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Standard Guide for Development and Operation of Level 1 Pediatric Trauma Facilities[1]

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1. Scope

1.1 This guide establishes minimum guidelines for the development and operation of a pediatric trauma facility in a children's or general hospital. A pediatric trauma facility is an institution whose medical and administrative leadership has expressed the personal, institutional, and financial commitment to optimal care of the injured child 24 h a day, 365 days a year.

1.2 This guide defines the system, organizational structure, clinical personnel, and physical equipment necessary for a pediatric trauma facility, whether freestanding or a joint adult/pediatric facility in either a children's hospital or general hospital committed to the care of injured children.

1.3 The criteria outline in this guide incorporates levels of categorization and their essential or desired characteristics.

2. Referenced Documents

2.1 *ASTM Standards:*

F 1224 Guide for Providing System Evaluation for Emergency Medical Services[2]

3. Terminology

3.1 *Definitions:*

3.1.1 *trauma care system*—a coordinated network of emergency medical systems (EMS) comprised of one or more trauma centers linked by triage protocols, appropriate communications, transportation services, and prehospital care to manage effectively the injured child from initial injury to complete rehabilitation. The trauma care system is a subsystem within the EMS system.

3.1.2 *trauma center*—a hospital that has made the institutional commitment to fulfill all criteria outlined in Sections 1 through 4 and where available be designated by the appropriate authority.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *pediatric patient*—a patient whose morphologic growth potential has not been completed. In general, a patient less than 15 years old or consistent with local practice.

4. Significance and Use

4.1 The purpose of this guide is to provide guidelines for categorizing pediatric trauma centers to ensure consistency of pediatric trauma care throughout the nation. The guidelines will form the quantitative basis for audit and ongoing quality assurance.

4.2 This guide can be used in conjunction with objective quality assurance outcome measures as outlined in Guide F 1224.

4.3 This guide can be used by local, regional, and national authorities to establish pediatric trauma centers.

5. Implementation of Pediatric Trauma Facilities

5.1 The implementation of a pediatric trauma facility designation will be conducted consistent with the regulation of local, state, and federal government authorities having jurisdiction for this process.

5.2 The most significant ingredient necessary for optimal care of the pediatric trauma patient is commitment, both personal and institutional. For the institutions, optimal care means providing capable personnel who are immediately available, sophisticated equipment, services that are frequently expensive to purchase and maintain, and priority of access to laboratory, radiology, operating suites, and intensive care facilities and services. For the medical and nursing staff, optimal care means a commitment to the concept of adequate staffing, prompt availability, continuing education, and quality assurance.

5.3 It is recognized that a Level I pediatric trauma center should be located in a facility providing comprehensive care for children. The institutions must demonstrate a continuing commitment to a high level of pediatric trauma care. Methods of demonstrating the commitment to the trauma system shall include, but not be limited to, a broad resolution that the hospital governing body agrees to do the following:

5.3.1 Participate in the operations and integration of a regional or statewide system, to ensure pediatric patient care data for system management, quality assessment, and operations research,

5.3.2 Establish policy and procedures for the maintenance of services essential for a trauma center/system,

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[2] *Annual Book of ASTM Standards*, Vol 13.02.

5.3.3 Ensure that all pediatric trauma patients will receive medical care to the level of the institution's accreditation, and

5.3.4 Establish a priority admission for the pediatric trauma patient to the full services of the institution, including adequate resuscitation facilities and personnel, operating room availability, and intensive care unit availability. The Level I pediatric trauma center must assume the responsibility for ensuring prompt access for all patients requiring trauma care.

5.3.5 Written transfer agreements to receive and transfer the pediatric trauma patient must be in place.

5.3.6 The pediatric trauma center must have the capability to receive the pediatric trauma patient by ground or by air.

6. Criteria for Level I Pediatric Trauma Facilities

6.1 *Participation Requirements*:

6.1.1 Designation as a Level I trauma center confers upon a facility the recognition that it has the commitment, personnel, and resources to provide optimum medical and psychological care for the critically injured child.

6.1.2 The center shall have appropriate support services for the child and the family and commitment to the ongoing care and total rehabilitation of the patient. This shall include the following:

6.1.2.1 Evidence of appropriate social service intervention and follow-up,

6.1.2.2 Identification of members of the rehabilitation team,

6.1.2.3 Discharge summary of the trauma care to the patient's private physician, where appropriate, and

6.1.2.4 Documentation in the patient's medical record of the post-discharge plan.

6.1.3 A Level I pediatric trauma center shall demonstrate its capability to manage injured and their sequelae to major injuries or critical conditions such as:

6.1.3.1 Signs of shock or hypotension associated with one or more system injuries,

6.1.3.2 Fractures of the axial skeleton,

6.1.3.3 Two or more proximal long-bone fractures,

6.1.3.4 Amputation or traumatic avulsion of one or more extremities proximal to digits,

6.1.3.5 Suspected or actual spinal cord injuries,

6.1.3.6 Head injuries,

6.1.3.7 One or more system injuries requiring pediatric intensive care, intracranial pressure monitoring, or mechanical ventilation support, and

6.1.3.8 Thermal or chemical injury.

6.2 *Service Requirements*:

6.2.1 Criteria guidelines embrace administrative and physical attributes of individual trauma centers. By this means, autonomous functioning of the trauma service may be ensured, and its staffing and direction sharply defined. The definition of bed capacity, intensive care unit, operating room capability, and proximity to an availability of supporting services (radiology, laboratory, and so forth) are important features of the concept. The intent is to ensure the optimal coordination of services for the trauma patient.

6.2.2 The hospital shall have an organized, defined trauma service within the institutional structure that shall consist of the following:

6.2.2.1 A pediatric surgeon as chief of the pediatric trauma service who shall have special interest and experience in major pediatric trauma care and the leadership skills to head a multidisciplinary team approach to the management of the patient. This surgeon shall have a significant time commitment to major trauma care.

6.2.2.2 The pediatric trauma service shall have designated pediatric specialists available 24 h per day for care of the major trauma patients.

6.2.2.3 Children with significant injuries shall undergo evaluation by the trauma service and disposition to the appropriate hospital service.

6.2.2.4 All pediatric trauma patients shall be treated by personnel who are organized as a team and available in-house from the major trauma service and the pediatric service 24 h per day with attending coverage as specified.

6.2.2.5 A designated pediatric surgeon is responsible for multidisciplinary and interdepartmental coordination of effort to trauma care.

6.3 *Trauma Service Director*:

6.3.1 Fundamental to the establishment and organization of a hospital's pediatric trauma service is the recognition that the individual identified and accountable for the operation of this service must be qualified to serve in this capacity. The following indicators shall be present:

6.3.1.1 Evidence of qualifications, including pediatric educational preparation in pediatric surgery and a certificate of special qualifications in pediatric surgery,

6.3.1.2 Selection process as defined by the hospital's medical staff bylaws,

6.3.1.3 Participation in local/state/national trauma-related activities,

6.3.1.4 Educational involvement such as the Advance Trauma Life Support (ATLS) course, teaching in the undergraduate, graduate, and postgraduate level training programs within the department of surgery. There shall be evidence of interface and collaboration between nursing management responsible for the trauma nursing service and the physician management responsible for the trauma service,

6.3.1.5 Participation in research and publication efforts of pediatric trauma,

6.3.1.6 Evidence of active participation by the trauma program director in the resuscitation or surgery, or both, of multisystem trauma patients,

6.3.1.7 A job description and organizational chart depicting the relationship between the trauma program director and other hospital clinical services, and

6.3.1.8 Evidence that a multidisciplinary method of providing, monitoring, and evaluating trauma patients throughout their hospital stay is in effect through the hospital organizational plan.

6.4 *Nursing Requirements*:

6.4.1 The hospital organization must define the roles of the nursing team members and their areas of responsibility, accountability, and authority.

6.4.2 It is suggested that the trauma plan for the nursing department include the ability to immediately mobilize qualified nursing resources.

6.4.3 Essential to the overall coordination and integration of the trauma center or system in the hospital is the designation of an individual as the pediatric trauma nurse coordinator. The trauma nurse coordinator should be responsibile for monitoring and promoting all trauma-related activities associated with patient care, and for providing documented evidence thereof.

6.4.3.1 Participation in trauma educational activities separate from the institution's in-house trauma education program as either program coordinator, consultant, or faculty member shall be required. There must be evidence of specific pediatric nursing practice application. There must be evidence of documentation of this participation.

6.4.4 The following indicators shall be present:

6.4.4.1 Evidence of qualification to include educational preparation, certification, and experience in pediatrics,

6.4.4.2 Participation in local, state, and national pediatric trauma-related nursing activities,

6.4.4.3 Evidence of participation in trauma research through promotion or coordination,

6.4.4.4 A job description and organizational chart depicting the relationship between the trauma nurse coordinator and other services, and

6.4.4.5 Evidence of participation in the establishment of systems to influence the nursing care of pediatric trauma patients.

6.5 *Department Requirements*—There shall be surgery departments, divisions, services, or sections with designated chiefs and staffed by qualified specialists with expertise in pediatrics in the following areas:

6.5.1 Pediatric general surgery,
6.5.2 Orthopedic surgery,
6.5.3 Cardiac surgery,
6.5.4 Vascular surgery,
6.5.5 Neurosurgery,
6.5.6 Urology,
6.5.7 Ear, nose, and throat,
6.5.8 Plastic and maxillofacial surgery,
6.5.9 Oral surgery,
6.5.10 Ophthalmic surgery,
6.5.11 Transplant or transfer agreement,
6.5.12 Reimplantation, or appropriate transfer agreement, and
6.5.13 Obstetrics and gynecologic surgery consultation.

6.6 *Physician Requirements*:

6.6.1 *Specialists*—Specialists shall be available in-hospital 24 h per day, as follows:

6.6.1.1 Pediatric surgical attendant or resident,
6.6.1.2 Pediatric attendant or resident,
6.6.1.3 Anesthesiologist or resident, and
6.6.1.4 Neurosurgical attendant or resident, or surgical designee of chief of neurosurgery.

6.6.2 *Attending Staff*—Attending (on-site) staff with expertise in pediatrics shall be on-call and promptly available in the following areas:

6.6.2.1 Orthopedic surgery,
6.6.2.2 Ophthalmic surgery,
6.6.2.3 Ear, nose and throat,
6.6.2.4 Plastic surgery,
6.6.2.5 Oral surgery,
6.6.2.6 Urologic surgery,
6.6.2.7 Hand surgery,
6.6.2.8 Burn,
6.6.2.9 Radiology,
6.6.2.10 Vascular radiology,
6.6.2.11 Neuroradiology,
6.6.2.12 Mental health services,
6.6.2.13 Pediatric medicine,
6.6.2.14 Pediatric critical care,
6.6.2.15 Neurosurgery, and
6.6.2.16 Anesthesia.

6.6.3 *Pediatric Consultation*—Specialists shall be on-staff and available on-site to respond for pediatric consultation in the following areas:

6.6.3.1 Cardiology,
6.6.3.2 Gastroenterology,
6.6.3.3 Hematology,
6.6.3.4 Infectious disease,
6.6.3.5 Psychiatry,
6.6.3.6 Neurology,
6.6.3.7 Pulmonary disease,
6.6.3.8 Clinical pathology,
6.6.3.9 Rehabilitation medicine, and
6.6.3.10 Nephrology.

6.6.4 *Subspecialists*—All subspecialists in a Level I specialty pediatric trauma center shall be board certified subspecialists where appropriate.

7. Hospital Resource Requirements

7.1 *General*—A Level I pediatric trauma facility shall have all of the hospital resources described in this section.

7.2 *Emergency Department*:

7.2.1 The hospital shall have an easily accessible and identifiable designated resuscitation area used for neonate, pediatric/adolescent major trauma patients.

7.2.2 The physical environment shall have areas for at least two simultaneous resuscitations.

7.2.3 The hospital should demonstrate a commitment to pediatric emergency care, and demonstrate compliance with the following requirements:

7.2.3.1 The designated trauma resuscitation area must be of adequate size to accommodate the full trauma resuscitation team.

7.2.3.2 Adequate facilities and personnel must be available within the emergency department to care simultaneously for more than one multisystem trauma patient. Back up areas to accomplish this need not be separately designated but should be immediately available.

7.2.3.3 Under normal conditions, the emergency department shall be open at all times.

7.2.3.4 All closures of the emergency department, for whatever reasons, shall be documented with notification of appropriate authorities and institutions.

7.2.3.5 The institution shall develop formal written protocols with neighboring trauma centers to accept trauma patients when bypass is mandatory.

7.2.4 *Receiving Personnel*—Emergency department or trauma receiving area personnel shall be comprised of at least the following:

7.2.4.1 There shall be a designated physician qualified in emergency care and pediatrics, and a nursing director of the emergency department.

7.2.4.2 There shall be 24-h in-house immediate coverage and response to the emergency department with a team approach to the initial management of the pediatric major trauma patient.

7.2.4.3 A paging system shall function to immediately mobilize the team.

7.2.5 *Emergency Department Team*—The team shall be comprised of at least the following personnel who are immediately available and responsible for resuscitation and stabilization of the patient:

7.2.5.1 *Physician*, with special competence in the care of the critically injured pediatric patient who is a designated member of the trauma team and physically present in the emergency department 24 h a day with training in emergency medicine and pediatrics, or appropriate subspecialities.

7.2.5.2 *Pediatric Resident or Staff*, PGY-3 (postgraduate year 3).

7.2.5.3 *Surgical Resident(s) or Staff*, PGY-3/4.

7.2.5.4 *Anesthesiologist Physician*—Initial response may be an anesthesiology resident at PGY 3/4 level responsible to attending anesthesiologist who is immediately available. When a residency trained pediatric anesthesiologist is not available there must be the ability to demonstrate the experience or special education of the anesthesiologist in the pediatric age group.

7.2.5.5 *Respiratory Therapist*.

7.2.5.6 *Registered Nurses*—A minimum of two registered nurses per shift, functioning in trauma resuscitation, who have documented experience in the care of injured children.

(a) All registered nurses shall be educated in trauma nursing.

(b) All registered nurses assigned to the department must receive training in pediatrics.

(c) The patient classification system utilized by the institution should define the severity of injury or illness, which indicates the number of nursing staff needed to adequately provide patient care.

(d) Appropriate nursing documentation for the trauma patient must be present.

(e) Evidence of annual continuing education in pediatric trauma care is required.

7.2.6 *Equipment and Drugs*—Equipment and drugs shall be available to the emergency department 24 h per day for the resuscitation and stabilization of the following conditions or injuries in the pediatric patient:

7.2.6.1 Unstable or potentially unstable airway,

7.2.6.2 Unstable or potentially unstable cardio-vascular system,

7.2.6.3 Open and closed head injuries,

7.2.6.4 Open and closed fractures,

7.2.6.5 Spinal cord or column injuries,

7.2.6.6 Facial injuries,

7.2.6.7 Thoraco-abdominal injuries,

7.2.6.8 Amputation,

7.2.6.9 Burns, and

7.2.6.10 Toxicology.

7.2.7 Equipment and drugs in the emergency department, all sized as appropriate for the pediatric patient, shall include, but not be limited to, at least one of each of the following items:

7.2.7.1 Resuscitation stretcher,

7.2.7.2 Airway control ventilator available, bag mask oxygen (O_2) suction, endotracheal tubes, laryngoscopes, tracheostomy set, and other appropriate respiratory equipment,

7.2.7.3 Electrocardiographic (ECG) monitor, oscilloscope, intracranial pressure monitor, and defibrillators with internal paddles,

7.2.7.4 Central venous pressure monitors,

7.2.7.5 Intravenous insertion sets for pediatric patients,

7.2.7.6 Drugs and intravenous fluids for all emergency situations with appropriate administrative devices,

7.2.7.7 Pediatric dose chart, immediately accessible and prominently displayed,

7.2.7.8 Mobile X-ray capability with 24-h in-house technician,

7.2.7.9 Communication between emergency transport system and emergency room personnel,

7.2.7.10 Thoracotomy trays,

7.2.7.11 Peritoneal lavage tray,

7.2.7.12 Appropriate lighting for emergency surgery,

7.2.7.13 Pediatric pneumatic antishock garments,

7.2.7.14 Pediatric suction equipment,

7.2.7.15 Pediatric skeletal tongs and splinting,

7.2.7.16 Neck immobilization device,

7.2.7.17 Thermal control equipment for patient, blood, and environment,

7.2.7.18 Patient weighing devices,

7.2.7.19 Intraosseous infusion set,

7.2.7.20 Needle cricothyroidotomy set, and

7.2.7.21 Cranial burr hole set.

7.3 *Operating Suite (Special Requirements)*—The operating suite shall be staffed and equipped to handle all children who are present in the emergency department and are in need of immediate surgical intervention, and, at a minimum, shall meet the following requirements:

7.3.1 The operating room shall be adequately staffed and immediately available 24 h per day for trauma patients.

7.3.2 A second staffed operating room shall be promptly available and staffed.

7.3.3 *Nursing Personnel*:

7.3.3.1 The operating room registered nursing staff shall have experience and shall be trained as both scrub and circulating nurses in the operating room.

7.3.3.2 At least one registered nurse must be physically present in the operating room.

7.3.4 *Equipment*—The operating room shall contain at least the following equipment:

7.3.4.1 Cardiopulmonary bypass pump-oxygenator,

7.3.4.2 Operating microscope available,

7.3.4.3 Thermal control equipment for patient, blood, and environment,

7.3.4.4 X-ray capability,

7.3.4.5 Pediatric endoscopes, all varieties, or promptly available,

7.3.4.6 Burr hole capability,

7.3.4.7 *Monitoring Equipment*—Electrocardiographic (ECG), continuous blood pressure, ICP, and appropriate respiratory monitors (such as transcutaneous pO_2, CO_2 monitors),

7.3.4.8 Pediatric drug dose chart,

7.3.4.9 Pediatric anesthesia ventilator,

7.3.4.10 Image intensifier available,

7.3.4.11 Fracture table available, and

7.3.4.12 Auto transfuser.

7.4 *Postanesthetic Recovery Room (PAR)*—The postanesthetic recovery room (pediatric intensive care unit is acceptable) shall consist of at least the following:

7.4.1 *Nursing Personnel*—Registered nurses and other essential personnel shall be on duty 24 h a day, and must be competent in postanesthesia care of the pediatric trauma patient.

7.4.2 *Anesthesiologist*—An anesthesiologist with pediatric experience or physician with demonstrated experience in airway management shall be available in-hospital 24 h per day.

7.4.3 *Equipment*—Equipment for resuscitation and to provide life support for the critically or seriously injured neonate, pediatric/adolescent shall include but not be limited to the following:

7.4.3.1 Airway control and ventilation equipment, including laryngoscopes, assorted blades, airways, endotracheal tubes, and bag-mask resuscitators of all sizes (this equipment must be readily available),

7.4.3.2 Oxygen, air, and suction devices,

7.4.3.3 Electrocardiograph, internal and external pediatric paddles, and defibrillator,

7.4.3.4 Apparatus to establish and maintain hemodynamic and ICP monitoring,

7.4.3.5 Appropriate standard intravenous fluids and administration devices, including intravenous catheters,

7.4.3.6 Sterile surgical set for emergency procedures such as thoracotomy and cut-down,

7.4.3.7 Drugs and supplies necessary for emergency care,

7.4.3.8 Temperature control devices for the patient (that is, radiant warmers), for parenteral fluids, and for blood,

7.4.3.9 Temporary cardiac pacemaker, and

7.4.3.10 Appropriate pressure monitoring.

7.5 *Intensive Care Unit*—The hospital shall have a pediatric intensive care unit (ICU) that has separate comprehensive pediatric intensive care capability and is capable of treating all pediatric major trauma patients requiring an ICU.

7.5.1 *ICU Personnel*—The unit shall be staffed at a level to ensure appropriate nurse-patient ratios, as determined by written nursing standards. Pediatric ICU personnel shall, at a minimum, be comprised of the following:

7.5.1.1 A designated medical director for pediatric intensive care, and.

7.5.1.2 Physician on duty in ICU 24 h a day or immediately available from inside the hospital. This physician should be credentialed by the institution in trauma care. The physician on duty in the ICU is not the emergency department physician. There shall be another physician in-house who has experience in pediatric trauma care.

7.5.1.3 *Nursing Staff*:

(a) The patient classification system utilized by the institution should define the patient care workload of the nursing staff.

(b) The pediatric patient shall have nursing care given by a registered nurse who has experience in pediatric nursing.

7.5.2 *Patient Care*—ICU equipment, drugs, and supplies shall be available for the optimal treatment of the following critical conditions or injuries:

7.5.2.1 Unstable airway or pulmonary system,

7.5.2.2 Unstable cardiac system,

7.5.2.3 Unstable cardiovascular system,

7.5.2.4 Head injuries with or without coma,

7.5.2.5 Axial skeletal injuries or fractures,

7.5.2.6 Spinal cord injuries,

7.5.2.7 Fractures, pre- or post-reduction, with or without traction devices,

7.5.2.8 Fluid electrolytes, or metabolic derangements,

7.5.2.9 Visceral injuries,

7.5.2.10 Eye injuries, and

7.5.2.11 Burns, or transfer agreement.

7.5.3 *Equipment*—Equipment of all sizes, as appropriate for pediatric patients, shall include, but not be limited to, the following:

7.5.3.1 *Airway Control Devices*, including endotracheal tubes, ventilating equipment, O_2 source and O_2 concentration devices, and suction,

7.5.3.2 *Electronic Monitors*—Electrocardiographic monitor, heart rate monitors, respiratory monitors, doppler and temperature,

7.5.3.3 *Other Equipment*—Pediatric venous, intraosseous, arterial access trays and catheters including catheterization venous pressure and Swanganz catheters, compartment pressure monitors, pediatric temperature control devices, pediatric dialysis machine, pediatric scales, skeletal traction attachments and instruments, and sterile thoracotomy kit, pulse, oximetry, pressure monitors and other equipment necessary for the care of children,

7.5.3.4 *Drugs*—All necessary drugs for optimal treatment,

7.5.3.5 *Sets*—Intravenous, crystalloid solutions, and pediatric administration sets,

7.5.3.6 *In-Unit and Intra-Hospital Communications*, and

7.5.3.7 *Standard Microtechnique*, required for electrolytes, blood count, arterial blood gases and platelets, urine/serum osmolality, coagulation studies, and capability to accept bacterial cultures, available 24 h in the laboratory.

7.6 *Pediatric Medical-Surgical Units*—These are general medical-surgical nursing unit beds.

7.6.1 *Nursing Staff*:

7.6.1.1 The patient classification system utilized by the institution should define the work load that indicates the number of nursing staff to adequately provide patient care.

7.6.1.2 Pediatric trauma patients will receive nursing care from a registered nurse trained in pediatric care.

7.6.2 *Equipment*—The equipment should support the current status of the patient and be readily available. Equipment for resuscitation and to provide support for the injured neonate, pediatric/adolescent patient shall include, but not be limited to, the following:

7.6.2.1 Airway control and ventilation equipment, including laryngoscopes, assorted blades, airways, endotracheal tubes, bag-mask resuscitator of all sizes (this equipment must be immediately available),

7.6.2.2 Oxygen, air, and suction devices,

7.6.2.3 Electrocardiograph, monitor, and defibrillator to include internal and external paddles,

7.6.2.4 All standard intravenous fluids and administration devices, including intravenous catheters designed with the capacity for delivering IV fluids and medication at rates and in amounts appropriate for children ranging in age from neonate to adolescent,

7.6.2.5 Drugs and supplies necessary for emergency care, and

7.6.2.6 Thoracotomy tube sets and cut down trays.

7.7 *Rehabilitation Medicine*:

7.7.1 *Rehabilitation Plan*—There must be a clearly identifiable comprehensive trauma rehabilitation plan developed for every pediatric trauma patient. If the patient is transferred to another institution for rehabilitation, then records, outcome, and follow-up must be obtained. If a rehabilitation facility is not associated with the institution, a formal written transfer agreement with a rehabilitation center specifically equipped for the care of the children shall be in place.

7.7.1.1 The multidisciplinary pediatric trauma team shall define and implement a mechanism for discharge planning for the pediatric trauma patient.

7.7.1.2 The pediatric trauma rehabilitation plan developed for the pediatric trauma patient shall be under the direction of a psychiatrist or a physician with special competence in pediatric trauma rehabilitation.

7.7.1.3 Ancillary services, such as physical therapy, occupational therapy, speech therapy, play therapy, nutritional therapy, etc., shall have a defined role in the rehabilitative care of the pediatric patient.

7.7.2 *Nursing Staff*:

7.7.2.1 Nursing staff ratios for medical-surgical units caring for the rehabilitation of the post-acute trauma neonate, pediatric/adolescent patients shall be based upon a patient classification system.

7.7.2.2 When a separate rehabilitation unit exists, the nursing staff ratios shall be based on the institution's classification system.

7.7.2.3 The education of the rehabilitation unit nurse shall have emphasis on the pediatric trauma patient's rehabilitation.

7.8 *Burn Center*—A transfer agreement with a burn center shall be in effect if not in-house.

7.9 *Spinal Cord Care*—A team approach to the initial and continued management of the acute spinal cord injury shall exist, and shall include the active participation of members of the rehabilitation service or as stated in a transfer agreement.

7.10 *Hemodialysis*—Hemodialysis capabilities shall be available.

7.11 *Radiology*—Radiological special capabilities shall be available and shall consist of the following:

7.11.1 Angiography of all types,

7.11.2 Sonography,

7.11.3 Nuclear scanning,

7.11.4 Computerized tomography, available 24 h per day, and

7.11.5 General angiography and cerebrovascular aortography, cardiac catheterization, and coronary capability.

7.12 *Blood Laboratory*—Clinical laboratory services shall be available 24 h per day and shall consist of the following:

7.12.1 Standard microtechnique analysis of blood, urine, and other body fluids,

7.12.2 Blood typing and crossmatching,

7.12.3 Coagulation studies,

7.12.4 Comprehensive blood bank with at least ten units of blood (all types) in-house, and access to community central blood bank and adequate hospital storage facilities,

7.12.5 Blood gases determinations immediately available,

7.12.6 Serum and urine osmolality,

7.12.7 Microbiology,

7.12.8 Written protocol that trauma patient receives priority, and

7.12.9 Toxicology testing.

7.13 *Social Service Capabilities*:

7.13.1 Social service intervention shall be available from the time of entry into the facility to the time of discharge. Social workers shall provide psycho-social services as part of an interdisciplinary team. They should be graduates of masters level programs in social work.

7.13.2 Social workers shall be available to the patient, patient's family, significant others, the community, and members of the interdisciplinary team as indicated.

7.13.3 There shall be adequate documentation in the patient's record of the social work services provided.

7.13.4 The social work team should participate in the development and delivery of in-service training for the trauma center staff and the community.

7.14 *Pastoral Counseling*—The opportunity for spiritual counseling should be available. As the injury or illness of a child frequently stresses the bonds of a family unit, it is suggested that there be the opportunity for all spiritual denominations to receive clerical support. This can be accomplished by developing a listing of clergy promptly available to the facility.

8. Education

8.1 Formal programs in continuing medical education specifically concerning pediatric trauma care shall be given by the hospital for the following personnel:

8.1.1 Staff physicians,

8.1.2 Nurses,

8.1.3 Allied health professionals (emergency medical technicians/paramedics),

8.1.4 Community physicians, and

8.1.5 Community nurses (registered nurses or licensed practical nurses).

8.2 Public education shall be provided by trauma hospitals.

8.3 The hospital shall exhibit existing or planned pediatric trauma prevention programs. There needs to be evidence of active programs to increase the public awareness of trauma prevention. The trauma prevention program needs to be internal and external to the facility. These programs can be presented collectively with other hospitals and organizations.

8.4 The hospital must be able to document active involvement in its local and regional emergency medical services (EMS) systems. The hospital can demonstrate involvement in local and regional EMS programs by the following means:

8.4.1 When appropriate, participation in pediatric emergency medical technician training programs,

8.4.2 Joint educational programs to include equipment, supplies, and drugs specific to the neonate and pediatric patient,

8.4.3 Participation in EMS system quality assessment and quality assurance mechanism, and

8.4.4 Assistance in the development of regional policy and procedures.

9. Disaster Plan

9.1 Each hospital shall incorporate into its master disaster plan the utilization of its pediatric major trauma area for children.

9.2 Each hospital shall participate in a process to incorporate its resources and activities into local and regional disaster plans.

10. Research in Pediatric Trauma

10.1 Each hospital shall participate in a registry of all pediatric major trauma admissions with pertinent treatment and outcome data as determined by the regional emergency medical services. The registry must include at a minimum:

10.1.1 Severity of injury, including the probability of dying,

10.1.2 Anatomic site of injury,

10.1.3 Nature of injury,

10.1.4 Mechanism of injury,

10.1.5 Classification of patient injuries, including sub groups,

10.1.6 Demographic information as to age, sex, etc.,

10.1.7 Outcome, and

10.1.8 Active involvement in the research of pediatric trauma care.

11. Protocols and Policies

11.1 The hospital shall provide written protocols and policies to support a systematic and comprehensive approach to the care of the pediatric trauma patient (including child abuse), as follows:

11.1.1 Trauma patient triage protocols,

11.1.2 Trauma team response protocols,

11.1.3 Trauma patient resuscitation and stabilization,

11.1.4 Operating room support, laboratory, X-ray, respiratory therapy, and pharmacy protocols; explicit recognition of the priority given to trauma patients,

11.1.5 Trauma patient transport protocols—emergency room to operating room, hospital to hospital,

11.1.6 Special audit for pediatric trauma deaths at least every month, including autopsy data, and

11.1.7 Monthly morbidity and cost-of-care review.

11.2 *Agreements*—The trauma center or unit shall have the following agreements:

11.2.1 The hospital shall implement a process of peer review regarding the care of the pediatric major trauma patient.

11.2.2 There shall be a system to permit all patients access to services regardless of financial status.

11.2.3 The pediatric trauma center shall agree to an area-wide mortality audit.

11.2.4 The trauma center shall provide evidence of consultation and appropriate transfer agreements with referring hospitals (including organ procurement).

11.2.5 The trauma center shall provide telephone consultation 24 h per day.

11.2.6 There shall be a written by-pass policy.

11.3 *Trauma Conferences*:

11.3.1 Regular trauma conferences, such as the following, are critical to the self evaluation and timely identification of problems for prompt resolution:

11.3.1.1 Pediatric nursing audit,

11.3.1.2 Medical records review, and

11.3.1.3 Long term follow-up of trauma care.

11.3.2 Every trauma admission shall be reviewed at these conferences. Departmental morbidity and mortality conferences do not exempt review by these conferences.

11.3.2.1 Conferences are intended to be major problem identification and problem solving sessions. Therefore, attendance of designated personnel from hospital administration is essential. Attendance is also expected to include physician and nursing personnel, pediatric transport team members, trauma call surgeons, involved consultants, the physician director of the ICU, social services, the prehospital agency, and rehabilitation personnel. The conference should be chaired by the trauma service director.

11.4 Adult and pediatric trauma may be reviewed at the same conference.

11.5 The multidisciplinary pediatric trauma conference, shall be held at least every 3 months.

12. Keywords

12.1 hospital; pediatric trauma; pediatric trauma facility; trauma center