Role of EMS Systems in Ensuring Pediatric Readiness

Katherine Remick, MD, FAAP
Associate Medical Director
Austin-Travis County EMS System
Attending Physician, Pediatric Emergency Medicine
Dell Children’s Medical Center

Marianne Gausche-Hill, MD, FAAP, FACEP
Vice Chair, Department of Emergency Medicine
Chief, Division of Pediatric Emergency Medicine
Harbor-UCLA Medical Center

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Pediatric Emergency Care

- Children account for 5 to 10% of all EMS patients
  - Only 0.5 - 1% are critically ill/injured
  - Limited experience for paramedics
- Children make 25-30 million ED visits per year
  - ~90% children are cared for in general EDs
  - 50% of EDs see < 10 pediatric pts/day
  - <5% require tertiary care
  - Limited experience with critically ill children
Pediatric Quality and Safety in the Emergency Department

- Children have unique needs:
  - Equipment
  - Policies and procedures
  - Communication
  - Weight-based dosing
- Deficiencies:
  - Pediatric Readiness
  - Provider experience and competencies
- Few critical events to drive the QI process

1993 Institute of Medicine Report on EMS for Children

- “The needs of children must be more widely recognized and made a genuine priority for policymakers at national, state, and local levels, particularly those in the position to influence the future directions of EMS and EMSC.”
- Regulatory agencies should “require that hospital emergency departments and emergency response and transport vehicles have available and maintain equipment and supplies appropriate for the emergency care of children.”

Emergency Care for Children: “Growing Pains”

“If there is one word to describe the current state of pediatric emergency care in 2006, it is UNEVEN”

--- IOM Panel, 2006
2009 Guidelines for Care of Children in the Emergency Department

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

1984-2014

National Pediatric Readiness Project

Overall Median Pediatric Readiness Score

<table>
<thead>
<tr>
<th>Year</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>70.9</td>
</tr>
<tr>
<td>2003</td>
<td>85.0</td>
</tr>
</tbody>
</table>
US Demographics

- 85 children’s hospitals in US
- 422 PICUs in US
- 953 of NICUs in US
- 170 verified trauma centers with pediatric capabilities
- 51 verified burn centers nationally (no stated pediatric expertise)
A Statewide Model Program to Improve Emergency Department Readiness for Pediatric Care

Cichon M, Lyons E, Fuchs S, Leonard D

- Hospital facility recognition process for pediatric emergency care
  - Based on AAP/ACEP guidelines
    - ED staffing & training, equipment/medications, P&P, QI/PI, etc
    - 3 tiers: PCCC (10), EDAP (82), SEDAP (15)
  - Voluntary program managed by Illinois EMSC and IDPH
  - Implemented 1999: 107 of 190 hospitals (55%) participate
  - Associated with improved patient outcomes

Mortality Rates per 1,000 Injury-Related Inpatient Admissions From the ED
Pre- and Post EDAP: 1994-2005

- Age group: 0-15 years
- Data is only from those hospitals participating in IL EDAP program
- Reductions in mortality exceed national trends for ISS ≥ 17

Sources: Illinois EMSC & Illinois Hospital Assn.

Tennessee’s Pediatric Verification Program

- Mandatory “Standards for Pediatric Emergency Care Facilities”
- Categorization: Comprehensive Regional Pediatric Care (CRPC), General Pediatric Care (GPC), Primary Pediatric Care (PPC), Basic Pediatric Care (BPC)
- Facilities self-designate, annual inspections through the Department of Health
- Each CRPC has designated region with associated hospitals tied through transfer agreements, feedback provided via CRPC
- Statewide database REDCap, tracks transports and provides feedback

Hohenhaus SM, Lyons E, Phillips RG.
Los Angeles County: Emergency Departments Approved for Pediatrics (EDAP)

- 73 acute care hospitals
  - 44 EDAP’s, 29 non-EDAP’s
- ED designation by EMS agency to receive 911 traffic of pediatric patients
- Requirements
  - Pediatric equipment
  - Physician coverage
  - Ongoing pediatric education
  - Pediatric policies
  - A designated Pediatric Liaison Nurse (PdLN)

Los Angeles County: Emergency Departments Approved for Pediatrics (EDAP)

- PdLN responsible for pediatric-specific quality improvement via chart audits and development of response programs
- EDAP standards mirror state and national guidelines for pediatric readiness
- Annual verification process to ensure ongoing pediatric readiness
- Requirement for continuing education in pediatric emergency care
CA Pediatric Readiness of EDAP’s

A statewide assessment of all 335 acute care hospitals in California for compliance with national guidelines for pediatric readiness

<table>
<thead>
<tr>
<th>EDAP (n=43)</th>
<th>Non-EDAP (n=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>91.8 [IQR 88.1-95.7]</td>
<td>68.3 [IQR 49.2-73.5]</td>
</tr>
</tbody>
</table>

p=0.0001

Preliminary Results: Trauma and Non-Trauma Centers

<table>
<thead>
<tr>
<th>Level I/II Trauma Centers</th>
<th>47 hospitals</th>
<th>83.8 (IQR 63.7-93.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level III/IV Trauma Centers</td>
<td>20 hospitals</td>
<td>64.8 (IQR 53.1-82.9)</td>
</tr>
<tr>
<td>Level III/IV or Non-Trauma Centers</td>
<td>254 hospitals</td>
<td>68.1 (IQR 56.7-83.6)</td>
</tr>
</tbody>
</table>

p = 0.006, 0.0002

What Role Can EMS Play in Pediatric Readiness?

- Goal: universal baseline pediatric readiness
  - Children can be transported to closest facility regardless of geographic location
  
  Until then...

- Facility verification ensures readiness of the system
  - Five states: CA, IL, TN, AZ, DE
  - States in process of developing verification systems - AK, WV, OH, WA, AL
Developing the Infrastructure

ACHIEVING THE VISION

Challenges of Integrating Care for Children within Emergency Care Systems

- Providing high-quality emergency medical services (EMS) to children requires an infrastructure designed to support the care of pediatric patients.

Achieving the Vision: Potential Solutions

1. Appoint a pediatric emergency medicine coordinator
2. Establish a pediatric advisory committee
Pediatric Emergency Care Coordinator/Pediatric EMS Medical Director

- Works with the EMS System Administrator and Medical Director to:
  1. Assess available pediatric resources and gaps within the EMS system
  2. Ensure field care protocols are in place that address the needs of children
  3. Ensure quality improvement plans incorporate pediatric specific indicators
  4. Maintain a relationship with the state’s EMS for Children Program Manager for both collaboration and reporting

Pediatric Emergency Care Coordinator/Pediatric EMS Medical Director

- The activities and responsibilities may include but are not limited to the following:
  - Chair Pediatric Advisory Committee
  - Liaison with hospitals to improve pediatric readiness of emergency departments
  - Coordinate with dispatch to provide evidence-based pre-arrival instructions for children and/or caretakers
  - Organize stakeholders to develop and review on a regular basis protocols, medications and devices available for prehospital care of children
  - Assist in education and training of EMS providers in the care of children and principles of family-centered care
  - Oversee quality improvement measures in the prehospital care of children
  - Work with state and local authorities and regional coalitions to develop strategies for addressing pediatric needs in the event of a disaster
  - Work closely with EMS agency personnel to develop quality improvement plans

Pediatric Advisory Committee

- Advisory to the authoritative body for the EMS System such as a governing board or EMS Commission
- Composed of a diverse group of local pediatric stakeholders, including physician and nurse leaders in pediatric emergency care, trauma, and pediatric critical care from all geographic areas in the region
- Ad hoc representatives with experience in system-based policies, protocol development, research, and quality improvement efforts
The Pediatric Advisory Committee

• Activities and responsibilities may include but are not limited to:
  – Review EMS system activities and policies for the prehospital care of children
  – Develop categorization systems to identify local or regional emergency departments that are able to stabilize and manage pediatric emergencies
  – Write and review pediatric-specific protocols for the prehospital care of children
  – Identify and institute pediatric-specific quality improvement measures
  – Develop a local/regional pediatric disaster surge plan
  – Organize and assist with pediatric disaster drills

UNDERSTANDING THE VERIFICATION PROCESS

Definitions

• Categorization
  – “A process for inventorying, assessing, and cataloguing the emergency care resources, services, capabilities, and capacities of medical care facilities in a community or region, using a criteria-based classification system over a range of emergency care conditions.”

Definitions

• Designation
  – “A process for granting a charter as a preferred pre-hospital receiving facility and/or local or regional referral facility for a certain medical condition or group of related conditions.”


Definitions

• Regionalization
  – “The matching of medical resources to patient needs in order to maximize health benefits and outcomes while minimizing cost and use of resources over a specified geographic area. In general, this process implies a level of organization beyond the local level, but below the national level.”

Regionalization in EMS Systems

– Either primary transport to pediatric critical care centers or trauma centers
– Primary stabilization and plan for transfer with consultation to appropriate services within the state (e.g. Tennessee)
Definitions

• Verification
  – “The act of reviewing, assessing, inspecting or testing in order to establish that a service or system meets pre-determined standards.”

Verification in EMS Systems

– Can be voluntary
– EMS may play a role (e.g. Emergency Departments Approved for Pediatrics)
– Role of the Pediatric Emergency Care Coordinator

Vertical Categorization

Figure 1. A Scheme for the Vertical Categorization of Hospital Emergency Services

Horizontal Categorization of ED Services

Figure 2. A Scheme for the Horizontal Categorization of ED Services


Regionalization of Pediatric Emergency Care


Regionalization of Pediatric Emergency Care

Process of Regionalization of Pediatric Emergency Care

1. Rapid EMS response
2. Transport to nearby facility with ability to stabilize pediatric medical emergencies
3. Transfer to a regional center with pediatric critical care services for high-risk critical illnesses
4. Eventual transition back to the community-based medical home

*Each step must be fully functioning*

Models of Regionalization

- Hub and Spoke Model vs Web Model
  - Back and forth exchange of information and resources
  - Regional centers provide community-based hospitals with pediatric emergency care education and protocols
  - Consultations via telemedicine may reduce transfers and facilitate ongoing management

**ROLE OF EMS IN DEVELOPING REGIONALIZED SYSTEMS OF PEDIATRIC EMERGENCY CARE**
Local EMS Systems and Regionalization of Pediatric Emergency Care

• Ensure pediatric equipment and supplies
• Adopt pediatric policies and protocols
• Promote continuing education activities
• Incorporate pediatric-specific needs into hospital disaster planning
• Develop facility verification programs
• Establish pediatric advisory committees
• Appoint pediatric EMS medical directors

State EMS Systems and Regionalization of Pediatric Emergency Care

• Appoint pediatric emergency and trauma specialists to state EMS advisory committees
• Hold educational forums on pediatric emergency care
• Facility categorization process
• Incorporate pediatric-specific needs into state disaster plans and drills
• Incorporate pediatric-specific indicators in state QI process

State EMS Systems and Regionalization of Pediatric Emergency Care: Working with State EMS for Children Program

• Assessment of optimal distribution of pediatric regional centers
• Continual monitoring of regionalized services
• Assist with drafting state regulations
REGIONALIZATION OF PEDIATRIC EMERGENCY CARE: CHALLENGES AND VISION

Challenges to Implementation of a Regionalized System of Emergency Care

- Lack of local resources including physician expertise and critical care capability of hospitals
- Availability of evidenced-based standards to categorize and designate
- Effect of categorization on prehospital destination protocols
- Effect on patient flow, reimbursement, distribution of patients
- Effect on patient outcomes
- Effect on physician and nurse procedural experience

Regionalized System for Pediatric Care

- Pros
  - Patients transported to hospitals with optimal capability to address their condition
  - Allows for appropriate distribution of expensive personnel and other resources
- Cons
  - Unclear effect on capabilities of local providers to provide pediatric critical care or resuscitations when rarely performed
  - Public may self-triage or bypass inappropriately
Conclusions

• Pediatric emergency care coordinators can play a critical role in EMS systems
• Verification processes involving EMS system administrators can improve pediatric readiness
• Regionalization of care has pros and cons but likely the vision of the future
• EMS systems will be challenged with creating regionalized care for children

Questions?

Tools of the Trade

• Online and Offline Pediatric Medical Direction Resources
  – Children with Special Healthcare Needs: A Template for Prehospital Protocol Development
  – Model EMS Clinical Guidelines
  – Improving EMS Medical Direction for Pediatric Patients
  – EMS for Children National Resource Center (NRC) Medical Direction Toolbox
  – Consent of EMS for children and adolescents
• Educational Resources:
  – Teaching Resource for Instructors in Prehospital Pediatrics
  – Pediatric Education of Prehospital Professionals
  – Emergency Pediatric Care
  – EMS for Children NRC Prehospital Education Toolbox
  – Special Children’s Outreach and Prehospital Education (SCOPE)
  – EMS for Children NRC Patient- and Family-Centered Care Toolbox
  – EMS for the Pediatric Emergency Physician
Tools of the Trade

• Disaster Resources
  – EMS for Children NRC Pediatric Disaster Preparedness Toolbox
  – Pediatric Disaster Preparedness Resource
  – Pediatric Disaster Triage: JumpSTART
  – California EMS for Children Pediatric Disaster Preparedness Guidelines for Local EMS Agencies
  – Pediatric Preparedness Resource Kit
• System-Based Policies and Procedures
  – Joint position statement on Equipment for Ambulances
  – Models for Facility Categorization
  – EMS for Children NRC Facility Categorization Toolbox
  – EMS for Children NRC Interfacility Transfer Toolbox
  – Guidelines for Air and Ground Transport of Neonatal and Pediatric Patients
  – EMS for Children NRC Facility Categorization Toolbox