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Practical, Evidence-Based Reviews in Emergency Care

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Pediatric Readiness: A Safeguard for Emergency Department Patients and Providers

You would not be mistaken if you feel, as I do, there is an increasing number of conditions and events that the emergency department (ED) is being tasked with "readiness," from trauma, heart attack, stroke, sepsis, and, most recently, pandemics. But of all these conditions, the one that makes me most anxious is a sick, small child. I just do not see enough of them working part-time in a community hospital to feel comfortable with a seriously ill child. Rather than an annual disaster drill, during which most of us are not on shift and do not participate, I would rather spend the time reviewing and practicing basic assessment and resuscitation procedures for children. At least such practices would keep me aware of the equipment we have and its location. The biannual PALS certification is just too infrequent to maintain skills. I hope this issue of Emergency Medicine Reports *motivates you to keep your ED pediatric ready.*
—J. Stephan Stapczynski, MD, Editor

Case Example

It is a Saturday morning when a mother is driving across town with her 18-month-old child. Suddenly, her child begins coughing and drooling, unable to catch his breath. She notices a bag of M&Ms on his car seat. His mouth is turning blue. Quickly, she pulls over to the side of the road to give back blows, which prove to be ineffective. Panicked, she grabs her phone to call 9-1-1 when she notices a sign for a hospital at the next exit. She jumps back into her car and speeds to the closest emergency department (ED). She enters the ED carrying her child who is drooling and becoming increasingly lethargic. What happens next may not reflect your personal practice; however, it is intended to highlight what might occur at any ED.

You have been working in the ED for two hours already. The morning has been steady. As you walk out of a room, you see the mother running down the hall to the resuscitation bay. A nurse quickly grabs you. As you ask questions to better understand what occurred, you see a lethargic, cyanotic boy in respiratory failure. Despite severe stridor, he is maintaining a respiratory rate of 40 breaths/minute, pulse of 84, and an oxygen saturation of 70% on room air. An adult non-rebreather mask is placed on the patient — the pediatric size cannot be found. Oxygen saturations do not improve. Meanwhile, another team member opens the pediatric crash cart. A bag valve mask (BVM) device and appropriately sized mask are pulled from the cart and applied to the patient. You request Magill forceps, thinking you can quickly remove the foreign body from the child's mouth. The resuscitation team reports there are no Magill forceps in the pediatric crash cart. They hand you the adult Magill forceps. As

EXECUTIVE SUMMARY

- Pediatric readiness simply means the systematic inclusion of pediatric-specific needs into all aspects of emergency department (ED) care.
- Of the about 30 million children seen in the ED each year, 80% are seen in community and general hospitals, and about 50% are seen in EDs with a low pediatric volume (fewer than 15 pediatric patients per day).
- Assigning a physician and nurse to the administrative role (part-time or full-time) as a Pediatric Emergency Care Coordinator (PECC) is one of the most important steps a general ED can take to improve pediatric readiness.
- Important aspects of the initial evaluation of children at ED triage are measuring weight in kilograms for patients younger than 18 years of age to prevent medication errors and the presence of a method to identify age-based abnormal pediatric vital signs..
- Professional organizations and state agencies are important resources to assist community hospitals with improving their pediatric readiness.

you reposition the child and attempt to remove the foreign body, you realize the adult Magill forceps are too large for the child's airway. As a last effort, you decide to intubate the child, thinking you may be able to push the foreign body into the right main stem and ventilate the left lung. An intravenous (IV) line has just been established. The child is too critical to move to a scale. A nurse asks the mother for the child's weight. She replies 25 pounds. You quickly calculate the dose of fentanyl, midazolam, and rocuronium only to realize later that the dose given was based on 25 kilograms, not 25 pounds. While the intubation is ultimately successful and the child is stabilized, you recognize that the resuscitation could have gone much better.

What Is Pediatric Readiness?

Pediatric readiness can be defined simply as the systemic inclusion of pediatric-specific needs into all aspects of ED care. Some have misinterpreted the concept of pediatric readiness as the ability to manage complex patients throughout the course of their hospital stay to include pediatric critical care capabilities, medical and surgical subspecialty care, and other high-level resources. Rather, pediatric readiness is within the scope of all EDs. Since an ED cannot decide which patients seek help, nor when, all EDs have a responsibility to meet the immediate needs of critically ill and injured patients of all ages, including children. Signage for nearby hospitals bears no differentiation as to pediatric capabilities, nor should it. Emergency care systems were intentionally designed to be universally available since emergencies are largely unpredictable. To the lay person, all EDs are equally capable of meeting the needs of children and, as emergency care providers, we have a duty to stand ready.

Epidemiology of Pediatric Emergency Care

The landscape of pediatric emergency care in the United States is both vast and uneven. Thirty million acutely ill or injured children seek care every year in an ED, representing 20% of all ED visits in the country.[1] Some of these visits occur in specialized pediatric EDs, while many more — more than 80% — occur in community or general EDs, and most are seen in EDs that see fewer than 15 children per day.[2] Collectively, visits to these low-volume EDs represent more than 15 million ED visits each year. Thus, children and families across the United States regularly rely on EDs where, by no fault of providers, the focus is common conditions found in the adult population (i.e., congestive heart failure, stroke, and chronic obstructive pulmonary disease). For these EDs, the regular pediatric visit often is urgent rather than emergent — respiratory diseases, minor injuries, and fever, among others.[1] With less than 5% of pediatric visits requiring tertiary care, the critically ill or injured child is an infrequent occurrence for an individual ED physician or nurse. Yet, since each critically ill child presents with a unique set of circumstances and challenges, in the absence of a systematic approach ensuring day-to-day readiness for all children, resuscitation teams will fumble, processes will fail, and patient outcomes will suffer. In a recent study, Ames and colleagues observed as much as a fourfold difference in mortality for critically ill and injured children presenting to the lowest vs. highest quartile of pediatric-ready EDs.[3]

Driving Quality in Pediatric Emergency Care

The challenges related to providing consistent, high-quality care for all pediatric emergency patients in the United States has been increasingly recognized over the past three decades. Initial emergency care systems in the United States were developed with a focus on trauma and cardiac arrest. The emergency care needs of children were not fully recognized until 1984, when Congress authorized the federal Emergency Medical Services for Children (EMSC) Program to decrease pediatric morbidity and mortality due to illness and injury across the emergency care continuum. The EMSC Program was authorized initially with an annual budget of $4 million in the 1980s. In 2020, the annual budget is now $22 million, but this funding requires frequent reauthorization (next in 2024) and funds a broad scope of work. Within the Health Resources and Services Administration, the EMSC Program is the only federal program dedicated exclusively to enhancing pediatric emergency care.

Over the past 35 years, the EMSC Program has invested in a multipronged approach that includes the creation of

educational resources; workforce development at the state and healthcare provider level; research support to generate evidence-based guidelines (i.e., Pediatric Emergency Care Applied Research Network); systems-based design and innovation to derive best practices; partnerships with states, professional organizations, and federal entities; use of quality improvement (QI) methodology; and data and analytics to measure improvements. Although initial efforts were slow, the EMSC Program has since expanded to support state partnership programs in all U.S. states and territories and is the lead agency aligning state and national efforts to drive high-quality pediatric emergency care.

Despite three decades of work to develop awareness, launch educational programs (e.g., PALS), and establish professional partnerships, in 2006 the Institute of Medicine (IOM), now the Health and Medicine Division of the National Academy of Sciences, published *The Future of Emergency Care, Part 3, Emergency Care for Children: Growing Pains*. This report detailed ongoing deficiencies in emergency care systems to meet the needs of children, including availability of pediatric equipment, supplies, and medications and ongoing pediatric training for staff.[4] To address these gaps, the IOM called for the establishment of two Pediatric Emergency Care Coordinators (one a physician) to oversee all administrative aspects of pediatric emergency care delivery, credentialing and certification organizations to better define pediatric emergency care competencies, and recommendations for the development of categorization systems based on pediatric capabilities.

Specific recommendations were outlined in the 2009 joint policy statement "Guidelines for the Care of Children in the Emergency Department" co-authored by the American Academy of Pediatrics (AAP), American College of Emergency Physicians (ACEP), and Emergency Nurses Association (ENA).[5] This was revised in 2018 to include expanded guidance on family-centered care, quality improvement processes, pediatric competencies, patient safety, and disaster planning.[6]

The seven core domains of pediatric readiness include[6]:

• **Administration and Coordination of the ED for the Care of Children**

Physician and nurse pediatric emergency care coordinators (PECCs) are identified by ED leadership to help ensure pediatric needs are integrated across all care processes. Assigning a physician and nurse to this administrative role (part-time or full-time) is one of the most important steps a general ED can take to improve pediatric readiness.

• **Pediatric Competencies of Physicians, Advanced Practice Providers, Nurses, and Other ED Healthcare Providers**

ED healthcare providers are charged with maintaining a broad and deep knowledge and skill set. Because critically ill and injured children are seen less frequently, baseline and periodic competency evaluations can help ensure that all ED clinical staff are ready to meet the needs of all children. While maintenance of certification programs and continuing education courses can help ensure ongoing cognitive knowledge, psychomotor skills also should be practiced and maintained.

• **Quality Improvement/ Performance Improvement in the ED**

Quality improvement processes ensure that all patients receive optimal care: safe, equitable, patient-centered, timely, efficient, and effective. Adoption of quality measures helps to minimize variability and gaps in emergency care delivery (e.g., ST-elevation myocardial infarction [STEMI] management), and, when monitored continuously, to assess adherence and standardization across all aspects of emergency care delivery, including pediatric patients. Ongoing evaluation of simple processes (e.g., weighing children in kilograms only) can identify variability and opportunities (e.g., ensure scales are locked to kilograms) to minimize adverse events (e.g., medication dosing errors). (*See Table 1.*)

• **Pediatric Patient Safety**

The delivery of pediatric care should reflect an awareness of unique pediatric patient safety concerns and should include specific pediatric policies and practices related to weight, assessment, medication dosing, treatment, culturally appropriate family-centered care, and patient identification policies.

• **Support Services**

Radiology and laboratory services should be available to support the unique needs of pediatric patients. Radiology protocols should aim to reduce radiation exposure when possible in children.

• **Policies, Procedures, and Protocols**

Policies, procedures, and protocols for the emergency care of children should be age and developmentally specific. Staff should be educated accordingly, monitored for compliance (QI process), and periodically updated. Evidence-based clinical pathways, order sets, or decision support tools help create consistency among a diverse set of providers. These may be systematically derived, consensus driven, or locally developed on the basis of available evidence. Policies that address challenging situations, such as the death of a child in the ED and/or interfacility transfers, can help optimize and standardize the process.

• **Equipment, Supplies, and Medications**

Performing immediate, life-saving interventions for critically ill and injured children depends on the availability of and ease of access to appropriately sized equipment, supplies, and medications (e.g., kilogram weight, weight-based color coding). Infrequently used supplies should be checked regularly to ensure appropriate function and expiration status. Last, because staffing models fluctuate, all providers should be well versed in the location of pediatric equipment. The presence of a pediatric-specific crash cart organized by weight or color coding can be especially helpful to resuscitation teams.

The National Pediatric Readiness Project

In 2012, the federal EMSC Program co-led the development of the National Pediatric Readiness Project (NPRP) alongside AAP, ACEP, and ENA. The NPRP is a national collaborative quality improvement effort to ensure all children have access to high-quality (safe, effective, efficient, timely, patient-centered, and equitable) emergency care regardless of geographic location.[7] The NPRP launched in 2013 with a national self-assessment of EDs to determine the capacity of our emergency care system to meet the needs of children. More than

Table 1. Top 15 Pediatric Emergency Care Metrics[64]			
Measure	**Potential Action Steps**	**Potential Impact**	**IOM Quality Domain**
Initial Care for Every Emergency Department Patient			
• Measuring weight in kilograms for patients < 18 years of age to prevent medication errors • Presence of a method to identify age-based abnormal pediatric vital signs	• Obtain scales that lock in kilograms and weigh all patients using this equipment • Enact an EMR-based vital sign screening tool using age-based normal values	• Decrease medication dosing errors • Early recognition of the critically ill child	• Effective, Safe • Effective, Safe
Emergency Department Infrastructure and Personnel			
• Pediatric equipment in the ED • Presence of on-site pediatric coordinator(s)	• Perform regular audits of the stockroom using national checklist to ensure the presence of all essential pediatric resuscitation equipment • Identify a physician and/or nurse PECC from your ED staff to ensure inclusion of pediatric needs in local policies and practices	• Minimize time to critical interventions • Decrease system-level gaps in pediatric emergency care delivery	• Effective, Safe • Effective, Safe, Patient Centered
Patient-Centered Emergency Department Care			
• Parent/caregiver understanding of discharge instructions	• Obtain pediatric-specific patient-facing discharge instructions and enact a policy to review all instructions with patients prior to discharge	• Minimize misunderstanding of diagnosis and treatment	• Effective, Safe, Patient Centered
Emergency Department Flow			
• Door-to-provider time • Total length of stay (LOS)	• Track pediatric specific door-to-provider times. Enact a QA process to ensure door-to-provider times are as short as possible. • Track pediatric-specific LOS according to reasonable benchmark. Enact policies to ensure timely transfer when indicated.	• Minimize duration of pain and delays in diagnosis • Reduce LOS for patients with a clear disposition. Reduce time to transfer when indicated.	• Timely, Patient Centered • Efficient, Patient Centered
Pain and Sedation			
• Reducing pain in children with acute fractures	• Ensure pediatric patients with fractures receive timely pain medication — consider adopting an intranasal analgesic protocol	• Minimize duration of pain in patients with orthopedic injuries	• Effective, Timely, Patient Centered

(*continued*)

4,140 EDs participated, representing 83% of EDs in the United States. Several key findings were identified.[2] (*see Table 2*):

• The presence of physician (47.5%) and nurse (59.3%) PECCs is increasing from 10 years earlier;

• Forty-five percent of EDs have a continuous quality improvement program in place that includes

Table 1. Top 15 Pediatric Emergency Care Metrics[64] (*continued*)

Measure	Potential Action Steps	Potential Impact	IOM Quality Domain
Trauma			
• Children with minor head trauma receiving a head CT scan • Protocol for suspected child abuse in place	• Utilize low-risk criteria to identify patients with blunt head trauma who can be safely managed without a head CT • Employ an automated EMR-based tool or clinical protocol to help identify suspected child abuse	• Reduce unnecessary exposure to ionizing radiation • Minimize missed opportunities to detect suspected child abuse	• Safe, Efficient • Effective, Safe
Respiratory Diseases			
• Systemic corticosteroids in asthma patients with acute exacerbation • Evidence-based guideline for bronchiolitis	• Enact a policy to ensure asthma patients receive steroids within 60 minutes of arrival when indicated • Use an evidence-based guideline for bronchiolitis care to guide the use of diagnostic tests and treatments	• Reduce length of stay and need for admission for patients with asthma exacerbations • Minimize the routine use of non-beneficial tests (i.e., chest X-ray) and treatments (i.e., bronchodilators)	• Effective • Effective, Efficient
Childhood Infections			
• Reducing antibiotic use in children with viral illnesses	• Use evidence-based guidelines regarding the use of antibiotics for common pediatric conditions	• Reduce potentially unnecessary antibiotic prescription rates for viral illnesses	• Effective, Efficient
Quality and Safe Care for All Patients			
• Return visits within 48 hours resulting in admission • Medication error rates	• Enact a quality assurance process to review return visits that result in admission and address contributing factors • Perform case reviews of all pediatric medication errors to identify and mitigate contributing factors	• Minimize "bounce-back" ED visits that result in admissions • Reduce medication errors by enacting system-based safeguards	• Effective • Safe

IOM = Institute of Medicine; ED = emergency department; PECC = pediatric emergency care coordinators; QA = quality assurance; CT = computed tomography

Adapted from the work of Evaline Alessandrini, Principal Investigator, and colleagues as part of the EMS for Children Targeted Issues grant titled: Defining Quality Performance Measures for Pediatric Emergency Care (2007-2009) and summarized in the manuscript: 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;18:519-526.

pediatric-specific metrics;

• Sixty-seven percent of EDs have a process to ensure pediatric weights are measured in kilograms only;

• Seventy percent of EDs have inter-facility transfer guidelines; and

• Fewer than 50% of EDs include pediatric-specific needs in the all-hazards disaster preparedness plan.

All participating EDs received a "weighted pediatric readiness score" (WPRS) based on 100 possible points derived from the seven core domains of pediatric readiness. Children's hospitals showed high levels of readiness, with

Table 2. Fast Facts: Making the Case for Pediatric Readiness

- Overall median readiness score: 69 out of 100 (pediatric EDs 96 out of 100)[2]
- Critically ill children evaluated among the highest quartile of pediatric-ready EDs have as much as a fourfold reduction in mortality compared with the lowest quartile of pediatric-ready EDs[3]
- Trauma centers: increased morbidity and mortality for injured children treated at adult trauma centers compared to pediatric-specific trauma centers[12-18]
- Critical access hospitals & Indian Health Service: 61/100, eight points lower than the national average[10,11]
- Access: 55% of children live within 30 minutes of a pediatric-ready ED
- Nine out of 10 children live closer to a local ED than to their regional pediatric-ready ED[8]
- Quality improvement: 45% of EDs track pediatric-specific quality measures[2]
- Disaster readiness: less than 50% of EDs include the needs of children in the disaster plan[2]

a median WPRS of 96. The median WPRS across all participating EDs was 69.[2]

Since 2013, AAP, ACEP, ENA, and the EMSC Program have hosted and supported numerous efforts to improve the nation's emergency care system to meet the needs of children, including:

- national quality improvement collaboratives;
- development of pediatric readiness recognition programs;
- alignment of organizational priorities with pediatric readiness;
- educational initiatives; and
- integration of pediatric readiness into workforce activities.

The NPRP is now preparing to launch another national assessment of pediatric readiness that will help target future improvement efforts and measure the impact of previous intervention strategies. The sequence of these activities is akin to the well-described P-D-S-A (plan, do, study, act) cycles that serve as the foundation for rapid transformation in healthcare systems and encapsulate quality improvement methodology.

The State of Pediatric Emergency Care

Although there have been notable improvements in pediatric emergency care during the past two decades, access to high-quality pediatric emergency care remains uneven across the United States. Ninety-four percent of children live within 30 minutes of any ED, yet only 55% live within 30 minutes of an ED above the 90th percentile of pediatric readiness (WPRS 94 or above). Furthermore, nine out of 10 children live closer to a lower-scoring ED than to a high "pediatric-ready" ED, making it highly probable that care would be sought at one of these community EDs instead.[8]

For children in rural and tribal areas, the disparities are even greater. Many of these children depend on critical access hospitals (CAHs) for their care. To qualify under the federal program, CAHs must be geographically isolated (more than 35 miles from another hospital); thus, the patients in their catchment area likely solely depend on the CAH for their care.[9] Many tribal hospitals have similar characteristics to CAHs. Among the 1,140 CAHs and 45 Indian Health Service (IHS) EDs that participated in the NPRP Assessment, the median weighted pediatric readiness score was 61, eight points lower than the national average.[10,11] Within the tribal EDs, 35% report the presence of all recommended pediatric resuscitation equipment.[11] While 63% of CAHs reported the presence of at least one PECC, 34% had a pediatric QI process, 26% had all the recommended pediatric resuscitation equipment, and 17% had all the recommended pediatric respiratory and airway equipment.[10]

Categorized systems of care have been developed to identify EDs that adhere to recommended standards and guidelines for care of certain populations of patients. Among these, trauma systems are the oldest and perhaps most well-developed. Based on high system-level standards of care, trauma systems have adopted a tiered approach that specifically recognizes the value of pediatric-specific elements in meeting the needs of children (i.e., Pediatric Trauma Center designation). Indeed, several studies have demonstrated disparities in outcomes and increased risk of complications for injured children treated at adult and mixed trauma centers compared to pediatric trauma centers.[12-18] One primary reason may be that while trauma centers adhere to rigorous trauma standards, such standards do not include all elements of pediatric readiness.[19,20] Even so, these verification systems have led to decreases in morbidity and mortality for the target populations (e.g., stroke, STEMI, trauma).[21-23]

In an effort to ensure emergency care systems meet the need of the pediatric population, more than 15 states have developed Pediatric Medical Recognition Programs to encourage EDs to maintain pediatric readiness. These Pediatric Readiness recognition programs are associated with high levels of pediatric readiness that surpass level I trauma hospitals,[19] yet the majority are strictly voluntary.

At the time of the NPRP Assessment in 2013, eight states had recognition programs in place: Arizona, California, Delaware, Illinois, New Jersey, Tennessee, Utah, and West Virginia. EDs recognized by these statewide programs had a 22-point higher WPRS than non-recognized EDs.[24] While the cost for a single ED to become pediatric ready is low,[25] participation in these programs is highly variable due, in part, to a lack of financial incentives and/or mandates for pediatric readiness.[24,26] Yet, even when a small percentage of EDs participate, the impact on the overall median pediatric readiness score for the state is significant.[26] This is noteworthy, given that EDs with high levels of pediatric readiness demonstrated a fourfold reduction in pediatric mortality among critically ill patients when compared with EDs in the lowest quartile.[3] Additional research has linked the implementation of a recognition

program in Arizona to decreased mortality in pediatric patients in an interrupted time-series study.[27] More states are undertaking pediatric readiness recognition programs. This represents an important step forward. A universal standard for pediatric emergency care can and should be achieved.

Not surprisingly, this variability in system-level readiness has an impact on outcomes associated with common clinical conditions. Pediatric patients who experience out-of-hospital cardiac arrest have 2.2 times better odds of surviving if transported to a pediatric ED as opposed to a general ED.[28] Simulation-based research shows similar variability across pediatric-ready EDs in adherence to American Heart Association pediatric cardiac arrest guidelines and sepsis resuscitation guidelines.[29,30] While national guidelines call for decreased radiation exposure and dosing in children, adoption of standardized protocols to reduce radiation exposure in pediatric patients with non-traumatic abdominal pain and blunt head trauma remains variable at best.[31-35] Among children presenting with acute asthma exacerbations, community EDs have lower rates of corticosteroid administration and higher rates of unnecessary testing or treatments.[36,37] Racial inequities also have been well documented across the spectrum of pediatric emergency care, ranging from differences in recognition and treatment of pain, antibiotic prescribing, STI testing, and sepsis recognition.[38-42] Such racial inequities further exacerbate the disparities that already exist in pediatric emergency care.

Quality improvement efforts that focus on a systems-based approach to improving processes of care can have a significant impact on the care children receive in the ED. This has been demonstrated by a number of local and regional quality improvement collaboratives that have led not only to decreased variability in care over time across community EDs, but all also to greater adherence to evidence-based guidelines and improved outcomes for children. Moreover, through engagement in quality improvement strategies, community EDs have achieved standards of care that meet or even exceed those found in children's hospital EDs.[43-47] These quality improvement efforts suggest that the fundamental issues related to access, safety, variability, and overall quality of care can be addressed at the local level. (*See Table 1.*)

Barriers to Pediatric Readiness

Despite recent data linking pediatric readiness to increased survival in critically ill and injured children, the persistence of gaps in pediatric readiness is likely multi-factorial.[3,48] Regular ongoing exposure to certain conditions and/or types of encounters can help drive system-level improvements, yet encounters with critically ill children at low-volume EDs are relatively infrequent.[2] At any given site, critically ill children account for just 5% of all pediatric ED visits.[4] Thus, while healthcare teams at an individual ED may believe pediatric patients typically seek care elsewhere, collectively, the majority of children are evaluated in these lower-volume EDs. The presentation of a critically ill or injured pediatric patient may be viewed as both uncommon and a scenario for which poor outcomes may be accepted and even anticipated. Thus, system-level factors associated with those poor outcomes may be difficult to identify.

To date, there are no uniform, standard, pediatric-specific emergency care requirements for hospital licensing and accreditation.[49] High-end resources that include pediatric inpatient capabilities or subspecialty services would certainly be overly burdensome for hospitals with low-volume EDs to obtain. Yet, such resources are beyond the scope of pediatric readiness guidelines for EDs. Rather, the focus is on ED-specific recommendations to assist healthcare teams in stabilizing and managing critically ill and injured children safely and effectively. All EDs, including those with fewer resources, should be able to maintain standard levels of pediatric-specific resources. Yet, the presence of financial incentives for adult-specific conditions and lack of similar incentives for pediatric-specific conditions further widens the gap in pediatric and adult emergency care.[50] Standard financial incentives may be more easily enacted at the federal level through CMS, yet efforts at the state level (i.e., Medicaid) may be more variable. Unless widespread efforts are undertaken to promote improvements in emergency care for children, outcomes will remain subpar.

How to Improve Pediatric Readiness in Your ED

Since 2012, numerous efforts have been implemented to increase pediatric capabilities within the larger emergency care system. ACEP now includes pediatric readiness as one of its core organizational objectives. The AAP Section on Emergency Medicine offers an NPRP subcommittee to support ongoing efforts and collaboration, including through a national Community of Practice. The ENA has created state-level champions to support pediatric readiness efforts at state and regional levels and foster networking and support to local EDs. Lastly, the EMS for Children Innovation and Improvement Center (EIIC) has led two national quality improvement collaboratives to increase pediatric readiness in EDs. The first focused on developing state-level pediatric medical recognition programs to identify EDs that have taken efforts to ensure day-to-day readiness for children. The second, the Pediatric Readiness Quality Collaborative, supported ED physicians and nurses to implement local QI processes that include pediatric-specific metrics.

From July 2016 through December 2017, the EIIC worked with 14 state teams (CO, CT, DC, FL, IN, KS, KY, MI, NM, NY, OK, PA, SC, and TX) to develop pediatric readiness medical recognition programs. Such programs are akin to trauma, stroke, and STEMI systems. Through the assurance of system-level infrastructure requirements (i.e., pediatric readiness), patient outcomes can be improved.[3,48] Currently, 15 states offer pediatric medical recognition programs for EDs, and more are underway. Such programs provide a snapshot of pediatric emergency care capabilities across a state or region. In addition to decreasing mortality for critically ill and injured children, this information can help guide destination decisions for critical pediatric prehospital transports and support pediatric disaster planning and response efforts.

Table 3. Best Practices for Improving Pediatric Readiness	
Weight in Kilograms	**Patient Assessment**
• Scales that lock in kilograms • Staff education • Leadership support	• Badge buddies • Room charts • Pediatric supply cart • Color-coded wristbands • Supply exchange program with regional center • Staff education (in-services, 1:1 coaching), performance emails and reviews • Pediatric committees • Pediatric skills day • Monthly newsletter • Policy changes • Develop a core pediatric nurse internship • Empowering staff to speak up
Interfacility Transfers	**Disaster Preparedness**
• Transfer packets • Standardized feedback forms for receiving centers • Patient satisfaction surveys • Policy with transfer criteria for pediatric medical and trauma patients (based on site resources)	• Engaging with a regional coalition and pediatric annex • Communication modes: blast text messages • Downtime charts and quick triage forms • Triage tags • Tracking floaters and tracking forms • Pediatric go-bags to reduce stress • Electronic medical record disaster integration

Although few studies have linked pediatric readiness to patient-centered outcomes, even fewer have evaluated the impact of pediatric readiness on the quality of pediatric emergency care delivery: safe, effective, timely, patient-centered, efficient, and equitable. Beginning in 2018, the Pediatric Readiness Quality Collaborative, led by the EIIC, worked to improve pediatric readiness across participating EDs through the implementation of local quality improvement (QI) efforts. Physicians and nurses from 140 EDs across 17 states worked collaboratively to implement policies, procedures, and education targeting pediatric patient safety, assessment, interfacility transfers, and disaster planning. (*See Table 3.*) Collectively, the sites represented 1.5 million pediatric ED visits, 5% of all visits in the United States. The final results are still pending, but this was the first large-scale effort to measure the impact of pediatric readiness efforts on the quality of pediatric emergency care delivery. Until the correlation between pediatric readiness and quality of emergency care has been identified and highlighted within general, community EDs, improvements to the emergency care system for children are likely to remain slow and deprioritized in lieu of other well-defined financial and risk-adverse metrics.[50]

Additionally, multiple state and regional efforts have been implemented, including regional QI collaboratives, state chapter-led efforts to identify Pediatric Emergency Care Coordinators, and simulation and mobile outreach training programs to build pediatric competencies among staff.[51-53] Such efforts have shown that while ED patient volumes and locations are not changed easily, system-level pediatric readiness can be. The NPRP now is planning a follow-up pediatric readiness assessment to measure the impact of these many efforts on pediatric readiness across the United States. In late spring 2021, the HRSA-EMSC program in collaboration with AAP, ACEP, and ENA will launch a second national pediatric readiness assessment based on the 2018 guidelines. ED physicians and nurses can prepare now using the 2020 NPRP checklist and toolkit housed on the EIIC website: https://emscimprovement.center/domains/hospital-based-care/pediatric-readiness-project/readiness-toolkit/.

Special Considerations

The impact of COVID-19 has been widespread across the United States. Children represent a particularly vulnerable population in an already challenged system. While it is fortunate that the virus has had less of a direct impact on the health of children as compared to elderly, the indirect effects have been widespread. Barriers to accessing education, food, and healthcare have affected the overall wellbeing of children in the United States. Even prior to the COVID pandemic, behavioral health emergencies in children were of epidemic proportions.[1,54-57] Social isolation, direct and indirect effects of the virus on loved ones, and reduced access to mental health providers has negatively affected these children.[58] Rates of child maltreatment are on the rise.[59] Delays in seeking medical attention and lack of access to regular healthcare providers has the potential to worsen underlying disease states. Finally, children with complex medical histories may be especially at risk as exposure carries greater potential for clinical deterioration.[60-62] While the ED remains the nation's healthcare safety net, previously identified shortcomings in pediatric emergency care delivery are further exacerbated as EDs make efforts to adapt to this unpredictable and ever-changing environment.

The Department of Health and Human Services over the Office of the Assistant Secretary for Preparedness and Response recently funded two Pediatric Disaster Care Centers of Excellence: Eastern Great Lakes Pediatric Consortium for Disaster Response led by UH Rainbow Babies and Children's Hospital of Cleveland and the Western Region Alliance for

Table 4. Action Steps: Four Things That Can Be Done Today to Improve Pediatric Readiness

- Access the National Pediatric Readiness Project (NPRP) Toolkit: https://emscimprovement.center/domains/hospital-based-care/pediatric-readiness-project/readiness-toolkit/
- Ensure your hospital completes the NPRP Pediatric Readiness Assessment in 2021: pedsready.org
- Volunteer to be your emergency department's Pediatric Emergency Care Coordinator (PECC) or help to identify a good candidate.
- Integrate pediatric-specific metrics into your Quality Improvement processes.

Pediatric Emergency Management led by the University of California, San Francisco (UCSF) Health System and the UCSF Benioff Children's Hospitals.[63] The two centers are working collaboratively across their regions to affect disaster preparedness efforts for nearly 20 million children. This includes assessing regional pediatric readiness capabilities to better understand and enhance pediatric disaster planning efforts. Yet, our nation's response to a large-scale disaster necessarily depends on our ability to optimize emergency care for a single child.

Final Thoughts — A Call to Action

Over the last decades, emergency care providers have recognized opportunities to foster improvement in emergency care delivery. ED physicians and nurses play a critical role in advocating, implementing QI efforts, and fostering a culture that encourages engagement. Pediatric patients are at particularly high risk. Families expect emergency care for their children to be at least at the same level as that provided to the adult community. We each play a critical role in ensuring equity in healthcare and, specifically, universal access to high-quality pediatric emergency care. (*See Table 4.*)

References

1. McDermott KW, Stocks C, Freeman WJ. Overview of pediatric emergency department visits, 2015: Statistical brief #242. Agency for Healthcare Research and Quality (US); 2018.
2. Gausche-Hill M, Ely M, Schmuhl P, et al. A national assessment of pediatric readiness of emergency departments. *JAMA Pediatr* 2015;169:527-534.
3. Ames SG, Davis BS, Marin JR, et al. Emergency department pediatric readiness and mortality in critically ill children. *Pediatrics* 2019;144;e20190568.
4. Institute of Medicine. *Emergency Care for Children: Growing Pains*. The National Acacemies Press; 2007.
5. American Academy of Pediatrics, Committee on Pediatric Emergency Medicine; American College of Emergency Physicians, Pediatric Committee; Emergency Nurses Association Pediatric Committee. Joint Policy Statement — Guidelines for Care of Children in the Emergency Department. *Pediatrics* 2009;124: 1233-1243.
6. Remick K, Gausche-Hill M, Joseph MM, et al. Pediatric readiness in the emergency department. *Pediatrics* 2018;142:e20182459.
7. National Pediatric Readiness Project, EMSC, EIIC. https://emscimprovement.center/domains/hospital-based-care/pediatric-readiness-project/
8. Ray KN, Olson LM, Edgerton EA, et al. Access to high pediatric-readiness emergency care in the United States. *J Pediatr* 2018;194:225-232.e1.
9. Centers for Medicare & Medicaid Services. Critical Access Hospitals. https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/CAHs
10. Pilkey D, Edwards C, Richards R, et al. Pediatric readiness in critical access hospital emergency departments. *J Rural Health* 2019;35:480-489.
11. Sadovich J, Adirim T, Telford R, et al. Pediatric readiness in Indian Health Service and Tribal Emergency Departments: Results from the National Pediatric Readiness Project. *J Emerg Nurs* 2017;43:49-56.
12. Notrica DM, Weiss J, Garcia-Filion P, et al. Pediatric trauma centers: Correlation of ACS-verified trauma centers with CDC statewide pediatric mortality rates. *J Trauma Acute Care Surg* 2012;73: 566-572.
13. Potoka DA, Schall LC, Gardner MJ, et al. Impact of pediatric trauma centers on mortality in a statewide system. *J Trauma* 2000:237-245.
14. Potoka DA, Schall LC, Ford HR, et al. Improved functional outcome for severely injured children treated at pediatric trauma centers. *J Trauma* 2001;51:824-834.
15. Hall JR, Reyes HM, Meller JL, et al. The outcome for children with blunt trauma is best at a pediatric trauma center. *J Pediatr Surg* 1996;31:72-77.
16. Dreyfus J, Flood A, Cutler G, et al. Comparison of pediatric motor vehicle collision injury outcomes at Level I trauma centers. *J Pediatr Surg* 2016;51:1693-1699.
17. Webman RB, Carter EA, Mittal S, et al. Association between trauma center type and mortality among injured adolescent patients. *JAMA Pediatr* 2016;170:780-786.
18. Sathya C, Alali AS, Wales PW, et al. Mortality among injured children treated at different trauma center types. *JAMA Surgery* 2015;150:874-881.
19. Remick K, Gaines B, Ely M, et al. Pediatric emergency department readiness among US trauma hospitals. *J Trauma Acute Care Surg* 2019;86:803-809.
20. Genovese TJ, Roberts-Santana C, Wills H. Pediatric trauma readiness: A trauma-specific assessment to complement the National Pediatric Readiness Project. *Pediatr Emerg Care* 2020. doi:10.1097/PEC.0000000000002144. [Online ahead of print].
21. MacKenzie EJ, Rivara FP, Jurkovich GJ, et al. A national evaluation of the effect of trauma-center care on mortality. *N Engl J Med* 2006;354:366-378.
22. Heidenreich PA, Zhao X, Hernandez AF, et al. Impact of an expanded hospital recognition program for heart failure quality of care. *J Am Heart Assoc* 2014;3:e000950.
23. Heidenreich PA, Zhao X, Hernandez AF, et al. Impact of an expanded hospital recognition program for stroke quality of care. *J Am Heart Assoc* 2017;6:e004278.
24. Remick K, Kaji AH, Olson L, et al. Pediatric Readiness and facility verification. *Ann Emerg Med* 2016;67:320-328.e1.
25. National EMSC Data Analysis Resource Center. National Pediatric Readiness Project Assessment; 2013.
26. Whitfill TM, Remick KE, Olson LM, et al. Statewide pediatric facility recognition programs and their association with pediatric readiness in emergency departments in the United States. *J Pediatr* 2020;218:210-216.e2.
27. Rice A, Dudek J, Gross T, et al. The impact of a pediatric emergency department facility verification system on pediatric mortality rates in Arizona. *J Emerg Med* 2017;52:894-901.

28. Michelson KA, Hudgins JD, Monuteaux MC, et al. Cardiac arrest survival in pediatric and general emergency departments. *Pediatrics* 2018;141:e20172741.

29. Auerbach M, Brown L, Whitfill T, et al. Adherence to pediatric cardiac arrest guidelines across a spectrum of fifty emergency departments: A prospective, in situ, simulation-based study. *Acad Emerg Med* 2018;25:1396-1408.

30. Kessler DO, Walsh B, Whitfill T, et al. Disparities in adherence to pediatric sepsis guidelines across a spectrum of emergency departments: A multicenter, cross-sectional observational in situ simulation study. *J Emerg Med* 2016;50:403-415.e3.

31. Strauss KJ, Goske MJ. Estimated pediatric radiation dose during CT. *Pediatr Radiol* 2011;41(Suppl 2):472-482.

32. Furlow B. Radiation protection in pediatric imaging. *Radiol Technol* 2011;82: 421-439.

33. Niles LM, Goyal MK, Badolato GM, et al. US emergency department trends in imaging for pediatric nontraumatic abdominal pain. *Pediatrics* 2017;140:e20170615.

34. Mannix R, Bourgeois FT, Schutzman SA, et al. Neuroimaging for pediatric head trauma: Do patient and hospital characteristics influence who gets imaged? *Acad Emerg Med* 2010;17:694-700.

35. Burstein B, Upton JEM, Terra HF, Neuman MI. Use of CT for head trauma: 2007-2015. *Pediatrics* 2018;142:e20180814.

36. Bekmezian A, Hersh AL, Maselli JH, Cabana MD. Pediatric emergency departments are more likely than general emergency departments to treat asthma exacerbation with systemic corticosteroids. *J Asthma* 2011;48:69-74.

37. Chamberlain JM, Teach SJ, Hayes KL, et al. Practice pattern variation in the care of children with acute asthma. *Acad Emerg Med* 2016;23:166-170.

38. Goyal MK, Kuppermann N, Cleary SD, et al. Racial disparities in pain management of children with appendicitis in emergency departments. *JAMA Pediatr* 2015;169: 996-1002.

39. Goyal MK, Johnson TJ, Chamberlain JM, et al. Racial and ethnic differences in emergency department pain management of children with fractures. *Pediatrics* 2020;145:e20193370.

40. Goyal MK, Johnson TJ, Chamberlain JM, et al. Racial and ethnic differences in antibiotic use for viral illness in emergency departments. *Pediatrics* 2017;140:e20170203.

41. Goyal MK, Hayes KL, Mollen CJ. Racial disparities in testing for sexually transmitted infections in the emergency department. *Acad Emerg Med* 2012;19:604-607.

42. Raman J, Johnson TJ, Hayes K, Balamuth F. Racial differences in sepsis recognition in the emergency department. *Pediatrics* 2019;144:20190348.

43. Homer CJ, Forbes P, Horvitz L, et al. Impact of a quality improvement program on care and outcomes for children with asthma. *Arch Pediatr Adolesc Med* 2005;159:464-469.

44. Walls TA, Hughes NT, Mullan PC, et al. Improving pediatric asthma outcomes in a community emergency department. *Pediatrics* 2017;139:e20160088.

45. Kaiser SV, Johnson MD, Walls TA, et al. Pathways to improve pediatric asthma care: A multisite, national study of emergency department asthma pathway implementation. *J Pediatr* 2020;223:100-107.e2.

46. Nigrovic LE, Stack AM, Mannix RC, et al. Quality improvement effort to reduce cranial CTs for children with minor blunt head trauma. *Pediatrics* 2015;136:e227-e233.

47. Rutman L, Klein EJ, Brown JC. Clinical pathway produces sustained improvement in acute gastroenteritis care. *Pediatrics* 2017;140:e20164310.

48. Balmaks R, Whitfill TM, Ziemele B, et al. Pediatric readiness in the emergency department and its association with patient outcomes in critical care. *Pediatr Crit Care Med* 2020;21:e213-e220.

49. Greenfield D, Pawsey M, Hinchcliff R, et al. The standard of healthcare accreditation standards: A review of empirical research underpinning their development and impact. *BMC Health Serv Res* 2012;12:329.

50. Centers for Medicare & Medicaid Services. Hospital Readmission Reduction Program (HRRRP). https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/value-based-programs/hrrp/hospital-readmission-reduction-program

51. Auerbach M, Roney L, Aysseh A, et al. In situ pediatric trauma simulation: Assessing the impact and feasibility of an interdisciplinary pediatric in situ trauma care quality improvement simulation program. *Pediatr Emerg Care* 2014;30:884-891.

52. Abulebda K, Lutfi R, Whitfill T, et al. A collaborative in situ simulation-based pediatric readiness improvement program for community emergency departments. *Acad Emerg Med* 2018;25:177-185.

53. Whitfill T, Gawel M, Auerbach M. A simulation-based quality improvement initiative improves pediatric readiness in community hospitals. *Pediatr Emerg Care* 2018;34:431-435.

54. Thomas KC, Ellis AR, Konrad TR, et al. County-level estimates of mental health professional shortage in the United States. *Psychiatric Services* 2009;60:1323-1328.

55. Rogers SC, Mulvey CH, Divietro S, Sturm J. Escalating mental health care in pediatric emergency departments. *Clin Pediatr* 2017;56:488-491.

56. Mahajan P, Alpern ER, Grupp-Phelan J, et al. Epidemiology of psychiatric-related visits to emergency departments in a multicenter collaborative research pediatric network. *Pediatr Emerg Care* 2009;25: 715-720.

57. Lo CB, Bridge JA, Shi J, et al. Children's mental health emergency department visits: 2007-2016. *Pediatrics* 2020;145: e201915236.

58. Lee J. Mental health effects of school closures during COVID-19. *Lancet Child Adolesc Health* 2020;4:421.

59. Rosenthal CM, Thompson LA. Child Abuse Awareness Month during the coronavirus disease 2019 pandemic. *JAMA Pediatr* 2020;174:812.

60. American Academy of Pediatrics Council on Children with Disabilities. Care coordination in the medical home: Integrating health and related systems of care for children with special health care needs. *Pediatrics* 2005;116:1238-1244.

61. Bramlett MD, Read D, Bethell C, Blumberg SJ. Differentiating subgroups of children with special health care needs by health status and complexity of health care needs. *Matern Child Health J* 2009;13: 151-163.

62. Mehrotra A, Chernew M, Linetsky D, et al. The impact COVID-19 pandemic outpatient visits: Adapting new normal. The Commonwealth Fund. June 25, 2020. https://www.commonwealthfund.org/publications/2020/jun/impact-covid-19-pandemic-outpatient-visits-practices-adapting-new-normal

63. HHS/ASPR Press Office. HHS Awards $6 million to create pediatric disaster care centers of excellence. Sept. 30, 2019. https://www.phe.gov/Preparedness/news/Pages/pdcc-award-30sept19.aspx

64. Emergency Department Pediatric Performance Measures Toolkit. EMSC • EIIC. https://emscimprovement.center/education-and-resources/toolkits/emergency-department-pediatric-performance-measures-toolbox/

CME/CE Questions

1. Pediatric readiness of emergency departments (EDs) refers to which of the following?
   a. Availability of pediatric equipment and supplies to meet the needs of children of all ages
   b. Maintenance of pediatric-specific competencies among staff

CME/CE INSTRUCTIONS

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   c. The systemic inclusion of pediatric-specific needs into all aspects of ED care
   d. Inclusion of pediatric tools and integration of family-centered care in interactions with pediatric patients

2. Of the 30 million children who seek emergency care every year, what percentage are evaluated in general EDs?
   a. 25%
   b. 40%
   c. 50%
   d. 80%

3. The National Pediatric Readiness Project is a joint quality improvement effort designed to do which of the following?
   a. Support EDs and emergency medical services agencies to ensure access to high-quality emergency care for all children regardless of geographic location
   b. Integrate pediatric needs into regional disaster plans
   c. Derive pediatric evidence-based guidelines for use by EDs
   d. Ensure all EDs are using the most up-to-date evidence-based guidelines for the care of children

4. Approximately what percentage of children in the United States have access to a pediatric-ready ED within 30 minutes?
   a. 10%
   b. 35%
   c. 55%
   d. 75%

5. What are two of the most effective ways to ensure an ED is pediatric ready?
   a. Maintaining board certification and identifying a Pediatric Emergency Care Coordinator
   b. Integrating children into an overarching quality improvement plan and integrating pediatric needs into the disaster plan
   c. Maintaining board certification and integrating children into an overarching quality improvement plan
   d. Identifying a Pediatric Emergency Care Coordinator and integrating children into an overarching quality improvement plan

6. When comparing patients ages 0-17 years who are cared for at adult trauma centers vs. pediatric trauma centers, those seen at pediatric trauma centers have which of the following?
   a. Easy access to their regional pediatric center
   b. Increased morbidity and mortality
   c. Decreased morbidity and mortality
   d. Equivalent outcomes

7. The 2013 National Pediatric Readiness Project (NPRP) assessment demonstrated significant disparities in pediatric readiness across the United States. Which of the following is true?
   a. Regional pediatric referral centers are pediatric ready, and all initial patient visits should be directed to these facilities.
   b. Level I trauma centers demonstrated universal pediatric readiness.
   c. Children in rural and remote areas have decreased access to pediatric-ready EDs compared to their urban and suburban counterparts.
   d. Indian Health Service and tribal EDs were not included in pediatric readiness efforts.

8. Which of the following is true of funding through the Emergency Medical Services for Children Act?
   a. It supports programs in pediatric prehospital and ED care as well as large research collaboratives.
   b. It is funded at about $100 million per year.
   c. It moved all pediatric readiness efforts to state block grants.
   d. It was started in 1964.

9. Pediatric medical recognition programs are generally:
   a. part of The Joint Commission accreditation guidelines.
   b. federally mandated.
   c. important to participate in to ensure Centers for Medicare and Medicaid Services reimbursement.
   d. voluntary state-wide partnerships designed to enhance pediatric emergency care.

10. Which of the following is an enabler to pediatric emergency readiness in general ED settings?
    a. Frequency of pediatric resuscitations
    b. Financial incentives for pediatric-specific conditions
    c. Engagement of emergency care physicians and nurses
    d. Regulatory and hospital licensing requirements for pediatric readiness

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EMERGENCY MEDICINE REPORTS

Pediatric Readiness: A Safeguard for Emergency Department Patients and Providers

Top 15 Pediatric Emergency Care Metrics[64]

Measure	Potential Action Steps	Potential Impact	IOM Quality Domain
Initial Care for Every Emergency Department Patient			
• Measuring weight in kilograms for patients < 18 years of age to prevent medication errors • Presence of a method to identify age-based abnormal pediatric vital signs	• Obtain scales that lock in kilograms and weigh all patients using this equipment • Enact an EMR-based vital sign screening tool using age-based normal values	• Decrease medication dosing errors • Early recognition of the critically ill child	• Effective, Safe • Effective, Safe
Emergency Department Infrastructure and Personnel			
• Pediatric equipment in the ED • Presence of on-site pediatric coordinator(s)	• Perform regular audits of the stockroom using national checklist to ensure the presence of all essential pediatric resuscitation equipment • Identify a physician and/or nurse PECC from your ED staff to ensure inclusion of pediatric needs in local policies and practices	• Minimize time to critical interventions • Decrease system-level gaps in pediatric emergency care delivery	• Effective, Safe • Effective, Safe, Patient Centered
Patient-Centered Emergency Department Care			
• Parent/caregiver understanding of discharge instructions	• Obtain pediatric-specific patient-facing discharge instructions and enact a policy to review all instructions with patients prior to discharge	• Minimize misunderstanding of diagnosis and treatment	• Effective, Safe, Patient Centered
Emergency Department Flow			
• Door-to-provider time • Total length of stay (LOS)	• Track pediatric specific door-to-provider times. Enact a QA process to ensure door-to-provider times are as short as possible • Track pediatric specific LOS according to reasonable benchmark. Enact policies to ensure timely transfer when indicated	• Minimize duration of pain and delays in diagnosis • Reduce LOS for patients with a clear disposition. Reduce time to transfer when indicated.	• Timely, Patient Centered • Efficient, Patient Centered
Pain and Sedation			
• Reducing pain in children with acute fractures	• Ensure pediatric patients with fractures receive timely pain medication — consider adopting an intranasal analgesic protocol	• Minimize duration of pain in patients with orthopedic injuries	• Effective, Timely, Patient Centered

(*continued*)

Top 15 Pediatric Emergency Care Metrics[64] (*continued*)

Measure	Potential Action Steps	Potential Impact	IOM Quality Domain
Trauma			
• Children with minor head trauma receiving a head CT scan • Protocol for suspected child abuse in place	• Utilize low-risk criteria to identify patients with blunt head trauma who can be safely managed without a head CT • Employ an automated EMR-based tool or clinical protocol to help identify suspected child abuse	• Reduce unnecessary exposure to ionizing radiation • Minimize missed opportunities to detect suspected child abuse	• Safe, Efficient • Effective, Safe
Respiratory Diseases			
• Systemic corticosteroids in asthma patients with acute exacerbation • Evidence-based guideline for bronchiolitis	• Enact a policy to ensure asthma patients receive steroids within 60 minutes of arrival when indicated • Use an evidence-based guideline for bronchiolitis care to guide the use of diagnostic tests and treatments	• Reduce length of stay and need for admission for patients with asthma exacerbations • Minimize the routine use of non-beneficial tests (i.e., chest X-ray) and treatments (i.e., bronchodilators)	• Effective • Effective, Efficient
Childhood Infections			
• Reducing antibiotic use in children with viral illnesses	• Use evidence-based guidelines regarding the use of antibiotics for common pediatric conditions	• Reduce potentially unnecessary antibiotic prescription rates for viral illnesses	• Effective, Efficient
Quality and Safe Care for All Patients			
• Return visits within 48 hours resulting in admission • Medication error rates	• Enact a quality assurance process to review return visits that result in admission and address contributing factors • Perform case reviews of all pediatric medication errors to identify and mitigate contributing factors	• Minimize "bounce-back" ED visits that result in admissions • Reduce medication errors by enacting system-based safeguards	• Effective • Safe

IOM = Institute of Medicine; ED = emergency department; PECC = pediatric emergency care coordinators; QA = quality assurance; CT = computed tomography

Adapted from the work of Evaline Alessandrini, Principal Investigator, and colleagues as part of the EMS for Children Targeted Issues grant titled: Defining Quality Performance Measures for Pediatric Emergency Care (2007-2009) and summarized in the manuscript: 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;18:519-526.

Fast Facts: Making the Case for Pediatric Readiness

- Overall median readiness score: 69 out of 100 (pediatric EDs 96 out of 100)[2]
- Critically ill children evaluated among the highest quartile of pediatric-ready EDs have as much as a fourfold reduction in mortality compared with the lowest quartile of pediatric-ready EDs[3]
- Trauma centers: increased morbidity and mortality for injured children treated at adult trauma centers compared to pediatric-specific trauma centers[12-18]
- Critical access hospitals & Indian Health Service: 61/100, eight points lower than the national average[10,11]
- Access: 55% of children live within 30 minutes of a pediatric-ready ED
- Nine out of 10 children live closer to a local ED than to their regional pediatric-ready ED[8]
- Quality improvement: 45% of EDs track pediatric-specific quality measures[2]
- Disaster readiness: less than 50% of EDs include the needs of children in the disaster plan[2]

Best Practices for Improving Pediatric Readiness

Weight in Kilograms	Patient Assessment
• Scales that lock in kilograms • Staff education • Leadership support	• Badge buddies • Room charts • Pediatric supply cart • Color-coded wristbands • Supply exchange program with regional center • Staff education (in-services, 1:1 coaching), performance emails and reviews • Pediatric committees • Pediatric skills day • Monthly newsletter • Policy changes • Develop a core pediatric nurse internship • Empowering staff to speak up
Interfacility Transfers	**Disaster Preparedness**
• Transfer packets • Standardized feedback forms for receiving centers • Patient satisfaction surveys • Policy with transfer criteria for pediatric medical and trauma patients (based on site resources)	• Engaging with a regional coalition and pediatric annex • Communication modes: blast text messages • Downtime charts and quick triage forms • Triage tags • Tracking floaters and tracking forms • Pediatric go-bags to reduce stress • Electronic medical record disaster integration

Action Steps: Four Things That Can Be Done Today to Improve Pediatric Readiness

- Access the National Pediatric Readiness Project (NPRP) Toolkit: https://emscimprovement.center/domains/hospital-based-care/pediatric-readiness-project/readiness-toolkit/
- Ensure your hospital completes the NPRP Pediatric Readiness Assessment in 2021: pedsready.org
- Volunteer to be your emergency department's Pediatric Emergency Care Coordinator (PECC) or help to identify a good candidate
- Integrate pediatric-specific metrics into your Quality Improvement processes

Supplement to *Emergency Medicine Reports*, October 15, 2020: "Pediatric Readiness: A Safeguard for Emergency Department Patients and Providers." Authors: Katherine E. Remick, MD, Emergency Medical Services for Children Innovation and Improvement Center, Department of Pediatrics, Dell Medical School at the University of Texas at Austin; Department of Surgery and Perioperative Medicine, Dell Medical School at the University of Texas at Austin; Stephen Janofsky, MD, Department of Pediatrics, University of Pittsburgh School of Medicine, Division of Emergency Medicine, Children's Hospital of Pittsburgh, PA.