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REVIEW ARTICLE

General Medicine

Research priority setting in emergency care: A scoping review

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Abstract

Objective: Priority areas for emergency care research are emerging and becoming ever more important. The objectives of this scoping review were to (1) provide a comprehensive overview of published emergency care priority-setting studies by collating and comparing priority-setting methodology and (2) describe the resulting research priorities identified.

Methods: The Joanna Briggs Institute methodological framework was used. Inclusion criteria were peer-review articles available in English, published between January 1, 2008 and March 31, 2019 and used 2 or more search terms. Five databases (Scopus, AustHealth, EMBASE, CINAHL, and Ovid MEDLINE) were searched. REporting guideline for PRIority SEtting of health research (REPRISE) criteria were used to assess the quality of evidence of included articles.

Results: Forty-five studies were included. Fourteen themes for emergency care research were considered within 3 overarching research domains: emergency populations (pediatrics, geriatrics), emergency care workforce and processes (nursing, shared decision making, general workforce, and process), and emergency care clinical areas (imaging, falls, pain management, trauma care, substance misuse, infectious diseases,

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mental health, cardiology, general clinical care). Variation in the reporting of research priority areas was evident. Priority areas to drive the global agenda for emergency care research are limited given the country and professional group-specific context of existing studies.

Conclusion: This comprehensive summary of generated research priorities across emergency care provides insight into current and future research agendas. With the nature of emergency care being inherently broad, future priorities may warrant population (eg, children, geriatrics) or subspecialty (eg, trauma, toxicology, mental health) focus and be derived using a rigorous framework and patient engagement.

KEYWORDS
emergency department, prehospital, priority areas, research, scoping review

1 | INTRODUCTION

1.1 | Background

The provision of emergency care is a feature of all countries and is an effective strategy to reduce the global burden of disease[1]; yet demand for this service is increasing at rates exceeding population growth.[2] Emergency care is variably organized between countries.[3] It can be situated within an emergency medical services (EMS) system, a comprehensive, coordinated, and integrated system of care for patients suffering acute illness and injury.[4] The EMS system can encompass hospital emergency departments, primary health care, first aid and first responder services, medical retrieval services (domestic and international), helicopter aeromedical services, fixed-wing aeromedical services, and publicly funded ambulance (predominantly road-based) services.[4] Many countries do not have hospital-based emergency medicine as a specialty.[3] Recognition as a specialty can vary[5] but generally requires a unique field of action, a defined body of knowledge, an active research program and a rigorous training program.[6] The benefits of such professional specialization include the capacity and capability to deliver high-quality care that requires extensive knowledge.[3]

1.2 | Importance

Identifying clinically meaningful research priorities in the context of the emergency care system (of which prehospital care is an important part of the continuum)[7] can be useful in guiding where further research in evidence-based care is needed, support rationale when seeking competitive research funding, and mitigate research waste. Mitigating such waste begins with ensuring that research is undertaken in areas that are relevant to the users of research (clinicians, patients, and policy makers) and does not simply represent the specialized interest of researchers.[8] Although substantial funding for research is available, it is insufficient for the demand, and thus some form of prioritization is inevitable. Developing a shared agenda is an important step in ensuring future research has the necessary relevance. Understanding the current landscape of research priority setting can guide future efforts to strategically align research in emergency care to support a high-quality, timely, and accessible health care system.[7] Furthermore, assessing the priority-setting process against an established framework, can assist in guiding where and how the process and reporting can be improved.

1.3 | Goals of this investigation

The objectives of this scoping review were to (1) provide a comprehensive overview of published emergency care priority setting studies by collating and comparing priority-setting methodology and (2) describe the resulting research priorities identified. It builds upon previous priority-setting work specific to the emergency care arena with the intention to map available evidence, highlight themes in research priority questions, explore the reasons for any differences,[9] and guide future research directions.

2 | METHODS

2.1 | Design

The methodological framework articulated by the Joanna Briggs Institute (JBI)[10] guided this scoping review. The development of the JBI approach has been underpinned by earlier work of others including Arskey and O'Malley.[11] Scoping reviews may be conducted as the first step in a larger project or they can serve as a standalone initiative. They are used to synthesize research evidence often involving mapping of existing literature in a given field in terms of its nature, features, and volume. The JBI framework[10] details 9 stages of the review process: (1) defining and aligning the objective(s) and question(s); (2) developing and aligning the inclusion criteria with the objective(s) and question(s); (3) describing the planned approach to evidence searching, selection; (4) searching for the evidence; (5) selecting the evidence; (6) extracting

TABLE 1 Article eligibility criteria

	Inclusion criteria
Population	People involved with emergency care
	This included patients, emergency clinicians (nurses and doctors), paramedics, and academics
Concept	Studies with an explicit aim to identify research priorities in emergency care
Context	Emergency care settings in health care systems and institutions, emergency departments, and prehospital emergency medicine (ie, paramedicine and ambulance).

Excluded: editorials, literature review papers, discussion papers, commentaries, conference abstracts, anonymous articles, articles where authorship was unclear, articles with military focus, articles focused on emergencies in the context of disasters.

the evidence; (7) charting the evidence; (8) summarising the evidence in relation to the objective(s) and question(s); and (9) consulting information scientists, librarians, and/or experts (throughout).

2.2 | Inclusion and exclusion criteria

The eligibility criteria for this review are described in Table 1 and aligned with the specified population, concept, and context.[10] Included were studies where the population was focused on people involved with emergency care, there was an explicit aim to identify research priorities in emergency care, and the context was the emergency care setting. Exclusion criteria were editorials, literature review papers, discussion papers, commentaries, conference abstracts, anonymous articles, articles where authorship was unclear, articles with military focus, and articles focused on emergencies in the context of disasters. The search was limited to peer-reviewed articles that were available in English, published between January 1, 2008 and March 31, 2019.

2.3 | Search strategy

A comprehensive 3-step search strategy was supported by a health librarian in consultation with the research team.[10] Search terms and synonyms relating to emergency care and research-priority setting were used. In step 1, an initial search of the Ovid MEDLINE database was conducted. An example of this search strategy is provided in Supplementary Material S1. In step 2, a second search was undertaken using search terms and keywords customized for each database: EMBASE, CINAHL, Ovid MEDLINE, Scopus, and AustHealth. The search for eligible articles included the following terms and synonyms: *ED/EDs*, *emergency department/s*, *emergency room/s*, *accident and emergency*, *ER/s*, *emergency medicine*, *emergency nursing*, *emergency care*, *prehospital*, *paramedicine*, *ambulance*, OR *A&E*; AND *research*; AND *priority*. Activation of "smart text" and automatic word variation options (unlimited truncation operators such as emergenc*) during searches ensured that word combination options including US and UK spelling variations and plural terms were detected. In step 3, reference chaining was conducted on all included articles.

2.4 | Selection of sources of evidence

The EndNote bibliographic software package[12] was used to manage all references and any duplicates were removed. Two authors (JC and YLH) independently screened titles and abstracts for inclusion based on criteria. A third author (DW) moderated where an agreement was not initially achieved. Full-text articles of studies were independently screened by 2 authors (JC and YLH) and disagreements were moderated by another author (GK). The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) flow diagram[13] was used to present the search decision process (Figure 1).

2.5 | Data extraction process

Study characteristics from articles were extracted by 2 authors (YLH and JH) into a data extraction form. Data extracted included study author(s), year of publication, study location, clinical setting, the objective of the study, participant population, study design, description of research priority-setting approach, and priority area outcomes. Initial extraction was cross-checked against original articles (by YLH for the data extracted by JH and by MK for all articles) with differences resolved through discussion and consensus agreement between 2 authors (YLH and MK). Two authors (YLH and MK) independently extracted data to appraise the quality of the studies. Assessment differences were discussed among reviewing authors to reach a consensus.

2.6 | Appraisal

There is currently no single gold-standard approach to appraising the quality of research priority-setting studies; however, principles of good practice have been proposed.[14–16] Each of the identified studies were appraised using the REporting guideline for PRIority SEtting of health research (REPRISE).[17] The REPRISE framework contains 32 items organized into 10 domains that are used to critically appraise studies for context and scope, governance and team, the framework for priority setting, stakeholders/participants, identification and collection of priorities, prioritization of research topics, output,

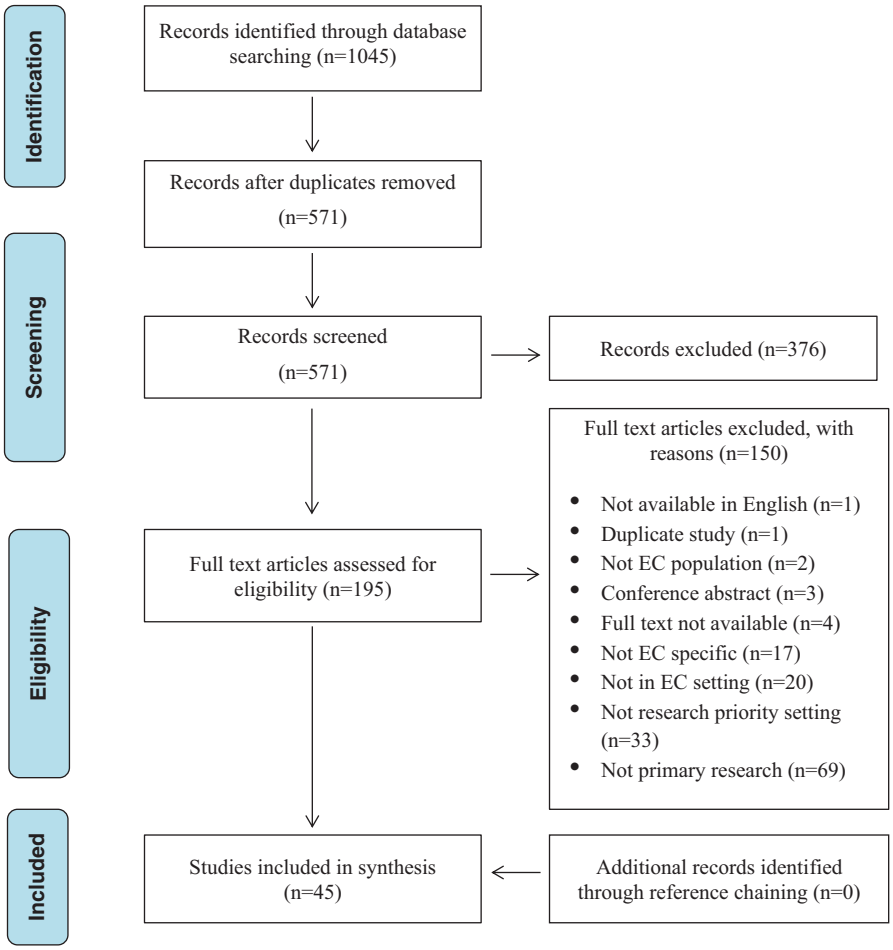

FIGURE 1 Flow diagram of process to identify eligible studies in this scoping review. EC, emergency care.

evaluation and feedback, translation and implementation, and funding and conflict of interest. As this framework was specifically designed with health research prioritization in mind, it could identify issues that may otherwise have been overlooked by traditional quality appraisal tools.

2.7 | Synthesis

A descriptive synthesis to summarize the study characteristics and priority-setting methodology and identify research priority areas was conducted. Prehospital and ED were considered separate emergency care settings. Study characteristics data are also reported. The research domains were pragmatically created via a process of generation, discussion, review, and refinement with experienced emergency care researchers (JC, YLH, MK and GK) with consensus from other authors. This information was used to produce an evidence map grouped by research domains and research themes (see Supplementary Material S2 for full details). Data were imported into Kumu[18] to create an interactive evidence gap map of the findings.

3 | RESULTS

3.1 | Study characteristics

A total of 1045 titles and abstracts were initially screened, followed by 195 full-text articles. As a result, 45 studies met inclusion criteria for this review. Study characteristics for all included studies are presented in Table 2. In total, 5638 participants were included; 5 (11%) studies did not report the number of participants. Most studies were undertaken in the United States ($n = 30$; 67%) and 5 (11%) involved more than 1 country. Eleven studies (24%) reported having consumer (ie, patient communities and advocacy groups, health consumers) involvement in the priority-setting process and most studies ($n = 24$; 53%) included a multidisciplinary (ie, representatives from > 1 professional group) participant population. Other participant cohorts were drawn from specific groups (ie, emergency physicians, emergency nurses, patients); the stakeholder population was not explicit in 2 studies. In most studies, the primary study setting was the ED ($n = 36$; 80%). This was followed by prehospital ($n = 7$; 16%), hospital ($n = 1$; 2%), or the combined prehospital and ED ($n = 1$; 2%) environment. Priority-setting methods included nominal group technique (NGT, including modified NGT)

TABLE 2 Characteristics of included studies

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Adelgais et al.[27]	United States	Prehospital	To evaluate the current scientific priorities of the pediatric emergency medicine research community and explore specific barriers that may prevent achievement of these scientific priorities	Researchers, educators, program managers, EMS medical directors and personnel, social media stakeholders, and community in pediatric emergency medicine (total $n = 70$)	NGT[a]	Emergency care population	Pediatrics
Al-Yateem et al.[28]	United Arab Emirates	Hospital (including ED)	To identify and rank the research priorities for nurses delivering specialized nursing care for patients in United Arab Emirates hospitals	Nurses working in a specialist clinical area (total $n = 1899$; $n = 142$, 13.8% from ED)	Two-stage Delphi	Emergency care workforce and process	Nursing
Ashurst et al.[29]	United States	ED	To determine research priorities for how patients' sex and gender may (or should) affect imaging choices in the acute care setting	Health professionals working in emergency medicine (total $n = 26$)	NGT	Emergency clinical care	Imaging
Bialy et al.[30]	United States	ED	To engage patients and families in developing a prioritized list of research topics for pediatric emergency medicine and to compare results with prior research prioritization initiatives in the ED setting	Emergency physicians, nurses, administrators, educators, trainees, and parents of children (total $n = 137$)	Survey and Delphi[a]	Emergency care population	Pediatrics
Bressan et al.[31]	Europe	ED	To define research priorities for pediatric emergency medicine in Europe to guide the development of future research projects	Pediatric emergency physicians (total $n = 52$)	Three-stage Delphi[a]	Emergency care population	Pediatrics
Browne et al. [32]	United States	Prehospital	To develop a list of research priorities that is relevant and important to the practice of pediatric prehospital care	Members from the Children's EMS research node of the Pediatric Emergency Care Applied Research Network (total $n = 20$)	Delphi[a]	Emergency care population	Pediatrics

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Cairns et al.[33]	United States	ED	To identify key research questions essential to advancing the scientific underpinnings of emergency trauma care and to discuss the barriers and best means to advance research by exploring the role of trauma research networks and collaboration between NIH and the emergency trauma care community	Respondents from adult and pediatric emergency medicine, trauma and critical care, nursing, and EMS organisations (n = NR)	Consensus process	Emergency care population	Trauma
Carpenter et al[34]	United States	ED	To identify key research opportunities within 3 domains of medication management, screening and prevention, and functional assessment that can be used to develop quality indicators in the future	Members of SAEM; SAEM Geriatric Interest Group; participants at the 2008 SAEM Annual Meeting; attendees from the 2009 American Geriatrics Society Annual Scientific Meeting (total n = 115)	Delphi-type surveys	Emergency care population	Geriatrics
Chen et al.[35]	United States	ED	To identify educational research priorities related to the implementation of SDM	Academics and patients (total n = 7)	Consensus process	Emergency care workforce and process	SDM
Choo et al.[36]	United States	ED	To identify research questions that could improve knowledge of gender differences in substance use relevant to the ED setting, focusing on the questions with highest potential to improve emergency care	Attendees from the 2014 Academic Emergency Medicine Conference (total n = 30)	NGT[a]	Emergency clinical care	Substance misuse
Chung et al. [37]	United States	ED	To develop a research agenda focused on well-being, resilience, and career longevity issues specific to practicing emergency medicine in an academic setting	Committee members from SAEM (total n = 18)	Consensus process	Emergency care workforce and process	General
Considine et al.[38]	Australia	ED	To establish research priorities to meet the needs of the profession and practice of emergency nursing in Australia	Attendees from the 15th International Conference for Emergency Nurses (total n = 446)	Survey and Delphi	Emergency care workforce and process	Nursing

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Deane et al.[39]	Australia and New Zealand	ED	To identify the research priorities of pediatric emergency specialists working in Australia and New Zealand	Pediatric emergency physicians (total *n* = 248)	Delphi and HPP	Emergency care population	Pediatrics
D'onofrio et al.[40]	United States	ED	To identify key research questions essential to advancing the science of emergency care and to discuss the barriers and strategies to advance research by exploring the collaboration between NIH and the emergency care community	Members from the National Institute of Neurological Disorders and Stroke, the National Institute on Mental Health, the Eunice Kennedy Shriver National Institute on Child Health and Human Development, the National Center for Research Resources, and extramural emergency care research advisors (*n* = NR)	Consensus process	Emergency clinical care	General
Fee et al.[41]	United States	ED	To gather expert opinion to define knowledge gaps and priority research questions related to interventions designed to mitigate the effect of ED crowding on safety	Expert stakeholders and attendees from the 2011 Academic Emergency Medicine Consensus conference (total *n* = 47)	Two-stage NGT[a]	Emergency care workforce and process	General
Fevang et al.[42]	Norway	Prehospital	To define key priority areas for research within the subfield of physician-provided, prehospital critical care by using a recognized consensus methodology	Expert physicians in physician-based, prehospital critical care (total *n* = 14)	Four-stage NGT[a]	Emergency care workforce and process	General
Finnerty et al.[43]	United States	ED	To generate a consensus-based research agenda for the development and implementation of clinical decision rules for diagnostic imaging in the ED	Attendees from the 2015 Academic Emergency Medicine Consensus conference (*n* = NR)	NGT[a]	Emergency clinical care	Imaging
Foltin et al.[44]	United States	Prehospital	To develop a pediatric-specific prehospital research agenda	Representatives from the Pediatric Emergency Care Applied Research Network, EMS agency, and nationally recognized prehospital researchers (total *n* = 42)	Consensus process	Emergency care population	Pediatrics

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Furyk et al.[45]	Australia and New Zealand	ED	To identify consensus research priorities in pediatric status epilepticus among experts and health consumers	Pediatric neurologists, emergency physicians, and health consumers (total $n = 216$)	Three-stage Delphi	Emergency care population	Pediatrics
Greenberg et al.[46]	United States	ED	To identify sex- and gender-specific research in the ED focused on trauma and injury, with specific attention to the domain of mechanical falls	Attendees from the 2014 Academic Emergency Medicine Consensus conference (total $n = 39$)	NGT[a]	Emergency clinical care	Falls
Gunn et al.[47]	United States	ED	To develop a research agenda regarding emergency diagnostic imaging on which to base future research	Attendees from the Academic Emergency Medicine consensus conference, members from SAEM, American Society for Emergency Radiology, the American College of Emergency Physicians, Radiologic Society of North America, American College of Radiology, and the American Association of Physicists in Medicine (total $n = 164$)	Consensus process	Emergency clinical care	Imaging
Hartshorn et al.[48]	United Kingdom and Ireland	ED	To establish the research agenda for pediatric emergency medicine in the United Kingdom and Ireland	Members of Paediatric Emergency Research in the United Kingdom and Ireland including clinical specialists, academics, trainees, and research nurses (total $n = 104$)	Two-stage Delphi[a]	Emergency care population	Pediatrics
Haukoos et al.[49]	United States	ED	To define knowledge gaps and priority research questions related to the performance of HIV and STI surveillance, screening, and intervention in the ED	Members of the National ED HIV Testing Consortium, authors of recent scientific abstracts related to HIV or STIs in the ED from the annual meetings of SAEM, the American College of Emergency Physicians, the Conference on Retroviruses and Opportunistic Infections, the Infectious Diseases Society of America, and the 2008 National Summit on HIV Diagnosis, Prevention, and Access to Care, authors of recently published peer-reviewed articles on HIV or STIs in the ED and specific HIV and STI experts (total $n = 98$)	Four-stage NGT	Emergency clinical care	Infectious disease

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Hawk et al[50]	United States	ED	To identify research priorities and develop a research agenda to improve the early identification of and management of ED patients with SUD with the goal of improving outcomes	Participants from emergency medicine, emergency psychiatry, emergency psychology, clinical research, governmental agencies, and patient advocacy groups (total *n* = 7)	NGT	Emergency clinical care	Substance misuse
Hodkinson et al.[51]	South Africa	ED	To seek consensus on key areas of emergency medicine development in developing world settings, with respect to the scope of emergency medicine, staffing needs, training requirements, and research priorities	Members of the American College of Emergency Physicians, attendees from the 2007 Emergency Medicine Society of South Africa conference, Ethiopian North American Health Professionals Association, European Society for Emergency Medicine, International Emergency Medicine Special Interest Group of Australasian College of Emergency Medicine, International Federation of Emergency Medicine, and SAEM (total *n* = 138)	Three-stage Delphi	Emergency care workforce and process	General
Keijzers et al.[52]	Australia	ED	To determine the clinical research priorities of Fellows of the Australasian College for Emergency Medicine to inform the strategic research agenda specific to multicenter clinical research	Fellows of Australasian College for Emergency Medicine (total *n* = 54)	Cross-sectional survey	Emergency clinical care	General
Kuehl et al.[53]	United States	ED	To describe the areas where administrative data have been applied to research evaluating the use of diagnostic imaging in the ED, the common sources for these data, and the strengths and limitations of administrative data	Expert stakeholders and attendees from the 2015 Academic Emergency Medicine Consensus conference (*n* = NR)	NGT	Emergency clinical care	Diagnostic imaging
Lewiss et al.[54]	United States	ED	To identify priority research areas related to education, assessment, and competency in the use and interpretation of diagnostic imaging within the practice of emergency medicine	Radiologists, physicists, and emergency physicians attending the 2015 Academic Emergency Medicine Consensus conference (total *n* = 10)	NGT[a]	Emergency clinical care	Imaging

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Martin et al.[55]	United States	Prehospital	To identify and rank research priorities for combat trauma care	Members of the Committee on Surgical Combat Casualty Care and the military committees of the Eastern Association for the Surgery of Trauma, and the American Association for the Surgery of Trauma (total $n = 64$)	Cross-sectional survey	Emergency clinical care	Trauma
McLay et al.[56]	Australia	ED	To determine the priorities for emergency medicine research of patients currently in an ED and to compare their priorities with those of Australasian College for Emergency Medicine researchers	Patients admitted to the EDs of Royal Perth Hospital and Armadale Health Service (total $n = 430$)	Cross-sectional survey	Emergency clinical care	General
Melnick et al. (2016)[57]	United States	ED	To develop a prioritized research agenda outlining important study questions to guide future investigations pertaining to the development and testing of SDM interventions in the ED	Patients, funding agencies, emergency medicine, pediatrics, research, and public health with roles ranging from medical student to attending physician to program managers (total $n = 35$)	NGT	Emergency care workforce and process	SDM
Miller et al.[58]	United States	ED	To describe the creation of a prioritized pediatric EMS research agenda specific for multicenter research	Members of Emergency Care Applied Research Network (total $n = 16$)	NGT and HPP	Emergency care population	Pediatrics
Moore et al.[59]	United States	ED	To seek consensus in identifying and prioritizing research questions and themes that involve the comparative effectiveness of "traditional" computed tomography use versus alternative diagnostic strategies in the acute care setting	Emergency physicians, emergency radiologists, medical physicists, and an industry expert (total $n = 67$)	Delphi[a]	Emergency clinical care	Imaging
Musey et al.[60]	United States	ED	To identify research priority areas related to influence of patients' gender on pain assessment, treatment and outcomes within ED populations	Emergency medicine and non-emergency medicine experts in pain research (total $n = 33$)	NGT	Emergency clinical care	Pain management

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Peltzer-Jones et al.[61]	United States	ED	To explore and enumerate the current knowledge gaps for the care of psychosis specifically in an emergency setting	Participants with expertise in psychosis from emergency medicine, emergency psychiatry, emergency psychology, clinical research, governmental agencies, and patient advocacy groups (total *n* = 7)	NGT	Emergency clinical care	Mental health
Plint et al.[62]	Canada	ED	To establish patient safety-related research priorities for emergency medicine	Clinicians, administrators, and researchers from adult and pediatric emergency medicine, patient safety, pharmacy, and mental health; representatives from patient safety organizations and the Emergency Medicine Patient Safety Foundation and Canadian Patient Safety Institute, patient safety researchers, directors of all Canadian pediatric academic EDs, trauma directors from hospitals accredited by the Trauma Association of Canada, and leaders of 3 pediatric emergency medicine research networks, ED directors from Canadian community hospitals (total *n* = 91)	Consensus process	Emergency care workforce and process	General
Roney et al.[63]	United States	Prehospital	To identify the upcoming research and education priorities related to the nursing care of pediatric trauma patients as described by the current members of Society of Trauma Nurses	Members from the Society of Trauma Nurses (total *n* = 128)	Delphi	Emergency care population	Pediatrics
Safdar et al.[64]	United States	ED	To identify sex- and gender-specific gaps in the key themes and research questions related to emergency cardiac ischemia care	Stakeholder representation from emergency physicians, cardiology, critical care, nursing, EMSs, patients, and major policymakers in government, academia, and patient care (total *n* = 113)	NGT	Emergency clinical care	Cardiology
Shenvi et al.[65]	United States	ED	To develop a set of research questions that would advance the understanding of optimal management of older adults with acute behavioral changes in the ED	Participants from emergency physicians, psychiatry, ED clinical research, student, governmental agencies (total *n* = 8)	NGT	Emergency care population	Geriatrics

(Continues)

TABLE 2 (Continued)

Study ID	Country	Emergency care setting	Objective	Population included in the identification of priorities	Method	Research domain	Research theme
Stoner et al.[66]	United States	ED	To develop a list of research priorities for future collaborative endeavors within and between pediatric emergency research networks	Members from the Pediatric Emergency Medicine Collaborative Research Committee, American Academy of Pediatrics, the Pediatric Emergency Care Applied Research Network, Pediatric Emergency Research Networks, Paediatric Emergency Research in the United Kingdom and Ireland, Pediatric Emergency Research Canada, P2Network, Pediatric Sedation, Research Consortium and Research in European Pediatric Emergency Medicine, International Network for Simulation-based Pediatric Innovation Research & Education, and a member of Translating Emergency Knowledge for Kids (total $n = 72$)	Three-stage Delphi[a]	Emergency care population	Pediatrics
Thom et al.[67]	Australia	ED	To construct a reproducible formula for determining research priorities using a weighting method	Fellows and trainees from the Australasian College for Emergency Medicine (total $n = 31$)	Consensus process	Emergency clinical care	General
Thompson et al.[68]	United States and Canada	ED	To solicit perceived priorities on future research and education strategies for addressing pediatric sepsis	Members of the American Academy of Pediatrics (total $n = 422$)	Cross-sectional survey	Emergency care population	Pediatrics
van de Glind et al.[69]	Netherlands	Prehospital	To determine future research priorities with representatives of the EMS field.	Experts, managers, and policy advisors from ambulance care services and representatives of organizations closely related to the field of EMS (total $n = 62$)	Four-stage Delphi[a]	Emergency care workforce and process	General
van Hoving et al.[70]	South Africa	Prehospital and ED	To identify, collate, and prioritize research topics from identified knowledge gaps in emergency care in South Africa	Doctors, nurses, prehospital care personnel, and policy makers (total $n = 31$)	Three-stage Delphi[a]	Emergency clinical care	General
Wilson et al.[71]	United States	ED	To highlight and prioritize areas of greatest research need within selected domains of emergency psychiatry	Clinical researchers, clinicians from emergency medicine, psychiatry and psychology, and representatives from governmental agencies and patient advocacy groups (total $n = 35$)	NGT	Emergency clinical care	Mental health

Other topic areas are defined in Supplementary Materials, S2.

Abbreviations: ED, emergency department; EMS, emergency medical services; HIV, human immunodeficiency virus; HPP, Hanlon Process of Prioritisation; NGT, nominal group technique; NIH, National Institutes of Health; NR, not reported; SAEM, Society for Academic Emergency Medicine; SDM, shared decision making; STI, sexually transmitted infection; SUD, substance use disorder.

[a]Method is described as a modified technique.

($n = 18$; 40%), Delphi (including modified Delphi) ($n = 13$; 29%), consensus ($n = 8$; 18%), cross-sectional surveys ($n = 4$; 9%), and a combination of survey and modified Delphi technique ($n = 2$; 4%).

3.2 | Appraisal

The comprehensiveness of reporting of research priority-setting studies varied. None of the studies fulfilled all items of the REPRISE framework, ranging from 18 to 30 of the 32 items (Table 3). All studies described the geographical scope, health area (ie, condition, health care delivery or system), target audience, the broad area of research, type of research question, methods for collecting initial priorities, number of research questions/topics, and the approach to formulating research priorities. Most studies described the characteristics of stakeholders or participants (87%), engagement of and inclusion criteria for stakeholders (95%), and the methods for collating and categorizing topics/questions (98%) or modifying priorities (66%). Only 13 studies (29%) described how priorities were fed back to stakeholders and whether feedback was addressed/integrated, 5 studies (11%) stated the frameworks of priority-setting used, and only 5 (11%) outlined a strategy or action plan for the implementation of priorities. No studies described the strategy or plan to evaluate impact (ie, implementation, integration in decision making, funding allocation), nor did they outline their budget/cost of completing the priority-setting study, including whether participants were reimbursed.

3.3 | Research priorities

Across all studies, key research priority areas were identified; these are described in more detail later in the article. The research priorities were mapped into 14 research themes (pediatrics, geriatrics, nursing, shared decision making, general workforce/process, imaging, falls, pain management, trauma care, substance misuse, infectious disease, mental health, cardiology, and general clinical care) within 3 overarching research domains (emergency care populations, emergency care workforce and processes, and emergency care clinical areas). Figure 2 provides an evidence map synthesizing the characteristics of the 45 research priority-setting studies included in this scoping review. An interactive evidence gap map of the findings can be accessed online.

3.3.1 | Domain 1: Emergency care population

Pediatrics

Twelve studies (7 from the United States, 2 from Australia and New Zealand, 1 from United States and Canada, 1 from Europe, 1 from United Kingdom and Ireland) specifically focused on identifying pediatric-specific priority areas. Research priority themes that emerged from these studies included the following: (1) optimal management of clinical conditions including injury, respiratory, seizures, sepsis, mental health, fever, asthma, toxicology, special needs/disparities/culture; (2) best practices for pain control, ventilation, medication administration, antibiotic stewardship, illness recognition, protocol adherence, communication, monitoring, sedation, assessing competency, training, cardiopulmonary resuscitation, spinal immobilization, risk stratification; (3) outcomes of interest–mortality, safety, effectiveness, efficacy, impact of media; (4) patient/family involvement regarding adherence; and (5) use of data linkage, biomarkers, clinical markers, devices, technology, simulation, decision support, machine learning, and registry development.

Geriatrics

Two studies (both from the United States) specifically focused on identifying geriatric-specific priority areas. The research priority theme that emerged from these studies focused on screening and management in terms of how (ie, what tools/algorithms/models of care), who (ie, pharmacists, nurses), what (ie, falls, medication management, substance abuse, mental health, behavioral), and why (ie, outcomes – reduce: length of stay, admission, re-presentation).

3.3.2 | Domain 2: Emergency care workforce and process

Nursing

Two studies (1 from the United States, 1 from the United Arab Emirates) specifically focused on identifying nursing-specific priority areas. Research priority themes that emerged from these studies included the following: (1) impact of and ways to improve workplace processes (triage, waiting times, length of stay, within- and between-agency); (2) how to improve certain practices (end of life, resuscitation, drug misuse, deteriorating patient, mental health, behavioral disturbance, children, older people); (3) enhancing the practice of nursing (education, research, skill mix, ratios, nurse-initiated care); and (4) addressing workplace stressors (eg, violence, burnout).

Shared decision making

Two studies (both from the United States) specifically focused on identifying shared decision making (SDM) priority areas. Research priority themes that emerged from these studies included the following: (1) what SDM tools/information is available and used; (2) how is SDM best applied in the ED setting, and how often; (3) who – varied target groups for SDM (clinician – undergraduate, training, permanent), patient (broad or targeted for a clinical condition, high uncertainty, low evidence); and (4) why – what is the effectiveness of SDM (impact on patient-oriented outcomes, clinician use) and engagement of stakeholders in SDM development.

General workforce/process

Six studies (2 from United States, 1 each from Norway, the Netherlands, South Africa, Canada) focused on general workforce/processes priorities. Research priority themes that emerged from these studies included the following: (1) what is the impact of ED staff well-being

TABLE 3 Appraisal of comprehensiveness of reporting

ID	Reporting Item	Total studies *n* (%)	References
Context and scope			
1	Define geographical scope	45 (100)	[27–71]
2	Define health area, field, focus	45 (100)	[27–71]
3	Define the intended beneficiaries	44 (98)	[27, 28, 30–71]
4	Define the target audience of the priorities	45 (100)	[27–71]
5	Identify the research area	45 (100)	[27–71]
6	Identify the type of research questions	45 (100)	[27–71]
7	Define the time frame	13 (29)	[34–41, 46–48, 52, 53]
Governance and team			
8	Describe the selection and structure of the leadership and management team	35 (78)	[27, 29–42, 44, 45, 47, 48, 52–55, 57, 58, 60, 61, 63–69, 71]
9	Describe the characteristics of the team	31 (69)	[27, 29–32, 34, 37–45, 48, 52–55, 57, 58, 60, 61, 63, 65–69, 71]
10	Describe any training or experience relevant to conducting priority setting	12 (27)	[27, 29, 34, 52, 55, 58, 60, 61, 65–68]
Framework for priority-setting			
11	State the framework used (if any)	5 (11)	[34, 39, 40, 43, 55]
Stakeholders or participants			
12	Define the inclusion criteria for stakeholders involved in priority-setting	43 (95)	[27–35, 37–45, 47–71]
13	State the strategy or method for identifying and engaging stakeholders	43 (95)	[27, 28, 30–46, 48–71]
14	Indicate the number of participants and/or organizations involved	41 (91)	[28–32, 34–42, 44–52, 55–71]
15	Describe the characteristics of stakeholders	39 (87)	[27–35, 38–45, 47–53, 55, 56, 59–71]
16	State if reimbursement for participation was provided	0 (0)	N/A
Identification and collection of research priorities			
17	Describe methods for collecting initial priorities	45 (100)	[27–71]
18	Describe methods for collating and categorizing priorities	44 (98)	[27–46, 48–71]
19	Describe methods and reasons for modifying (removing, adding, reframing) priorities	30 (66)	[27, 30–36, 38, 39, 42–46, 48, 50–53, 55, 56, 60, 62, 64, 66, 67, 69–71]
20	Describe methods for refining or translating priorities into research topics or questions	29 (64)	[28–31, 34–36, 38, 39, 41, 42, 44–46, 49, 52–55, 58, 60, 62–67, 69, 70]
21	Describe methods for checking whether research questions or topics have been answered	24 (53)	[29–32, 34, 35, 37, 42, 47, 51–53, 55–58, 60–63, 65, 67, 68, 70]
22	Describe number of research questions or topics	45 (100)	[27–71]
Prioritization of research topics/questions			
23	Describe methods and criteria for prioritizing research topics or questions	41 (91)	[27–36, 38–43, 45, 46, 49–71]
24	Provide reasons for excluding research topics/questions	25 (55)	[27, 28, 31–34 36, 38, 39, 41, 43, 45, 46, 49, 51–53, 55, 56, 60, 62, 64, 67, 69, 70]

(Continues)

TABLE 3 (Continued)

ID	Reporting Item	Total studies *n* (%)	References
Output			
25	State the approach to formulating the research priorities	45 (100)	[27–71]
Evaluation and feedback			
26	Describe how the process of prioritization was evaluated	27 (60)	[27–31, 33–39, 45, 50–55, 58, 62, 63, 65–67, 70, 71]
27	Describe how priorities were fed back to stakeholders and/or to the public; and how feedback (if received) was addressed and integrated	13 (29)	[27, 32, 34, 43, 44, 52, 53, 58, 63, 65–67, 71]
Implementation			
28	Outline the strategy or action plans for implementing priorities	5 (11)	[33,34, 58, 60, 63]
29	Describe plans, strategies, or suggestions to evaluate impact	0 (0)	N/A
Funding and conflict of interest			
30	State sources of funding	36 (80)	[27–29, 31–54, 57, 59–62, 64, 65, 69, 71]
31	Outline the budget and/or cost	0 (0)	N/A
32	Declare any conflicts or competing interests	43 (95)	[27–57, 59–67, 69–71]

(burnout, resilience) on outcomes (patient, clinician – at varying levels, department, economic); (2) what are the best strategies (organizations and individual) to support clinician well-being and resilience; (3) considerations of the prehospital provision of care (what, who, how, training, skill maintenance, cost); (4) the impact of and decision making regarding prehospital care (time-sensitive treatments provided; transport vs non-transport; handover; use of protocols); (5) database development to support treatment decision making; (6) emergency care research in developing countries – considerate of local context; requires collaboration and resourcing; focused on an area of need to support services and care delivery;(7) the role of patients and family in preventing errors; and (8) identifying and implementing structures and processes to improve the safety of clinical practice.

3.3.3 | Domain 3: Emergency care clinical areas

Imaging

Six studies (all from the United States) focused on imaging research priority areas. Research priority themes that emerged from these studies included the following: (1) gender-specific investigation into clinical areas (cancer, pulmonary embolism, abdominal pain, renal colic, heart disease, brain, back pain); (2) best use of data to support service delivery (data linkage, SDM, accuracy, decision support, feasibility); (3) appropriateness of imaging considering cost, value, guideline driven; (4) prioritizing populations (considerations of disposition, geographical location, time, mode of arrival); (5) risk of frequency of imaging exposure considering: gender, age, trauma, chronicity, end of life; (6) curriculum development and impact on clinicians and patients; and (7) competency regarding mode of imaging, career stage, the role of simulation.

Falls

One study from the United States focused on fall-specific research priority areas. The research priority theme that emerged from this study was the structure (sex, vulnerability, living arrangements, screening tool use), process (screening, admission location, medication reconciliation), and impact on outcomes (falls – future/recurrent, morbidity, mortality).

Pain management

One study from the United States focused on pain management research priority areas. The research priority theme that emerged from this study was gender-specific considerations regarding interventions (pharmacological and non-pharmacological), that consider underlying (acute/chronic) conditions, response (tolerance, side effects, misuse), and lifespan.

Trauma care

Two studies (both from the United States) focused on trauma care research priority areas. Research priority themes that emerged from these studies included (1) hemorrhage-related interventions – control, testing; (2) time-sensitive and novel/innovative testing capability; (3) differences in outcomes considerate of age and geographical location; and (4) staffing model considerations (training, skill mix, capability) for various trauma-related scenarios.

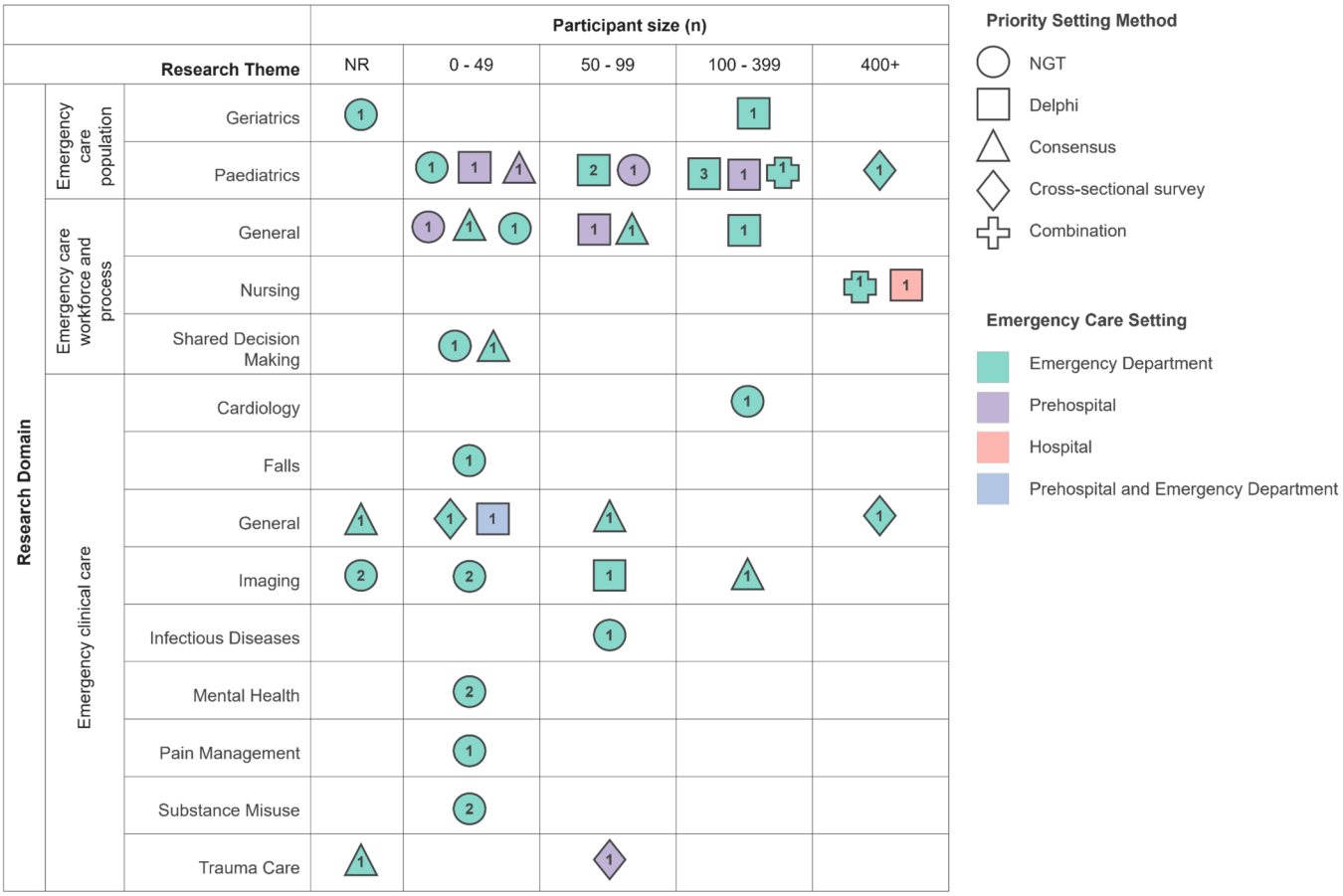

FIGURE 2 Evidence gap map synthesizing the characteristics of 45 research priority-setting studies included in this scoping review. Studies are distributed by research domain and research theme (*y*-axis) and the number of participants involved in each study (*x*-axis). The shape of each icon is associated with the priority-setting methodology and the color with the emergency care setting. The numeric value associated with each icon indicates the number of studies. Studies that did not provide participant sample size are included in the not reported (NR) column. NGT, nominal group technique.

Substance misuse

Two studies (both from the United States) focused on substance misuse research priority areas. Research priority themes that emerged from these studies included the following: (1) best practice approaches to screening and referral; (2) care continuity between ED and other departments (social services, community services); (3) individualized risk factors and care; (4) care considerations of gender and other subgroups (eg, age, pregnancy, LGBTQ – lesbian, gay, bisexual, transgender, and queer); (5) risk factors, severity, screening, referral, motivators, outcome considerations among ED patients; (6) role of digital technology in supporting tailored interventions; and (7) the effectiveness of interventions.

Infectious diseases

One study from the United States focused on infectious diseases research priorities. Research priority themes that emerged from this study included (1) clinical foci (human immunodeficiency virus and sexually transmitted infections); 2) acceptance (patient and staff) of screening in the ED, including consent processes; (3) measures to improve effectiveness (including cost-effectiveness) and efficiency (with technology, ancillary staff); and (4) data capture approaches to inform surveillance, screening, interventions, and outcomes.

Mental health

Two studies (both from the United States) focused on mental health research priorities. Research priority themes that emerged from these studies included (1) process improvement opportunities (triage, screening, roles); (2) consideration of patient-specific outcomes; (3) consideration of service outcomes (ED re-presentation, length of stay, adverse events, delirium); (4) treatment options (medications, location of care); and (5) clinical foci (substance use disorder, delirium, psychosis, dementia).

Cardiology

One study (from the United States) focused on cardiology-specific research priorities. Research priority themes that emerged from this study included (1) consideration of sex-specific differences in detection and management of heart disease and (2) considering patient- rather than disease-specific outcomes.

General clinical care

Five studies (3 from Australia, 1 from the United States, 1 from South Africa) focused on general clinical research priority areas. Research priority themes that emerged from these studies included the following: (1) clinically and patient important areas of focus: populations (pediatrics, geriatrics), presentation (resuscitation, trauma, behavioral disturbance, critical care), illness (infectious disease; toxicology; neurological; respiratory; gastrointestinal; oncology; ear, nose and throat), service (ultrasound, drug trials, competence, crowding, alignment of ED and national priorities, mass casualty, rural retrieval, quality improvement, continuity of care between and within hospitals); (2) appropriateness of prehospital practices and policies on patient outcomes; (3) workforce considerations: recruitment, retention, competence; and (4) identifying the best ways to screen, assess, support, and improve the design of research into cerebral injury, acute/chronic pain, mental health, and substance use disorder in the ED.

4 | LIMITATIONS

This study was limited to peer-reviewed literature published in English, potentially limiting complete ascertainment from grey literature and studies from countries where researchers publish non-English language articles. Priorities are likely to be context specific and may vary according to the health care system, priority-setting method used, and participants included in studies, making discrete inferences difficult. The many special interest areas within emergency care made it challenging to comprehensively present the depth of research priority areas and, as such, we may have missed research prioritization activities that were not emergency care specific but included emergency care themes. However, our broad approach (as also taken by others)[9] does enable maximum impact.

Our review was guided by the JBI framework[10] using independent screening and moderation for article selection at the title and abstract and full-text stages in an effort to enhance the transparency of decision-making process. This review did not perform a pilot testing of screeners. Instead, before the screening, the screeners had meetings to discuss and clarify their understandings of inclusion and exclusion criteria of this review. For subsequent scoping reviews, we recommend the use of further process enhancements that includes undertaking pilot testing of random sample of 25 titles and abstracts so that when 75% or greater agreement is achieved, the team can start screening.[19]

5 | DISCUSSION

This scoping review provides a significant summary of research priority-setting studies in emergency care. Aligning with the purpose of scoping reviews,[10] our discussion is framed in terms of understanding where gaps in the evidence exist to inform future research and can be used by any special interest group as a foundation for next steps.

All studies identified were from middle-high income country settings. This may highlight the existence of a dedicated research infrastructure enabling the articulation of priorities in particular populations, areas, and topics. Most of the studies originated in the United States, a country that has a health structure different from that in many other countries. This concentrated view of priority areas provides impetus to understand and discuss priority areas more broadly within our emergency care community. The priorities of a country's primary research funding mechanisms influence on research priority studies was not investigated in our review and warrants consideration in future research.

Although a wide range of priority areas were identified in the heterogeneous studies, some basic patterns can be identified. Of the studies reviewed, the contexts they broadly relate to included population groups (pediatrics, older persons), high-risk clinical conditions (eg, infectious diseases, trauma, mental health), and issues affecting workforce/processes of care. They also reflect areas of special interest and special skills emerging within emergency medicine and areas where trainees are pursuing dual fellowships or further postgraduate education (eg, pediatrics, geriatrics, anesthetics, toxicology, addiction medicine, forensic medicine, ultrasound, education, prehospital, and retrieval medicine).[20] This trend toward special interest/subspecialization is similarly reflected in emergency nursing (eg, with emergency nurse practitioners,[21] early pregnancy,[22] geriatrics[23]) and paramedicine (eg, low acuity response,[24] and critical care[25]). Already formally established in the United States and United Kingdom,[20] subspecialization may become the new norm according to some authors.[26] Thus, this review may help inform subspecialization pathways and will help mature broader emergency medicine programs with the research required to advance the overall specialty and subspecialty. The benefits of subspecialization would help drive advances in knowledge, patient outcomes, and technology.[20] Whether generalist, special interest, or subspecialty, the development of a research program, with set priority areas, is, nevertheless, integral. With the recognized nature of emergency care being inherently broad, future priorities, therefore, may warrant population (eg, children, geriatrics) or subspecialty (eg, trauma, toxicology, mental health) focus and be derived using a rigorous framework and patient engagement.

This review of research priority-setting literature has revealed a research agenda that has been heavily driven by expert clinical opinion, potentially generating priorities that do not encompass patient concerns. So, there is the possibility that unconscious bias and certain agendas may be reflected in the priorities presented. The need for consumer/patient input into the priority-setting processes is thus instrumental. The patient voice (or lack thereof) in setting research agendas has been noted elsewhere.[9] In the health care (including health research) agenda, there has however been a move toward more patient-centered care to minimize the mismatch between the research interests of patients and researchers. More inclusive research priority-setting processes have the potential to generate a more relevant research agenda and thus reduce waste in research.

This study has identified some shortcomings regarding the quality/rigor of priority-setting processes in emergency care research. The narrowness of the fields in which the priorities were set make it challenging to specify overarching key questions in emergency care.

Future priority-setting processes should be guided by supporting principles,[14,15] which include considerations for before and after the priority-setting exercise.[16] Indeed, the impact of the priority-setting research warrants consideration. Although this can be difficult to measure as it can take some time to determine, it is helpful to ascertain if and how research/practice/patient outcomes in that priority area have changed.

In conclusion, it is evident that research priorities for emergency care vary widely and are context specific. Based on our review, the contexts they broadly relate to included population groups (pediatrics, older persons), high-risk clinical conditions (eg, infectious diseases, trauma, mental health), and issues affecting workforce/processes of care. We recommend future research focuses on these key findings, and a set of internationally agreed research priorities would be of enormous value. It is important to note that the priorities synthesized in this study predominantly reflect those of high- and middle-income countries and that patient populations were underrepresented. To further inform global emergency care research directions there is a need for patients, disciplines, and countries that are not yet represented to be involved in priority development using a rigorous framework.

AUTHOR CONTRIBUTIONS

The authors contributed to this manuscript in the following ways: Study concept and design (Julia Crilly, Gerben Keijzers, Daniel Wilhelms, Ulf Ekelund, Michelle Krahe, Ya-Ling Huang); acquisition of the data (Ya-Ling Huang); analysis and interpretation of the data (Julia Crilly, Ya-Ling Huang, Michelle Krahe, Daniel Wilhelms, Ulf Ekelund, Gerben Keijzers); drafting of the manuscript (Ya-Ling Huang, Michelle Krahe, Julia Crilly); statistical expertise (Michelle Krahe); critical revision of the manuscript for important intellectual content (Julia Crilly, Ya-Ling Huang, Michelle Krahe, Daniel Wilhelms, Ulf Ekelund, Erika Horlin, Jessica Hayes, Gerben Keijzers).

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CONFLICTS OF INTEREST

The authors have no competing interests to disclose.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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