Disparities in prehospital critical care response: further understanding potential fractures in the chain of survival. Chen C. Resuscitation. 2025 Oct;215:110701. doi: 10.1016/j.resuscitation.2025.110701. Epub 2025 Jun 28. https://doi.org/10.1016/j.resuscitation.2025.110701

Response to: Letter to Editor: Prehospital Management of Spinal Cord Injuries, Calland et al. Millin MG. Prehosp Emerg Care. 2025 Nov 17:1-4. doi: 10.1080/10903127.2025.2588647. Online ahead of print. https://doi.org/10.1080/10903127.2025.2588647

High ratio of plasma to red cells in contemporary resuscitation of haemorrhagic shock after trauma: a secondary analysis of the PATCH-trauma trial. Mitra B. Scand J Trauma Resusc Emerg Med. 2025 Oct 2;33(1):154. doi: 10.1186/s13049-025-01476-2. https://doi.org/10.1186/s13049-025-01476-2

Reply to: "Ways to Explore Further:" The Role of Ultrasound for Cricothyroid Membrane Identification in the Prehospital Setting. Long B. J Emerg Med. 2025 Nov;78:417-418. doi: 10.1016/j.jemermed.2025.07.028. https://doi.org/10.1016/j.jemermed.2025.07.028

Re: Comment on "Prehospital Cricothyrotomy: A Narrative Review of Technical, Educational, and Operational Considerations for Procedure Optimization": Ways to Explore Further. Singh N. J Emerg Med. 2025 Sep;76:159-160. doi: 10.1016/j.jemermed.2025.05.026. Epub 2025 Jun 13. https://doi.org/10.1016/j.jemermed.2025.05.026

Prehospital extracorporeal cardiopulmonary resuscitation in mass gatherings: Towards a new paradigm in cardiac arrest. Argudo E. Med Intensiva (Engl Ed). 2025 Dec;49(12):502266. doi: 10.1016/j.medine.2025.502266. Epub 2025 Oct 13. https://doi.org/10.1016/j.medine.2025.502266

Dried plasma for trauma resuscitation: from Canadian Armed Forces to civilian prehospital and rural settings. Prifti V. CMAJ. 2025 Sep 14;197(30):E953-E956. doi: 10.1503/cmaj.250648. https://doi.org/10.1503/cmaj.250648

"All it's gonna tell you is if it has fentanyl or not:" Perceptions of fentanyl and drug checking among first responders and people who use drugs. Goh BY. J Subst Use Addict Treat. 2025 Sep;176:209747. doi: 10.1016/j.josat.2025.209747. Epub 2025 Jun 25. https://doi.org/10.1016/j.josat.2025.209747

Urban-rural disparities in out-of-hospital cardiac arrest outcomes: a nationwide Hungarian study. Pál-Jakab Á. Resusc Plus. 2025 Sep 23;26:101108. doi: 10.1016/j.resplu.2025.101108. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101108

Operationalising prehospital management of exertional heat illness in athletes and team sports. Leckie T. BMJ Mil Health. 2025 Oct 21:military-2025-003116. doi: 10.1136/military-2025-003116. Online ahead of print. https://doi.org/10.1136/military-2025-003116

Tele-ultrasound enables EMT-Intermediate providers to identify occult haemorrhage: A novel, scalable SUPER-YL framework for prehospital POCUS. Yang WH. Resusc Plus. 2025 Sep 18;26:101104. doi: 10.1016/j.resplu.2025.101104. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101104

Identifying patients transported by helicopter emergency medical services using the International Classification of Diseases (ICD)-11: a scoping review. Hu X. BMC Emerg Med. 2025 Nov 29. doi: 10.1186/s12873-025-01419-1. Online ahead of print. https://doi.org/10.1186/s12873-025-01419-1

[Prehospital pericardiocentesis in a 41-year-old woman in obstructive shock using a handheld ultrasound device]. Sahner R. Med Klin Intensivmed Notfmed. 2025 Nov 14. doi: 10.1007/s00063-025-01350-0. Online ahead of print. https://doi.org/10.1007/s00063-025-01350-0

Use of Auto Transfusion Tourniquet increases end-tidal-CO(2) in out-of-hospital cardiac arrest patients - a feasibility pilot study. Esih M. Resusc Plus. 2025 Sep 11;26:101100. doi: 10.1016/j.resplu.2025.101100. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101100

Clinical outcomes of pediatric versus adult pedestrian motor vehicle traumas. Shim EH. Am J Emerg Med. 2025 Nov;97:1-4. doi: 10.1016/j.ajem.2025.07.005. Epub 2025 Jul 2. https://doi.org/10.1016/j.ajem.2025.07.005

Wide discrepancy between best practice recommendations and real-life management of suspected eosinophilic esophagitis-associated food bolus impaction. Siegfried Y. Dis Esophagus. 2025 Sep 1;38(5):doaf073. doi: 10.1093/dote/doaf073. https://doi.org/10.1093/dote/doaf073

Current management of urgent epileptic seizures in a tertiary referral hospital in the Community of Madrid: a descriptive study. Mayo Rodríguez P. Neurologia (Engl Ed). 2025 Sep;40(7):661-667. doi: 10.1016/j.nrleng.2025.07.003. Epub 2025 Jul 17. https://doi.org/10.1016/j.nrleng.2025.07.003

The authors respond to reader comment regarding "peripheral perfusion index versus NEWS score in prehospital non-trauma adults: A prospective cohort study". Siber V. Am J Emerg Med. 2025 Oct 27:S0735-6757(25)00719-3. doi: 10.1016/j.ajem.2025.10.058. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.10.058

Correction: The emergency medical services network's response to the COVID-19 pandemic in Albania. Persiani N. Front Public Health. 2025 Oct 7;13:1697485. doi: 10.3389/fpubh.2025.1697485. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1697485

The use of tranexamic acid in the management of injured patients at risk of hemorrhage: a systematic review and meta-analysis and an Eastern Association for the Surgery of Trauma Practice Management Guideline. Dumas RP. J Trauma Acute Care Surg. 2025 Sep 15. doi: 10.1097/TA.0000000000004773. Online ahead of print. https://doi.org/10.1097/TA.0000000000004773

Electrocardiographic alterations in patients with emergency medical services-witnessed out-of-hospital cardiac arrest. Verkaik BJ. Heart Rhythm. 2025 Oct 24:S1547-5271(25)03027-9. doi: 10.1016/j.hrthm.2025.10.046. Online ahead of print. https://doi.org/10.1016/j.hrthm.2025.10.046

Associations between apparent temperatures and emergency ambulance calls in Wuxi, China: a time series analysis. Yang C. Front Public Health. 2025 Sep 9;13:1652961. doi: 10.3389/fpubh.2025.1652961. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1652961

Flat lines in survival from out-of-hospital pediatric cardiac arrest: making the case for bold reform in prehospital care and resuscitation. Donohue KJ. Pediatr Res. 2025 Oct 6. doi: 10.1038/s41390-025-04477-0. Online ahead of print. https://doi.org/10.1038/s41390-025-04477-0

Definitive Field Care: The Modern Application of a Historical Strategy. Hiles JM. J Spec Oper Med. 2025 Sep 1;25(3):115-118. doi: 10.55460/NPPC-CLHM. https://doi.org/10.55460/NPPC-CLHM

Peer Support Programs for First Responders: A Critical Review and Research Roadmap. Bowers C. Int J Environ Res Public Health. 2025 Oct 7;22(10):1532. doi: 10.3390/ijerph22101532. https://doi.org/10.3390/ijerph22101532

System level changes are essential to improve the psychological wellbeing of NHS staff. Saul H. BMJ. 2025 Oct 23;391:r2071. doi: 10.1136/bmj.r2071. https://doi.org/10.1136/bmj.r2071

Reflective Learning as a Pathway to Professional Self-Actualization in Simulation-Based Learning: A Qualitative Case Study. Marchi AJ. Simul Healthc. 2025 Oct 1;20(5):316-323. doi: 10.1097/SIH.0000000000000852. Epub 2025 Mar 26. https://doi.org/10.1097/SIH.0000000000000852

[Optimization of emergency care : a pre-implementation analysis of a «fast track» co-managed by an advanced practice nurse-physician team at the University Hospital of Liиge]. Dawans A. Rev Med Liege. 2025 Nov;80(11):723-728. https://doi.org/

Regional differences, repeated use, and costs of emergency medical services in Germany. Roessler M. Med Klin Intensivmed Notfmed. 2025 Oct;120(7):576-584. doi: 10.1007/s00063-024-01189-x. Epub 2024 Sep 25. https://doi.org/10.1007/s00063-024-01189-x

Mobile Stroke Unit Dispatch and Outcomes in the Real World: The Berlin Prehospital or Usual Delivery of Acute Stroke Care Study (B_PROUD-2.0). Grotta JC. Neurology. 2025 Nov 11;105(9):e214284. doi: 10.1212/WNL.0000000000214284. Epub 2025 Oct 16. https://doi.org/10.1212/WNL.0000000000214284

Lessons Learned in the Response to Multiple Cases of Exertional Hyperthermia at an Urban Half Marathon. Walsh LV. Disaster Med Public Health Prep. 2025 Sep 30;19:e285. doi: 10.1017/dmp.2025.10213. https://doi.org/10.1017/dmp.2025.10213

Protocols for Pulseless Low-Flow States: Time to Define and Design? In Response to 'Ultrasound Detection of Pulseless Rhythm with Echocardiographic Motion (PREM) in Prehospital Cardiac Arrest: A Case-Series'. Gander B. Prehosp Emerg Care. 2025 Oct 7:1-2. doi: 10.1080/10903127.2025.2563876. Online ahead of print. https://doi.org/10.1080/10903127.2025.2563876

Emergency Medical Services and Primary Health Care linkage: a potential solution for effective emergency response in rural areas: the case of Ukraine. Castro-Delgado R. Front Public Health. 2025 Oct 2;13:1691361. doi: 10.3389/fpubh.2025.1691361. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1691361

Correction: Right patient to the right place: the impact of a 6-year regional trauma centre-led prehospital education programme on EMS triage and patient outcomes. Choi D. BMC Emerg Med. 2025 Sep 29;25(1):196. doi: 10.1186/s12873-025-01367-w. https://doi.org/10.1186/s12873-025-01367-w

Views on the usability and usefulness of the PeerConnect app among Ontario public safety professionals. Foley G. Digit Health. 2025 Oct 1;11:20552076251384142. doi: 10.1177/20552076251384142. eCollection 2025 Jan-Dec. https://doi.org/10.1177/20552076251384142

Feasibility, Safety, and Effectiveness of Neonatal Air Transport in India: A Case Series. Panigrahy N. Indian Pediatr. 2025 Nov;62(11):846-850. doi: 10.1007/s13312-025-00146-x. Epub 2025 Aug 6. https://doi.org/10.1007/s13312-025-00146-x

Part 7: Adult Basic Life Support: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Kleinman ME. Circulation. 2025 Oct 21;152(16_suppl_2):S448-S478. doi: 10.1161/CIR.0000000000001369. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001369

Impact of on-scene time interval on survival in traumatic out-of-hospital cardiac arrest. Choi Y. Injury. 2025 Oct 15:112821. doi: 10.1016/j.injury.2025.112821. Online ahead of print. https://doi.org/10.1016/j.injury.2025.112821

Prehospital cardiac arrest resuscitation practices differ around the globe. Kjær J. Resusc Plus. 2025 Jun 24;25:101017. doi: 10.1016/j.resplu.2025.101017. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101017

Feasibility and Preliminary Outcomes of a Simulated Prehospital Pediatric Ventilation Scenario Using a Ventilation Feedback Device. Finney JD. Prehosp Emerg Care. 2025 Sep 25:1-11. doi: 10.1080/10903127.2025.2558861. Online ahead of print. https://doi.org/10.1080/10903127.2025.2558861

Cardiac arrest centers improve survival. Rott N. Curr Opin Crit Care. 2025 Dec 1;31(6):713-716. doi: 10.1097/MCC.0000000000001322. Epub 2025 Oct 22. https://doi.org/10.1097/MCC.0000000000001322

Application of telemedicine in emergency ophthalmology. Wo R. J Fr Ophtalmol. 2025 Nov;48(9):104669. doi: 10.1016/j.jfo.2025.104669. Epub 2025 Oct 24. https://doi.org/10.1016/j.jfo.2025.104669

Part 10: Adult and Pediatric Special Circumstances of Resuscitation: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Cao D. Circulation. 2025 Oct 21;152(16_suppl_2):S578-S672. doi: 10.1161/CIR.0000000000001380. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001380

Traumatic cardiac arrest in older adults in the United States. Shekhar AC. Resusc Plus. 2025 Aug 23;26:101076. doi: 10.1016/j.resplu.2025.101076. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101076

Impact of Delayed Trauma Unit Admission on Mortality and Disability in Traumatic Brain Injury Patients. Quispe-Alcocer J. Int J Environ Res Public Health. 2025 Oct 15;22(10):1566. doi: 10.3390/ijerph22101566. https://doi.org/10.3390/ijerph22101566

Prehospital aspirin use is associated with improved clinical outcomes in pulmonary embolism: A retrospective case-control study. Suresh MG. World J Cardiol. 2025 Nov 26;17(11):110178. doi: 10.4330/wjc.v17.i11.110178. https://doi.org/10.4330/wjc.v17.i11.110178

Resuscitation outcomes and associated factors among out-of-hospital cardiac arrest patients at the National Referral Hospital, Bhutan: a prospective cohort study. Rinzin U. Int J Emerg Med. 2025 Oct 20;18(1):209. doi: 10.1186/s12245-025-01043-7. https://doi.org/10.1186/s12245-025-01043-7

Implementing the WHO's Emergency Care Systems toolkit: a qualitative study for facilitators and barriers. Yegele KT. Emerg Med J. 2025 Nov 21;42(12):817-823. doi: 10.1136/emermed-2023-213652. https://doi.org/10.1136/emermed-2023-213652

Examining Emerging Risks of Vehicle Electrification in Emergency Medical Transport. Bai J. Risk Anal. 2025 Nov 26. doi: 10.1111/risa.70148. Online ahead of print. https://doi.org/10.1111/risa.70148

Reimagining Acute Diabetes Care: Insights From the Victorian Virtual Emergency Department. Nash B. Diabetes Care. 2025 Nov 1;48(11):1920-1924. doi: 10.2337/dc25-0852. https://doi.org/10.2337/dc25-0852

Survival and cost-effectiveness of helicopter versus ground emergency medical services: a systematic review and meta-analysis with meta-regression and trial sequential analysis. Orso D. Scand J Trauma Resusc Emerg Med. 2025 Oct 3;33(1):160. doi: 10.1186/s13049-025-01478-0. https://doi.org/10.1186/s13049-025-01478-0

Incidence, Prevalence, and Severity of Mental Health Issues Among Emergency Medical Service Clinicians: A Systematic Review and Meta-Analysis. Chan SC. J Emerg Med. 2025 Dec;79:427-442. doi: 10.1016/j.jemermed.2025.09.004. Epub 2025 Sep 9. https://doi.org/10.1016/j.jemermed.2025.09.004

Screening Sonography in the Prehospital Setting: A Case Report on Transforming Clinical Decisions. Miravent S. Cureus. 2025 Sep 8;17(9):e91871. doi: 10.7759/cureus.91871. eCollection 2025 Sep. https://doi.org/10.7759/cureus.91871

Who Is Leaving the Emergency Medical Services Workforce?. Woodward KF. J Public Health Manag Pract. 2025 Sep-Oct 01;31(5):818-827. doi: 10.1097/PHH.0000000000002175. Epub 2025 Jul 17. https://doi.org/10.1097/PHH.0000000000002175

Evaluating the impact of emergency interventions and geographical disparities on out-of-hospital cardiac arrest outcomes: A retrospective analysis from Poland. Goniewicz M. Medicine (Baltimore). 2025 Oct 17;104(42):e45244. doi: 10.1097/MD.0000000000045244. https://doi.org/10.1097/MD.0000000000045244

Self-harm and Violence Presenting to Emergency Care Registry (SAVER) project: protocol for a mixed-methods study. Bebbington E. BMJ Open Qual. 2025 Sep 14;14(3):e003463. doi: 10.1136/bmjoq-2025-003463. https://doi.org/10.1136/bmjoq-2025-003463

Human Factors in Helicopter Air Ambulance Accidents, Incidents, and Safety Reports. Baumgartner HM. Air Med J. 2025 Sep-Oct;44(5):347-353. doi: 10.1016/j.amj.2025.03.008. Epub 2025 Jun 11. https://doi.org/10.1016/j.amj.2025.03.008

Geospatial Analysis to Determine Optimal Distribution of Mobile Stroke Units. Ramphul R. Stroke. 2025 Oct;56(10):2988-2995. doi: 10.1161/STROKEAHA.125.051756. Epub 2025 Aug 4. https://doi.org/10.1161/STROKEAHA.125.051756

Emergency medical team interventions in Poland during out-of-hospital deliveries: A retrospective analysis. Strózik M. Adv Clin Exp Med. 2025 Oct;34(10):1731-1737. doi: 10.17219/acem/184141. https://doi.org/10.17219/acem/184141

Embedding FHIR in Medical PDF: A Migration Path for Interoperable Documentation. Bienzeisler J. Stud Health Technol Inform. 2025 Sep 3;331:186-194. doi: 10.3233/SHTI251395. https://doi.org/10.3233/SHTI251395

Cardiopulmonary resuscitation-induced consciousness in an elderly patient: a case report in the prehospital setting. Yusty-Prada JD. Int J Emerg Med. 2025 Nov 5;18(1):230. doi: 10.1186/s12245-025-01032-w. https://doi.org/10.1186/s12245-025-01032-w

Part 9: Adult Advanced Life Support: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Wigginton JG. Circulation. 2025 Oct 21;152(16_suppl_2):S538-S577. doi: 10.1161/CIR.0000000000001376. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001376

Waiting room and hallway care for older adults: a qualitative study with emergency nurses and technicians. Nessen SJ. BMC Geriatr. 2025 Nov 26;25(1):970. doi: 10.1186/s12877-025-06384-9. https://doi.org/10.1186/s12877-025-06384-9

The effects of tropical climate on the stability of emergency drugs used in ambulances under real EMS situations. Leela-Amornsin S. Prehosp Emerg Care. 2025 Nov 12:1-9. doi: 10.1080/10903127.2025.2587176. Online ahead of print. https://doi.org/10.1080/10903127.2025.2587176

Improvement in Cardiovascular Outcomes Using Telemedicine to Support Medical Decision in Acute Coronary Syndrome: Experience of Prehospital Public Emergency Care Units in Brazil. Rocon C. Telemed J E Health. 2025 Sep 22. doi: 10.1177/15305627251380334. Online ahead of print. https://doi.org/10.1177/15305627251380334

Cost-effectiveness of virtual emergency care models: A protocol for a systematic review. Shankar R. PLoS One. 2025 Sep 4;20(9):e0330946. doi: 10.1371/journal.pone.0330946. eCollection 2025. https://doi.org/10.1371/journal.pone.0330946

Association Between On-Scene Time and Number of Physicians in Helicopter Emergency Medical Services in Japan: A Retrospective Study. Hishinuma H. Air Med J. 2025 Nov-Dec;44(6):473-477. doi: 10.1016/j.amj.2025.06.022. Epub 2025 Jul 21. https://doi.org/10.1016/j.amj.2025.06.022

Modeling of Intensive Care Risk Factors for Spreading Depolarizations in Severe Traumatic Brain Injury. Hartings JA. J Neurotrauma. 2025 Oct 29. doi: 10.1177/08977151251388453. Online ahead of print. https://doi.org/10.1177/08977151251388453

Atlanto-occipital dislocation: a modern case series refining management paradigms through integration of CT and MR imaging. Desai AS. Eur Spine J. 2025 Sep 30. doi: 10.1007/s00586-025-09410-x. Online ahead of print. https://doi.org/10.1007/s00586-025-09410-x

Evolution and Contemporary Predictors of Outcomes in Out-of-Hospital Cardiac Arrest Patients Admitted to Intensive Cardiovascular Care Units: The Multicentric PCR-Cat Registry. Andrea R. Heart Lung Circ. 2025 Dec;34(12):1389-1398. doi: 10.1016/j.hlc.2025.07.004. Epub 2025 Oct 17. https://doi.org/10.1016/j.hlc.2025.07.004

Age matters: A Secondary Analysis of Endothelial Biomarkers in the Prehospital Tranexamic Acid for Traumatic Brain Injury Trial. Anand T. J Trauma Acute Care Surg. 2025 Oct 1;99(4):541-550. doi: 10.1097/TA.0000000000004582. Epub 2025 Mar 20. https://doi.org/10.1097/TA.0000000000004582

Use of machine learning for risk stratification of chest pain patients in the emergency department. Li Y. BMC Med Inform Decis Mak. 2025 Oct 24;25(1):393. doi: 10.1186/s12911-025-03226-x. https://doi.org/10.1186/s12911-025-03226-x

Rethinking Emergency Medical Services Triage for Children With Chest Pain. Williams JEP. JAMA Netw Open. 2025 Sep 2;8(9):e2533968. doi: 10.1001/jamanetworkopen.2025.33968. https://doi.org/10.1001/jamanetworkopen.2025.33968

To act or not to act in an in-flight emergency. Sabeen F. Indian J Med Ethics. 2025 Oct-Dec;X(4):330-332. doi: 10.20529/IJME.2025.049. https://doi.org/10.20529/IJME.2025.049

Managing Mental Health Crisis Calls Received by a US Poison Center: A Statewide Collaboration Between the Georgia Poison Center, 911, and 988. Dernbach MR. Am J Public Health. 2025 Nov;115(11):1814-1817. doi: 10.2105/AJPH.2025.308229. Epub 2025 Aug 28. https://doi.org/10.2105/AJPH.2025.308229

Out-of-hospital cardiac arrests in Swedish nursing homes: occurrence, treatment, and survival compared to private residences. Mobaeck Å. Scand J Trauma Resusc Emerg Med. 2025 Oct 21;33(1):170. doi: 10.1186/s13049-025-01496-y. https://doi.org/10.1186/s13049-025-01496-y

Part 3: Ethics: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Elmer J. Circulation. 2025 Oct 21;152(16_suppl_2):S323-S352. doi: 10.1161/CIR.0000000000001371. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001371

Enhancing the Community Chain of Survival: A Simulation Study of Defibrillator Delivery by Food Delivery Riders in a High-Density City. Chin KC. Can J Cardiol. 2025 Nov;41(11):2132-2142. doi: 10.1016/j.cjca.2025.07.017. Epub 2025 Aug 28. https://doi.org/10.1016/j.cjca.2025.07.017

Beyond the blood: A practical guide to thalassemia care in the emergency department. Mufarrij A. Blood Rev. 2025 Nov;74:101327. doi: 10.1016/j.blre.2025.101327. Epub 2025 Jul 29. https://doi.org/10.1016/j.blre.2025.101327

Emergency Medical Services Response Times in Cardiac Arrest: Less Is More. Jentzer JC. Mayo Clin Proc. 2025 Oct;100(10):1690-1692. doi: 10.1016/j.mayocp.2025.08.010. https://doi.org/10.1016/j.mayocp.2025.08.010

Distance between OHCA and AED location within a community first responder system to achieve early AED connection. Stieglis R. Resuscitation. 2025 Oct;215:110721. doi: 10.1016/j.resuscitation.2025.110721. Epub 2025 Jul 18. https://doi.org/10.1016/j.resuscitation.2025.110721

Letter to the Editor: Strengthening emergency medical services in LMICs through local initiatives and technological solutions. Iversen E. Injury. 2025 Nov;56(11):112549. doi: 10.1016/j.injury.2025.112549. Epub 2025 Jun 24. https://doi.org/10.1016/j.injury.2025.112549

Avoiding harm in pediatric heatstroke: Lessons from a case of ice-related frostbite. Rittblat M. JPRAS Open. 2025 Jul 18;45:386-389. doi: 10.1016/j.jpra.2025.07.009. eCollection 2025 Sep. https://doi.org/10.1016/j.jpra.2025.07.009

"Associations Between Prenotification and Time to Management in Acute Stroke Patients Transported by Emergency Medical Services": A Broader Perspective. Ozakin E. J Emerg Med. 2025 Dec;79:663-664. doi: 10.1016/j.jemermed.2025.09.001. Epub 2025 Sep 10. https://doi.org/10.1016/j.jemermed.2025.09.001

The Sepsis Chain of Survival: A Comprehensive Framework for Improving Sepsis Outcomes. Hidalgo JL. Crit Care Med. 2025 Oct 1;53(10):e1886-e1892. doi: 10.1097/CCM.0000000000006796. Epub 2025 Jul 16. https://doi.org/10.1097/CCM.0000000000006796

Characteristics of out-of-hospital cardiac arrest due to cerebrovascular disorders: a nationwide, retrospective, observational study. Ueda Y. Resusc Plus. 2025 Oct 28;26:101145. doi: 10.1016/j.resplu.2025.101145. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101145

Prognosis and Prevalence of Hyperchloremia in Dogs and Cats. Ueda Y. J Vet Emerg Crit Care (San Antonio). 2025 Nov 20. doi: 10.1111/vec.70054. Online ahead of print. https://doi.org/10.1111/vec.70054

Significance of a hypotensive episode following traumatic injury: A retrospective observational study. Al-Thani H. World J Crit Care Med. 2025 Sep 9;14(3):104778. doi: 10.5492/wjccm.v14.i3.104778. eCollection 2025 Sep 9. https://doi.org/10.5492/wjccm.v14.i3.104778

Manual bag-valve-mask ventilation during out-of-hospital cardiopulmonary resuscitation: a prospective observational study. Lemoine F. Resuscitation. 2025 Nov 12;217:110895. doi: 10.1016/j.resuscitation.2025.110895. Online ahead of print. https://doi.org/10.1016/j.resuscitation.2025.110895

Association Between Emergency Medical Services Intervention Volume and Out-of-Hospital Cardiac Arrest Survival: Comment. Daungsupawong H. J Emerg Med. 2025 Sep;76:150-151. doi: 10.1016/j.jemermed.2025.01.003. Epub 2025 Jan 27. https://doi.org/10.1016/j.jemermed.2025.01.003

Effect of Mobile Stroke Unit Dispatch on Process Parameters and Functional Outcomes in Patients With Acute Stroke: The B_PROUD-2.0 Study. Rohmann JL. Neurology. 2025 Nov 11;105(9):e214225. doi: 10.1212/WNL.0000000000214225. Epub 2025 Oct 16. https://doi.org/10.1212/WNL.0000000000214225

Gaslini Neonatal Emergency Transport Service. Celebrating 30 Years of Activity, 1995-2025. Bellini C. Air Med J. 2025 Sep-Oct;44(5):338-346. doi: 10.1016/j.amj.2025.05.006. Epub 2025 Jun 30. https://doi.org/10.1016/j.amj.2025.05.006

Acute anisocoria: learning from a case of accidental exposure to nebulised medicines in the emergency department. Cook K. Emerg Nurse. 2025 Nov 5. doi: 10.7748/en.2025.e2243. Online ahead of print. https://doi.org/10.7748/en.2025.e2243

Admission Hypothermia in Trauma Patients Undergoing Prehospital Tracheal Intubation: 15-Year Review of a Level-1 Trauma Center. Struck MF. Prehosp Emerg Care. 2025 Sep 24:1-10. doi: 10.1080/10903127.2025.2558865. Online ahead of print. https://doi.org/10.1080/10903127.2025.2558865

Enhancing Agitation Care for Children in the Emergency Department. Foster AA. Acad Pediatr. 2025 Nov 5:103171. doi: 10.1016/j.acap.2025.103171. Online ahead of print. https://doi.org/10.1016/j.acap.2025.103171

Impact of resuscitation duration on 12-month functional recovery following out-of-hospital cardiac arrest with initially shockable rhythms. Alhenaki A. Resuscitation. 2025 Nov;216:110824. doi: 10.1016/j.resuscitation.2025.110824. Epub 2025 Sep 12. https://doi.org/10.1016/j.resuscitation.2025.110824

Impact of the COVID-19 Pandemic on Hemato-Oncology Services: A Retrospective Dual-Center Cohort Study in Kazakhstan. Yerdenova M. Healthcare (Basel). 2025 Oct 4;13(19):2520. doi: 10.3390/healthcare13192520. https://doi.org/10.3390/healthcare13192520

Evaluating call prioritisation discrepancies and Emergency Medical Services resource allocation in the North West province of South Africa. Mbatha BN. Afr J Emerg Med. 2025 Dec;15(4):100913. doi: 10.1016/j.afjem.2025.100913. Epub 2025 Oct 29. https://doi.org/10.1016/j.afjem.2025.100913

One and Done? Rethinking "First-Pass Success" in Out-of-Hospital Airway Management. Spigner MF. Ann Emerg Med. 2025 Nov;86(5):531-532. doi: 10.1016/j.annemergmed.2025.05.025. Epub 2025 Jul 9. https://doi.org/10.1016/j.annemergmed.2025.05.025

Burn Disasters in North Carolina: An Analysis of Four Major Incidents With a Look to the Future. King BT. J Burn Care Res. 2025 Sep 19;46(5):1105-1112. doi: 10.1093/jbcr/iraf095. https://doi.org/10.1093/jbcr/iraf095

A decade of aeromedical care for the older adult: a 10-year review of Irish HEMS cases in patients aged 65 and over. Mathews D. Scand J Trauma Resusc Emerg Med. 2025 Nov 4;33(1):178. doi: 10.1186/s13049-025-01466-4. https://doi.org/10.1186/s13049-025-01466-4

Implementation Challenges in Emergency Cardiovascular Care. O'Halloran AJ. Crit Care Clin. 2026 Jan;42(1):23-38. doi: 10.1016/j.ccc.2025.08.002. Epub 2025 Oct 13. https://doi.org/10.1016/j.ccc.2025.08.002

A regular wide QRS tachycardia with right bundle branch block morphology and left QRS axis deviation. Kolben Y. Indian Pacing Electrophysiol J. 2025 Sep-Oct;25(5):379-381. doi: 10.1016/j.ipej.2025.09.003. Epub 2025 Oct 9. https://doi.org/10.1016/j.ipej.2025.09.003

Part 6: Pediatric Basic Life Support: 2025 American Heart Association and American Academy of Pediatrics Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Joyner BL Jr. Circulation. 2025 Oct 21;152(16_suppl_2):S424-S447. doi: 10.1161/CIR.0000000000001370. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001370

Exploratory study comparing a single episode of feedback with regular feedback and no feedback on BVM ventilation during a simulated cardiac arrest over a six-month time frame: a research protocol. McClelland G. Br Paramed J. 2025 Sep 1;10(2):34-39. doi: 10.29045/14784726.2025.9.10.2.34. https://doi.org/10.29045/14784726.2025.9.10.2.34

ST-Segment Elevation in Lead aVR in Acute Intracranial Pathologies: A Diagnostic Pitfall?. Túri BZ. J Emerg Med. 2025 Oct 25;80:54-59. doi: 10.1016/j.jemermed.2025.10.023. Online ahead of print. https://doi.org/10.1016/j.jemermed.2025.10.023

Overdose response centering inequity and diversity study: a protocol for assessing the population-level and equity impact of the emergency medical services system changes using critical race theory. Gatanaga OS. Front Public Health. 2025 Sep 15;13:1629518. doi: 10.3389/fpubh.2025.1629518. eCollection 2025. https://doi.org/10.3389/fpubh.2025.1629518

Association between coagulation biomarkers, intracranial hemorrhage types, and tranexamic acid treatments in early traumatic brain injury. Minoza KG. J Trauma Acute Care Surg. 2025 Sep 1;99(3):468-476. doi: 10.1097/TA.0000000000004669. Epub 2025 Jun 10. https://doi.org/10.1097/TA.0000000000004669

Incidence and prehospital management of convulsive status epilepticus in Martinique, a French Caribbean territory. Negrello F. Epilepsia Open. 2025 Nov 22. doi: 10.1002/epi4.70189. Online ahead of print. https://doi.org/10.1002/epi4.70189

Perceptions and Experiences of Emergency Medical Care Among Spanish-speaking Latin American Immigrants in Providence. Daici K. R I Med J (2013). 2025 Nov 3;108(11):25-30. https://doi.org/

Unstable Pelvic Ring Fractures: From Bleeding Control to Bone Repair Along the Trauma Pathway. Varathan K. Chirurgia (Bucur). 2025 Nov;120(eCollection):1-8. doi: 10.21614/chirurgia.3217. https://doi.org/10.21614/chirurgia.3217

Prehospital Defibrillation Challenges in Victims Wearing Wetsuits: A Pilot Comparison of AED Pad Placement Strategies. Santos-Folgar M. J Clin Med. 2025 Oct 24;14(21):7536. doi: 10.3390/jcm14217536. https://doi.org/10.3390/jcm14217536

High-fidelity simulation in healthcare education: Design and delivery considerations for optimising teaching and learning in higher education. Newton J. Br Paramed J. 2025 Sep 1;10(2):55-63. doi: 10.29045/14784726.2025.9.10.2.55. https://doi.org/10.29045/14784726.2025.9.10.2.55

Multiple-Casualty Incident Following Lightning Strike at Mount Giewont: An Analysis of Disaster Rescue Response. Mikiewicz M. Prehosp Disaster Med. 2025 Oct;40(5):280-286. doi: 10.1017/S1049023X2510143X. Epub 2025 Oct 23. https://doi.org/10.1017/S1049023X2510143X

CARES: The National Registry Driving Cardiac Arrest Surveillance and Quality Improvement. Carr MJ. J Am Coll Cardiol. 2025 Oct 22:S0735-1097(25)08131-8. doi: 10.1016/j.jacc.2025.09.323. Online ahead of print. https://doi.org/10.1016/j.jacc.2025.09.323

Analysis of the Incidence and Severity of Cellulitis During the COVID-19 Pandemic in Japan. Sato T. J Dermatol. 2025 Oct;52(10):1512-1518. doi: 10.1111/1346-8138.17853. Epub 2025 Jul 14. https://doi.org/10.1111/1346-8138.17853

Evidence-based approach for selecting human resources in urgent transport. Laso-Alonso AE. An Pediatr (Engl Ed). 2025 Nov;103(5):503997. doi: 10.1016/j.anpede.2025.503997. Epub 2025 Nov 11. https://doi.org/10.1016/j.anpede.2025.503997

Real-time ventilation feedback devices for out-of-hospital cardiac arrest: a review of the literature. Barcroft C. Br Paramed J. 2025 Sep 1;10(2):24-33. doi: 10.29045/14784726.2025.9.10.2.24. https://doi.org/10.29045/14784726.2025.9.10.2.24

Frequency of emergency medical service contacts after hospital admissions. Sigvardt E. Intern Emerg Med. 2025 Nov;20(8):2493-2502. doi: 10.1007/s11739-024-03852-9. Epub 2025 Jan 6. https://doi.org/10.1007/s11739-024-03852-9

Israeli attacks against medical personnel and facilities in Lebanon: A violation of International Humanitarian Law. Nasrallah S. Torture. 2025 Oct 15;35(2-3):168-173. doi: 10.7146/torture.v35i2.156178. https://doi.org/10.7146/torture.v35i2.156178

Bridging the gaps in prolonged casualty care: the Prolonged Evacuation Transport Team (PETT) programme. Ingram BJ. BMJ Mil Health. 2025 Oct 23:military-2025-003052. doi: 10.1136/military-2025-003052. Online ahead of print. https://doi.org/10.1136/military-2025-003052

Validation of the Glasgow Admission Prediction Score in a Japanese Emergency Setting. Horiuchi S. Acute Med Surg. 2025 Oct 31;12(1):e70097. doi: 10.1002/ams2.70097. eCollection 2025 Jan-Dec. https://doi.org/10.1002/ams2.70097

Emergency Care for Patients with Cancer on Immune Checkpoint Inhibitors: A Retrospective Analysis of Immune-Related Adverse Events. Ferrua A. J Emerg Med. 2025 Nov;78:235-240. doi: 10.1016/j.jemermed.2025.08.025. Epub 2025 Aug 21. https://doi.org/10.1016/j.jemermed.2025.08.025

Impact of same day emergency care services on urgent and emergency care delivery outcomes: a systematic review. Jones K. Emerg Med J. 2025 Sep 24;42(10):643-651. doi: 10.1136/emermed-2024-214821. https://doi.org/10.1136/emermed-2024-214821

Impact of language barrier during emergency call on out of hospital cardiac arrest treatment and outcomes. Joshi I. Resuscitation. 2025 Sep;214:110677. doi: 10.1016/j.resuscitation.2025.110677. Epub 2025 Jun 11. https://doi.org/10.1016/j.resuscitation.2025.110677

Indiana Adults Who Participated In Treatment Court Programs Had Better Health Outcomes Than Those Who Did Not. Van Nostrand E. Health Aff (Millwood). 2025 Sep;44(9):1148-1156. doi: 10.1377/hlthaff.2025.00346. https://doi.org/10.1377/hlthaff.2025.00346

Critical considerations in shock index application for normotensive trauma patients: Limitations and future directions. Ullah S. Injury. 2025 Oct 31:112874. doi: 10.1016/j.injury.2025.112874. Online ahead of print. https://doi.org/10.1016/j.injury.2025.112874

Impact of Tranexamic Acid on Traumatic Hemorrhage Outcomes in Emergency Medicine: A Systematic Review and Meta-Analysis. Zaki HA. Cureus. 2025 Sep 27;17(9):e93362. doi: 10.7759/cureus.93362. eCollection 2025 Sep. https://doi.org/10.7759/cureus.93362

Comparing the incomparable: Population densities and first responder groups through alternate statistics. Szvath P. Resusc Plus. 2025 Oct 15;26:101130. doi: 10.1016/j.resplu.2025.101130. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101130

European Resuscitation Council Guidelines 2025 System Saving Lives. Semeraro F. Resuscitation. 2025 Oct;215 Suppl 1:110821. doi: 10.1016/j.resuscitation.2025.110821. https://doi.org/10.1016/j.resuscitation.2025.110821

[Sustainability in preclinical emergency medicine : What is the influence of ethical considerations on sustainable and resource-saving practices in prehospital emergency medicine?]. Grannemann JJ. Med Klin Intensivmed Notfmed. 2025 Sep 3. doi: 10.1007/s00063-025-01322-4. Online ahead of print. https://doi.org/10.1007/s00063-025-01322-4

Transfusion of Whole Blood Is Not Associated With Increased Rate of Hemolytic Transfusion Reaction. Murphy S. Mil Med. 2025 Sep 1;190(9-10):e1946-e1950. doi: 10.1093/milmed/usaf080. https://doi.org/10.1093/milmed/usaf080

Balancing Cure and Care for Geriatric Patients With Frailty in Emergency Care: A Qualitative Study. Venema D. J Emerg Nurs. 2025 Oct 6:S0099-1767(25)00317-4. doi: 10.1016/j.jen.2025.08.016. Online ahead of print. https://doi.org/10.1016/j.jen.2025.08.016

Treatment outcome of acute coronary syndrome and associated factors among patients admitted to public hospitals in Harari Regional State, Eastern Ethiopia: a retrospective cross-sectional study. Tessema TB. BMJ Open. 2025 Nov 29;15(11):e105208. doi: 10.1136/bmjopen-2025-105208. https://doi.org/10.1136/bmjopen-2025-105208

Improved Survival With Automated External Defibrillator-Only Training in a Public-Access Defibrillation Program: A 23-Year Database Analysis of Progetto Vita. Aschieri D. J Am Heart Assoc. 2025 Nov 4;14(21):e040795. doi: 10.1161/JAHA.124.040795. Epub 2025 Oct 28. https://doi.org/10.1161/JAHA.124.040795

Comparing Virtual Reality Trauma Training Across Diverse Clinical Backgrounds: A Mixed-Methods Study in Canada And India. Laor B. J Surg Educ. 2025 Nov 23;83(1):103794. doi: 10.1016/j.jsurg.2025.103794. Online ahead of print. https://doi.org/10.1016/j.jsurg.2025.103794

Real-time cerebral oximetry and outcomes during out-of-hospital resuscitation. Shin J. Resuscitation. 2025 Oct;215:110761. doi: 10.1016/j.resuscitation.2025.110761. Epub 2025 Aug 7. https://doi.org/10.1016/j.resuscitation.2025.110761

STEMI patients' demographics and outcomes by mode of emergency department arrival. Stirparo G. J Cardiovasc Med (Hagerstown). 2025 Sep 1;26(9):501-507. doi: 10.2459/JCM.0000000000001767. Epub 2025 Jul 2. https://doi.org/10.2459/JCM.0000000000001767

[Inhospital Management of Mass Casualty Incidents (MASCAL)]. Speicher C. Anasthesiol Intensivmed Notfallmed Schmerzther. 2025 Sep;60(9):479-491. doi: 10.1055/a-2593-3516. Epub 2025 Sep 4. https://doi.org/10.1055/a-2593-3516

Organization of French level 1 adult trauma centers: A national survey. Bouhours G. Anaesth Crit Care Pain Med. 2025 Sep 29;45(2):101624. doi: 10.1016/j.accpm.2025.101624. Online ahead of print. https://doi.org/10.1016/j.accpm.2025.101624

Effectiveness of External Hemorrhage Compression Device of the Abdominal Aorta in Hemorrhagic Shock: A Systematic Review of the Literature. Kuusisto J. J Spec Oper Med. 2025 Sep 1;25(3):119-126. doi: 10.55460/FGHJ-K86Z. https://doi.org/10.55460/FGHJ-K86Z

Occupational health and safety system factors influencing the experiences of emergency management volunteers exposed to dying and death. Roche N. Appl Ergon. 2025 Nov;129:104563. doi: 10.1016/j.apergo.2025.104563. Epub 2025 May 28. https://doi.org/10.1016/j.apergo.2025.104563

Assessment of Hemostatic Dressings for Compressible Wounds in a Swine Model Simulating Prolonged Field Care. Booms Z. Mil Med. 2025 Oct 23:usaf490. doi: 10.1093/milmed/usaf490. Online ahead of print. https://doi.org/10.1093/milmed/usaf490

European Resuscitation Council Guidelines 2025 Adult Basic Life Support. Smyth MA. Resuscitation. 2025 Oct;215 Suppl 1:110771. doi: 10.1016/j.resuscitation.2025.110771. https://doi.org/10.1016/j.resuscitation.2025.110771

Virtual Observation Units: A Novel Disposition for Older Adults With Falls From the Emergency Department. Li A. J Am Coll Emerg Physicians Open. 2025 Aug 19;6(5):100230. doi: 10.1016/j.acepjo.2025.100230. eCollection 2025 Oct. https://doi.org/10.1016/j.acepjo.2025.100230

Difficult calls to emergency medical dispatch centres - a mixed method study. Holmström IK. BMC Emerg Med. 2025 Sep 8;25(1):179. doi: 10.1186/s12873-025-01343-4. https://doi.org/10.1186/s12873-025-01343-4

Part 4: Systems of Care: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Dezfulian C. Circulation. 2025 Oct 21;152(16_suppl_2):S353-S384. doi: 10.1161/CIR.0000000000001378. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001378

Research and conflict: mapping research trends and gaps in Ukrainian Emergency Medical Services- a scoping review. Castro-Delgado R. Confl Health. 2025 Oct 7;19(1):69. doi: 10.1186/s13031-025-00711-y. https://doi.org/10.1186/s13031-025-00711-y

Heat-related emergency medical service operations: the relevance of the heat definition. Grümme L. Int J Biometeorol. 2025 Nov;69(11):3085-3096. doi: 10.1007/s00484-025-03009-z. Epub 2025 Aug 13. https://doi.org/10.1007/s00484-025-03009-z

Indicators of early transfusion in paediatric trauma: a retrospective analysis of 11,849 cases from the TraumaRegister DGU(®). Schneider NRE. Scand J Trauma Resusc Emerg Med. 2025 Nov 26;33(1):195. doi: 10.1186/s13049-025-01516-x. https://doi.org/10.1186/s13049-025-01516-x

Chronic respiratory diseases risk during the COVID-19 pandemic: an integrated modelling approach based on hospital records across 30 countries. Zhou C. Popul Health Metr. 2025 Nov 6;23(1):61. doi: 10.1186/s12963-025-00412-x. https://doi.org/10.1186/s12963-025-00412-x

A case of telehealth-directed emergency front-of-neck access (FONA). Powell B. J Telemed Telecare. 2025 Oct;31(9):1351-1353. doi: 10.1177/1357633X241272946. Epub 2024 Aug 23. https://doi.org/10.1177/1357633X241272946

The risk of secondary exposure in the operating room from a sulfur mustard-contaminated penetrating wound using a simulation scenario. Caré W. Clin Toxicol (Phila). 2025 Nov 20:1-10. doi: 10.1080/15563650.2025.2570873. Online ahead of print. https://doi.org/10.1080/15563650.2025.2570873

Use of tranexamic acid in trauma surgical specialties: a narrative review. Thomas HM. World J Emerg Surg. 2025 Oct 10;20(1):76. doi: 10.1186/s13017-025-00649-9. https://doi.org/10.1186/s13017-025-00649-9

Accuracy of 6.5" Beaded Cable Tie, 10" Paracord, and Operator Gestalt in Prehospital Whole Blood Collection Techniques in Filling Donor Blood Bags to Target Volume. Carlton DM. J Spec Oper Med. 2025 Sep 26:BO33-5BSJ. doi: 10.55460/BO33-5BSJ. Online ahead of print. https://doi.org/10.55460/BO33-5BSJ

The Potential of Flight Simulation to Support Pilot Training for Mountain Helicopter Emergency Medical Services. Watson NA. Air Med J. 2025 Sep-Oct;44(5):386-389. doi: 10.1016/j.amj.2025.06.002. Epub 2025 Jun 28. https://doi.org/10.1016/j.amj.2025.06.002

Part 5: Neonatal Resuscitation: 2025 American Heart Association and American Academy of Pediatrics Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Lee HC. Circulation. 2025 Oct 21;152(16_suppl_2):S385-S423. doi: 10.1161/CIR.0000000000001367. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001367

Methods matter: unpacking the survival impact of first responder CPR in OHCA. Sødergren STF. Resusc Plus. 2025 Aug 14;26:101060. doi: 10.1016/j.resplu.2025.101060. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101060

Exploring the real-life value of first responders for out-of-hospital cardiac arrest in a Belgian urban context: a retrospective analysis. Van de Voorde P. Acta Clin Belg. 2025 Oct;80(5):159-165. doi: 10.1080/17843286.2025.2573748. Epub 2025 Oct 13. https://doi.org/10.1080/17843286.2025.2573748

Emergency Department Management of Acute Heatstroke: A Retrospective Analysis from Phoenix, Arizona. Stowell JR. West J Emerg Med. 2025 Sep 25;26(5):1345-1354. doi: 10.5811/westjem.42051. https://doi.org/10.5811/westjem.42051

Patient flow and safety after implementing a community paramedicine service: a quasi-experimental study. Elden OE. BMJ Open. 2025 Nov 4;15(11):e103111. doi: 10.1136/bmjopen-2025-103111. https://doi.org/10.1136/bmjopen-2025-103111

Increase in 9-1-1 activations for obstetric-related emergencies following the Dobbs decision in the United States. Powell JR. Am J Epidemiol. 2025 Oct 7;194(10):2968-2976. doi: 10.1093/aje/kwaf123. https://doi.org/10.1093/aje/kwaf123

Risk of delayed percutaneous coronary intervention for STEMI in the Southeast United States. Messinger MC. Am Heart J. 2025 Nov;289:67-77. doi: 10.1016/j.ahj.2025.05.002. Epub 2025 May 13. https://doi.org/10.1016/j.ahj.2025.05.002

Interdisciplinary working within urgent community response and intermediate care services. Brooks A. Br J Community Nurs. 2025 Nov 2;30(11):524-536. doi: 10.12968/bjcn.2025.0111. https://doi.org/10.12968/bjcn.2025.0111

The Opioid Crisis: Scaling Up Treatment And Harm Reduction Programs To Reach More People Who Would Benefit. Saloner B. Health Aff (Millwood). 2025 Sep;44(9):1034-1041. doi: 10.1377/hlthaff.2025.00340. https://doi.org/10.1377/hlthaff.2025.00340

Correlations between wastewater levels of naloxone and substance use disorder treatment medications with treatment encounters and overdoses - Marin County, California, USA, March 2023-June 2024. Hannah H. Public Health. 2025 Sep;246:105823. doi: 10.1016/j.puhe.2025.105823. Epub 2025 Jul 3. https://doi.org/10.1016/j.puhe.2025.105823

Enhancing emergency care for geriatric patients: Insights from a dedicated outpatient clinic study. Uzer B. Geriatr Gerontol Int. 2025 Sep;25(9):1247-1252. doi: 10.1111/ggi.70113. Epub 2025 Jul 10. https://doi.org/10.1111/ggi.70113

Improving spaces for women first responders: A grounded theory on gender equity. Gregory KB. PLoS One. 2025 Sep 10;20(9):e0330849. doi: 10.1371/journal.pone.0330849. eCollection 2025. https://doi.org/10.1371/journal.pone.0330849

Barriers to bystander interventions in suspected opioid-associated out-of-hospital cardiac arrests: A multiple methods study of 9-1-1 calls. Joiner A. Resuscitation. 2025 Oct;215:110748. doi: 10.1016/j.resuscitation.2025.110748. Epub 2025 Aug 5. https://doi.org/10.1016/j.resuscitation.2025.110748

The Association Between Out-of-Hospital Drug-Assisted Airway Management Approach and Intubation First-Pass Success. Jarvis JL. Ann Emerg Med. 2025 Nov;86(5):521-530. doi: 10.1016/j.annemergmed.2025.04.034. Epub 2025 Jun 4. https://doi.org/10.1016/j.annemergmed.2025.04.034

Epidemiological evolution of acute mastoiditis in children after COVID-19 pandemic. Ribaut B. Eur Arch Otorhinolaryngol. 2025 Oct;282(10):5355-5363. doi: 10.1007/s00405-025-09566-8. Epub 2025 Jul 23. https://doi.org/10.1007/s00405-025-09566-8

EMS Care of Survivors of Sexual Assault - A Position Statement and Resource Document of NAEMSP. Yang DH. Prehosp Emerg Care. 2025 Nov 18:1-11. doi: 10.1080/10903127.2025.2579074. Online ahead of print. https://doi.org/10.1080/10903127.2025.2579074

Conventional versus hands-only cardiopulmonary resuscitation by bystanders for pediatrics with out-of-hospital cardiac arrest: A systematic review and meta-analysis. Kietli ska M. Cardiol J. 2025 Sep 8. doi: 10.5603/cj.104135. Online ahead of print. https://doi.org/10.5603/cj.104135

Chlorocatechol-functionalized gelatin nanoparticles as a hemostatic agent with antimicrobial properties. Razaviamri F. Acta Biomater. 2025 Sep 15;204:568-581. doi: 10.1016/j.actbio.2025.08.020. Epub 2025 Aug 12. https://doi.org/10.1016/j.actbio.2025.08.020

Prevalence and Prognosis of Hypochloremia in Dogs and Cats. Ueda Y. J Vet Emerg Crit Care (San Antonio). 2025 Nov 19. doi: 10.1111/vec.70053. Online ahead of print. https://doi.org/10.1111/vec.70053

Association between base excess level at hospital arrival and neurological outcomes in adult out-of-hospital cardiac arrest: A multicentre cohort study. Onodera R. Resusc Plus. 2025 Aug 6;25:101055. doi: 10.1016/j.resplu.2025.101055. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101055

Radiological Assessment of Abdominal Aortic and Junctional Tourniquet-Induced Ischemia and Organ Displacement in a Porcine Model. Luckhurst C. J Surg Res. 2025 Oct;314:580-588. doi: 10.1016/j.jss.2025.07.062. Epub 2025 Aug 28. https://doi.org/10.1016/j.jss.2025.07.062

Clinical Outcomes of Patients Experiencing Seizures Treated With Antiemetic Drugs During Transport by Physician-Staffed Helicopters in Japan. Yanagawa Y. Air Med J. 2025 Sep-Oct;44(5):390-393. doi: 10.1016/j.amj.2025.06.014. Epub 2025 Jul 17. https://doi.org/10.1016/j.amj.2025.06.014

European Resuscitation Council Guidelines 2025 First Aid. Djärv T. Resuscitation. 2025 Oct;215 Suppl 1:110752. doi: 10.1016/j.resuscitation.2025.110752. https://doi.org/10.1016/j.resuscitation.2025.110752

[Emergency intervention plans for treatment of suicidal patients: a narrative literature review]. Teismann T. Nervenarzt. 2025 Sep;96(5):490-495. doi: 10.1007/s00115-024-01763-w. Epub 2024 Nov 17. https://doi.org/10.1007/s00115-024-01763-w

[Forced centralized allocation in the emergency department-what has the COVID-19 pandemic changed?]. Zehnder P. Med Klin Intensivmed Notfmed. 2025 Sep;120(6):500-507. doi: 10.1007/s00063-024-01182-4. Epub 2024 Sep 26. https://doi.org/10.1007/s00063-024-01182-4

Enhancing Emergency Obstetric Care Through Implementation of a Triage Acuity Score: A Quality Improvement Initiative. Price S. J Nurs Care Qual. 2025 Oct-Dec 01;40(4):351-357. doi: 10.1097/NCQ.0000000000000867. Epub 2025 Apr 22. https://doi.org/10.1097/NCQ.0000000000000867

Regional Anesthesia and Analgesia for Acute Trauma Patients. Samet RE. Anesthesiol Clin. 2025 Dec;43(4):707-738. doi: 10.1016/j.anclin.2025.07.009. Epub 2025 Sep 6. https://doi.org/10.1016/j.anclin.2025.07.009

[Drug therapy in cardiac arrest: an overview]. Colin-Benoit L. Rev Med Suisse. 2025 Sep 10;21(930):1620-1625. doi: 10.53738/REVMED.2025.21.930.47232. https://doi.org/10.53738/REVMED.2025.21.930.47232

Preparedness for infection prevention and control practice among undergraduate students: A systematic review. Mukona DM. J Infect Prev. 2025 Nov 20:17571774251397197. doi: 10.1177/17571774251397197. Online ahead of print. https://doi.org/10.1177/17571774251397197

Intraprosthetic Dislocation Following Reduction of Dual-mobility Total Hip Arthroplasty. Barden M. Clin Pract Cases Emerg Med. 2025 Nov;9(4):474-476. doi: 10.5811/cpcem.47211. https://doi.org/10.5811/cpcem.47211

Reframing paediatric mental health screening and assessment in emergency care through a biopsychosocial lens: A call for system-level integration. Maximous K. Australas Emerg Care. 2025 Sep 10:S2588-994X(25)00067-3. doi: 10.1016/j.auec.2025.09.001. Online ahead of print. https://doi.org/10.1016/j.auec.2025.09.001

Optimizing Helicopter Air Ambulance Dispatch to Improve Sustainability in Interfacility Transfers. Zhao F. Air Med J. 2025 Nov-Dec;44(6):516-520. doi: 10.1016/j.amj.2025.08.003. Epub 2025 Sep 13. https://doi.org/10.1016/j.amj.2025.08.003

The Dynamic Impacts of Serial Prevention-and-Control Policies Against COVID-19 Pandemic on Residents' Emergency Medical Service Demands in China Pre- and Post-Reopening: An Observational Study. Ye JJ. J Emerg Med. 2025 Oct;77:117-126. doi: 10.1016/j.jemermed.2025.07.008. Epub 2025 Jul 14. https://doi.org/10.1016/j.jemermed.2025.07.008

Prompt dispatcher-initiated tele-CPR and facilitation of bystander's CPR to improve out-of-hospital cardiac arrest outcomes: A prospective cohort study from Finland. Järvenpää V. Resuscitation. 2025 Oct;215:110755. doi: 10.1016/j.resuscitation.2025.110755. Epub 2025 Aug 6. https://doi.org/10.1016/j.resuscitation.2025.110755

Evaluation of the Direction of External Force Input to the Skull and Its Influence on the Severity of Traumatic Brain Injury. Mori M. Cureus. 2025 Oct 30;17(10):e95781. doi: 10.7759/cureus.95781. eCollection 2025 Oct. https://doi.org/10.7759/cureus.95781

Design projections for prospective studies evaluating the clinical effectiveness of cardiac arrest detection technologies. Hutton J. Resuscitation. 2025 Oct;215:110681. doi: 10.1016/j.resuscitation.2025.110681. Epub 2025 Jun 13. https://doi.org/10.1016/j.resuscitation.2025.110681

Early goal-directed management after out-of-hospital cardiac arrest: lessons from a certified cardiac arrest centre. Markus B. Eur Heart J Qual Care Clin Outcomes. 2025 Sep 12;11(6):707-718. doi: 10.1093/ehjqcco/qcae032. https://doi.org/10.1093/ehjqcco/qcae032

Assessing cognitive load through eye metrics in in-motion vs. stationary environments. Li Y. Appl Ergon. 2025 Nov;129:104598. doi: 10.1016/j.apergo.2025.104598. Epub 2025 Jul 12. https://doi.org/10.1016/j.apergo.2025.104598

Designing a management model for outsourcing non-clinical services in public hospitals in Iran. Merati S. BMC Health Serv Res. 2025 Nov 22;25(1):1517. doi: 10.1186/s12913-025-13521-y. https://doi.org/10.1186/s12913-025-13521-y

Trauma Exposure, Insomnia, and Fatigue: A Cross-Sectional Study of the Pathways to Burnout Among South African First Responders. Padmanabhanunni A. Health Sci Rep. 2025 Aug 28;8(9):e71204. doi: 10.1002/hsr2.71204. eCollection 2025 Sep. https://doi.org/10.1002/hsr2.71204

Owner-reported financial limitations negatively impact emergency veterinary teams. McCobb E. J Am Vet Med Assoc. 2025 Oct 6;263(S3):S49-S59. doi: 10.2460/javma.25.06.0361. Print 2025 Dec 1. https://doi.org/10.2460/javma.25.06.0361

Ice Cave Rescue-A Hybrid Approach Between Mountain and Cave Rescue: A Case Report. Picart J. Wilderness Environ Med. 2025 Nov 18:10806032251391774. doi: 10.1177/10806032251391774. Online ahead of print. https://doi.org/10.1177/10806032251391774

Injuries among middle aged and older adult patients presenting to the emergency department: a retrospective cohort study. Basnawi AM. Front Aging. 2025 Oct 23;6:1652588. doi: 10.3389/fragi.2025.1652588. eCollection 2025. https://doi.org/10.3389/fragi.2025.1652588

Occurrence and prediction of clinical interventions during transfer of near-term and term infants with respiratory distress on CPAP. An observational study. Morel A. Arch Pediatr. 2025 Nov;32(8):575-579. doi: 10.1016/j.arcped.2025.07.001. Epub 2025 Oct 7. https://doi.org/10.1016/j.arcped.2025.07.001

Helicopter EMS for scene response to head-injured patients: systematic review & meta-analysis. Fritz CL. BMC Emerg Med. 2025 Nov 14;25(1):233. doi: 10.1186/s12873-025-01392-9. https://doi.org/10.1186/s12873-025-01392-9

Cardiac Rhythm Conversions and the Outcome in Refractory Out-of-Hospital Cardiac Arrest: Extracorporeal Versus Conventional Resuscitation. Havranek S. Crit Care Med. 2025 Oct 1;53(10):e1930-e1940. doi: 10.1097/CCM.0000000000006787. Epub 2025 Jul 16. https://doi.org/10.1097/CCM.0000000000006787

How a system saves lives: Results of Luxembourg's nationwide cardiac arrest project. Stammet P. Resusc Plus. 2025 Oct 10;26:101127. doi: 10.1016/j.resplu.2025.101127. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101127

Nomogram predicts in-hospital mortality in patients with emergency gastrointestinal bleeding: A multicenter retrospective study. Li Y. Sci Rep. 2025 Oct 22;15(1):36872. doi: 10.1038/s41598-025-20953-3. https://doi.org/10.1038/s41598-025-20953-3

Regional disparities in 1-month survival following traffic accident-related out-of-hospital cardiac arrest in Japan: A nationwide observational study. Adachi T. Am J Emerg Med. 2025 Oct;96:249-255. doi: 10.1016/j.ajem.2025.07.002. Epub 2025 Jul 3. https://doi.org/10.1016/j.ajem.2025.07.002

Chain of Call: Learning How to Effectively Communicate with Emergency Medical Services at School. Martínez-Isasi S. Children (Basel). 2025 Nov 5;12(11):1501. doi: 10.3390/children12111501. https://doi.org/10.3390/children12111501

Night-time road traffic fatalities disproportionately affect male pedestrians in geographic hotspots. Sobuwa S. BMC Public Health. 2025 Nov 24. doi: 10.1186/s12889-025-25690-w. Online ahead of print. https://doi.org/10.1186/s12889-025-25690-w

From rare procedure to institutional capability: a proposal to embed systematic training and adoption of emergency front of neck access. Duffy CC. Br J Anaesth. 2025 Dec;135(6):1779-1786. doi: 10.1016/j.bja.2025.08.035. Epub 2025 Oct 8. https://doi.org/10.1016/j.bja.2025.08.035

Transition Interest and Roles Assessment for Nationally Certified Emergency Medical Service Clinicians in the U.S Military. Gage CB. Mil Med. 2025 Nov 6:usaf549. doi: 10.1093/milmed/usaf549. Online ahead of print. https://doi.org/10.1093/milmed/usaf549

AI-Powered Early Detection of Sepsis in Emergency Medicine. Aityan S. Life (Basel). 2025 Oct 10;15(10):1576. doi: 10.3390/life15101576. https://doi.org/10.3390/life15101576

Regional differences in characteristics of patients with acute coronary syndromes pre- and during Coronavirus-2019 pandemic. Bryniarski K. Am Heart J Plus. 2025 Oct 14;60:100640. doi: 10.1016/j.ahjo.2025.100640. eCollection 2025 Dec. https://doi.org/10.1016/j.ahjo.2025.100640

Initial cardiac rhythm and rhythm conversion recorded by public access defibrillators. Hald NS. Resuscitation. 2025 Nov;216:110840. doi: 10.1016/j.resuscitation.2025.110840. Epub 2025 Sep 23. https://doi.org/10.1016/j.resuscitation.2025.110840

German Cardiac Arrest Registry (G-CAR)-results of the pilot phase. Pöss J. Clin Res Cardiol. 2025 Oct;114(10):1270-1279. doi: 10.1007/s00392-024-02468-5. Epub 2024 Jun 13. https://doi.org/10.1007/s00392-024-02468-5

Factors that contribute to mental distress and suicidal events for first responders in Nebraska: A qualitative study. Mickles MS. Psychol Serv. 2025 Nov 20. doi: 10.1037/ser0001007. Online ahead of print. https://doi.org/10.1037/ser0001007

Lessons learned from the promotion of Essential Emergency and Critical Care in Tanzania - a qualitative study. Kaliza AC. BMJ Open. 2025 Oct 29;15(10):e089229. doi: 10.1136/bmjopen-2024-089229. https://doi.org/10.1136/bmjopen-2024-089229

Part 1: Executive Summary: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Del Rios M. Circulation. 2025 Oct 21;152(16_suppl_2):S284-S312. doi: 10.1161/CIR.0000000000001372. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001372

Emergencies in Otorhinolaryngology: Diagnostic Evaluation, Assessment of Urgency, and Treatment. Hahn J. Dtsch Arztebl Int. 2025 Sep 19;122(19):533-540. doi: 10.3238/arztebl.m2025.0122. https://doi.org/10.3238/arztebl.m2025.0122

Emergency preparedness on a national level: Israel's three-pronged approach to collecting and supplying blood during times of crisis. Glassberg E. Vox Sang. 2025 Nov 27. doi: 10.1111/vox.70160. Online ahead of print. https://doi.org/10.1111/vox.70160

[Oxygen therapy in hospitalized patients : What are the indications? What are the targets?]. Cuénoud A. Rev Med Suisse. 2025 Nov 19;21(940):2066-2071. doi: 10.53738/REVMED.2025.21.940.47981. https://doi.org/10.53738/REVMED.2025.21.940.47981

Barriers to helicopter emergency medical services in a Haze-Prone, mountainous region of Northern Thailand. Sutham K. Scand J Trauma Resusc Emerg Med. 2025 Nov 13;33(1):182. doi: 10.1186/s13049-025-01498-w. https://doi.org/10.1186/s13049-025-01498-w

Association between time of day and outcomes after out-of-hospital cardiac arrest in Poland: an analysis of the EuReCa registry. dło A. BMJ Open. 2025 Oct 20;15(10):e105187. doi: 10.1136/bmjopen-2025-105187. https://doi.org/10.1136/bmjopen-2025-105187

[Diaphragmatic Eventration Treated with Abdominal Organ Fixation by a Combination of Thoracoscopy and Laparoscopy:Report of a Case]. Ishida J. Kyobu Geka. 2025 Oct;78(11):978-982. https://doi.org/

The relationship between cardiopulmonary resuscitation duration and prognosis in patients with out-of-hospital cardiac arrest due to asphyxiation. Nakajima C. Resuscitation. 2025 Nov;216:110818. doi: 10.1016/j.resuscitation.2025.110818. Epub 2025 Sep 11. https://doi.org/10.1016/j.resuscitation.2025.110818

Delivering bad news in clinical practice: the role of communication skills and emotional intelligence among Polish healthcare professionals. Kosydar-Bochenek J. BMC Med Educ. 2025 Nov 29. doi: 10.1186/s12909-025-08222-3. Online ahead of print. https://doi.org/10.1186/s12909-025-08222-3

Practice variations in pharmacological management of acute renal colic pain: A cross-sectional survey study. Lee N. Australas Emerg Care. 2025 Nov 7:S2588-994X(25)00085-5. doi: 10.1016/j.auec.2025.10.004. Online ahead of print. https://doi.org/10.1016/j.auec.2025.10.004

Workplace violence among healthcare providers in India: a mixed-method study. Anil D. BMJ Public Health. 2025 Oct 21;3(2):e002520. doi: 10.1136/bmjph-2024-002520. eCollection 2025. https://doi.org/10.1136/bmjph-2024-002520

First-generation Turkish immigrants' views and preferences on cardiovascular disease prevention in primary care - a qualitative study in the Netherlands. van Apeldoorn JAN. J Migr Health. 2025 Sep 26;12:100367. doi: 10.1016/j.jmh.2025.100367. eCollection 2025. https://doi.org/10.1016/j.jmh.2025.100367

Penetrating aortic ulcer: a rare cause of neck swelling. Rimmer C. BMJ Case Rep. 2025 Oct 13;18(10):e265524. doi: 10.1136/bcr-2025-265524. https://doi.org/10.1136/bcr-2025-265524

The Decimation of Gaza's Health Care System-Hospitals Destroyed and Lives Endangered. Hamamra B. Int J Soc Determinants Health Health Serv. 2026 Jan;56(1):30-40. doi: 10.1177/27551938251378096. Epub 2025 Sep 16. https://doi.org/10.1177/27551938251378096

Canadian water-related fatalities: Demographic, situational, and environmental risk factors. Lam VC. J Forensic Sci. 2025 Nov;70(6):2403-2419. doi: 10.1111/1556-4029.70153. Epub 2025 Aug 13. https://doi.org/10.1111/1556-4029.70153

RESCUER mobile app to support pediatric resuscitation: Study protocol for a randomized controlled trial. Lee SA. Contemp Clin Trials Commun. 2025 Oct 8;48:101558. doi: 10.1016/j.conctc.2025.101558. eCollection 2025 Dec. https://doi.org/10.1016/j.conctc.2025.101558

Part 12: Resuscitation Education Science: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Donoghue AJ. Circulation. 2025 Oct 21;152(16_suppl_2):S719-S750. doi: 10.1161/CIR.0000000000001374. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001374

Part 11: Post-Cardiac Arrest Care: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Hirsch KG. Circulation. 2025 Oct 21;152(16_suppl_2):S673-S718. doi: 10.1161/CIR.0000000000001375. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001375

Analysis of prehospital delay in acute ischaemic stroke and its influencing factors: a multicentre prospective case registry study in China. Su Y. Stroke Vasc Neurol. 2025 Oct 27;10(5):637-647. doi: 10.1136/svn-2024-003535. https://doi.org/10.1136/svn-2024-003535

Early identification of high-risk older two-wheeler riders: A dual-sample approach for 30-day mortality prediction. Hsu MC. Accid Anal Prev. 2026 Jan;224:108298. doi: 10.1016/j.aap.2025.108298. Epub 2025 Oct 29. https://doi.org/10.1016/j.aap.2025.108298

Outcomes of patients with unstable circulation transported by a physician-staffed helicopter using the keyword method in Japan. Yanagawa Y. J Rural Med. 2025 Oct;20(4):276-281. doi: 10.2185/jrm.2025-025. Epub 2025 Oct 1. https://doi.org/10.2185/jrm.2025-025

Changes in clinical features and severity in patients presenting to European emergency departments with acute cannabis toxicity over the 10-year period from 2013 to 2022. Miró . Addiction. 2025 Nov 13. doi: 10.1111/add.70233. Online ahead of print. https://doi.org/10.1111/add.70233

Real-Time Monitoring of Cerebrovascular Insufficiency due to Emergent Large Vessel Occlusion Using Near-Infrared Spectroscopy Based on the Modified Beer-Lambert Law: A Retrospective Study. Okune S. World Neurosurg. 2025 Sep;201:124277. doi: 10.1016/j.wneu.2025.124277. Epub 2025 Jul 11. https://doi.org/10.1016/j.wneu.2025.124277

Measurement of Long-Term, Quality of Life Outcomes in Injury Databases. Ordoobadi AJ. J Surg Res. 2025 Sep;313:18-25. doi: 10.1016/j.jss.2025.05.027. Epub 2025 Jul 9. https://doi.org/10.1016/j.jss.2025.05.027

Assessing the Trauma System in Ukraine Through the Perspectives of International Healthcare Volunteers and Ukrainian Healthcare Workers: Application of an Observational Tool. Koehlmoos TP. Mil Med. 2025 Sep 1;190(9-10):e1986-e1991. doi: 10.1093/milmed/usaf132. https://doi.org/10.1093/milmed/usaf132

Lipomatous hypertrophy of cardiac interatrial septum: A case report. Laima S. Medicine (Baltimore). 2025 Oct 3;104(40):e44991. doi: 10.1097/MD.0000000000044991. https://doi.org/10.1097/MD.0000000000044991

Aeromed: Navigating India's Skyways to Save Lives. Lakhwani TS. Air Med J. 2025 Nov-Dec;44(6):452-456. doi: 10.1016/j.amj.2025.07.003. Epub 2025 Aug 25. https://doi.org/10.1016/j.amj.2025.07.003

Navigating Limitations and Clinical Challenges in Indonesian Tertiary Trauma Center for Penetrating Brain Injury: A Case Report and Literature Review. Apriawan T. Asian J Neurosurg. 2025 May 19;20(3):636-645. doi: 10.1055/s-0045-1809143. eCollection 2025 Sep. https://doi.org/10.1055/s-0045-1809143

From Combat to Search and Rescue: The Modern Air Force Pararescue Medical Experience. Day R. Mil Med. 2025 Oct 18:usaf492. doi: 10.1093/milmed/usaf492. Online ahead of print. https://doi.org/10.1093/milmed/usaf492

Telehealth-directed emergency tube thoracostomy. Aston B. J Telemed Telecare. 2025 Sep 8:1357633X251372248. doi: 10.1177/1357633X251372248. Online ahead of print. https://doi.org/10.1177/1357633X251372248

Assessment of Disaster Preparedness Planning in 25 Hub Hospitals of Nepal. Adhikari SK. J Nepal Health Res Counc. 2025 Oct 17;23(2):369-376. doi: 10.33314/jnhrc.v23i02.4703. https://doi.org/10.33314/jnhrc.v23i02.4703

Understanding research engagement among allied health professionals working in UK emergency departments: a qualitative study. Coates K. Emerg Med J. 2025 Oct 24:emermed-2025-214932. doi: 10.1136/emermed-2025-214932. Online ahead of print. https://doi.org/10.1136/emermed-2025-214932

Part 2: Evidence Evaluation and Guidelines Development: 2025 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Panchal AR. Circulation. 2025 Oct 21;152(16_suppl_2):S313-S322. doi: 10.1161/CIR.0000000000001373. Epub 2025 Oct 22. https://doi.org/10.1161/CIR.0000000000001373

Analysis of mortality of users treated at a Mobile Emergency Care Service: an observational study, Paranõ, 2019-2020. Ludwig EFDSB. Epidemiol Serv Saude. 2025 Sep 15;34:e20240092. doi: 10.1590/S2237-96222025v34e20240092.en. eCollection 2025. https://doi.org/10.1590/S2237-96222025v34e20240092.en

Exception From Informed Consent Community Consultation Surveys-Do Respondent Characteristics Accurately Reflect Targeted Communities?. Keister A. Acad Emerg Med. 2025 Nov 10. doi: 10.1111/acem.70189. Online ahead of print. https://doi.org/10.1111/acem.70189

Advanced Airway Practice Patterns and Out-of-Hospital Cardiac Arrest Outcomes. Nassal MMJ. JAMA Netw Open. 2025 Sep 2;8(9):e2532334. doi: 10.1001/jamanetworkopen.2025.32334. https://doi.org/10.1001/jamanetworkopen.2025.32334

Emergency care for children with sickle cell disease: a focus on pain and fever. Korman R. Expert Rev Hematol. 2025 Nov;18(11):899-921. doi: 10.1080/17474086.2025.2538537. Epub 2025 Jul 28. https://doi.org/10.1080/17474086.2025.2538537

The Majority of Total Joint Arthroplasty Patients Have Hypovitaminosis D: An Analysis From a Single Tertiary Care Center in China. Zha GC. J Arthroplasty. 2025 Sep 17:S0883-5403(25)01183-0. doi: 10.1016/j.arth.2025.09.019. Online ahead of print. https://doi.org/10.1016/j.arth.2025.09.019

Application of structured team model based on shared decision model in obstetrics and gynecology joint intensive care unit (ICU) rescue of critical care pregnant women: A randomized controlled trial. Lu Y. Medicine (Baltimore). 2025 Sep 5;104(36):e44430. doi: 10.1097/MD.0000000000044430. https://doi.org/10.1097/MD.0000000000044430

Blood product use in paediatric trauma: lessons from the TARN data. Mullan K. Emerg Med J. 2025 Sep 24;42(10):662-668. doi: 10.1136/emermed-2024-214397. https://doi.org/10.1136/emermed-2024-214397

Common Mental Health Symptoms in Personnel Working in Helicopter Emergency Medical Services: A Systematic Review. Damsgaard K. Air Med J. 2025 Sep-Oct;44(5):420-428. doi: 10.1016/j.amj.2025.06.019. Epub 2025 Jul 14. https://doi.org/10.1016/j.amj.2025.06.019

Capnometry predicts the viability of procured kidneys from uncontrolled donation after circulatory death donors. Rubio-Chacón C. Resuscitation. 2025 Oct;215:110783. doi: 10.1016/j.resuscitation.2025.110783. Epub 2025 Aug 20. https://doi.org/10.1016/j.resuscitation.2025.110783

Communication Surrounding Treatment Preferences for Older Adults With Dementia During Emergency Medical Services Response. Pollack LR. J Am Geriatr Soc. 2025 Sep 4. doi: 10.1111/jgs.70078. Online ahead of print. https://doi.org/10.1111/jgs.70078

Optimization of dispatcher instruction for public-access automated external defibrillator retrieval and use: A scoping review. Snow L. Resusc Plus. 2025 Jun 14;25:101005. doi: 10.1016/j.resplu.2025.101005. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101005

Equity of Access to Care in an Urban Trauma System. Stolarski AE. J Surg Res. 2025 Oct;314:298-304. doi: 10.1016/j.jss.2025.07.010. Epub 2025 Aug 9. https://doi.org/10.1016/j.jss.2025.07.010

Extreme Heat and Emergency Department Presentations for Circulatory and Respiratory Conditions: A 5-Year Study in Two Large Hospitals in Australia. Yoon HJ. Stud Health Technol Inform. 2025 Nov 12;333:64-69. doi: 10.3233/SHTI251577. https://doi.org/10.3233/SHTI251577

Associations between four standard interventions as well as epinephrine use and sustained ROSC, 30-Day and one-year survival of patients in traumatic cardiac arrest: a multicentre, retrospective cohort study. Erblich R. Scand J Trauma Resusc Emerg Med. 2025 Oct 14;33(1):165. doi: 10.1186/s13049-025-01486-0. https://doi.org/10.1186/s13049-025-01486-0

Using graph theory to flexibly construct patient journeys in linked healthcare data. Powell I. Int J Popul Data Sci. 2025 Oct 9;10(1):2371. doi: 10.23889/ijpds.v10i1.2371. eCollection 2025. https://doi.org/10.23889/ijpds.v10i1.2371

An Improvised Reduction Method for Anterior Shoulder Dislocation in a Waterborne Environment. Christensen MJ. Wilderness Environ Med. 2025 Sep;36(3):373-377. doi: 10.1177/10806032251323501. Epub 2025 Mar 17. https://doi.org/10.1177/10806032251323501

Overdose-Related Cardiac Arrest in the Era of the Opioid Epidemic. Buckley RJ. Crit Care Clin. 2026 Jan;42(1):215-233. doi: 10.1016/j.ccc.2025.08.008. Epub 2025 Sep 18. https://doi.org/10.1016/j.ccc.2025.08.008

Acute Intracerebral Hemorrhage in a Pregnant Woman in the Third Trimester: A Case Report. Ali AMA. Cureus. 2025 Sep 21;17(9):e92822. doi: 10.7759/cureus.92822. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92822

Impact of an eCPR Pilot Program on Outcomes After Out-of-Hospital Cardiac Arrest for Patients Who Do Not Receive eCPR in a Large, Urban EMS System. Tolles J. Prehosp Emerg Care. 2025 Nov 24:1-12. doi: 10.1080/10903127.2025.2592239. Online ahead of print. https://doi.org/10.1080/10903127.2025.2592239

Factors that influence the use of direct access to allied health professionals in the Netherlands. Damen LJ. Prim Health Care Res Dev. 2025 Sep 23;26:e80. doi: 10.1017/S1463423625100467. https://doi.org/10.1017/S1463423625100467

Effect of real-time carbon dioxide sensing stylet-assisted endotracheal intubation: A case-crossover manikin simulation study. Kim Y. Am J Emerg Med. 2025 Sep;95:124-128. doi: 10.1016/j.ajem.2025.05.047. Epub 2025 May 26. https://doi.org/10.1016/j.ajem.2025.05.047

Safety Planning for Youth in the Emergency Department Who Have Suicide Risk. Foster AA. J Am Coll Emerg Physicians Open. 2025 Nov 6;6(6):100275. doi: 10.1016/j.acepjo.2025.100275. eCollection 2025 Dec. https://doi.org/10.1016/j.acepjo.2025.100275

Silent crisis on the frontlines: a systematic review of suicidal behaviors among disaster responders - epidemiology, risk pathways, and evidence-based interventions. Moslehi S. Scand J Trauma Resusc Emerg Med. 2025 Oct 3;33(1):161. doi: 10.1186/s13049-025-01479-z. https://doi.org/10.1186/s13049-025-01479-z

Submersion Injuries in the United States Trauma Quality Improvement Program Trauma Registry from 2017 to 2023. Schauer SG. Wilderness Environ Med. 2025 Nov 18:10806032251393142. doi: 10.1177/10806032251393142. Online ahead of print. https://doi.org/10.1177/10806032251393142

Development and Validation of a Safety Compliance Scale for Fire-Based Emergency Medical Services (EMS) Personnel. Geczik AM. Prehosp Emerg Care. 2025 Nov 14:1-10. doi: 10.1080/10903127.2025.2571042. Online ahead of print. https://doi.org/10.1080/10903127.2025.2571042

A Delphi process to build consensus on revised Emergency Obstetric and Newborn Care (EmONC) signal functions and levels of care. Moxon SG. PLoS One. 2025 Sep 22;20(9):e0331684. doi: 10.1371/journal.pone.0331684. eCollection 2025. https://doi.org/10.1371/journal.pone.0331684

Precipitation, EMS use, and time to presentation of Acute Ischemic stroke in the get with the guidelines-stroke registry. Berner M. J Stroke Cerebrovasc Dis. 2025 Nov;34(11):108460. doi: 10.1016/j.jstrokecerebrovasdis.2025.108460. Epub 2025 Sep 27. https://doi.org/10.1016/j.jstrokecerebrovasdis.2025.108460

Consensus-based research priorities for post-collision care in the Western Cape province of South Africa. Abdullah N. Afr J Emerg Med. 2025 Dec;15(4):100900. doi: 10.1016/j.afjem.2025.100900. Epub 2025 Sep 5. https://doi.org/10.1016/j.afjem.2025.100900

Pyogenic Spondylitis Due to Erysipelothrix rhusiopathiae Infection: A Case Report. Oshita Y. Cureus. 2025 Sep 17;17(9):e92532. doi: 10.7759/cureus.92532. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92532

Evaluating the impact of social determinants of health on undertriage among trauma patients. Boland S. J Trauma Acute Care Surg. 2025 Nov 12. doi: 10.1097/TA.0000000000004812. Online ahead of print. https://doi.org/10.1097/TA.0000000000004812

Clinical Profile and Outcome of Air Medical Evacuation Cases Involving Anesthesiologists of a Military Tertiary Care Hospital of Nepal: A Retrospective Study. Amatya BR. Air Med J. 2025 Nov-Dec;44(6):478-484. doi: 10.1016/j.amj.2025.06.023. Epub 2025 Jul 23. https://doi.org/10.1016/j.amj.2025.06.023

Hand therapy experience after major earthquakes in 2023 in Tьrkiye: A single-site evaluation. Emir Z. Hand Ther. 2025 May 10;30(3):124-134. doi: 10.1177/17589983251338744. eCollection 2025 Sep. https://doi.org/10.1177/17589983251338744

Accessing emergency eye care by therapeutically qualified optometrists: a simulated-patient study in Quebec, Canada. Tousignant B. Clin Exp Optom. 2025 Nov;108(8):1055-1062. doi: 10.1080/08164622.2025.2486662. Epub 2025 Apr 21. https://doi.org/10.1080/08164622.2025.2486662

Narrative Review of Emergency Medicine Clinical Research Examining Exclusion by Language. Curt AM. West J Emerg Med. 2025 Sep 25;26(5):1260-1264. doi: 10.5811/westjem.46547. https://doi.org/10.5811/westjem.46547

A review of mass casualty incident triage tools for hospital-based triage. Abdul-Nabi SS. Turk J Emerg Med. 2025 Oct 1;25(4):251-255. doi: 10.4103/tjem.tjem_77_25. eCollection 2025 Oct-Dec. https://doi.org/10.4103/tjem.tjem_77_25

Intracerebral Hemorrhage: Advances, Knowledge Gaps, and Future Directions. Liu T. MedComm (2020). 2025 Oct 26;6(11):e70436. doi: 10.1002/mco2.70436. eCollection 2025 Nov. https://doi.org/10.1002/mco2.70436

Status epilepticus: Updates on mechanisms and treatments. Joshi S. Epilepsia Open. 2025 Sep 16. doi: 10.1002/epi4.70146. Online ahead of print. https://doi.org/10.1002/epi4.70146

In-Flight Deterioration Occurs Early in Aeromedical Trauma Patients. Powell B. Emerg Med Australas. 2025 Oct;37(5):e70140. doi: 10.1111/1742-6723.70140. https://doi.org/10.1111/1742-6723.70140

Don't blame it on the alcohol! Alcohol and Trauma Outcomes: A 10 year retrospective single-center study. Nowacki JC. Am J Surg. 2025 Oct;248:116444. doi: 10.1016/j.amjsurg.2025.116444. Epub 2025 May 23. https://doi.org/10.1016/j.amjsurg.2025.116444

A KAP Study on dengue prevention and surveillance among healthcare professionals in Narowal, Pakistan. Akhtar S. J Pak Med Assoc. 2025 Oct;75(10):1585-1589. doi: 10.47391/JPMA.21178. https://doi.org/10.47391/JPMA.21178

Barriers and enablers of elderly care specialists towards deprescribing practices in the nursing homes: a focus group study. Malek Makan A. BMC Health Serv Res. 2025 Nov 12;25(1):1466. doi: 10.1186/s12913-025-13630-8. https://doi.org/10.1186/s12913-025-13630-8

HUGS@Home - An initial evaluation of a psychological first aid programme for families and friends of first responders. O'Toole M. Compr Psychiatry. 2025 Oct 10;143:152636. doi: 10.1016/j.comppsych.2025.152636. Online ahead of print. https://doi.org/10.1016/j.comppsych.2025.152636

Preparedness for Disaster Response: An Assessment of Northeast Romanian Emergency Healthcare Workers. Haut A. Healthcare (Basel). 2025 Sep 9;13(18):2257. doi: 10.3390/healthcare13182257. https://doi.org/10.3390/healthcare13182257

Silent Killer: A Case Report on Carbon Monoxide Poisoning. Lipman N. J Emerg Med. 2025 Dec;79:529-530. doi: 10.1016/j.jemermed.2025.09.002. Epub 2025 Sep 9. https://doi.org/10.1016/j.jemermed.2025.09.002

Critical illness in prisons: a multi-method analysis of reported healthcare safety incidents in England. McFadzean IJ. Br J Gen Pract. 2025 Sep 15:BJGP.2025.0239. doi: 10.3399/BJGP.2025.0239. Online ahead of print. https://doi.org/10.3399/BJGP.2025.0239

Characteristics and in-hospital outcomes of patients presenting to a level 1 trauma center classified under the modified Brain Injury Guidelines. Kim KT. J Neurosurg. 2025 Oct 10:1-8. doi: 10.3171/2025.6.JNS25342. Online ahead of print. https://doi.org/10.3171/2025.6.JNS25342

[What the e-MUST Registry Reveals About Myocardial Infarction in Women]. Lapostolle F. Ann Cardiol Angeiol (Paris). 2025 Sep;74(4):101925. doi: 10.1016/j.ancard.2025.101925. Epub 2025 Aug 20. https://doi.org/10.1016/j.ancard.2025.101925

Rapid thawing of fresh frozen plasma with a 45°C dry tempering system maintains critical coagulation activities. Rikimaru S. Transfusion. 2025 Nov;65(11):2024-2033. doi: 10.1111/trf.18426. Epub 2025 Sep 22. https://doi.org/10.1111/trf.18426

Role of artificial intelligence in virtual emergency care: a protocol for a systematic review. Shankar R. BMJ Open. 2025 Sep 28;15(9):e103084. doi: 10.1136/bmjopen-2025-103084. https://doi.org/10.1136/bmjopen-2025-103084

Changes in the nationwide number of emergency department visits following the junior physicians' walkout in South Korea: An interrupted time-series analysis. Han C. Public Health. 2025 Dec;249:105984. doi: 10.1016/j.puhe.2025.105984. Epub 2025 Oct 10. https://doi.org/10.1016/j.puhe.2025.105984

A Decade of Specialized Acute Care: Clinical Impact of an Oncology-Hematology Emergency Room Compared to General Emergency Services. Malavasi N. Cancer Med. 2025 Nov;14(22):e71377. doi: 10.1002/cam4.71377. https://doi.org/10.1002/cam4.71377

Impact of the WHO emergency care toolkit on mortality in Zambia: an implementation-effectiveness hybrid study. Broccoli MC. BMJ Glob Health. 2025 Nov 9;10(11):e019729. doi: 10.1136/bmjgh-2025-019729. https://doi.org/10.1136/bmjgh-2025-019729

Randomised hybrid type 1 pilot trial evaluating preliminary effectiveness and implementation of an emergency care action plan (ECAP) for infants with medical complexity within a rural health network: a study protocol. Palaza A. BMJ Open. 2025 Oct 6;15(10):e106842. doi: 10.1136/bmjopen-2025-106842. https://doi.org/10.1136/bmjopen-2025-106842

Transition to Plain Language Overhead Emergency Announcements: An Experiential Account. Gray PJ. Mil Med. 2025 Nov 1;190(11-12):e2652-e2658. doi: 10.1093/milmed/usaf171. https://doi.org/10.1093/milmed/usaf171

An In Vitro Assessment of a Biopolymer-Based Medical Foam for Enhanced Antifibrinolytic and Infection Prophylaxis for Acute Wound Management. Stoner AK. ACS Appl Bio Mater. 2025 Nov 18. doi: 10.1021/acsabm.5c01584. Online ahead of print. https://doi.org/10.1021/acsabm.5c01584

Systems-based care of the injured child: Technical report. Flynn-O'Brien KT. J Trauma Acute Care Surg. 2025 Sep 1;99(3):e23-e41. doi: 10.1097/TA.0000000000004736. Epub 2025 Aug 18. https://doi.org/10.1097/TA.0000000000004736

Systems-Based Care of the Injured Child: Technical Report. Flynn-O'Brien KT. J Trauma Nurs. 2025 Sep-Oct 01;32(5):227-251. doi: 10.1097/JTN.0000000000000876. Epub 2025 Sep 5. https://doi.org/10.1097/JTN.0000000000000876

RETRACTED: Artificial intelligence for emergency medical care. Rajput S. Health Care Sci. 2023 Oct 13;4(5):359-374. doi: 10.1002/hcs2.72. eCollection 2025 Oct. https://doi.org/10.1002/hcs2.72

Exploring thunderstorm asthma in South Australia. Lyne K. Int J Biometeorol. 2025 Nov;69(11):2953-2965. doi: 10.1007/s00484-025-03000-8. Epub 2025 Sep 24. https://doi.org/10.1007/s00484-025-03000-8

NuRse-led home CardiovErsion for control of atrial fibrillation-RACE 6. Hengstman G. Neth Heart J. 2025 Sep;33(9):281-285. doi: 10.1007/s12471-025-01972-1. Epub 2025 Jul 31. https://doi.org/10.1007/s12471-025-01972-1

A Better Standard to Assess the Performance of Portable Suction Devices: Time-Averaged Air Flow Rate. Peri SR. Ann Biomed Eng. 2025 Oct;53(10):2648-2657. doi: 10.1007/s10439-025-03764-5. Epub 2025 Jul 10. https://doi.org/10.1007/s10439-025-03764-5

Discrepancies in Bystander CPR Documentation: Comparing the Birmingham CARES Data with 9-1-1 Audio Review. Coute RA. Prehosp Emerg Care. 2025 Nov 17:1-8. doi: 10.1080/10903127.2025.2584506. Online ahead of print. https://doi.org/10.1080/10903127.2025.2584506

Organization and delivery of medical services at the 19th Asian Games in Hangzhou China. Yang Y. Sci Rep. 2025 Oct 2;15(1):34446. doi: 10.1038/s41598-025-17565-2. https://doi.org/10.1038/s41598-025-17565-2

Risk factors for failure of the first intubation attempt during cardiopulmonary resuscitation in out-of-hospital emergency settings: What about chest compression?. Galinski M. Resuscitation. 2025 Sep;214:110623. doi: 10.1016/j.resuscitation.2025.110623. Epub 2025 Apr 26. https://doi.org/10.1016/j.resuscitation.2025.110623

Systems-Based Care of the Injured Child: Policy Statement. Flynn-O'Brien KT. J Trauma Nurs. 2025 Sep-Oct 01;32(5):220-226. doi: 10.1097/JTN.0000000000000877. Epub 2025 Sep 5. https://doi.org/10.1097/JTN.0000000000000877

Systems-based care of the injured child: Policy statement. Flynn-O'Brien KT. J Trauma Acute Care Surg. 2025 Sep 1;99(3):351-356. doi: 10.1097/TA.0000000000004735. Epub 2025 Aug 18. https://doi.org/10.1097/TA.0000000000004735

A scoping review of emergency front of neck access (eFONA) for airway access in the setting of trauma. Kocik VI. Am J Emerg Med. 2025 Nov;97:72-83. doi: 10.1016/j.ajem.2025.07.028. Epub 2025 Jul 11. https://doi.org/10.1016/j.ajem.2025.07.028

What every intensivist should know about exertional heat stroke. Stomeo N. J Crit Care. 2025 Oct;89:155134. doi: 10.1016/j.jcrc.2025.155134. Epub 2025 Jun 3. https://doi.org/10.1016/j.jcrc.2025.155134

Health System Preparedness for Nuclear and Radiological Disasters: A Review. Pandya J. Disaster Med Public Health Prep. 2025 Nov 7;19:e312. doi: 10.1017/dmp.2025.8. https://doi.org/10.1017/dmp.2025.8

The impact of the COVID-19 pandemic on adult out-of-hospital cardiac arrest incidence, community response, and outcomes in England: An interrupted time series analysis. Contreras A. Resuscitation. 2025 Nov;216:110823. doi: 10.1016/j.resuscitation.2025.110823. Epub 2025 Sep 16. https://doi.org/10.1016/j.resuscitation.2025.110823

Anticoagulant management in Emergency settings: 2024 guidelines from the French Society of Emergency Medicine (SFMU), the French Society of Anaesthesia and Intensive Care Medicine (SFAR), the French Society of Thrombosis and Haemostasis (SFTH) and the French Working Group on Perioperative Haemostasis (GIHP), endorsed by the French Neurovascular Society. Douillet D. Anaesth Crit Care Pain Med. 2025 Sep;44(5):101584. doi: 10.1016/j.accpm.2025.101584. Epub 2025 Jun 26. https://doi.org/10.1016/j.accpm.2025.101584

Acute heart failure care - a consensus series of an international experts' group. Cotter G. Eur J Heart Fail. 2025 Sep 28. doi: 10.1002/ejhf.70057. Online ahead of print. https://doi.org/10.1002/ejhf.70057

Systems-Based Care of the Injured Child: Technical Report. Flynn-O'Brien KT. Pediatrics. 2025 Sep 1;156(3):e2025072721. doi: 10.1542/peds.2025-072721. https://doi.org/10.1542/peds.2025-072721

Systems-Based Care of the Injured Child: Policy Statement. Flynn-O'Brien KT. Pediatrics. 2025 Sep 1;156(3):e2025072720. doi: 10.1542/peds.2025-072720. https://doi.org/10.1542/peds.2025-072720

Can cMyc challenge cTn?. Li Q. Lab Med. 2025 Oct 8:lmaf059. doi: 10.1093/labmed/lmaf059. Online ahead of print. https://doi.org/10.1093/labmed/lmaf059

Evaluation of injury prevention interventions using the stepped wedge cluster randomised trial design: key considerations. Ouyang Y. Inj Prev. 2025 Oct 5:ip-2025-045788. doi: 10.1136/ip-2025-045788. Online ahead of print. https://doi.org/10.1136/ip-2025-045788

Pathogen-Reduced Low-Titer Group O Whole Blood for Managing Massive Blood Loss in Prehospital and Early Hospital Settings: An In Vitro Study. Sherstyukova E. J Clin Med. 2025 Sep 5;14(17):6292. doi: 10.3390/jcm14176292. https://doi.org/10.3390/jcm14176292

Sex disparities in receipt of layperson bystander cardiopulmonary resuscitation and survival for adults who experienced out-of-hospital cardiac arrest in China. Ma J. Resuscitation. 2025 Oct;215:110776. doi: 10.1016/j.resuscitation.2025.110776. Epub 2025 Aug 15. https://doi.org/10.1016/j.resuscitation.2025.110776

The impact of telehealth care on escalation to emergency care: A systematic review and meta-analysis. Scott AM. J Telemed Telecare. 2025 Sep;31(8):1059-1077. doi: 10.1177/1357633X241259525. Epub 2024 Jun 5. https://doi.org/10.1177/1357633X241259525

Assessing Racial and Ethnic Disparities in Receipt of Tele-Emergency Care. Faiz J. Med Care. 2025 Nov 1;63(11):866-874. doi: 10.1097/MLR.0000000000002207. Epub 2025 Sep 10. https://doi.org/10.1097/MLR.0000000000002207

Emergency Related Mental Health Challenges Among Frontline Health Workers in Khyber Pakhtunkhwa, Pakistan: A Cross-Sectional Study. Rehman A. Disaster Med Public Health Prep. 2025 Oct 3;19:e286. doi: 10.1017/dmp.2025.10210. https://doi.org/10.1017/dmp.2025.10210

Examining the geriatric-friendliness of emergency departments in the Canadian province with the oldest population. Jacques Q. CJEM. 2025 Oct;27(10):820-829. doi: 10.1007/s43678-025-00974-7. Epub 2025 Jul 28. https://doi.org/10.1007/s43678-025-00974-7

Skill mix changes in healthcare professions during the COVID-19 pandemic: a scoping review. Petka-Nosal N. BMJ Open. 2025 Oct 15;15(10):e100024. doi: 10.1136/bmjopen-2025-100024. https://doi.org/10.1136/bmjopen-2025-100024

Same-Day Hospital Discharge Is Feasible for a Variety of Urologic Surgeries When Using a Virtual Hybrid Care Hotel. Hampton S. Urol Pract. 2025 Nov;12(6):683-690. doi: 10.1097/UPJ.0000000000000879. Epub 2025 Aug 8. https://doi.org/10.1097/UPJ.0000000000000879

The Hennepin Healthcare Forced Ketamine Studies, Excited Delirium, and Police Violence. Elliott C. Hastings Cent Rep. 2025 Sep-Oct;55(5):29-40. doi: 10.1002/hast.4985. https://doi.org/10.1002/hast.4985

Increasing access: Making naloxone available at highway rest areas. Ingram T. Explor Res Clin Soc Pharm. 2025 Sep 19;20:100660. doi: 10.1016/j.rcsop.2025.100660. eCollection 2025 Dec. https://doi.org/10.1016/j.rcsop.2025.100660

Initial Double Sequential External Defibrillation for Refractory Ventricular Fibrillation in Cardiac Sarcoidosis. Duncan TJ. JACC Case Rep. 2025 Nov 7:105945. doi: 10.1016/j.jaccas.2025.105945. Online ahead of print. https://doi.org/10.1016/j.jaccas.2025.105945

'It's that camaraderie': Experiences of a Long-COVID peer support group for staff working in health, social care and emergency services. Somerton A. J Health Psychol. 2025 Sep;30(10):2460-2474. doi: 10.1177/13591053241296184. Epub 2024 Nov 22. https://doi.org/10.1177/13591053241296184

Engaging Community Reviewers: The Geriatric Emergency Care Applied Research (2.0)-Advancing Dementia Care Network Approach. Gifford A. J Am Geriatr Soc. 2025 Sep;73(9):2678-2684. doi: 10.1111/jgs.19515. Epub 2025 May 16. https://doi.org/10.1111/jgs.19515

Spectator medicine in the men's international Ice Hockey World Championships in 2022 and 2023. Bister V. BMC Health Serv Res. 2025 Oct 3;25(1):1301. doi: 10.1186/s12913-025-13504-z. https://doi.org/10.1186/s12913-025-13504-z

Prospective randomized trial of standard left anterolateral thoracotomy vs modified bilateral clamshell thoracotomy performed by emergency physicians in a live tissue penetrating cardiac injury model. Newberry R. Am J Emerg Med. 2025 Sep 11;99:70-75. doi: 10.1016/j.ajem.2025.09.012. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.09.012

The First Eight Years of the Manitoba TeleStroke Program: An Observational Study. Alcock S. Can J Neurol Sci. 2025 Oct 24:1-11. doi: 10.1017/cjn.2025.10460. Online ahead of print. https://doi.org/10.1017/cjn.2025.10460

Comparing complications in pediatric trauma patients transported before and after 30 minutes. Hung G. J Pediatr Surg. 2025 Sep 12:162664. doi: 10.1016/j.jpedsurg.2025.162664. Online ahead of print. https://doi.org/10.1016/j.jpedsurg.2025.162664

Independence of the mortality of severely injured patients from types of transport and hospital level in a well-developed trauma network. Ernstberger A. Eur J Trauma Emerg Surg. 2025 Oct 28;51(1):322. doi: 10.1007/s00068-025-02997-2. https://doi.org/10.1007/s00068-025-02997-2

Intraosseous administration of lyophilized synthetic platelets renders hemostatic efficacy in rat model of traumatic hemorrhage. Liu Z. J Thromb Haemost. 2025 Nov 10:S1538-7836(25)00831-1. doi: 10.1016/j.jtha.2025.10.030. Online ahead of print. https://doi.org/10.1016/j.jtha.2025.10.030

A Machine Learning Approach for Real-Time Detection of Inadequate Sedation Using Non-EEG Physiological Signals. Wang H. Bioengineering (Basel). 2025 Sep 29;12(10):1049. doi: 10.3390/bioengineering12101049. https://doi.org/10.3390/bioengineering12101049

Impact of Extreme Temperatures on Hemostatic Gauze Using Thromboelastography. Ockenfels BA. Wilderness Environ Med. 2025 Sep 24:10806032251376307. doi: 10.1177/10806032251376307. Online ahead of print. https://doi.org/10.1177/10806032251376307

Informing relatives of non-surviving patients about research participation following out-of-hospital cardiac arrest: a prospective cohort study. Pocock H. Resusc Plus. 2025 Oct 15;26:101131. doi: 10.1016/j.resplu.2025.101131. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101131

Rapid diagnosis of pediatric nonconvulsive status epilepticus using point-of-care EEG. Simma L. Am J Emerg Med. 2025 Oct 6;99:241-247. doi: 10.1016/j.ajem.2025.10.017. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.10.017

A soft robotic device for rapid and self-guided intubation. Haggerty DA. Sci Transl Med. 2025 Sep 10;17(815):eads7681. doi: 10.1126/scitranslmed.ads7681. Epub 2025 Sep 10. https://doi.org/10.1126/scitranslmed.ads7681

SARSIM: Exploring the Impact of Simulation-Based Training on the Medical Skill Comfort Level of Search and Rescue Volunteers. Baker NJ. Wilderness Environ Med. 2025 Nov 28:10806032251387111. doi: 10.1177/10806032251387111. Online ahead of print. https://doi.org/10.1177/10806032251387111

Critical care challenges after severe trauma surgery. Werner M. Curr Opin Crit Care. 2025 Dec 1;31(6):774-781. doi: 10.1097/MCC.0000000000001334. Epub 2025 Oct 3. https://doi.org/10.1097/MCC.0000000000001334

Establishing an Essential Dataset for Trauma Registry in LMICs: Insights From a Delphi Survey. Farhat T. World J Surg. 2025 Sep;49(9):2585-2593. doi: 10.1002/wjs.70009. Epub 2025 Jul 16. https://doi.org/10.1002/wjs.70009

Factors influencing pregnant women's use of antenatal and emergency care services covered by social security: findings from the maternal eCohort in Mexico. Doubova SV. BMC Pregnancy Childbirth. 2025 Nov 4;25(1):1160. doi: 10.1186/s12884-025-08301-9. https://doi.org/10.1186/s12884-025-08301-9

Sex-related differences in the association of obesity described by emergency medical teams on outcomes in out-of-hospital cardiac arrest patients. Briz VD. Adv Clin Exp Med. 2025 Oct;34(10):1637-1647. doi: 10.17219/acem/193367. https://doi.org/10.17219/acem/193367

Predicting the unpredictable: unveiling hidden patterns of emergency department unexpected deaths - a retrospective study. Gontier R. Acta Clin Belg. 2025 Nov 24:1-10. doi: 10.1080/17843286.2025.2594469. Online ahead of print. https://doi.org/10.1080/17843286.2025.2594469

Factors for good neurological outcome in adult OHCA with initial shockable rhythm: a retrospective multicenter cohort study from the German Resuscitation Registry. Katzenschlager S. Resusc Plus. 2025 Jul 5;25:101022. doi: 10.1016/j.resplu.2025.101022. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101022

New openEHR technology and clinical collaboration in vital steps toward improved patient care and true interoperability: Scotland's first digital ReSPECT emergency care plan. Mclean S. BMJ Health Care Inform. 2025 Sep 10;32(1):e101435. doi: 10.1136/bmjhci-2025-101435. https://doi.org/10.1136/bmjhci-2025-101435

Mobile ECMO for inter-hospital transport of pediatric patients: experience from 22 cases. Yang Y. Front Pediatr. 2025 Sep 24;13:1664454. doi: 10.3389/fped.2025.1664454. eCollection 2025. https://doi.org/10.3389/fped.2025.1664454

[The impact of Leary's interpersonal relationships and attachment styles in the background of suicide attempts in borderline personality disorder]. Csizmadia L. Ideggyogy Sz. 2025 Sep 30;78(9-10):307-317. doi: 10.18071/isz.78.0307. https://doi.org/10.18071/isz.78.0307

Exploring the Implementation of Early Mobilization of Stroke Patients in Qatar. Viswambharan J. Cureus. 2025 Sep 20;17(9):e92798. doi: 10.7759/cureus.92798. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92798

Characteristics and outcomes of children initiated on high flow nasal cannula and continuous positive airway pressure at the emergency centre of a district hospital in South Africa. Head J. Afr J Emerg Med. 2025 Sep;15(3):100884. doi: 10.1016/j.afjem.2025.100884. Epub 2025 Jun 16. https://doi.org/10.1016/j.afjem.2025.100884

Healthcare usage and cost-effectiveness of approach bias modification at 12-months for patients undergoing inpatient withdrawal for alcohol use disorder. Huxley N. J Subst Use Addict Treat. 2025 Nov 24;181:209834. doi: 10.1016/j.josat.2025.209834. Online ahead of print. https://doi.org/10.1016/j.josat.2025.209834

"We Should Not Call an Ambulance, Even If We are Very Sick": Ukrainian Refugee Women's Experiences in the United States Healthcare System. Gepshtein YD. J Immigr Minor Health. 2025 Oct;27(5):766-777. doi: 10.1007/s10903-025-01710-0. Epub 2025 Jul 4. https://doi.org/10.1007/s10903-025-01710-0

Postmortem Identification of a Foreign Body in the Heart: A Case Report. ahin K. Pediatr Cardiol. 2025 Oct;46(7):2133-2136. doi: 10.1007/s00246-024-03672-w. Epub 2024 Oct 10. https://doi.org/10.1007/s00246-024-03672-w

Industrial Disasters-Preparedness and Response Perspectives: Integrating ISO 45001, MIMMS, and Local MCI Response Plans. Eddahiri K. Disaster Med Public Health Prep. 2025 Nov 13;19:e316. doi: 10.1017/dmp.2025.10245. https://doi.org/10.1017/dmp.2025.10245

From Conference Presentation to Publication: An Analysis of Abstracts Presented at NAEMSP Scientific Sessions, 2018-2022. Kimbrell JM. Prehosp Emerg Care. 2025 Oct 28:1-4. doi: 10.1080/10903127.2025.2568084. Online ahead of print. https://doi.org/10.1080/10903127.2025.2568084

Improving Door-In-Door-Out Times for STEMI Transfer Patients: Impact of a Protocolized Autolaunch Process. Zaidi H. JACC Case Rep. 2025 Nov 5;30(35):104882. doi: 10.1016/j.jaccas.2025.104882. Epub 2025 Sep 9. https://doi.org/10.1016/j.jaccas.2025.104882

Aniline-induced refractory methemoglobinemia in polytrauma: successful management with erythrocytapheresis. Le bychová K. Int J Emerg Med. 2025 Nov 6;18(1):232. doi: 10.1186/s12245-025-01026-8. https://doi.org/10.1186/s12245-025-01026-8

Knowledge and practices of infection prevention and control measures in the obstetrics and gynecology department of a referral hospital in Cameroon. Cheuyem FZL. Antimicrob Resist Infect Control. 2025 Nov 24. doi: 10.1186/s13756-025-01666-8. Online ahead of print. https://doi.org/10.1186/s13756-025-01666-8

Intraosseous versus intravenous vascular access in adults with out-of-hospital cardiac arrest: a meta-analysis with trial sequential analysis and meta-regression analysis. Ibrahim A. Eur J Emerg Med. 2025 Oct 1;32(5):314-324. doi: 10.1097/MEJ.0000000000001267. Epub 2025 Aug 4. https://doi.org/10.1097/MEJ.0000000000001267

Delayed adrenaline administration prolongs adrenaline-to-ROSC interval in out-of-hospital cardiac arrest. Hubble MW. Br Paramed J. 2025 Sep 1;10(2):8-16. doi: 10.29045/14784726.2025.9.10.2.8. https://doi.org/10.29045/14784726.2025.9.10.2.8

Part 8: Pediatric Advanced Life Support: 2025 American Heart Association and American Academy of Pediatrics Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Lasa JJ. Pediatrics. 2025 Oct 22. doi: 10.1542/peds.2025-074351. Online ahead of print. https://doi.org/10.1542/peds.2025-074351

Unlocking the potential of uncontrolled DCD in lung transplantation: A review of 2 decades of experience. Bello I. JHLT Open. 2025 Aug 14;10:100374. doi: 10.1016/j.jhlto.2025.100374. eCollection 2025 Nov. https://doi.org/10.1016/j.jhlto.2025.100374

Recognition of stroke symptoms indicative of anterior circulation large-vessel occlusion via telephone and video calls: a simulation study. Herrmann ML. BMC Emerg Med. 2025 Sep 10;25(1):180. doi: 10.1186/s12873-025-01344-3. https://doi.org/10.1186/s12873-025-01344-3

Minor Decrease of Core Temperature in Shivering Volunteers Over a 3-Hour Exposure to Cold, Wet, and Windy Conditions. Helland AM. Wilderness Environ Med. 2025 Oct 24:10806032251378099. doi: 10.1177/10806032251378099. Online ahead of print. https://doi.org/10.1177/10806032251378099

Cardiac arrest events on Australian beaches. Reid D. Resusc Plus. 2025 Sep 9;26:101092. doi: 10.1016/j.resplu.2025.101092. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101092

Solvent-Detergent Treated Pooled Human Plasma Provides Superior Hemodynamic Stability and Cerebral Tissue Oxygenation Compared to Crystalloid in a Cynomolgus Macaque Model of Traumatic Hemorrhagic Shock. Neidert LE. Shock. 2025 Sep 5. doi: 10.1097/SHK.0000000000002686. Online ahead of print. https://doi.org/10.1097/SHK.0000000000002686

Influence of esophageal temperature probe tip placement on core temperature measurement accuracy in cold environments: a randomized crossover trial with implications for cardiac arrest management. Roveri G. Resusc Plus. 2025 Sep 4;26:101087. doi: 10.1016/j.resplu.2025.101087. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101087

Clinical applications of portable CT scanners. Khalid RN. Br J Radiol. 2025 Nov 1;98(1175):1736-1747. doi: 10.1093/bjr/tqaf175. https://doi.org/10.1093/bjr/tqaf175

Common femoral artery access in emergency medicine. Burns B. Emerg Med J. 2025 Oct 28:emermed-2025-215295. doi: 10.1136/emermed-2025-215295. Online ahead of print. https://doi.org/10.1136/emermed-2025-215295

Malaysian assistant medical officers: The profession's history, education, practices, and future. Mahmud A. JAAPA. 2025 Sep 1;38(9):e9-e14. doi: 10.1097/01.JAA.0000000000000221. Epub 2025 Aug 26. https://doi.org/10.1097/01.JAA.0000000000000221

The effect of leukoreduction and prolonged storage on coagulation in cold-stored whole blood: An in vitro study. Susila S. Vox Sang. 2025 Sep;120(9):881-891. doi: 10.1111/vox.70075. Epub 2025 Aug 5. https://doi.org/10.1111/vox.70075

Unlocking survival in traumatic cardiac arrest: global insights, innovations, and unmet needs. Jiang S. Crit Care. 2025 Oct 24;29(1):449. doi: 10.1186/s13054-025-05700-4. https://doi.org/10.1186/s13054-025-05700-4

Cumulative effect of public health interventions on time interval to first chest compression and survival outcomes in out-of-hospital cardiac arrest. Li Y. Resuscitation. 2025 Nov;216:110827. doi: 10.1016/j.resuscitation.2025.110827. Epub 2025 Sep 12. https://doi.org/10.1016/j.resuscitation.2025.110827

Timing of Advanced Airway Management in Witnessed Pediatric Out-of-Hospital Cardiac Arrest. Amagasa S. Pediatr Emerg Care. 2025 Sep 1;41(9):e81-e86. doi: 10.1097/PEC.0000000000003412. Epub 2025 May 12. https://doi.org/10.1097/PEC.0000000000003412

Impact of two-level filtering organization on population's accessibility to an emergency medical communication centre. Uro L. BMC Emerg Med. 2025 Sep 26;25(1):192. doi: 10.1186/s12873-025-01310-z. https://doi.org/10.1186/s12873-025-01310-z

Association of Component Strategies of the Target Stroke Phase 3 Nationwide Quality Improvement Program With Accelerated Door-to-Puncture and Door-In-Door-Out Times for Ischemic Stroke Endovascular Thrombectomy in the United States. Mac Grory B. Circ Cardiovasc Qual Outcomes. 2025 Nov;18(11):e012456. doi: 10.1161/CIRCOUTCOMES.125.012456. Epub 2025 Oct 20. https://doi.org/10.1161/CIRCOUTCOMES.125.012456

Refractory ventricular fibrillation from thyrotoxic hypokalemic periodic paralysis. Stults G. Am J Emerg Med. 2025 Sep;95:291.e1-291.e2. doi: 10.1016/j.ajem.2025.06.011. Epub 2025 Jun 7. https://doi.org/10.1016/j.ajem.2025.06.011

An end-to-end solution for out-of-hospital emergency medical dispatch triage based on multimodal and continual deep learning. Ferri P. Artif Intell Med. 2025 Dec;170:103264. doi: 10.1016/j.artmed.2025.103264. Epub 2025 Sep 10. https://doi.org/10.1016/j.artmed.2025.103264

Assessing the Effectiveness of Automatic Speech Recognition Technology in Emergency Medicine Settings: a Comparative Study of Four AI-Powered Engines. Luo X. J Healthc Inform Res. 2025 Mar 19;9(3):494-512. doi: 10.1007/s41666-025-00193-w. eCollection 2025 Sep. https://doi.org/10.1007/s41666-025-00193-w

Natural language processing for triage of cerebral large-vessel occlusion. Andrade JBC. Arq Neuropsiquiatr. 2025 Nov;83(11):1-9. doi: 10.1055/s-0045-1813238. Epub 2025 Dec 2. https://doi.org/10.1055/s-0045-1813238

Advancements in burn size assessment: A systematic review of emerging technologies. Woods A. Burns. 2025 Nov 15;52(1):107782. doi: 10.1016/j.burns.2025.107782. Online ahead of print. https://doi.org/10.1016/j.burns.2025.107782

Evaluation of ST-segment agreement between Spandan Pro and gold standard electrocardiogram for percutaneous coronary intervention decision-making. Pandey CB. Egypt Heart J. 2025 Oct 7;77(1):92. doi: 10.1186/s43044-025-00691-7. https://doi.org/10.1186/s43044-025-00691-7

Association of Scene Time Interval and Field Arrival to Epinephrine Administration Time with Outcomes in Cardiac Arrest. Okada Y. J Clin Med. 2025 Sep 20;14(18):6645. doi: 10.3390/jcm14186645. https://doi.org/10.3390/jcm14186645

Procedure duration predicts outcomes more than prehospital delay in endovascular stroke treatment. Saad H. J Neurointerv Surg. 2025 Sep 19:jnis-2025-023906. doi: 10.1136/jnis-2025-023906. Online ahead of print. https://doi.org/10.1136/jnis-2025-023906

Sex differences in out-of-hospital cardiac arrest: the impact of comorbidities on first monitored rhythm. Casarini E. Resuscitation. 2025 Nov 11;217:110894. doi: 10.1016/j.resuscitation.2025.110894. Online ahead of print. https://doi.org/10.1016/j.resuscitation.2025.110894

Unplanned intensive care unit admissions in trauma patients: A critical appraisal. Swain A. World J Crit Care Med. 2025 Sep 9;14(3):105147. doi: 10.5492/wjccm.v14.i3.105147. eCollection 2025 Sep 9. https://doi.org/10.5492/wjccm.v14.i3.105147

Health system drivers of antimicrobial resistance: a qualitative exploration of implications for infection prevention and control in hospitals and long-term care facilities in Merseyside. Alhassan Y. J Hosp Infect. 2025 Dec;166:12-20. doi: 10.1016/j.jhin.2025.08.004. Epub 2025 Sep 7. https://doi.org/10.1016/j.jhin.2025.08.004

Out-of-hospital cardiac arrest: A 10-year analysis of survival and neurological outcomes. Schwaiger D. Heart Lung. 2025 Sep-Oct;73:1-8. doi: 10.1016/j.hrtlng.2025.04.003. Epub 2025 Apr 18. https://doi.org/10.1016/j.hrtlng.2025.04.003

Sickness absence due to common mental disorders and antidepressant prescription among health and social care workers during as compared to before the COVID-19 pandemic - a nationwide register study of the Swedish population. Kirchner S. J Occup Health. 2025 Nov 25:uiaf067. doi: 10.1093/joccuh/uiaf067. Online ahead of print. https://doi.org/10.1093/joccuh/uiaf067

Retrospective analysis of characteristics and transfer times of helicopter interhospital transfer of stroke patients: balancing air and ground transport efficiency. Hoechter DJ. Scand J Trauma Resusc Emerg Med. 2025 Nov 15;33(1):184. doi: 10.1186/s13049-025-01506-z. https://doi.org/10.1186/s13049-025-01506-z

Stroke and post-stroke aphasia management in low- and middle-income African countries: a scoping review. Kankam K. Disabil Rehabil. 2025 Nov;47(22):5700-5717. doi: 10.1080/09638288.2025.2493209. Epub 2025 Apr 22. https://doi.org/10.1080/09638288.2025.2493209

The Implementation of Dynamic Appraisal of Situational Aggression Score at Emergency Department Triage. Costigan AD. Ann Emerg Med. 2025 Oct;86(4):374-383. doi: 10.1016/j.annemergmed.2025.02.023. Epub 2025 Apr 2. https://doi.org/10.1016/j.annemergmed.2025.02.023

Circumstances in a young German cohort with sudden cardiac arrest: systematic insights and implications. Kreimer F. Clin Res Cardiol. 2025 Oct;114(10):1440-1444. doi: 10.1007/s00392-025-02593-9. Epub 2025 Jan 22. https://doi.org/10.1007/s00392-025-02593-9

Implementation of a Package of Emergency Care Interventions and Clinical Outcomes. Bills CB. JAMA Netw Open. 2025 Oct 1;8(10):e2539471. doi: 10.1001/jamanetworkopen.2025.39471. https://doi.org/10.1001/jamanetworkopen.2025.39471

Integrating multiple data sources to predict all-cause readmission or mortality in patients with substance misuse. Gruenloh T. PLOS Digit Health. 2025 Sep 18;4(9):e0001008. doi: 10.1371/journal.pdig.0001008. eCollection 2025 Sep. https://doi.org/10.1371/journal.pdig.0001008

Category Characteristics and Influencing Factors of Stroke Preparedness Among Middle-Aged and Older Adults: A Latent Class Study. Mai Q. Nurs Health Sci. 2025 Sep;27(3):e70223. doi: 10.1111/nhs.70223. https://doi.org/10.1111/nhs.70223

Lymphoma: factors associated with unplanned diagnostic pathways and survival -a nationwide Danish register-based cohort study. Rasmussen LA. Leuk Lymphoma. 2025 Oct;66(10):1863-1874. doi: 10.1080/10428194.2025.2508299. Epub 2025 May 27. https://doi.org/10.1080/10428194.2025.2508299

Conference Proceedings for the 2024 Design for Implementation: The Future of Trauma Research and Clinical Guidance Conference Series. Wilson DJ. Trauma Surg Acute Care Open. 2025 Sep 5;10(Suppl 5):e001583. doi: 10.1136/tsaco-2024-001583. eCollection 2025. https://doi.org/10.1136/tsaco-2024-001583

Augmenting early stroke diagnosis with an eye-tracker. Hassan MA. Front Neurol. 2025 Oct 14;16:1632939. doi: 10.3389/fneur.2025.1632939. eCollection 2025. https://doi.org/10.3389/fneur.2025.1632939

Comment on "Pediatric emergency backpacks-effects of using xABCDE- and Broselow-systems on pediatric emergency care". Khan S. Eur J Pediatr. 2025 Oct 16;184(11):696. doi: 10.1007/s00431-025-06547-1. https://doi.org/10.1007/s00431-025-06547-1

Comparison of the Victorian emergency minimum dataset (VEMD) human intent coding descriptor to medical records in discriminating suicide attempts for emergency presentations to Eastern Health Psychiatric Triage, Victoria, Australia. Hang T. Health Inf Manag. 2025 Sep 4:18333583251360616. doi: 10.1177/18333583251360616. Online ahead of print. https://doi.org/10.1177/18333583251360616

Preventing Fentanyl-Related Overdose Deaths with Naloxone-A Medical Examiner Study. Alexander GD. Am J Forensic Med Pathol. 2025 Sep 1;46(3):207-216. doi: 10.1097/PAF.0000000000001028. Epub 2025 Feb 13. https://doi.org/10.1097/PAF.0000000000001028

Trends and age-period-cohort effect on incidence and mortality of unintentional drowning from 1990 to 2021 in China. Jiang P. Inj Prev. 2025 Nov 13:ip-2025-045635. doi: 10.1136/ip-2025-045635. Online ahead of print. https://doi.org/10.1136/ip-2025-045635

Chiropractic students versus emergency care practitioners in simulated musculoskeletal emergencies. Balanco I. Health SA. 2025 Oct 31;30:3195. doi: 10.4102/hsag.v30i0.3195. eCollection 2025. https://doi.org/10.4102/hsag.v30i0.3195

Expert Versus Peer-Led Hands-on Training for Army Medics: A Non-Inferiority Study of Focused Assessment with Sonography in Trauma Performance. Miller CL. Mil Med. 2025 Nov 4:usaf526. doi: 10.1093/milmed/usaf526. Online ahead of print. https://doi.org/10.1093/milmed/usaf526

In vitro inhibition of snake venom toxins by varespladib, marimastat, nafamostat and dimercaprol. le Roux A. Toxicon. 2025 Dec;268:108626. doi: 10.1016/j.toxicon.2025.108626. Epub 2025 Oct 15. https://doi.org/10.1016/j.toxicon.2025.108626

Corticosteroids, Rifampicin and LMWH impact plasma aMMP-8 and TIMP-1 and aMMP-8/TIMP-1 molar ratio in methicillin-sensitive Staphylococcus aureus bacteraemia. Forsblom E. Int J Infect Dis. 2025 Nov 26:108261. doi: 10.1016/j.ijid.2025.108261. Online ahead of print. https://doi.org/10.1016/j.ijid.2025.108261

The Potential Implications of Neutrophil to Albumin Ratio for Short-term Prognosis in Myasthenia Gravis Patients. Lin H. Mol Neurobiol. 2025 Nov 27;63(1):192. doi: 10.1007/s12035-025-05555-4. https://doi.org/10.1007/s12035-025-05555-4

ET3 Treat in Place Program Implementation in a Large Urban EMS System. Castillo L. Prehosp Emerg Care. 2025 Oct 28:1-7. doi: 10.1080/10903127.2025.2576564. Online ahead of print. https://doi.org/10.1080/10903127.2025.2576564

Triangular fibrocartilage complex injury in cardiopulmonary resuscitation providers: A case report. He Y. Medicine (Baltimore). 2025 Sep 26;104(39):e44532. doi: 10.1097/MD.0000000000044532. https://doi.org/10.1097/MD.0000000000044532

Implementation of an EHR-Based Emergency Information Form for Children With Medical Complexity. Lyons TW. Hosp Pediatr. 2025 Sep 1;15(9):701-710. doi: 10.1542/hpeds.2025-008396. https://doi.org/10.1542/hpeds.2025-008396

PED-IA, a CDSS to support decision in pediatrics telephone triage: a crossover evaluation. Manns A. Comput Biol Med. 2025 Sep;195:110645. doi: 10.1016/j.compbiomed.2025.110645. Epub 2025 Jun 20. https://doi.org/10.1016/j.compbiomed.2025.110645

Limitations of the MIRACLE(2) score in coronary cardiac arrest: Findings from a French interventional cohort. Martin N. Arch Cardiovasc Dis. 2025 Nov 6:S1875-2136(25)00801-0. doi: 10.1016/j.acvd.2025.09.007. Online ahead of print. https://doi.org/10.1016/j.acvd.2025.09.007

Trends in Etiology and Mortality in Severe Polytrauma Patients with Traumatic Brain Injury: A 25-Year Retrospective Analysis. Mateo-Sierra O. J Clin Med. 2025 Oct 2;14(19):6986. doi: 10.3390/jcm14196986. https://doi.org/10.3390/jcm14196986

The possible effect of fentanyl on PTSD. Weiss Schonberg YO. Prog Neuropsychopharmacol Biol Psychiatry. 2025 Oct 2;142:111519. doi: 10.1016/j.pnpbp.2025.111519. Epub 2025 Oct 10. https://doi.org/10.1016/j.pnpbp.2025.111519

Drip and ship in patients with acute ischemic stroke: a narrative review. Palaiodimou L. Ther Adv Neurol Disord. 2025 Oct 6;18:17562864251378833. doi: 10.1177/17562864251378833. eCollection 2025. https://doi.org/10.1177/17562864251378833

Fenestrated Catheters are Superior to Non-Fenestrated Needle Thoracostomy Catheters in a Cadaveric Tension Pneumothorax Model. Kruse AJ. Prehosp Emerg Care. 2025 Sep 15:1-7. doi: 10.1080/10903127.2025.2549726. Online ahead of print. https://doi.org/10.1080/10903127.2025.2549726

Fatal and non-fatal civilian injuries sustained during law enforcement-reported encounters in California, 2016-2021. Dillon DG. Inj Prev. 2025 Nov 20;31(6):561-566. doi: 10.1136/ip-2024-045250. https://doi.org/10.1136/ip-2024-045250

Early complications related to acute myocardial infarction: evolution over 20 years and risk factors. The ECAMI study. Lapostolle F. Intern Emerg Med. 2025 Nov 18. doi: 10.1007/s11739-025-04192-y. Online ahead of print. https://doi.org/10.1007/s11739-025-04192-y

EEG-Based Deep Learning Model for Hyper-Acute Large Vessel Occlusion Stroke Detection in Mice. Zhang T. CNS Neurosci Ther. 2025 Sep;31(9):e70592. doi: 10.1111/cns.70592. https://doi.org/10.1111/cns.70592

Impact of AEDs and training of smartphone activated volunteers in residential areas on OHCA: a nationwide stepped-wedge implementation trial. Pek PP. Resuscitation. 2025 Sep 12;217:110826. doi: 10.1016/j.resuscitation.2025.110826. Online ahead of print. https://doi.org/10.1016/j.resuscitation.2025.110826

A team without a name: emergency medicine recognition and its impact on working conditions and well-being. Kemnitz MG. Med Klin Intensivmed Notfmed. 2025 Sep;120(6):481-486. doi: 10.1007/s00063-025-01275-8. Epub 2025 May 2. https://doi.org/10.1007/s00063-025-01275-8

Impact of Rural Dwelling on Emergency Department Visits for Individuals with Psychotic Disorders in Newfoundland and Labrador, Canada. Giovannini-Green ZEM. Schizophr Bull. 2025 Nov 8:sbaf198. doi: 10.1093/schbul/sbaf198. Online ahead of print. https://doi.org/10.1093/schbul/sbaf198

Experiences of Emergency Triage Nurses and Evidence of Bias in the Assessment of People Experiencing Homelessness. Martineau Jackson KY. J Adv Nurs. 2025 Oct 31. doi: 10.1111/jan.70336. Online ahead of print. https://doi.org/10.1111/jan.70336

Mobile Integrated Health vs a Transitions of Care Coordinator for Patients Discharged After Heart Failure: The Mighty-Heart Randomized Clinical Trial. Masterson Creber R. JAMA Intern Med. 2025 Nov 1;185(11):1341-1348. doi: 10.1001/jamainternmed.2025.4483. https://doi.org/10.1001/jamainternmed.2025.4483

Transcranial ultrasound tomography for brain imaging: Ex vivo results and potential for stroke imaging. Mitcham T. Med Phys. 2025 Oct;52(10):e18090. doi: 10.1002/mp.18090. https://doi.org/10.1002/mp.18090

Beyond Nurse Efficiency: A Multilevel Analysis of Nurse, Contextual, and Patient-Related Factors in Triage Duration. Zaboli A. J Emerg Nurs. 2025 Sep;51(5):816-825.e2. doi: 10.1016/j.jen.2025.04.008. Epub 2025 May 19. https://doi.org/10.1016/j.jen.2025.04.008

Does Single Dose Epinephrine Improve Outcomes for Patients with Out-of-Hospital Cardiac Arrest by Sex or Race?. Blaschke BL. West J Emerg Med. 2025 Sep 25;26(5):1313-1321. doi: 10.5811/westjem.41482. https://doi.org/10.5811/westjem.41482

Mapping Overdose Risk in Real Time: A Risk Terrain Modeling Analysis of 911 Calls in Detroit, 2022-2024. Lersch KM. J Public Health Manag Pract. 2026 Jan-Feb 01;32(1):66-69. doi: 10.1097/PHH.0000000000002238. Epub 2025 Nov 18. https://doi.org/10.1097/PHH.0000000000002238

Effect of Epinephrine Administration on Neurological Outcomes in Patients with Out-of-hospital Cardiac Arrest Receiving Bystander Cardiopulmonary Resuscitation. Otani H. Prehosp Emerg Care. 2025 Nov 18:1-12. doi: 10.1080/10903127.2025.2589961. Online ahead of print. https://doi.org/10.1080/10903127.2025.2589961

Does Time to Achieve a Targeted Body Temperature Matter for Survivors of Cardiac Arrest? A Systematic Review and Meta-Analysis. Alotaibi KS. Crit Care Med. 2025 Nov 11. doi: 10.1097/CCM.0000000000006964. Online ahead of print. https://doi.org/10.1097/CCM.0000000000006964

Comparing validated stroke screening scales for identifying large and medium vessel occlusions: a prospective observational cohort study. Kothari SA. J Neurointerv Surg. 2025 Nov 18;17(12):1320-1324. doi: 10.1136/jnis-2024-022309. https://doi.org/10.1136/jnis-2024-022309

Acute stroke management in the Caribbean: a scoping review protocol. Clervius H. BMJ Open. 2025 Nov 24;15(11):e104034. doi: 10.1136/bmjopen-2025-104034. https://doi.org/10.1136/bmjopen-2025-104034

Tranexamic acid in multiply injured patients-the independent risk of thromboembolic complications with repeated dosing: retrospective analysis based on the TraumaRegister DGU®. Bayer J. Scand J Trauma Resusc Emerg Med. 2025 Nov 15;33(1):185. doi: 10.1186/s13049-025-01512-1. https://doi.org/10.1186/s13049-025-01512-1

Near-Death Experience During Emergency Ketamine Use: A Case Report. Fritz P. Brain Behav. 2025 Oct;15(10):e70939. doi: 10.1002/brb3.70939. https://doi.org/10.1002/brb3.70939

Epidemiology and outcomes of out-of-hospital cardiac arrests treated by an anaesthetist-staffed emergency medical service: a 3-year registry analysis in The Friuli-Venezia-Giulia region. Pegani C. Resusc Plus. 2025 Jun 10;25:101000. doi: 10.1016/j.resplu.2025.101000. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101000

Transforming Emergency Care on the Slopes: A Study on the Integration of Nurses in Ski Patrol Teams. Longobardi M. Wilderness Environ Med. 2025 Nov 6:10806032251389927. doi: 10.1177/10806032251389927. Online ahead of print. https://doi.org/10.1177/10806032251389927

Effects of Cold Exposure on Neurological Mortality of Out-of-Hospital Cardiac Arrest Patients. Uechi T. J Emerg Med. 2025 Sep 30;80:119-133. doi: 10.1016/j.jemermed.2025.09.030. Online ahead of print. https://doi.org/10.1016/j.jemermed.2025.09.030

Education Research: Simulation-Based Interventions in Acute Stroke Care From Symptom Onset to Acute Treatment: A Scoping Review. Ajmi SC. Neurol Educ. 2025 Oct 29;4(4):e200263. doi: 10.1212/NE9.0000000000200263. eCollection 2025 Dec. https://doi.org/10.1212/NE9.0000000000200263

The effects of delays at each stage of care on mortality in patients with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. Rafizadeh O. Coron Artery Dis. 2025 Oct 22. doi: 10.1097/MCA.0000000000001578. Online ahead of print. https://doi.org/10.1097/MCA.0000000000001578

Risk Stratification for Early Seizures after Traumatic Brain Injury: A Clinical Scoring Model for Prediction and Management. Onda H. Neurotrauma Rep. 2025 Sep 23;6(1):804-812. doi: 10.1177/2689288X251377020. eCollection 2025. https://doi.org/10.1177/2689288X251377020

Protocol for an observational prospective study on the use and impact of over-the-phone interpretation in 911 calls with language discordance. Meischke H. BMC Public Health. 2025 Oct 9;25(1):3413. doi: 10.1186/s12889-025-24538-7. https://doi.org/10.1186/s12889-025-24538-7

Clinical characteristics and mortality risk factors in polytrauma patients with pelvic fractures: a retrospective study based on an integrated multidisciplinary treatment approach. Ding H. Int J Emerg Med. 2025 Oct 6;18(1):192. doi: 10.1186/s12245-025-00990-5. https://doi.org/10.1186/s12245-025-00990-5

Electronic Health Record-Integrated Legal Documentation to Measure Involuntary Mental Health Detention of Children. Edgcomb JB. JAACAP Open. 2024 Sep 18;3(3):689-700. doi: 10.1016/j.jaacop.2024.09.001. eCollection 2025 Sep. https://doi.org/10.1016/j.jaacop.2024.09.001

Efficacy of publicly accessible tourniquets: a systematic review of layperson performance utilizing simulation models. Bordonaro S. Adv Simul (Lond). 2025 Nov 18;10(1):57. doi: 10.1186/s41077-025-00390-y. https://doi.org/10.1186/s41077-025-00390-y

The association of blood transfusion and sustained return of spontaneous circulation in blunt traumatic out-of-hospital cardiac arrest. Huang CH. Emerg Med J. 2025 Oct 23:emermed-2025-215089. doi: 10.1136/emermed-2025-215089. Online ahead of print. https://doi.org/10.1136/emermed-2025-215089

Predictors of Survival in Patients With Severe Traumatic Brain Injury Undergoing Extracorporeal Membrane Oxygenation. Rafaqat W. J Surg Res. 2025 Sep;313:526-536. doi: 10.1016/j.jss.2025.06.021. Epub 2025 Jul 24. https://doi.org/10.1016/j.jss.2025.06.021

Defining emergency physicians' consultative roles in emergency care: a scoping review. Cunningham J. CJEM. 2025 Nov 3. doi: 10.1007/s43678-025-01025-x. Online ahead of print. https://doi.org/10.1007/s43678-025-01025-x

Mass gathering emergency medicine during the first international football event with anti-COVID-19 measures: An Italian experience. Romanò B. Saudi J Anaesth. 2025 Oct-Dec;19(4):580-586. doi: 10.4103/sja.sja_399_25. Epub 2025 Sep 3. https://doi.org/10.4103/sja.sja_399_25

Telephone-assisted cardiopulmonary resuscitation in a simulated environment: A pilot exploratory study evaluating first responder adherence and dispatcher performance. Caplliure-Llopis J. Resusc Plus. 2025 Nov 1;26:101149. doi: 10.1016/j.resplu.2025.101149. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101149

The Norwegian Armed Forces Aeromedical Evacuation Response to the 2023 Earthquake in Turkey. Andresen ÅEL. Air Med J. 2025 Nov-Dec;44(6):505-510. doi: 10.1016/j.amj.2025.08.001. Epub 2025 Sep 10. https://doi.org/10.1016/j.amj.2025.08.001

Cluster-Randomized Trials in Emergency Care Research. Kim HS. Acad Emerg Med. 2025 Oct 28. doi: 10.1111/acem.70181. Online ahead of print. https://doi.org/10.1111/acem.70181

High trauma mortality and severe injury burden in Pakistan: epidemiology, surgical interventions, and in-hospital care from a digital hospital-based trauma registry. Shaukat N. Eur J Trauma Emerg Surg. 2025 Oct 28;51(1):312. doi: 10.1007/s00068-025-02978-5. https://doi.org/10.1007/s00068-025-02978-5

Impact of multicultural doula support on pregnant migrant women's healthcare service utilisation in Norway: a multi-centre case-control study. Oommen H. BMJ Public Health. 2025 Nov 4;3(2):e002801. doi: 10.1136/bmjph-2025-002801. eCollection 2025. https://doi.org/10.1136/bmjph-2025-002801

Missing Data in OHCA Registries: How Imputation Methods Affect Research Conclusions-Paper I. Zhan SJ. J Clin Med. 2025 Sep 8;14(17):6345. doi: 10.3390/jcm14176345. https://doi.org/10.3390/jcm14176345

Characteristics of U.S. emergency department visits for altered mental status, 2016-2022. Pertsovskaya V. Am J Emerg Med. 2025 Nov 1;99:445-450. doi: 10.1016/j.ajem.2025.10.063. Online ahead of print. https://doi.org/10.1016/j.ajem.2025.10.063

Clinical advisors at NHS 111 improve accuracy for paediatric patients and their advice is more reliably followed: a retrospective observational cohort study. Lewis J. Arch Dis Child. 2025 Oct 22:archdischild-2025-328896. doi: 10.1136/archdischild-2025-328896. Online ahead of print. https://doi.org/10.1136/archdischild-2025-328896

Preventable trauma deaths and health system strengthening recommendations: findings from a multi-disciplinary expert panel review of trauma deaths in the Western Cape, South Africa. Dixon J. BMC Public Health. 2025 Nov 7;25(1):3835. doi: 10.1186/s12889-025-25139-0. https://doi.org/10.1186/s12889-025-25139-0

New Opportunities for Health and Resilience Measures for Suicide Prevention (NO HARMS): protocol to investigate suicidal behaviours using linked multisystem administrative data. Hensley S. BMJ Open. 2025 Sep 10;15(9):e100665. doi: 10.1136/bmjopen-2025-100665. https://doi.org/10.1136/bmjopen-2025-100665

On-Field Management of Athletic Head and Neck Injuries: Spinal Motion Restriction, Equipment Removal, Patient Transfer, and Spine Boarding Techniques. Blanchard N. Video J Sports Med. 2025 Dec 1;5(6):26350254251351999. doi: 10.1177/26350254251351999. eCollection 2025 Nov-Dec. https://doi.org/10.1177/26350254251351999

Suction-Assisted Laryngoscopy and Airway Decontamination (SALAD) for Emergency Airway Management: A Systematic Review of Evidence and Implementation. Shaikh S. J Clin Med. 2025 Oct 21;14(20):7430. doi: 10.3390/jcm14207430. https://doi.org/10.3390/jcm14207430

Rescue epilepsy medication and training: A comparison between midazolam use, guidelines, clinical practice, and possibilities in the UK and Norway. McBride A. Epilepsia Open. 2025 Oct 6. doi: 10.1002/epi4.70145. Online ahead of print. https://doi.org/10.1002/epi4.70145

Quality of outcome (QoO) in oral cancer patients: prospective perioperative analysis of patients' resilience and satisfaction during inpatient stay at a University Medical Centre in Germany. Kröplin J. Innov Surg Sci. 2024 Aug 2;10(3):143-150. doi: 10.1515/iss-2024-0026. eCollection 2025 Sep. https://doi.org/10.1515/iss-2024-0026

Initial management of haemorrhagic war casualties: tactical priorities and innovative approaches in modern and future warfare. Jarrassier A. Crit Care. 2025 Nov 28;29(1):509. doi: 10.1186/s13054-025-05752-6. https://doi.org/10.1186/s13054-025-05752-6

Outcomes and guideline adherence for emergency department thoracotomy: a single-center experience in Saudi Arabia. Alageel M. Int J Emerg Med. 2025 Oct 9;18(1):197. doi: 10.1186/s12245-025-00992-3. https://doi.org/10.1186/s12245-025-00992-3

Assessment of Danish surf lifeguards' skills using in situ simulation: a retrospective cohort study. Rasmussen JV. Inj Prev. 2025 Sep 9:ip-2024-045523. doi: 10.1136/ip-2024-045523. Online ahead of print. https://doi.org/10.1136/ip-2024-045523

Point-of-care ultrasound of the common carotid arteries for detection of large vessel occlusion stroke: Results of the POCUS-LVO study. Pinho J. Eur Stroke J. 2025 Sep;10(3):853-861. doi: 10.1177/23969873251315337. Epub 2025 Jan 30. https://doi.org/10.1177/23969873251315337

The Impact of Mindfulness on Stress and Resilience During Military Medical Field Exercises. Cole R. Mil Med. 2025 Nov 18:usaf571. doi: 10.1093/milmed/usaf571. Online ahead of print. https://doi.org/10.1093/milmed/usaf571

Delirium and Cognitive Dysfunction in and Beyond the Pediatric Intensive Care Unit. Lachman SE. Pediatr Neurol. 2025 Dec;173:182-190. doi: 10.1016/j.pediatrneurol.2025.09.002. Epub 2025 Sep 15. https://doi.org/10.1016/j.pediatrneurol.2025.09.002

The Effect of Remote Ischemic Conditioning in Patients Treated with Endovascular Therapy: A RESIST Trial Post Hoc Study. Blauenfeldt RA. Transl Stroke Res. 2025 Dec;16(6):2173-2184. doi: 10.1007/s12975-025-01379-5. Epub 2025 Sep 6. https://doi.org/10.1007/s12975-025-01379-5

Clinical Practice Guideline for the Prehospital Stage of Acute Stroke : III. Initial Decision for Primary Treatment in Subarachnoid Hemorrhage. Oh JS. J Korean Neurosurg Soc. 2025 Nov 12. doi: 10.3340/jkns.2025.0108. Online ahead of print. https://doi.org/10.3340/jkns.2025.0108

Adolescent trauma and alcohol: increased risk for severe head injury and organ dysfunction-insights from the TraumaRegister DGU(®). Hörauf JA. Eur J Trauma Emerg Surg. 2025 Oct 28;51(1):320. doi: 10.1007/s00068-025-02993-6. https://doi.org/10.1007/s00068-025-02993-6

Breaking barriers in pediatric stroke care: a comprehensive systematic review and meta-analysis of emergency department management practices. Helal MB. Ital J Pediatr. 2025 Oct 27;51(1):293. doi: 10.1186/s13052-025-02124-2. https://doi.org/10.1186/s13052-025-02124-2

Introducing an on-site Helicopter Emergency Medical Service (HEMS) physician in a Norwegian Emergency Medical Communication Centre: a focus group study on the experiences of operators and physicians. Sand K. BMJ Open. 2025 Nov 12;15(11):e106150. doi: 10.1136/bmjopen-2025-106150. https://doi.org/10.1136/bmjopen-2025-106150

What to expect from a smartphone dispatch application for out-of-hospital cardiac arrest in a national population?. Soumagnac T. Resuscitation. 2025 Nov 6;217:110887. doi: 10.1016/j.resuscitation.2025.110887. Online ahead of print. https://doi.org/10.1016/j.resuscitation.2025.110887

Recognizing Wellens Syndrome in Emergency Medical Care - A Case Report. Niksic E. Am J Case Rep. 2025 Oct 30;26:e950353. doi: 10.12659/AJCR.950353. https://doi.org/10.12659/AJCR.950353

Advances in the Detection and Management of Organophosphate Poisoning. Galindo Alonso L. Am J Ther. 2025 Sep-Oct 01;32(5):e473-e480. doi: 10.1097/MJT.0000000000002008. https://doi.org/10.1097/MJT.0000000000002008

Characterization and management of pain across phases of intraosseous infusion in emergency department patients with non-cardiac arrest. Shi A. Saudi Med J. 2025 Oct;46(10):1232-1239. doi: 10.15537/smj.2025.46.10.20250457. https://doi.org/10.15537/smj.2025.46.10.20250457

Cool Running Water as a First Aid Treatment for Burn Injuries. Holbert MD. Ann Emerg Med. 2025 Sep 22:S0196-0644(25)01138-2. doi: 10.1016/j.annemergmed.2025.08.003. Online ahead of print. https://doi.org/10.1016/j.annemergmed.2025.08.003

Stroke Sensitivity Calculation in Medical Emergency Calls and Factors Associated With Stroke Suspicion: A Retrospective Registry-Based Study. Iversen E. Ann Emerg Med. 2025 Nov;86(5):533-540. doi: 10.1016/j.annemergmed.2025.04.028. Epub 2025 May 31. https://doi.org/10.1016/j.annemergmed.2025.04.028

Characteristics of Out-of-hospital Cardiac Arrest from 2018 to 2021 across the World: Third Report from the International Liaison Committee on Resuscitation (ILCOR) Research and Registries Committee. Nishiyama C. Resuscitation. 2025 Sep 29:110852. doi: 10.1016/j.resuscitation.2025.110852. Online ahead of print. https://doi.org/10.1016/j.resuscitation.2025.110852

A nationwide comparative study of pediatric and adult intussusception in emergency departments during the COVID-19. Kim DU. Sci Rep. 2025 Sep 25;15(1):32921. doi: 10.1038/s41598-025-18175-8. https://doi.org/10.1038/s41598-025-18175-8

The use of drone-delivered Automated External Defibrillators in the emergency response for out-of-hospital cardiac arrest. A simulation study. Smith CM. Resusc Plus. 2025 Jul 25;25:101045. doi: 10.1016/j.resplu.2025.101045. eCollection 2025 Sep. https://doi.org/10.1016/j.resplu.2025.101045

Nonglomerular Hypocomplementemic Interstitial Nephritis. Hemphill T. HCA Healthc J Med. 2025 Oct 1;6(5):479-483. doi: 10.36518/2689-0216.2067. eCollection 2025. https://doi.org/10.36518/2689-0216.2067

Hashimoto's thyroiditis and congenital long QT syndrome: a dangerous addition causing torsades-case report. Acharya R. Eur Heart J Case Rep. 2025 Oct 15;9(11):ytaf504. doi: 10.1093/ehjcr/ytaf504. eCollection 2025 Nov. https://doi.org/10.1093/ehjcr/ytaf504

The Impact of the Bypass Transport Method on Clinical Outcomes after Large Vessel Occlusion: A Pooled-Proportion Meta-Analysis. Lauinger AR. World Neurosurg. 2025 Nov 5:124626. doi: 10.1016/j.wneu.2025.124626. Online ahead of print. https://doi.org/10.1016/j.wneu.2025.124626

Intimate Partner Violence and Paramedicine: An Updated Scoping Review of Perspectives and Practices. Caspell JR. Prehosp Emerg Care. 2025 Nov 18:1-13. doi: 10.1080/10903127.2025.2564841. Online ahead of print. https://doi.org/10.1080/10903127.2025.2564841

Evaluating large language models as clinical laboratory test recommenders in primary and emergency care: a crucial step in clinical decision making. Zayed AM. Clin Chem Lab Med. 2025 Aug 14;63(11):2186-2197. doi: 10.1515/cclm-2025-0647. Print 2025 Oct 27. https://doi.org/10.1515/cclm-2025-0647

The Australian Traumatic Brain Injury Initiative: Systematic Review of the Effect of Acute Interventions on Outcome for People With Moderate-Severe Traumatic Brain Injury. Keeves J. J Neurotrauma. 2025 Nov;42(21-22):2062-2077. doi: 10.1089/neu.2023.0465. Epub 2024 Apr 8. https://doi.org/10.1089/neu.2023.0465

Improving Hand Hygiene Skills Using Virtual Reality: Quasi-Experimental Study. Mira J. J Med Internet Res. 2025 Oct 7;27:e78882. doi: 10.2196/78882. https://doi.org/10.2196/78882

Uncovering Medication Errors Leading to Hospital Admissions in the Emergency Department: An External, Prospective Validation of Clinical Decision Rules. Amini N. Pharmacoepidemiol Drug Saf. 2025 Nov;34(11):e70265. doi: 10.1002/pds.70265. https://doi.org/10.1002/pds.70265

Access to services for mental ill-health and substance use among people released from prison in Scotland (RELEASE): Retrospective observational cohort study protocol. Kjellgren R. Int J Popul Data Sci. 2025 Oct 16;10(1):2971. doi: 10.23889/ijpds.v10i1.2971. eCollection 2025. https://doi.org/10.23889/ijpds.v10i1.2971

[Drug addiction and hereditary angioedema type 1, a dangerous combination]. Rodríguez-Carbajal A. Rev Alerg Mex. 2025 Sep 30;72(3):77. doi: 10.29262/ram.v72i3.1514. https://doi.org/10.29262/ram.v72i3.1514

Clinical and Laboratory Parameters After Drowning and Diving Accidents and Their Association with Survival. Petzold A. Pathophysiology. 2025 Nov 19;32(4):65. doi: 10.3390/pathophysiology32040065. https://doi.org/10.3390/pathophysiology32040065

Managing peripheral vascular injuries in gunshot trauma: A surgical perspective. McPherson DE. Injury. 2025 Nov;56 Suppl 1:112687. doi: 10.1016/j.injury.2025.112687. https://doi.org/10.1016/j.injury.2025.112687

Silica-Based Fiber Universal Combat Matrix Reduces Inflammation, Supporting Cellular Migration and Extracellular Matrix Remodeling in Porcine Full-Thickness Burns. Jorgensen AM. Mil Med. 2025 Sep 1;190(Supplement_2):521-527. doi: 10.1093/milmed/usaf256. https://doi.org/10.1093/milmed/usaf256

Effect of an integrated care model on ST-segment elevation myocardial infarction management in China: a prospective, multicentre, non-randomised controlled study. Liu Y. Heart. 2025 Sep 9:heartjnl-2024-324155. doi: 10.1136/heartjnl-2024-324155. Online ahead of print. https://doi.org/10.1136/heartjnl-2024-324155

A randomised controlled trial of verbal guidance versus verbal guidance supplemented by a photographic aid for bystander identification of intramuscular tranexamic acid injection sites in a simulated road injury scenario. Nutbeam T. BMC Emerg Med. 2025 Oct 1;25(1):197. doi: 10.1186/s12873-025-01323-8. https://doi.org/10.1186/s12873-025-01323-8

End-of-Life Care in the Austere Military Environment. David J. Mil Med. 2025 Sep 27:usaf436. doi: 10.1093/milmed/usaf436. Online ahead of print. https://doi.org/10.1093/milmed/usaf436

Machine Learning to Predict Individualized Treatment Effects of Sodium Bicarbonate for Patients With Out-of-Hospital Cardiac Arrest. Chen CH. Crit Care Med. 2025 Oct 1;53(10):e1874-e1885. doi: 10.1097/CCM.0000000000006792. Epub 2025 Aug 13. https://doi.org/10.1097/CCM.0000000000006792

Does the effectiveness of advanced airway management depend on initial cardiac arrest rhythm? A secondary analysis of the pragmatic airway resuscitation trial. Eurick-Bering K. Resuscitation. 2025 Oct;215:110760. doi: 10.1016/j.resuscitation.2025.110760. Epub 2025 Aug 7. https://doi.org/10.1016/j.resuscitation.2025.110760

Intravenous Thrombolysis Administration Rate in Patients With Ischemic Stroke at a Tertiary Private Hospital in Mexico City. Milpas Muñoz LD. Cureus. 2025 Oct 22;17(10):e95158. doi: 10.7759/cureus.95158. eCollection 2025 Oct. https://doi.org/10.7759/cureus.95158

Evaluating age-based vital sign cutoffs for pediatric trauma: a multicenter evaluation of the Japanese trauma data bank. Shinohara M. Eur J Trauma Emerg Surg. 2025 Oct 28;51(1):323. doi: 10.1007/s00068-025-02985-6. https://doi.org/10.1007/s00068-025-02985-6

Prospective cohort study on the characteristics of acute poisoning patients at a tertiary care hospital in Pakistan. Muhammad S. BMJ Open. 2025 Oct 23;15(10):e099837. doi: 10.1136/bmjopen-2025-099837. https://doi.org/10.1136/bmjopen-2025-099837

Comparative Safety of Medications for Severe Agitation: A Geriatric Emergency Department Guidelines 2.0 Systematic Review. Casey MF. J Am Geriatr Soc. 2025 Sep;73(9):2893-2904. doi: 10.1111/jgs.19485. Epub 2025 Apr 24. https://doi.org/10.1111/jgs.19485

Out-of-hospital cardiac arrest outcomes following EMS resuscitation protocol revision during the COVID-19 pandemic: a population-based study. Kaichi R. Resusc Plus. 2025 Oct 15;26:101134. doi: 10.1016/j.resplu.2025.101134. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101134

Predicting Mortality in Non-Variceal Upper Gastrointestinal Bleeding: Machine Learning Models Versus Conventional Clinical Risk Scores. Ustaalio lu . J Clin Med. 2025 Oct 21;14(20):7425. doi: 10.3390/jcm14207425. https://doi.org/10.3390/jcm14207425

An Exploration of Challenges in Routine Emergency Care With Delayed Presentations of Blunt Abdominal Trauma. Fattani B. Cureus. 2025 Sep 18;17(9):e92675. doi: 10.7759/cureus.92675. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92675

[Analysis of visits to the hospital emergency unit and the population's awareness of primary care]. Balsells-Roig A. Aten Primaria. 2025 Oct;57(10):103291. doi: 10.1016/j.aprim.2025.103291. Epub 2025 Jun 17. https://doi.org/10.1016/j.aprim.2025.103291

Assessing Educational Satisfaction and Career Attitudes Among Health Science Students: A Cross-Sectional Study in Six Iranian Universities. Sangi S. Health Sci Rep. 2025 Nov 17;8(11):e71513. doi: 10.1002/hsr2.71513. eCollection 2025 Nov. https://doi.org/10.1002/hsr2.71513

Self-referral trends to a virtual emergency department following initial presentation: A retrospective exploratory analysis. Baines BL. Australas Emerg Care. 2025 Sep;28(3):221-226. doi: 10.1016/j.auec.2025.03.008. Epub 2025 Apr 10. https://doi.org/10.1016/j.auec.2025.03.008

Validation of the Japanese Association for Acute Medicine-2 disseminated intravascular coagulation criteria to predict critical bleeding in patients with trauma: A nationwide cohort study in Japan. Takahashi M. Thromb Res. 2025 Dec;256:109532. doi: 10.1016/j.thromres.2025.109532. Epub 2025 Nov 7. https://doi.org/10.1016/j.thromres.2025.109532

Development and implementation of a multiple stage emergency care training program in Kono, Sierra Leone: a clinician-educator curriculum. Shen M. BMC Med Educ. 2025 Oct 14;25(1):1411. doi: 10.1186/s12909-025-07808-1. https://doi.org/10.1186/s12909-025-07808-1

Impact of the coronavirus disease pandemic on emergency transport times for pediatric febrile seizures: A retrospective study. Matsumoto T. Brain Dev. 2025 Oct;47(5):104456. doi: 10.1016/j.braindev.2025.104456. Epub 2025 Sep 29. https://doi.org/10.1016/j.braindev.2025.104456

Health system response to health emergencies in low- and middle-income countries: a systematic review protocol. Owusu-Addo SB. BMJ Open. 2025 Sep 14;15(9):e100226. doi: 10.1136/bmjopen-2025-100226. https://doi.org/10.1136/bmjopen-2025-100226

Examining the between- and within-person associations among perceived sleep quality and mental health symptoms in emergency medical service clinicians. Plaitano EG. J Trauma Stress. 2025 Oct;38(5):781-792. doi: 10.1002/jts.23180. Epub 2025 Jun 11. https://doi.org/10.1002/jts.23180

Emergency department glucose cut-off for 2-year mortality: A multicentre, prospective, cohort study. Linares CB. Eur J Clin Invest. 2025 Sep;55(9):e70066. doi: 10.1111/eci.70066. Epub 2025 May 15. https://doi.org/10.1111/eci.70066

Beyond Urgency: Emergency Nurse and Physician Perspectives on Nonurgent Emergency Department Use and the Role of Underlying Conditions. McIntyre A. J Emerg Nurs. 2025 Sep;51(5):826-834. doi: 10.1016/j.jen.2025.03.022. Epub 2025 Apr 28. https://doi.org/10.1016/j.jen.2025.03.022

AI HeartBot to Increase Women's Awareness and Knowledge of Heart Attacks: Nonrandomized, Quasi-Experimental Study. Fukuoka Y. JMIR Cardio. 2025 Oct 15;9:e80407. doi: 10.2196/80407. https://doi.org/10.2196/80407

Factors associated with hospitalization for emergency ankle fractures and the development and validation of a predictive model. Liang-Jie Z. Medicine (Baltimore). 2025 Oct 3;104(40):e44789. doi: 10.1097/MD.0000000000044789. https://doi.org/10.1097/MD.0000000000044789

[Good and cost-effective palliative care in Westphalia-Lippe - but why? Results of a mixed-methods study]. Suslow A. Z Evid Fortbild Qual Gesundhwes. 2025 Sep;197:19-29. doi: 10.1016/j.zefq.2025.06.001. Epub 2025 Jul 14. https://doi.org/10.1016/j.zefq.2025.06.001

Editor's Choice - Preliminary Assessment of Contemporary Wartime Vascular Injuries. Bilman V. Eur J Vasc Endovasc Surg. 2025 Oct;70(4):503-514. doi: 10.1016/j.ejvs.2025.05.031. Epub 2025 May 19. https://doi.org/10.1016/j.ejvs.2025.05.031

Preliminary exploration of efficacy assessment and optimal concentration of teprenone oral rehydration solution for the early management of post-burn shock. Liu XY. Burns. 2025 Sep;51(7):107615. doi: 10.1016/j.burns.2025.107615. Epub 2025 Jul 9. https://doi.org/10.1016/j.burns.2025.107615

Clinical use and safety of empiric anticoagulation during diagnostic work-up for deep vein thrombosis. Mohamad H. Hematology. 2025 Dec;30(1):2573586. doi: 10.1080/16078454.2025.2573586. Epub 2025 Oct 20. https://doi.org/10.1080/16078454.2025.2573586

Early stroke diagnosis and evaluation based on pathological voice classification using speech enhancement. Zhang J. Comput Biol Med. 2025 Sep;196(Pt C):110940. doi: 10.1016/j.compbiomed.2025.110940. Epub 2025 Aug 16. https://doi.org/10.1016/j.compbiomed.2025.110940

Aiding Chronic Obstructive Pulmonary Disease and Congestive Heart Failure Ultrasound-Guided Management Through Enhanced Point-of-Care Ultrasound (ACCUMEN-POCUS): Protocol for a Randomized Controlled Trial. Grinman MN. JMIR Res Protoc. 2025 Sep 23;14:e76186. doi: 10.2196/76186. https://doi.org/10.2196/76186

Validity of the International Classification of Diseases, 10th Revision codes for lithium toxicity in adult patients at hospital admission: a cohort study in Canada. Ahmadi F. BMJ Open. 2025 Nov 4;15(11):e097196. doi: 10.1136/bmjopen-2024-097196. https://doi.org/10.1136/bmjopen-2024-097196

Acute myocardial infarction treatment delay in South Asia: a systematic review and meta-analysis. Ramamurthy D. Future Cardiol. 2025 Nov;21(11):913-927. doi: 10.1080/14796678.2025.2541525. Epub 2025 Aug 14. https://doi.org/10.1080/14796678.2025.2541525

Comfort scores instead of pain scores as a possible tool for pain and analgesia reduction in the emergency department: A randomized controlled clinical trial. Edwards CM. Int Emerg Nurs. 2025 Sep;82:101657. doi: 10.1016/j.ienj.2025.101657. Epub 2025 Jul 12. https://doi.org/10.1016/j.ienj.2025.101657

Digital Health Technology Compliance With Clinical Safety Standards In the National Health Service in England: National Cross-Sectional Study. Oskrochi Y. J Med Internet Res. 2025 Oct 31;27:e80076. doi: 10.2196/80076. https://doi.org/10.2196/80076

Association of blood nardilysin and neurogranin levels with early outcomes in transient ischemic attack: A prospective cohort study. Orun S. Medicine (Baltimore). 2025 Oct 3;104(40):e44785. doi: 10.1097/MD.0000000000044785. https://doi.org/10.1097/MD.0000000000044785

The impact of the COVID-19 pandemic on bystander CPR and AED rates in Canada. Blanchard IE. Resusc Plus. 2025 Sep 29;26:101118. doi: 10.1016/j.resplu.2025.101118. eCollection 2025 Nov. https://doi.org/10.1016/j.resplu.2025.101118

Trends and characteristics during 17 years of naloxone distribution and administration through an overdose prevention program in Pittsburgh, Pennsylvania. Dasgupta N. PLoS One. 2025 Oct 24;20(10):e0315026. doi: 10.1371/journal.pone.0315026. eCollection 2025. https://doi.org/10.1371/journal.pone.0315026

Back-UPUG: Risk Factors at Emergency Admission for Early Unplanned Readmissions in Older Adults Following Short-Stay Geriatric Hospitalization After Emergency Care. Morisset D. Geriatr Gerontol Int. 2025 Nov;25(11):1555-1563. doi: 10.1111/ggi.70205. Epub 2025 Oct 15. https://doi.org/10.1111/ggi.70205

Timeliness of injury care and housing status. Decker H. Injury. 2025 Sep;56(9):112531. doi: 10.1016/j.injury.2025.112531. Epub 2025 Jun 17. https://doi.org/10.1016/j.injury.2025.112531

Epidemiological and clinical characteristics of seawater drowning cases in Sinop, a Turkish coastal city: a 13-year retrospective study. Er en T. BMC Emerg Med. 2025 Oct 21;25(1):210. doi: 10.1186/s12873-025-01365-y. https://doi.org/10.1186/s12873-025-01365-y

Assessing the Knowledge of Trauma Care Among Government Medical Officers in Uttarakhand: A Pre- and Post-intervention Study. Uniyal M. Cureus. 2025 Sep 14;17(9):e92320. doi: 10.7759/cureus.92320. eCollection 2025 Sep. https://doi.org/10.7759/cureus.92320

Diminishing returns: how treatment delays undermine the mortality benefits of high-quality stroke care. Guo R. BMJ Qual Saf. 2025 Oct 15:bmjqs-2025-019307. doi: 10.1136/bmjqs-2025-019307. Online ahead of print. https://doi.org/10.1136/bmjqs-2025-019307

Accidental hypothermia in emergency care: multifactorial triage-based prediction of early critical outcomes in a temperate-climate cohort. Ádám K. PLoS One. 2025 Oct 9;20(10):e0334328. doi: 10.1371/journal.pone.0334328. eCollection 2025. https://doi.org/10.1371/journal.pone.0334328

Effectiveness of a structured triage system in improving timeliness of emergency care in a resource-limited rural hospital in Uganda. Rovati L. Int J Emerg Med. 2025 Oct 3;18(1):190. doi: 10.1186/s12245-025-01005-z. https://doi.org/10.1186/s12245-025-01005-z

Effects of Injury Registry Data on Policymaking, Hospitalizations, and Mortality: Systematic Review. Medeiros-de-Souza AC. JMIR Public Health Surveill. 2025 Sep 10;11:e67115. doi: 10.2196/67115. https://doi.org/10.2196/67115

Army Medic Performance in Trauma Sonography: The Impact of Artificial Intelligence Assistance in Focused Assessments With Sonography in Trauma-A Prospective Randomized Controlled Trial. Hartline CPTAD. Mil Med. 2025 Nov 1;190(11-12):e2376-e2381. doi: 10.1093/milmed/usaf215. https://doi.org/10.1093/milmed/usaf215

Wartime trauma surge volume and its impact on surgical care delivery and patient outcomes: A nationwide study. Epstein D. Surgery. 2025 Oct;186:109588. doi: 10.1016/j.surg.2025.109588. Epub 2025 Aug 5. https://doi.org/10.1016/j.surg.2025.109588

Resuscitation at a cost: Excessive perioperative crystalloid administration is associated with increased fascial complications following damage control laparotomy for trauma. DePhillips PB. Injury. 2025 Sep;56(9):112521. doi: 10.1016/j.injury.2025.112521. Epub 2025 Jun 17. https://doi.org/10.1016/j.injury.2025.112521

Evaluating and Updating the IMPACT Model to Predict Outcomes in Two Contemporary North American Traumatic Brain Injury Cohorts. Takegami N. J Neurotrauma. 2025 Sep;42(17-18):1585-1600. doi: 10.1089/neu.2024.0158. Epub 2024 Jul 24. https://doi.org/10.1089/neu.2024.0158

Time-limited association between plasma transfusion and mortality in pediatric traumatic brain injury. Furman L. J Trauma Acute Care Surg. 2025 Oct 1;99(4):588-596. doi: 10.1097/TA.0000000000004694. Epub 2025 Jun 6. https://doi.org/10.1097/TA.0000000000004694

Expedited transfer to Emergency Department versus Cardiac Catheter Laboratory in a Cardiac Arrest Centre for non ST-elevation Out-Of-Hospital Cardiac Arrest: ARREST Trial as-treated analysis. Patterson T. Eur Heart J Acute Cardiovasc Care. 2025 Oct 22:zuaf133. doi: 10.1093/ehjacc/zuaf133. Online ahead of print. https://doi.org/10.1093/ehjacc/zuaf133

Intraday ultrashort-term effects of heat on the incidence of out-of-hospital cardiac arrest in Hangzhou, China. Yu Q. Ecotoxicol Environ Saf. 2025 Nov 1;306:119268. doi: 10.1016/j.ecoenv.2025.119268. Epub 2025 Oct 27. https://doi.org/10.1016/j.ecoenv.2025.119268

Physiological Impacts of Cold Conditions during Moderate Intensity Activity while Wearing Firefighter Protective Clothing. Poreda AR. Prehosp Disaster Med. 2025 Oct;40(5):259-265. doi: 10.1017/S1049023X25101507. Epub 2025 Nov 3. https://doi.org/10.1017/S1049023X25101507

Patterns of pediatric emergency department visits in a tertiary women's and children's hospital in China: A 2021 retrospective analysis. Zhao J. Int Emerg Nurs. 2025 Dec;83:101690. doi: 10.1016/j.ienj.2025.101690. Epub 2025 Sep 25. https://doi.org/10.1016/j.ienj.2025.101690

The second survey of the Saudi Acute Myocardial Infarction Registry Program: Main results and temporal changes in care (STARS-2 program). AlSaleh A. PLoS One. 2025 Sep 2;20(9):e0331215. doi: 10.1371/journal.pone.0331215. eCollection 2025. https://doi.org/10.1371/journal.pone.0331215

Evidence review for prognostic accuracy of NEWS2 and PEWS in people with community-acquired pneumonia: Pneumonia: diagnosis and management: Evidence review K. . London: National Institute for Health and Care Excellence (NICE); 2025 Sep. https://doi.org/

Fortifying healthcare: exploring organizational resilience in Israeli healthcare organizations - a quasi-longitudinal study. Velner T. BMC Health Serv Res. 2025 Nov 28;25(1):1550. doi: 10.1186/s12913-025-13738-x. https://doi.org/10.1186/s12913-025-13738-x

Accident-related deaths in the geriatric population: the role of chronic diseases and forensic investigations. Kilinç BB. BMC Geriatr. 2025 Nov 17;25(1):915. doi: 10.1186/s12877-025-06636-8. https://doi.org/10.1186/s12877-025-06636-8

Correcting for the Inflated Adult Population Denominator in an English Nationwide Health Care Cohort: Database Analysis Study. Venkatesan S. JMIR Public Health Surveill. 2025 Oct 27;11:e64788. doi: 10.2196/64788. https://doi.org/10.2196/64788

Evaluation of the performance of telephone triage service. Vainio H. Scand J Trauma Resusc Emerg Med. 2025 Oct 22;33(1):172. doi: 10.1186/s13049-025-01462-8. https://doi.org/10.1186/s13049-025-01462-8

Parent injury admission as a potential adverse childhood experience: A 25 US Level I Trauma center investigation. Buggaveeti AE. Injury. 2025 Sep;56(9):112344. doi: 10.1016/j.injury.2025.112344. Epub 2025 Apr 14. https://doi.org/10.1016/j.injury.2025.112344

Potential of ChatGPT in youth mental health emergency triage: Comparative analysis with clinicians. Thotapalli S. PCN Rep. 2025 Jul 15;4(3):e70159. doi: 10.1002/pcn5.70159. eCollection 2025 Sep. https://doi.org/10.1002/pcn5.70159

Reverse shock index multiplied by Glasgow Coma Scale score as a predictor of urgent trauma care and mortality in isolated severe traumatic brain injury: a 10-year nationwide validation study. Kokeguchi H. BMC Emerg Med. 2025 Nov 14;25(1):235. doi: 10.1186/s12873-025-01390-x. https://doi.org/10.1186/s12873-025-01390-x

Human-Delivered Conversation Versus AI Chatbot Conversation in Increasing Heart Attack Knowledge in Women in the United States: Quasi-Experimental Studies. Kim DD. J Med Internet Res. 2025 Oct 17;27:e73184. doi: 10.2196/73184. https://doi.org/10.2196/73184

Risk factors associated with return sepsis admission following emergency department discharge with infection. Chen AY. Am J Emerg Med. 2025 Nov;97:207-215. doi: 10.1016/j.ajem.2025.07.059. Epub 2025 Jul 27. https://doi.org/10.1016/j.ajem.2025.07.059

Single Dose Epinephrine Protocol Is Associated With Improved Survival of Older Adults With Out-Of-Hospital Cardiac Arrest. Lilien EJ. Acad Emerg Med. 2025 Sep 25. doi: 10.1111/acem.70154. Online ahead of print. https://doi.org/10.1111/acem.70154

Factors Influencing Mistriage Based on the Korean Triage and Acuity Scale: A Retrospective Cross-Sectional Study. Yi N. J Nurs Scholarsh. 2025 Sep;57(5):860-873. doi: 10.1111/jnu.70033. Epub 2025 Jul 6. https://doi.org/10.1111/jnu.70033

Emergency Department Preparedness in a Mega Mass Casualty Incident While Under Missile Fire: Lessons Learned From Israel on October 7, 2023. Berzon B. J Emerg Med. 2025 Oct;77:130-139. doi: 10.1016/j.jemermed.2025.07.032. Epub 2025 Jul 29. https://doi.org/10.1016/j.jemermed.2025.07.032

Compression only CPR and mortality in pediatric out-of-hospital cardiac arrest during COVID-19 pandemic. Obara T. Resuscitation. 2025 Oct;215:110706. doi: 10.1016/j.resuscitation.2025.110706. Epub 2025 Jul 4. https://doi.org/10.1016/j.resuscitation.2025.110706

Burden of RSV in Young Children in High-Income Countries: Incidence Estimates From a Multilevel Meta-Analysis in Primary and Emergency Care. Heemskerk S. Influenza Other Respir Viruses. 2025 Oct;19(10):e70179. doi: 10.1111/irv.70179. https://doi.org/10.1111/irv.70179

Impact of dispatcher-assisted cardiopulmonary resuscitation policy on outcomes following out-of-hospital cardiac arrest: an interrupted time series analysis. Li Q. Resuscitation. 2025 Nov;216:110829. doi: 10.1016/j.resuscitation.2025.110829. Epub 2025 Sep 12. https://doi.org/10.1016/j.resuscitation.2025.110829

Factors influencing pain management in patients presenting to the emergency department: A mixed-method systematic review. Almutairi A. Int J Nurs Stud. 2025 Dec;172:105214. doi: 10.1016/j.ijnurstu.2025.105214. Epub 2025 Sep 12. https://doi.org/10.1016/j.ijnurstu.2025.105214

Digital Health Interventions in Emergency Obstetric and Newborn Care Services in Low- and Middle-Income Countries: Scoping Review. Shartyanie NP. J Med Internet Res. 2025 Oct 28;27:e75738. doi: 10.2196/75738. https://doi.org/10.2196/75738

Naloxone Use, 911 Calls, and Emergency Visits After Nonfatal Overdose. Saloner B. JAMA Netw Open. 2025 Oct 1;8(10):e2537678. doi: 10.1001/jamanetworkopen.2025.37678. https://doi.org/10.1001/jamanetworkopen.2025.37678

The Need for SPEED: Sonography for Pulmonary Embolism in the Emergency Department. Blackwell C. J Emerg Med. 2025 Nov;78:258-265. doi: 10.1016/j.jemermed.2025.03.017. Epub 2025 Mar 26. https://doi.org/10.1016/j.jemermed.2025.03.017

Advanced Airway Devices and End-Tidal Capnography Trends in Cardiac Arrest: A Secondary Analysis of a Randomized Clinical Trial. Nassal MMJ. JAMA Netw Open. 2025 Sep 2;8(9):e2531511. doi: 10.1001/jamanetworkopen.2025.31511. https://doi.org/10.1001/jamanetworkopen.2025.31511

Abdominal Pain and Vaginal Discharge: An Eye-Opening Simulation Case about Human Trafficking. Exeni McAmis NE. J Educ Teach Emerg Med. 2025 Oct 31;10(4):S1-S41. doi: 10.21980/J8.52150. eCollection 2025 Oct. https://doi.org/10.21980/J8.52150

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

GUIDELINES FOR AUTHORS

The *International Journal of Paramedicine (IJOP)* is a forum for scholarly contributions and state-of-the-art research relevant to patient care and the growth and advancement of paramedicine, including the areas of paramedic leadership, management, education, operations, culture, professional and clinical practice. The *IJOP* encourages exploration of paramedicine from diverse theoretical and practical views from all disciplines, including business and economics; the natural, basic, and applied sciences; and the humanities, social sciences, and arts. Priority will be given to submissions that use sound theoretical or conceptual frameworks, strong methodological design, and relevance to the international paramedic community. All methodologies such as quantitative, qualitative, mixed methods, and knowledge syntheses will be considered.

NEMSMA is a longtime collaborator with National Association of EMS Physicians in support of *Prehospital Emergency Care*. In continuation of that relationship, IJOP and PEC have established a collaborative relationship that will the facilitate the exchange of submissions in certain circumstances based in part on which journal may be the best fit for a particular manuscript.

SUBMISSION CHECKLIST

Authors need to register with the journal prior to submitting or, if already registered, can simply log in and begin the submission process.

Download the following worksheets to assist with the submission process. Complete the forms, use them to assist with the submission process, then upload with the submission.

- Complete one of these forms per submission: IJOP Submission Info Form
- Complete one of these forms per author: IJOP Author Info Form

GENERAL GUIDELINES AND NOTES

- The *IJOP* only publishes material in English. Please use Academic English.
- The *IJOP* accepts submissions in the following categories:
  - Case Studies (2,000 words)
  - Concepts (3,000 words)
  - Correspondence / Commentary (1,000 words)
  - Education (3,000 words)
  - Empirical Investigations / Original Research (4,500 words)
  - Methodology (2,000 words)
  - Quality Improvement Project Reports (3,000 words)
  - Reviews / Synthesis (4,000 words)
  - Special Reports (2,000 words)
  - Toolbox (1,500 words)

The word limits noted above are guidelines for the various submission types. Authors are encouraged to adhere to these guidelines and to be concise in their submissions.

- Merriam-Webster's Collegiate Dictionary (11th ed.) should be consulted for spelling.
- Contributions that explore non-clinical topics such as leadership, operations, education, professional practice, and the culture of paramedicine are strongly encouraged.
- Based on the international scope of the *IJOP*, contributions should provide a degree of generalizability and transferability to global settings and should have relevance to the *IJOP's* broad readership.
- *IJOP* discourages multiple publications derived from a single study.
- All original research submissions must have received approval from an Institutional Research Board (IRB) or Research Ethics Board (REB).
- Once a submission has been assessed for suitability by the editorial team, it will undergo a double-blind peer-review by independent, anonymized reviewers.

USE OF ARTIFICIAL INTELLIGENCE

IJOP recognizes that artificial intelligence (AI) tools are increasingly used in research, clinical education, and manuscript preparation. This policy establishes standards for the responsible, transparent, and ethical use of AI in all materials submitted for consideration in the Journal.

The goal is to ensure academic integrity, patient safety, and accountability in the dissemination of paramedicine research and other scholarly content.

AI tools may be used to assist authors in limited and transparent ways, such as:

- Grammar, spelling, or stylistic editing
- Summarizing or organizing references
- Statistical analysis or data visualization (when described in the methods)
- Programming support for simulations or modeling
- Language translation for non-native English authors

Any use of AI tools must be clearly disclosed in the manuscript. The disclosure should appear in the Methods section, depending on the nature of the use, and include:

- The name, version, and provider of the AI tool
- A description of its purpose in the work
- An affirmation of author responsibility for the accuracy and integrity of the final content

Here is an example disclosure statement: "ChatGPT (OpenAI, GPT-5, 2025) was used to assist with language editing and formatting. The authors reviewed and verified all content and take full responsibility for the accuracy and integrity of this publication."

If no AI tools were used, authors should include the statement: "No generative AI tools were used in the preparation of this manuscript."

Authors remain fully responsible for all content produced and for verifying the accuracy and appropriateness of any AI-assisted output.

IJOP strictly prohibits the use of AI tools to:

- Generate or fabricate data, patient information, or references
- Produce substantive portions of the manuscript (e.g., results, discussion, or conclusions)

- Create or modify images (including clinical photographs or graphics) unless explicitly validated and disclosed.
- Circumvent originality or plagiarism checks

Failure to properly disclose AI use or evidence of misuse will be treated as a breach of ethical standards. Consequences may include:

- Immediate rejection or retraction
- Notification to authors' institutions or employers
- Reporting to relevant research integrity bodies

All cases involving suspected AI misuse will be handled in accordance with COPE and ICMJE guidelines.

SUBMISSION ITEMS

As part of the submission process, authors will be required to confirm that their submission complies with all of the items below. Submissions may be returned that do not adhere to these guidelines:

Documents

- The submission cannot be previously published or in the submission process of another publication (or an explanation has been provided in a cover letter to the Editor).
- The Author and Funding File and the Main Submission File are both in Microsoft Word document file format.
- An ICMJE Form for Disclosure of Potential Conflicts of Interest is submitted for each author.
- All illustrations, figures, and tables should be placed within the text at the appropriate points AND submitted as separate files in a high resolution format.
- Supplemental media files (e.g., spreadsheets, slides, audio or video files) may be included for reader access. The file should be hosted by the authors unless other arrangements have been made with the Editors.
- Where available, URLs for each reference have been provided.

Manuscript

- The text is double-spaced in a 12-point font.
- Page numbers and line numbering are used for the 'Main Submission File'
- The text adheres to the stylistic and bibliographic requirements outlined.
- Authors are strongly encouraged to follow any EQUATOR (Enhancing the QUAlity and Transparency Of health Research) Guidelines that apply to their type of submission. These include, but are not limited to:
  - Randomized trials
    - CONSORT and its extensions
  - Observational studies
    - STROBE and its extensions
  - Systematic reviews
    - PRISMA and its extensions
  - Study protocols
    - SPIRIT and the PRISMA-P extension
  - Diagnostic/prognostic studies
    - STARD and the TRIPOD extension
  - Case reports
    - CARE and its extensions

- Clinical practice guidelines
  - AGREE and the RIGHT extension
- Qualitative research
  - SRQR and the COREQ extension
- Animal pre-clinical studies
  - ARRIVE
- Quality improvement studies
  - SQUIRE and its extensions
- Economic evaluations
  - CHEERS

Note that there is a section in EQUATOR with guidelines specific to emergency medicine that may also be applicable to studies in paramedicine.

SUBMISSION FILES

The following describes the 'standard' submission files that should be uploaded via the *Journal* submission website for each manuscript. Please refer to the specific submission guidelines for each submission category for more specific instructions that may apply.

Author and Funding Information File

Author Information

- All authors of a manuscript should provide their full name with up to four post-nominals and up to two organizational affiliations and titles – exactly as they should appear in the publication.
- The email of all authors should also be included.
- If available, please include ORCiDs numbers for each author.
- You also include social media handles (e.g., Facebook, Twitter, LinkedIn) for each author.
- Please ensure that everyone who meets the International Committee of Medical Journal Editors (ICMJE) requirements for authorship is included as an author (http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html).
- If an author changes their affiliation during the peer-review process, the new affiliation information can be given to the Editorial Team and will be handled as any other manuscript revision. Please note that no changes to affiliation can be made after the pre-publication galleys of the manuscript have been accepted for final publication.
- Identify one author as the corresponding author. They will be shown as such when the article is published and will be the point of contact between the editorial team and the authors.
- If the work presented in the manuscript was presented at conference or published in abstract form, identify the name of the event, location, format, and date of presentation.
- Acknowledgements, where applicable, can be provided. Brevity is strongly encouraged.

Funding Information

- Please provide the details for any funding that supported the submitted work, to include all details required by your funding and grant-awarding bodies. The following template sentences are suggested:
  - For single agency grants: This work was supported by the [Funding Agency] under Grant [number xxxx].

- For multiple agency grants: This work was supported by the [Funding Agency #1] under Grant [number xxxx]; [Funding Agency #2] under Grant [number xxxx]; and [Funding Agency #3] under Grant [number xxxx].
- If a funding source was not involved, please confirm with a statement such as, "External funding was not used to support this work."

Main Submission File

To provide a high level of objectivity in the peer-review process *IJOP* uses a double blind process. The identities of the authors and their institutions are not revealed to the reviewers and the identifies of the reviewers are not revealed to the authors.

Due to the double blind review process, information about the authors and their institutions should not appear anywhere in the main submission file. This should include removal of identifying information in the 'properties' of the Microsoft Word (.doc or .docx) files that are submitted.

Please do not use extensive formatting of the document. Use single spaces between sentences. Separate paragraphs with a carriage return. Do not indent the first line paragraphs with tabs or added spaces.

Unless stated otherwise in the directions for a specific manuscript category, all submissions should include the following elements in the following order as a single document file, called the Main Document File.

Title

- Provide the suggested title for the published article. Please note that the title used for publication is subject to editorial team approval.

Abstract, Keywords, Disclosures / Conflicts, Presentations, and Acknowledgements

- Unless exempted or described differently in the directions for a specific submission category, abstracts MUST be limited to 300 words or less, including the section headers (e.g., Problem, Methods, etc.). Use structured abstracts when possible.
- Unless exempted or described differently in the directions for a specific submission category, this page will also include between three (3) and six (6) keywords or short phrases that will be used for title and search engine optimization. Keywords of paramedicine, EMS, and emergency medical services will be added by default and will not count towards the keyword count requirements.
- State any disclosures or conflicts for each author. This will be in addition to completion of the ICMJE Disclosure Forms for each author as described below. If the are no conlficts, please state 'none.'

Primary Manuscript Body

- The primary body of the manuscript will come next in the main submission file. The composition of the primary body of the manuscript may vary with the category of the manuscript. Refer to specific manuscript category descriptions for details.
- The manuscript should use a minimum of formatting. If there are multiple levels of heading and sub-headings, please indicate the heading level by placing (H1) directly after the heading text for the top level heading, H2 for sub-headings, H3 for sub-sub headings, etc.
- Tables should be used to summarize large amounts of information rather than writing it out as a narrative. Tables may be created within the word processor or inserted from another program (e.g., Excel). If another program is used to create the table, please include the original source

file as a supplementation media file submission. All tables should be inserted into this primary manuscript body file. They must be labelled sequentially, and referred to in the text. Table captions must include the table number and a name for the table at a minimum. Additional descriptive text may be added to the caption as needed to complement the reference to the table in the main body of the paper.

- Figures shall be inserted directly into the text at the appropriate position. These may be lower resolution images to simply show their correct placement. Figures must be labelled sequentially and referred to in the text. Figure captions must be included with the figure number and a name for the figure at a minimum. Additional descriptive text may be added to the caption as needed to complement the reference to the figure in the main body of the paper. In addition to including figures in the text, submit each figure as a supplemental media files in high resolution PDF, .jpeg, .tiff, or .png file formats, with a 300dpi minimum resolution.

References

- Where applicable, the references for the manuscript come next. Use endnotes rather than footnotes. The APA style in-text reference marks and in endnotes must be used.
- In each endnote reference, include hyperlink whenever possible to the referenced document. A DOI hyperlink is preferred, which will have a format of https://doi.org/XXXXX. If a DOI is not available, provide a link to the source journal, publisher website or similar source.
- Authors are responsible for the accuracy of all references, links and in text citations.

Appendices

- Where applicable, any appendices to the manuscript are inserted next.

ICMJE Forms for Disclosure of Potential Conflicts of Interest

- One form per author should be submitted.
- The form is available at: https://icmje.org/disclosure-of-interest/

Supplemental Media Files

- If the submission includes any supplemental tables or figures, they would be each be uploaded individually for inclusion at the end of the article.
- For spreadsheets used to generate tables, upload them as individual files and clearly indicate which table they are associated with.
- If there are any supplemental media files (e.g., spreadsheets, slide decks, audio or video files), provide links to where readers can access them. They must be readily accessible without passwords or other restrictions.

GUIDELINES FOR CATEGORY-SPECIFIC SUBMISSIONS

Case Reports (≤2,000 words)

- These manuscripts share the experience of unusual clinical presentations, circumstances, or treatment approaches. Case reports should be structured as described in the Consensus-based Clinical Case Reporting Guideline (CARE; https://www.equator-network.org/reporting-guidelines/care/).

Concepts (≤3,000 words)

- These papers present a specific management or clinical concept, idea, or theory – and describes its practical application. If the paper presents a new concept, it may also suggest research, improvement projects, or pilot implementations of its application. Along with other standard

submission file elements, the primary manuscript body pages file for Concept papers should contain:

- Introduction - The introduction should describe the problem, issue, or circumstance that the concept is intended to address. Where applicable, address the current literature that demonstrates a gap and any pertinent background information.
- Concept Description – Provide a description of the concept and how it can be applied. Where applicable, provide sufficient detail and clarity of any methods or procedures and the setting and population to which the concept applies.
- Discussion - Authors are encouraged to include a critical review of related research and a fulsome discussion that highlights how the concept contributes to the field of paramedicine. Address any limitations of the concept.

Dialogues (≤1,000 words)

- The Dialogues section will publish comments and questions from readers related to previously published articles. Along with other standard submission file elements, the primary manuscript body pages file for correspondence should include:
  - Subject Paper Information - Provide the title, name of the first author, and the *IJOP* issue for the paper that is the subject of the correspondence.
  - The narrative of the correspondence.

Editorials (≤2,000 words)

- Editorials are a venue for the expression of opinion and perspective on topics relevant to the paramedicine community. They should make clear point(s) in a concise manner with a scholarly approach and tone. They should not be used for the presentation of data, findings, or research that has not been previously published.

Educational Methods and Processes (≤3,000 words)

- These submissions explore a specific educational process, approach, or method. The paper should also discuss any issues to consider in its practical application. Along with other standard submission file elements, the primary manuscript body pages file for Education papers should contain:
  - Introduction - The introduction should describe the problem, issue, or circumstance that the educational process, approach, or method is intended to address. Where applicable, address the current literature that demonstrates a gap and any pertinent background information.
  - Description – Provide a description of the educational process, approach, or method and how it can be applied. Where applicable, provide sufficient detail and clarity of any methods or procedures and the setting and population to which the process, approach or method applies.
  - Discussion - Authors are encouraged to include a critical review of related research and a fulsome discussion that highlights how the concept contributes to the field of paramedicine. Address any limitations of the concept.

Empirical Investigations / Original Research (≤4,500 words)

- The submission of manuscripts for empirical investigations / original research may be clinical or non-clinical. Several of the EQUATOR guidelines, described previously, may apply to any given study in this category. Please apply them as appropriate to your particular investigation.
- Authors may provide, or editors may suggest, that some information be provided as a supplemental file so that the main paper remains concise. The supplemental content may include

data sets, images, video clips, and in-depth details on methodology. Along with other standard submission file elements, the primary manuscript body pages file for empirical investigations / original research should include elements as called for in the applicable EQUATOR guidelines.

- NEMSMA is a longtime collaborator with National Association of EMS Physicians in support of *Prehospital Emergency Care (PEC)*. In continuation of that relationship, *IJOP* and *PEC* have established a collaborative relationship that exchanges manuscripts in certain circumstances. Empirical investigations on clinical topics may be forwarded to *PEC* for their initial consideration with author consent.

Methodology (≤2,000 words)

- This category of submissions provides deep explorations of methods used or may be used in research studies or improvement projects. These methods should be novel in some way that makes them of significant interest in their own right, separate from the studies in which they are utilized. These papers can also provide a more detailed description of the methods than would otherwise be appropriate in the primary research or improvement project manuscript. The primary paper's methods section may direct readers to a methodology paper in this category for more detailed descriptions of the methods it utilized.
- Along with other standard submission file elements, the primary manuscript body pages file for Methodology papers should contain appropriate elements from the EQUATOR guidelines, as described for empirical investigations.

Quality Improvement Project Reports (≤3,000 words)

- *IJOP* acknowledges the importance of quality improvement activities to optimize EMS system performance and patient outcomes and welcomes manuscripts describing quality improvement projects.
- United States regulations do not require quality improvement activities to have Institutional Review Board (IRB) or Research Ethics Board (REB) approval. The distinction between manuscripts requiring or not requiring IRB/REB approval may be subtle. Manuscripts not requiring approval will generally be those which do not apply clinical treatments or diagnostic methods that have not been previsouly established in the literature. A manuscript that explores different ways to implement a clinical treatment or diagnostic method may not require approval.
- The *IJOP* shall reject manuscripts that appear to have framed an activity as quality improvement to circumvent research compliance, conduct, or reporting standards.
- Authors may contact the editorial office if they are uncertain whether their work should be submitted as a quality improvement or a research manuscript. If there any dounbdt, authors are encouraged to submit QI projects to an IRB is to obtain their independent judgement of the need for IRB oversight.
- Quality improvement project reports should adhere to the Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines (http://www.squire-statement.org). With permission of the Editorial Team, authors may submit manuscripts that use other generally accepted improvement project frameworks (e.g., IHI Model for Improvement; DMAIC).
- In general, quality improvement project reports should describe the process being examined; the process change(s) that were tested; the baseline process performance level; the methods used for conducting process tests and evaluating the results; the results, including the post-intervention performance levels; any confounding variables and balancing measures; and the process change iterations as applicable.
- The manuscript discussions and conclusions should highlight what the external audience can learn from the reported experience, not just the activity's internal success or failure.

- Authors may provide, or editors may suggest, that some information be provided as a supplemental file so that the main paper remains concise. The supplemental content may include data sets, images, video clips, and in-depth details on methodology.

Reviews / Synthesis (≤4,000 words)

- *IJOP* invites the submission of reviews of all types, including those with and those without meta-analytic components. In addition to the guidelines for original research provided elsewhere in these guidelines, any submissions in this category should be consistent with the Prisma 2020 guidelines for reporting systematic reviews https://www.equator-network.org/reporting-guidelines/prisma/.

Toolbox (≤3000 words)

- These submissions will explain a tool or technique and describe its practical use. Where applicable, the articles may include a supplemental file or link that contains the tool and a data file where the reader may try out the tool.
- Along with other standard submission file elements, the primary manuscript body pages file for Toolbox papers should contain:
  - Introduction - The manuscript shall include an introduction that provides an overview of the type(s) of projects that the tool or technique could be used for or the specifics of the project that it was actually used in.
  - Description of the Tool / Technique – As the central focus on the paper, this section shall provide in an in-depth examination of the tool or technique and its mechanics. Describe how the tool or technique should be applied in context of a clinical, operational, or administrative setting.
  - Discussion – Discuss the underlying rationale for the tool or technique and why it may be favored over other options.
  - Provide a critique of related methods. Also include discussion of any limitations of the tool or technique.
  - Exercise – Where applicable, describe how to use the tool or technique in conjunction with a sample data set or scenario.

Special Reports

- This submission category will be used for articles of a scholarly nature that do not fit into one of the other *IJOP* submission categories. Authors are encouraged to use the guidelines described in this document that seem to be most applicable to their Special Report, but consultation with the Editorial Team before manuscript submission is strongly encouraged.

International Journal of Paramedicine

Published by the National EMS Management Association (USA)

ADDENDUM, CORRIGENDUM, AND ERRATUM

Recommended Citation: Addendum, Corrigendum, and Erratum. (2026). *International Journal of Paramedicine*, (13), 247. https://doi.org/10.56068/LRUV3230.

Keywords: addendum, corrigendum, erratum, corrections, emergency medical services, EMS, paramedicine

Published: February 10, 2026

Occasionally, issues requiring clarification, correction, or supplementation are identified after publication. In accordance with the Committee on Publication Ethics (COPE) guidelines, the journal uses addenda, errata, and corrigenda to maintain the integrity, transparency, and reliability of the scholarly record. Addenda are published to provide additional information that was not available at the time of publication and that does not affect the validity of the original work. Errata are issued to correct errors introduced during the journal's editorial or production process. Corrigenda are issued to correct errors made by the authors.

FEBRUARY 10, 2026

ADDENDA:

Rimstad, C., Kayanja, J., Newman, S., & Violato, E. (2025). Bachelor's degree as entry-to-practice: A literature review of paramedicine and other health professions. *International Journal of Paramedicine*. (13). 120-132.

A graphic and link to the video interview of the author was added to the frontmatter of the article.

- Article: https://doi.org/10.56068/HRSG6460
- Complete issue with corrected article: https://doi.org/10.56068/JBWU4159