ABSTRACT. The care of critically ill children has become more complex and demanding. This document establishes recommendations for developing regionalized integration of the care of these children into the emergency medical services system. These recommendations were developed by pediatricians with expertise in pediatric critical care, transport, and emergency medicine from the Committee on Pediatric Emergency Medicine, and the Pediatric Section of the Society of Critical Care Medicine Task Force on Regionalization of Pediatric Critical Care. The document was developed from existing guidelines from a number of professional organizations including the American Academy of Pediatrics and the Society of Critical Care Medicine, a thorough review of the literature, and expert consensus.

ABBREVIATIONS. EMSC, emergency medical services for children; AAP, American Academy of Pediatrics; ACS, American College of Surgeons; AMA, American Medical Association; SCCM, Society of Critical Care Medicine; EMS, Emergency Medical Services; PICU, pediatric intensive care unit; CRPC, comprehensive regional pediatric center.

There is broad recognition of the need for improved care of critically ill or injured children. This document addresses this need in the context of regionalized systems of care providing emergency medical services for children (EMSC). A generalized system appropriate to diverse geographic, demographic, and political environments is described.

General guidelines for prehospital and emergency department triage, referral, and interfacility transport to pediatric critical care centers are recommended, which are included in previously published guidelines from the American Academy of Pediatrics (AAP), the American College of Surgeons (ACS), the American Medical Association (AMA), and the Society of Critical Care Medicine (SCCM), as well as from a variety of state and local governmental agencies and professional organizations. These recommendations provide a framework for a rational system that is flexible enough to accommodate local circumstances. These recommendations also provide information to governmental and voluntary organizations concerned with the development of emergency medical systems and may assist individual institutions in assessing their own capabilities and roles in an emergency medical care system for children.

In this consensus report, the term child indicates any individual from birth (excluding the significantly premature infant) through adolescence. The term region indicates a geographic area that contains at least 1 tertiary pediatric care facility to which critically ill and injured children are referred, and within which appropriately coordinated care can be provided. Boundaries of a region may include multiple existing county, state, or Emergency Medical Services (EMS) boundaries.

RATIONALE FOR REGIONALIZATION

Emergency medical systems have historically been oriented toward adult care. The assessment and management of critical illness and injury in pediatric patients requires specialized training and experience. In areas where specialized pediatric emergency and critical care are not available, the outcome of pediatric critical illness and injury is adversely affected.

The death rate for trauma in children is higher than that of adults with similar injuries, and the discrepancy is greatest in areas without pediatric centers. Many deaths can be prevented with optimal specialized pediatric care. Mortality of pediatric patients with respiratory failure or head injury is lower in hospitals that provide tertiary-level pediatric intensive care than in those that do not. The difference in mortality increases as the severity of illness or injury increases. Furthermore, the presence of a pediatric critical care specialist supervising care leads to lower severity-adjusted mortality for illness and injury in pediatric intensive care units (PICUs). Similar benefits have been shown when regionalized systems have been developed to deal
with groups of patients for whom specialized knowledge and skills are needed such as perinatal care, or specific problems such as trauma.

In its report on Emergency Medical Services for Children, the Institute of Medicine emphasized: "A fundamental position is that society has a special obligation to address the needs of children because they must depend on others for the protection of their health and safety and have no political voice of their own. EMSC must be recognized as a public responsibility; the ‘market’ cannot be relied on to produce the kind of planning and cooperation required to make services available to all who need them."

Additionally, the special resources for optimal care of critically ill or severely injured children are expensive and limited in availability. Regionalization promotes more efficient use and greater availability of such resources.

THE EMSC SYSTEM

EMSC embodies a system that provides a continuum of care for the pediatric patient. The full spectrum of care includes programs for illness and injury prevention, initial problem identification, access to the system, prehospital care, hospital-based emergency care, inpatient and specialized pediatric critical care, and rehabilitative services appropriate for children. Individual patients may require one or many of these components. Although individual features may vary as a function of local circumstances, the central theme of these guidelines is that a system of care be developed for each region to ensure that all children receive the care they need. Such a system provides a degree of planning and coordination that transcends the scope of any single component. To achieve this effectively and efficiently, critical linkages must be formed between the separate components of EMSC to the larger EMS system and to the broader elements of child health care, including illness and injury prevention programs. Such linkages can only be ensured and maintained within a system designed for this purpose.

Important definitions pertaining to a system of care and its components of the critically ill or injured child include:

- **Categorization**, the process of delineating the readiness and capability of a health care facility and its staff to provide care.
- **Accreditation**, which requires that a health care facility apply for and receive approval from a certifying group to qualify as a provider of specified services. The process requires commitment on the part of an accredited facility to maintain its capability for service.
- **Designation**, a process in which facilities are identified as providers of a certain level of care within a specified geographic area. The process usually involves formal evaluation by state or local governmental bodies.
- **Regionalization**, a process of organizing resources within a geographic region to ensure access to medical care of a level appropriate to a patient’s needs, while maintaining efficient use of the available resources. Regionalization incorporates the following:

1. **Categorization** to delineate the resources available in the region;
2. **Accreditation** to verify the commitment to provide the needed services; and
3. **Designation** to ensure that the necessary range of services will be available without inefficient duplication of resources.

Because of the variable availability of and access to essential services in different locales, regionalization is an integral feature of an EMSC system.

ELEMENTS OF A REGIONALIZED EMSC SYSTEM

The specific organization of a regionalized EMSC system will vary, but certain elements are essential. These include:

1. Coordination at the state and regional level to ensure that the responsibilities of the EMSC system are met;
2. Training, equipping, and supervising prehospital care providers; and
3. Participation of emergency care facilities, interhospital transport systems, and pediatric critical care referral facilities.

Coordination

Each state should establish an EMSC system by legislation and/or administrative rule. A lead agency to organize and coordinate all aspects of the EMSC system should be identified. Where an EMSC region logically crosses state lines, a joint interstate agency may be needed. The duties of this agency include the following:

1. Establishing the boundaries of the EMSC region.
2. Establishing the linkages to and relationship with the larger EMS system of which it is a part.
3. Establishing requirements and responsibilities for various levels of pediatric emergency and critical care, including triage, consultation, and transfer criteria.
4. Categorizing, accrediting, and designating facilities for levels of pediatric emergency and critical care.
5. Establishing requirements for training, equipment, and medical control of prehospital emergency care providers, as well as protocols for prehospital care, and criteria for prehospital triage.
6. Establishing criteria for consultation and/or transfer of seriously ill or injured children to a regional center providing special capabilities for the care of such patients.
7. Establishing standards and guidelines for interhospital transport of moderately to critically ill and injured children. Recommended guidelines are available.
8. Ensuring system-wide consideration of children with special medical needs.
9. Establishing a mechanism for collecting, collating, and analyzing patient care and outcome data to permit assessment and improvement of quality of care throughout the system. Such a data system should permit tracking patients from their initial contact with the EMSC system through final hos-
pital discharge to their medical home.\textsuperscript{21} Data collected should include, as a minimum, a common data set for all regions, so that a national database will evolve. This will permit evaluation of regional variations and their effects. Linkage of the data obtained in different settings is important to ensure the capacity to “track” a patient from initial contact with the EMSC system until discharge from that system to the patient’s medical home.

It is important that all health care providers involved with this process be given the opportunity to participate in the development of system organization.

Prehospital Care

The level and specific features of prehospital care vary depending on local circumstances.

1. Training, equipment, and experience for prehospital care providers have historically been oriented toward adult emergencies and therefore are often insufficiently prepared for pediatric emergencies.\textsuperscript{8,9,22} Prehospital care providers may also include lay first responders. It is important to ensure that appropriate education and training of the public includes the handling of pediatric emergencies and the prevention of further illness or injury until professional providers arrive to assume care.

2. Primary care pediatricians and other primary care physicians should ensure that the appropriate training and equipment is available to address pediatric emergencies in their patients’ “medical home.”

3. Prehospital care providers may also include lay first responders. It is important to ensure that appropriate education and training of the public includes the handling of pediatric emergencies and the prevention of further illness or injury until professional providers arrive to assume care.

4. Equipment and supplies appropriate for all sizes of children should be carried on all ambulances and emergency transport vehicles.

5. Medical direction for pediatric emergency care should be available 24 hours a day for all levels of prehospital care. Rapid consultation with a comprehensive regional pediatric center (CRPC),\textsuperscript{1} either directly from the field or via the physician director, should be accessible 24 hours per day.

6. Prehospital transport should be to the closest appropriate facility. Some critically ill or injured patients may require transport directly to a CRPC, even if a lower level facility is closer.

Facilities

Guidelines for facilities within an EMSC system necessary for the care of critically ill and injured children have been developed.\textsuperscript{24} These include guidelines for emergency departments, PICUs and other inpatient services, and interfacility transport.

**IMPLEMENTATION**

Implementation of any regionalized system involves a complex medical environment that includes a variety of traditional and managed care systems. Implementation can be achieved through voluntary association of those involved, including prehospital care providers, hospitals, physician and nursing professional organizations, insurance companies, and health care professional organizations. EMSC should have broad public and professional support throughout the community. Fundamental to a regionalized EMSC system, however, is the principle that specialized pediatric emergency and critical care be available to all children in need, without regard to financial resources or insurance plans. This suggests that state governmental involvement is essential to ensure representation of the public interest, adequacy of resources, and compliance with the EMSC plan. Currently 8 states (California, Colorado, Hawaii, Louisiana, New Jersey, Oklahoma, Texas, and Virginia) have enacted legislation establishing comprehensive EMSC systems including regionalization in some form. Three other states have legislated specific aspects of EMSC (Florida, Ohio, and Utah). Similar legislation is under consideration in 4 additional states (Illinois, Oregon, Rhode Island, and South Carolina). It seems evident that local circumstances will dictate a variety of approaches, but that a legislative and/or administrative initiative is needed to facilitate regionalization of EMSC. It is the responsibility of those who care for children to take the initiative, mobilize public and professional support, and provide leadership in promoting the development of this regionalized system.
18. Wisconsin DHSS. Section of Emergency Medical Services: Improving Emergency Medical Services for Children in Wisconsin: Saving Little Lives for Big Futures: Project Comprehensive Report. Madison, WI: Department of Health and Social Services, Division of Health, Bureau of Environmental Health, Section of Emergency Medical Services; 1990

REFERENCES

SUGGESTED READINGS
American Academy of Pediatrics, Committee on Hospital Care, Section on Critical Care, and the Society of Critical Care Medicine, Pediatric Section Admission Criteria Task Force. Guidelines for developing admission and discharge policies for the pediatric intensive care unit. Pediatrics. 1999;103:840–842
Weinberg JA. Trauma and severe illness in children: how are they alike and different? In: Emergency Medical Services for Children. Columbus, OH: Ross Laboratories; 1989:34–39
Consensus Report for Regionalization of Services for Critically Ill or Injured Children

American Academy of Pediatrics, Committee on Pediatric Emergency Medicine Pediatric Section American College of Critical Care Medicine and Society of Critical Care Medicine, Pediatric Section, Task Force on Regionalization of Pediatric Critical Care

Pediatrics 2000;105;152

| Updated Information & Services | including high resolution figures, can be found at: /content/105/1/152.full.html |
| References | This article cites 20 articles, 7 of which can be accessed free at: /content/105/1/152.full.html#ref-list-1 |
| Citations | This article has been cited by 10 HighWire-hosted articles: /content/105/1/152.full.html#related-urls |
| Permissions & Licensing | Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: /site/misc/Permissions.xhtml |
| Reprints | Information about ordering reprints can be found online: /site/misc/reprints.xhtml |
Consensus Report for Regionalization of Services for Critically Ill or Injured Children

American Academy of Pediatrics, Committee on Pediatric Emergency Medicine
Pediatric Section American College of Critical Care Medicine and Society of Critical Care Medicine, Pediatric Section, Task Force on Regionalization of Pediatric Critical Care

Pediatrics 2000;105;152

The online version of this article, along with updated information and services, is located on the World Wide Web at:
/content/105/1/152.full.html