Guidelines for Prehospital Pediatric Protocol Development

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Technical Advisory Committee

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Guidelines for Pre-hospital Pediatric Protocol Development

INTRODUCTION

In 2006, the Institute of Medicine (IOM) issued three reports on *The Future of Emergency Care in the United States Health System*. These reports identified pediatric specific issues that should be addressed within emergency medical services (EMS) systems. Recommendations included the development of evidenced-based protocols for prehospital and emergency care including those for children. In addition, the Federal Emergency Medical Services for Children (EMSC) Program has developed performance measures for the care of children within emergency care systems which state prehospital provider agencies have online and offline pediatric medical direction available. This includes the creation and implementation of pediatric specific protocols. The State of California Emergency Medical Services Authority EMS for Children (EMSC) Technical Advisory Committee (EMSC-TAC) recognizes that many local EMS agencies within the state have previously integrated pediatric care within their overall protocols for prehospital care. In this document the EMS Authority, informed by the EMSC-TAC, recommends local EMS agencies address specific issues in the development of pediatric protocols:

- Definition of a Pediatric Patient
- Pediatric Assessment
- BLS and ALS Management Principles
- Pediatric-Specific Protocols
- Integration of Pediatric Considerations into General Protocols

In addition, this document provides references for protocols from other states and from within California as examples for local EMS agencies that wish to update their protocols or that have not yet initiated protocol development for children.

DEFINITION

The definition of a pediatric patient should be clearly defined within EMS protocols. There is some variability amongst EMS systems of the age definition of a pediatric patient. For the purposes of this document, the definition of a pediatric patient is as follows:

> Patient ≤ 14 years of age or those whose weight is ≤ 36 kg as determined by a length-based resuscitation tape.

Patients who are known to be less than 15 years of age but whose weight exceeds 36 kg may still be considered pediatric patients given their chronological age; however weights will then need to be estimated and adult dosages should be used.

Although patients >14 years of age and <21 years of age are often considered "pediatric"; this group should be considered as adolescent/young adults and should be managed based on maturity level. Drug and equipment sizing should be based on adult doses and sizes.

The following are age classifications of pediatric patients that may assist prehospital personnel in their assessment and management of pediatric patients:

- Neonate: newborn up to first 28 days of life
- Infant: comprises neonatal period up to 12 months
- Toddler: 1-3 years
- Pre-school: 4-5 years
- School-age: 6-10 years
- Adolescent: 11-14 years

Children with Special Health Care Needs (CSHCN) are children who have any type of condition that may affect normal growth and development. This may include physical disability, developmental or learning disability, technologic dependency, and chronic illness. CSHCN may be any age. It is important to consider developmental age, rather than chronological age when working with this population.

All prehospital personnel should have the capability to assess the pediatric patient, form a general impression, and begin life saving management.

PEDIATRIC PROTOCOLS

Prehospital EMS providers are given several tools to assist them in providing the standard of care for children. One of the most important of these tools is a prehospital pediatric care protocol. As local EMS agencies develop pediatric protocols, the inclusion of pediatric-specific assessment guidance for medical/ traumatic conditions, including the evaluation of pain, is recommended.

Pediatric Assessment

The following pediatric assessment elements will assist the local EMS agency in providing its prehospital care providers guidance in assessing children. These elements may be provided as a separate Assessment Protocol or incorporated within individual protocols as pediatric-specific assessment considerations.

Pediatric Assessment may include the following:

1. Scene safety
2. Scene survey with attention to risk of child maltreatment or non accidental trauma Provider and patient safety; dangers such as trauma or infection
3. Pediatric Assessment Triangle
   A. Appearance
   B. Work of Breathing
   C. Circulation to the Skin
4. Formulation of the general impression which may dictate initial management priorities
   A. Stable
   B. Respiratory Distress
      a. Wheezing – lower airway obstruction
      b. Stridor – upper airway obstruction
      c. Tachypnea / Rales / Crackles – disease of the lungs
   C. Respiratory Failure
   D. Shock
   E. Central Nervous System / Metabolic disorders
   F. Cardiopulmonary Failure/Cardiopulmonary Arrest
5. Initial assessment includes vital signs
   A. Vital sign assessment to include heart rate, respiratory rate, blood pressure, and oxygen saturation and end tidal CO2 values as appropriate
   B. Vital sign limits by age which are potentially dangerous should be identified and a management strategy delineated
6. Focused history and physical exam
   A. Assessment of pain that is age appropriate
7. Detailed physical exam as indicated
8. Ongoing assessment

Pediatric Protocols – Guidelines for Management

The following elements of patient care reflect variations in the management of pediatric patients based upon local EMT scope of practice and availability of regional resources. Local EMS agencies should provide their prehospital providers with the most current pediatric-specific management guidelines for Basic Life Support (BLS) and Advanced Life Support (ALS).

Basic Life Support Management

1. Basic Airway
2. Shock Management
3. AED use in children
4. Spinal Stabilization Strategies for Children
5. Special Circumstances
   A. Family-Centered Approach/Care
   B. Emergency Childbirth and Neonatal Resuscitation
   C. Provider assists with medications such as oral glucose, albuteol inhaler, epinephrine injector (Epi-pen), or hydrocortisone
   D. Evaluation of the scene for risk of child maltreatment or for non-accidental trauma or abuse
6. Transport considerations
   E. Need for ALS intercept
   F. Appropriate restraint for transport
   G. Local EMS agency criteria for transport of pediatric patients to specialty center versus the closest receiving center (e.g. Perinatal Center, Pediatric Trauma Center, Trauma Center, Burn Center, Emergency Department Approved for Pediatrics, Pediatric Medical Center or Pediatric Critical Care Center)

Advanced Life Support Management

Includes all BLS management as outline above and the following:

1. Rapid determination of weight (in kg only) in order to determine appropriate equipment sizing and medication dosing
2. Airway management strategies
3. Vascular access strategies
4. Manual defibrillation
5. Pain assessment and management that is developmentally based
6. Special considerations:
   A. Technology dependent children (e.g. tracheostomy management, use of indwelling central lines, home ventilator management, indwelling devices such as vagal stimulators, G or J tubes, and insulin pumps)
   B. Determination of death / termination of resuscitation
   C. Child maltreatment considerations for traumatic injury, burns, seizure, poisoning, hyperthermia, altered level of consciousness (ALOC) and apparent life threatening events (ALTE)

7. Transport considerations
    D. Regionalization issues to include criteria for transport of pediatric patients to specialty center versus the closest receiving center (e.g. Perinatal Center, Pediatric Trauma Center, Trauma Center, Burn Center, Emergency Department Approved for Pediatrics, Pediatric Medical Center or Pediatric Critical Care Center)

Pediatric Specific Protocols

The care of pediatric patients in the EMS environment is challenging for the most seasoned EMS personnel. Children have unique medical and developmental needs that are best addressed through specific guidance. It is recommended that local EMS agencies develop pediatric-specific protocols in the following categories to guide EMS personnel in the assessment and care of children.

Pediatric Specific Protocols

1. Pediatric Assessment and General Care
2. Apparent Life Threatening Event
3. Altered Level of Consciousness
4. Allergic Reactions/Anaphylaxis
5. Medical Cardiopulmonary Arrest
    A. Death of a Child (SIDS) or Sudden Unexplained Infant Death
    B. Asystole/ PEA/ VTach-Vfib
6. Child Maltreatment or Non-Accidental Trauma or Abuse
7. Childbirth
    A. Neonatal Resuscitation
8. Diabetic Emergencies
    A. Hypoglycemia
    B. Suspected Diabetic Ketoacidosis
9. Dysrhythmias
    A. Symptomatic Bradycardia
    B. Supraventricular Tachycardia
10. Fever
11. Poisoning
12. Respiratory Distress
    A. Wheezing (Asthma, Bronchiolitis)
    B. Stridor (to include Foreign Body Aspiration, Croup)
    C. Rales
    D. Tracheostomy Emergencies
13. Seizures
14. Shock
15. Technology Dependent Children with Special Healthcare Needs

16. Trauma
    A. Traumatic Arrest
    B. Multisystem Trauma
    C. Head Trauma
    D. Isolated Extremity Trauma
        a. Pain Assessment and Management
    E. Burns
        b. Pain Assessment and Management

Pediatric Management Integrated into a General Protocol

The following provides specific diseases and conditions where it is recommended local EMS agencies integrate pediatric-specific management considerations within general prehospital care protocols.

Environmental

1. Bites and Stings
2. Decompression Emergency
3. Hyperthermia
4. Hypothermia
5. Submersion Injury
6. Organophosphate Emergency

Medical

1. Behavioral Emergency
2. Chest Pain
3. Dystonic Reaction
4. Hypertension
5. Non-Traumatic Abdominal/Pelvic Pain
6. Non Traumatic Hypotension/Poor Perfusion
7. Seizure (adult)
8. Stroke/acute Neurologic Deficits
9. Syncope

Trauma

1. Traumatic Crush Injury/Syndrome

RESOURCE LIST OF PROTOCOL EXAMPLES

This list of reference protocols was accessed in 2011. The scope of practice may vary from state to state and from region to region. The provision of these protocols in this document does not signify an endorsement by the EMS for Children Technical Advisory Committee or the EMS Authority but are provided as examples of existing pediatric protocol development.

National Association of EMS Physicians Model Protocols (2003)
http://www.chems.alaska.gov/ems/Assets/EMSC/ModelPediatricProtocols.pdf

State of Illinois Pediatric Protocols (2008)
http://www.luhs.org/depts/emsc/Prehospital.pdf

State of Minnesota BLS and ALS Pediatric Protocols (2009)
http://www.emsrb.state.mn.us/docs/BLS_pediatric_guidelines.pdf
http://www.emsrb.state.mn.us/docs/ALS_pediatric_guidelines.pdf

State of Utah Pediatric Guidelines (2009)
http://health.utah.gov/ems/emsc/pediatric_protocol_guidelines.pdf

San Diego County EMS Agency Pediatric Treatment Protocols (2009)
http://www.co.san-diego.ca.us/hhsa/programs/phs/documents/EMS-PolicyProtocolManual_2009online.pdf

Los Angeles County EMS Agency Manuals & Protocols
Pre-hospital Care Manual (2011)
Color Code Drug Doses for L.A. County Kids / Ref. No 1200 Treatment Protocols Index-(Pediatric)
http://ems.dhs.lacounty.gov/ManualsProtocols/Manuals.htm

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