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OBSAH

PREHOSPITAL CARE

– clinical trials & RCT & multicenter study

- 1: McMurry AJ, Phelan D, Dixon BE, Geva A, Gottlieb D, Jones JR, Terry M, Taylor DE, Callaway H, Manoharan S, Miller T, Olson KL, Mandl KD. **Large Language Model Symptom Identification From Clinical Text: Multicenter Study.** J Med Internet Res. 2025 Jul 31;27:e72984. doi: 10.2196/72984. PMID: 40743494; PMCID: PMC12313083.
- 2: Holzinger F, Kümpel L, Resendiz Cantu R, Alberter A, Möckel M, Heintze C. **Could low-acuity emergency medical services patients be redirected to primary care? Findings from a multicenter survey in Berlin, Germany.** BMC Emerg Med. 2025 Jul 30;25(1):138. doi: 10.1186/s12873-025-01295-9. PMID: 40739617; PMCID: PMC12312431.
- 3: Forbes A, Simpson C, Griggs J, Barrett J, Lyon R, Leech C; **Pre-Hospital Trainee Operated Research Network (PHOTON) and Air Ambulance Charity Kent Surrey Sussex. Pre-hospital blood product transfusion and calcium management in the United Kingdom: a multicentre service evaluation.** Scand J Trauma Resusc Emerg Med. 2025 Jul 28;33(1):133. doi: 10.1186/s13049-025-01446-8. PMID: 40722177; PMCID: PMC12306068.
- 4: Cullen KJ, Mir H, Natarajan MK, Corovic M, Mosleh K, Crawshaw J, Mercuri M, Masoom H, Schwalm JD. **Exploring the Barriers and Facilitators to Implementing a Smartphone App for Physicians to Improve the Management of Acute Myocardial Infarctions: Multicenter, Mixed Methods, Observational Study.** JMIR Mhealth Uhealth. 2025 Jul 8;13:e60173. doi: 10.2196/60173. PMID: 40627818; PMCID: PMC12262926.
- 5: Gude MF, Valentin JB, Meisner-Jensen M, Bohnstedt-Pedersen NH, Dalgaard AK, Væggemose U, Blauenfeldt RA. **Video Streaming or Telephone Communication During Emergency Medical Services Dispatch Calls: A Cluster Randomized Clinical Trial.** JAMA Netw Open. 2025 Jul 1;8(7):e2519020. doi: 10.1001/jamanetworkopen.2025.19020. PMID: 40591356; PMCID: PMC12215568.

PREHOSPITAL CARE

– systematic review & meta-analysis & scoping review

- 1: Dion PM, Singh K, Coleby J, Beckett A, Lampron J, McGowan M, Shorr R, Nolan B. **Blood transfusion training for prehospital providers: a scoping review.** Scand J Trauma Resusc Emerg Med. 2025 Jul 31;33(1):134. doi: 10.1186/s13049-025-01440-0. PMID: 40745553; PMCID: PMC12312356.



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2: Zeleke S, Drury P, Allida SM, Ferguson C. **Multicultural Recommendations to Guide Stroke Care: A Document Review of International Stroke Guidelines.** Stroke. 2025 Aug;56(8):2375-2379. doi: 10.1161/STROKEAHA.125.052000. Epub 2025 Jul 28. PMID: 40720568.

3: Shaeri S, Considine J, Dainty KN, Olasveengen TM, Morrison LJ. **The role of contributing factors, triggers, and prodromal symptoms in the etiological classification of out-of-hospital cardiac arrest; A scoping review.** PLoS One. 2025 Jul 16;20(7):e0327651. doi: 10.1371/journal.pone.0327651. PMID: 40668847; PMCID: PMC12266415.

4: Kokori E, Al-Hashemi N, Aldeen ZS, Patel R, Aderinto N, Olatunji G, Ojo IS, Abraham IC, Shaka H. **Intraosseous vs. intravenous access in out-of-hospital cardiac arrest: a systematic review and meta-analysis of clinical outcomes.** Int J Emerg Med. 2025 Jul 15;18(1):131. doi: 10.1186/s12245-025-00927-y. PMID: 40665212; PMCID: PMC12261587.

5: Sahebi A, Tahernejad S, Rezaei E, Shahmahmoudi F, Pirhadi S, Tahernejad A. **Needle stick injuries among emergency medical services personnel: a systematic review and meta-analysis.** BMC Nurs. 2025 Jul 1;24(1):697. doi: 10.1186/s12912-025-03399-w. PMID: 40598144; PMCID: PMC12211645.

6: Yadollahifar S, Aminizadeh M, Nasiriani K, Tafti AAD, Sefidkar R, Mirzaei S. **Identifying the components of prehospital emergency preparedness in radiological and nuclear incidents: a scoping review.** BMC Emerg Med. 2025 Jul 1;25(1):100. doi: 10.1186/s12873-025-01258-0. PMID: 40596856; PMCID: PMC12211649.

7: Fritz CL, Thomas CE, Skaggs M, Zernicke L, McCartin MP, Blumen IJ, Price J, Hibberd O, Schoenfeld DW, Thomas SH. **Recent Outcomes Research in Helicopter Emergency Medical Services: A Scoping Review of Publication-Year 2024 Additions to the Helicopter Outcomes Assessment Research Database.** Air Med J. 2025 Jul-Aug;44(4):306-313. doi: 10.1016/j.amj.2025.04.005. Epub 2025 May 20. PMID: 40571389.

8: Dwivedi DB, Ball J, Smith K, Nehme Z. **Incidence and outcomes of out-of-hospital cardiac arrest from initial asystole: a systematic review and meta-analysis.** Resuscitation. 2025 Jul;212:110629. doi:10.1016/j.resuscitation.2025.110629. Epub 2025 May 3. PMID: 40324517.



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PREHOSPITAL CARE

– clinical trials & RCT & multicenter study –

1. J Med Internet Res. 2025 Jul 31;27:e72984. doi: 10.2196/72984.

Large Language Model Symptom Identification From Clinical Text: Multicenter Study.

McMurry AJ(1)(2), Phelan D(1), Dixon BE(3)(4), Geva A(1)(5), Gottlieb D(1)(6), Jones JR(1), Terry M(1), Taylor DE(4), Callaway H(4), Manoharan S(4), Miller T(1)(2), Olson KL(1)(2), Mandl KD(1)(2).

BACKGROUND: Recognizing patient symptoms is fundamental to medicine, research, and public health. However, symptoms are often underreported in coded formats even though they are routinely documented in physician notes. Large language models (LLMs), noted for their generalizability, could help bridge this gap by mimicking the role of human expert chart reviewers for symptom identification.

OBJECTIVE: The primary objective of this multisite study was to measure the accurate identification of infectious respiratory disease symptoms using LLMs instructed to follow chart review guidelines. The secondary objective was to evaluate LLM generalizability in multisite settings without the need for site-specific training, fine-tuning, or customization.

METHODS: Four LLMs were evaluated: GPT-4, GPT-3.5, Llama2 70B, and Mixtral 8×7B. LLM prompts were instructed to take on the role of chart reviewers and follow symptom annotation guidelines when assessing physician notes. Ground truth labels for each note were annotated by subject matter experts. Optimal LLM prompting strategies were selected using a development corpus of 103 notes from the emergency department at Boston Children's Hospital. The performance of each LLM was measured using a test corpus with 202 notes from Boston Children's Hospital. The performance of an International Classification of Diseases, Tenth Revision (ICD-10)-based method was also measured as a baseline. Generalizability of the most performant LLM was then measured in a validation corpus of 308 notes from 21 emergency departments in the Indiana Health Information Exchange.

RESULTS: Symptom identification accuracy was superior for every LLM tested for each infectious disease symptom compared to an ICD-10-based method (F1-score=45.1%). GPT-4 was the highest scoring (F1-score=91.4%; $P<.001$) and was significantly better than the ICD-10-based method, followed by GPT-3.5 (F1-score=90.0%; $P<.001$), Llama2 (F1-score=81.7%; $P<.001$), and Mixtral (F1-score=83.5%; $P<.001$). For the validation corpus, performance of the ICD-10-based method decreased (F1-score=26.9%), while GPT-4 increased (F1-score=94.0%), demonstrating better generalizability using GPT-4 ($P<.001$).



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CONCLUSIONS: LLMs significantly outperformed an ICD-10-based method for respiratory symptom identification in emergency department electronic health records. GPT-4 demonstrated the highest accuracy and generalizability, suggesting that LLMs may augment or replace traditional approaches. LLMs can be instructed to mimic human chart reviewers with high accuracy. Future work should assess broader symptom types and health care settings.

DOI: 10.2196/72984

PMCID: PMC12313083

PMID: 40743494 [Indexed for MEDLINE]

2. BMC Emerg Med. 2025 Jul 30;25(1):138. doi: 10.1186/s12873-025-01295-9.

Could low-acuity emergency medical services patients be redirected to primary care? Findings from a multi-center survey in Berlin, Germany.

Holzinger F(1), Kümpel L(2), Resendiz Cantu R(3), Alberter A(3), Möckel M(3), Heintze C(2).

BACKGROUND: Emergency medical services (EMS) are frequently used by low-acuity patients, which contributes to emergency department (ED) crowding. The feasibility of EMS transporting low-acuity patients directly to general practitioner (GP) practices remains a matter of debate. We therefore investigated the circumstances of EMS utilization in patients who subsequently receive ambulatory treatment in the ED. We wanted to find out how often a primary care (PC) consultation could have been a suitable alternative in such cases.

METHODS: Low-acuity ED utilizers transported by EMS were surveyed on demographics and medical characteristics and asked about the appropriateness and acceptability of a potential PC redirection, supplemented with case assessments by EMS personnel. Additionally, treatment documentation from both the ED and EMS was analyzed. Descriptive statistics were conducted. Associations between categorical variables were examined by Chi2 tests.

RESULTS: A total of n = 358 low-acuity EMS participants were recruited. Participants had a mean age of 47.6 years; gender f/m: 58.1%/41.9%. In the hospital, 71.8% were assigned to the Manchester triage system (MTS) category 3 and 28.0% to category 4. A third of the patients had decided to alert EMS at their discretion, while other people (e.g., relatives, colleagues) had been involved twice as often. Patients most commonly cited severe symptoms and related fears as reasons for engaging EMS services. EMS personnel categorized the complaints as treatable by a GP in 37.0%, while 44.5% of patients would have been open to PC management. However, these assessments exhibited substantial discrepancies, as evidenced by a Cohen's Kappa coefficient of approximately 0.1. From a preclinical perspective, only 24.4% of cases met



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the criteria for potentially realistic diversion. These encompassed both patient openness to alternative care pathways and EMS discernment of cases as potentially appropriate.

CONCLUSIONS: PC diversion is estimated to be feasible for a maximum of a quarter of ED outpatients. Markers for potential management in PC show highly discrepant results, and there is no validated system or score for preclinical identification of patients eligible for safe redirection. As EMS is intended for high-acuity emergencies, such patients could potentially also benefit from options like telemedicine care at home or alternative transportation.

TRIAL REGISTRATION: German Clinical Trials Register (DRKS00023480); date: 27/11/2020.

DOI: 10.1186/s12873-025-01295-9

PMCID: PMC12312431

PMID: 40739617 [Indexed for MEDLINE]

3. Scand J Trauma Resusc Emerg Med. 2025 Jul 28;33(1):133. doi: 10.1186/s13049-025-01446-8.

Pre-hospital blood product transfusion and calcium management in the United Kingdom: a multicentre service evaluation.

Forbes A(1)(2), Simpson C(3)(4), Griggs J(5)(6), Barrett J(3)(7), Lyon R(3)(8), Leech C(9)(10); Pre-Hospital Trainee Operated Research Network (PHOTON) and Air Ambulance Charity Kent Surrey Sussex.

BACKGROUND: Hypocalcaemia and hypercalcaemia are associated with increased morbidity and mortality in trauma patients. Although in-hospital calcium replacement protocols target normocalcaemia, UK pre-hospital services lack standardised calcium monitoring capabilities and demonstrate significant variation in calcium supplementation. No evidence-based guidelines exist for pre- and early in-hospital calcium administration in patients receiving blood product transfusion. This study characterises current UK pre-hospital calcium management in patients requiring blood transfusion prior to ionised calcium (iCa) measurement.

METHODS: A multicentre pre-hospital service evaluation across five UK Helicopter Emergency Medicine Services (HEMS) from February to April 2024, including all adult trauma patients receiving pre-hospital blood transfusions. Data collected included baseline demographics, pre- and in-hospital blood products transfused, calcium dose and calcium measurement in the Emergency Department. The primary outcome was iCa on initial blood gas measurement.



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RESULTS: Fifty-eight patients were included, stratified by calcium levels on hospital arrival: 25 (43.1%) hypocalcaemic, 20 (34.5%) normocalcaemic, and 13 (22.4%) were hypercalcaemic. Most patients were male (84%) sustained blunt trauma (76%) and the overall median iCa was 1.14 mmol/L on first blood gas analysis. Pre-hospital calcium was given to 57%, with hypercalcaemic patients more likely to receive replacement. Normocalcaemic patients received fewer blood products overall. Increasing blood product administration was associated with lower calcium levels, especially in those not receiving pre-hospital calcium.

CONCLUSION: Hypocalcaemia and hypercalcaemia were common. Calcium replacement protocols may under- or overtreat due to diverse injury patterns and baseline patient factors. Pre-hospital point-of-care testing (POCT) for iCa could help tailor treatment, especially in cases with longer times between injury and arrival at hospital. We demonstrate the feasibility of collecting comprehensive pre- and in-hospital data across multiple HEMS services to better inform future guidelines in patients with traumatic haemorrhage.

DOI: 10.1186/s13049-025-01446-8

PMCID: PMC12306068

PMID: 40722177 [Indexed for MEDLINE]

4. JMIR Mhealth Uhealth. 2025 Jul 8;13:e60173. doi: 10.2196/60173.

Exploring the Barriers and Facilitators to Implementing a Smartphone App for Physicians to Improve the Management of Acute Myocardial Infarctions: Multicenter, Mixed Methods, Observational Study.

Cullen KJ(#)(1)(2), Mir H(#)(3)(4), Natarajan MK(1)(2)(5), Corovic M(1)(2), Mosleh K(1)(2), Crawshaw J(6), Mercuri M(1)(7)(8)(9), Masoom H(10), Schwalm JD(1)(2)(5).

BACKGROUND: Timely and appropriate care is critical for patients with ST-elevation myocardial infarction (STEMI). Effective communication and prompt sharing of test results, particularly electrocardiograms (ECGs), between the referring emergency medicine (EM) physician or emergency medical service (EMS) paramedic and the interventional cardiologist (IC) are essential. This exchange relies on fax or SMS text messages. The SmartAMI-ACS (Strategic Management of Acute Reperfusion and Therapies in Acute Myocardial Infarction) App was developed to streamline communication. It is user friendly and privacy compliant, and enables rapid, secure ECG sharing to support faster, informed clinical decision-making.



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OBJECTIVE: This paper details the results of targeted preimplementation surveys to establish barriers and enablers of using a smartphone app to transmit ECG images among ICs, EM physicians, and EMS paramedics to help tailor implementation interventions.

METHODS: To assess the proposed acceptability and uptake of the app, preimplementation surveys were disseminated to ICs, EM physicians, and EMS paramedics in one region of Ontario, Canada. Questions were generated based on selected components of the Consolidated Framework for Implementation Research, results from a pilot study carried out at a regional hospital where the SmartAMI-ACS app was previously implemented, and predicted barriers based on expert guidance. The preimplementation surveys consisted of 7-point Likert scale questions (1=strongly disagree and 7=strongly agree) and open-ended questions. Open-ended data were extracted verbatim and analyzed using an inductive qualitative approach, with transcripts coded into descriptive qualitative codes and then collapsed into themes.

RESULTS: Survey uptake was acceptable, with 9 of the invited 10 ICs, 51 of the invited 223 EM physicians, and 93 of the invited 1138 EMS paramedics responding. All groups recognized that current practices for sharing ECGs allowed room for improvement, accepting that fax can be inconvenient and SMS text messages may not be secure. When asked whether there was a need for a smartphone app to transmit ECGs, ICs (mean 6.67, SD 0.5), EM physicians (mean 5.57, SD 1.3), and EMS paramedics (mean 5.79, SD 1.45) consistently agreed. Commonly reported barriers were concerns over technological challenges, privacy issues, and cell phone reception strength. Through the identification of the barriers in each stakeholder group, implementation strategies were developed that facilitated the scale-up of this system-change intervention.

CONCLUSIONS: Results from the 3 web-based preimplementation surveys to identify key barriers and enablers to the implementation of the app helped inform the selection of tailored implementation strategies to support the rollout of the app across the health region. The surveys identified key barriers around technology, privacy, and access to required Wi-Fi that needed to be addressed during app implementation to facilitate uptake and use. Results from the surveys, and ongoing evaluation of effectiveness, are informing the expansion of the app intervention to local ambulance services and other health regions.

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PMCID: PMC12262926

PMID: 40627818 [Indexed for MEDLINE]



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5. JAMA Netw Open. 2025 Jul 1;8(7):e2519020. doi: 10.1001/jamanetworkopen.2025.19020.

Video Streaming or Telephone Communication During Emergency Medical Services Dispatch Calls: A Cluster Randomized Clinical Trial.

Gude MF(1)(2), Valentin JB(3), Meisner-Jensen M(1), Bohnstedt-Pedersen NH(1), Dalgaard AK(1), Væggemose U(1)(2), Blauenfeldt RA(2)(4).

IMPORTANCE: Video streaming during emergency medical calls may enhance triage precision and optimize health resource allocation. However, its clinical safety and effect on key outcomes remain unexplored in randomized clinical trials.

OBJECTIVE: To assess whether video streaming during emergency calls reduces highest-urgency ambulance dispatches while ensuring safety through outcomes such as 24-hour hospital admissions among initially nonconveyed patients, mortality, and intensive care unit (ICU) admissions.

DESIGN, SETTING, AND PARTICIPANTS: This cluster randomized clinical trial was conducted across 4 months (January 1 through April 30, 2023) at a single emergency medical dispatch center serving 1.3 million residents in the Central Denmark Region. Matched pairs of dispatchers were randomized to manage calls using either telephone only communication (control) or video streaming (intervention). Calls were routed to the next available dispatcher who had been idle the longest. Data were analyzed using the intention-to-treat approach.

INTERVENTION: Dispatchers in the intervention group used secure, 1-way smartphone video streaming during emergency calls, while the control group followed standard telephone protocols.

MAIN OUTCOMES AND MEASURES: The primary outcome was the percentage of ambulances dispatched at the highest urgency level. Secondary outcomes included 24-hour hospital admissions among initially nonconveyed patients, ICU admission, mortality rates, and dispatch call duration.

RESULTS: Of 18 745 calls (patient median [IQR] age, 57 [31-76] years; 54.4% female), 8124 were received by 10 dispatchers randomized to video streaming and 10 621 by 10 dispatchers randomized to telephone-only communication. Video streaming was established in 3706 of the 8124 calls (45.6% [95% CI, 44.6%-46.7%]). Compared with the control group, the intervention group demonstrated a 5.0% absolute reduction (95% CI, 0.0%-10.1%; $P = .049$) in highest-urgency ambulance dispatches and no significant change (4.5% increase [95% CI, -1.1% to 10.0%; $P = .11$]) in nonconveyance. Hospital admissions among initially nonconveyed patients within 24 hours were reduced by 2.0% (95% CI, -3.7% to -0.2%; $P = .03$). Mean dispatch



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time was 3.7 minutes (95% CI, 3.4-4.0 minutes) in the video streaming group vs 3.2 minutes (95% CI, 2.9-3.4 minutes) in the telephone-only group, a difference of 0.5 minutes (95% CI, 0.1-0.9 minutes; $P = .02$). Mortality rates at 30 days and ICU admission rates were not statistically different between the 2 groups.

CONCLUSIONS AND RELEVANCE: In this cluster randomized clinical trial assessing high-stakes emergency calls, video streaming reduced the frequency of highest-urgency ambulance dispatches and lowered hospital admissions among initially nonconveyed patients, but slightly increased dispatch times. These findings suggest that video streaming may improve triage accuracy and reduce hospital and prehospital resource use.

TRIAL REGISTRATION: ClinicalTrials.gov Identifier: NCT05742412.

DOI: 10.1001/jamanetworkopen.2025.19020

PMCID: PMC12215568

PMID: 40591356 [Indexed for MEDLINE]



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PREHOSPITAL CARE

– systematic review & meta-analysis & scoping review –

1. Scand J Trauma Resusc Emerg Med. 2025 Jul 31;33(1):134. doi: 10.1186/s13049-025-01440-0.

Blood transfusion training for prehospital providers: a scoping review.

Dion PM(1)(2), Singh K(3), Coleby J(4), Beckett A(5)(6), Lampron J(7), McGowan M(8), Shorr R(9), Nolan B(10)(11)(12)(13).

BACKGROUND: Blood transfusion is increasingly utilised to manage haemorrhagic shock in prehospital environments. This practice is particularly relevant in settings where delays to definitive treatment are common due to extended evacuation timelines, limited resupply, and challenging environmental conditions. Safe and effective transfusion in these contexts depends on competent, well-prepared providers. Non-physician personnel may be required to perform transfusions independently in high-stakes situations without direct physician supervision. This scoping review synthesizes current literature on blood transfusion training for prehospital providers, with a focus on instructional design, simulation modalities, knowledge retention, and outcome evaluation.

METHODS: We conducted a scoping review following Joanna Briggs Institute methodology and reported in accordance with the PRISMA-ScR framework. Seven databases were systematically searched through 20 February 2025. Eligible studies described transfusion training for non-physician healthcare providers in prehospital or austere environments. Data were extracted on instructional strategies, simulation modalities, and outcome measures. Outcomes were categorised using the Kirkpatrick Model, and instructional design features mapped to simulation-based education frameworks.

RESULTS: Six studies involving 475 participants were included. Participants included combat medics, paramedics, registered nurses, physician assistants, and medical students. Training was delivered across environments including simulation centres, field-based exercises, and in-theatre deployments. All studies featured face-to-face instruction and hands-on skills training. Simulation modalities included part-task trainers in four studies, high-fidelity mannequins in two, live human models in two, and real-world transfusions in one. Instructional design features such as team-based learning, repeated practice, and structured feedback were reported in most studies. Outcomes were reported across all four Kirkpatrick levels. Four studies assessed learner satisfaction and confidence (Level 1), five evaluated knowledge and procedural skill acquisition (Level 2), three assessed behavioural change in practice (Level 3), and one reported patient-level outcomes during operational missions (Level 4). None assessed



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long-term retention. Variability in instructional methods and limited evaluation at higher outcome levels constrained generalizability.

CONCLUSIONS: Blood transfusion training for prehospital providers appears feasible and associated with short-term improvements in knowledge, skills, and confidence. However, inconsistent instructional design and limited evaluation of long-term or clinical outcomes indicate important gaps. Structured, simulation-informed programs aligned with operational needs may improve training consistency and effectiveness.

DOI: 10.1186/s13049-025-01440-0

PMCID: PMC12312356

PMID: 40745553 [Indexed for MEDLINE]

2. Stroke. 2025 Aug;56(8):2375-2379. doi: 10.1161/STROKEAHA.125.052000. Epub 2025 Jul 28.

Multicultural Recommendations to Guide Stroke Care: A Document Review of International Stroke Guidelines.

Zelege S(1)(2)(3), Drury P(1), Allida SM(1)(2), Ferguson C(1)(2).

Stroke disproportionately affects individuals from culturally and linguistically diverse backgrounds, often leading to poorer outcomes. Although stroke guidelines are essential for ensuring evidence-based care, the extent to which they incorporate cultural considerations remains unclear. This document review aims to systematically review international stroke guidelines for the inclusion of culture-related recommendations that support equitable stroke care. We conducted a document review of English-language international stroke guidelines published between June 2019 and May 2024, using a structured search strategy. Paired reviewers independently screened and extracted cultural recommendations, with a third reviewer resolving discrepancies. Guideline quality was appraised using the Appraisal of Guidelines for Research and Evaluation II instrument. Among 24 included guidelines, only 3 (12%) contained culture-related recommendations. Of 2991 total recommendations, 6 (0.2%) addressed cultural considerations, spanning prehospital care, acute care, rehabilitation, and palliative care. Most were supported by low-to-moderate quality evidence. The majority (88%) of international stroke guidelines lack cultural recommendations. Incorporating cultural considerations is critical for promoting culturally safe and equitable stroke care. Future research should explore barriers and facilitators to integrating cultural recommendations into stroke guidelines.



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DOI: 10.1161/STROKEAHA.125.052000

PMID: 40720568 [Indexed for MEDLINE]

3. PLoS One. 2025 Jul 16;20(7):e0327651. doi: 10.1371/journal.pone.0327651. eCollection 2025.

The role of contributing factors, triggers, and prodromal symptoms in the etiological classification of out-of-hospital cardiac arrest; A scoping review.

Shaeri S(1)(2), Considine J(3)(4), Dainty KN(1)(5), Olasveengen TM(6), Morrison LJ(1)(7)(8).

BACKGROUND: Current Utstein etiological classifications for out-of-hospital cardiac arrest (OHCA) are heterogenous and inaccurate when compared with robust sources. This heterogeneity may influence reporting incidence and outcomes and patient enrollment in observational studies and clinical trials. Circumstance-related factors may contribute to cardiac arrest; however, the role of these factors in improving the etiological classification of OHCA is unknown.

OBJECTIVE: This scoping review was proposed to explore current evidence to identify the role of contributing factors, triggers, and prodromal symptoms of out-of-hospital cardiac arrest in the reported etiology of cardiac arrest based on emergency medical services data, medical records, or autopsy reports.

METHOD: We searched Medline, Embase, and EMB review-Cochrane databases from 1946 to 2024. Studies were selected if the included population was adults with OHCA for whom the initial etiology was assigned, and any contributing factors, triggers, or prodromal symptoms of OHCA were reported. A descriptive review of the included studies was conducted.

RESULT: The search yielded 24,833 citations. Seventy studies met the inclusion criteria. These studies were published predominantly in Europe and Asia between 2010 and 2024 and classified as contributing factors (n = 24), exercise (n = 13), environmental triggers (n = 24), and prodromal symptoms (n = 9). The etiology of cardiac arrest initially assigned to cardiac or obvious non-cardiac classification may be precipitated by seizures (n = 8), trauma (n = 7), alcohol or drug intoxication (n = 6), Covid-19 infection (n = 5), myocardial infarction (n = 4), suicide (n = 4), antipsychotic medications (n = 4), and illicit drug use (n = 3). Exercise and environmental factors (e.g., particulate matter (PM) 2.5 μ and ambient temperature) may trigger cardiac arrest predominantly due to cardiac etiologies. Based on EMS data, approximately 50% of patients with OHCA experienced symptoms prior to cardiac arrest which suggested cardiac and non-cardiac etiologies.



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CONCLUSION: Many circumstance-related factors may directly or indirectly contribute to cardiac arrest etiology classification. Listing these factors in the reporting template may help prehospital personnel and data abstractors gather enough information to identify more accurately the etiology of OHCA.

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PMCID: PMC12266415

PMID: 40668847 [Indexed for MEDLINE]

4. Int J Emerg Med. 2025 Jul 15;18(1):131. doi: 10.1186/s12245-025-00927-y.

Intraosseous vs. intravenous access in out-of-hospital cardiac arrest: a systematic review and meta-analysis of clinical outcomes.

Kokori E(1), Al-Hashemi N(2), Aldeen ZS(3), Patel R(4), Aderinto N(5), Olatunji G(6), Ojo IS(7), Abraham IC(1), Shaka H(8).

BACKGROUND: Out-of-hospital cardiac arrest (OHCA) is a critical emergency with low survival rates despite advancements in prehospital care. Timely vascular access for medication administration is essential, with intravenous (IV) and intraosseous (IO) access as primary strategies. While IO offers rapid and reliable access under challenging conditions, its effectiveness compared to IV access remains uncertain. This systematic review and meta-analysis evaluate the comparative outcomes of IO versus IV access in OHCA.

METHODS: A systematic search of PubMed, Embase, SCOPUS, and other databases was conducted up to November 2024, following PRISMA guidelines. Studies were included comparing IO and IV access in OHCA and reporting outcomes such as return of spontaneous circulation (ROSC), 30-day survival, and neurological outcomes. Meta-analyses were performed using random-effects models to calculate pooled odds ratios (ORs) and mean differences. Heterogeneity was assessed using the I^2 statistic, and sensitivity analyses were conducted to evaluate the robustness.

RESULTS: Nineteen studies involving ~ 140,000 observations (7 randomized controlled trials, 12 retrospective/observational) were analyzed. IO access was associated with significantly lower odds of ROSC (OR 0.75, 95% CI 0.65-0.85, $p = 0.0003$; 17 studies) and FNO at hospital discharge (OR 0.53, 95% CI 0.35-0.80, $p = 0.0058$; 12 studies) compared to IV access. The 30-day survival showed a non-significant trend favoring IV access (OR 0.59, 95% CI 0.28-1.21, $p = 0.1088$; 5 studies). Subgroup analyses revealed stronger IV advantages for shorter



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emergency medical services (EMS) response times (< 10 min; FNO: OR 0.55, ROSC: OR 0.75) and shockable rhythms (FNO: OR 0.53, ROSC: OR 0.75).

CONCLUSION: While IO access is a viable alternative when IV access is challenging, this study highlights its association with poorer survival and neurological outcomes in OHCA. The findings show the importance of prioritizing IV access. Further high-quality research is needed to refine recommendations for OHCA management.

DOI: 10.1186/s12245-025-00927-y

PMCID: PMC12261587

PMID: 40665212

5. BMC Nurs. 2025 Jul 1;24(1):697. doi: 10.1186/s12912-025-03399-w.

Needle stick injuries among emergency medical services personnel: a systematic review and meta-analysis.

Sahebi A(1), Tahernejad S(2), Rezaei E(3), Shahmahmoudi F(3), Pirhadi S(3), Tahernejad A(4)(5).

INTRODUCTION: EMS personnel, including nurses working in prehospital care, are frontline responders in various emergencies and disaster scenarios. Due to their direct involvement in high-risk procedures such as injections and IV access under dynamic conditions, they are especially vulnerable to NSIs—a major occupational hazard with serious health implications. This study aimed to conduct a systematic review and meta-analysis to examine the prevalence of NSIs among EMS personnel and highlight its significance for nursing practice, education, and safety policy.

METHOD: This study was conducted based on the PRISMA guidelines, and its protocol was registered in PROSPERO under the code CRD42024615515. The searches were performed without time restrictions until the end of October 2024 across databases including PubMed, Scopus, and Web of Science. Manual searches were also performed via Google Scholar to ensure comprehensiveness. A random-effects model was used for the meta-analysis, and the I^2 index was employed to assess heterogeneity among studies. Data were analyzed using STATA software (version 15).

RESULT: During the initial search of the information sources, 239 articles were identified from the reviewed databases. After screening, study selection, and quality assessment, 15 studies were ultimately included in the meta-analysis, with 17,547 EMS personnel being analyzed.



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According to the meta-analysis results, the overall prevalence of NSIs among emergency medical services personnel was reported to be 24.21% (95% CI: 17.31-31.10, I² = 99.3%, P < 0.000).

CONCLUSION: Given the relatively high prevalence of NSIs among EMS personnel and the presence of specific risk factors associated with NSIs in EMS tasks compared to other professions, it is recommended to prioritize targeted training, regular evaluations, and ergonomic interventions to reduce the incidence of NSIs in EMS staff. Key occupational risk factors identified include shift work, high stress levels, fatigue, and exposure to unfamiliar environments. Educational programs, safety-engineered devices, and adherence to infection control protocols were among the most effective interventions noted.

DOI: 10.1186/s12912-025-03399-w

PMCID: PMC12211645

PMID: 40598144

6. BMC Emerg Med. 2025 Jul 1;25(1):100. doi: 10.1186/s12873-025-01258-0.

Identifying the components of prehospital emergency preparedness in radiological and nuclear incidents: a scoping review.

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INTRODUCTION: Despite the low probability of radiological and nuclear (RN) incidents, they can have severe consequences and require immediate response. Therefore, preparedness for them is important. In this regard, prehospital emergencies are important in reducing injuries and deaths from these accidents.

AIM: This study aimed to identify the factors affecting prehospital emergency preparedness in RN incidents.

METHOD: The study was conducted using a scoping review methodology. The research protocol followed the 2020 PRISMA-P checklist for systematic reviews and meta-analysis protocols. A search was conducted from 1970 to 2024 across PubMed, Scopus, Web of Science, ProQuest, Google Scholar, and Persian databases such as SID and Magiran using "Medical Emergency Services," "EMS," "Preparedness," "nuclear," and "radiological" as keywords. Of the 9,330 articles, 39 were selected according to the inclusion and exclusion criteria.



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RESULTS: The study identified three main categories, 18 subcategories, and 125 codes for prehospital emergency preparedness in RN incidents. These include medical and non-medical care at the scene (triage, treatment surveillance, monitoring, decontamination, Psychosocial Support, and safety & Security), scene management aspects (command system & management, information & data management, documentation, communication, coordination, cooperation & collaboration, risk Assessment, evacuation, and surge capacity), resources and education (staff, equipment & stuff, finances, and training & exercises).

CONCLUSION: The preparedness of the prehospital system in RN incidents is important in various aspects and includes various components addressed in this study. Paying attention to them can play a significant role in reducing the health effects of the mentioned accidents. These components include planning, resource provision, training and practice, and internal and external organizational coordination.

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PMCID: PMC12211649

PMID: 40596856 [Indexed for MEDLINE]

7. Air Med J. 2025 Jul-Aug;44(4):306-313. doi: 10.1016/j.amj.2025.04.005. Epub 2025 May 20.

Recent Outcomes Research in Helicopter Emergency Medical Services: A Scoping Review of Publication-Year 2024 Additions to the Helicopter Outcomes Assessment Research Database.

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OBJECTIVE: This scoping review is an annual update of helicopter emergency medical services (HEMS) outcomes literature added to the HEMS outcomes assessment research database (HOARD). HOARD is maintained by the critical care transport collaborative outcomes research effort (CCT CORE) and is updated each year with the previous calendar year's studies assessing whether HEMS use alters patient-centered outcomes.

METHODS: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Scoping Review (PRISMA-ScR) guidelines, we used multiple reviewers of records retrieved from multiple medical and gray literature sources: Medline (PubMed), EMBASE, Scopus, CINAHL, and Google Scholar. Eligible for review was HEMS vs. ground EMS outcomes studies either published or appearing in preprint databases during calendar year 2024. HOARD excludes case reports and review articles (unless they provide a new calculation of effect estimate). We



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assessed articles for subject matter (trauma vs non-trauma), journal impact factor (JIF), and geographic region of the study's correspondence author. Categorical analyses comparing 2024 studies with HOARD studies from 2023 were executed with Pearson's chi-square or Fisher's exact test, and we also calculated risk ratio with its 95% confidence interval. Non-normal JIF data were described using median and interquartile range and analyzed using rank sum testing. Nonparametric trend testing evaluated the last decade's evidence using Cochrane-Armitage (dichotomous) or Cuzick (JIF) testing.

RESULTS: Of an initial records of $N = 5,179$ (74 of which were reviewed as full text), we identified 21 studies for addition to HOARD. Longitudinal analysis revealed a significant ($P < .001$) annual trend toward increasing proportions of studies focusing on non-trauma; 2024 was the first time in a decade that the more than half of the year's outcomes studies focused on non-trauma. There was no indication of trend involving the proportion of studies emanating from the USA ($P = .821$) or from the combined countries of USA and Europe ($P = .566$). The 2024 JIF had a median of 2.11 and interquartile range of 1.25 to 2.60. There was no suggestion ($P = .919$) of longitudinal JIF trend in the past decade.

CONCLUSION: This scoping review provides information on 21 HEMS outcomes studies new to the evidence base in 2024. The HOARD database, freely available, has been updated with these studies.

DOI: 10.1016/j.amj.2025.04.005

PMID: 40571389 [Indexed for MEDLINE]

8. Resuscitation. 2025 Jul;212:110629. doi: 10.1016/j.resuscitation.2025.110629. Epub 2025 May 3.

Incidence and outcomes of out-of-hospital cardiac arrest from initial asystole: a systematic review and meta-analysis.

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AIM: To examine global variation in the incidence and outcomes of Emergency Medical Services (EMS) attended and treated out-of-hospital cardiac arrest (OHCA) from initial asystole.

DATA SOURCES: We systematically reviewed electronic databases for studies between 1990 and August 2024 reporting EMS-attended or treated asystolic OHCA populations. The primary outcome was survival to hospital discharge or 30-days. Random-effects models were used to pool primary and secondary outcomes and meta-regression was used to examine sources of



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heterogeneity. Study quality was assessed using the Joanna Briggs Institute critical appraisal tool for prevalence studies.

RESULTS: The search returned 4464 articles, of which 82 studies were eligible for inclusion encompassing 540,054 EMS-treated patients across 35 countries. Five studies reported on EMS attended populations (n = 35,561). The studies included in the review had high clinical and statistical heterogeneity. The pooled proportion of EMS-treated initial asystolic OHCA was 53.0% (95% CI: 49.0%, 58.0%; I² = 100%). The overall pooled proportion of survivors to hospital discharge or 30-days was 1.5% (95% CI: 1.2%, 1.8%, I² = 97%). The pooled proportion of event survivors was 11.6% (95% CI 6.5%, 17.8%, I² = 99%), the pooled proportion of prehospital ROSC was 16.0% (95% CI 14.0%, 17.0%, I² = 100%) and the pooled proportion of neurologically favourable survival at longest follow-up was 0.6% (95% CI 0.5%, 0.8%, I² = 100%). The overall pooled incidence of EMS-treated asystolic OHCA was 11.0 cases per 100,000 person-years (95% CI: 10.5, 11.5, I² = 100%). In stratified analysis of survival to hospital discharge or 30-days, population type, study duration, study design and aetiology were the only variables that were significantly associated with survival to hospital discharge or 30-days. In adjusted analysis, population type, study duration, highest EMS skill level and region were significantly associated with the primary outcome. In the multivariable analysis of incidence, study region, arrest aetiology, sample size, year of publication, study population, study duration and study quality significantly explained variation in incidence across studies.

CONCLUSION: Initial asystolic OHCA made up 53% of all EMS-treated patients and pooled survival rates were extremely poor. Research efforts in this population should focus on developing prevention strategies as well as adherence to termination or withholding of resuscitation guidelines for asystolic OHCA.

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