

IMPROVING PEDIATRIC EMERGENCY CARE- BEST PRACTICES: SYSTEMIC
REVIEW ARTICLESaif Helal Almutairi*, Hatim Failhan Alotaibi, Ibrahim Mohammed Alanazi, Adel Mohammed Aldukhain,
Hamoud Ghayyadh Alanizi

National Guard Health Affairs.



*Corresponding Author: Saif Helal Almutairi

National Guard Health Affairs

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ABSTRACT

Background: Overcrowding in pediatric emergency departments (EDs) poses significant challenges, impacting patient safety, care quality, and system efficiency. With nearly 800,000 children visiting EDs daily in the United States, overcrowding results from various factors including increased patient volume, resource fragmentation, and a shortage of subspecialists. This problem exacerbates delays in care, reduces patient satisfaction, and leads to adverse outcomes such as prolonged wait times and higher rates of medical errors. **Aim:** This review aims to identify best practices and strategies to improve pediatric emergency care, focusing on the roles of nursing, pharmacists, emergency teams, and health informatics in mitigating ED overcrowding. **Methods:** A systemic review of recent literature was conducted to assess various interventions and strategies for enhancing pediatric emergency care. The review included an evaluation of clinical pathways, LEAN methodology, staffing models, and performance measures. **Results:** Effective strategies to improve ED flow include the implementation of clinical pathways and evidence-based guidelines, which have been shown to reduce patient length of stay and optimize resource utilization. The LEAN methodology has proven successful in enhancing ED efficiency by eliminating waste and optimizing workflows. Innovative staffing models, including the integration of nurse practitioners and physician assistants, have also contributed to better management of patient flow. Health informatics plays a crucial role by utilizing electronic health records and predictive modeling to streamline processes and manage patient surges. **Conclusion:** Addressing ED overcrowding requires a comprehensive approach involving improvements in triage processes, medication management, team collaboration, and technological advancements. By integrating these strategies, pediatric EDs can enhance care quality, reduce overcrowding, and improve patient outcomes. Continuous evaluation and adaptation of these practices are essential to meet evolving patient needs and optimize emergency care.

KEYWORDS: Pediatric emergency care, ED overcrowding, clinical pathways, LEAN methodology, staffing models, health informatics, patient flow, medication management.

INTRODUCTION

Every day, almost 800,000 children in the United States visit emergency rooms (EDs), and 3.4% of them depend on EDs for medical care. An even smaller percentage of visits happen in pediatric emergency departments (EDs) compared to community EDs. Ambulance diversions and overcrowding have been brought on by a dearth of subspecialists and fragmentation of resources, in addition to increased use of EDs. Overcrowding persisted throughout the 1990s as a result of a loss in hospitals, beds, and EDs and an increase in the number of patients admitted to emergency departments.^[1,2] According to data from 2001 to 2008, the number of ED visits rose more quickly than the population, which raised the mean occupancy.^[3] Overcrowding in emergency departments (EDs) endangers patients' safety, aggravates medical errors, lengthens hospital stays, decreases patient

happiness, and decreases the effectiveness of the US healthcare system.^[4-6] Several studies have shown that overcrowding negatively affects ED throughput, which in turn affects how quickly patients receive care. For instance, studies conducted at a sizable metropolitan children's hospital revealed a substantial correlation between patient elopement rates and boarding time and daily census, as well as lengthier stays and longer times spent seeing doctors.^[7,8] Additionally, delayed emergency care is observed in crowded EDs, particularly for high-acuity patients.^[9] The percentage of patients seen within triage target periods, especially for urgent cases,^[10] is steadily declining.

Minority groups and lower-class communities are disproportionately impacted by the care disparities that occur during overcrowding, according to additional

research.^[11,12] As occupancy rates rise, studies on pediatric EDs treating asthma exacerbations show a significant decline in the likelihood of receiving prompt and efficient care.^[13] Further lowering the quality of care is crowding, which causes delays in the treatment of adults with pneumonia or stomach pain and children with sickle cell crises.^[14-17] Furthermore, congested emergency departments have been linked to greater rates of errors, including prescription errors, and unfavorable outcomes like higher mortality and longer hospital admissions.^[18,19] An important California study found that overcrowding in the emergency department (ED) resulted in 300 unnecessary deaths, 6,200 extra hospital days, and \$17 million in expenses.^[20] Prolonged wait times have a major impact on patients' experiences, and delays and errors are associated with lower patient satisfaction.^[21,22] ED overcrowding is a widespread problem that has been connected to increased rates of patient elopement, longer patient stays, and grave deficiencies in the quality of care, including timeliness and safety.^[23] The U.S. ED care delivery system must address these issues in order to improve patient satisfaction and ED treatment quality. Throughput must also be increased.

Improving care

Efforts to mitigate emergency department (ED) overcrowding are gaining attention from regulatory bodies. The Joint Commission emphasizes the issue of patient flow as a safety risk, particularly concerning psychiatric patient boarding.^[30] In 2014, the Centers for Medicare and Medicaid Services mandated hospitals to report five key ED crowding metrics, including patient wait times and departures.^[31] Despite these process improvements, quality patient care remains essential. The Institute of Medicine (IOM) has urged pediatric care providers, businesses, and purchasers to ensure that the healthcare provided matches the cost.^{[32][33][34]} In its report *Emergency Care for Children: Growing Pains*, the IOM highlighted the need for pediatric emergency providers to improve ED flow, decrease wait times, and establish high-quality care standards. The report suggested three main objectives: coordination to ensure timely and appropriate care, regionalization to create evidence-based categorization systems for EDs, and accountability through performance indicators in pediatric care. Additional challenges involve expanding pediatric workforces, updating clinical guidelines, and disaster preparedness.^[35]

The implementation of clinical pathways—multidisciplinary care plans designed to support evidence-based practices—has also been instrumental in improving ED care efficiency. These nurse-initiated protocols have shown to streamline care delivery, reduce variations, and lower risks for high-risk pediatric patients.^{[36][37-41]} For example, nurse-initiated triage orders have shortened ED care times by 16%,^[42] particularly for common pediatric conditions such as asthma and bronchiolitis. Addressing behavioral health

patient needs through these pathways, including nurse practitioner collaboration, aligns with updated Joint Commission guidelines.^{[43][44]} Healthcare insurers have increasingly linked payment incentives to achieving quality benchmarks, although some criteria require further scrutiny.^{[45][46]} Pediatric emergency care providers are now more actively involved in defining quality care standards.^[47-51] The 2001 IOM report *Crossing the Quality Chasm* stressed the importance of combining evidence-based practice, clinical expertise, and patient values. Practice guidelines, derived from scientific evidence, guide healthcare decisions, reduce care inconsistencies, and promote quality improvement.^[52-54] Guidelines can also offer alternative treatment strategies when definitive evidence is lacking. Frequently, these guidelines are integrated into clinical pathways, which, according to the Cochrane group, include five core elements: multidisciplinary care plans, local evidence translation, detailed management steps, progression criteria, and standardization of care.^[55]

Application of guidelines

The implementation of clinical guidelines and pathways has demonstrably enhanced healthcare quality. For instance, guidelines concerning pediatric emergency care for conditions such as bronchiolitis, croup, asthma, appendicitis imaging, and the management of acute exacerbations of metabolic disorders have been shown to improve outcomes.^[40,56-58] However, despite the availability of guidelines, their application by healthcare providers remains inconsistent. A study on fever management in young children highlighted that differences in guideline usage among emergency physicians impacted both care quality and costs.^[59] It is essential to treat guidelines as tools that complement, rather than replace, clinical judgment, allowing healthcare providers to tailor treatments to individual patients. One key obstacle to guideline implementation is physician "buy-in".^[60,61] The perception that guidelines restrict a physician's autonomy or mandate specific interventions can hinder their acceptance. Engaging physicians early in the guideline development process may facilitate broader acceptance within the medical community. Guidelines that are strongly evidence-based tend to be more readily adopted. Additionally, real-time reminders and strong leadership have proven more effective in promoting guideline adherence than passive educational approaches.^[62] At the local level, guideline implementation should account for cultural, ethnic, and socioeconomic factors specific to the community. Involving all emergency care providers who work with children, from advanced-practice nurses to social service professionals, in the guideline development process ensures that various factors influencing pediatric outcomes are considered.^[63]

Strategies to Improve Emergency Department (ED)

Flow: ED flow encompasses multiple components, such as triage, evaluation efficiency, resource allocation, patient length of stay, and inpatient bed availability.^[29,63-65]

^{65]} Many successful efforts to improve ED throughput have employed a combination of strategies.^[66]

Lean methodology: The LEAN methodology, originating from Japanese automotive manufacturing, is grounded in core principles like system evaluation, waste identification and elimination, flow optimization, and continuous improvement.^[67] A key feature of LEAN is its "bottom-up" approach, where those involved in value-adding processes are integral to process design and modification.^[68] In a study focused on rapid triage and treatment in both adult and pediatric emergency care, the LEAN approach significantly enhanced ED efficiency.^[69]

Emergency care pathways: The integration of emergency care pathways and clinical practice guidelines in triage has been shown to reduce patient length of stay, optimize resource utilization, and streamline ED throughput.^[70–72] While most studies focus on adult or general triage pathways, some pediatric-specific pathways have also demonstrated a positive impact on ED flow.^[73–75] Developing care pathways that address pediatric-specific concerns while aligning with adult triage priorities is crucial. The most recognized system is the five-level triage system, which has improved pediatric triage.^[76–80] However, inadequate triage categorizations or reevaluations may result in children not receiving timely care. Long wait times may also cause parents to leave the ED before their child's treatment is complete.^[81]

Innovative staffing models: Resource optimization is critical to addressing ED overcrowding. While research into innovative staffing models is still developing, existing evidence supports the effectiveness of incorporating nurse practitioners or physician assistants into the ED team to enhance patient flow.^[82,83] and satisfaction.^[84–86] Although a portion of pediatric patients present with acute conditions, many are of lower acuity and tend to arrive during peak times, such as evenings and weekends. Deploying nurse practitioners or physician assistants in lower-acuity settings during these peak periods has been shown to relieve pressure on the system by managing higher-volume, lower-acuity patients.^[87,88] Implementing fast-track or urgent care services during peak times has also increased patient satisfaction in adult populations.^[28,89] When nurse practitioners or physician assistants assess and treat patients, it frees up emergency physicians to focus on more complex cases.^[90] However, this model requires flexibility in both staffing and scheduling, as lower-acuity patients may sometimes be present with more complicated conditions requiring extended evaluations, creating potential bottlenecks.^[91–93] Alternatively, physician-led team triage models, where a physician leads the triage team from the outset, have been linked to improvements in patient throughput and care quality. In one study, this model was associated with shorter ED stays, lower rates of patients leaving without treatment, fewer unscheduled return visits, and reduced mortality within seven days.^[94] Similar models have shown

sustained improvements in length of stay and fewer patients leaving without being seen.^[95] While results from other studies are more modest, the continued rise in demand for ED care underscores the need for ongoing adaptation to meet evolving patient expectations.^[96,97]

Reimbursement based on value: Impact of value

The need to improve patient flow and happiness while preserving high-quality care has become more pressing due to health budget constraints and the introduction of value-based reimbursement. Patients with lower acuity frequently have to wait the longest in emergency rooms (EDs), which has a negative influence on their satisfaction. Research continuously shows that among these patients with lesser acuity, satisfaction scores are often the lowest.^[84] As a result, cutting-edge care models that target wait times for all patients—not just those with minor problems—have taken center stage.^[98] A thorough analysis of 66 research published in English and French examined physician assistants' roles in emergency departments and evaluated how they affected patient flow and satisfaction. The results indicated that shorter patient stays were typically the consequence of the use of physician assistants. However, the brief duration of several investigations hindered the generalizability of these findings. Notably, a study carried out at a U.S. hospital that established a fast-track unit manned by physician assistants discovered a noteworthy increase in patient satisfaction after it was put into place.^[83] In the past, patient registration took place either before to or during triage. It has been shown that using bar-coded identification bands and finishing registration in the examination room after triage can improve patient throughput while maintaining safety, even if accurate patient identification is essential for guaranteeing safe and efficient emergency care.^[99,100]

Patterns of Staffing and "Fast Tracking"

Strategic planning can help with the more effective management of predictable seasonal variations in patient load, such as peaks for respiratory infections and influenza in the winter and trauma-related injuries in the summer. By increasing staffing and providing surge space in front of these peak periods, ED management can optimize supply and demand.^[101,102] In pediatric emergency departments, computer models have been effectively used to predict how various physician staffing patterns may affect patient throughput.^[103] A solution to reduce high-volume pressure in packed EDs are ED to Observation Units or Inpatient Transition Observation Units. By lowering inpatient admissions, reducing ED stays, and raising staff and patient satisfaction, these units have proven successful in relieving ED congestion. Individuals suffering from ailments like asthma, croup, gastroenteritis, dehydration, stomach pain, and poisoning are among the most benefiting from these units.^[104–108] A hybrid unit concept, which incorporates resources from general pediatric inpatient or outpatient services, can be successfully adopted when ED space and staffing are

insufficient for a dedicated urgent care or observation program.^[109,110]

One of the main factors affecting the effectiveness of ED flow is the difficulty of promptly moving patients to inpatient beds. High inpatient occupancy rates were linked to longer ED stays, according to a study conducted in an urban children's hospital, despite the paucity of data on this topic in pediatric EDs. For example, every 5% increase in occupancy when inpatient occupancy exceeded 80% of capacity was associated with a 17.7-minute increase in duration of stay for discharged patients and a 34.3-minute increase for admitted patients. Moreover, there was a stronger correlation observed between such increases in occupancy and the probability of patients departing from hallway beds without being seen or treated.^[113] It is essential to implement an early notice system to notify all parties involved about restricted bed availability. In addition to senior administrators, this approach should involve charged nurses, operative room personnel, and inpatient physicians. In order to manage bed availability and patient flow, an efficient warning system makes sure that people are quickly made aware when there are not enough inpatient beds.^[114] The emergency department accounts for a sizable percentage of admissions in many hospitals. Reevaluating and simplifying the admissions process, making the most use of available ED space, and guaranteeing precise patient placement are all necessary to combat ED overcrowding. Admission and discharge protocols should be evaluated by hospital administration in order to optimize workflow and minimize resource consumption. Electronic dashboards and daily safety updates can help anticipate needs for units in real time and enhance patient flow.^[115] Crowding can also be reduced by initiatives to encourage earlier discharges, such as the use of play areas or family waiting rooms and positive incentives. In addition, managers ought to assess how best to employ ED follow-up visits as opposed to referrals to urgent care or outpatient locations, making sure that resources are used effectively by working in tandem with the hospital, outpatient clinics, and community doctors.

Performance measure development

Performance measures serve to continuously evaluate healthcare delivery within a system, highlighting areas of excellence, offering early warnings of potential issues, verifying the effectiveness of corrective actions, and enabling performance comparisons with peers. These measures can be classified into structural, process, or outcome indicators. Structural indicators provide indirect assessments of care quality based on the physical environment and resources. Process indicators assess care quality through the evaluation of the methods and processes involved in care delivery, encompassing both technical and interpersonal aspects. Outcome indicators focus on valued results such as extended life, pain relief, reduced disabilities, and patient satisfaction. An alternative classification system includes four categories:

condition-specific measures (e.g., otitis media, childhood asthma, infectious diseases), consumer satisfaction measures (e.g., satisfaction with emergency medical technicians, nurses, or physicians), general health status measures (e.g., limitations in social and physical activities, overall mental health), and system measures (e.g., referral rates to pediatric specialists, disenrollment rates). These classification frameworks for quality review are not mutually exclusive and offer different perspectives on performance measures.

Previous research has proposed several paradigms for establishing performance measures. In emergency medicine, performance indicators have included mortality and morbidity rates, ED length of stay, inappropriate admissions, unplanned return ED visits, unplanned primary care visits, usage of diagnostic tests and imaging equipment, and utilization of ED personnel. Based on this concept, a Canadian expert consensus panel was convened to (1) define a set of common conditions and outcomes by age group to evaluate pediatric ED care, (2) identify connections between care processes and outcomes for these conditions, (3) establish a set of specific process and outcome indicators for these conditions, and (4) assess the feasibility of measuring these indicators using an existing population-based administrative data set. The conditions identified were common, frequently encountered in EDs, covered a range of patient acuity, and had evidence supporting best practices for improving outcomes or clinical efficiency. However, the panel did not explicitly evaluate the evidence level for each clinical condition.^[149]

The American College of Cardiology/American Heart Association guidelines for selecting performance indicators that are likely to enhance quality suggest considering: (1) the strength of evidence supporting the measure, (2) the clinical relevance of the outcomes related to the performance measure, (3) the strength of the relationship between the measure and outcome, and (4) the cost of implementing the measure. These guidelines emphasize the need to evaluate the cost-effectiveness of performance measurement to identify measures that offer meaningful benefits. Quality improvement programs focus on performance measures and interventions that are both effective and cost-efficient.^[116]

Reducing ED Overcrowding

Emergency department (ED) overcrowding is a complex issue that requires a multifaceted approach to resolve. Nursing staff play a crucial role in managing ED overcrowding by triaging patients efficiently and ensuring that those with non-urgent conditions are directed to appropriate care settings. Nurses are often the first point of contact, and their assessment skills are vital in prioritizing care based on patient acuity. By employing advanced triage protocols and rapidly identifying patients who can be treated in urgent care or outpatient settings, nursing staff help streamline patient flow and

reduce unnecessary ED visits. Pharmacists contribute significantly to reducing ED overcrowding through their expertise in medication management and patient education. They assist in the rapid assessment and management of medications, which can expedite patient care and prevent delays caused by medication errors or inefficiencies. Pharmacists also provide valuable input on medication-related issues, ensuring that patients receive appropriate prescriptions and counseling before discharge, which can reduce the likelihood of return visits due to medication-related complications. Emergency teams, comprising physicians, residents, and other healthcare professionals, are essential in managing patient flow and optimizing the use of ED resources. Effective teamwork and communication among emergency personnel are critical for coordinating care, making timely decisions, and managing patient throughput. Implementing fast-track systems for lower-acuity patients and improving protocols for patient discharge can help alleviate congestion and ensure that high-acuity patients receive prompt attention.

Health informatics plays a transformative role in addressing ED overcrowding by leveraging technology to enhance patient flow and care efficiency. Electronic health records (EHRs) and real-time data analytics can streamline the patient registration and triage process, allowing for quicker access to patient information and improving decision-making. Advanced health informatics systems can also facilitate predictive modeling to anticipate patient surges and optimize staffing levels. Additionally, telemedicine and remote monitoring can be utilized to manage non-urgent cases outside of the ED, reducing unnecessary visits and easing the burden on emergency services. In conclusion, addressing ED overcrowding requires a coordinated effort from nursing staff, pharmacists, emergency teams, and health informatics professionals. By optimizing triage processes, improving medication management, enhancing team collaboration, and utilizing advanced technological solutions, the efficiency of ED operations can be significantly improved, ultimately reducing overcrowding and enhancing patient care.

CONCLUSION

Pediatric emergency departments (EDs) face significant challenges due to overcrowding, which adversely affects patient safety, care quality, and system efficiency. The complexity of this issue necessitates a multifaceted approach to improve emergency care delivery. Effective management of ED overcrowding requires a comprehensive strategy involving nursing staff, pharmacists, emergency teams, and health informatics. Nursing staff play a pivotal role in alleviating overcrowding by utilizing advanced triage protocols to prioritize patient care based on acuity. Efficient triage not only ensures that high-acuity patients receive timely attention but also directs non-urgent cases to appropriate care settings, such as urgent care centers or outpatient clinics. This targeted approach helps streamline patient

flow and reduces unnecessary ED visits, thereby alleviating congestion and improving overall efficiency. Pharmacists contribute significantly by optimizing medication management and providing patient education. Their expertise in rapid medication assessment and management can prevent delays caused by medication errors and inefficiencies. Pharmacists also ensure that patients receive appropriate prescriptions and counseling upon discharge, which can mitigate the risk of return visits due to medication-related complications. Emergency teams, including physicians, residents, and other healthcare professionals, are crucial in managing patient flow and utilizing ED resources effectively. Coordinated teamwork and communication among emergency personnel are essential for making timely decisions and managing patient throughput. Implementing fast-track systems for lower-acuity patients and improving discharge protocols are strategies that have proven effective in reducing ED congestion and ensuring prompt care for high-acuity cases. Health informatics has a transformative impact on ED operations by leveraging technology to enhance patient flow and care efficiency. Electronic health records (EHRs) and real-time data analytics streamline patient registration and triage, facilitating quicker access to information and improved decision-making. Predictive modeling can anticipate patient surges, optimize staffing levels, and enhance resource allocation. Additionally, telemedicine and remote monitoring offer alternative solutions for managing non-urgent cases outside the ED, further reducing the burden on emergency services. In summary, addressing ED overcrowding requires a coordinated effort across multiple domains. By optimizing triage processes, enhancing medication management, fostering effective team collaboration, and utilizing advanced technological solutions, pediatric EDs can significantly improve their operational efficiency, reduce overcrowding, and enhance patient care. Continuous evaluation and adaptation of these strategies are vital to address the evolving demands of emergency care and to ensure the delivery of high-quality, timely, and effective care to pediatric patients.

REFERENCES

1. McCaig LF. National Hospital Ambulatory Medical Care Survey: 1992 emergency department summary. *Adv Data*, 1994; (245): 1–12. [PubMed]
2. McCaig LF, Burt CW. National Hospital Ambulatory Medical Care Survey: 2003 emergency department summary. *Adv Data*, 2005; (358): 1–37.
3. Pitts SR, Pines JM, Handrigan MT, Kellermann AL. National trends in emergency department occupancy 2001 to 2008: effect of inpatient admissions versus emergency department practice intensity. *Ann Emerg Med*, 2012; 60(6): 679.e3–686.e3
4. American Academy of Pediatrics, Committee on Pediatric Emergency Medicine. Policy statement: overcrowding crisis in our nation's emergency departments: is our safety net unraveling? *Pediatrics*, 2004; 114(3): 878–888. Reaffirmed June 2011

5. Hostetler MA, Mace S, Brown K, et al Subcommittee on Emergency Department Overcrowding and Children, Section of Pediatric Emergency Medicine, American College of Emergency Physicians. Emergency department overcrowding and children. *Pediatr Emerg Care*, 2007; 23(7): 507–515. [PubMed]
6. Twanmoh JR, Cunningham GP. When overcrowding paralyzes an emergency department. *Manag Care*, 2006; 15(6): 54–59. [PubMed]
7. McCarthy ML, Zeger SL, Ding R, Levin SR. Crowding delays treatment and lengthens emergency department length of stay, even among high-acuity patients. *Ann Emerg Med*, 2009; 54(4): 492.e4–503.e4
8. Timm NL, Ho ML, Luria JW. Pediatric emergency department overcrowding and impact on patient flow outcomes. *Acad Emerg Med*, 2008; 15(9): 832–837. [PubMed]
9. Gilboy N, Tanabe T, Travers D, Rosenau AM. Emergency Severity Index (ESI): A Triage Tool for Emergency Department Care, Version 4. Implementation Handbook 2012 Edition. Rockville, MD. Agency for Healthcare Research and Quality; November, 2011. AHRQ Publication 12-0014
10. Horwitz LI, Bradley EH. Percentage of US emergency department patients seen within the recommended triage time: 1997 to 2006. *Arch Intern Med*, 2009; 169(20): 1857–1865. [PubMed]
11. Pines JM, Localio AR, Hollander JE, et al. The impact of emergency department crowding measures on time to antibiotics for patients with community-acquired pneumonia. *Ann Emerg Med*, 2007; 50(5): 510–516 [PubMed]
12. Lambe S, Washington DL, Fink A, et al. Waiting times in California's emergency departments. *Ann Emerg Med*, 2003; 41(1): 35–44. [PubMed]
13. Sills M, Fairclough D, Ranade D, Kahn MG. Emergency department crowding is associated with decreased quality of care for children with acute asthma. *Ann Emerg Med*, 2011; 57(3): 191.e7–200.e7
14. Sheno R, Ma L, Syblik D, Yusuf S. Emergency department crowding and analgesic delay in pediatric sickle cell pain crises. *Pediatr Emerg Care*, 2011; 27(10): 911–917. [PubMed]
15. Pines JM, Hollander JE. Emergency department crowding is associated with poor care for patients with severe pain. *Ann Emerg Med*, 2008; 51(1): 1–5. [PubMed]
16. Fee C, Weber EJ, Maak CA, Bacchetti P. Effect of emergency department crowding on time to antibiotics in patients admitted with community-acquired pneumonia. *Ann Emerg Med*, 2007; 50(5): 501.e1–509.e1
17. Mills AM, Shofer FS, Chen EH, Hollander JE, Pines JM. The association between emergency department crowding and analgesia administration in acute abdominal pain patients. *Acad Emerg Med*, 2009; 16(7): 603–608. [PubMed]
18. Hwang U, Richardson L, Livote E, Harris B, Spencer N, Sean Morrison R. Emergency department crowding and decreased quality of pain care. *Acad Emerg Med*, 2008; 15(12): 1248–1255. [PubMed]
19. Epstein SK, Huckins DS, Liu SW, et al. Emergency department crowding and risk of preventable medical errors. *Intern Emerg Med*, 2012; 7(2): 173–180. [PubMed]
20. Kulstad EB, Sikka R, Sweis RT, Kelley KM, Rzechula KH. ED overcrowding is associated with an increased frequency of medication errors. *Am J Emerg Med*, 2010; 28(3): 304–309. [PubMed]
21. Sun BC, Hsia RY, Weiss RE, et al. Effect of emergency department crowding on outcomes of admitted patients. *Ann Emerg Med*, 2013; 61(6): 605.e6–611.e6
22. Boudreaux ED, O'Hea EL. Patient satisfaction in the emergency department: a review of the literature and implications for practice. *J Emerg Med*, 2004; 26(1): 13–26. [PubMed]
23. Tekwani KL, Kerem Y, Mistry CD, et al. Emergency department crowding is associated with reduced satisfaction scores in patients discharged from the emergency department. *West J Emerg Med*, 2103; 14(1): 11–15.
24. Sun BC, Adams J, Orav EJ, Rucker DW, Brennan TA, Burstin HR. Determinants of patient satisfaction and willingness to return with emergency care. *Ann Emerg Med*, 2000; 35(5): 426–434. [PubMed]
25. Pines JM, Iyer S, Disbot M, Hollander JE, Shofer FS, Datner EM. The effect of emergency department crowding on patient satisfaction for admitted patients. *Acad Emerg Med*, 2008; 15(9): 825–831 [PubMed]
26. Magaret ND, Clark TA, Warden CR, Magnusson AR, Hedges JR. Patient satisfaction in the emergency department—a survey of pediatric patients and their parents. *Acad Emerg Med*, 2002; 9(12): 1379–1388. [PubMed]
27. Rodi SW, Grau MV, Orsini CM. Evaluation of a fast track unit: alignment of resources and demand results in improved satisfaction and decreased length of stay for emergency department patients. *Qual Manag Health Care*, 2006; 15(3): 163–170. [PubMed]
28. Spaite DW, Bartholomeaux F, Guisto J, et al. Rapid process redesign in a university-based emergency department: decreasing waiting time intervals and improving patient satisfaction. *Ann Emerg Med*, 2002; 39(2): 168–177. [PubMed]
29. Bernstein SL, Aronsky D, Duseja R, et al Society for Academic Emergency Medicine, Emergency Department Crowding Task Force. The effect of emergency department crowding on clinically oriented outcomes. *Acad Emerg Med*, 2009; 16(1): 1–10. [PubMed]
30. MCN Healthcare. Joint Commission revises two standards related to patient flow through the

- emergency department. Published May, 2012; 16. Available at: www.mcnhealthcare.com/stayalert/alert/sa_2523/Joint-commission-Revises.
31. McHugh M, Van Dyke K, McClelland M, Moss D. Improving Patient Flow and Reducing Emergency Department Crowding: A Guide for Hospitals. Prepared by the Health Research and Educational Trust, an affiliate of the American Hospital Association, under contract 290-200-600022, Task Order No. 6. Rockville, MD: Agency for Healthcare Research and Quality; October. AHRQ Publication, 2011; 11(12)-0094
 32. Institute of Medicine, Committee on the Quality of Health Care in America. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: National Academies Press, 2001; 39–60.
 33. Chassin MR, Galvin RW. Institute of Medicine National Roundtable on Health Care Quality. The urgent need to improve health care quality. *JAMA*, 1998; 280(11): 1000–1005. [PubMed]
 34. Corrigan JM, O’Kane ME. Assessing the Quality and Accessibility of Patient Care Provided by Health Plans. Washington, DC: Physician Payment Review Commission, 1993.
 35. Institute of Medicine, Committee on the Future of Emergency Care in the United States Health System. Emergency Care for Children: Growing Pains. Washington, DC: National Academies Press, 2006.
 36. Centers for Medicare and Medicaid Services. “Standing orders” in hospitals—revisions to S&C memoranda. Memorandum sent to State Survey Agency Directors October, 2008; 24. Available at: <https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/SurveyCertificationGenInfo/downloads/SCLetter09-10.pdf>
 37. Zand DJ, Brown KM, Lichter-Konecki U, Campbell JK, Salehi V, Chamberlain JM. Effectiveness of a clinical pathway for the emergency treatment of patients with inborn errors of metabolism. *Pediatrics*, 2008; 122(6): 1191–1195. [PubMed]
 38. Brown K, Martinez A, Sun S, Teach S, Chamberlain J. Addition of a standing order for dexamethasone to an emergency department asthma pathway is associated with improved patient outcomes [abstract]. Presented at Pediatric Academic Societies Annual Meeting, 2010; 1–4. Vancouver, Canada. Available at: http://www.abstracts2view.com/pasall/view.php?nu=PAS10L1_3290
 39. Browne GJ, Giles H, McCaskill ME, Fasher BJ, Lam LT. The benefits of using clinical pathways for managing acute paediatric illness in an emergency department. *J Qual Clin Pract*, 2001; 21(3): 50–55. [PubMed]
 40. Scribano PV, Lerer T, Kennedy D, Cloutier MM. Provider adherence to a clinical practice guideline for acute asthma in a pediatric emergency department. *Acad Emerg Med*, 2001; 8(12): 1147–1152. [PubMed]
 41. Goldberg R, Chan L, Haley P, Harmata-Booth J, Bass G. Critical pathway for the emergency department management of acute asthma: effect on resource utilization. *Ann Emerg Med*, 1998; 31(5): 562–567. [PubMed]
 42. Retezar R, Bessman E, Ding R, Zeger SL, McCarthy ML. The effect of triage diagnostic standing orders on emergency department treatment time. *Ann Emerg Med*, 2011; 57(2): 89–99. e2[PubMed]
 43. Nicholls D, Gaynor N, Shafiei T, Bosanac P, Farrell G. Mental health nursing in emergency departments: the case for a nurse practitioner role. *J Clin Nurs*, 2011; 20(3–4): 530–536. [PubMed]
 44. The Joint Commission. Standards revisions to address patient flow through the emergency department. Oakbrook Terrace, IL: The Joint Commission, 2012. Available at: www.jointcommission.org/assets/1/18/Pre_Publication_EDO_HAP.pdf. Accessed April 14, 2014
 45. Beal AC, Co JP, Dougherty D, et al. Quality measures for children’s health care. *Pediatrics*, 2004; 113(1 pt 2): 199–209. [PubMed]
 46. Ferris TG, Dougherty D, Blumenthal D, Perrin JM. A report card on quality improvement for children’s health care. *Pediatrics*, 2001; 107(1): 143–155. [PubMed]
 47. Lindsay P, Schull M, Bronskill S, Anderson G. The development of indicators to measure the quality of clinical care in emergency departments following a modified-delphi approach. *Acad Emerg Med*, 2002; 9(11): 1131–1139. [PubMed]
 48. Guttmann A, Razzaq A, Lindsay P, Zagorski B, Anderson GM. Development of measures of the quality of emergency department care for children using a structured panel process. *Pediatrics*, 2006; 118(1): 114–123. [PubMed]
 49. Hung GR, Chalut D. A consensus-established set of important indicators of pediatric emergency department performance. *Pediatr Emerg Care*, 2008; 24(1): 9–15. [PubMed]
 50. Khan NS, Jain S. Quality initiatives in the emergency department. *Curr Opin Pediatr*, 2010; 22(3): 262–267. [PubMed]
 51. Alessandrini E, Varadarajan K, Alpern ER, et al. Pediatric Emergency Care Applied Research Network. Emergency department quality: an analysis of existing pediatric measures. *Acad Emerg Med*, 2011; 18(5): 519–526. [PubMed]
 52. Armon K, MacFaul R, Hemingway P, Werneke U, Stephenson T. The impact of presenting problem based guidelines for children with medical problems in an accident and emergency department. *Arch Dis Child*, 2004; 89(2): 159–164. [PubMed]
 53. Wright SW, Trott A, Lindsell CJ, Smith C, Gibler WB. Evidence-based emergency medicine. Creating a system to facilitate translation of evidence into

- standardized clinical practice: a preliminary report. *Ann Emerg Med*, 2008; 51(1): 80–86, e1–e8.
54. Bergman DA. Evidence-based guidelines and critical pathways for quality improvement. *Pediatrics*, 1999; 103(1): 225–232. [PubMed]
 55. Kinsman L, Rotter T, James E, Snow P, Willis J. What is a clinical pathway? Development of a definition to inform the debate. *BMC Med*, 2010; 8: 31. [PubMed]
 56. Guttmann A, Zagorski B, Austin PC, et al. Effectiveness of emergency department asthma management strategies on return visits in children: a population-based study. *Pediatrics*, 2007; 120(6). Available at: www.pediatrics.org/cgi/content/full/120/6/e1402 [PubMed]
 57. Chin R, Browne GJ, Lam LT, McCaskill ME, Fasher B, Hort J. Effectiveness of a croup clinical pathway in the management of children with croup presenting to an emergency department. *J Paediatr Child Health*, 2002; 38(4): 382–387. [PubMed]
 58. Ramarajan N, Krishnamoorthi R, Barth R, et al. An interdisciplinary initiative to reduce radiation exposure: evaluation of appendicitis in a pediatric emergency department with clinical assessment supported by a staged ultrasound and computed tomography pathway. *Acad Emerg Med*, 2009; 16(11): 1258–1265. [PubMed]
 59. Isaacman DJ, Kaminer K, Veligeti H, Jones M, Davis P, Mason JD. Comparative practice patterns of emergency medicine physicians and pediatric emergency medicine physicians managing fever in young children. *Pediatrics*, 2001; 108(2): 354–358. [PubMed]
 60. Butterfoss FD, Major DA, Clarke SM, et al. What providers from general emergency departments say about implementing a pediatric asthma pathway. *Clin Pediatr (Phila)*, 2006; 45(4): 325–333. [PubMed]
 61. Olajos-Clow J, Szpiro K, Julien B, Minard J, Loughheed MD. Emergency department adult asthma care pathway: healthcare providers' perceived utility and barriers to implementation. *Adv Emerg Nurs J*, 2009; 31(1): 44–53. [PubMed]
 62. Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G, Mokkink H. Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. *BMJ*, 1998; 317(7162): 858–861. [PubMed]
 63. Yen K, Gorelick MH. Strategies to improve flow in the pediatric emergency department. *Pediatr Emerg Care*, 2007; 23(10): 745–749; 750–751. [PubMed]
 64. Chan L, Reilly KM, Salluzzo RF. Variables that affect patient throughput times in an academic emergency department. *Am J Med Qual*, 1997; 12(4): 183–186. [PubMed]
 65. American College of Emergency Physicians. Boarding of pediatric patients in the emergency department: policy statement. *Ann Emerg Med*, 2012; 59(5): 406–407. [PubMed]
 66. LeBaron J, Culberson MC III, Wiley JF II, Smith SR. "Be quick": a systems response to overcrowding in the pediatric emergency department. *Pediatr Emerg Care*, 2010; 26(11): 808–813. [PubMed]
 67. Liker J. *The Toyota Way*. New York, NY. McGraw-Hill, 2004.
 68. Jimmerson C, Weber D, Sobek DK II. Reducing waste and errors: piloting lean principles at Intermountain Healthcare. *Jt Comm J Qual Patient Saf*, 2005; 31(5): 249–257. [PubMed]
 69. Murrell KL, Offerman SR, Kauffman MB. Applying LEAN: implementation of a rapid triage and treatment system. *West J Emerg Med*, 2011; 12(2): 184–191. [PubMed]
 70. Fosnocht DE, Swanson ER. Use of a triage pain protocol in the ED. *Am J Emerg Med*, 2007; 25(7): 791–793.
 71. Fan J, Woolfrey K. The effect of triage-applied Ottawa Ankle Rules on the length of stay in a Canadian urgent care department: a randomized controlled trial. *Acad Emerg Med*, 2006; 13(2): 153–157.
 72. Chan TC, Killeen JP, Kelly D, Guss DA. Impact of rapid entry and accelerated care at triage on reducing emergency department patient wait times, lengths of stay, and rate of left without being seen. *Ann Emerg Med*, 2005; 46(6): 491–497. [PubMed]
 73. Choi J, Claudius I. Decrease in emergency department length of stay as a result of triage pulse oximetry. *Pediatr Emerg Care*, 2006; 22(6): 412–414. [PubMed]
 74. Abanses JC, Dowd MD, Simon SD, Sharma V. Impact of rapid influenza testing at triage on management of febrile infants and young children. *Pediatr Emerg Care*, 2006; 22(3): 145–149. [PubMed]
 75. Karpas A, Hennes H, Walsh-Kelly CM. Utilization of the Ottawa ankle rules by nurses in a pediatric emergency department. *Acad Emerg Med*, 2002; 9(2): 130–133. [PubMed]
 76. Maldonado T, Avner JR. Triage of the pediatric patient in the emergency department: are we all in agreement? *Pediatrics*, 2004; 114(2): 356–360. [PubMed]
 77. Bergeron S, Gouin S, Bailey B, Amre DK, Patel H. Agreement among pediatric health care professionals with the pediatric Canadian triage and acuity scale guidelines. *Pediatr Emerg Care*, 2004; 20(8): 514–518. [PubMed]
 78. Mistry RD, Cho CS, Bilker WB, Brousseau DC, Alessandrini EA. Categorizing urgency of infant emergency department visits: agreement between criteria. *Acad Emerg Med*, 2006; 13(12): 1304–1311. [PubMed]
 79. Baumann MR, Strout TD. Evaluation of the Emergency Severity Index (version 3) triage

- algorithm in pediatric patients. *Acad Emerg Med*, 2005; 12(3): 219–224. [PubMed]
80. Gravel J, Gouin S, Bailey B, Roy M, Bergeron S, Amre D. Reliability of a computerized version of the Pediatric Canadian Triage and Acuity Scale. *Acad Emerg Med*, 2007; 14(10): 864–869. [PubMed]
 81. Rapid ED access reduces patients leaving without being seen. *Perform Improv Advis*, 2005; 9(10): 114–115, 109. [PubMed]
 82. Nestler DM, Fratzke AR, Church CJ, et al. Effect of a physician assistant as triage liaison provider on patient throughput in an academic emergency department. *Acad Emerg Med*, 2012; 19(11): 1235–1241. [PubMed]
 83. Doan Q, Sabhaney V, Kissoon N, Sheps S, Singer J. A systematic review: the role and impact of the physician assistant in the emergency department. *Emerg Med Australas*, 2011; 23(1): 7–15. [PubMed]
 84. Jeanmonod R, Delcollo J, Jeanmonod D, Dombchewsky O, Reiter M. Comparison of resident and mid-level provider productivity and patient satisfaction in an emergency department fast track. *Emerg Med J*, 2013; 30(1): e12. [PubMed]
 85. Hooker RS, Klocko DJ, Larkin GL. Physician assistants in emergency medicine: the impact of their role. *Acad Emerg Med*, 2011; 18(1): 72–77. [PubMed]
 86. Hoskins R. Evaluating new roles within emergency care: a literature review. *Int Emerg Nurs*, 2011; 19(3): 125–140. [PubMed]
 87. Carter AJ, Chochinov AH. A systematic review of the impact of nurse practitioners on cost, quality of care, satisfaction and wait times in the emergency department. *CJEM*, 2007; 9(4): 286–295. [PubMed]
 88. Ganapathy S, Zwemer FL Jr. Coping with a crowded ED: an expanded unique role for midlevel providers. *Am J Emerg Med*, 2003; 21(2): 125–128. [PubMed]
 89. Sanchez M, Smally AJ, Grant RJ, Jacobs LM. Effects of a fast-track area on emergency department performance. *J Emerg Med*, 2006; 31(1): 117–120. [PubMed]
 90. Callander EJ, Schofield DJ. Emergency department workforce models: what the literature can tell us. *Emerg Med Australas*, 2011; 23(1): 84–94. [PubMed]
 91. Simon LV, Matteucci MJ, Tanen DA, Roos JA, Riffenburgh RH. The Pittsburgh Decision Rule: triage nurse versus physician utilization in the emergency department. *J Emerg Med*, 2006; 31(3): 247–250. [PubMed]
 92. Doctor in triage slices door-to-discharge times. *ED Manag*, 2006; 18(5): 54–55. [PubMed]
 93. ‘PIT’ more than triples ED’s satisfaction rates. *ED Manag*, 2007; 19(9): 101–102. [PubMed]
 94. Burström L, Nordberg M, Ornung G, et al. Physician-led team triage based on lean principles may be superior for efficiency and quality? A comparison of three emergency departments with different triage models. *Scand J Trauma Resusc Emerg Med*, 2012; 20: 57. [PubMed]
 95. Rogg JG, White BA, Biddinger PD, Chang Y, Brown DF. A long-term analysis of physician triage screening in the emergency department. *Acad Emerg Med*, 2013; 20(4): 374–380. [PubMed]
 96. Han JH, France DJ, Levin SR, Jones ID, Storrow AB, Aronsky D. The effect of physician triage on emergency department length of stay. *J Emerg Med*, 2010; 39(2): 227–233. [PubMed]
 97. Cheng I, Lee J, Mittmann N, et al. Implementing wait-time reductions under Ontario government benchmarks (Pay-for-Results): a cluster randomized trial of the effect of a physician-nurse supplementary triage assistance team (MDRNSTAT) on emergency department patient wait times. *BMC Emerg Med*, 2013; 13: 17. [PubMed]
 98. Davidson J, Rogers T. A lesson from the UK? *Australas Emerg Nurs J*, 2005; 8(1-2): 5–8.
 99. Gorelick MH, Yen K, Yun HJ. The effect of in-room registration on emergency department length of stay. *Ann Emerg Med*, 2005; 45(2): 128–133. [PubMed]
 100. Bar-coded patient IDs cut LOS nearly one hour. *ED Manag*, 2004; 16(12): 139–140. [PubMed]
 101. Fagbuyi DB, Brown KM, Mathison DJ, et al. A rapid medical screening process improves emergency department patient flow during surge associated with novel H1N1 influenza virus. *Ann Emerg Med*, 2011; 57(1): 52–59. [PubMed]
 102. Cooke MW, Wilson S, Pearson S. The effect of a separate stream for minor injuries on accident and emergency department waiting times. *Emerg Med J*, 2002; 19(1): 28–30. [PubMed]
 103. Hung GR, Whitehouse SR, O’Neill C, Gray AP, Kissoon N. Computer modeling of patient flow in a pediatric emergency department using discrete event simulation. *Pediatr Emerg Care*, 2007; 23(1): 5–10. [PubMed]
 104. Silvestri A, McDaniel-Yakscoe N, O’Neill K, et al. Observation medicine: the expanded role of the nurse practitioner in a pediatric emergency department extended care unit. *Pediatr Emerg Care*, 2005; 21(3): 199–202. [PubMed]
 105. Mace SE. Pediatric observation medicine. *Emerg Med Clin North Am*, 2001; 19(1): 239–254.
 106. Scribano PV, Wiley JF II, Platt K. Use of an observation unit by a pediatric emergency department for common pediatric illnesses. *Pediatr Emerg Care*, 2001; 17(5): 321–323. [PubMed]
 107. Hostetler B, Leikin JB, Timmons JA, Hanashiro PK, Kissane K. Patterns of use of an emergency department-based observation unit. *Am J Ther*, 2002; 9(6): 499–502. [PubMed]
 108. Connors GP, Melzer SM, Betts JM, et al. Committee on Hospital Care Committee on Pediatric Emergency Medicine. Pediatric observation units. *Pediatrics*, 2012; 130(1): 172–179. [PubMed]
 109. Zebrack M, Kadish H, Nelson D. The pediatric hybrid observation unit: an analysis of 6477

- consecutive patient encounters. *Pediatrics*, 2005; 115(5). Available at: www.pediatrics.org/cgi/content/full/115/5/e53
110. Crocetti MT, Barone MA, Amin DD, Walker AR. Pediatric observation status beds on an inpatient unit: an integrated care model. *Pediatr Emerg Care*, 2004; 20(1): 17–21. [PubMed]
111. Espinosa G, Miró O, Sánchez M, Coll-Vinent B, Millá J. Effects of external and internal factors on emergency department overcrowding. *Ann Emerg Med*, 2002; 39(6): 693–695.
112. Forster AJ, Stiell I, Wells G, Lee AJ, van Walraven C. The effect of hospital occupancy on emergency department length of stay and patient disposition. *Acad Emerg Med*, 2003; 10(2): 127–133.
113. Hillier DF, Parry GJ, Shannon MW, Stack AM. The effect of hospital bed occupancy on throughput in the pediatric emergency department. *Ann Emerg Med*, 2009; 53(6): 767, e3-776.e3
114. Asplin B, Blum FC, Broida RI, et al. American College of Emergency Physicians Task Force Report on Boarding. Emergency medicine crowding: high-impact solutions. Irving, TX: American College of Emergency Physicians; April, 2008. Available at: www.acep.org/WorkArea/linkit.aspx?LinkIdentifier=id&ItemID=50026&libID=50056.
115. Children's Hospitals' Solutions for Patient Safety. Web-based SPS network: together, saving lives & reducing harm, 2013. Available at: www.solutionsforpatientsafety.org/wp-content/uploads/SPS_2013AnnualReport.pdf.
116. Bonow RO, Masoudi FA, Rumsfeld JS, et al. American College of Cardiology/American Heart Association Task Force on Performance Measures. ACC/AHA classification of care metrics: performance measures and quality metrics: a report of the American College of Cardiology/American Heart Association Task Force on Performance Measures. *Circulation*, 2008; 118(24): 2662–2666.

تحسين رعاية الطوارئ للأطفال - أفضل الممارسات: مقالة مراجعة منهجية الملخص:

الخلفية: يشكل الازدحام في أقسام الطوارئ للأطفال تحديات كبيرة، تؤثر على سلامة المرضى، وجودة الرعاية، وكفاءة النظام. مع زيارة ما يقرب من 800,000 طفل لأقسام الطوارئ يوميًا في الولايات المتحدة، ينجم الازدحام عن عوامل متعددة تشمل زيادة حجم المرضى، تفتت الموارد، ونقص المتخصصين الفرعيين. هذه المشكلة تعمق التأخيرات في الرعاية، تقلل من رضا المرضى، وتؤدي إلى نتائج سلبية مثل زيادة أوقات الانتظار ومعدلات أعلى من الأخطاء الطبية.

الهدف: تهدف هذه المراجعة إلى تحديد أفضل الممارسات والاستراتيجيات لتحسين رعاية الطوارئ للأطفال، مع التركيز على أدوار الممرضين، والصيادلة، وفرق الطوارئ، ومعلومات الصحة في التخفيف من ازدحام أقسام الطوارئ.

الطرق: تم إجراء مراجعة منهجية للأدبيات الحديثة لتقييم التدخلات والاستراتيجيات المختلفة لتحسين رعاية الطوارئ للأطفال. شملت المراجعة تقييم المسارات السريرية، ومنهجية LEAN، ونماذج التوظيف، وقياسات الأداء.

النتائج: تشمل الاستراتيجيات الفعالة لتحسين تدفق أقسام الطوارئ تنفيذ المسارات السريرية والإرشادات المستندة إلى الأدلة، والتي ثبت أنها تقلل من مدة إقامة المرضى وتزيد من تحسين استخدام الموارد. لقد أثبتت منهجية LEAN نجاحها في تعزيز كفاءة أقسام الطوارئ من خلال القضاء على الهدر وتحسين سير العمل. كما ساهمت نماذج التوظيف المبتكرة، بما في ذلك دمج ممارسي التمريض ومساعدى الأطباء، في تحسين إدارة تدفق المرضى. تلعب معلومات الصحة دورًا حيويًا من خلال استخدام السجلات الصحية الإلكترونية والنمذجة التنبؤية لتبسيط العمليات وإدارة الزيادات في عدد المرضى.

الاستنتاج: يتطلب التعامل مع ازدحام أقسام الطوارئ نهجًا شاملاً يشمل تحسينات في عمليات التصنيف، وإدارة الأدوية، والتعاون بين الفرق، والتقدمات التكنولوجية. من خلال دمج هذه الاستراتيجيات، يمكن لأقسام الطوارئ للأطفال تعزيز جودة الرعاية، وتقليل الازدحام، وتحسين نتائج المرضى. التقييم المستمر وتكييف هذه الممارسات أمران أساسيان لتلبية احتياجات المرضى المتطورة وتحسين رعاية الطوارئ.

الكلمات المفتاحية: رعاية الطوارئ للأطفال، ازدحام أقسام الطوارئ، المسارات السريرية، منهجية LEAN، نماذج التوظيف، معلومات الصحة، تدفق المرضى، إدارة الأدوية.