## **Pediatric Readiness**

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Rainbow Babies & Children's





Cleveland | Ohio

## Disclosures

- ASPR 2019 Pediatric Disaster Center of Excellence Grant FEMA V for Kids.
- HSRA 2019 Grant for EMSC EIIC U07MC37471.
- HSRA 2021 Pediatric Pandemic Network grant.
- Member of Central Committee of ACS COT.



## **Pediatric Readiness – What is it?**



- The ability of healthcare group (EMS, ED, etc) to care for critically ill children.
- Not just trauma -> medical emergencies also.

 "The National Pediatric Readiness Project is a multiphase quality improvement initiative to ensure that all U.S. emergency departments have the essential guidelines and resources in place to provide effective emergency care to children."



## Pediatric Readiness: Why are we talking about this?



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## **The Data – Important Facts**

- 22% of the US population are children.
- 5000 EDs in the US. About 140 million visits per year.
- > 80% of pediatric ED visits are to general EDs.
- EMS transport of critically ill children is a rare event.
- Critically ill children are seen relatively infrequently.
- >80% of EMS agencies see <8 children / month.
- Hospitals with high ED readiness scores demonstrate a 4-fold lower rate of mortality for children with critical illness than those with lower readiness scores.



### **Pediatric Differences**

- There are true anatomic and physiologic differences.
- Airway / Breathing ->
  - Small oral cavity & large tongues & tonsils. Large occiput.
  - Larynx is more cephalad and anterior. Floppy U shaped epiglottis.
  - Hypoxia is most common cause of cardiac arrest.
- Head ->
  - TBI is the leading cause of mortality. Large head.
  - Cranium thinner and less protective. Significant force transmission.
- Circulation ->
  - Challenging vascular access and shock recognition.
  - Different vital signs. Hypotensive is the last step before death.



## **Physiologic Differences – Disaster Medicine**

| Pediatric characteristic | Special risk during disaster   |
|--------------------------|--|
| Respiratory              | Higher minute volume increases risk from exposure to inhaled<br>agents. Nuclear fallout and heavier gases settle lower to the<br>ground and may affect children more severely.   |
| Gastrointestinal         | Higher risk for dehydration from vomiting and diarrhea after<br>exposure to contamination.   |
| Skin                     | Higher body surface area increases risk for skin exposure. Skin<br>is thinner and more susceptible to injury from burns,<br>chemicals, and absorbable toxins. Evaporation loss is higher<br>when skin is wet or cold, so hypothermia is more likely. |
| Endocrine                | Increased risk for thyroid cancer from radiation exposure.   |
| Thermoregulation         | Less able to cope with temperature problems, with higher risk for hypothermia.   |
| Developmental            | Lower ability to escape environmental dangers or anticipate hazards.   |
| Psychological            | Prolonged stress from critical events. Susceptible to<br>separation anxiety.   |

Adapted from AAP, Pediatric Education for Prehospital Professionals, Jones & Bartlett Publishers, London, 2006.



## **Pediatric Readiness**

Why is this important?



EMERGENCY CARE FOR CHILDREN GROWING PAINS



- 2007 Institute of Medicine report
- A call to action.
- Children represent 27% of all ED visits.
- Only 6% of EDs have essential pediatric equipment.
- Continue pediatric education is NOT required for most EMTs.
- Most disaster preparedness plans don't include needs of children.
- Failure to recognize child abuse is wide spread.



EMERGENCY CARE FOR CHILDREN GROWING PAINS



- EDs and EMS agencies should appoint a pediatric emergency care coordinator (PECC)
  - Ensure skills and knowledge
  - Oversee pediatric QI initiatives
  - Ensure availability of pediatric medications/equipment
  - Pediatric protocols and procedures
- More training and guidelines is <u>not</u> sufficient



Institute of Medicine Committee on the Future of Emergency Care in the U.S. Health System. Washington, DC: National Academies Press; 2006.

## The Current State of our Emergency Care System

- Overcrowding
- ED environment difficult to control
- Prioritization of adult metrics/outcomes => limited resources and effort to address pediatric metrics/outcomes
- Critically ill children are seen relatively infrequently





## Improving reulatic Astillia Unicollies in a Community Emergency Department in a wate way way to a start a magnet unit page c. united units units and c. **Prgency Care**

Asthma triggers 2775 000 emergency department (ED) visits for children each year. Approximately 80% of these visits occur in community EDS. We performed this study to measure effects of partnership with children each year. Approximately 80% of these visits occur in commun EDS. We performed this study to measure effects of partnership with a summinity en inclusive, we impremented an included community ED Increased % of children with an METHODS: For th evidence-bas patients wh asthma score, % who received electronic or wheezi steroids, and time to steroid guideli

Improving Pediatric Asthma Outcomes

Thereas A. Walls, MD, MPH\* Naomi T. Hughes, MD\* Paul C. Mollan, MD, MPH; James M. Chambertan, MD, \* Sathleen Brown, MD\*

Asthma triggers 2775 000 emergency department (ED) visits for n each year. Approximately 80% of these visits occur in community

Variability

Del

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Auerbach et al. JAMA Pediatr. 2016 Knapp et al. Pediatrics 2013 Li et al. Ped Emerg Care. 2017 Michelson et al. Pediatrics, 2018 Niles et al. Pediatrics. 2017

## Epidemiology of Pediatric Prehospital Emergency Care

- >6 million EMS transports per year
  - Children account for ~10%
  - <1% critically ill (pediatric arrests)</p>
- Most EMS agencies (>80%) see < 8 children/month
- Variability in care across agencies:
  - trauma/pain, seizures, respiratory distress, cardiac arrest
- Most providers report <3 pediatric calls/month</li>





Meckler, Leonard, Hoyle. Clin Ped Emerg Med, 2014.

# The State of Prehospital Emergency Care for Children

- >80% EMS agencies see < 8 children/month
- Known gaps in day-to-day readiness
  - Written pediatric protocols
  - Pediatric equipment
  - Pediatric education requirements for licensing (82%)
  - Lags in translation of pediatric evidence base

| Annual 911 Pediatric Call Volume  |                         |  |  |  |
|---|-------------------------|--|--|--|
| NONE: No pediatric calls in the last year   | <b>2.8%</b><br>n=236    |  |  |  |
| LOW: 12 or fewer pediatric calls in the last year (1 or fewer pediatric calls per month)          | <b>40.8%</b><br>n=3,478 |  |  |  |
| MEDIUM: Between 13-100 pediatric calls in the last year<br>(1-8 pediatric calls per month         | <b>37.2%</b><br>n=3,169 |  |  |  |
| MEDIUM-HIGH: Between 101-600 pediatric calls in the last<br>year (8-50 pediatric calls per month) | <b>14.9%</b><br>n=1,267 |  |  |  |
| HIGH: More than 600 pediatric calls in the last year (more than 50 pediatric calls per month)     | <b>4.0%</b><br>n=337    |  |  |  |



POLICY STATEMENT

#### Equipment for Ground Ambulances

AMERICAN ACADEMY OF PEDIATRICS, AMERICAN COLLEGE OF EMERGENCY PHYSICIANS, AMERICAN COLLEGE OF SURGEONS COMMITTEE ON TRAUMA, EMERGENCY MEDICAL SERVICES FOR CHILDREN, EMERGENCY NURSES ASSOCIATION, NATIONAL ASSOCIATION OF EMS PHYSICIANS, AND NATIONAL ASSOCIATION OF STATE EMS OFFICIALS



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Carlson JN, et al. Pediatric Critical Care Medicine. 2015;16:e260-e267. Shah MN, et al. Prehosp Emerg Care. 2008;12:269-276. Federal Interagency Committee on Emergency Medical Services. 2011. www.ems.gov

#### **Original Investigation**

## A National Assessment of Pediatric Readiness of Emergency Departments

Marianne Gausche-Hill, MD; Michael Ely, MHRM; Patricia Schmuhl, BA; Russell Telford, MA; Katherine E. Remick, MD; Elizabeth A. Edgerton, MD, MPH; Lenora M. Olson, PhD, MA

- Assessment of 5017 EDs (24 million peds visits).
  - 55 question survey (83% compliance)
- 70% had low peds volume (<14 kids per day).
- Higher volume had higher pediatric readiness scores.
- Conclusions:
  - PECCs are key to pediatric readiness.



Pediatric Disaster Preparedness: Are We Really Prepared?

Marianne Gausche-Hill, MD, FACEP, FAAP

#### • Surveyed 42 DMAT teams

- 30-85% victims are children
- Lacked peds airway equipment, IV, training, protocols, etc.
- 70% of US EMS systems have no school mass casualty plan.
  - Survey of 2000 superintendents: only 43% knew the local EMS plan.
- Only 12% of disasters drills include pediatrics.

The Journal of TRAUMA® Injury, Infection, and Critical Care • Volume 67, Number 2, August Supplement 2009



Cleveland Ohio

### How do we fix this?



Joint Policy Statement—Guidelines for Care of Children in the Emergency Department

AMERICAN ACADEMY OF PEDIATRICS COMMITTEE ON PEDIATRIC EMERGENCY MEDICINE AMERICAN COLLEGE OF EMERGENCY PHYSICIANS PEDIATRIC COMMITTEE EMERGENCY NURSES ASSOCIATION PEDIATRIC COMMITTEE

- 2008 policy statement to set the stage for improvement.
- ED must have physician and nursing pediatric care coordinators.
- Providers must have the "necessary skill, knowledge, and training in the emergency evaluation and treatment of children of all ages."
- Pediatric patient care review must be incorporated in QI/PI plan.
- Pediatric specific guidelines.
- Guidelines for the care and maintenance of pediatric meds & equipment.



## National Projects to Address the Need.



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## **Emergency Medical Services for Children**

- Mission: to reduce childhood morbidity and mortality due to severe illness or trauma.
  - Administered by the Health Resources and Services Administration (HRSA), within the Department of Health and Human Services
  - Authorized by Congress in 1984
  - Focus on enhancing the pediatric capability of existing EMS systems





## **HRSA-EMSC** Programs



## **EMS for Children State Partnerships**

State Partnership grants were first introduced in 1996 to help states improve, refine, and integrate pediatric care within the state EMS system.

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## EMS for Children Innovation and Improvement Center (EIIC)

- Mission: Accelerate improvements in quality of care and outcomes for children who are in need of emergency care
- Use a quality improvement science-based model
- Link resources, efforts, and entities to decrease child mortality and morbidity due to illness or injury









### **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

#### EMERGENCY NURS ASSOCIATION

American Academy of Pediatrics

American College of Emergency Physicians<sup>® DE</sup>

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## Pediatric Readiness in the Emergency Department

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Goal: Ensure high quality emergency care for all children

- Phase 1: 2013 National Self-Assessment (www.pedsready.org)
- Phase 2: Improvement efforts (www.pediatricreadiness.org)
- Phase 3: 2021 National Re-Assessment





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## National Assessment of Pediatric Readiness of Emergency Departments

|                         | All Hospitals                | Low                          | Medium                       | Medium-High                  | High                         |
|-------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| WPRS<br>Median<br>(IQR) | 68.9<br>(56.1 <i>,</i> 83.6) | 61.4<br>(49.5 <i>,</i> 73.6) | 69.3<br>(57.9 <i>,</i> 81.8) | 74.6<br>(60.9 <i>,</i> 87.9) | 89.8<br>(74.7 <i>,</i> 97.2) |

p<0.0001

• **Low** pediatric volume (<1800 pediatric visits/yr)

Gausche-Hill et al. JAMA Pediatr. 2015

- Medium volume (1800-5K visits/yr)
- Medium high volume (5-10K visits/yr)
- **High** volume (10K+ visits/yr)





Pediatric Readiness Project Ensuring Emergency Care for All Children

## More treadiness tienest readiness tienest lower mortalith ax **Emergency Department Pediatric Readiness and Mortality in Critically** Ill Children

Stefanie G. Ames, MD, MS,\* Billie S. Davis, PhD,\* Jennifer R. Marin, MD, MSc,<sup>c,d</sup> Ericka L. Fink, MD, MS,<sup>ce</sup> Lenora M. Olson, PhD, MA,8 Marianne Gausche-Hill, MD, eni Jeremy M. Kahn, MD. MSe,f

| Pediatric Readiness                               | Quartile 1 | Quartile 2     | Quartile 3     | Quartile 4     |
|---|------------|----------------|----------------|----------------|
| Score   | 30-59      | 60-74          | 75-88          | 89-100         |
| Adjusted Odds Ratio<br>(In-hospital<br>Mortality) |            | 0.52 (0.3-0.9) | 0.36 (0.2-0.6) | 0.25 (0.2-0.4) |

P<0.001





Ames, et al. Pediatrics. 2019; 144(3).



### **2020: Pediatric Readiness in Emergency Medical Services Systems**

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



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#### Pediatric Readiness in Emergency Medical Services Systems

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## **Prehospital Pediatric Readiness Project**

- Launched in 2019
- Collaborative effort 25 national professional organizations and federal partners
- National prehospital pediatric readiness assessment (2024)
- Prehospital pediatric readiness toolkit



Prehospital Pediatric Readiness Project Ensuring Emergency Care for All Children



Growing presence of PECCs within EMS agencies





## **National Pediatric Readiness Project: Checklist and Toolkit**

Updated checklist based on 2018 guidelines, revised in 2020



| Administration and Coordination of the ED for the<br>Care of Children   | ED Policies, Procedures, and Protocols  |
|---|---|
| <ul> <li>Physician Coordinator for Pediatric Emergency Care (PECC)*         <ul> <li>Board certified/eligible in EM or PEM (preferred but not required for resource limited hospitals)</li> <li>The Physician PECC is not board certified in EM or PEM but meets the qualifications for credentialing by the hospital as an emergency clinician specialist with special training and experience in the evaluation and management of the critically ill child.</li> </ul> </li> <li>Nurse Coordinator for Pediatric Emergency Care (PECC)*         <ul> <li>CPEN/CEN (preferred)</li> <li>Other credentials (e.g. CPN, CCRN)</li> <li>*An Advanced Practice Provider may serve in either of these roles. Please see the guidelines/ toolkit for further definition of the role(s).</li> </ul> </li> <li>Physicians, Advanced Practice Providers (APPs), Nurses, and Other ED Healthcare Providers</li> <li>Healthcare providers who staff the ED have periodic pediatric-specific competencies include any/all of the following:         <ul> <li>Assessment and treatment (e.g. triage)</li> <li>Medication administration</li> <li>Device/equipment safety</li> <li>Critical procedures</li> </ul> </li> </ul> | Policies, procedures, and protocols for the emergency can         children. ( <i>These policies may be integrated into overall E policies as long as pediatric-specific issues are addressed</i> Illness and injury triage         Pediatric patient assessment and reassessment         Identification and notification of the responsible provof abnormal pediatric vital signs         Immunization assessment and management of the unimmunized patient         Sedation and analgesia, for procedures including medical imaging         Consent, including when parent or legal guardian is not immediately available         Social and behavioral health issues         Physical or chemical restraint of patients         Children with special health care needs         Children with special health care needs         Family and guardian presence during all aspects of emergency care, including resuscitation         Discharge planning and instruction         Breavement counseling         Communication with the patient's medical home or primary care provider as needed. |
| Resuscitation     Trauma resuscitation and stabilization     Disaster drills that include children     Patient and family-centered care     Team training and effective communication   | All-Hazard Disaster Preparedness The written all-hazard disaster-preparedness plan address pediatric-specific needs within the core domains including Medications, vaccines, equipment, supplies and trained movides for children in disasters  |
| Guidelines for QI/PI in the ED         Image: The QI/PI plan includes pediatric-specific indicators         • Data are collected and analyzed   | Pediatric surge capacity for injured and non-injured<br>children     Decontamination, isolation, and quarantine of families<br>children of all ages   |
| <ul> <li>system changes are implemented based on<br/>performance</li> <li>System performance is monitored over time</li> </ul>  | <ul> <li>Ammuzation of parent-child separation</li> <li>Tracking and reunification for children and familie:</li> <li>Access to specific behavioral health therapies, and social services for children</li> </ul>   |

**Pediatric Readiness in the Emergency Department** This checklist is based on the American Academy of Pediatrics (AAP), American College of Emergency



#### Administration and Coordination of the ED for the Care of Children

This section contains resources regarding the qualifications and responsibilities for the physician and nursing Pediatric emergency care coodinator (PECC) staffing your emergency department (ED).

- Importance of the Pediatric Care Coordinator
- Role Responsibilities of a MD ED Coordinator P
- Role Responsibilities of a Nursing ED Coordinator
- Is Your ED Ready for Children? Pediatric Emergency Care Coordinators Lead the Way to Readiness! I This webinar shares data supporting the need for pediatric emergency care coordinators (PECC), as well as strategies employed to identify and assure availability of PECCs in the EDs of a large hospital system.



Physicians, Advanced Practice Providers (APPs), Nurses, and Other ED Healthcare Providers

This section contains resources regarding the necessary skills, knowledge, and training in emergency evaluation and treatment of children of all ages among staff in your emergency department (ED).

Close A

Expand ~

https://emscimprovement.center

# The presence of a PECC significantly improves pediatric readiness

#### Median Adjusted Pediatric Readiness Score by Presence of PECC

|                  | No PECC                                     | Nurse PECC only                       | Physician PECC<br>only                 | Both PECCs                     | P-value  |
|------------------|---|---------------------------------------|--|--------------------------------|----------|
| All<br>Hospitals | <b>66.5</b><br>[IQR56.0,76.9]               | <b>69.7</b><br>[IQR 58.9, 80.9]       | <b>75.3</b><br>[IQR 64.4, 85.6]        | <b>82.2</b><br>[IQR 69.7,92.5] | <.0001   |
|                  | <ul><li>Physicia</li><li>Nurse Pl</li></ul> | n PECC - 48% of p<br>ECC – 59% of par | participating site<br>ticipating sites | es                             | National |

Pediatric Readiness Project

**Ensuring Emergency Care for All Children** 

Gausche-Hill et al. JAMA Pediatr. 2015



## **Pediatric Readiness: How do we fix the problem?**



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## **Pediatric Readiness – The Practical?**

- Pediatric Airway
  - Know the pediatric anatomic differences.
  - Have pediatric sized equipment.
  - Practice.
- Pediatric Breathing.
- Pediatric Circulation.
- Specific Conditions -> TBI
- Equipment preparation.
- Staff training and case review.



## Summary

- Kids are not just little adults.
- Significant portion of pre-hospital groups and trauma centers are not prepared for critically ill children.
- PECCs are key to success.
- Partnership with children's hospitals are key to success.
- There are significant national and state resources to help you and your organization prepare to care for injured children.









## Thanks

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Emergency Medical Services for Children Innovation and Improvement Center





