

SYSTEMATIC REVIEW

General Medicine

Emergency department observation units: A scoping review

Rebecca Goodwin MD¹  | John Cyrus PhD² | Radina L. Lilova BS³ |
Sreedhatri Kandlakunta MS⁴ | Taruna Aurora MD⁵

¹Department of Emergency and Internal Medicine, Virginia Commonwealth University, Richmond, Virginia, USA

²Health Sciences Library, Research and Education, Virginia Commonwealth University, Richmond, Virginia, USA

³Virginia Commonwealth University School of Medicine, Richmond, Virginia, USA

⁴Virginia Commonwealth University, Richmond, Virginia, USA

⁵Division of Observation Medicine, Clinical Decision Unit Co-Director, Virginia Commonwealth University Health System, Richmond, Virginia, USA

Correspondence

Rebecca Goodwin, Virginia Commonwealth University Health System, Richmond, VA, USA.
Email: rebecca.goodwin@vcuhealth.org; bexLgoodwin@gmail.com

Supervising Editor: Christopher W. Baugh, MD, MBA

Abstract

Objective: This scoping review assesses existing research on observation units, examining diagnoses, clinical outcomes, finances, and health system comparisons to identify knowledge gaps related to patients in dedicated emergency observation units.

Methods: The scoping review follows the Joanna Briggs Institute (JBI) methodology and was published prior to the review on Open Science Framework. Databases searched included MEDLINE/PubMed, Embase (Ovid), and CINAHL (Ebsco), with unpublished studies and gray literature identified via Web of Science. Articles were screened and extracted by two reviewers in Covidence. Any data or inclusion criteria inconsistencies were resolved through arbitration by a third researcher or by team consensus. Data were transferred to Excel for analysis.

Results: A total of 1061 studies were assessed for eligibility: 461 articles met study inclusion criteria and 433 were excluded for being abstracts only. Of these 461 articles, the majority focused on cardiac diagnoses (111/461, 24%) and adult populations (321/461, 70%) and are retrospective or cohort studies (241/461, 52%). Fifty-four articles (12%) belonged to expert opinion category. Length of stay (191/461, 41%) is the most common outcome measure followed by morbidity/mortality (189/461, 41%), admission/failure rate (169/461, 37%), and protocol assessments (120/461, 26%). Few articles focused on staff models and structure but 121 of 461 (26%) mentioned it. Note that 162 (35%) measured hospital finances, and 120 (26%) articles performed some direct comparison to other forms of observation.

Conclusion: While reimbursement and cardiac conditions are frequently assessed in emergency department observation unit literature, there is paucity of discussion on staffing models and other diagnoses remain less frequently explored. This review aims to spotlight future research areas in observation medicine.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2024 The Author(s). *Journal of the American College of Emergency Physicians Open* published by Wiley Periodicals LLC on behalf of American College of Emergency Physicians.

1 | INTRODUCTION

1.1 | Background

Observation medicine is the art of monitoring the natural evolution of a patient's presentation to determine best management. It answers the need for patients who require between 6 hours and 24 hours of work-up and management to reach an appropriate disposition.¹ Transition of patients to an observation unit (OU) has many benefits related to patient flow. Emergency department observation units (EDOUs) have been found to decrease ambulance diversion times and left without being seen rates, likely due to their effect of decompressing emergency departments.² They can accommodate a broad range of patient presentations from cellulitis to traumatic brain injury evaluations.^{3,4} Units are also diverse. They can be physician managed or advanced practice provider run, protocol driven, or locations for complex decision-making.⁵ Arguably, the one commonality shared is a rapid turn-around time compared to a traditional inpatient admission.

Aside from being diagnostically diverse, this relatively new field of medicine is rapidly expanding due to its role in addressing key performance indicators related to patient flow. Research already exists demonstrating that OUs can improve hospital metrics ranging from shorter length of stay to lower costs without compromising patient outcomes for a variety of diagnoses.⁶⁻⁹ This has a profound impact on the flow of patients throughout the entire hospital. Furthermore, as reimbursements change and shift care away from inpatient settings, EDOUs are filling the gap for patients requiring care but not meeting inpatient criteria.

1.2 | Importance

In this new and growing field, there is not a singular source or well-known repository of observation research. Many publications are shunted to their respective specialties or to health management journals. Processing all this scattered information is a monumental task for an individual observation provider to accomplish on their own, especially when trying to understand the current state of the specialty.

1.3 | Goals of this investigation

The aim of this review is to reveal what has been found to date and identify gaps in the research. A scoping review was the most appropriate method to evaluate the information given the diverse locations of publications and the desire to map existing research. This review focuses on clinical outcomes of emergency department (ED) observation patients as well as data regarding their structure, finances, and comparisons. Three questions were assessed during this review. What clinical outcomes and quality metrics are reported for observation patients? What existing structures and functions of EDOUs are reported and finally what if any comparative data exists between types

of EDOUs? These questions were designed to help outline current research in the field of observation medicine with regard to clinical diagnoses and outcomes as well as the structure and function of EDOUs, and comparison of them within the context of emergency medicine.

2 | METHODS

2.1 | Study design and registration, search strategy, selection of studies

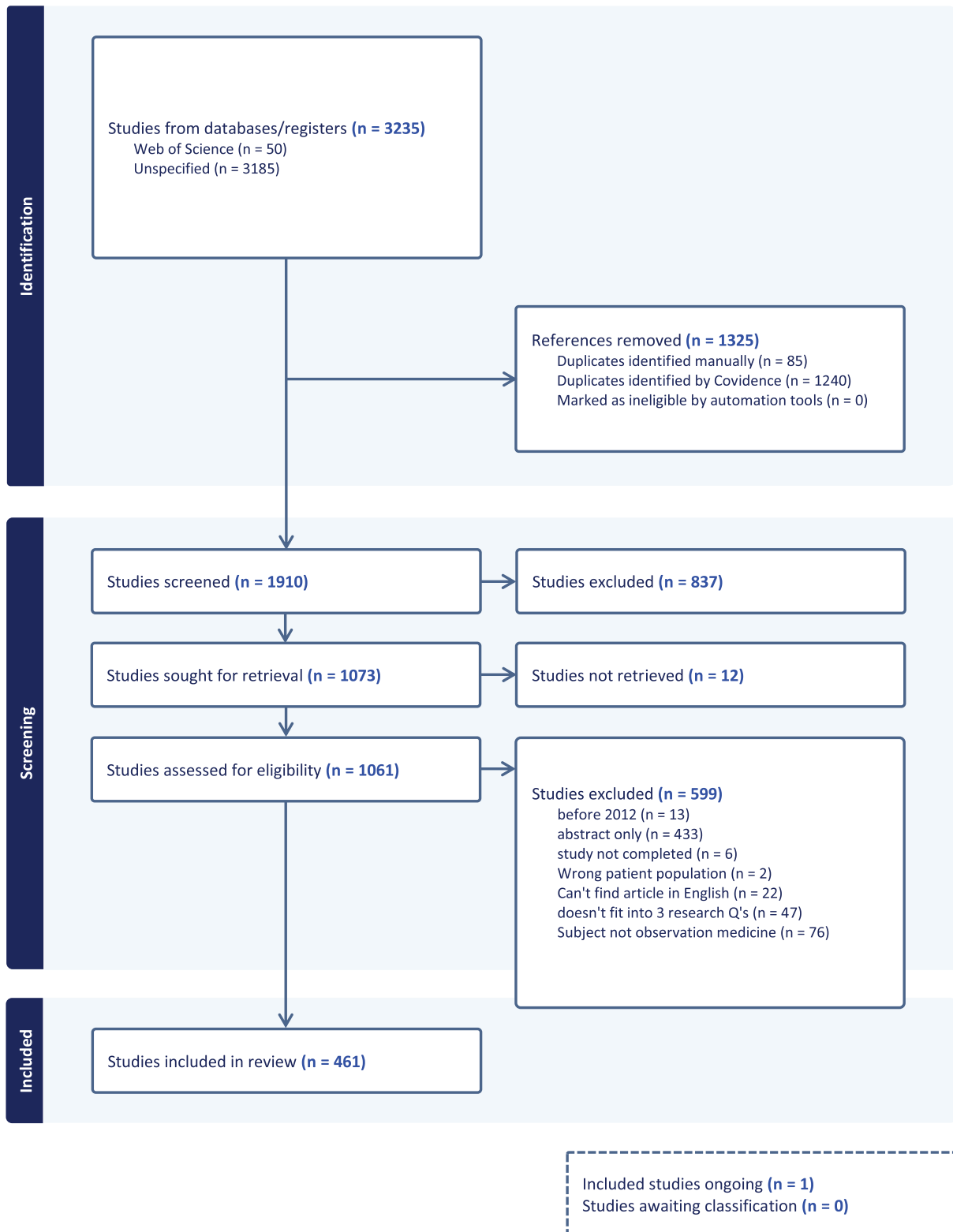
The scoping review was conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews.¹⁰ The search strategy aimed to locate both published and unpublished studies. An initial limited search of MEDLINE/PUBMED, EMBASE, and CINAHL was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles were used to develop a full search strategy (see Supporting Information Appendix 1). The search strategy, including all identified keywords and index terms, were adapted for each included database and/or information source. Sources of unpublished studies/ gray literature to be searched include Web of Science. The reference lists of all included studies were screened for additional studies.

Studies published in or translated to English language are included. Studies published since January 1, 2012 are included as Medicare reimbursement criteria were changed in 2013 to the two-midnight rule that arguably increases the utilization of observation care. Data from 2012 were included to reflect this change. Studies prior to 2012 are excluded in order to make the review more manageable and relevant to the current practice.

2.2 | Study selection

Following the search, all identified citations were collated and uploaded into *Covidence* and duplicates removed. Following a pilot test, titles and abstracts were screened by two or more independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant sources were retrieved in full and their citation details were imported into the JBI System for the Unified Management, Assessment and Review of Information (JBI SUMARI).¹¹ The full text of selected citations was assessed in detail against the inclusion criteria by two independent reviewers and ties were resolved by senior reviewers (T.A. or R.G.). Reasons for exclusion were recorded and reported in the scoping review. Any disagreements between reviewers at each stage of the selection process were resolved by the two senior reviewers (T.A. or R.G.). The results of the search and the study inclusion process can be seen in the PRISMA in Figure 1. For full text review, inter-rater reliability Cohen kappa values ranged between 0.56 to 0.83. See Supporting Information Appendix 5 for tabulated breakdown at each stage of screening.

Observation Medicine



24th April 2024


FIGURE 1 PRISMA flow diagram of articles reviewed for this study.

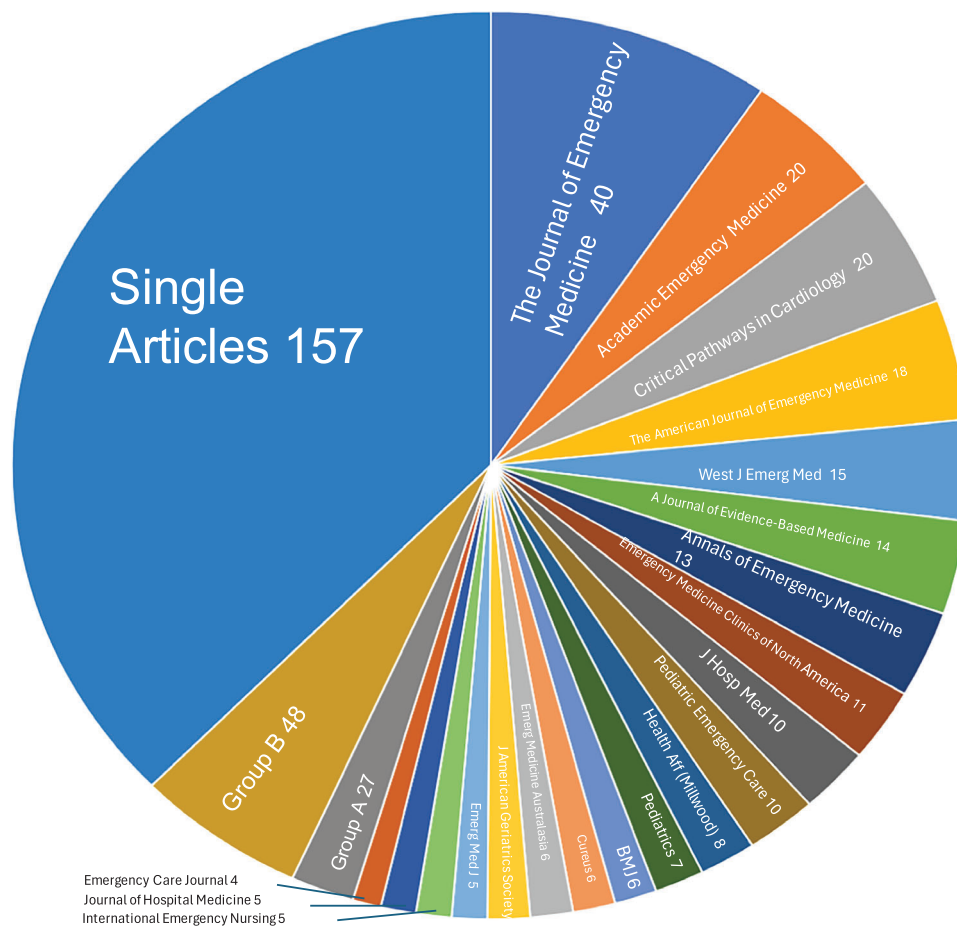


FIGURE 2 The number of articles published in each journal during the study period. ‘Single article’ refers to journals that published only one observation article included in this study. Group A contains 9 different journals that each published three times representing 27 studies. Group B contains 24 different journals that each published 2 articles for a total of 48 articles.

2.3 | Data extraction and synthesis

Once studies were approved, two independent reviewers extracted data using the extraction tool which was developed in Covidence and iteratively refined. This tool can be seen in Supporting Information Appendix 2. Two researchers conducted data collection independently. Data inconsistency was judged by a senior reviewer (T.A. or R.G.). Data were then exported into Excel for analysis using descriptive statistics.

3 | RESULTS

The searches returned a total of 3235 records of which 1325 were duplicates, leaving 1910 articles to screen. Of these, 1073 were screened in full text review with 461 ultimately included in the study (see Figure 1 PRISMA flow diagram).

Mapping literature involves finding the location of where the articles tend to be published. The *Journal of Emergency Medicine* most frequently published observation articles comprising about 9% (40/461) of all studies included in this paper. On average, the 210 journals in this study published only two articles during the

entire study period, although most journals (157) only published one (see Figure 2).

It is also valuable to look at timing. Figure 3 demonstrates the frequency of publications per year included in this study period. On average, there were 38.4 studies published per year. However, 2017 was a productive year with 60 publications. Notably, *Emergency Medicine Clinics of North America* published a supplement on observation medicine in 2017.

Most studies evaluated involved adult populations (321/461, 70%). Most were retrospective cohort studies (184/461, 40%), although text and opinion pieces (54/461, 12%) were disproportionately represented as can be seen in Table 1.

Articles that reported patient outcomes were tabulated. As a single article often mentions numerous outcomes, all reported outcomes were counted. Table 2 shows the frequency of outcomes mentioned in articles. Length of stay was most frequently measured, followed closely by morbidity/mortality and factors that influenced failure of observation status (patient transitioning to inpatient admission) and protocol assessments.

Table 3 shows an abbreviated list of the most frequently published chief complaints or diagnoses. Not all reviewed literature focused on a

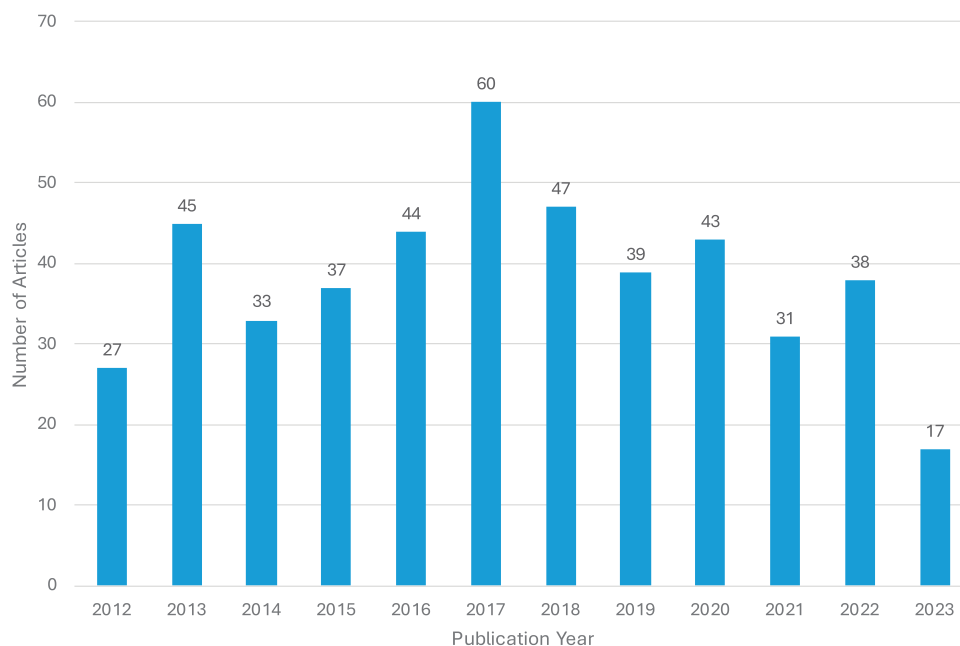


FIGURE 3 Articles per year from 2012-2023.

TABLE 1 Study design: Types of articles published.

Study type	No. of articles
Retrospective cohort	184
Cohort study	57
Text and opinion	54
Cross sectional study	25
Economic evaluation	22
Literature review	17
Qualitative research	16
Randomized controlled trial	14
Prospective observational study	12
Case report/series	8
Systematic review	8
Quality Improvement	7
Non-randomized experimental study	6
modeling or simulation study	6
Case control study	5
Consensus statements	3
Scoping review	3
Other	14
Total	461

specific diagnosis of the articles that had a clinical focus, chest pain, and acute coronary syndromes are the most frequently published topics. Infectious causes of observation are a distant second topic—inclusive of respiratory, skin, urinary/renal, and other etiologies. Heart failure or volume overload also receive significant attention in the published lit-

TABLE 2 Outcome assessed: Metrics reported in reviewed articles.

Outcome	No. of articles
Length of stay	191
Morbidity/ mortality	189
Other	170
Admission rate (failure rate)	169
Protocol assessment	120
Readmission rate	94
Discharge rate (success rate)	77
Appropriateness of disposition	63
Risk factors for failure	59
Predictors for success	24
Bounceback rate	16
Throughput (boarding)	13

erature as well as patients in OUs due to trauma. Notably, many articles publish data regarding “all comers” or multiple diagnoses. This group of articles is represented by “multiple” in the table as opposed to miscellaneous that represents a diverse group of articles that focused on reasons such as need for magnetic resonance imaging (MRI) or physical therapy evaluation.

Note that 162 articles fit into our third research question evaluating the economic aspect of EDOUs. Most focused on hospital costs (105/162, 65%), though several touched on patient costs (37/162, 23%) and insurance (43/162, 26%).

While staffing structures were briefly mentioned in some articles (122), none provided an extensive profile of the department structure

TABLE 3 Common topics: Count of articles that mention high frequency diagnoses.

CC/diagnoses	No. of articles
Chest pain/Acute coronary syndrome (ACS)	78
Multiple	45
Infections	31
Congestive heart failure (CHF)/volume overload	23
Trauma and head injury	20
Miscellaneous	18
Syncope	17
Toxicology (ie, poisoning/overdose/ingestion)	15
Respiratory other (ie, asthma/Chronic Obstructive Pulmonary Disease)	13
Abdominal pain	11
Cardiovascular conditions (ie, arrhythmia)	10
Transient ischemic attack/stroke	8
Cancer related/hospice	7
Diabetes/hyperglycemia/metabolic disorder	7

TABLE 4 Comparison articles: The number of articles that compare an emergency department observation unit (EDOU) to another unit is tabulated.

Comparator	Cost	Length of stay	Patient satisfaction	Other
ED prior	14	14	1	8
Inpatient admissions	34	44	6	40
Medicine observation	2	4	1	5
Other	0	2	2	1

Note: "ED prior" refers to articles that compare the ED OU with the same ED prior to the addition of the ED OU. Other frequent comparisons included against standard inpatient admissions, medicine-run observation units or "other." Metrics of comparison included cost, length of stay, patient satisfaction, or "other."

with regard to staffing. Finally, a total of 120 articles made some comparison of an ED OU to another setting across several different metrics such as length of stay or cost. Some articles mentioned multiple different comparisons. Ultimately, it seems more frequent for ED OUs to compare against standard inpatient medicine admissions or an ED prior to the implementation of the OU. These findings are organized in Table 4.

4 | LIMITATIONS

There are several limitations to our data. The first is that this is not a quality assessment study and only sought to map available literature in relation to our three questions. It also did not evaluate data written in published abstracts that likely would skew the outcomes and types of studies. Furthermore, this is not comprehensive of all studies

published and was limited to those published beyond 2012 likely missing many early foundational articles. Finally, this study only looked at publications in the English language.

5 | DISCUSSION

The results of this scoping review shed light on the evolving role of ED OUs within the broader landscape of emergency medicine. As healthcare systems strive to improve efficiency, patient outcomes, and cost-effectiveness, the integration and optimization of ED OUs has become increasingly important.

This particular review focused on three areas of observation medicine and sheds light on the market for ED OU research and possible future topics.

The first research question focused on the clinical diagnoses and outcomes most represented in the observation literature. Our review shows that cardiology remains dominant, likely reflecting the historical use of OUs for chest pain evaluation as well as the known high prevalence and significant resource utilization associated with such conditions in the ED. However, the literature shows a diverse range of specialties, from toxicology to hospice care, indicating the expanding role of OUs. Broadening the scope of ED OU research to include more of these conditions will provide a better understanding of their utility and impact as hospitals strive to battle overcrowding, patient flow, and timely disposition.

The second question explored the structure and function of ED OUs. While many studies examine the financial impact of OUs, the patient financial experience and the role of insurance in observation care are less frequently addressed. Additionally, the lack of detailed studies on staffing models within ED OUs represents a critical gap. Efficient and effective staffing is key to the success of these units, and research in this area can inform best practices and optimize care delivery.

The third research question inquired about existing comparative data. Comparative studies are scarce, with few articles examining pre- and post-ED OU implementation or comparing OUs to inpatient admissions. The lack of standardized metrics further complicates comparisons. A dedicated study to establish these metrics is necessary for a clearer understanding of ED OU efficacy compared to other settings of observation medicine.

It is also important to understand where the ED OUs stand with regard to academic interest. The literature on ED OUs appears to be growing, albeit at a different pace compared to other areas of emergency and observation medicine. The peak in publications observed in 2017, particularly with the supplement on observation medicine by the Emergency Medicine Clinics of North America, suggests heightened interest and recognition of ED OUs within the community. However, compared to other well-established topics in emergency medicine, such as prehospital care, the volume of research dedicated to ED OUs remains relatively modest. This is even more apparent when considering review literature. A PubMed search of literature in the time frame this review considered (2012–2023) shows 207 scoping reviews in emergency medicine services, 218 in hospital medicine, and only two

in emergency department observation medicine (see Supporting Information Appendix 6 for search terms). Comparatively, EDOU literature is lagging.

This scoping review highlights several areas of observation medicine representing gaps in understanding and opportunities for growth in the field of Emergency Medicine Observation. Addressing these gaps can promote best practices and enhance the efficacy of OUs across various clinical scenarios.

AUTHOR CONTRIBUTIONS

Study design, data collection, senior reviewer, and manuscript authorship: Rebecca Goodwin. *Search engine build and study design:* John Cyrus. *Data collection and review, and manuscript editing:* Radina L. Lilova. *Data collection and review, manuscript editing:* Sreedhatri Kandlakunta. *Data collection, senior reviewer, and manuscript editing:* Taruna Aurora.

ORCID

Rebecca Goodwin MD  <https://orcid.org/0000-0003-4357-0727>

REFERENCES

- Ross MA, Aurora T, Graff LG. State of the art: Observation units in the emergency department. ACEP Policy Resource and Education Paper (PREP). 2011. <https://www.acep.org/siteassets/new-pdfs/preps/state-of-the-art-observation-units-in-the-ed-prep.pdf>
- Kelen GD, Scheulen JJ, Hill PM. Effect of an emergency department (ED) managed acute care unit on ED overcrowding and emergency medical services diversion. *Acad Emerg Med*. 2001;8(11):1095-1100. doi:10.1111/j.1553-2712.2001.tb01122.x
- Yusuf S, Hagan JL, Adekunle-Ojo AO. Managing skin and soft tissue infections in the emergency department observation unit. *Pediatr Emerg Care*. 2019;35(3):204-208. doi:10.1097/PEC.0000000000000975
- Wheatley MA, Kapil S, Lewis A, et al. Management of minor traumatic brain injury in an ED observation unit. *West J Emerg Med*. 2021;22(4):943-950. doi:10.5811/westjem.2021.4.50442
- Mace SE. *Observation Medicine*. 1st ed. Cambridge University Press; 2016.
- McDermott MF, Murphy DG, Zalenski RJ, et al. A comparison between emergency diagnostic and treatment unit and inpatient care in the management of acute asthma. *Arch Intern Med*. 1997;157(18):2055-2062. doi:10.1001/archinte.1997.00440390041006
- Ross MA, Compton S, Medado P, Fitzgerald M, Kilanowski P, O'Neil BJ. An emergency department diagnostic protocol for patients with transient ischemic attack: a randomized controlled trial. *Ann Emerg Med*. 2007;50(2):109-119. doi:10.1016/j.annemergmed.2007.03.008
- Koenig BO, Ross MA, Jackson RE. An emergency department observation unit protocol for acute-onset atrial fibrillation is feasible. *Ann Emerg Med*. 2002;39(4):374-381. doi:10.1067/mem.2002.122785
- Shen WK, Decker WW, Munger TM, et al. Syncope evaluation in the Emergency Department Study (SEEDS): a multidisciplinary approach to syncope management. *Circulation (New York, NY)*. 2004;110(24):3636-3645. doi:10.1161/01.CIR.0000149236.92822.07
- Peters MDJ, Godfrey C, McInerney P, Munn Z, Tricco AC, Khalil H. Scoping reviews. In: Aromataris E, Lockwood C, Porritt K, Pilla B, Jordan Z, eds. *JBIM Manual for Evidence Synthesis*. JBI; 2024. <https://synthesismanual.jbi.global/doi.org/10.46658/JBIMES-24-09>
- Munn Z, Aromataris E, Tufanaru C, et al. The development of software to support multiple systematic review types: the Joanna Briggs Institute System for the Unified Management, Assessment and Review of Information (JBI SUMARI). *Int J Evid Based Healthc*. 2019;17(1):36-43. doi:10.1097/XEB.0000000000000152

SUPPORTING INFORMATION

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

How to cite this article: Goodwin R, Cyrus J, Lilova RL, Kandlakunta S, Aurora T. Emergency department observation units: A scoping review. *JACEP Open*. 2024;5:e13254. <https://doi.org/10.1002/emp2.13254>