Optimizing Pediatric Patient Safety in the Emergency Care Setting

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Abstract

This is a revision of the previous American Academy of Pediatrics policy statement titled "Patient Safety in the Emergency Care Setting" and is the first joint policy statement by the American Academy of Pediatrics, the American College of Emergency Physicians, and the Emergency Nurses Association to address pediatric patient safety in the emergency care setting. Caring for children in the emergency setting can be prone to medical errors because of a number of environmental and human factors. The emergency department has frequent workflow interruptions, multiple care transitions, and barriers to effective communication. In addition, the high volume of patients, high decision density under time pressure, diagnostic uncertainty, and limited knowledge of patients' history and preexisting conditions make the safe care of critically ill and injured patients even more challenging. It is critical that all emergency departments, including general emergency departments who care for the majority of ill and injured children, understand the unique safety issues related to children. Furthermore, it is imperative that all emergency departments practice patient safety principles, support a culture of safety, and adopt best practices to improve safety for all children seeking emergency care. This policy statement outlines the recommendations necessary for emergency departments to minimize pediatric medical errors and to provide safe care for children of all ages.

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Abbreviations:
AAP, American Academy of Pediatrics; ACEP, American College of Emergency Physicians; AI, artificial intelligence; CDS, clinical decision support; CPOE, computerized physician order entry; ED, emergency department; EHR, electronic health record; ENA, Emergency Nurses Association; EMS, Emergency Medical Services

Policy Statement

Over the last 2 decades, patient safety has become a key priority for health care systems because of increased recognition of the risks of medical care. Since the publication of the 2000 report of the Institute of Medicine (now the National Academies of Sciences, Engineering, and Medicine) "To Err is Human: Building a Safer Health System,"[1] there have been significant increases in research, education, collaboration among numerous organizations, and development of outcome measures to promote safety in the medical care arena. Despite such progress, medical errors and patient harm remain common.[2,3]

Since the publication of the original American Academy of Pediatrics (AAP) policy statement on this topic,[4] several specific policies of the AAP, American College of Emergency Physicians (ACEP), and Emergency Nurses Association (ENA) related to patient safety strategies have been published in the peer-reviewed medical literature, including pediatric readiness in the emergency department (ED), handoffs, patient- and family-centered care, and medication safety.[5-8] In addition, the revised policy expands on the principles of pediatric patient safety in the AAP policy statement from the Council on Quality Improvement and Patient Safety[9] to address elements specific to caring for pediatric patients in the emergency care setting. Of note, the revised policy statement is also intended for promoting pediatric safety in all emergency care settings, including general EDs caring for children and pediatric EDs.

The Joint Commission constructed a framework that health care organizations can use to accelerate their progress toward the ultimate goal of zero harm. The framework is organized around 3 major domains of change including: 1) commitment of leadership to the goal of zero harm; 2) promotion of safety culture; and 3) empowerment of the work force to employ robust process improvements tools.[10] In addition, the Institute for Healthcare Improvement and Safe & Reliable Healthcare collaborated to develop the Framework for Safe, Reliable, and Effective Care. The framework consists of 2 foundational domains—culture and the learning system—along with 9 interrelated components, with engagement of patients and families at the core.[11] The 9 components include leadership, 4 cultural components (psychological safety, accountability, teamwork and communication, and negotiation) and 4 components of the learning system (transparency, reliability, improvement and measurement, and continuous learning). This policy statement will address adopting these frameworks of The Joint Commission as well as the Institute for Healthcare Improvement and Safe & Reliable Healthcare in the emergency care setting to provide resources and recommendations that promote pediatric patient safety.

Recommendations for Optimizing Pediatric Patient Safety in the Emergency Care Setting

LEADERSHIP COMMITMENT TO SAFETY THROUGH ADOPTING PEDIATRIC READINESS

- Make patient safety in the ED a priority for hospital and ED leadership.
- Ensure that all EDs have the appropriate resources (medications, equipment, policies, and education) and capable staff to provide emergency care for children, per the AAP, ACEP, ENA joint policy on pediatric readiness in the emergency department.[5]
- Support the presence of a pediatric ED quality and patient safety committee or pediatric representative on the ED quality and safety committee, which increases the culture of safety and addresses pediatric specific safety issues.[12]
- Support the concepts and encourage acceptance of tenets of pediatric readiness in all EDs across communities at state and national levels.[5]
- Establish processes for ongoing quality improvement and regular assessment of pediatric readiness in the ED and develop a plan to address any deficiencies.

Factors Influencing Patient Safety Culture in the ED

The main factors influencing patient safety culture in the ED are human, managerial, and organizational and environmental.[13,14]

I. FACTORS THAT INFLUENCE PEOPLE AND THEIR BEHAVIOR

Patient- and Family-Centered Care

- Acknowledge the family's role in the health of the patient as one of the core principles of patient- and family-centered care to ensure patient safety.[15]
- Engage patients and families at all points of emergency care, including family presence during procedures and resuscitation, cultural sensitivity, communication, shared decision-making, coordination with the medical home, and discharge planning and instructions.[7]
- Establish a clear policy and procedure for family presence, supported by all levels of the hospital staff including physician specialties, which will decrease family and staff anxiety when family is present during procedures and resuscitations[7,16,17]
- Support attention to the physical, emotional, and distinct medical needs of children. Having designated areas in a general ED allows for taking steps toward making the physical environment safer for children, such as locks on cabinets, and placing dangerous equipment—ie, the sharps containers high and out of reach of children.
- Support patient- and family-centered care and safe care of all children, including children and youth with special health care needs such as children with intellectual disabilities, children who are nonverbal and have cerebral palsy, and children with deafness. This includes ensuring specific components of dignity and respect (such as listening to families), participation, collaboration, information and child-oriented resources, support for families, and environmental resources (eg, conducive and welcoming waiting room design and wait-time strategies).[18]
- Support the presence and expertise of a certified child life specialist in the ED that focuses on age-appropriate distraction techniques to minimize anxiety and fear and need for sedation in children undergoing procedures like intravenous line insertion, wound repair, and other invasive and painful procedures to positively affect the experience for the child and their caregiver and help improve safety and satisfaction with the ED visit.[19-21]. Training for nurses and physicians regarding distraction and pain-alleviating strategies is important especially in the absence of a child life specialists.
- Encourage timely communication between the ED and the medical home to ensure safe and continuum of care.
- Encourage seeking resources available at the Institute for Patient- and Family-Centered Care on the subject including a self-assessment inventory specific to the ED.[22]

Communication

- Cultural competency, cultural humility
  - Acknowledge the impact of racial and/or ethnic disparities on many aspects of emergency care, such as recognizing disparities in analgesic management for children presenting with acute abdominal pain, appendicitis, and fractures[23-25]; imaging[26]; and antibiotic prescriptions in viral infections.[27]
  - Advocate for efforts to target implicit bias training and diversify the ED workforce, which has the potential to close some of the gaps in heath disparities in the emergency care settings.[28,29]
  - Improve clinicians' cultural competency and awareness of their own implicit bias on the safety and quality of care of children in emergency care settings by providing education in health equity.[30] The fast pace and stressors in the ED environment may lead to cognitive shortcuts and greater use of stereotypes, which exacerbate implicit biases.[28]
- Language barriers
  - Identify language and cultural barriers in the emergency care setting, because they have a large impact on health care delivery and patient safety because of higher rates of medical errors and worse clinical outcomes.[31,32] Patients with language, culture, and socioeconomic challenges are disproportionately at risk of experiencing preventable adverse events in the health care system.[33-35]
  - Implement shared decision-making practices and address issues of ethnic culture, literacy, and language barriers by using trained language interpreter services rather than bilingual relatives or limited clinician's proficiency in the patient's language.[36,37] Lack of such resources can increase the risk of adverse safety events, return visits to the ED, or deviation from evidence-based guidelines in emergency care setting.[38-41]
  - Expand available resources for beside ED interpreters, such as using tele-interpreter services, which include sign language.[42]

Errors in Diagnosis in Pediatric Emergency Medicine

- Recognize that diagnostic errors or delayed diagnoses can occur throughout all settings of care including the ED. Such errors may cause harm to patients by preventing or delaying appropriate treatment, providing unnecessary or harmful treatment.[43]
- Identify factors that can cause breakdown in the diagnostic process. These include patient factors (language barriers, lower health literacy, and altered mentation), provider factors (overconfidence, cognitive biases, inadequate training, loss of skills/competencies, drug use), and systems factors (such as lack of available resources and poorly designed electronic health system). System factors also include socioeconomic factors (disparities attributable to insurance, race, language barriers, social determinants of health) that predispose patients to diagnostic errors.[43]
- Become aware of common cognitive biases in the clinician that can lead to diagnostic error.
- Systematically address diagnostic errors in the pediatric emergency care setting to provide high-quality and safe care.[44-48]

Shift Work/Burnout/Wellness

It has long been recognized that clinician factors, such as physician burnout, have a significant influence on the health care system in terms of productivity, care quality, and patient safety.[49-51] Burnout has led many physicians to consider reducing workload, retiring early, quitting, or even suicide.[52] Clinicians' mental health is also often affected by burnout.[50]

- Recognize clinician's burnout and poor well-being as factors contributing to poor safety outcomes such as incorrect medication orders, delayed care, and incorrect documentation, all of which contribute to diagnostic errors and patient harm.[51]
- Be aware of the potential impact of "off hour" shift work (evenings, nights, weekends, and holidays), changing shift assignment from day to night in the ED on premature burnout as well as poor overall physical, cognitive, mood and mental health.[53-56] All of these factors impact the potential to cause medical errors and risk to patient safety.[56,57]
- Consider using behavioral interventions such as light therapy, keeping a consistent shift, moderate caffeine consumption, and scheduled naps to minimize the short-term negative effects of a shifting sleep schedule. In addition, many of the risks of shift work are associated with metabolic syndrome and obesity. Therefore, encouraging all ED staff in keeping a healthy weight, exercising regularly, and adopting healthy eating habits might decrease such risks.
- Take into account improvement in clinicians' wellness when planning interventions to improve patient safety.[53] It is also critical to advocate for governments and health policy makers to invest in the wellness of health care professionals, especially nursing, to counter workforce shortage, which was exacerbated during the COVID-19 pandemic in hospitals and EDs, to ensure a healthy population.[58]

II. MANAGERIAL FACTORS

Psychological Safety and Reporting Close Calls

- Enhance patient safety by using reports from frontline staff of near misses and unsafe conditions to identify latent safety events. Such reporting is vital to continue to improve systems within the ED environment to ensure patient safety.[59]
- Encourage open communication and joint review and auditing (morbidity and mortality conferences or other mechanisms) of "near misses" among ED physicians and ED nursing staff. That practice can help create "just culture" with no individual blame for errors, which can mitigate reluctance among clinicians to report and discourage the hiding of events.[60]
- Listen to families, as an underused source of data in emergency care settings, to learn about errors, especially preventable adverse events, many of which may not be otherwise recognized by the medical team or documented in the medical record or event reporting.[61]

ED Crowding and Patient Safety

- Recognize that ED crowding threatens pediatric patient safety and poses an increased risk of medical errors, including errors related to delays in providing emergent care.[62-68]
- Support sustainable solutions to ED crowding that decrease input by increasing primary care access through extended hours of the medical home.[69,70]

- Support ED throughput by implementing a 5-level triage system with nurse-initiated, evidence-based, standardized protocols and order sets at the point of initial triage consistent with the recommendations of the AAP policy statement on overcrowding and ACEP standardized protocols for optimizing ED care and policy triage scale standardization.[71-75]
- Increase the use of clinical pathways, which could be included as part of the electronic health record (EHR) order set, in emergency care settings to decrease variation, increase efficiency, and improve safety for pediatric patients.[76,77]
- Improve the efficiency of care provided in emergency care settings to all acuity levels through the use of fast track and split flow on presentation.[73,78,79]
- Develop innovative ED staffing models that adapt to growing patient needs [80] and introduce active bed management to facilitate timely ED to inpatient bed transfer and improve ED throughput.[81,82] Active bed management includes improvement of hospital inpatient discharge processes, such as timely room cleaning, streamlining the discharge process, and conducting early rounds to determine patients' eligibility for discharge. All of these practices can facilitate early transfer of patients from ED to the inpatient unit.
- Address nursing and staff shortage in the inpatient unit as well as in the ED, which can worsen during disasters such as during the COVID-19 pandemic. Such shortages can exacerbate the lack of available beds for admitted patients and also overburden nursing staff and create potential safety concerns.[83]
- Recognize that boarding, because of pediatric mental health issues, can worsen during disasters such as during the COVID-19 pandemic, where mental health illnesses increased in frequency and severity.[84] Disparities also exist in the outcomes of mental health; Black and Hispanic families are at risk for increased burden of grief because they experience higher mortality with certain illnesses such as with COVID-19, food insecurity, financial instability, and education interruption.[85,86]
- Advocate for increased mental health services in schools; integrate mental health into pediatric primary care; increase insurance coverage and payment for mental health in the ED as well as follow up care; and extend access to telehealth, all of which can decrease children and adolescents in crisis requiring ED visits. Advocacy for having appropriate mental health resources in the ED is critical for safety planning and post-discharge mental health outreach.
- Explore research, education, and collaboration to develop and implement sustainable solutions to prevent and manage ED crowding.

III. ORGANIZATIONAL AND ENVIRONMENTAL FACTORS

Teamwork/Team Training

- Train ED staff in teamwork that teaches individuals to crosscheck each other's actions using easy to remember acronyms[87,88] and mnemonics like those identified in the Children's Hospital's Solutions for Patient Safety-Zero Harm program to decrease the possibility of errors.[89]
- Optimize classroom education in teamwork by using simulation with specific scenarios to facilitate critical thinking skills, team interaction, and communication in the ED.[88] Multidisciplinary teams benefit from pre-event briefing, huddles, and post-event de-briefing to help identify opportunities for improvement. Simulation training is an effective tool to modify safety attitudes and teamwork behaviors in the ED setting. Sustaining cultural and behavioral changes requires repeated practice opportunities and accountability of the entire ED team to complete such training.[90]
- Support the integration of team training in the physician, nursing, and emergency medical services (EMS) training programs. The Agency for Healthcare Research and Quality provides information on several team-training programs with documented success in managing the challenging environment of the ED.[91]
- Incorporate a cultural broker (a go-between, one who advocates on behalf of another individual or group), when available, in the care team who can support the team to effectively address cultural differences in the patient's practices and subsequently promote health equity and safety.[92]

Emergency Department Shift Huddles

- Conduct shift huddles among all staff involved in the patient's care regularly in the ED to improve care

coordination, relationships, and collaboration and strengthen the culture of safety.[93,94] In addition, if time and circumstances allow, encourage less formal "spot" meetings at mid-shift to tackle any foreseeable concerns.
- Support safety huddles/safety briefings including daily check-ins. Huddles are recommended as a team building tool in Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS), which is an evidence-based teamwork system aimed at optimizing patient outcomes and safety to increase situational awareness and decrease error.[95]
- Support interprofessional and interdepartmental communication and collaboration between the ED and hospital units to improve patient flow from the ED to other units.[96]

Handoffs in the Emergency Department

Communication errors are a contributing factor for approximately two-thirds of sentinel events,[97] more than half of which involve handoff failures.[98]

- Recognize that patients requiring emergency care often transition across and within multiple care areas, including the prehospital setting, the ED, inpatient units, and medical homes. All of these transitions of care require handoffs to exchange mission-specific information, responsibility of care, and authority for treatment and procedures.[6] The joint policy statement from the AAP, ACEP, and ENA on handoffs reviewed many recommendations to improve the safety practice in the ED setting.[6]
- Recognize that miscommunication and misinformation that starts in the ED may affect a patient's inpatient and outpatient care as well, because such information can be perpetuated throughout the entire patient encounter (and future encounters). Handoffs are a well-documented safety risk in the ED attributable to communication errors,[6,99-102] cognitive biases,[102] and environmental factors.[6]
- Increase structured handoffs in the ED, which occur in less than 20% of handoffs from ED to inpatient care.[103] Numerous models have been implemented and studied to improve the quality of handoffs, including checklists[102-105] structured mnemonics,[104,106,107] and handoff bundles.[108,109] Examples of mnemonics include SBAR (**s**ituation, **b**ackground, **a**ssessment, and **r**ecommendation),[110] SOUND (**s**ynthesis, **o**bjective data, **u**pcoming tasks, **n**ursing input, and **d**ouble check),[104] ABC-SBAR (**a**irway, **b**reathing, **c**irculation followed by **s**ituation, **b**ackground, **a**ssessment, and **r**ecommendation),[108] and I-PASS (**i**llness severity, **p**atient summary, **a**ction list, **s**ituation awareness and contingency planning, and **s**ynthesis by receiver).[106]
- Develop novel and innovative physician staffing models to allow overlapping shifts to decrease the number of handoffs that occur.[111] Of note, the needs of each individual ED are unique. Therefore, the utilization and distribution of various staffing models utilizing physicians and other clinicians within the ED should be determined at the site level by local ED leadership.[112]
- Monitor patients in high-risk situations, in which key team members will visit such patients regularly to assess for change in clinical status. This situation includes handoff of a patient with an uncertain diagnosis or disposition, an unstable patient, a consultant-driven evaluation, a pending imaging study, deviations from a typical diagnosis or treatment plan, or a prolonged stay in the ED.[113]
- Explore further research comparing different handoff models in the ED setting to determine their effects on patient harm and clinical outcomes. In addition, best practices for handoffs need to be derived and validated so they can be implemented to improve patient safety in the emergency care setting.

Empowerment of the Workforce to Employ Robust Process Improvements and Safety Strategies

It is critical for patient safety to ensure that staff has the ability to do what is necessary for patients in a timely manner, keeping the best interest of the patient in mind, including adapting to technology and developing and implementing strategies for providing safe and quality medical care. Information from frontline clinicians is critical to continue to improve any system process or strategies taken to increase patient safety.

THE ROLE OF INFORMATION TECHNOLOGY IN PATIENT SAFETY

- Recognize the important role of information technology in improving health care safety and quality. In the modern ED, EHR functionally integrates

bed management, patient flow, medication ordering and administration, abnormal study results, documentation, changes in clinical status, and disposition planning.

- Increase the implementation of computerized physician order entry (CPOE) and clinical decision support (CDS) with electronic prescribing to reduce ordering medication errors. On the other hand, CPOE systems may not fully eliminate medication errors in children, because commercial or independently developed CPOE systems may fail to address critical unique pediatric dosing requirements.[114] In addition, because true dosing alerts for medication errors can be overridden by clinicians, system refinements are necessary to reduce the high false-positive alert rate, which could lead to alert fatigue.[115]
- Develop CDS tools and integrate them into EHR to streamline workflows. An example of a guideline embedded within information systems to increase adherence to best practices is the successful CDS implementation in EHR of the 2 Pediatric Emergency Care Applied Research Network (PECARN) prediction rules to identify children at very low risk of clinically important traumatic brain injury. As a result, head computed tomography (CT) utilization rates decreased from 26.8% to 18.9% with no increase in returns within 7 days and no significant missed diagnoses.[116]
- Identify technological solutions to medical safety concerns such as the use of electronic equipment (eg, programmable "smart" infusion pumps in neonates,[117] barcoding to compare identification bands with medications). Such solutions have resulted in improved detection of medication calculations and administration errors.[118]
- Leverage the use of telehealth to enhance patient safety by connecting patients and pediatricians to remote specialist care. Telehealth can help in preventing unnecessary transfers and keeping patients in rural areas connected to the health care system when in-person visits are difficult to achieve.[119-122]
- Recognize and support the evolving role of data science, and specifically artificial intelligence (AI) methods, in creating statistical models that can be integrated into CDS to improve patient safety and outcomes. In the ED, data science methods such as AI are increasingly being used for disease identification, admission or discharge prediction, and patient triage.[123] AI is also being used to guide "smart" staffing decisions and resource allocation.[124]

STRATEGIES FOR IMPROVING MEDICATION SAFETY IN THE EMERGENCY CARE SETTING

- Use strategies for improving medication safety as outlined in the joint policy statement from the AAP, ACEP, and ENA on pediatric medication safety in the ED.[8] This includes the development of a standard pediatric formulary that includes standard concentrations and dosage of high-risk and frequently used medications, such as resuscitation medications, vasoactive infusions, narcotics, and antibiotics, as well as look-alike and sound-alike medications.[8]
- Establish a process to ensure that body weight is measured and recorded in kilograms only to avoid inappropriate calculations.[8,125,126]
- Advocate for the integration of ED pharmacists, when possible, within the ED team to verify the preparation, dosing, dispensing, and reconciliation of medications administered in the ED as well as drug education to heath care team and patients.[127-129] Having pharmacists in the ED directly or in a consultative fashion remotely (telepharmacy) may increase medication safety in the emergency care setting.
- Establish the use of a distraction-free medication safety zone and implementation of an independent 2-clinicians check process[130] for high-alert medications, as suggested by the Institute for Safe Medication Practices and The Joint Commission.[131,132] Patient-identification policies, consistent with The Joint Commission National Patient Safety Goals, should be implemented and monitored.[130-132]
- Recognize risk factors for medication errors during ordering, preparation, and administration such as not using the appropriate weight and performing medication calculations based on pounds instead of the recognized standard of kilograms, inappropriate calculations including tenfold-dosing errors, and making medication errors in the 5 rights of medication (the right patient, the right medication, the right dose, the right time, and the right route).
- Establish safe sedation practices using guidelines such as the recently developed guidelines through a collaborative effort of the AAP and the American Academy of Pediatric Dentistry.[133]
- Advocate for policies to address timely tracking, reporting, and evaluation of patient safety events and for the disclosure of medication errors or unanticipated outcomes. Education and training in medication error disclosure should be available to care providers who are assigned this responsibility.[5,134,135]

PEDIATRIC EMERGENCY CARE SAFETY DURING DISASTERS INCLUDING INFECTIOUS OUTBREAKS

- Recognize that one of the fundamental foundations of pediatric disaster readiness is ensuring that general EDs are able to meet the needs of children on a daily basis. Thus, one of the key components of disaster preparedness for EDs is to be "pediatric ready."[5,125]
- Ensure disaster planning takes into consideration the unique needs of children, especially those with access and functional needs and preexisting and complex medical conditions, as well as recognition of physical, developmental, and psychosocial differences, because the majority of children present to community hospital EDs.[136]
- Review ED disaster plans to ensure the safety of unaccompanied children, because during disasters, children may present unaccompanied by caregivers and unable to self-identify,[137] and have an established protocols for patient tracking and family reunification.[137]
- Recognize that in a hazardous materials event, plans for decontamination of children should include attention to water temperature and pressure to reduce hypothermia and prevent further dermal injury.[138]
- Ensure that ED staff has practiced pediatric disaster plans either through simulations or including children in disaster drills given that disasters are "low frequency, high impact events."[139-141]
- Recognize that the mental health needs of children experiencing disasters can extend into adulthood.[142] Therefore, hospital ED pediatric disaster plans may include identifying personnel to attend to the psychosocial and psychological needs of children to immediately decrease mental stress/trauma.
- Ensure that staff and pediatric patients have adequate personal protective equipment to reduce transmission during infectious outbreaks.
- Use available resources to improve pediatric disaster preparedness and response. The Emergency Medical Services for Children Improvement and Innovation Center has excellent resources for disaster preparedness.[143] The AAP offers a resource kit and related tabletop exercises scenarios on a collaborative website as well as a chapter within the Topical Collection Part One on Pediatric Preparedness Exercises.[144,145] This kit was based on implementation of an AAP and Centers for Disease Control and Prevention virtual exercise.[146]

Conclusion

Patient safety remains a critical priority for all clinicians caring for children who are ill and injured as it is the foundation of high-quality health care. Clinicians must practice patient safety principles, support a culture of safety, and adopt best practices to continue to improve safety for all children seeking emergency care.

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