TECHNICAL REPORT

American Academy of Pediatrics

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Pediatric Readiness in the Emergency Department: Technical Report

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This is a revision of the previous 2018 joint technical report titled "Pediatric Readiness in the Emergency Department." Children have unique physical and psychosocial needs that are heightened in the setting of serious or life-threatening emergencies. Most ill and injured children and those with mental health emergencies are brought to community hospital emergency departments (EDs) by virtue of proximity. Therefore, all EDs must have the appropriate resources (medications, equipment, policies, and education) and staff to provide effective emergency care for children. This technical report outlines the evidence and rationale supporting resources necessary for EDs to stand ready to care for children of all ages. Although resources within emergency and trauma care systems vary locally, regionally, and nationally, ED staff, administrators, and medical directors can ensure high-quality emergency care is available for all children. The updated recommendations in the accompanying policy statement of the same title are intended to serve as a resource for clinical and administrative leadership of EDs as they strive to improve their readiness for children of all ages.

INTRODUCTION

This technical report describes the background leading to the development of the 2025 joint policy statement "Pediatric Readiness in the Emergency Department"[1] and provides details of the foundational infrastructure (ie, pediatric readiness) needed to ensure immediate high-quality care for critically ill or injured children presenting to the emergency department (ED). Pediatric readiness includes pediatric-specific

abstract

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To cite: Remick KE, Foster AA, Jensen AR, et al; AMERICAN ACADEMY OF PEDIATRICS; Committee on Pediatric Emergency Medicine, Section on Surgery; AMERICAN COLLEGE OF EMERGENCY PHYSICIANS; Pediatric Emergency Medicine Committee; EMERGENCY NURSES ASSOCIATION; Pediatric Committee; AMERICAN COLLEGE OF SURGEONS; Committee on Trauma. Pediatric Readiness in the Emergency Department: Technical Report. *Pediatrics*. 2026;157(2):e2025075319

equipment and supplies, policies and procedures, competencies for staff, patient safety protocols, continuous quality improvement (QI) efforts, and oversight of all administrative aspects of pediatric emergency care.[1–8] The evidence described in this report further affirms that high levels of pediatric readiness are feasible for all EDs, regardless of annual pediatric patient volume or availability of inpatient and subspecialty resources. The ED is a central health care access or triage point for initial evaluation and disposition across the health care landscape.[9] For this reason, optimizing emergency care services has great potential to improve patient-centered outcomes for children and families. Indeed, high levels of pediatric readiness are associated with improved survival for critically ill or injured children, making pediatric readiness a health care imperative.[10–16] Adopting the recommendations in this report will facilitate the delivery of emergency care for children of all ages and, when appropriate, timely transfer to a facility with specialized pediatric services.

These recommendations are specifically designed for all EDs that provide care for children. In the United States, most children who seek emergency care (>80%) present to general EDs rather than specialized pediatric EDs.[17–19] The intended users of these recommendations include all EDs that operate 24/7, including freestanding EDs and critical access hospital EDs. It is important to note that this report and the accompanying policy statement are not intended to address urgent care centers, as there are other recommendations available for those settings.[20]

BACKGROUND

In 2024, the American Hospital Association estimated there were approximately 6120 hospitals in the United States, of which 5336 were acute care community hospitals and federal government hospitals.[21] Among the 140 million ED visits in the United States in 2021, approximately 18% were for children younger than 15 years.[22] This percentage represents a slight decrease from previous years (20%–25%), which may reflect improvements in children's health relative to adults or, alternatively, changes in health care usage attributable to the COVID-19 pandemic.[23,24] Children have unique anatomic, physiologic, developmental, psychological, and medical needs that differ from adults.[25] These differences must be considered when developing emergency care pathways and protocols, training ED staff, stocking equipment, medications, and supplies and when implementing QI interventions. The critical importance of these recommendations cannot be overstated as pediatric readiness is now linked to a 4-fold reduction in mortality risk among critically ill children and an almost 2-fold reduction for injured children.[10–12]

Improving Pediatric Readiness in US EDs

In 2006, the "Future of Emergency Care" series of the Institute of Medicine (IOM; now the National Academies of Sciences, Engineering, and Medicine) noted ongoing deficiencies in pediatric emergency care in both the prehospital and ED settings, including the availability of pediatric equipment, access to supplies and medications, training for staff, and policies and protocols incorporating the unique needs of children. Although there have been marked improvements in many areas of everyday pediatric readiness, persistent variability and the need for improvement remain across the continuum of care.[17,18,26–29]

Variability in care has been noted across a spectrum of physical and behavioral health conditions, from pain assessment and management to cardiopulmonary resuscitation performance and sepsis recognition and treatment.[30–41] Even the most foundational aspects of care are applied inconsistently across diverse presentations including vital signs acquisition and reassessment.[42] Standardization and uniform adoption of evidence-based practices are necessary to promote the best possible outcomes for children.

One of the specific recommendations from the 2006 IOM report was that hospitals appoint both a nurse and physician pediatric emergency care coordinator (PECC). At that time, only 18% of EDs in the United States reported having a physician coordinator, and only 12% had a nurse PECC.[43] National assessments performed in 2013 and 2021 demonstrated that EDs that have staff assigned to the role of PECC have higher levels of pediatric readiness as measured by compliance with national guidelines.[17,18] Although the 2013 assessment demonstrated an increase in the proportion of EDs with both nurse and physician PECCs (42%), there was a significant decrease noted in 2021 during the COVID-19 pandemic (29%).

The National Pediatric Readiness Project (NPRP), launched in 2012, is an ongoing QI initiative among the federal Health Resources and Services Administration (HRSA)/Emergency Medical Services for Children (EMSC) Program and the American Academy of Pediatrics, American College of Emergency Physicians, and Emergency Nurses Association to ensure pediatric readiness of EDs.[44,45] The American College of Surgeons Committee on Trauma and the HRSA Pediatric Pandemic Network have joined this effort. Derived from the joint policy statement "Pediatric Readiness in the Emergency Department," the NPRP initiative now encompasses 6 pillars:

1. NPRP assessment: A comprehensive self-assessment of pediatric readiness components that provides a weighted pediatric readiness score (on a 100-point scale) based on responses.[46]

2. NPRP checklist and toolkit: A compilation of up-to-date, freely available online resources and educational materials to support the adoption of pediatric readiness.[47]
3. NPRP quality improvement collaboratives: National structured and time-bound shared learning networks to support ED-based teams and individual clinicians in implementing pediatric readiness improvement efforts.[48]
4. NPRP Quality Initiative (NPRQI): An open-access, self-driven QI data platform to help measure, benchmark, and improve pediatric clinical performance in EDs.[49]
5. Pediatric Readiness ED recognition programs: State- and territory-based programs to identify and recognize EDs that demonstrate adherence to core components of pediatric readiness.[50,51]
6. NPRP data registry to promote research in pediatric readiness. The EMSC Data Center houses databases consisting of aggregate data from serial NPRP assessment periods that researchers who wish to investigate aspects of pediatric readiness can request.[52]

Major Research Findings from the NPRP Initiative Include

1. Approximately 70% of EDs see fewer than 10 children per day, yet more than 80% of children are seen in non-children's hospitals.[17]
2. Although more than 90% of children have access to an ED within 30 minutes of their home, 90% of those live closest to a non-pediatric-ready ED.[53]
3. The median pediatric readiness score among all US EDs is 69.5 on a 100-point scale.[17]
4. The survival benefit of pediatric readiness is only achieved among EDs in the highest quartile of pediatric readiness (weighted pediatric readiness score greater than 88–93).[10,11]
5. For EDs in the highest quartile of pediatric readiness, there is a 60% decrease in mortality risk for injured children and a 76% decrease in mortality for critically ill children.[10,11]
6. High pediatric readiness is associated with as much as a 3-fold decrease in racial disparities in mortality.[16]
7. The median time to death among children who succumb to their illness or injury is 3 hours following arrival to the ED.[14]
8. The estimated cost for an ED to obtain and sustain pediatric readiness is $4 to $48 per pediatric patient visit.[54]
9. The overall national cost to ensure pediatric readiness of all 5000 EDs in the United States is approximately $200 million.[55]
10. The greatest drivers of pediatric readiness are a) the presence of physician and nurse PECCs to oversee all administrative aspects of pediatric readiness; b) continuous pediatric QI efforts to track and increase adherence to safe and evidence-based care processes; and c) staffing the ED to include board-certified emergency physicians, defined as board certified or board eligible in emergency medicine or pediatric emergency medicine.[17]

Pediatric Readiness and Pediatric Facility Recognition

The impact of facility recognition for specialty care has long been recognized, with superior outcomes seen for adult patients with ST-elevation myocardial infarction (STEMI), stroke, and trauma when treated at designated specialty centers.[56–58] Better outcomes have been demonstrated for children treated at a designated pediatric trauma center.[59] The EMSC program has long promoted improved readiness and recognition of prepared EDs, with current EMSC performance measures addressing pediatric readiness for children requiring emergency medical care.[60] Performance measure EMSC 04 is: "Hospital Emergency Department Pediatric Readiness Recognition Program.[61]" Currently, 19 states have implemented pediatric readiness recognition programs for emergency departments.[50,51] Although most programs use criteria that are based on the 2018 joint policy statement, there is significant variability in program requirements, verification processes, and designation of "level" of pediatric readiness.[62] Many states have described the process they used to establish and maintain a pediatric readiness recognition system.[50]

Recognition and Verification Have Been Associated With Improved Readiness Scores

Remick et al described an association between higher hospital readiness scores and an on-site verification program in California.[51] Nationally, hospitals achieving Pediatric Readiness Recognition by their respective states scored, on average, 22 points higher on the assessment than those that had not been recognized as pediatric-ready by their state.[62] National uniform standards are associated with decreased variability in pediatric readiness, as evidenced by consistently high levels of pediatric readiness at American College of Surgeons Verified Level 1 Pediatric Trauma Centers (PTCs) compared with high variability in pediatric readiness at PTCs with state pediatric designation alone.[63] The American College of Surgeons has incorporated pediatric readiness requirements into verification standards.

Identifying pediatric ready-receiving centers for emergency medical services (EMS) transport to trauma centers can potentially decrease mortality nationally. Children presenting for emergency treatment of critical illness or injury at high-readiness centers have been shown to have improved mortality compared with children treated at low-readiness centers.[11–13] Furthermore, mortality differences adjusted for transport time have been demonstrated for injured children treated at the highest-readiness centers compared with low-readiness centers, suggesting

that children are potentially best treated with EMS bypass of low-readiness centers with transport to a high-readiness center if the transport time is under 30 minutes.[64] Unfortunately, access to care at a trauma center with a high level of pediatric readiness is limited, with only 8.6% of US children having access within 30 minutes by ground and only 60.5% with access in under 60 minutes.[65] Optimizing pediatric readiness at high-level trauma centers within existing trauma systems could potentially increase timely access to high-quality pediatric emergency care to 81% of children nationally (93% if air transport resources are available).

Pediatric Readiness: Improving the Safety and Quality of Pediatric Emergency Care

Over the past 15 years, patient safety has become a key priority for health systems. In 2022, the American Academy of Pediatrics published the revised policy statement "Optimizing Pediatric Patient Safety in the Emergency Care Setting."[66] This statement and other recent work have demonstrated the value of specific structural and process measures for improved patient safety and quality of care. For example, a weight-based, color-coded medication safety system can decrease dosing errors and improve the timeliness of dosing,[67,68] and order sets, reminders, and clinical practice recommendations embedded within information systems increase adherence to best practices.[69,70]

The information from the pediatric readiness assessment, research described earlier, and expert opinion from the coauthoring organizations informed this report.[1,6–8] These recommendations are intended for all EDs regardless of high-level resources. Some hospitals with pediatric critical care capabilities may elevate regional pediatric readiness by sharing their expertise with other community EDs. Coordination of pediatric care within and across integrated health care systems is a strategy that may improve pediatric readiness locally, regionally, and nationally. This report is intended to serve as a resource for clinical and administrative leadership of EDs as they strive to improve their readiness for children of all ages.[1]

I. ADMINISTRATION AND COORDINATION FOR THE CARE OF CHILDREN IN THE ED

A. Pediatric emergency care coordinator (PECC): Ideally, a physician coordinator identified by the ED medical director and a registered nurse coordinator identified by the ED nurse director. The presence of at least 1 PECC is central to the readiness of any ED that cares for children and is associated with pediatric survival.[17,18,71]
   1. The physician and nurse PECCs may be concurrently assigned other roles in the ED (eg, frontline staff designated by leadership) or may oversee more than 1 program in the ED (ie, medical or nursing director, or as coordinator for trauma, stroke, or STEMI). Regardless of how the role is delineated, PECC roles should include administrative support and protected time for PECC activities.[72] PECC roles may be shared through formal agreements with administrative entities, such as within hospital systems in which an alternate hospital is capable of providing definitive pediatric care.
   2. Facilitate the following qualifications for physician and nurse PECCs:
      a. The physician PECC is qualified by the facility to provide emergency care. Optimally, the physician PECC is a board-certified or board-eligible specialist in emergency medicine or pediatric emergency medicine. Otherwise, the physician PECC meets the qualifications for credentialing by the hospital as an emergency clinician specialist with training and experience in evaluating and managing the critically ill or injured child. The physician PECC is credentialed by the facility and has verified competency in the care of children, including resuscitation, per the hospital policy. For EDs with limited resources, this administrative role may be shared with a clinical nurse specialist, nurse practitioner, or physician assistant (ie, advanced practice clinician) who is credentialed to care for patients in the ED. Engaging with collaborative groups can provide resources, best practices, and opportunities for shared learning regarding optimization of pediatric emergency care.
      b. The nurse PECC is a registered nurse who possesses special interest, knowledge, and skill in the emergency nursing care of children through clinical experience and demonstrated competence in critical thinking and clinical skills. Where available, a certified emergency nurse (CEN) or, preferably, a certified pediatric emergency nurse (CPEN) is desirable. Otherwise, the nurse coordinator has verified competency per hospital policy and may have other credentials such as certified pediatric nurse (CPN) or certified critical care registered nurse (CCRN).
   3. The physician and nurse PECCs work collaboratively and are responsible for the following[73]:
      a. Promote adequate skill and knowledge of ED staff physicians, nurses, and other health care clinicians and staff (ie, physician assistants, advanced practice nurses, paramedics, and technicians) in the emergency care and resuscitation of infants and children. PECCs should have significant input into the methods for

demonstrating competency in pediatric emergency care for their respective disciplines.

b. Participate in developing the pediatric components of the QI plan and facilitating QI activities related to pediatric emergency care.
c. Assist with the development and periodic review of ED policies, procedures, and standards for medications, equipment, and supplies to ensure adequate resources for children of all ages.
d. Serve as liaison/coordinator in collaboration with appropriate in-hospital and out-of-hospital pediatric care committees in the community/region and EMS, trauma, and emergency preparedness coordinators (if they exist).
e. Serve as liaison to definitive care hospitals, such as regional pediatric referral hospitals and trauma centers, EMS agencies, primary care clinicians, health insurers, and any other care resources needed to integrate services along the pediatric care continuum, such as pediatric injury prevention, chronic disease management, and community education programs.
f. Facilitate pediatric emergency medical and nursing education for ED health care clinicians and staff, including identifying continuing pediatric emergency education resources.
g. Facilitate inclusion of pediatric-specific elements in physician and nursing orientation in the ED.
h. In coordination with the local credentialing processes, facilitate competency evaluations for staff that are pertinent to children of all ages. Simulation (ie, pediatric scenario-based mock codes) has been demonstrated to improve pediatric care in resuscitation and team settings.[74–77]
i. Facilitate integration of pediatric needs in hospital disaster/emergency preparedness plans and promote inclusion of pediatric patients in disaster drills.[78–80]
j. Collaborate with ED leadership to enable adequate staffing, medications, equipment, supplies, and other resources for children in the ED.
k. Communicate with ED and hospital leadership on efforts to facilitate pediatric emergency care.

II. COMPETENCIES FOR PHYSICIANS, ADVANCED PRACTICE PROVIDERS, NURSES, AND OTHER ED HEALTH CARE CLINICIANS

A. Physicians, physician assistants, nurse practitioners, nurses, and other ED health care clinicians, based on their level of training and scope of practice, maintain the necessary skill, knowledge, and training in the emergency evaluation and treatment of children of all ages. Continuing education may be used to fulfill certain pediatric competencies, but interval updates of skills and procedures is strongly encouraged to maintain pediatric competencies. Training and board certification in emergency medicine or pediatric emergency medicine is considered optimal for physicians and nursing staff with ongoing participation in maintenance of certification. Staffing that includes board-certified emergency physicians has been associated with higher pediatric readiness and, as such, ensures the initial training in pediatric resuscitation which includes mastery of cognitive and procedural skills as well as a continuing certification that reenforces best practice emergency care for pediatric patients in emergency settings.[17] Similar training and ongoing requirements for certification in emergency and pediatric emergency medicine are available for nursing staff and should be encouraged.[81] There are more than 40 000 board-certified emergency physicians and fewer than 3000 pediatric emergency physicians in the United States. Ultimately, staffing for the over 5000 EDs to care for children should be developed on the basis of local resources, but it would ideally include a board-certified emergency medicine or pediatric emergency medicine physician.[82–84]

B. Baseline and periodic competency evaluations completed for all ED clinical staff, including physicians, physician assistants, nurse practitioners, nurses, and other health care clinicians are age-specific and optimally include neonates, infants, children, adolescents, and children with special health care needs. Competencies are determined by each institution's hospital policy and medical staff privileges as a part of the local credentialing process for all licensed ED staff.[85] Competencies refer to both knowledge and skills retention.

C. Demonstration and maintenance of pediatric clinical competencies may differ for physicians and nursing staff and can be achieved through maintenance or continuing certification; continuing education, including participation in local educational programs, professional organization conferences, or national pediatric emergency care courses; or through scheduled mock codes or patient simulation, team training exercises, or experiences in other clinical settings, such as the operating room (ie, airway management). Evaluation of such competencies may be achieved through direct observation, chart reviews, written knowledge tests, and/or by documentation of board certification for physicians, nurse practitioners,

physician assistants, and nursing staff. Demonstration of competency for emergency physicians is achieved by documentation of initial certification in emergency medicine or pediatric emergency medicine and ongoing participation in continuing certification. Ongoing education in pediatric emergency care is recommended for all emergency clinicians. At minimum, clinicians should demonstrate and maintain competency of practice in the:

1. Recognition and care of acutely ill or injured children and children with complex medical histories and/or those with technological dependency.
2. Performance of procedures commonly encountered in the ED.
3. Provision of patient triage, resuscitation, and stabilization, aligning care provided with severity of illness or injury.
4. ED management and supervision of ED personnel.

D. Potential areas for pediatric competency and professional performance evaluations may include but are not limited to[86]:

1. Assessment and treatment
   a. Triage
   b. Illness and injury assessment and management
   c. Pain assessment and treatment, including nonpharmacologic pain management (eg, distraction techniques and comfort holds)
   d. Assessment and management of mental and behavioral health emergencies in children
   e. Recognition of toxidromes and common poisonings
2. Medication administration and delivery
3. Device/equipment safety (eg, low-volume infusion pumps)
4. Procedures
   a. Airway management
   b. Vascular access
   c. Sedation and analgesia
   d. Hemorrhage control (tourniquets and packing)
5. Resuscitation
   a. Critical care monitoring
   b. Neonatal resuscitation
   c. Pediatric resuscitation
6. Trauma resuscitation and stabilization[87]
   a. Burn management
   b. Traumatic brain injury
   c. Fracture management
   d. Hemorrhage control and resuscitation
   e. Recognition and reporting of nonaccidental trauma
7. Disaster drills that include triage of pediatric victims, tracking and identification of unaccompanied children, family reunification, and determination of pediatric surge capacity[88]
8. Patient- and family-centered care, including cultural competency
9. Team training and effective communication
   a. Transitions of care/handoffs[89]
   b. Closed loop communication

III. QUALITY IMPROVEMENT/PERFORMANCE IMPROVEMENT IN THE ED

Quality is best ensured by evaluating each of the 6 domains addressed by the IOM report[90]: safe, equitable, patient centered, timely, efficient, and effective. Performance improvement (PI) processes are essential to evaluating the quality of care, and measurement is integral to PI activities. Pediatric-specific metrics should be carefully identified to assess the quality of care throughout each phase of health care delivery across the emergency care continuum. A pediatric patient care review process is integrated into the QI and/or PI plan of the ED according to the following recommendations:

A. The potential framework for QI efforts may focus on the effectiveness of structural elements, processes, and clinical outcomes relative to pediatric emergency care. Minimum components of the QI/PI process should include collecting and analyzing data to discover variances from local, regional, or national norms; defining an improvement plan; and evaluating the success of the QI/PI plan with measures that are outcome based. High-level quality improvement efforts facilitate education and training, targeted system change implementation, and system performance measurement over time until steady, high-level performance is achieved. Simulation across the continuum of pediatric emergency care should be considered to improve outcomes and mortality.[91]

B. The QI/PI plan of the ED shall include pediatric-specific indicators. As shown in Table 1, pediatric emergency care metrics have been identified and should be strongly considered for inclusion in the overall QI plan.[49,92–94] In addition, performance bundles may be used to assess the quality of care provided for specific clinical conditions (eg, pediatric septic shock, pediatric asthma, pediatric closed-head injury).[95–99]

C. Process components integrate prehospital, ED, trauma, inpatient pediatrics, pediatric critical care, and hospital-wide QI or PI activities and may interface with regional, state, or national QI collaboratives, including injury prevention efforts.[100–104]

D. Mechanisms are in place to monitor professional performance, credentialing, continuing education, and clinical competencies including integration of findings from QI audits and case reviews for pediatric emergency care.

TABLE 1. Examples of Pediatric Emergency Care Performance Improvement Activities and Resources
Clinical Emergency Department Registry (CEDR) https://www.acep.org/cedr/
EMS for Children Innovation and Improvement Center https://emscimprovement.center
Emergency Nurses Association https://www.ena.org/#practice-resources
Education in Quality Improvement for Pediatric Practice (EQIPP) https://eqipp.aap.org/
The National Pediatric Readiness Assessment, https://www.pedsready.org
The National Pediatric Readiness Quality Initiative, www.NPRQI.org
Pedialink, The AAP Online Learning Center https://pedialink.aap.org/visitor
Pediatric Readiness Toolkit, https://emscimprovement.center/domains/pediatric-readiness-project/
Pediatric Trauma Society https://pediatrictraumasociety.org/
The Pediatric Interfacility Transfer Guide, https://emscimprovement.center/education-and-resources/interfacility-transfer/
Pediatric TQIP https://www.facs.org/quality-programs/trauma/quality/trauma-quality-improvement-program/pediatric-tqip/
Pediatric Emergency Care Applied Research Network (PECARN) guidelines: https://pecarn.org

Numerous resources are available to assist ED staff implementing QI/PI activities (see Table 1).

IV. POLICIES, PROCEDURES, AND PROTOCOLS FOR THE ED

A. Policies, procedures, and protocols allow for the preparation and standardization of emergency care for children. ED policies, procedures, and protocols should be age specific and include neonates, infants, children, adolescents, and children with special health care needs, and they may need to be periodically updated.[105] Additionally, ED staff should be educated accordingly and monitored for compliance.
   1. Pediatric triage for illness and injury, including children with medical complexity.[106]
   2. Pediatric patient assessment and reassessment, including a complete set of vital signs and frequency of reassessment.[25]
   3. Documentation of a full set of pediatric vital signs, including weight in kilograms, and the following: temperature, respiratory rate, pulse oximetry, heart rate, blood pressure, pain score, and mental status. Core temperature and manual blood pressure confirmation should be considered when indicated. End-tidal CO_2 monitoring is available for children of all ages based on severity of illness and/or need for sedation (eg, requiring advanced airway placement, monitoring for respiratory failure, or sedation). Identification and notification of the responsible clinician of abnormal vital signs, adjusted for age. Metric units are preferred for all patient measurements (eg, height, length, head circumference), when clinically indicated by the treating clinician.
   4. Pediatric sedation and analgesia (including nonpharmacologic interventions for comfort) for procedures, including medical imaging.[107–111]
   5. Pediatric transfusion protocol.[112–115]
   6. Assent and consent of minors (including when a caregiver is unavailable) and confidentiality protections per state laws.[116,117]
   7. Management of caregivers who exhibit verbal or physical abuse.[118–120]
   8. Assuming temporary protective custody of a child.
   9. Pediatric social issues including food insecurity and home safety.[121,122]
   10. Pediatric behavioral health and substance use disorders.[123]
   11. Approach and management of a child with agitation.[124–127]
   12. Appropriate use of deescalation, pharmacologic management, and physical restraint of a child with agitation.[124–127]
   13. Trauma-informed care.[128,129]
   14. Suicide screening and management.[130]
   15. Child maltreatment assessment and mandated reporting (physical and sexual abuse, sexual assault, human trafficking, and neglect).[131,132]
   16. Reduced-dose radiation and appropriateness of contrast for pediatric imaging.[133–135]
   17. Death of a child in the ED.[136,137]
   18. Family-centered care including[138–141]:
      a. Involving families and guardians in patient care decision making, interfacility transfer decisions, when needed, and in medication safety processes
      b. Family and guardian presence during all aspects of emergency care, including resuscitation and transport
      c. Education of the patient, family, and caregivers and guardians
      d. Discharge planning and education
      e. Bereavement counseling

19. Communication with patient's medical home or primary health care provider at the time of the ED visit (this can help ensure that a judicious and appropriate approach to examination, testing, imaging, and treatment is coordinated and follow-up is arranged in the most cost-effective and up-to-date manner)[142]A process for managing the safe discharge of patients who lack a medical home or regular primary care provider and may benefit from a community referral and/or consultation with a case manager and/or social worker.[143–146]
20. Do-not-resuscitate orders.[147]
21. Consultation and/or transfer to a pediatric center for children with medical complexity (including developmental disabilities, chronic care needs, and technology dependency) when needed.[148,149]
22. Immunization assessment and management.[150,151]
23. All-hazard disaster preparedness plan that addresses the following pediatric issues[80]:
    a. Availability of medications, vaccines (eg, tetanus and rabies), equipment, supplies, and appropriately trained providers for children in disasters
    b. Pediatric surge capacity for both injured and uninjured children
    c. Decontamination, isolation, and quarantine of families and children of all ages
    d. Minimization of parent-child separation and improved methods for reuniting separated children with their families
    e. Access to specific medical and behavioral health therapies, as well as social services, for children in the event of a disaster
    f. Disaster drills that include a pediatric mass casualty incident at least once every 2 years and that all drills include pediatric patients
    g. The care of children with special health care needs, including children with disabilities and technology dependency
24. Pediatric telehealth/telemedicine for subspecialty consultation.[152–154]
25. Human trafficking screening and management.[155,156]

B. Best practices to standardize care include use of evidence-based clinical pathways, order sets, or decision support that are available to clinicians in real-time.[98,111,157–167] When possible, integration of clinical pathways into the electronic medical record system can facilitate use by the ED care team. These may be systematically derived, consensus-driven, or locally developed on the basis of available evidence. Collaboration with regional pediatric centers and trauma centers may facilitate the use of standard, evidence-based guidelines. Additionally, some children's hospitals and academic centers have developed and studied clinical pathways, which are now available for public use. Examples of clinical pathways for the most common pediatric conditions seen in the ED are displayed in Table 2. The use of evidence-based pathways in the ED can improve patient-centered outcomes and mitigate disparities in care by providing a uniform approach to emergency care for all children.[168] Special attention is warranted to eliminate any race-based medicine in any of the pathways used in the ED to foster optimal emergency care for all children.[169]

C. Written pediatric interfacility transfer procedures and/or agreements that include the following pediatric components[148,149]:
1. Defined process for initiation of transfer, including the roles and responsibilities of the referring facility and referral center (including responsibilities for requesting transfer, method of transport and communication).
2. Transport plan to deliver children safely (including the use of child passenger restraint devices) and in a timely manner to the appropriate facility capable of providing definitive care.
3. Process for selecting the appropriate care facility for pediatric specialty services not available at the hospital; these specialty services may include:
    a. Medical and surgical specialty care
    b. Critical care
    c. Reimplantation (replacement of severed digits or limbs)
    d. Trauma and burn care
    e. Behavioral health emergencies
    f. Obstetric and perinatal emergencies
    g. Child maltreatment (physical and sexual abuse and neglect)
    h. Rehabilitation for recovery from critical medical or traumatic conditions
    i. Orthopedic emergencies
    j. Neurosurgical emergencies
4. Process for selecting the appropriately staffed transport service to match the patient's acuity level (ie, level of care required, and equipment needed for transport) and appropriate for children with special health care needs.
5. Process for patient transfer (including obtaining informed consent).[64]
6. Plan for transfer of critical patient information (ie, medical record, imaging, copy of signed transport consent) as well as personal belongings and

TABLE 2. Sample Evidence-Based Clinical Pathways for Common Pediatric Conditions

Most Common Conditions[23]	Citations	Use of Evidence-Based Pathways Improve Care	Open-Access Pathway Examples
Respiratory			
Asthma	Kaiser SV et al, 2020[98]	Summary: 83 EDs (37 in children's hospitals, 46 in community hospitals) were recruited, and 61 (73%) completed the study. Pathway implementation was associated with significantly increased odds of systemic corticosteroid administration within 60 min of arrival (aOR, 1.26; 95% CI, 1.02–1.55), increased odds of severity assessment at triage (aOR, 1.88; 95% CI, 1.22–2.90), and decreased rate of change in odds of hospital admission/transfer (aOR, 0.97; 95% CI, 0.95–0.99). Pathway implementation was not associated with chest radiograph use or ED length of stay.	VIP Pathways for Improving Asthma Care (PIPA): Clinical Pathway for Pediatric Asthma in the Emergency Department Setting
Injury and Poisoning			
Minor head trauma	Corwin DJ et al, 2021,[157] and Nigrovic LE, Kuppermann N, 2019[158]	Summary: Head CT rates in patients with minor head trauma consistently decreased each year after guideline implementation. Children who received head CT did not have prolonged lengths of stay compared with those who did not. A minority of patients who received a CT and were discharged met low-risk criteria by standardized guidelines.	Corwin DJ et al, 2021,[157] and Nigrovic LE, Kuppermann N, 2019[158]
Nervous System Disorders			
Status epilepticus	Shorvon S et al, 2008[159]	Summary: Consensus recommendation that all hospital units have a written management pathway with a clear, structured timeframe for management of status epilepticus.	Emergency Medical Services for Children Pediatric Education and Advocacy Kit (PEAK): Status Epilepticus Algorithm
Digestive Disorders			
Gastroenteritis	Rutman L et al, 2017[160]	Summary: There was a decrease in patients receiving IV fluids after initiation of the pathway and later with the addition of ondansetron to the pathway from 48% to 26%. The mean ED length of stay for discharged patients with acute gastroenteritis decreased from 247 to 172 min. These improvements were sustained over time.	Rutman et al[160]
Infectious and Parasitic Diseases			
Infant fever	Murray AL et al, 2017[161]	Summary: The mean time to urine collection and time to the first antibiotic administration were reduced after pathway implementation (23-min reduction to urine collection vs 36-min reduction to the first antibiotic administration). There was improvement in the proportion of infants who received the pathway-specific antibiotics based on age (OR, 7.2; 95% CI, 4.4, 11.9) and the proportion of infants who were administered acyclovir based on pathway guidelines (OR, 8.8; 95% CI, 2.9–30.0).	American Academy of Pediatrics Clinical Practice Guideline: Evaluation and Management of Well-Appearing Febrile Infants 8 to 60 Days Old. DOI: https://doi.org/10.1542/peds.2021-052228
Mental and Behavioral Health Conditions			
Pediatric agitation	Hoffmann JA et al, 2023[162]	Summary: Among ED visits with medication given for severe agitation, standardized medication choices (olanzapine or droperidol) increased from 8% to 88%. Mean minutes in physical restraints decreased from 173 to 71.	Supplementary material

Abbreviations: aOR, adjusted odds ratio; CT, computed tomography; IV, intravenous; OR, odds ratio.

provision of directions and referral institution information to family.
7. Process for return transfer of the pediatric patient to the referring facility as appropriate.
8. Integration with telehealth/telecommunications processes and mobile integrated health/community paramedicine as appropriate.[152,153]

V. PEDIATRIC PATIENT AND MEDICATION SAFETY IN THE ED

The delivery of pediatric care should reflect an awareness of unique pediatric patient safety concerns and should include the following policies or practices[66]:

A. Weigh all children in kilograms and record the weight in a prominent place on the medical record, preferably with the vital signs.[170]
   1. For children who require resuscitation or emergency stabilization, a standard method for estimating weight in kilograms (eg, length-based tape) should be used.
B. A full set of vital signs, including blood pressure, heart rate, respiratory rate, temperature, oxygen saturation, and pain score should be documented and reassessed as patient status requires.
C. Processes for safe medication (including blood products) prescribing, delivery, and disposal should be established and should include the following:
   1. Use precalculated dosing guidelines for children of all ages and ensure they are easily accessible at the point of care.
   2. Consider adding a pharmacist with pediatric competency to the ED team, especially in large EDs, during times of higher volume.
   3. Identify the administration phase as a high-risk practice (eg, the simple misplacement of a decimal point can result in a 10-fold medication error).
   4. Promote distraction-free zones for medication preparation.
   5. Implement systems to decrease the cognitive load with pediatric dosing during resuscitation, which can lead to medication errors, (eg, precalculated dosing guidelines, computerized physician order entry, and clinical decision support with pediatric-specific kilogram-only dosing rules, including upper dosing limits, within emergency department information systems).
   6. Implement and utilize computerized physician order entry to create allergy alerts for all prescribed medications.
   7. Practice vigilance for all administered or prescribed medications and consider developing standardized order sets, particularly for high-risk medications, such as opioids and antibiotics.
   8. Implement an independent 2-clinician cross-check process for high-alert medications such as pain and resuscitation medications.
   9. Create a standard formulary for pediatric high-risk and commonly used medications.
   10. Standardize concentrations of high-risk medications.
   11. Reduce the number of available concentrations to the smallest possible number.
   12. Encourage open communication and review of near misses among the ED team to support a "just culture" with no individual blame for errors, which can mitigate clinicians' reluctance to report.
   13. Ensure that caregivers are well instructed on medication administration, particularly for pain and antipyretic medications, before the patient is discharged from the ED.
   14. Health literacy-informed communication strategies should be used with all families in a "universal precautions approach," because all parents likely benefit from clear communication (use of plain language, teach-back, etc). Redesigning the process of clinician medication counseling from a health literacy perspective has decreased dosing error rates. Clinicians may be trained to deliver simple, brief interventions associated with improved dosing safety.[171]
D. Pediatric emergency services are culturally and linguistically appropriate, and the ED provides a safe environment for children and support patient- and family-centered care.[172–174]
   1. Enhance family-centered care by actively engaging patients and families in safety at all points of care and addressing issues of ethnic culture, language, and literacy.
   2. Direct families to appropriate resources and review patients' rights and responsibilities from the safety perspective.
   3. Include shared decision making.
   4. Utilize trained language interpreter services rather than bilingual relatives.
E. Patient-identification policies are consistent with The Joint Commission's national patient safety goals.[175]
F. Policies exist for the timely tracking, reporting, and evaluation of patient safety events and the disclosure of medical errors or unanticipated outcomes. Education and training in disclosure is available to care clinicians who are assigned this responsibility.

VI. SUPPORT SERVICES FOR THE ED

A. Imaging and laboratory testing policies, informed by research and expert opinion, should be developed

and regularly reexamined and updated. Examples include the "Choosing Wisely" principles of applying evidence-based medicine criteria to obtaining radiographs for children with bronchiolitis, croup, asthma, first-time wheezing, or constipation and limiting testing of children with a viral illness, children with uncomplicated seizures, or children with mental or behavioral health symptoms who require psychiatric inpatient admission ("medical clearance").[176]

B. The radiology department should have the skills and capability to provide imaging studies of children and have the equipment and personnel necessary to do so as well as guidelines to reduce radiation exposure that are age and size specific.[177–179]
   1. The radiology capability of hospitals may vary from one institution to another; however, every ED should promote on-site radiology capabilities to meet the needs of children in the community.
   2. Medical imaging protocols that address age- or weight-appropriate dose reductions for children receiving studies that impart ionizing radiation, consistent with ALARA (as low as reasonably achievable) principles, especially when obtaining computed tomography scans or performing interventional procedures.[157–159]
   3. A process should be established for referring children to appropriate facilities for radiologic procedures that exceed the hospital's capability.
   4. A process should be in place for the timely review and interpretation reporting by a qualified radiologist for medical imaging studies in children.
   5. When an injured patient is transferred to a pediatric facility, imaging should be deferred to the receiving facility unless results will significantly alter management prior to or during the transfer process. Specifics should be discussed with the receiving facility.
   6. When a patient is transferred from one facility to another following imaging, all efforts are made to transfer completed images to avoid unnecessary radiation exposure. Technology (eg, cloud sharing with Health Insurance Portability and Accountability [HIPAA] protection) may facilitate digital image sharing between facilities.

C. The laboratory has the skills, personnel, and capability to perform laboratory tests for children of all ages, including obtaining samples, and the availability of micro technique for small or limited sample size.
   1. The clinical laboratory capability must meet the needs of the children in the community it serves.
   2. There should be a clear understanding of what the laboratory capability is for any given community, and definitive plans for referring children to the appropriate facility for laboratory studies should be in place.
   3. Protocols should be developed for the screening and administration of blood and blood products for ill or injured children.

D. Personnel capable of providing supportive, family-centered, trauma-informed care should be available. Personnel may include specially trained social workers, nurses, chaplains, mental health professionals, or child life specialists.[138]

VII. EQUIPMENT, SUPPLIES, AND MEDICATIONS

Pediatric equipment, supplies, and medications are easily accessible, labeled, and logically organized (eg, kilogram weight, weight-based color coding, etc).

A. Medication chart, color-based coding, medical software, or other systems are readily available to ED staff to ensure proper sizing of resuscitation equipment and proper dosing of medications based on patient weight in kilograms.
B. Resuscitation equipment and supplies are located in the ED; trays and other items may be housed in other departments (such as the newborn nursery or central supply) with a process to ensure immediate accessibility to ED staff. A mobile or portable appropriately stocked pediatric crash cart should be available in the ED at all times.
C. ED staff are appropriately educated as to the location of all items.
D. Each ED has a daily method to verify the proper location and function of equipment and expiration of medications and supplies.

The accompanying 2025 joint policy statement "Pediatric Readiness in the Emergency Department" includes and ED checklist that provides further details regarding pediatric-specific medications, equipment, and supplies necessary for the care of children in the ED.[1]

SUMMARY

The 2006 IOM report, "Emergency Care for Children: Growing Pains," used the word "uneven" to describe the status of pediatric emergency care in the United States at the time.[26] Although much progress has been made in the level of pediatric readiness across communities,[17,18] there remains a significant opportunity for further advancement nationwide. An important first step in ensuring readiness is the identification of both a physician and a nurse PECC for pediatric emergency care.

All EDs must be continually prepared to receive, accurately assess, and at a minimum, stabilize and safely transfer acutely ill or injured children. This readiness is

necessary even for hospitals located in communities with readily accessible pediatric tertiary care centers and regionalized systems for pediatric trauma and critical care. The vast majority of children requiring emergency services in the United States receive this care in a non-children's hospital ED, with 70% of EDs providing care for fewer than 10 children per day.[17] This relatively infrequent exposure of hospital-based emergency care professionals to seriously ill or injured children represents a substantial barrier to the maintenance of essential skills and clinical competency. Recognition of the unique needs of the ill and/or injured children served by an emergency care facility, including children with special health care needs; the commitment to better meet those needs through adoption of these recommendations; and the ongoing commitment to evaluate care quality and safety and maintain pediatric competencies should provide a strong foundation for pediatric emergency care.

Resources to assist with implementation of all aspects of this document can be found at www.pediatricreadiness.org.

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ABBREVIATIONS

ED: emergency department
EMS: emergency medical services
EMSC: Emergency Medical Services for Children (program)
IOM: Institute of Medicine
NPRP: National Pediatric Readiness Project
PECC: pediatric emergency care coordinator
PI: performance improvement
QI: quality improvement

All authors contributed substantially to the conception and design; review and interpretation of relevant literature; drafting and revisions; and final approval of the published version.

All authors have filed conflict of interest statements with the American Academy of Pediatrics.

Any conflicts have been resolved through a process approved by the Board of Directors. Author disclosures are provided at the end of this article. The American Academy of Pediatrics has neither solicited nor accepted any commercial involvement in the development of the content of this publication.

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FINANCIAL/CONFLICT OF INTEREST DISCLOSURE: Dr Remick had disclosures related to: EMS for Children Innovation and Improvement Center.

Dr Williams had disclosures related to: Edwards Lifesciences Corporation; Hologic Sales and Service; PolyMedics Innovations Inc.

Disclosures are reviewed and mitigated through a conflict-of-interest process that consists of reviewing pertinent information which is then used to decide what action is required to maintain content integrity. Disclosures may include salary, wages or other remuneration of any kind (including but not limited to consulting or advising fees, speaking fees, research funding, ownership interests, honoraria, participation in pension or benefit plans or programs or other perquisites, and reimbursement for travel, lodging, and meals) given for services rendered or other activities for which remuneration is received or expected, whether that compensation or other remuneration is paid directly to the individual or to the individual's employer or another third party. A disclosure does not necessarily imply a real or perceived conflict of interest.

Members of the Committee on Pediatric Emergency Medicine and the executive committees of the Section on Surgery assisted in the development of this technical report. AAP requires committee members to mitigate any perceived or actual conflict of interest which may include recusal from participating in policy development.

FUNDING: No external funding.

https://doi.org/10.1542/peds.2025-075319

COMPANION PAPER: A companion to this article can be found online at www.pediatrics.org/cgi/doi/10.1542/peds.2025-075318.

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