Pediatric Emergency Care Council

COUNCIL MEETING MINUTES

Thursday, November 15, 2018 ● 11:00 a.m. Eastern Time

CALL TO ORDER / CALL ROLL / APPROVE AGENDA

Members Present
Michelle Bailey (FL)
Victoria Barnes (NH)
Tracy Cleary (KS)
Jeff Doyle (MA)
Dave Edwards (VA)
Rachel Ford (OR)
Deb Hummel (IA)
Erica Kane (WI)
Corolla Lauck (SD)
Crystal Mallory (DE)
Kripa Patel (AR)
Rhonda Phillippi (TN)
Xenya Poole (ID)
Carolina Roberts-Santana (RI)
Morgan Scaggs (KY)
Tomi St. Mars (AZ)
Jolene Whitney (UT)

Others Present
Rachael Alter (NASEMSO/EIIC)
Kate Copeland (TN)
Phyllis Hendry (FL)
Dr. Kate Remick (EIIC)
Rich Wisniewski (SC)

SECRETARY'S REPORT – *Karen Moore (SC)*

- No full Council minutes to approve

PRESENTATION – *Dr. Kate Remick*

- *Pediatric Readiness in the Emergency Department, October 2018*
  - Changes/Updates made to the 2009 version
- Slides presented are attached
- Article also attached

CHAIR'S REPORT – *Morgan Scaggs (KY)*

- Government Information Committee
  - **H.R. 6748**, **S. 3482**, EMSC Program Reauthorization Act of 2018
  - **HR 2801**, **S 1666**, HOT Cars Act of 2017
- EIIC State Partners Call
  - Met mid-October
  - Requests to let Morgan know what support is needed from partner organizations
- NASEMSO Board Meetings
  - Focused on the Strategic Plan
  - Next meeting, December 13th
  - Draft agenda for the May meeting
    - Council meetings Mon-Tues
    - Committee meetings on Wedensday
  - Recommendations out of NEMSMA (degree requirements) – no recommendations yet from the Board
- 2018 National EMS Scope of Practice Model
  - https://nasemso.org/projects/ems-scope-of-practice/

Pediatric Emergency Care Council

COUNCIL MEETING MINUTES

NASEMSO/EIIC REPORT – *Rachael Alter*

- NHTSA National EMS Projects of Significance, Year 3
  - Exteneded corrobartive agreement, signed October 2018
    - Task 1 – Redoing 2011 National EMS Assessment. Updated questions being review by NHTSA (will not be as long as original)
    - Task 2 – Assess state status' of Time Sensitive Emeregenices Systems of Care
- Prehospital PECC Learning Collaborative
  - HRSA funded collaborative
  - 9 states participating
  - Completion date is March 31, 2019
- HRSA: Critical Crossroads: Improving Emergency Care for Children in Mental Health Crisis
  - Focus is hospital domain, but hopefully to encompass the continuum of care
  - Keith Wages attended as NASEMSO rep
  - Tomi St. Mars attened meeting representing EMSC managers
    - Nursing was not engaged in the development of the toolkit
    - Document has not been finalized, nor published
    - *What does the medical behavioral health system look like in your state?*

DISCUSSION ITEMS

Old Business

- ACTION ITEM: Prehospital PECC Resolution
  - NASEMSO staff provided feedback on the current version. Rachael will send revisions to the workgroup. Will have a final version for Council approval at the December meeting.
- Planning for Pediatric Crosswalk - EMS 2050
  - Work session time at the Spring meeting
  - Workgroup:
    - Tracy wll send out email with responses requested by Monday, Nov 26th
    - Call the first week of December to get a plan going

New Business

- Updates on Incoming and Outgoing Members
  - Outgoing/Departed:
    - Amy Keller (ND)
    - Kari Hancock (VT)
    - Joe Santos (TX)
    - Sean Caffery (CO)
    - Justin Allen (MI)
  - Incoming
    - Debbie Hummel (IA)
    - Michelle Bailey (FL)
    - Marc Minkler (ME)
    - Misty Jones (MO)
- Spring Meeting Agenda
  - Possible Topics
    - Tracy - Pediatric Mental Health
    - Morgan - Support Document of EMS2015 (work session)
    - Jolene - Utah Pediatric Trauma Network (Joint Session)

        - Victoria - EMS role in pediatric sepsis (guidelines and suggestions)
    - Format (allowing for working sessions)
    - Workgroup:
        - Tracy will send out email with responses requested by Monday, Nov 26th
        - Set a call time separate from the next PEC Council call
- Committee Vacancies
    - Carolina will send out an email to assess for interest to fill openings on;
        - CP-MIH, Lead
        - Emerging Systems of Care, Lead
        - NAEMSP Ped Committee, Alternate
    - Description of committees to be included in the email request
- Safe Transport Issue – misuse of Interim Guidance
    - Options to respond to misinformation being sent out on listserv
        - Going across listserv at that time citing data and knowledge
        - PEC Council sending STC a letter
        - Identifying source and giving them the contact info for EMSC program
        - Reach out to Eric Hicken and Katherine Schafer

Reports

- **Regional Reports (Fall Meeting Updates)**
    - East – *Dave Edwards (VA)*
        - Meeting regularly, lots of information
    - South – *Billie Collier (MS)*
        - No report
    - Western Plains – *Robin Suzor (MT)*
        - No report
    - Great Lakes – *Kjelsey Polzin (MN)*
        - Nothing to report
    - West – *Xenya Poole (ID)*
        - Nothing to report

- **NASEMSO Committee Reports**
    - **AVL –** *Eric Hicken (NJ)*
        - No report
    - **Safe Transport of Children -** *Eric Hicken (NJ)*
        - Eric and Dave have been approved to spend some monies on testing
    - **CP/MIH –** alt – *Debbie Kuhn (NE)*
        - No report
    - **Education** – *Victoria Barnes (CT)*
        - Nothing to report
    - **Emerging Systems of Care** – alt - *Victoria Barnes (CT)*
        - Nothing to report
    - **Health & Medical Preparedness Council –** *Dave Edwards (VA)*
        - Meeting regularly, nothing new to report

- **HITS –** *Jolene Whitney (UT)*
  - Nothing new to report
- **Rural EMS Committee/JCREC –** *Amanda Broussard (LA)*
  - No report
- **Program Committee –** *Jolene Whitney (UT)*
  - Nothing new to report

- **Liaison Reports**
  - **AAP COPEM –** *Cyndy Wright-Johnson (MD)*
    - Highlights from the AAP COPEM Summer and Fall Work:
      - Peidatric Readiness in Emergency Departments released (attached)
      - The NEW policy statement : Pediatric Prehospital Readiness (Joint AAP COPEM, AAP SOEM, ACEP, ENA, NAEMSP, NAEMT) has been approved and is going to the respective Boards for final approval and publication. The Technical report companion document final draft is ready for peer review and will be sent out for final comments to be incorporated at the December 2018 AAP COPEM meeting.
    - Advocacy Discussion:
      - Airplane Kit Act Update – Congress passed the Airplane Kit Act as part of the FAA Reauthorization in September 2018. This will require the emergency medical kits on airplanes will be updated to include supplies for children.
      - EMSC Reauthorization Update - With the retirement of Senator Orin Hatch, the AAP and others are hoping to have the reauthorization done while he is still in office. The bill is join Senate and House and is bipartisan. EMSC Program Reauthorization Act – would reauthorize for five more years starting in 2019. The funding level proposed is for the current funding level of $22.34 million.
  - **AAP SOEM –** *Robin Suzor (MT)*
    - No report
  - **AAP PEPP Steering Committee** – *Corolla Lauck (SD)*
    - 4th Edition of PEEP
    - Meeting workshop in February
  - **NAEMSP Pediatric Committee** – *Tomi St. Mars (AZ)*
    - Nothing new to report
  - **NPCD –** *Carolina Roberts-Santana (RI)*
    - Meeting in NOLA at the end of November 2018
    - Some listservs of interest for this group include:
      - SchoolSafetyInfo.org resources for safer kids
      - Disaster Mental Health Response for Children (3rd Edition)
      - Introducing Stop the Bleed to the EMSC Community
      - Violence and Active Shooter
      - Wildfire Resources for Children and Families from the National Child Traumatic Stress Network

- Wildfires: Tips for Parents on Media Coverage (En Español)
- After a Crisis: Helping Young Children Heal
- Age-Related Reactions to a Traumatic Event
- Unintentional injury data sources where do you find national, state and local childhood unintentional injury death, hospitalization, ER, etc. data – Oct 24 at 1:00pm
- Safe sleep and sleep suffocation prevention showcasing details of two successful CA local program best practice programs – Nov 6 at 10:00am

- **EIIC PRQC -** *Cyndy Wright-Johnson (MD)*
- **EIIC Pediatric Readiness Steering Committee** – *Morgan Scaggs (KY)*
  - Nothing to report
- **EIIC Pediatric PECC Learning Collaborative Advisory Committee –** *Tracy Cleary (KS)*
  - Meeting later today, project moving forward nicely
- **NHTSA Improving Prehospital Trauma Care Federal Register Notice -** *Victoria Barnes (CT)*
  - Nothing new to report

Adjourn

Next Meeting:

Full PEC Council Meeting - Thursday, December 13, 2018 – 11:00am to 12:30pm EST

2018 Pediatric Readiness in the Emergency Department

POLICY STATEMENT Organizational Principles to Guide and Define the Child Health Care System and/or Improve the Health of all Children

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Pediatric Readiness in the Emergency Department

Katherine Remick, MD, FAAP, FACEP, FAEMS,[a,b,c] Marianne Gausche-Hill, MD, FAAP, FACEP, FAEMS,[d,e,f] Madeline M. Joseph, MD, FAAP, FACEP,[g,h] Kathleen Brown, MD, FAAP, FACEP,[i] Sally K. Snow, BSN, RN, CPEN,[j] Joseph L. Wright, MD, MPH, FAAP,[k,l] AMERICAN ACADEMY OF PEDIATRICS Committee on Pediatric Emergency Medicine and Section on Surgery, AMERICAN COLLEGE OF EMERGENCY PHYSICIANS Pediatric Emergency Medicine Committee, EMERGENCY NURSES ASSOCIATION Pediatric Committee

1. Administration and Coordination
2. Physicians, Nurses, and Other Healthcare Providers
3. Quality Improvement
4. Policies, Procedures, and Protocols
5. Patient and Medication Safety
6. Support Services
7. Equipment, Supplies, and Medications

Pediatric Readiness in the ED: What's New?

- Pediatric Emergency Care Coordinators
  - Emphasis on collaboration between nurse and physician PECC
    - APP could share the physician PECC role if limited resources
  - Ideal qualifications for PECC
    - Board certified in PEM or EM
    - Certified Pediatric Emergency Nurse or Certified Emergency Nurse
  - Suggested responsibilities outlined
    - Liaison to referral sites, in-hospital and out-of-hospital entities
    - Communication with ED leadership and hospital administrative leadership regarding pediatric emergency care
    - Education, QI, competencies, policies, adequate equipment and supplies

Pediatric Readiness in the ED: What's New?

- Pediatric competencies to be **maintained** by all ED providers
  - Continuing education
  - Simulation/mock codes
  - National conferences
- Pediatric competencies can be **evaluated** in a number of ways
  - Chart reviews
  - Direct observation
  - Written knowledge tests
  - Maintenance of national certification when PEM is a significant component

Pediatric Readiness in the ED: What's New?

- Potential pediatric competencies areas highlighted
  - Pediatric assessment
  - Medication administration
  - Device/equipment safety
  - Clinical procedures
  - Resuscitation
  - Trauma resuscitation/stabilization
  - Disaster drills
  - Family and patient-centered care
  - Team training

Pediatric Readiness in the ED: What's New?

- Pediatric emergency care quality improvement
  - Discussion of structure => process => outcome
  - At minimum, QI requires data collection and analysis => intervention => re-assessment for improvement
  - Target system-level changes and measure system performance over time
  - Emphasis on continuum of care

Pediatric Readiness in the ED: What's New?

- Pediatric emergency care quality metrics
  - PEM metrics (Alessandrini et al)
  - Performance bundles based on specific conditions (sepsis, head injury, etc.)

Pediatric Readiness in the ED: What's New?

- Key policies and procedures:
  - Full set of vital signs: HR, RR, Temp, BP, pulse ox, pain, and mental status
  - Sedation and analgesia
  - Behavioral and social health
  - Child maltreatment
  - Family-centered care
  - Children with special healthcare needs
  - Communication with medical home/lack of medical home
  - Telehealth
  - Disaster preparedness
  - Inter-facility transfers

Pediatric Readiness in the ED: What's New?

- Heightened vigilance regarding pediatric patient *and* medication safety
  - All children should be weighed in kilograms only (length-based tape only if need for immediate stabilization)
  - Integration of technology (CPOE, clinical decision support tools)
  - Recognition of medication administration as "high risk"
  - Distraction free zones, and 2-provider cross check
  - Standard formularies and medication concentrations
  - Pre-calculated drug dosing
  - Integration of family-centered care, shared decision making

Pediatric Readiness in the ED: What's New?

- Support Services
  - Weight-based radiation dosing
  - Transfer or sharing of imaging between facilities

Pediatric Readiness in the ED: What's New?

- Equipment and Supplies
  - Recommendations specific to high-volume EDs
    - Central catheters, chest tubes, umbilical vein catheters
    - Lumbar puncture trays
    - Non-invasive ventilation
    - Video laryngoscopy
    - Hypothermia thermometers
    - Rarely used medications (prostaglandin, milrinone)
    - 00 Laryngoscope blade

Next National Re-Assessment… Coming in 2020



www.pedsready.org

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This is a revision of the previous joint Policy Statement titled "Guidelines for Care of Children in the Emergency Department." Children have unique physical and psychosocial needs that are heightened in the setting of serious or life-threatening emergencies. The majority of children who are ill and injured are brought to community hospital emergency departments (EDs) by virtue of proximity. It is therefore imperative that all EDs have the appropriate resources (medications, equipment, policies, and education) and capable staff to provide effective emergency care for children. In this Policy Statement, we outline the resources necessary for EDs to stand ready to care for children of all ages. These recommendations are consistent with the recommendations of the Institute of Medicine (now called the National Academy of Medicine) in its report "The Future of Emergency Care in the US Health System." Although resources within emergency and trauma care systems vary locally, regionally, and nationally, it is essential that ED staff, administrators, and medical directors seek to meet or exceed these recommendations to ensure that high-quality emergency care is available for all children. These updated recommendations are intended to serve as a resource for clinical and administrative leadership in EDs as they strive to improve their readiness for children of all ages.

INTRODUCTION

In this Policy Statement, we delineate the recommended resources necessary to prepare emergency departments (EDs) to care for pediatric patients. Adoption of the recommendations in this Policy Statement will facilitate the delivery of emergency care for children of all ages and, when appropriate, timely transfer to a facility with specialized pediatric services. This joint Policy Statement is an update of previously published guidelines.[1–4]

abstract

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Drs Gausche-Hill, Remick, Joseph, Brown, and Wright and Ms Snow were each responsible for all aspects of writing and editing the document and reviewing and responding to questions and comments from reviewers and the Board of Directors; and all authors approved the final manuscript as submitted.

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These recommendations are intended to apply to all EDs that provide care for children. In the United States, most children who seek emergency care (83%) present to general EDs versus specialized pediatric EDs.[5] Intended users of these recommendations include all EDs that are open 24 hours per day, 7 days per week, including freestanding EDs and critical access hospital EDs. This Policy Statement is not intended to address urgent care centers because other recommendations are available to address those settings.[6]

BACKGROUND

In the National Hospital Ambulatory Medical Care Survey, it was reported that in 2014, there were approximately 5000 EDs in the United States. Of the more than 141 million ED visits in the United States in 2014, approximately 20% were for children younger than 15 years old.[7] Children have unique anatomic, physiologic, developmental, and medical needs that differ from those of adults. These differences must be considered when developing emergency services, training ED staff, and stocking equipment, medication, and supplies.

Improving Pediatric Readiness in US EDs

In 2006 in the "Future of Emergency Care" series, the Institute of Medicine (IOM) (now the National Academy of Medicine) noted ongoing deficiencies in both the prehospital and ED settings, including the availability of pediatric equipment, access to supplies and medications, training for staff, and policies in which the unique needs of children are incorporated.[8] Although there have been marked improvements in many areas of everyday pediatric readiness, persistent variability and a need for improvement remain across the continuum of care.[5,9–12]

One of the specific recommendations from the 2006 IOM report was that hospitals appoint coordinators for pediatric emergency care. At that time, only 18% of EDs in the United States reported having a physician coordinator, and only 12% had a nursing coordinator for pediatric emergency care. A national assessment performed in 2003[13] revealed that EDs that have staff in these positions tend to be more prepared, as measured by using compliance with the "Guidelines for the Care of Children in the ED" published by the American College of Emergency Physicians (ACEP) and American Academy of Pediatrics (AAP) in 2001.[1] In 2009, the AAP, ACEP, and Emergency Nurses Association (ENA), with the support of the Emergency Medical Services for Children (EMSC) program, undertook a major revision of these guidelines.[3,4] The 2009 joint Policy Statement is the subject for this policy revision.

The National Pediatric Readiness Project, launched in 2013, is an ongoing quality improvement (QI) initiative among the federal EMSC program, AAP, ACEP, and ENA to ensure pediatric readiness of EDs.[9] In phase 1 of the project, hospital ED leaders in all US states and territories were asked to complete a comprehensive Web-based assessment of their readiness to care for children. The assessment was based on the 2009 joint Policy Statement.[3,4] The response rate was 83%, representing more than 4000 EDs.[5] The data from this project reveal a snapshot of the nation's readiness to provide care to children in the ED. They also provide information on gaps in readiness at the state and national levels, confidential site-specific needs, and recommendations to improve readiness. Key findings include the following:

1. The majority of children who seek emergency care (69.4%) are cared for in EDs that see fewer than 15 pediatric patients per day, highlighting the need to provide additional pediatric emergency resources to smaller and often rural EDs.
2. The overall median score for the nation was 70 (of 100 possible points). This represents an improvement when compared with a similar survey completed in 2003 (median score of 55 points).[5,13]
3. The median score for EDs with a high volume of pediatric patients (>27 pediatric visits per day) was greater than that of EDs with medium, medium-high (5–27 pediatric visits per day), or low pediatric volume (<5 pediatric visits per day).
4. Approximately half of EDs lacked a physician (52.5%) or nurse (40.7%) pediatric emergency care coordinator (PECC). The presence of a PECC is strongly correlated with improved pediatric readiness, independent of other factors.[5] Another analysis of hospital-based EDs in the state of California also revealed that the presence of a PECC was associated with improved overall pediatric readiness scores.[14]
5. Fifty-five percent of EDs reported the absence of a QI plan in which they address pediatric care, and of those that had a QI plan, 41.7% lacked specific quality indicators for children. The presence of a QI plan that included pediatric-specific indicators was independently associated with improved overall readiness scores in California.[14]
6. In the absence of participation in a pediatric verification program, trauma center status was not predictive of higher pediatric readiness scores.[14]
7. Approximately half of hospitals reported lacking disaster plans

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(53.2%) that include specific care needs for children.[5]

8. A process to ensure that weights are measured and recorded in kilograms only, which is a pediatric safety concern, was also lacking in 32.3% of EDs completing the assessment.[5]

Pediatric Readiness and Pediatric Facility Recognition

The EMSC program has long promoted improved preparedness and recognition of prepared EDs. Current EMSC program performance measures address pediatric readiness for children with both traumatic and medical emergencies.[10] Performance Measure 04 reads as follows: "the percent[age] of hospitals recognized through a statewide, territorial, or regional[ly] standardized system that are able to stabilize and/or manage pediatric medical emergencies." At this time, 11 states have developed such a system (recognizing 8% of all US hospital-based EDs),[15] and all have used the 2009 joint Policy Statement as the basis of their recognition criteria. Some states have published descriptions of the process they used to establish and maintain a pediatric recognition system.[14,16]

Recognition and verification have been associated with improved readiness scores. Remick et al[14] described an association between higher hospital readiness scores and an on-site verification program in California. National data reveal that states that have a recognition and/or verification system and have achieved EMSC program Performance Measure 04 have readiness scores that are an average of 10 points higher than those that do not have such a system.[15] In addition, hospitals that have been recognized scored, on average, 22 points higher on the assessment than those that had not been recognized as pediatric ready by their states (National EMSC Data Analysis and Resource Center, unpublished observations, 2014).

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.[17] In 2014, the AAP released the revised Policy Statement "Patient Safety in the Pediatric Emergency Care Setting."[18] This statement and other recent work have revealed the value of specific structural and process measures on improved patient safety and quality of care. For example, a weight-based, color-coded medication safety system can be used to decrease dosing errors and improve the timeliness of dosing,[19,20] and order sets, reminders, and clinical practice recommendations embedded within information systems can be used to increase adherence to best practices.[21,22]

Although previous guidelines[1,2] were consensus based, several recent studies have revealed the effects of pediatric readiness on outcomes for children treated in EDs. Some investigators have examined the effect of improved pediatric readiness and/or facility recognition on the quality of pediatric emergency care. Ball et al[23] compared outcomes in children with extremity immobilization and a pain score of 5 or greater in a state with a medical facility recognition program to similar facilities in a state without a facility recognition program. The children in the state with the recognition system had improved timeliness of the management of pain for fractures and decreased exposure to radiation use.[23] Kessler et al[24] demonstrated that teams of health care providers who practiced in EDs with higher pediatric readiness scores performed better in a standardized simulation of the care of children with sepsis. A statewide program in Arizona to improve the pediatric readiness of EDs has been associated with a decreased pediatric mortality rate after participation in a verification process based on compliance with published guidelines.[25] Shared resources and coordination of care in emergency care systems is a strategy that may be used to improve pediatric readiness locally, regionally, and nationally. Further research should be supported to evaluate the effects of each of the recommended components of the guidelines on the quality of pediatric emergency care.

The information from the pediatric readiness assessment, research described earlier in this Policy Statement, and expert opinion from the coauthoring organizations were used to inform this revised Policy Statement. These recommendations include current information on equipment, medications, supplies, and personnel that are considered critical for managing pediatric emergencies in EDs. In this Policy Statement, we also offer recommendations for the administration and coordination of pediatric care in the ED; pediatric emergency care QI, performance improvement (PI), and patient safety activities; policies, procedures, and protocols for pediatric care; and key ED support services. It is believed that all EDs in the United States can meet or exceed these recommendations and that some hospitals, such as those with pediatric critical care capabilities or children's hospitals with greater resources, will develop and implement even more comprehensive recommendations and share their expertise with their local and regional communities. These updated recommendations 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.

ADMINISTRATION AND COORDINATION FOR THE CARE OF CHILDREN IN THE ED

A pediatric emergency care coordinator (PECC) is a physician

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coordinator identified by the ED medical director or a registered nurse coordinator identified by the ED nurse director. Identification of a physician and nurse PECC is central to the readiness of any ED that cares for children. Recommendations include the following:

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 cardiac [STEMI]). PECC roles may be shared through formal agreements with administrative entities, such as within hospital systems, when there is another ED 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 and/or eligible specialist in emergency medicine or pediatric emergency medicine. Otherwise, the physician PECC must meet the qualifications for credentialing of the hospital as an emergency clinician specialist with special training and experience in the evaluation and management of the child who is critically ill. 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 provider) who is credentialed to care for patients in the ED; and

    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 has demonstrated competence in critical thinking and clinical skills. When available, a certified emergency nurse or, preferably, a certified pediatric emergency nurse is desirable. Otherwise, the nurse coordinator has verified competency per hospital policy and may have other credentials, such as certified pediatric nurse or certified critical care registered nurse.

3. The physician and nurse PECCs work collaboratively and are responsible for the following:

    a. promoting adequate skill and knowledge of ED staff physicians, nurses, and other health care providers 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 of demonstrating competency in pediatric emergency care for their respective disciplines;

    b. participating in the development of the pediatric components of the QI plan and facilitating QI activities related to pediatric emergency care;

    c. assisting with the development and periodic review of ED policies and procedures and standards for medications, equipment, and supplies to ensure adequate resources for children of all ages;

    d. serving as liaisons and/or coordinators in collaboration with appropriate in-hospital and out-of-hospital pediatric care committees in the community and/or region and emergency medical services (EMS), trauma, and emergency preparedness coordinators (if they exist);

    e. serving as liaisons to definitive-care hospitals, such as regional pediatric referral hospitals and trauma centers, EMS agencies, primary care providers, 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. facilitating pediatric emergency medical and nursing education for ED health care providers and staff, including but not limited to the identification of continuing pediatric emergency education resources;

    g. facilitating the inclusion of pediatric-specific elements in physician and nursing orientation in the ED;

    h. in coordination with the local credentialing processes, facilitating competency evaluations for staff that are pertinent to children of all ages. When available, simulation (ie, pediatric scenario–based mock codes) has been revealed to improve pediatric care in resuscitation and team settings[26–28];

    i. facilitating the integration of pediatric needs in hospital disaster and/or emergency preparedness plans and promoting the inclusion of pediatric patients in disaster drills[29];

    j. collaborating with ED leadership to enable adequate staffing, medications, equipment, supplies, and other resources for children in the ED; and

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k. communicating with ED and hospital leadership on efforts to facilitate pediatric emergency care.

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

Recommendations include the following:

A. Physicians, advanced practice providers, nurses, and other ED health care providers, on the basis of their level of training and scope of practice, should have the necessary skill, knowledge, and training in the emergency evaluation and treatment of children of all ages consistent with the services provided by the hospital.

B. Baseline and periodic competency evaluations completed for all ED clinical staff, including physicians, advanced practice providers, nurses, and other health care providers are age specific and 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.

C. The demonstration and maintenance of pediatric clinical competencies may be achieved through continuing education, including participation in local educational programs, professional organization conferences, or national pediatric emergency care courses, or scheduled mock codes or patient simulation, team training exercises, or experiences in other clinical settings, such as the operating room (ie, airway management). The evaluation of such competencies may be achieved through direct observation, chart reviews, written knowledge tests, and/or the maintenance of physician or advanced practice provider board certification or nurse certification when pediatric emergency medicine is a significant component of annual continuing education requirements.

D. Potential areas for pediatric competency and professional performance evaluations may include but are not limited to the following:

1. assessment and treatment, including the following: (a) triage, (b) illness and injury assessment and management, and (c) pain assessment and treatment, including nonpharmacologic pain management (eg, distraction techniques and comfort holds);
2. medication administration and delivery;
3. device and/or equipment safety (eg, low-volume infusion pumps);
4. procedures, including the following: (a) airway management, (b) vascular access, and (c) sedation and analgesia;
5. resuscitation, including the following: (a) critical care monitoring, (b) neonatal resuscitation, and (c) pediatric resuscitation;
6. trauma resuscitation and stabilization,[30] including the following: (a) burn management, (b) traumatic brain injury, (c) fracture management, (d) hemorrhage control, and (e) recognition and reporting of nonaccidental trauma;
7. disaster drills that include a triage of pediatric victims, the tracking and identification of unaccompanied children, family reunification, and the determination of pediatric surge capacity[29];
8. patient- and family-centered care, including cultural competency; and
9. team training and effective communication, including the following: (a) transitions of care and/or handoffs[31] and (b) closed-loop communication.

QI AND/OR PI IN THE ED

Quality is best ensured by evaluating each of the 6 domains addressed by the IOM[31,32]: safe, equitable, patient centered, timely, efficient, and effective. 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 be focused on the effectiveness of structural elements, processes, and clinical outcomes relative to pediatric emergency care. Minimum components of the QI and/or PI process should include collecting and analyzing data to discover variances, defining a plan for improvement, and evaluating the success of the QI and/or PI plan with measures that are outcome based. High-level QI efforts are used to facilitate education and training, the implementation of targeted system change, and the measurement of system performance over time until steady, high-level performance is achieved.

B. The QI and/or PI plan of the ED shall include pediatric-specific indicators. Pediatric emergency

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TABLE 1 Sample Performance Measures for Pediatric Emergency Care

Measures	Description
System based	
Patient triage	Measurement of wt in kilograms for pediatric patients; method to identify age-based abnormal pediatric vital signs
Infrastructure and personnel	Presence of all recommended pediatric equipment in the ED; presence of physician and nurse coordinators for pediatric emergency care
Patient-centered care	Patient and/or caregiver understanding of discharge instructions
ED flow	Door-to-provider time; total length of stay
Pain management	Pain assessment and reassessment for children with acute fractures
Quality and safety	Number of return visits within 48 h resulting in hospitalization; medication error rates
Disease specific	
Trauma	Use of head computed tomography in children with minor head trauma; protocol for suspected child maltreatment
Respiratory diseases	Administration of systemic steroids for pediatric asthma exacerbations; use of an evidence-based guideline to manage bronchiolitis
Infectious diseases	Use of antibiotics in children with suspected viral illness

Based on the work of Alessandrini E, Varadarajan K, Alpern ER, et al. Emergency department quality: an analysis of existing pediatric measures. *Acad Emerg Med.* 2011;18(5):519–526.

TABLE 2 Examples of Pediatric Emergency Care PI Activities and Resources

Clinical ED Registry (https://www.acep.org/cedr/)
Committee on Quality Transformation, Section on Emergency Medicine (https://www.aap.org/en-us/about-the-aap/Committees-Councils-Sections/Section-on-Emergency-Medicine/Pages/About-Us.aspx)
EMSC Innovation and Improvement Center (https://emscimprovement.center)
ENA (https://www.ena.org/#practice-resources)
Education in QI for Pediatric Practice (https://eqipp.aap.org/)
The National Pediatric Readiness Assessment (https://www.pedsready.org)
PediaLink: The AAP Online Learning Center (https://pedialink.aap.org/visitor)
Pediatric Readiness Toolkit (www.pediatricreadiness.org)
Pediatric Trauma Society (http://pediatrictraumasociety.org/)
Interfacility Tool Kit for the Pediatric Patient (http://www.traumanurses.org/inter-facility-tool-kit-for-the-pediatric-patient)
Pediatric TQIP (https://www.facs.org/quality-programs/trauma/tqip/pediatric-tqip)
PECARN guidelines (http://www.pecarn.org)

PECARN, Pediatric Emergency Care Applied Research Network; TQIP, Trauma Quality Improvement Program.

care metrics have been identified (Table 1) and should be strongly considered for inclusion in the overall QI plan. In addition, performance bundles may be used to assess the quality of care provided for specific clinical conditions (eg, pediatric septic shock, pediatric asthma, and pediatric closed head injury).

C. Components of the process are used to integrate out-of-hospital, ED, trauma, inpatient pediatrics, pediatric critical care, and hospital-wide QI or PI activities and may be interfaced with regional, state, or national QI collaboratives, including injury prevention efforts.[33–36]

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

Numerous resources are available to assist ED staff with implementing QI and/or PI activities (Table 2).

POLICIES, PROCEDURES, AND PROTOCOLS FOR THE ED

Recommendations include the following:

A. Policies, procedures, and protocols for the emergency care of children are age specific and include neonates, infants, children, adolescents, and children with special health care needs. Staff are educated accordingly and monitored for compliance and periodically updated. These include, but are not limited to, the following:

1. illness and injury triage;
2. pediatric patient assessment and reassessment;
3. documentation of a full set of pediatric vital signs, including core temperature, respiratory rate, pulse oximetry, heart rate, blood pressure (including manual confirmation), pain, and mental status when indicated;
4. identification and notification of the responsible provider of abnormal vital signs (age or weight based);
5. immunization assessment and management (eg, tetanus and rabies) of the patient who is underimmunized[37];
6. sedation and analgesia (including nonpharmacologic interventions for comfort) for procedures, including medical imaging[38,39];
7. consent (including situations in which a parent or legal guardian is not immediately available)[40];
8. social and behavioral health issues, including parents and patients who are belligerent, impaired, or violent[41–43];
9. physical or chemical restraint of patients;
10. child maltreatment mandated reporting and assessment (physical and sexual abuse, sexual assault, human trafficking, and neglect)[44];
11. death of a child in the ED[45,46];
12. do-not-resuscitate orders;

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13. lack of a medical home;
14. children with special health care needs, including developmental disabilities (eg, autism spectrum disorders and ventilator dependence);
15. family-centered care,[47–52] including the following:

a. involving families and guardians in patient care decision-making and medication safety processes;

b. family and guardian presence during all aspects of emergency care, including resuscitation;

c. education of the patient, family, and caregivers and guardians;

d. discharge planning and education; and

e. bereavement counseling;

16. communication with a 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)[53];
17. telehealth and telecommunications[54]; and
18. an all-hazard disaster preparedness plan in which the following pediatric issues are addressed[55]:

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 children who are injured and noninjured;

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; all drills include pediatric patients; and

g. the care of children with special health care needs, including children with developmental disabilities.

B. Evidence-based clinical pathways, order sets, or decision support should be available to providers in real time. These may be systematically derived, consensus driven, or locally developed on the basis of available evidence. Many children's hospitals and/or academic centers have developed such clinical pathways. Collaboration with regional pediatric centers and trauma centers may facilitate the use of standard, evidence-based guidelines. An updated and complete list is available on the National Pediatric Readiness Project Web site.[56–60]

C. Hospitals should have written pediatric interfacility transfer procedures and/or agreements that include the following pediatric components[61–63]:

1. defined processes for the 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. a transport plan to deliver children safely (including the use of child passenger–restraint devices) and in a timely manner to the appropriate facility that is capable of providing definitive care;
3. processes for selecting the appropriate care facility for pediatric specialty services that are not available at the hospital; these specialty services may include the following: (a) medical and surgical specialty care, (b) critical care, (c) reimplantation (replacement of severed digits or limbs), (d) trauma and burn care, (e) psychiatric emergencies, (f) obstetric and perinatal emergencies, (g) child maltreatment (physical and sexual abuse and assault), (h) rehabilitation for recovery from critical medical or traumatic conditions, (i) orthopedic emergencies, and (j) neurosurgical emergencies;
4. processes for selecting the appropriately staffed transport service to match a patient's acuity level (ie, level of care required and equipment needed for transport) and that are appropriate for children with special health care needs;
5. processes for patient transfer (including obtaining informed consent)[64];
6. a plan for the transfer of critical patient information (ie, medical record, imaging, and copy of signed transport consent) as well as personal belongings and the provision of directions and referral institution information to the family;
7. processes for the return transfer of the pediatric patient to the referring facility as appropriate; and

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8. integration with telehealth and/or telecommunications processes and mobile-integrated health and/or community paramedicine as appropriate.[54]

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[65,66]:

A. Children should be weighed in kilograms, with the exception of children who require emergency stabilization, and the weight should be recorded in a prominent place on the medical record, preferably with the vital signs.
    1. For children who require resuscitation or emergency stabilization, a standard method for estimating weight in kilograms should be used.

B. A full set of vital signs should be recorded and reassessed per hospital policy for all children.

C. The following processes for safe medication (including blood products) prescribing, delivery, and disposal should be established[67,68]:
    1. use precalculated dosing guidelines for children of all ages;
    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[69,70];
    5. implement and use computerized physician order entry and clinical decision support with pediatric-specific, kilogram-only dosing rules, including upper dosing limits, within ED information systems;
    6. implement and use 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-provider cross-check process for high-alert 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. implement systems in which weight-based calculations are bypassed during pediatric resuscitations and treatment to reduce potentially harmful mistakes;
    13. establish a culture of safety surrounding pediatric medication administration that encourages the reporting of near-miss or adverse medication events that can then be analyzed as feedback into the system in a continuous QI model;
    14. ensure that caregivers are well instructed on medication administration, particularly for pain and antipyretic medications, before being discharged from the ED; and
    15. promote the integration of health literacy concepts and skills, including the use of plain language, the teach-back method, pictograms, and lower-literacy instructions.[71–75]

D. Pediatric emergency services should be culturally and linguistically appropriate,[76] and the ED should provide an environment that is safe for children and supports patient- and family-centered care.[48,49,77]
    1. Enhance family-centered care by actively engaging patients and families in safety at all points of care, and address issues of ethnic culture, language, and literacy.
    2. Direct families to appropriate resources, and review patients' rights and responsibilities from the perspective of safety.
    3. Include shared decision-making.
    4. Use trained language interpreter services rather than bilingual relatives.

E. Patient-identification policies, consistent with The Joint Commission's National Patient Safety Goals, should be implemented and monitored.[78]

F. Policies for the timely tracking, reporting, and evaluation of patient safety events and for the disclosure of medical errors or unanticipated outcomes should be implemented and monitored, and education and training in disclosure should be available to care providers who are assigned this responsibility.[65,66]

SUPPORT SERVICES FOR THE ED

Recommendations include the following:

A. The radiology department should have the skills and capability to provide imaging studies of children, the equipment necessary to do so, and guidelines to reduce

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radiation exposure that are age and size specific.[79–81]

1. The radiology capability of hospitals may vary from 1 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 are used to address age- or weight-appropriate dose reductions for children receiving studies in which ionizing radiation is imparted, consistent with "as low as reasonably achievable" principles, are necessary.[82]
3. A process should be established for the referral of children to appropriate facilities for radiologic procedures that exceed the capability of the hospital.
4. A process should be in place for timely review and interpretation reporting by a qualified radiologist for medical imaging studies in children.
5. When a patient is transferred from 1 facility to another, to avoid unnecessary radiation exposure, all efforts should be made to transfer completed images. New technology (eg, Cloud file sharing or Health Insurance Portability and Accountability Act protection) may facilitate image sharing between facilities.[83]

B. The laboratory should have the skills and capability to perform laboratory tests for children of all ages, including obtaining samples, and have available microtechnology for small or limited sample sizes.
   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 children who are ill or injured.

EQUIPMENT, SUPPLIES, AND MEDICATIONS

Pediatric equipment, supplies, and medications shall be 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 shall be 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 shall be 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 shall be appropriately educated as to the location of all items (Supplemental Figs 1 and 2).

D. Each ED shall have a daily method to verify the proper location and function of equipment and expiration of medications and supplies.

E. Tables 3 and 4 and Supplemental Figs 1 and 2 outline medications, equipment, and supplies necessary for the care of children in the ED by qualified health care providers.[84]

TABLE 3 Resuscitation Medications for Use in Pediatric Patients in EDs

Adenosine
Amiodarone
Atropine
Calcium chloride and/or calcium gluconate
Epinephrine (1 mg/mL [IM] and 0.1 mg/mL [IV] solutions)[a]
Lidocaine
Procainamide
Sodium bicarbonate (4.2%)[b]
Vasopressor agents (eg, dopamine, epinephrine, and norepinephrine)

For a more complete list of medications used in a pediatric ED, see Winkelman et al.[75] IM, intramuscular; IV, intravenous.

[a] The formerly epinephrine 1:1000 solution is now 1 mg/mL for IM use or inhalation; the 1:10 000 solution is now 0.1 mg/mL for IV use.

[b] If only sodium bicarbonate 8.4% is available, may dilute 1:1 with normal saline before administration in children <2 y of age.

CONCLUSIONS

In the 2006 report, "Emergency Care for Children: Growing Pains," the IOM uses the word "uneven" to describe the current status of pediatric emergency care in the United States.[8] Although much progress has been made to improve pediatric readiness across communities,[5] there remains a significant opportunity for further progress nationwide. An important first step in ensuring readiness is the identification of a physician and nurse coordinator for pediatric emergency care.

All EDs must be continually prepared to receive; accurately assess; and, at a minimum, stabilize and safely transfer children who are acutely ill or injured. This 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 69% of EDs providing care for fewer than 15 children per day.[5] This relatively infrequent exposure of hospital-based emergency care professionals to children who are seriously ill or injured represents

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TABLE 4 Medications to Be Used in the ED for the Care of Children

Analgesics (oral, intranasal, and parenteral)
Anesthetics (eg, eutectic mixture of local anesthetics; lidocaine 2.5% and prilocaine 2.5%; lidocaine, epinephrine, and tetracaine; and LMX 4 [4% lidocaine])
Anticonvulsants (eg, levetiracetam, valproate, carbamazepine, fosphenytoin, and phenobarbital)
Antidotes (common antidotes should be accessible to the ED)[a]
Antiemetics (eg, ondansetron and prochlorperazine)
Antihypertensives (eg, labetalol, nicardipine, and sodium nitroprusside)
Antimicrobials (parenteral and oral)
Antipsychotics (eg, olanzapine and haloperidol)
Antipyretics (eg, acetaminophen and ibuprofen)
Benzodiazepines (eg, midazolam and lorazepam)
Bronchodilators
Corticosteroids (eg, dexamethasone, methylprednisolone, and hydrocortisone)
Dextrose ($D_{10}W$)
Diphenhydramine
Furosemide
Glucagon
Insulin
Lidocaine
Magnesium sulfate
Mannitol
Naloxone hydrochloride
Neuromuscular blockers (eg, rocuronium and succinylcholine)
Oral glucose
Sucrose solutions for pain control in infants
Sedation medications (eg, etomidate and ketamine)
Vaccines
3% hypertonic saline

$D_{10}W$, dextrose 10% in water.

[a] For less frequently used antidotes, a procedure for obtaining them should be in place.

a substantial barrier to the maintenance of essential skills and clinical competency. Recognition of the unique needs of children who are ill and/or injured and served by an emergency care facility, including children with special health care needs; the commitment to better meet those needs through the adoption of these recommendations; and an ongoing commitment to evaluate care quality and safety and maintain pediatric competencies should provide a strong foundation for pediatric emergency care.

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

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ABBREVIATIONS

AAP: American Academy of Pediatrics
ACEP: American College of Emergency Physicians
ED: emergency department
EMS: emergency medical services
EMSC: Emergency Medical Services for Children
ENA: Emergency Nurses Association
IOM: Institute of Medicine
PECC: pediatric emergency care coordinator
PI: performance improvement
QI: quality improvement

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