Pediatric Surge Planning

Train the Trainer

Developed by: Rady Children's Hospital in partnership with San Diego County Healthcare Disaster Council

About RCHSD

Rady Children's Hospital-San Diego, **the largest children's hospital in California, is a 442-bed pediatric-care facility** providing the largest source of comprehensive pediatric medical services in San Diego, Southern Riverside and Imperial counties.

We are dedicated to excellence in care – **the latest technology, the best equipment, the most progressive research, the finest teaching** – because that's the right thing to do for every child. We offer programs and services that will never be reimbursed by insurance, simply because our families deserve the best.

Through Rady Children's network of physicians, kids can receive specialized clinical and primary care services at **more than 30 satellite locations throughout the county**. Rady Children's physician network offers a broad range of services, from speech, physical and occupational therapies to child guidance and child protective services.

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Section 1:

Why Pediatric Surge Training?

In a disaster event there can be:
Massive injuries: Communication disruption. Utility failure. Freeway blocked. Cellular repeaters down. Mass evacuation…In the event of a catastrophic natural disaster or terrorist attack, hospitals are the front lines and victims from all ages will arrive for care. Children under the age of 18 comprise nearly 25% of the US population and have specific and complex planning and emergency response needs.

In the hours and day following a catastrophic disaster, the surge of injured patients may exhaust local medical resources quickly. As healthcare professionals, we are responsible for ensuring a rapid and competent response to the most catastrophic disaster at a moment's notice…this includes care for pediatrics.

Critically injured children often require entirely different treatments, strategies, and drugs. Their bodies respond differently from adults. Typically, general acute care facilities do not stock adequate supplies for treating large numbers of ill and injured children. Emergency response plans rarely address triage of pediatric patients.

Pediatric Special Needs

In any event with mass casualties – *children cannot be treated like little adults.* Children are more physically and psychologically vulnerable than adults to trauma, biological agents, chemical agents, and other assaults on their bodies.

Children have special vulnerabilities. All staff responsible for their care must be aware of these differences. For example:

- Children are more susceptible to dehydration and shock, more vulnerable to radiation, and suffer greater effects from skin/inhaled agents. They must be treated with medications using weight-based dosing and appropriately sized equipment.
- Depending on the development level some pediatric victims cannot respond to disaster triage protocols (e.g. "If you can hear my voice, walk to the white tent.")
- Many pediatric patients are non-verbal and non-ambulatory. Available personnel or family members are essential in providing companionship and direction.
- Children require special considerations to ensure their safety
- Children are often frightened, crying or exhibit uncooperative behavior when arriving. Volunteers, child life or mental health staff must provide support for these children. This is particularly a problem when separated from their family.
- The Personal Protective Equipment safeguarding healthcare workers may frighten many small children.

- Pediatric patient decontamination is challenging as children chill easily. They may become hypothermic, requiring warm water during the washing component of decontamination. Many small children cannot follow directions, self-decontaminate, wash thoroughly or manipulate equipment.
- Pediatric disaster victims have unique psychological needs. Rapid psychological assessment is important to allay fear and panic.

Pediatric Surge Train the Trainer

Pediatric surge planning involves identifying knowledge gaps and insufficiency of pediatric specific supplies. The purpose of this Pediatric Surge Training Course is to help prepare general acute care facilities to the challenges of pediatrics. The course is designed for a target audience that has knowledge of disaster planning.

The Emergency Preparedness Team at Rady Children's Hospital prepared this manual. This team includes physicians, nursing, behavioral health, surgeon, safety supervisor, trauma, pharmacy, security and disaster planning experts. The curriculum development team conducted in-depth research of best practices and other existing curricula to bring best practice.

The goal of this curriculum is to prepare hospitals and clinics have the tools to respond more effectively in a disaster which involves a surge of child victims.

Rady Children's Hospital San Diego ☐ **P O L I C Y/PROCEDURE** ☐ **STANDARDIZED PROCEDURE** ☐ **PLAN** ☐ **GUIDELINE**	CURRENT EFFECTIVE DATE **3/9/2011**	REVISED DATE **NEW**	MANUAL: TRACKING #
	TITLE: **PEDIATRIC SURGE PLAN**		
	PERFORMED BY:		

Specialty Review		**Council Review**	**ACCREDITATION/STANDARD**
☐ Multidisciplinary ☐ Nursing Council ☐ RT Council ☐ SW Council ☐ Child Life ☐ Human Resources ☐ EOC/Safety	☐ Information Services ☐ Infection Control ☐ Interdisciplinary Practice ☐ Pharmacy & Therapeutics ☐ Forms ☐ Med Staff ☐ Specialty Review	☐ Clinical Ops ☐ Med Staff Executive ☐ Center Ops ☐ Board	

1.0 PURPOSE:

Important Basic Information Regarding Surge Planning

Emergencies are a threat to any health care organization regardless of the size, scope or location. A single emergency can affect demand and the ability to provide services, and multiple emergencies that occur concurrently or sequentially can adversely affect patient safety and the hospital's ability to provide care, treatment, or services for an extended length of time. (RCHSD)

Challenges to an Effective Response to Patient Surges

To respond effectively to pediatric patient surges, RCHSD must 1) recognize the incident in its early stages, 2) activate existing surge capacity plans, 3) adequately prepare for consequence management after such incidents, utilize our existing Hospital Incident Command Structure (HICS) and 4) provide adequate logistical support for increased patient volume.

Guidelines for Pediatric Hospital Responses to Increased Patient Volume

Activation of the surge capacity plan should be performed either on hospital notification (from police, emergency medical services control, public health officials, or another established mechanism) that a mass casualty event has occurred, or once clinicians in the ED have made the determination of need.

Reluctance to Activate the Surge Capacity Plan

Activation of the surge capacity plan signals the absolute need for transition from normal hospital operations to a disaster footing. Because of the unknown extent and expense of the response, however, clinicians may hesitate to activate the plan. Alternatively, emergency physicians and staff who have become inured to severely crowded conditions may be unaware that activation of the surge capacity plan is warranted when there is a large influx of pediatric patients.

Logistics: Deployment of Hospital Personnel

Effective surge capacity plans require brisk responses at institutional and departmental levels that are supervised by a designated team of individuals following a defined command structure. An organized and well-communicated response can support well-designed surge capacity plans, heighten the benefit of disaster drills, improve the efficiency of hospitals operations, and foster the delivery of good quality patient care.

RCHSD Response to Patient Surge

The surge of children will require significant changes in every aspect of hospital operations. Individuals already within a hospital may need to be relocated to allow efficient operations during a surge.

Hospital service elevators are assigned for the transport of patients. Access to these dedicated elevators should be limited by security staff; their use is restricted to hospital staff.

Employee Response during a Surge of Pediatric Patients

Every department at RCHSD has a staff call back system that includes a phone tree, which is an algorithm by which all employees can be contacted in the event of a mass casualty incident. Once the Incident Commander in conjunction with the Chief Operating Officer of his designee has identified a patient surge, the EOC will direct PBX to send out a DNT/Com page with directions. The directions will address the need for evaluation by every department management to evaluate staffing needs and implement their call back plan as needed. An important element of the disaster notification process is to make staffing requests for: 1) staff who can immediately respond to the disaster; 2) staff who will be responsible for relieving the current staff at the next operational period, ; 3) staff who is not being requested, but should remain on alert in case they are needed and which staff are available for the requested resources for the labor pool.

Each department has disaster response action cards (DRACS) which describe individual responsibilities in the event of a disaster. All employees should report to their immediate supervisors on site and receive their assignment.

It may become necessary to use outside personnel or volunteers to assist with both clinical and non-clinical elements of the disaster response. For clinical licensed professionals, regulatory agencies like the Joint Commission has instituted clear

disaster privileging protocols. Federal programs like Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) and local Medical Reserve Corps programs are an attempt to organize potential health care responders should the need arise. These medical volunteers will be credentialed through Human Resources or the Medical Staff per policy

Any non-employee volunteers responding to support the incident by adding the logistic, supply and material distribution, administrative functions, or other forms of emergency response must be clearly identified as disaster volunteers and assigned a supervisor who will oversee their activities. This group of support personnel is typically protected from civil liability by falling under "Good Samaritan" laws. Table 2 describes the responses of individual departments and workgroups within the hospital during a surge of bioterror patients.

The Emergency Department (ED)

As with any disaster, the ED bears the brunt of the patient inflow into a health care facility. ED operations, the efficiency of which is severely compromised by overcrowding, are further hampered by intentional capacity-to-demand mismatch promoted by hospital administrations to ensure that inpatient bed spaces are never wasted. Hospital administrations, credentialing organizations, and Federal, State, and local agencies need to eliminate or minimize ED overcrowding to ensure good quality patient care in the event of a natural disaster or terrorist attack.

Critical Care

A dramatic number of patients exposed to a bioweapon may become critically ill. An excessive volume of high-acuity children will place extreme pressures on the clinicians staffing intensive care units, particularly if critically ill patients have significant respiratory illness or involvement of multiple organ systems. Critical care staff may be required to assist in patient resuscitation in the ED as well as other inpatient and outpatient departments.

Respiratory Care and Radiology

Patient surges may overwhelm the ability of respiratory therapists to provide adequate care to critically ill children. Excess patient load, especially patients with significant respiratory demands, may prevent the adherence to hospital standards for ventilator management, respiratory care, and pulmonary toilet. Hospitals may lack an adequate number of positive-pressure ventilators to affect the degree of activation of a pediatric surge capacity plan. Moreover, respiratory therapists may be at increased risk for infection during procedures such as orotracheal intubation and administration of nebulized therapy. To mitigate this risk strict adherence to Infection Control policies and use of Personal Protective Equipment (PPE) is critical and can decrease the risks attrition of the available workforce.

Nursing

The numbers of patients who can be admitted to hospital floors is typically determined

by the ratio of nurses to patients. In the event of a surge of high-acuity children, nursing staff may need to provide care for greater numbers of sicker patients, at least until additional staff can be mobilized through the surge capacity plan. Provision of nursing care documents should address the change in level of care during disasters as compared to normal operations.

Ancillary Staff (Security, Engineering and Environmental Services, and Public Affairs)

Controlling the flow of patients, families, and visitors into a health care facility is vitally important after a disaster. A breach of hospital security can lead to unnecessary exposure of staff to infected victims, spread of disease, and contamination of "clean" hospital areas. Engineering services may be needed to construct ventilation barriers that can isolate entire floors from the remainder of the facility. Adequate disposal of contaminated materials by environmental services personnel is necessary to avoid contamination of hospital areas. Lastly, centrally controlling communication messages sent to staff, patients, and the public is an important role for Public Information Officer as it improves the response by providing clear, consistent communication while decreasing rumors.

Logistics: Insufficient Resources for Communicable Disease Control

Both pediatric and general hospitals may have insufficient resources to control the spread of communicable diseases. Surges of patients may overwhelm the number of respiratory isolation rooms and permit the spread of airborne pathogens into "clean" hospital areas, a problem that would be exacerbated by inadequate air exchange ensured by antiquated heating-ventilation-air conditioning (HVAC) units. If multiple patients are cohorted in multi-bed rooms, the distance between beds may be insufficient to prevent the spread of airborne pathogens. In locations such as the ED, there are many challenges to preventing the spread of infectious agents. RCHSD ED has a mix of single rooms and also some ward rooms for evaluation and treatment. The multiple patient rooms are separated only by a curtain and patients will share a common bathroom. These rooms have adequate sinks and supplies for handwashing and care. These rooms can also be temporarily set up with portable negative pressure ventilation for isolation.

Logistics: Maintaining an Adequate Supply of Hospital Stocks

During a surge of patients the availability of adequate supplies are the main focus for the Supply Chain Management (SCM) Department An increased volume of critically ill patients may completely deplete available supplies of ventilators, respiratory isolation gowns, N95 respirators, sheets, medications, intravenous supplies, and other material. For example, to prevent the spread of disease from patients requiring respiratory support after infection with an airborne pathogen, clean gowns, N95 respirators, and bag-valve mask devices ("ambubags") must be used for each patient. Furthermore, clinicians should change gowns, gloves, and N95 respirators when entering each patient room to avoid the spread of disease. The SCM Department will collaborate with the Emergency Preparedness team to utilize the emergency supplies on campus at RCHSD

and with coordinating with the request to obtain critical supplies through the San Diego County EOC.

Communication:

During an emergency event and specifically in an event there is a surge in patients, communication is key to success and coordination. Communication needs to be well coordinated during the event, drilled and be in established process that all employees are familiar with. RCHSD's communication plan includes:

Types	Actions and Responsibilities
Initial Activation	In the event of an emergency situation the person who assumes the Incident Commander role first contacts PBX and provides specific instructions for use of DNT/Comm Paging and overhead paging. This may include direction for picking up or distribution of 2-way radios.
Communication Tools	Include: Overhead paging, brown phones, regular phones, web paging, use of Intranet and Internet, outlook emails, Meditech emails, satellite phones, cell phones, 800 megawatts radio, runners, WEBEOC, Trauma system
Radios	Used to report urgent, critical information to Command Center. Limited to urgent communication.
Intranet/Internet	Post information such as important phone numbers, community and staff can ask questions, posting of updated information regarding event, posting open and closed business status.
Phones, Brown phones	Routine utilization, used for reporting to command center as needed. Brown phones are utilized for regular phone failure.
Telephone Tree	Each department creates and manages their own departmental communication in an emergency event. Telephone tree is test at least twice a year.

During a drill or activation the Command Center communicates with main hospital departments but also off site businesses. The off-site departments are to report into the Command Center with updates regarding staffing needs, patient status and bed availability, supply and equipment needs, facility status, etc… The units that are within an adult facility are covered under their disaster plan but keep RCHSD updated on status and needs. Urgent Care, clinics and Children's Primary Medical Group (CPMG has a Command Center) reports form their Command Center to RCHSD Command Center.

Activation of the Surge Capacity Plan: The Hospital Incident Command System (HICS) - Hospital Command Group

Activation of RCHSD Hospital Incident Command System (HICS) can be initiated by:

* Emergency Department Charge Nurse in response to notification by the San Diego County Trauma System or by influx of patients into the Emergency Department in greater numbers or type of diagnosis.
* House Supervisor in response to concern our resource availability that includes: space, equipment, supplies, staffing or bed availability or notification of a community incident.
* Hospital Administrator or Safety Officer: In response to any situation that may affect the organization resources and appropriate response is to activate HICS for coordination, planning and implementing a response.

Once a surge capacity plan is activated, a defined group of individuals known as the **Hospital Command Group (HCG)** (Figure 1) should convene in a location identified as the Emergency Operations Center (EOC). The HCG typically receives valuable input from the emergency department or other Medical Technical Specialist: and is comprised the Administrator on-call (Incident Commander), Public Information Officer, Safety Officer, Liaison Officer, as well as other members of hospital leadership. Although the exact responsibilities of each member are unique to the specific disaster plans for each health care facility, the HCG has responsibility to:

- Coordinate the institutional response to the surge capacity plan
- Receive, interpret, and communicate information from emergency medical services and public health communication networks, including updates of the facility's bed capacity.
- Coordinate hospital activities during activation of surge capacity plan
- Rapidly discharge inpatients capable of outpatient or delayed management
- Monitor the flow of disaster patients as they move through the hospital's systems
- Receive and communicate information between hospital departments
- Ensure that elective admissions are postponed, depending on the scope of the disaster
- Formulate plans for the next operational period
- Determine recovery strategies and devolution of the surge capacity plan

Each member should be clearly identified by means such as a vest with the wearer's responsibility written on it (e.g. Medical Technical Specialist: Medical Safety Officer). Each member should also read his/her facility-specific Job Action Sheets that delineate individual responsibilities during the disaster. The ED Disaster Team Leader (physician leadership based in the ED) should designate a predetermined location in the ED as the ED Disaster Command Post. Here, the ED-based strategies are formulated and management objectives are defined. These strategies are shared with the HGC staff to better coordinate surge activities outside of the ED. Once the surge capacity plan is activated, each member

of the HCG should immediately attend a status/action plan meeting in the EOC. Any communication with patient families or the press must remain under the control of the Public Information Officer who works with the Incident Commander and the Medical Technical Specialist: Medical Staff Officer. Once convened, the HCG priorities should include:

- Ensure that primary response and support departments (nursing, critical care, radiology, respiratory care, security, janitorial services, etc.) have received the alert and are prepared.
- Receive briefing from the Situation Team Leader regarding patient census and bed status.
- Consider canceling elective procedures and admissions.
- Ensure Logistics Section Chief is able to deploy resources as needed.
- Ensure contact with senior hospital executives.
- Activate the Documentation Team Leader individual to maintain the Incident Action Plan for post-incident debrief notes.

The EOC should be stocked with sufficient supplies to ensure operations of the HCG. Supplies should include communication sets, clerical supplies, redundant communication systems, mobile communication assets, HICS Incident Team Chart, hospital and city emergency contact directories. WebEOC and Bed Tracking site log-in information, disaster related tracking forms, hospital charts, patient flow board, and reference Job Action Sheets, area maps, copies of vendor memoranda of understanding, and risk communication templates and protocols.

Communication tools at RCHSD are designed to collaborate with other networks used by the police, emergency medical services, and fire departments. Tactical radio channels such as those used for local communications have many different configurations. Some systems are dedicated EMS channels, some share channels with fire or police operations, and others have special channels for on-scene operations. In a small event, such as a motor vehicle crash, first response agencies may operate on a single channel. As operational complexity increases, incident commanders should decide the point at which communications transition from a RCHSD single channel to include the use of resources utilizing through the county that bring their amateur radio skills and equipment on site.. The use of tactical channels prevents the overload of the primary EMS channel and prevents interference between agencies with different primary function. The incident commander or Medical Technical Specialist: Medical Staff Officer from the ED and other agencies should, however, communicate on a pre-designated (mass casualty incident) channel when needed.

Emergency department communication use multichannel portable radios that have talk around capacity, although these systems are susceptible to missed messages if a dispatcher transmits over direct messages. . Training on the use of RCHSD radios is done with key department staff and as needed with nay disaster event. The Emergency Preparedness Team coordinates the process of keeping radios ready for use by keeping an adequate supply of batteries for portable radios should be readily available to keep communications open as long as necessary And rotating the charge and radio devices to keep batteries

ready for use. Second, it is important to use plain English and avoid coded language. This decreases the amount of radio traffic by eliminating phrases such as "at this time" or "be advised" and greatly decreases the potential for miscommunication. Third, radio users should remember to release the key the radio for a full second before speaking, then depress the speak key to ensure the beginning of the message is not missed.

Not all mass casualty incidents demand a hospital-wide response. For example, incidents that involve one or two clinical areas that can be handled with normal hospital staffing and are resolved in less than 8 hours can be often handled with improved coordination between clinical services. In these limited cases, a Labor Pool can be staffed with minimal personnel to assist the activated HICS members with information management and to relieve workload on specific services (e.g., patient transport or radiology). Examples of these incidents include: alteration of ED operations without immediate threat to life or property, one or two operational areas involved (e.g., ED and radiology), considerable media attention, or an initial response to an unconfirmed external emergency.

Triage

RCHSD Emergency Department utilizes a standard pediatric triage system. The use of standardized triage algorithms will provide guidance for triage personnel making potential life and death decisions that otherwise might be influenced by emotional issues. Depending on the volume of children arriving at RCHSD, clinicians may elect to use one of two assessment tools. In the event of very large numbers of patients arriving at an ED simultaneously, the Pediatric Assessment Triangle (PAT) suggests the urgency with which treatment should be initiated (Attachment 2). This assessment tool relies on appearance of the patient to determine the severity of illness, the need for treatment, and the response to therapy. By using only visual and auditory assessments to develop an initial impression of a pediatric victim, PAT allows clinicians to rapidly identify patients with physiological instability without using sophisticated monitoring techniques. The components include appearance, peripheral perfusion, and respiratory effort. The PAT is a simple tool that may be applied during any patient encounter; clinicians should practice applying PAT during routine emergency care to increase familiarity with the method.

Slower patient arrival and intake may permit the use of another assessment tool, the JumpSTART Pediatric Multiple Casualty Incident Triage system (Attachment 2, 3). This triage protocol is based on an assessment of respiration, perfusion, and mental status (RPM). The JumpSTART system is modified from a triage system developed for adults; the modification to pediatric triage is based on known differences between adults and children in terms of risk and patterns of respiratory failure/arrest. Unless there is a clear external airway obstruction or compression, or internal obstruction from a foreign body, respiratory failure in adults usually follows massive head injury or circulatory failure. In this context, an apneic adult has likely suffered sufficient cardiac insult to preclude successful resuscitation in a mass casualty setting. In children, however, circulatory collapse often follows respiratory failure. Children may develop apnea relatively rapidly for mechanical reasons (e.g., weak respiratory musculature or inhibition of diaphragmatic excursion), rather than after a prolonged period of hypoxia.

Step 1: All children who can walk should be directed toward an area of designated for **minor** injuries, where secondary triage will occur. Secondary triage should, at a minimum, employ the RPM components of the JumpSTART algorithm. Infants who are developmentally unable to walk should be screened at initial site using the JumpSTART algorithm; an infant who satisfies all of the "delayed" criteria may be triaged to the minor category.

Special consideration should be given to children with medical conditions that prevent ambulation (e.g., mental retardation-cerebral palsy). These individuals can be triaged in a manner similar to infants. Clinicians should be aware, however, that patients with chronic respiratory problems may have an elevated respiratory rate at baseline. Moreover, an assessment of the neurological examination may prove difficult without an understanding of baseline function. Emergency personnel should, therefore, attempt to retrieve information from any available source.

Step 2A: Nonambulatory patients should be assessed for the presence of spontaneous breathing. Any patient with spontaneous respiratory effort should then have respiratory rate determined. Any patient with duration of apnea of greater than 10 seconds must have the airway assessed; any obvious foreign bodies should be removed by finger sweep. Otherwise, the airway should be opened by maneuvers such as chin lift/jaw thrust. If the patient regains spontaneous respiratory effort, the triage officer or his designee classifies the patient as **immediate** (red tag) and moves on.

Step 2B: If spontaneous respirations do not return upper airway opening, the triage officer or his designee should palpate for peripheral pulses in the radial, brachial, and dorsalis pedis arteries. The absence of peripheral pulses warrants a triage category of deceased.

Step 2C: If there is a palpable peripheral pulse, the triage officer or his designee will administer five rescue breaths using a bag-valve-mask device. The use of a mouth-to-mask device, as suggested by some protocols, is contraindicated in patients suffering exposure from airborne bioterror agents. If ventilatory trial fails to trigger spontaneous respiration, the child is classified as deceased. Make the decision to terminate efforts based on overall situation and available resources.

Step 3: At this point in the triage protocol, all patients have spontaneous respirations. Patients with a respiratory rate of 15-45 breaths per minute move to Step 4. Patients with respiratory rates less than 15, greater than 45, or with irregular breathing are classified as **immediate** (red tag), and the triage officer or his designee moves on.

Step 4: At this point in the triage protocol, all patients have been determined to have adequate respiratory effort and rate. The triage officer or his designee should now assess perfusion by palpation of peripheral pulses. Because of terrorist attack may occur during winter months, and decontamination will be performed out-of-doors in a potentially cold environment, capillary refill should not be used to assess perfusion. The palpation of pulses is a tactile method that adapts well to poor environmental conditions. If there are

palpable peripheral pulses, the triage officer or his designee assesses mental status (STEP 5). If there are no palpable pulses, the patient is classified as **immediate** (red tag), and the triage officer or his designee moves on.

Step 5: For all patients at this point, the triage officer performs a developmentally-tailored "AVPU" assessment. If the child is **a**lert, responds to **v**oice, or responds appropriately to **p**ain (e.g. localizes the painful stimulus or pushes it away), the patient is classified as **delayed** (yellow tag). If the child does not respond to voice and responds inappropriately to pain (e.g. makes noise or moves in a non-localizing fashion), has decorticate posturing, or is truly unresponsive, the patient is classified as **immediate** (red tag).

Recognize Limitations of Care

Finally, avoid resource allocations to unsalvageable patients. Decision criteria regarding decease acuity includes pre-established physiologic criteria using START/JumpSTART algorithm, injuries incapability with survival, objective emotional components plus recognizing capabilities and resource limitations when deciding to terminate efforts.

Personal Protective Equipment and the Triage Location

Triage areas in medical care facilities should be considered "hot zones" - areas in which the greatest risk for contamination occurs. This designation is distinct from field MCI operations, where the triage location is considered to be a "warm zone" - an area defined by a perimeter inside which no or an acceptable level of contamination exists. Based on this definition, an entire health care facility could be considered a "warm zone," which poses a risk of exposure to contaminated victims and equipment.

In general, early recognition of the type of exposure is based on the signs and symptoms demonstrated by patients. The type of exposure, in turn, determines the level of protective gear used by individuals in triage and patient decontamination. ED personnel handling victims contaminated with bioweapons in liquid or powder form require respiratory protection.

The location at which triage occurs will be determined in part by the number of patients presenting to the health care facility. For example, triage may occur in the ambulance bay of the emergency department, in the lobby of the hospital, or in driveways, traffic circles, or other areas normally used by vehicular traffic. Triage teams should report to the triage location determined by the Incident Commander. The exact composition of triage teams may vary with the time of day and week depending on staffing levels. The composition and number of triage teams should be codified prior to a disaster. Decisions on triage location and team composition will be made by the Incident Commander with input from ED leadership and Medical Technical Specialist.

Patient Recordkeeping

On notification of a surge of patients, the ED staff should prepare to access hospital-generated, pre-positioned trauma and supply carts and antidotes. Supplies carts brought down by the supply chain management team.

Depending on the size of the disaster, various State and regional medical supplies may be requested, as well as the U.S. Centers for Disease Control and Prevention-sponsored Strategic National Stockpile (SNS). The SNS is a national repository of antibiotics, chemical antidotes, antitoxins, life-support medications, airway maintenance supplies, and medical/surgical items. The SNS is intended to supplement and resupply State and local public health agencies in the event of a national emergency. The SNS involves a flexible response. The first line of support lies within the immediate response in "Push Packages"; these are caches of pharmaceuticals and medical supplies. Although these Federal assets are designed for delivery within 12 hours of the Federal decision to deploy SNS assets, local planners should first use available State and local resources. Clinicians wishing to access the SNS should contact their State's department of public health who will in turn call for the governor's office to request the release of the SNS.

Example: Smallpox Scenario

Smallpox is transmitted by respiratory droplets and airborne particles. For victims of smallpox, triage should be performed outdoors in a well-ventilated area. Triage teams should employ airborne, contact, and droplet precautions. This level of protection requires either a fitted N95 respirator with goggles and face shield; alternatively, a powered air purifying respirator (PAPR) hood may be used. In addition, personnel must use hair cover, shoe cover, gloves, and disposable yellow gowns or Tyvek overalls.

Triage will be performed outdoors in a well-ventilated area such as the ambulance bay or hospital driveway. Patients may need to be held in the triage area until the ED is prepared for intake of victims. Because victims may be exposed to cold in the outdoor environment, warming lights, disposable blankets, or other devices (portable forced air and water heaters) should be available for patient warming. Specific preparations that the EOC may have to make in anticipation of victim intake include moving existing non-victim patients from negative pressure rooms or the discharge or transport of all patients from the ED.

A surge of patients carrying a communicable respiratory illness will require significant modifications of standard ED disaster practice. Typically, patients from a disaster are managed in a single geographical location in the ED, while non-disaster patients ("non-disaster patient flow" or "worried well") are treated in separate areas. The arrival of patients with infections that may be spread by airborne route may compel striking changes in the management of patient surges. For example, patient volumes that outstrip the number of isolation beds place the entire ED - including its patients and staff - at risk for exposure. The influx of patients infected with an airborne agent may require that all non-disaster patients be discharged or diverted from the receiving facility to avoid exposure and spread. Alternative locations for triage and treatment are located in Appendix section and will be determined by type of exposure risk and anticipated volume of patients.

Scrupulous attention must therefore be paid to ensuring that patients remain isolated. Multiple patients with proven infection may require placement in a single respiratory isolation room, or it may even be necessary to devote the entire ED to bioterrorism treatment, with all non-disaster being diverted elsewhere.

Effective patient isolation includes observing biohazard precautions. All staff should wear respiratory isolation garb suitable for droplet precautions. Clinicians should employ airborne, droplet, and, if necessary contact precautions. This level of protection requires either a fitted N95 respirator with goggles and face shield; alternatively, a powered air purifying respirator (PAPR) hood may be used. In addition, personnel must use hair cover, shoe cover, gloves, and disposable yellow gowns or Tyvek overalls. When exiting a patient care area, clinicians should observe the following steps.

At the door just prior to exit from the patient care area:

a) Remove gloves by peeling them off inside out. Dispose of gloves in red bag trash.
b) Remove isolation gowns by unfastening the back and with inside outward motion pull from top downward. Dispose of gown in red bag waste.
c) Perform personal hygiene maneuvers, particularly hand washing.

Exit room.

At the door just outside of room or in the anteroom:

a) Remove hood respirator if used. Hood and battery pack must be cleaned before next re-use. Place the contents in a clean plastic bag.
b) Remove face shield and discard.
c) Remove goggles and discard.
d) Remove N95 respirator and discard.
e) Perform personal hygiene.

The ED air handling system should be isolated from the remainder of the hospital. Ventilation systems that recycle mixed air from the ED and the facility may disseminate airborne pathogens to the remainder of the structure and force isolation of the entire facility. In preparation for the receipt of patients exposed to airborne bioterror agents, engineering services should review ED heating/ventilation/air conditioning systems, the age of air handling filters, and the dispersal of air withdrawn from the ED. Engineering services may be required to construct barriers to limit airflow in the ED and ensure that ventilation of the ED is maximized.

Surge Stress Management

Most individuals - victims, rescue personnel, and health care workers alike - will demonstrate normal stress reactions that may persist for several days or weeks after a disaster. Approximately one-third of survivors will develop severe stress reactions that place them at risk for acute anxiety syndromes in the immediate post-event period and post-traumatic stress disorder (PTSD) in the days to weeks afterward. After a critical incident such as a surge of bioterrorism victims, stress management in the form of a mandatory meeting decreases negative effects of the incident on involved staff. The debriefing is a confidential, non-judgmental evaluation of the event, the hospital's response

to it, and the staff's feelings about involvement in the event. It also helps the staff process events related to the surge and returns the workplace to normal equilibrium. Individual sessions are sometimes indicated for staff experiencing significant levels of post event stress and may be followed by referral for Employee Assistance funded counseling. At RCHSD the Behavioral Health Crisis Response Team (BHCRT) coordinates debrief and assessment with a mix of expertise from psychiatry and social services.

Emergency Credentialing

Surges that overwhelm a medical system may impel clinicians to offer temporary services. Even if hospitals can accomplish the unlikely goal of increasing capacity by 20-30 percent, these additional beds require staffing. Granting emergency privileges may alleviate staffing demands. The Medical Staff department and Human Resources coordinate emergency credentialing. In the event of a surge, medical personnel from unaffected areas can receive temporary credentialing from the duration of an emergency. Such an approach is inexpensive, accurate, and Joint Commission-compliant. RCHSD works closely with SD County EOC for local credentialed staff.

Unique Challenges Posed by Pediatric Mass Casualty Incidents

Surge of Children with Infectious Outbreaks and Bioterrorism Incidents: Difficulties in Recognizing an Outbreak

Diseases spread by the airborne route have great epidemic potential in those without immunity to the organism, and the ability to recognize such an epidemic is inhibited by the delay between exposure to a bioweapon and the development of clinical symptoms. The ability to identify a bioweapon remains critical to the planning for and management of an outbreak; the same holds true for recognizing a natural outbreak. Experience with the outbreak of the Severe Acute Respiratory Syndrome (SARS) demonstrated that epidemiologic history and tracing patients' travels were critically important in understanding the patterns of disease spread. Unfortunately, many clinicians who work in an emergency setting receive minimal training in traditional epidemiologic methods, or they do not have the time to apply them.

Access to surveillance systems capable of informing clinicians about terrorist attacks can quicken response to a sudden surge of patients. For example, poison control centers are linked to a single nationwide database that is updated within minutes; the goal of this database is to rapidly identify and disseminate information about sentinel events back to poison control centers and then to local clinicians. Physicians who access this important information source will receive timely notification of developing outbreaks of various types.

Bioterrorism

The release of a biological weapon would disproportionately affect children through several mechanisms. With aerosolized agents (e.g. anthrax), increased respiratory minute ventilation in children (500 ml/Kg/min) compared with adults (140 ml/Kg/min) results in the child's exposure to a relatively greater inoculum. The high vapor density of bioaerosols, such as those potentially used to disseminate airborne pathogens, places their highest concentration close to the ground in the lower breathing zone of children. The more permeable skin of newborns and children in conjunction with a larger surface-to-mass ratio results in greater than exposure to transdermally absorbed toxicants. Children, because of their relatively larger body surface area, lose heat quickly when showered. Consequently, skin decontamination with water may result in hypothermia unless heating lamps and other warming equipment are used. Having less fluid reserve increases the child's risk of rapid dehydration or frank shock after vomiting and diarrhea. Finally, children have significant developmental vulnerabilities. Infants, toddlers, and young children do not have the motor skills to escape from the site of a biological incident. Even if they are able to walk, they may not have the cognitive insight to decide in which direction to flee. All children are at risk of psychological injury, such as posttraumatic stress disorder, from experiencing or witnessing an act of terrorism. Most children in these events would benefit from Psychology First Aid, a model developed by the National Child Traumatic Stress Network. Some children will have more profound response to events based on relevance to the child (i.e. level of perceived threat to the child or caregivers), disruption of environment (loss of home or school), and past trauma exposure. In a mass casualty incident, children witness injuries and deaths,

possible of their parents, who would produce both short- and long-term psychological trauma requires intervention.

Children are difficult to care for by health care personnel wearing protective equipment, which is essential in the management of chemical, biological, and radiological events. Protective clothing is bulky and cumbersome; it impedes the ability of healthcare providers to perform procedures such as venipuncture or endotracheal intubation on small children.

Surge of Children with a Communicable Respiratory Illness: Emergency Department Response

All disaster patients should be triaged immediately on arrival according to the protocol described below.

Reverse Triage

Before patients can be handled safely, ED operations must have adequate bed space into which ED patients may be admitted. In a surge environment, reverse triage - the process of determining risk for discharge of inpatients - assumes a critical role. Stratifying risk into minimal (a limit of risk of adverse medical events in the next 72 hours of 3.8 percent); moderate (a limit of risk for consequential events in the next 72 hours of 33 percent); high (limit of risk of 61 percent); and very high (92 percent limit of risk) categories, patient disposition can be identified. Minimal and low risk patients may be sent home; moderate risk patients may deserve immediate transfer to another facility since they may be too sick for simple discharge home. High risk patients require highly skilled care during transport to major acute-care facilities, while very high risk patients may tolerate only ICU-capable transport - if they are stable for transport at all.

As RCHSD is the primary provider of pediatric care in San Diego and Imperial County the decision or transfer of patients to an alternative facility is challenging. In the event of a surge situation the Incident Commander will:

1. Decide criteria for discharge or transfer from the Medical Technical Specialist and Chief Operating Officer or designee.
2. Communicate the criteria for discharge and transfer to Hospitalists or Chief Resident.
3. Criteria for discharge and transfer will be based on the scenario specific to the surge event. The criteria address inpatient, outpatient and community resources.

Surge of Children with a Communicable Foodborne or Waterborne Illness: Emergency Department Response

Reverse Triage

Reverse triage applies to an outbreak of communicable foodborne or waterborne illness as it would with communicable respiratory illnesses. In the event of a foodborne or waterborne pathogen release, a surge of patients may be managed along lines that mimic standard disaster plans (e.g. victims may be handled in a single geographical location of the ED if patient volume permits). Nonetheless, some variations from standard disaster practice may be required. RCHSD has a limited number of toilets for patient use. If victims suffer diarrhea, there may not be sufficient capacity to handle patient demands. Patients that use existing toilets may inadvertently contaminate the facility and increase the potential for transmission. To forestall this likelihood, every room in which a patient is assigned should have a dedicated toilet, either permanent or portable. All clinicians should follow rigorous handwashing discipline before entering and leaving patient rooms, and use gloves for all examinations. Gloved hands should not be placed on light switches, elevator buttons, keyboards, or any other surface that could promote disease spread. In the event there is not enough bathroom or commodes, toilets and commodes will be bagged to capture the waste.

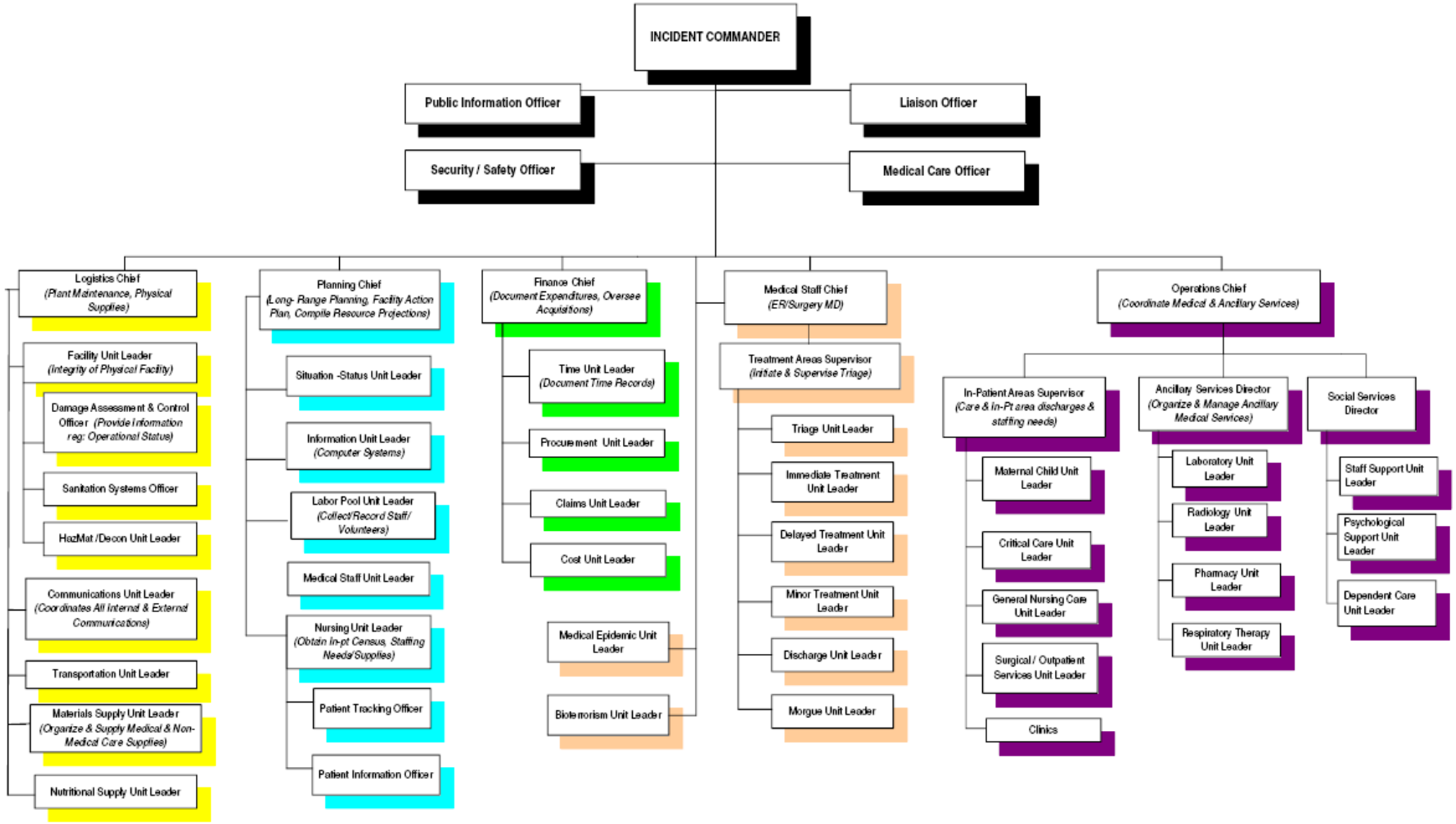
Security Concerns Unique to Children

Children caught up in a surge may be separated from parents. Siblings/families should be treated together whenever possible. If separation occurs, or if members are triaged to different levels of care, hospitals will need to establish a plan to ensure the security of these patients until the family can take custody.

RCHSD has designated staff and a holding area to supervise and support unaccompanied children. General staffing guidelines – one adult per four infants or 10 preschool children or 20 school-aged children – is minimum staffing. Coordination at RCHSD is through RCHSD Child Care Center with staffing by teachers, child life specialist and other staff.

Rady Children's Hospital San Diego

Appendix 1



Surge Capacity Alternative Location Options
*** Locations are dependent on event and number of patients**

Activity	Area
Inpatients pending discharge	Dining Rooms A, B & C as needed or old ORR starlight room.
Preoperative care/minor surgery	Main Operating Room
Emergency Department waiting room	Rose Pavilion Lobby, McDonalds
Triage and treatment of disaster patients	Emergency Department, outside tent, walking wounded, low acuity to Building 28
Waiting area for family of disaster victims	MOB 113
Expired patients	Morgue, mass fatalities use truck with added refrigeration
Patients requiring surgery	Warren Family Surgical Suite
Postoperative patients	PACU
Admitted intensive care disaster patients	Pediatric ICU, up to 54 PICU beds Addition space can be MOB DSC PACU & ACP PACU
Patients requiring radiology	Radiology
Disaster patients pending discharge	MOB 113
Labor Pool	Cafeteria
Expanded isolation options	NICU "C" - 10 beds Medical West - 40 beds DSC PACU - 40 beds Bernardy Center - 54 beds 1st Floor Rose South Side * POM will set up additional isolation with use of containment and negative pressure machines under the direction of infection control. Bernardy Center patients would need to be relocated.

Appendix

Departmental Response during Patient Surge

Admitting/Patient Access	On notification of a surge of patients, the admitting department should follow Unidentified Patient protocols for all disaster patients; this DOE #'s involves assigning predetermined medical record numbers that are retained throughout hospitalization. The admitting department should maintain a record of all elective admissions that have been cancelled.
Anesthesia	After notification of disaster, all anesthesiology staff not immediately involved in a case should report to the Labor Pool to be assigned in patient management as needed. Operating rooms should be made ready, and plans should be made to cancel elective cases. Depending on the level of operating room activity and the volume of patients, additional anesthesiology personnel may need to be summoned.
Blood Bank	The blood bank will contact Operation Section Chief to determine if any hemorrhaging patients have arrived or are expected. The blood bank will check inventory of blood to ensure appropriate amounts are in stock. If sufficient blood is not immediately available, the blood bank will contact outside suppliers for additional material. Per protocol blood will be brought to the ED.
Clinical Laboratories	The laboratory director will notify chemistry and hematology sections of the lab. The lab should follow the Unidentified Patient Policy protocols using the pre-assigned medical record number. The disaster patient retains this number throughout hospitalization.
Medical Staff	Medical Staff should provide sufficient personnel to assist in the triage, resuscitation, and management of disaster patients in the ED; manage admitted patients; and provide administrative and medical support for the discharge of inpatients. The Chief Resident and Hospitalist on-call will direct the residents, interns and medical staff of their assignments. The chief residents designate the staff that will assist the ED in triage/resuscitation/ED management. The chief residents will also identify those patients appropriate for immediate discharge. After details of the bioterror release are known, the chief medical residents will begin to discharge inpatients. Following discharge, the chief medical residents will review bed availability with the Hospitalist who report to the Operation Section Chief.

Nursing	The VP of Nursing or designee will assume responsibility for coordinating nursing activities during the disaster. Once the hospital transitions to a disaster footing to handle surges of patients, the nursing administrator will meet with the EOC. The house supervisor will assist with inpatient census management, bed availability, and nursing availability. The nursing director will prepare floor nurses for the potential for numbers of patients on medical floors that greatly exceed normal "maximum" census for that patient location. The VP of Nursing should also be responsible for providing adequate nursing staff for the ED and disaster discharge areas. If disaster staffing needs exceed the number of staff available in the hospital, then the nursing administrator will work with the Incident Commander to establish the Labor Pool and activate the call back process so that patient needs can be met. When the number of disaster patients exceeds the number of available beds, the nursing staff should transport patients suitable for early discharge to the designated discharge holding area. The nursing staff should notify Patient Access department of all early discharges.
Operating rooms	The Director of Surgical Services or designee in charge should report to the EOC available Ors and staff. The SS Medical Director will cancel elective/non-emergent cases. If patient volume exceeds available staff, then the director in charge should call in additional personnel.
PACU	The PACU Supervisor should report PACU availability to the EOC. If necessary, additional staff should be called in. If a bioterror attack produces large numbers of intubated patients that overwhelm PICU capacity, the PACU should receive PICU overflow.
Pathology	Pathology should oversee transport from the ED to the morgue. The route of transport from the ED to the morgue will be predetermined. If additional morgue/refrigerator space is need, the mass fatality plan will be implemented. Pathology staff should be responsible for paperwork related to expirations, including identification, date and time of receipt, and the person receiving the body. All casualties of the bioterror disaster - either immediate or delayed - should be referred to the medical examiner. Pathology staff should remember to use contact precautions consistent with the type of bioterror attack.

Radiology	The chief radiologist should be notified of the disaster. The EOC will request radiology attending and radiology additional staff to report to the ED as indicated by the type of event. In the event of airborne pathogen release, all plain films should be obtained portably in the ED. Although this approach may lead to suboptimal films, it limits exposure of the hospital and its staff to the bioterror agent. For other bioterror releases, only those patients requiring immediate studies or who are unstable for transport should receive portable studies. All inpatient and elective studies should be postponed until after the surge is cleared.
Respiratory Care	This department will oversee administration of respiratory treatments. The respiratory therapist in charge will report the EOC and determine the type and amount of supplies needed. In the event of an airborne pathogen release, respiratory therapist will need to have adequate supplies of personal protective equipment to guard against infection. The number of respiratory therapists providing care in the ED should be limited, and those individuals should not return to the main hospital until cleared to do so. Respiratory Therapist Director report through Operation.
Department of Surgery	All ongoing operations will be ended as expeditiously as possible. No other procedures should begin until cleared to do so. All surgical patients will be evaluated for discharge by the nurse in charge of surgical floors, in consultation with the surgical staff. The department of surgery should postpone all elective surgeries until the surge is cleared. Attending staff should remain in the operating rooms in anticipation of procedures, unless directed differently by the Incident Commander. The SS Director and Medical Director or designee in collaboration with the EOC determines when to call additional staff from home.
Support Departments ▪ Supply Management Chain ▪ Biomedical Equipment	These departments are responsible for the distribution of material and equipment to individual departments in the hospital. On notification of a surge of patients, normal paperwork requirements should be suspended. The support department should make available sufficient personnel to distribute supplies as directed by the Incident Commander. The support department should keep a 48-hour supply of all supplies and equipment sufficient for the average hospital census plus an additional 100 patients.

Child Life Services	Child life services should provide staff support for operations in the disaster discharge area. Child life activities should collaborate with nursing services in providing these services.
Labor Pool/Volunteer Services	A labor pool should be organized from the staff of departments and services not directly involved with the disaster. The labor pool is usually located in the cafeteria but location will be determined by the Incident Commander. The labor pool should assist in transporting specimens to the laboratories, medical records pickup, transporting/escorting patients, delivering supplies, and delivering written messages to patient care areas or assign to a clinical department as appropriate.
Pharmacy	The senior pharmacist on duty should assume responsibility for transitioning to emergency operations. The senior pharmacist should notify the Director of Pharmacy, call in additional staff if needed, and contact the EOC to offer services. The pharmacy department should maintain contact with other hospitals and local pharmacies for obtaining additional supplies. All pharmacy staff should remain on duty until the surge is cleared. The pharmacy should maintain a 48-hour supply of all pharmaceuticals for the average daily hospital census plus an additional 100 patients.
Public Affairs	Media Relations will report initially to the EOC, then may be assigned to the Emergency Department depending on the event, Media Relations will be the direct contact with the outside media, communicate patient's names and conditions to appropriate entities and coordinate all internal and external communications.
Behavioral Health Services Psychiatry, Chadwick & Medical Social Work	Behavioral Health Services should be available during and after the disaster. Anticipated services including providing treatment to patients, families, and staff; advocating for the needs of patients, families, and staff; providing education to patients, families, staff, and the media regarding psychosocial effects of terror attack; and providing consultation to schools to assist in coping with trauma. RCHSD is guided in the event of a disaster by the SMHSA funded National Child Traumatic Stress Network – Disaster and Terrorism Division.
Chaplaincy	Chaplaincy services should be made available to patients and families to assist with their spiritual issues and coping mechanisms to traumas and disasters. Additionally, Chaplaincy offers a considerable resource to the RCHSD's provider staff, to provide critical incident debriefing, support and stress reduction.
Environmental Services	Available to clean, coordinate waste stream

Information Desk	Personnel assigned to the main reception help control access and give directions to families.
Security	A major responsibility of the security department should be to secure the emergency department against intrusion by unauthorized persons. Individual health care facilities must determine the level of personal protective equipment issued to security officers, as well as the level of force permissible to prevent contamination of the ED and to prevent the disruption of patient services. Security officers should be assigned to the triage area and the ED entrance. These officers are responsible for ensuring that only casualties, emergencies, and specifically authorized personnel enter the ED. One security officer should be assigned outside the main ED entrances; this person will exert initial control of persons entering the ED, and will distribute disaster dots authorized personnel. The following personnel should be authorized to enter the ED during a disaster surge: medical staff, physicians, critical care nurses, hospital administration members and support staff bringing supplies and specimen transporters. One security officer should be assigned to restrict access to the hospital. An additional security officer should be assigned to ambulance bays to control access. All other available security officers should manage the traffic - both private and ambulance - arriving at the hospital. All other entrances to the hospital should be secured so that unauthorized entry - and contamination of the hospital - is impossible. Members of the media should not enter the hospital unless accompanied by a Public Affairs representative.
Safety & Infection Control	Members of the safety department should make appropriate measurements and observations to ensure the magnitude of risk of exposure to patients, employees, visitor, local community, and environment. In the event of an airborne hazard release, members of the safety department may be needed to assess air sampling and, if necessary, provide recommendations for temporary airflow barriers to ensure that the entire facility does not become contaminated.

Telecommunications	Once a disaster is declared, the telecommunications department should page all persons on the disaster notification list. After all necessary pages have been accomplished, the page operator notifies the supervisor on call who in turn notifies the telecommunications manager. The telecommunications department should direct all inquiries pertaining to the disaster to media relations. No information should be given to the public by the telecommunications staff.

Security & Safe Pediatric Environment

PEDIATRIC SECURITY

Key points:

In addition to typical considerations of patient safety, the following are critical considerations for pediatric populations:

- Be cautious of predatory behaviors, abuse, and kidnapping

Security Concerns Unique to Children

Children caught up in a surge may be separated from parents. Siblings/families should be treated together whenever possible. If separation occurs, or if members are triaged to different levels of care, hospitals will need to establish a plan to ensure the security of these patients until the family can take custody.

- Have a designated staff and a holding area to supervise and support unaccompanied children. General staffing guidelines - one adult per four infants or 10 preschool children or 20 school-aged children - is minimum staffing.

Protocol to Rapidly Identify and Protect Displaced Children

- Survey all children in your hospital, medical clinic, or shelter to identify children who are not accompanied by an adult; these children have a high probability of being listed as missing by family members. Find out where they are sleeping/being held and the name and age of person(s) who is/are supervising them, if available. A sample survey form for identifying displaced child is attached.

- Place a hospital-style identification bracelet (or, ideally, a picture identification card) on the child and a matching one on the supervising adult(s), if such an adult is available. Check frequently to make sure that the wrist band matches that of the adult(s) seen with the child in the hospital or shelter. If there is no supervising adult, the child should be taken to the hospital's pre-determined Pediatric Safe Area (see following pages) where he/she can be appropriately cared for until a safe disposition or reunification can be made.

- The names of all children identified through the survey as not being with their legal guardians or who are unaccompanied should be considered at high-risk and immediately reported to the hospital's emergency operations center. Additional reporting should also be made to the National Center for Missing and Exploited Children (NCMEC) at 1-888-544-5475. The NCMEC can then cross-check them with the names of children who have been reported missing.

- After the "high risk" children have been reported, a complete list of all children names in

the hospital, clinic or shelter should be sent to NYS Hospital Emergency Resource Database System (HERDS) if activated and the information is requested. The complete list should also be sent the NCMEC in case adults and/or children have provided incorrect information about their relationship and status.

- Unaccompanied children and those who are not with their legal guardians should undergo a social and health screening taking into consideration an assessment of the relationship between the child and accompanying adult, ideally performed by a physician with pediatric experience.

1. CDC Health Advisory, "Instructions for Identifying and Protecting Displaced Children." Sept. 28, 2005.

PEDIATRIC SAFETY

Key points:

In addition to typical considerations of patient safety, the following are critical considerations for pediatric populations:

- Be cautious of predatory behaviors, abuse, and kidnapping

- Ensure a CHILDSAFE environment: physical security, physical hazards (childproofing)

    - Sharps container access
    - Outlets, wires, overhead objects
    - Windows (fallout/through)
    - Doors (access/escape)
    - Chemicals
    - Pharmaceuticals

- SUPERVISION
- Tagging & Tracking
- Release policy
- Unaccompanied minors

Separation of children from families (AHRQ)

In the event of a disaster or terrorist event [or other surge], it is likely that numerous children will be separated from their parents or other caregivers. Several national organizations—including the National Center for Missing and Exploited Children and the Red Cross—work to help separated family members find each other. This issue deserves more attention in preparedness and mitigation planning. For example, pre-disaster identification of children (e.g., name tags, other forms of ID, etc)—especially for those who are not verbal or cannot give their own name, parent's name, or pother critical information—should be considered. Neonates and their mothers purposefully given matching ID bracelets in hospitals immediately after delivery so the identity of the maternal-child pair is never in doubt. Similar identification of parent-child pairs at the time of separation (e.g., during rescue or evacuation) could greatly aid in the identification of the child and more accurately track and reunite children separated from their parents.

Child ID Survey

Name: _____ Hospital # _____

Age: _____ Months/Years DOB _____

Gender: Male_____ Female_____

Is the child currently accompanied by a supervising adult? Yes No

Name of currently the supervising adult? _____Age ____

Is this person a Parent? Yes No A Grandparent? Yes No

Is this parent the usual guardian? Yes No

Was the child living with this person before the disaster? Yes No

Does the supervising adult have any proof of legal guardianship or relationship to child? Yes No

If Yes, please describe or attach a copy:

_____

If the adult(s) is not a Parent or Grandparent, what is the relationship to this child?

Aunt/Uncle_____ Age _____

Sibling_____ Age _____

Friend_____ Age _____

Other (next-of-kin, teacher) _____ Age _____

Was the child treated for illness or have an injury? Yes No

If yes, please describe: _____

_____

Was the child admitted to the hospital? Yes No

If Yes, give room or location _____

If No, give location or address where child is currently (lobby, Pediatric Safe Area, sent to shelter, etc.)_____

Does this child have a history of medical problems? Yes No

If yes, please list: _____

Does this child or family members have special needs? Yes No

If yes, please list: _____

PEDIATRIC SAFE AREAS

Supervised areas should also be created to cohort all unaccompanied pediatric visitors or unaccompanied released pediatric patients in one central and safe location. This central location will need to be pre-assigned and secured to ensure that minors cannot leave the area without appropriate escorts. Security personnel or other responsible staff will need to be trained to supervise and assist pediatric visitors who may be frightened or who have other mental health issues as a result of being involved in a disaster and separated from family members.

Included in this section are three forms that may be helpful for hospital planning required for a Pediatric Safe Area. These forms include:

1. **Pediatric Safe Area Checklist**. This form was adapted from the Chicago Department of Health, and outlines recommended steps to ensure that the Pediatric Safe Area is appropriately set-up to receive children.

2. **Pediatric Safe Area Coordinator Job Action Sheet (JAS)**. Created for the staff coordinating these pediatric safe areas. By having a JAS, staff can readily review what steps need to be taken to prepare for the possible influx of pediatric patients. See JAS at the end of this chapter.

3. **Pediatric Safe Area Register**. This is a sample of a form that could potentially be used in the Pediatric Safe Area to monitor the arrival and departure of children. A copy of this register should be made available to the hospital EOC on a frequent basis.

Pediatric Safe Area Process/Checklist

YES	NO	ITEM
		Needle boxes are at least 48 inches off the floor?
		Do the windows open?
		Are the windows locked?
		Do you have window guards?
		Do the windows have blinds or drapes that might pose a strangulation hazard?
		Are there any water basins, buckets or sinks that might pose a drowning hazard?
		Can children be safely contained in this area (consider stairwells, elevators, doors)?
		Is the area poison proof? (Check for cleaning supplies, Hemoccult developer, choking hazards or cords that should be removed or locked away.)
		Are med carts and supply carts locked?
		Should separate areas for various age groups be created?
		Have drills for managing this area been conducted with all relevant departments?
		Is there a security plan for the unit?
		Is there a plan to identify the children?
		Is there a plan for assessing the mental health needs of children?
		Are there any fans or heaters in use? Are they safe? Check all equipment.
		Is there an onsite or nearby daycare center? Could they be of help?
		Is there enough staff to supervise the number of children? (Younger children will require more staff.)
		Are there a sign-in and sign-out sheet for all children and adults who enter the area? Always check adult identification and document on sign out sheet.
		Will children need to be escorted away from safe area to bathrooms?
		Are age appropriate snacks available for children? Always check for allergies (peanuts, peanut butter, nuts)
		Are there sleeping accommodations available (i.e., foam mats on floor)?
		Are there handwashing sinks available and/or hand sanitizer?

Always have 2 staff per child if private assessment or treatment occurs.

Rady Children's Hospital San Diego

PEDIATRIC SAFE AREA REGISTER SHEET

	Name of Child	Age	Arrival Time	Discharge Time	*Disposition	**Responsible Adult Name	Responsible Adult Signature	Contact Phone Number
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								

***Disposition:** Admit to Hospital (A); Discharged to Parent (D-P); Discharged to relative (D-R); Discharged to Other (D-O); Social Services Placement (SS); Policy (SDPD)

****Responsible Adult:** Adult responsible for child at time of discharge. PSA Coordinator should determine if child can be discharged to this adult based on hospital policy.

STAFF CHILD RATIO AND GROUP SIZE INDICATOR

These indicators only have one standard represented because in the national data base a specific state regulation that deals with staff child ratio and group size exists. Even so, the variation of these regulations among the states is great. While some states meet or almost meet these standards for staff child ratio and group size, many states do not. Of all the indicators, the greatest variation occurs in how state regulations match up with the national standard for staff child ratio and group size.

CFOC Standard (1992):

ST 002 – Child:staff ratios for centers and large family child care homes shall be maintained as follows during all hours of operation:

Age	Child-staff ratio	Maximum group size
Birth – 12 months	3:1	6
13 – 24 months	3:1	6
25 – 30 months	4:1	8
31 – 35 months	5:1	10
3 year olds	7:1	14
4 year olds	8:1	16
5 year olds	8:1	16
6 – 8 year olds	10:1	20
9 – 12 year olds	12:1	24

When there are mixed age groups in the same room, the child:staff ratio and group size shall be consistent with the age of the majority of the children when no infants or toddlers are in the mixed age group. When infants or toddlers are in the mixed age group, the child:staff ratio and group size for infants and toddlers shall be maintained.

Sample Job Action Sheet

PEDIATRIC SAFE AREA (PSA) COORDINATOR

You report to: _____ (PEDIATRIC SERVICES UNIT LEADER)
Command Center_____

Mission: To ensure that the pediatric safe area is properly staffed and stocked for implementation during an emergency, and to insure the safety of children requiring the PSA until an appropriate disposition can be made.

Immediate:

____ Receive appointment from Pediatric Services Unit Leader
____ Read this entire job action sheet
____ Obtain briefing from Pediatric Services Unit Leader
____ Ascertain that the pre-designated pediatric safe area is available
____ If not immediately available, take appropriate measures to make the area available as soon as possible
____ Gather information about how many pediatric persons may present to the area
____ Make sure that enough staff is available for PSA
____ Make sure that enough security staff is available for PSA
____ Make sure that there is adequate communication in PSA
____ Make sure that there is a sign in/out log for PSA
____ Make sure that all items in PSA checklist have been met; if there are any deficiencies, address them as soon as possible and report them the PSUL

Intermediate:

____ Ascertain the need for ongoing staff for PSA
____ Maintain registry of children in PSA as they arrive or are released to appropriate adult
____ Determine estimated length of time for the expected operational period of PSA
____ Maintain communication with Pediatric Services Unit Leader for planning needs
____ Determine if there are any medical or non-medical needs specifically needed by pediatric persons in PSA
____ Prepare an informational session for the pediatrics persons in the PSA
____ Prepare to make arrangements for sleeping capacities if needed
____ Ascertain if there will be any additional needs required for this event (volunteers, staff, security, and equipment)
____ Make sure that pediatric persons have the appropriate resources (food, water, medications, age-appropriate reading materials) and entertainment for their stay
____ Report frequently to Pediatric Services Unit Leader concerning status of PSA

Extended:

____ Make sure that PSA staff have enough breaks, water, and food during their working periods
____ Coordinate with Psychological Support for ongoing evaluations of mental health of volunteers and pediatric persons in case of need for psychosocial resources
____ Document all action/decisions with a copy sent to the Pediatric Services Unit Leader
____ Other concerns: _____

Pediatric Age Specific Care

Managing Pediatric Patients: Age-Specific Care

1. Provide Age-Specific Care

The challenge of pediatrics is treating each age group with sensitivity to their developmental stage. The following are age-specific guidelines for care.

Note: BP is measured in mmHG Temp is measured in C°

Age	Statistics
Newborn **0-28 days**	*Normal vital Signs and Assessment* Temp: 36.1 – 38 HR: 120 – 140 RR: 30 – 60 BP: Systolic 60 – 80, Diastolic: 40 – 55 *General* ▪ In ability to hold head erect ▪ Sleeps 16-18 hr/day ▪ Immature immune system ▪ Breathes through nose instead of mouth ▪ Poor temperature control ▪ Responds to light, sound *A Newborn does feel pain as evidenced by:* ▪ Facial expression ▪ Increased HR & BP ▪ Decreased oxygen saturations ▪ Sweaty palms ▪ Loud crying *Stress indicators* ▪ Skin color changes ▪ Poor feeding & regurgitation ▪ Yawning and/or hiccups ▪ Tremors ▪ Fussiness and/or listlessness ▪ Same indicators as pain in a child *Comfort Measures* ▪ Holding newborns close engenders security ▪ Bonds with parents and develops trust

Age	Statistics
Newborn **0-28 days**	*Miscellaneous* ▪ Limit use of tape and other adhesives ▪ Promote bonding ▪ Bundling ▪ Provide pacifier
Infants **29 days-12 months**	*Normal Vital Signs and Assessment* Temp: 36.1 – 38 HR: 110 – 170 RR: 30 – 60 BP: Systolic 60 – 100, Diastolic 40 – 60 *General* ▪ Responds better to visual rather than spoke cues ▪ Progresses to raising head, turning, rolling over and brings hand to mouth usually by 6 months ▪ Repeats actions to fine-tune learning ▪ Short attention span ▪ Learns by imitation, exploring and playing ▪ Progresses to crawling, standing and walking alone usually by 12 months *Comfort Measures* ▪ Likes to follow normal routine ▪ Provide familiar objects ▪ Lessen stranger anxiety by talking softly, meeting infant at his level and avoiding sudden gestures ▪ Use a security toy or pacifier to reduce anxiety and elicit cooperation *Stress Indicators* ▪ Anxious and unhappy ▪ Clings to parents and cries *Safety Measures* ▪ Keep side rails on crib at all times ▪ Keep small objects away from infant's reach
Toddlers **1 to 3 years**	*Normal Vital Signs and Assessment* Temp: 36.1 – 38 HR: 100 – 190

Age	Statistics
Toddlers **1 to 3 years**	RR: 24 – 34 BP: Systolic 95-105, Diastolic 53-66 *General* ▪ Abdomen protrudes ▪ Gains 5-6 pounds per year and grows 3 inches per year ▪ Requires fewer calories and more protein ▪ Gains fine motor coordination ▪ Progresses to walking independently ▪ Attaches to security objects and toys ▪ Asserts self to achieve independence ▪ Very ritualistic ▪ See things only from own point of view *Stress Indicators* ▪ Fears separation from parents/caregivers ▪ Has a low tolerance for frustration & Pain resulting overblown responses *Comfort Measure* ▪ Enjoys being read to ▪ Enjoys finger foods and feeding self ▪ Likes food & drinks at room temperature ▪ Enjoys age-appropriate toys *Teaching Approaches* ▪ Explain procedures to the toddler just before they occur ▪ Use dolls and toys as teaching aids
Preschoolers **3 to 5 years**	*Normal Vital Signs and Assessment* Temp: 36.1 – 38 HR: 70 – 130 RR: 20 – 30 BP: Systolic 92-116, Diastolic 56-75 *General* ▪ Growth is slow and regular ▪ Full set of teeth ▪ Increased skill and coordination ▪ Feeds and dresses self with little supervision ▪ Begins reasoning logically

Age	Statistics
Preschoolers **3 to 5 years**	▪ Understands right from wrong ▪ Vivid imagination ▪ Improving impulse control ▪ Socializes and plays with groups *Stress Indicators* ▪ Fears being left alone ▪ Fears the unknown ▪ Fears bodily injury ▪ Separation anxiety ▪ Often regresses ▪ Eating/sleeping disturbances *Comfort Measures* ▪ Family members are still the most important people ▪ Provide choices (foods, etc.) allowing a sense of control ▪ Offer rewards, praise cooperation ▪ Enjoys puzzles *Teaching Approaches* ▪ Assure preschooler that procedures and treatments are not punishment ▪ Use toys, dolls, puppets, etc. and games to teach and reduce fears ▪ Needs clear rules and boundaries ▪ Promote sense of security ▪ Use simple, neutral words during explanations
School-Age **6 to 11 years**	*General Normal Vital Signs and Assessment* Temp: 36.1 – 38 HR: 62 – 130 RR: 16 – 24 BP: Systolic 94-128, Diastolic 66-80 *General* ▪ Awkward with nervous energy ▪ Increase in gross and fine motor skills ▪ Increased attention span ▪ Logical reasoning ▪ Understands cause and effect ▪ Understands past and future ▪ Describes pain/discomfort in some detail

Age	Statistics
School-Age 6 to 11 years	▪ Starts preferring friends to family ▪ Develops moral and ethical behavior *Stress Indicators* ▪ Insomnia, nightmares, etc. from anxiety ▪ Fears the unknown, bodily harm, separation and death ▪ Alternately conforms to adults standards and rebels against them *Comfort Measures* ▪ Enjoys reading ▪ Desires privacy ▪ Enjoys sense of control *Teaching Approaches* ▪ Use body outlines and models for explanations ▪ Explain logically why a procedure is necessary ▪ Describe sensations to anticipate during procedures ▪ Encourage active participation in learning ▪ Praise the child for cooperating
Adolescents 12 to 18 years	*Normal Vital Signs and Assessment* Temp: 36.1 – 38 HR: 50 – 100 RR: 12 – 20 BP: Systolic 100-138, Diastolic 60-80 *General* ▪ Growth spurt lasts 2 years ▪ Easily fatigued ▪ Increased ability to use abstract thought & logic ▪ Able to handle hypothetical situations or thoughts ▪ Able to form independent opinion ▪ Develops own identity ▪ Wide mood swings *Stress Indicators* ▪ Risk taking behavior ▪ Challenges authority ▪ Concerned about bodily changes ▪ Depression – include screening in assessment ▪ Reluctant to admit he or she does not understand something

Age	Statistics
Adolescents 12 to 18 years	*Comfort Measures* ▪ Needs, but does not ask for, adult support to cope ▪ Underlying need to please adults ▪ Desires privacy *Teaching Approaches* ▪ Involve in decision and approach and treat as an adult ▪ Give scientific explanations using body diagrams, etc. ▪ Encourage verbalization of feelings ▪ Offer praise appropriately

2. Provide Child Safe Environment and Patient Supervision

In a disaster situation, designate special areas for unaccompanied children. Consider adding the JAS, "Pediatric Safe Area Coordinator" to your Disaster Plan. Separate these areas from the general population and modify for child injury prevention.

Recommendations for creating these areas:

- Identify locations within the facility appropriate for housing children
- Determine the supplies required to childproof the location
- Modify adult patient care areas for pediatric patients

Registering and maintaining appropriate adult/child association is important.

3. Ensure Patient Comfort

Patient comfort services are vital, especially during or after a crisis event. Child-specific services include art, music, and child life for disaster response. Developmentally appropriate creative art, music, bibliotherapy, therapeutic beading program, and other child life activities providing comfort to the patient during his/her hospital stay are invaluable.

Train spiritual care staff to deliver disaster-appropriate services to patients and their families. Where feasible, provide animal assisted intervention to increase the comfort of patients and families. Provide ongoing support and psycho-education for patients and families regarding clinical care and patient reactions. Grant access to educational materials, DVDs, CDs and the disaster library to learn more about disasters and recovery.

4. Perform Hygiene

Infection control relies on proper hygiene maintenance during a disaster. Certain environmental measures assist in this process. Follow hand hygiene procedures and ensure availability of adequate soap, sinks and paper towel supplies. Establish diapering

protocols using Department of Health and Human Services (DHHS) documents (or similar) for guidance regarding setting up sanitary changing stations.

Supply easy-to-clean toys (hard plastic, not fuzzy). Assign young children individual sleeping mats. Provide adequate clean linens, disposable diapers and changes of clothing for infants and young children. Ensure waste or soiled linen collection units are child safe, adequate in number and constructed to permit hands-free use.

Ensure adequate supplies of cleaning and disinfecting materials. Store them in a child safe manner. Additionally, schedule regular cleaning/disinfection procedures for toilets, bathrooms, changing stations, sleeping mats and toys. Clean any reusable equipment or toys appropriately following infection control procedure.

5. Ensure Nutrition

Address nutrition needs for all patients. Maintain a five-day food supply for emergency use. Place Memorandums of Understanding (MOUs) with nearby stores, pharmacies and medical supply companies to provide the facility with immediate delivery and additional supplies.

Pediatric Dietary Needs

Health children

- *0 to 6 months*
  - Breast or bottle feed
  - Ready-to-feed formula is available for use and requires no refrigeration or preparation. Powdered formula has a longer shelf life
  - Continue offering bottles to breast-fed babies. Baby will feed from bottle eventually
- *7 to 12 months*
  - Baby cereal
  - Jarred baby food or mashed table food
  - Formula or breast milk
- *1 to 2 years*
  - Soft, bite sized pieces of foods (vegetables or mashed potatoes) and meat
  - Cow or breast milk
- *2 years and older*
  - Table food – finger foods: Avoid foods causing choking hazards such as hot dogs or grapes for the youngest children
  - Pedialyte for hydration

Children with special needs

- *0 – 12 months*
  - Infant formula infused via 60 ml syringe (bolus feeds) or pump for continuous feeds
- *12 months – 18 years*
  - Pediatric formulas
  - Enteral products if appropriate
  - Tap or bottled water

Diabetic Children

- Determined by body weight and insulin requirements
- Require between-meal snacks to control blood glucose

6. Maintain Infection Control

Use the Healthcare Inspection Control Practices Advisory Committee (HICPAC) guidelines for children who are symptomatic owing to a biological event (see below for guidelines).

The nature of an illness or exposure determines the appropriateness of isolation. Cohort patients where necessary (same exposure/same symptom). Maintaining good hand hygiene is important for staff because placing masks on infants or young children to contain respiratory droplets is impractical. Placing infants or young children in portable isolation units alone is also not practical. Young children and infants should not be left alone.

Instruct adult caregivers of children placed in isolation regarding appropriate infection control measures such as doffing and donning of gowns, gloves, masks, hand hygiene and cough etiquette. Ensure adult caregivers follow appropriate infection control measures.

Use daycare setting guidelines (DHHS) for all asymptomatic children requiring diapering, feeding, toileting and assistance with hand hygiene. Evaluate these children and separate from symptomatic children or adults as soon as possible. Cohort children similarly exposed or asymptomatic. Daycare approaches apply and hand hygiene is paramount. Educate emergency caregivers about sanitary considerations.

Begin by sorting according to age group when cohorting children in a hospital setting to accommodate sanitary needs of infants and young children (diapering, toileting, hand hygiene, feeding, cleaning). Traumatized children often regress under stress. They require additional help with sanitary needs. Small group size is associated with a lower risk of infection in childcare settings. Support infection control by aiming for recommended age appropriate staff-child rations.

7. Manage Patient Flow

Prepare for the reception and care of potential pediatric patients by undertaking the following:

- Trigger hospital external disaster plan
- Identify and notify providers: MD, RN, Family Medicine, Emergency Medicine and Surgery

Identify equipment, drug dosing guidelines, ventilators, availability of operating rooms and pediatric ICU beds. Set up a family assistance area for victim's families and a separate area for media contact.

Staff should know the hospital's pediatric surge capacity (i.e. when the institution will run out of clinicians, equipment, medications, OR rooms or ICU beds for the number and severity of expected pediatric patients). Request transport teams, more MDs and RN staff to help as needed.

Decontaminate pediatric victims on arrival prior to entering the hospital if chemical or radioactive contamination is suspected. If the hospital lacks a decontamination shower, remove all clothing and objects from the patient while still outside and wash with warm water if possible, for several minutes. Do this for all age groups.

Keep at least 5 cribs, port-a-cribs or playpens in a storage area. You may use adult beds if the following actions are taken:

- The bed has side rails.
- Set the bed at the lowest possible height.
- Unplug so the adjustment buttons do not work.

Plan ahead for news media and a rush of anxious families. Additionally, prepare security to handle large numbers of family members and other non-medically affected individuals. Expect approximately 4 to 5 visitors/family per pediatric patient. Open a Pediatric Safe Area to care for non-injured or discharged unaccompanied children temporarily.

Make all attempts at identifying pediatric victims. Maintain and update a list frequently. Relay information to the hospital emergency operating center and/or family assistance center.

8. Coordinate Patient Transport

Prior to a surge, create patient transport guidelines. Instruct staff to follow these guidelines to reduce confusion. Create MOUs with neighboring hospitals or other hospitals with specialty capabilities.

Behavioral Health

Behavioral Health

In the midst and aftermath of a pediatric emergency children, families, and hospital staff all need emotional support. When the emergency occurs on a large scale the emotional impact of the event can be overwhelming to any and all involved.

Physical medicine and stabilization is vital but long term adverse psychological impacts can linger for a life time if not properly addressed. Significant traumas can lead to post traumatic symptoms in children and adults and can produce Post Traumatic Stress Syndrome and long term adverse health consequences years later (www.acestudy.org).

RCHSD Behavioral Health professionals are trained to support children, families, and staff.

Role of Behavioral Health Departments: In the event of a significant pediatric event or surge the first line of response to needs within the hospital and outpatient clinics is the Medical Social Work Department. Additional support can be secured from the Chadwick Center for Children and Families and the Psychiatry Department.

Medical Social Work

Immediate response to a disaster requires Medical Social Work to coordinate actions with Hospital Incident Command Center. In concert with Trauma staff, Medical Social Work will conduct an assessment to support triage activities, including:

Clinical

- On site assessment of the crisis situations
- Crisis intervention and short term trauma counseling – children and adults
- Crisis intervention and short term trauma counseling –adult (staff, parents, child caregivers)
- Clinical supervision and coordination of deployments

Non-Clinical

- Logistical support of team
- Media relations
- Internal communications
- Triage telephone line

Staffing will be supported by a Call Back system and is managed by either the Director or Supervisor of Medical Social Work Department. Social Workers from all hospital units can be deployed as needed by leadership to provide both Clinical and Non-Clinical services during the disaster. All activities will be coordinated through the Hospital Incident Command Center.

In the event of a major event or surge and demands that exceed the capacity of Medical Social Work Department, RCHSD has expanded capacity in the Behavioral Health Crisis Response Team (BHCRT).

Behavioral Health Crisis Response Team (BHCRT) mobilizations may occur in response to:

1. A major national or local event that places RCHSD staff in a state of emotional stress or crisis that exceeds the capacity of normal Human Resources and Employee Assistance Program (EAP) support.

2. A major national or local event that places significant numbers of children and/or patient families within the hospital in a state of emotional stress or crisis that exceeds the capacity of existing social work and/or child life resources.

3. A major national or local event in the community in which significant numbers of children are suffering the after effects of emotional trauma ranging from those who witness violence or who are vicarious victims of violence to those suffering emotional distress as a result of major manmade or natural disasters.

Long Term Follow-up: Children requiring mental health treatment for post traumatic stress symptoms should be referred to the Chadwick Center or Psychiatry Department.

In the aftermath of a disaster RCHSD Behavioral health professionals will often be guided by the principals of **Psychological First Aid** (see below) for child and adult patients. Critical Incident Debriefing is utilized to support Hospital staff during and after the disaster.

Important Note: Critical Incident Debriefing is not appropriate for use with children

Critical Incident Response for Staff

In an emergency, hospital staff and doctors will respond to the incident utilizing all prior training and experiences in order to deliver appropriate care to patients and families. Physicians, nurses, and allied health providers are highly trained to intervene and treat patients, regardless of the volume or acuity. Frequently in such situations, patients are triaged and treated consecutively without the opportunity for staff to process the events or consider the impact on them.

Healthcare providers are a valued resource and need to be educated, supported, assessed, and sometimes offered mental health treatment in order to allow them to continue to provide the services they deliver during and after emergencies and critical events. Emotional support intervention should be immediately available following any critical incident, event, or emergency. Resources should be made available to all providers and staff involved in the event, including physicians, nurses, CHET team, paramedics, lab,

radiology, pharmacy, transport, ancillary services, BA staff, housekeeping, etc. All staff has some relative exposure to the event in the course of completing their jobs. Implementation of support for hospital staff includes:

1. Education of key hospital staff, including House Supervisors, Department Directors, Charge Nurses, and Social Work staff on signs and symptoms of the emotional impact of the disaster or trauma on hospital staff. These staff is the first level of intervention and support to providers and are critical to assisting staff in continuing their functions and resolving issues encountered in the course of their work.

2. Screening, Assessment, and Triage of all involved staff.

3. Intervention options:
   a. One-to-one immediate intervention on the job
   b. Support and advise
   c. Back up resources for staff who may have to leave shift
   d. Offer of options to staff, including brief discussion, ongoing supervisor support, brochure, referrals, and follow-up contacts
   e. Group critical incident debriefing for all involved in incident
   f. Referrals to ongoing therapy, as needed

4. Resources for support:
   a. Internal multi-disciplinary critical incident debriefing team
   b. External, including EAP programs and Physician Well-Being Committees

What is Psychological First Aid?

Psychological First Aid is an evidence-informed[1] modular approach to help children, adolescents, adults, and families in the immediate aftermath of disaster and terrorism. Psychological First Aid is designed to reduce the initial distress caused by traumatic events and to foster short- and long-term adaptive functioning and coping. Principles and techniques of Psychological First Aid meet four basic standards. They are:

1. Consistent with research evidence on risk and resilience following trauma
2. Applicable and practical in field settings
3. Appropriate for developmental levels across the lifespan
4. Culturally informed and delivered in a flexible manner

Psychological First Aid does not assume that all survivors will develop severe mental health problems or long-term difficulties in recovery. Instead, it is based on an understanding that disaster survivors and others affected by such events will experience a broad range of early reactions (for example, physical, psychological, behavioral, spiritual). Some of these reactions will cause enough distress to interfere with adaptive coping, and recovery may be helped by support from compassionate and caring disaster responders.

Family Information & Support Center (FISC) EDUCATIONAL TOOLS for Staff

Normal Reactions to Disaster for Adults and Children

Age	Parameter	Normal Reactions May Include
All Ages	**Emotional**	• Shock • Fear • Grief • Anger • Guilt • Shame • Helplessness • Hopelessness • Numbness • Emptiness • Decreased ability to feel interest, pleasure, love
	Cognitive	• Confusion • Disorientation • Indecisiveness • Worry • Shortened attention span • Poor concentration • Memory difficulties • Unwanted memories • Self-blame
	Physical	• Tension • Fatigue • Edginess • Insomnia • Generalized aches and pains • Startles easily • Rapid heartbeat • Nausea • Decreased appetite • Decreased sex drive
	Interpersonal	• Difficulties being intimate • Being over-controlling • Feeling rejected or abandoned

Children's age-specific disaster response:		
Preschool	**Emotional**	• Separation fears • Temper tantrums
	Cognitive	• See All Ages
	Physical	• Regression • Fussiness • Somatic complaints • Sleep disturbances including nightmares, somnambulism and night terrors
	Interpersonal	• Likely to seek comfort
School-age	**Emotional**	All of above, plus: • Excessive guilt and worries about others' safety
	Cognitive	• Poor concentration and loss of school performance
	Interpersonal	• Repetitious re-telling or play related to traum
Adolescent	**Emotional**	• Depression • Wish for revenge
	Cognitive	• Altered view of the future
	Physical	• Sleeping disturbances • Eating disturbances
	Interpersonal	• Acting out

FISH Educational Tools for Staff # 3

Mental Health Consequences of Disaster – An Overview for Emergency Department Staff

Developmental Considerations in the Comprehension of Death in Children & Adolescents				
	Infants	**Preschool**	**School-Aged**	**Adolescents**
Developmental considerations	• Object permanence • Establishing trust • Dependency for basic needs	• Magical thinking • No concept of time • Egocentric	• Logical thinking • Concept of time • Differentiation of self from others	• Abstract thinking • Establishing independence • Identity formation • Feelings of omnipotence
Effect of disaster	• Destroyed routine • Loss of loved ones			
Behavioral changes seen as result of disaster	• Regression • Detachment	• Post-traumatic play • Withdrawal • Apathy	• School problems • Anxiety • Anger • Somatic complaints • Post-traumatic play	• Risk-taking • Somatic experiences • Depression • Anger • Hostility to others • Self-doubt • Shame • Guilt
View of disaster	• No comprehension	• Reversible	• Understands loss as a consequence of injury and illness	• Full understanding
Modified from: American Academy of Pediatric Workgroups on Disasters, *Psychological issues for children and families in disasters: a guide for the primary care physician.* US Department of Health and Human Services, 1995 [DHHS Publication (SMA) 95-3022].				

FISC Educational Tools for Staff # 4

Helping Children Deal with Disasters

Listen to the child

- Ask the child what he/she knows, what they heard, or what their friends are saying
- Ask the child how they are feeling. They may feel angry, scared, sad or anxious
- Let the child know that you understand their feelings
- It is important not to laugh at the child's fears, even if they seem silly to you
- Let the child ask questions
- When the child ask questions, answer briefly and honestly
- Remember: it is OK to answer, "I don't know."

Try to make the child feel safe

- Let the child know that many people (police, teachers, doctors and our President) are working hard to:
    - Take care of the hurt people
    - Help keep us safe
- If the child is worried that his/her home is not safe, explain the nature of the event as simply as possible
- Try to keep to the child's regular routine as much as possible

Adapted from: Child Life Department, (2001) Bellevue Hospital Center Pediatric Resource Center

Source:

http://www.health.state.ny.us/facilities/hospital/emergency_preparedness/guideline_for_hospitals/support.htm#fisced

RCHSD Capacity Management Plan

Rady Children's Hospital San Diego	CURRENT EFFECTIVE DATE **December 2010**	REVISED DATE **December 2010**	MANUAL: **Clinical Care**
			TRACKING # **A-07**
☐ **P O L I C Y/PROCEDURE** ☐ **STANDARDIZED PROCEDURE** ☐ **PLAN** ☒ **GUIDELINE**	TITLE: **MANAGING CAPACITY TO ENSURE PATIENT ACCESS**		
	PERFORMED BY: **Management**		

Specialty Review		**Council Review**	**ACCREDITATION/STANDARD**
☒ Multidisciplinary ☐ Nursing Council ☐ RT Council ☐ SW Council ☐ Child Life ☐ Human Resources ☐ EOC/Safety	☐ Information Services ☐ Infection Control ☐ Interdisciplinary Practice ☐ Pharmacy & Therapeutics ☐ Forms ☐ Med Staff ☐ Specialty Review	☐ Clinical Ops ☒ Med Staff Executive ☐ Center Ops ☒ Board	

Philosophy:

Rady Children's Hospital's specialized resources for pediatric patients will always be judiciously managed to ensure access for children for services not available through other resources in our community. Our primary focus is the care of children from birth to the 18th birthday or up to the 14th birthday if resources are in short supply. Examples of this include: lack staff, beds, or operating room capacity.

Rady Children's Hospital and Health Center recognizes its community responsibility to provide comprehensive, cost-effective, high quality medical care for ill and injured children. Furthermore, Children's recognizes its responsibility as a resource to collaborative organizations in the community relative to out-reach, education, and programs with our partners in wellness, ambulatory and in-patient acute care.

Close coordination of services within the community provides improved continuity of care and improved organization of inter-facility transfers when necessary. When transfers of patients are necessary to return a patient to a lower level of care in a family's own community or to ensure availability of staffed beds for sickest patients at Rady Children's (diversion), such transfers will be in accordance with clinical need, inter-facility patient transfer agreements and regulatory statutes. Diversion of patients who have already arrived for care at Children's will only occur when all efforts to

mobilize appropriate resources have been exhausted.
Final coordination and authority on behalf of the Hospital and Medical Staff, to approve admissions, surgical scheduling and diversion are as follows:

All Admissions:
- Shall be coordinated through Nursing Supervisor
- Final authority rests with Chief Medical Officer and Medical Director of In-Patient Services for clinical decisions and disposition. Hospital Administrator or designee will be on call for non-clinical decisions.

All Surgical Scheduling:
- All surgeries shall be scheduled through the surgery scheduling office.
- Final authority rests with the Surgery Medical Director and/or Chief Medical Officer for clinical decisions and disposition.

Trauma Service:
- If there is an imminent threat of closure to trauma, the Trauma Surgeon on service must be notified.
- The final authority for closure to trauma rests with the Trauma Surgeon on service.

Alternative RCHSD Surge Locations and Process
- Every effort is made to keep all appropriate patients on the main RCHSD campus during a surge event of high patient census.
- The Hospital Incident Command System (HICS) is used to coordinate patient placement and review of census and options.
- The Inpatient Medical Director, Chief Operating Officer and Designated Nurse Executive are the Surge leadership and utilize the HICs process. Multiple briefs are held daily within inclusion of appropriate stake holders for decision making.
- Alternative locations to be provide care are identified in the RCHSD Emergency Preparedness and also Surge policies (insert names). If the census increases greater than 5% of licensed beds California Department of Public Health Licensing Department will be notified.

The following “APPENDIX 1” delineates the tiered approach to routine as well as critical resource management.

Date Written: February 2001
Date Revised: November 2005, February 2009, December 2010

Attachment 1
Transfer Options (as of 11/30/05)

Transfer (to) Facility	Appropriate Transfer Patients
1. Balboa Naval Medical Center	Champus eligible children Acuity levels PICU, IMU & Med/Surg *Must have an accepting MD to follow
2. Sharp-Grossmont Hospital RCHSD Pediatric Unit. This is an RCHSD unit. Beds: 11 Surge Capacity: 14	Medical patients primarily – non-critical This is now our unit and is not a transfer out of RCHSD.
3. Palomar Hospital RCHSD NICU and Pediatric Unit NICU Beds: 12 NICU Surge: 14 Peds Beds: 17 Ped Surge: 20	Partnership with RCHSD Medical-Surgical, NICU Level II patient types Primary medical/limited surgical
4. Affiliated groups/payors: ▪ CPCMG North County ▪ Greybill ▪ Penn-Elm/Scripps Clinic ▪ Escondido Community Clinic under Medical Direction of CSSD Hospitalist	Medical-Surgical, NICU Level II patient types Primary medical/limited surgical *Must have accepting MD to follow
5. Sharp Mary Birch Hospital	Neonatal Level II services
6. Sharp Memorial Hospital ▪ Sharp Rees Stealy ▪ Sharp Community Medical Group ▪ Sharp Health Plan Providers	Medical and Surgical Services Optimal transfer for teens *Must have accepting MD to follow Bed Reservation Agreement
7. Tri-City Medical Center ▪ Sharp Mission Park Medical Group ▪ Cassidy Medical Group	Medical/Surgical, NICU Level II, primarily medical/non-critical. *Must have accepting MD to follow
8. Kaiser Permanente ▪ Permanente Medical Group ▪ Kaiser Members	Peds IMU, Medical/Surgical and NICU Level II. *Must have accepting MD to follow
9. UCSD	NICU Levels II and III NICU Level II

Transfer (to) Facility	Appropriate Transfer Patients
10. RCHSD NICU at Scripps La Jolla ▪ NICU Beds: 14 ▪ NICU Surge: 17 11. Scripps Encinitas RCHSD NICU ▪ NICU Beds: 6 ▪ NICU Surge: 7	NICU Level II

Criteria for Transfer to Alternative Inpatient Care in a General Acute Care Facility

Purpose:

Describe transfer criteria of inpatients to an adult general acute care facility in the event that Rady Children's Hospital has met surge capacity.

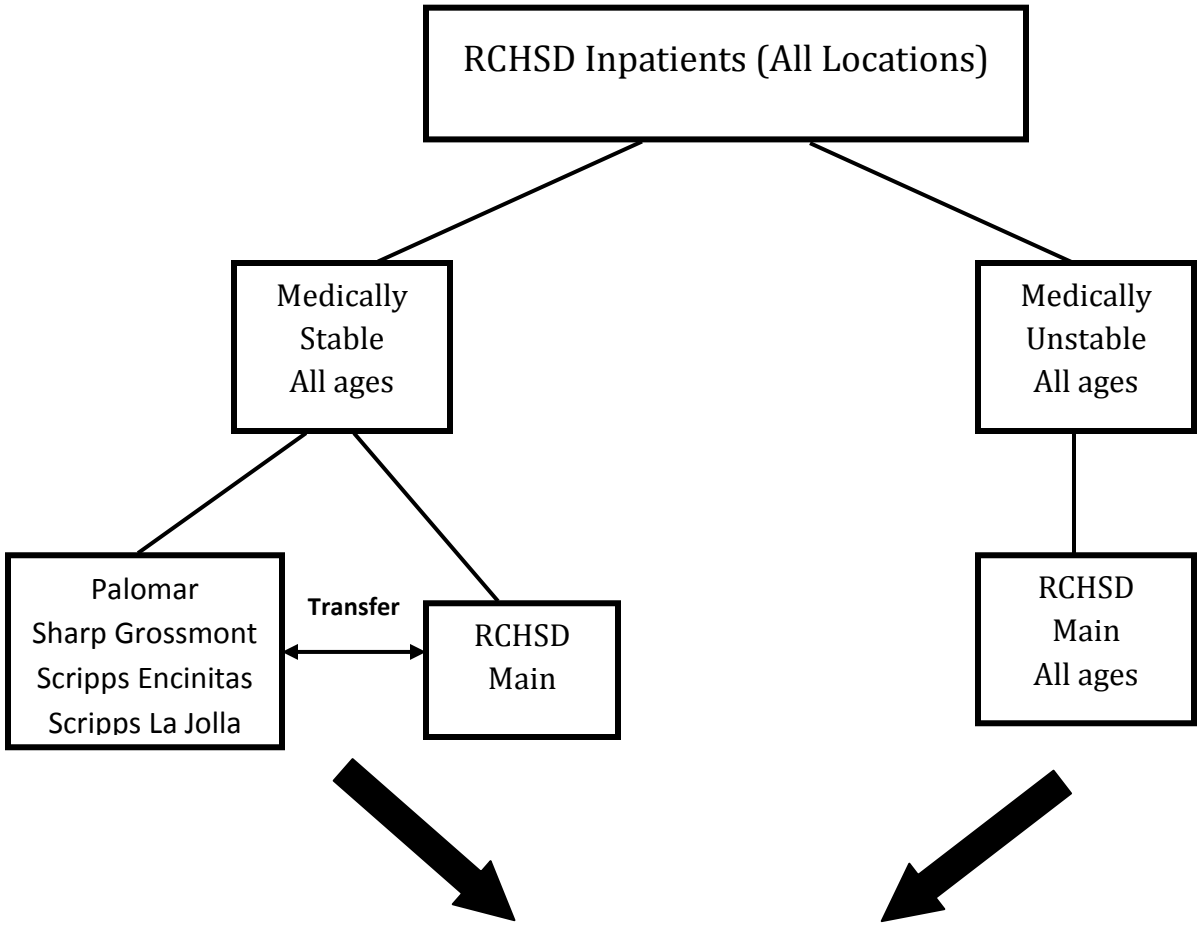
I. General Statements

1. RCHSD is the optimal provider for inpatient pediatric care for San Diego and Imperial County.
2. In the event of a surge of pediatric patients there are times patients will need to be cared for in a General Acute Care Facility.
3. Process to review inpatients and potential admissions is described in Clinical Care Manual policy A-07 Managing Capacity to Ensure Patient Access.

II. General Criteria Transfer

Assumption: RCHSD will triage to keep the most medically unstable pediatric patients within RCHSD inpatient care units. These units include the main campus, Palomar, Scripps La Jolla, Scripps Encinitas and Sharp Grossmont. Additionally transfer criteria will be reviewed by age, keeping the youngest patients who require specialized supplies, equipment and pharmaceuticals within RCHSD inpatient care areas.

Flow Chart



Criteria to Transfer to General Acute Care Facility (GAC)

List is in order of first to transfer

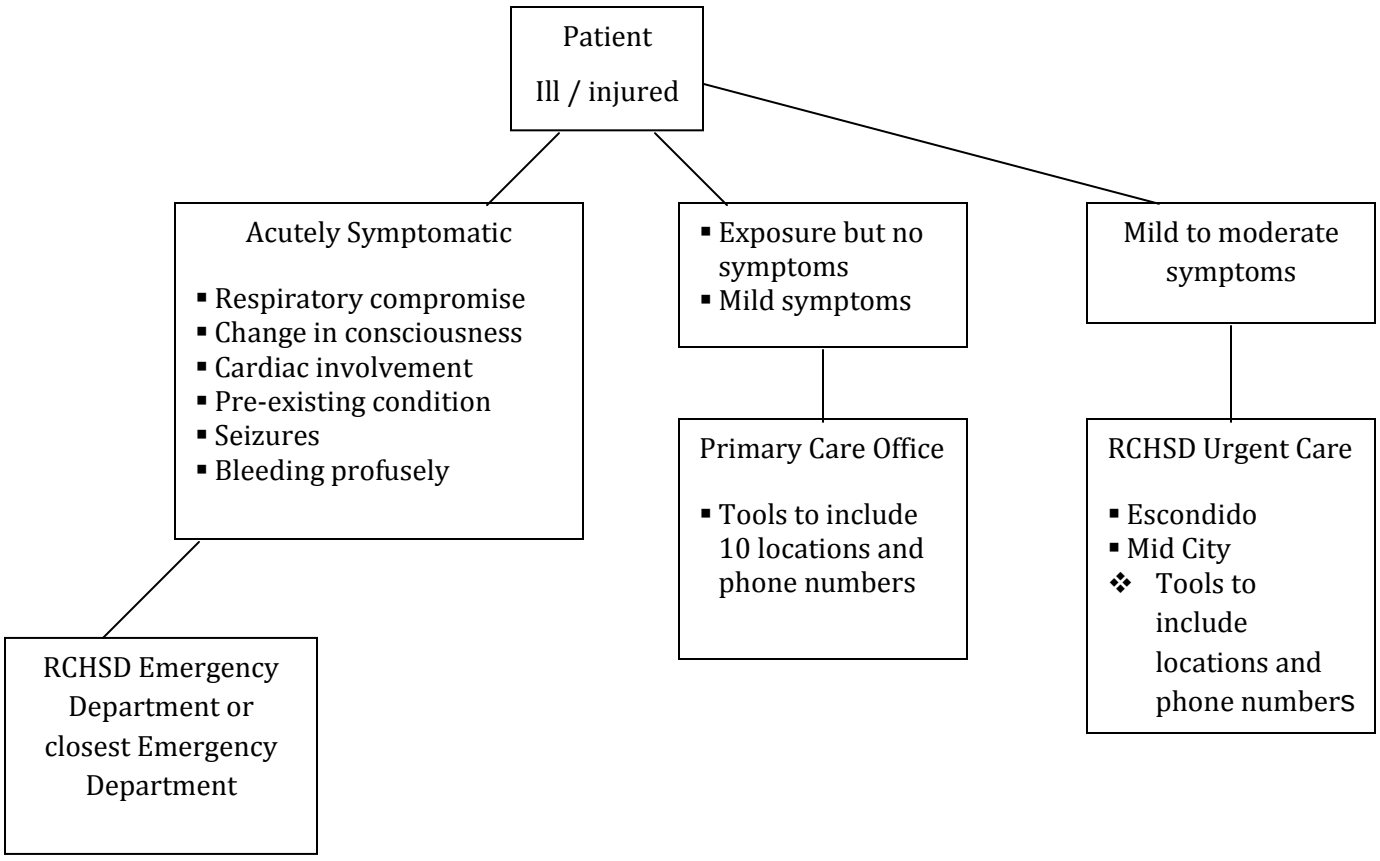
- Patients older than 14 years of age and developmentally age appropriate, medically stable condition, no special equipment needs
- Patients older than 12 years of age, developmentally age appropriate, medically stable condition, no special equipment
- Patients older than 10, then 8 with same criteria
- NICU patients to Sharp Mary Birch or UCSD if beds are available
- Patients with multiple medical issues or chronic medical conditions (cardiac, pulmonary, oncology, endocrine are examples will stay with RCHSD)
- Patients requiring specialize pediatric equipment or procedures or are medically unstable will remain with RCHSD

Surge Planning
Across RCHHC

1/2011

Purpose: This document outlines surge planning options across RCHHS inpatient and outpatient locations.

Outpatient Surge: Primary goal in an event that creates a surge in outpatient visits is to triage and direct patients to appropriate locations and reserve the Emergency Department for most acutely ill.



Clinical Space and Staff: As part of the RCHSD Emergency Preparedness Plan Clinic space utilization may change. In the event of a large surge the decision may be to cancel elective clinical and use space and resources for ambulatory surge capacity. For surge planning this includes:

Location	Modified Utilization during Surge
Building 28 Main Campus	Depending on the event this space and the staff are identified as alternate care sites to triage away from the Emergency Department. This area can service as an urgent care of primary physician office. It can be designated a contaminated evaluation site or clean depending on the situation.
7920, 8010 Clinics	These clinics can be utilized as specific surge locations to include urgent care services or primary care services.
Other off site locations	All off site locations and business will be evaluated in the Command Center to be integrated into the surge plan.

- **See Communication Plan**

Inpatient Surge: Primary goal is to keep the most acute pediatric patients at the main hospital. The transferring of pediatric patients to other RCHSD locations or adult facilities will be coordinated through the Command Center.

RCHSD Beds within the County:

Location	Bed Capacity	Surge Capacity	Transfer Considerations
RCHSD	ICU - 54 MedSurg - 180 NICU - 49	ICU - 74 MedSurg - 212 NICU - 69 *	Priority is highest risk, highest acuity, youngest, most complex stay at RCHSD
Grossmont Peds	MedSurg - 11	MedSurg - 14	Stable, all ages
Palomar	MedSurg - 17 NICU - 12	MedSurg - 20 NICU - 14	Stable, all ages Level 2
Scripps LaJolla	NICU - 14	NICU - 17	Level 2
Scripps Encinitas	NICU - 6	NICU - 7	Level 2
Adult Facilities: ▪ Sharp ▪ Grossmont ▪ Scripps LJ ▪ Tricity ▪ Mercy ▪ UCSD			Stable Initial > 14 yrs of age then decrease by need (i.e. >12 years, >10 years

RCHSD Satellites & Use Plan during a Surge Event

Location	Type Unit	
Grossmont Hospital Peds Beds - 11	Pediatrics	Transfer and admit stable - moderately ill pediatric patients
Palomar Ped Beds - 17 / Surge 20 NICU 12 / Surge 14	Pediatrics & NICU Level 2	Transfer and admit stable - moderately ill patients to save acute beds at main campus. Transfer stable NICU patients.
Specialty Clinics	Pediatric Outpatient	Can be used as a site for triage and treatment of ambulatory patients around county.
Scripps La Jolla NICU Beds - 14 / Surge 17	NICU Level 2	Transfer stable patients from Main NICU to accommodate sick neonates.
Scripps Encinitas NICU Beds - 6 / Surge 7	NICU Level 2	Transfer stable patients from main NICU to accommodate sick neonates.
Primary Care Medical Group Offices	Physician Offices	Triage and treat patients to keep RCHSD ED available for sicker patients. May need expanded hours.
RCHSD Urgent Care Sites	Walk-in Pediatric Urgent Cares	Expand hours and staffing to meet patient flow needs. Keep RCHSD ED available for sickest pediatric patient.

Disaster Types: Injuries & Illnesses

Key Disaster Types and Related Injury Conditions

Disaster Types and Pediatric Considerations
The table below highlights the types, symptoms, and treatment of common injuries resulting from the following disasters:

Natural Disasters

- Fire
- Flood
- Hurricane/Tornadoes
- Earthquake
- Infectious Epidemic

Manmade Disasters (SEE Terrorism Tools Section)
Chemical, Biological, Radiological, Nuclear, high-yield explosives (CBRNE) + F

Chemical
- Nerve Agents
- Toxic Industrial Chemicals
- Choking Agents
- Vesicants
- Irritants
- Cynanides

Biological
- Class A Biological Agents
- Class B Biological Agents

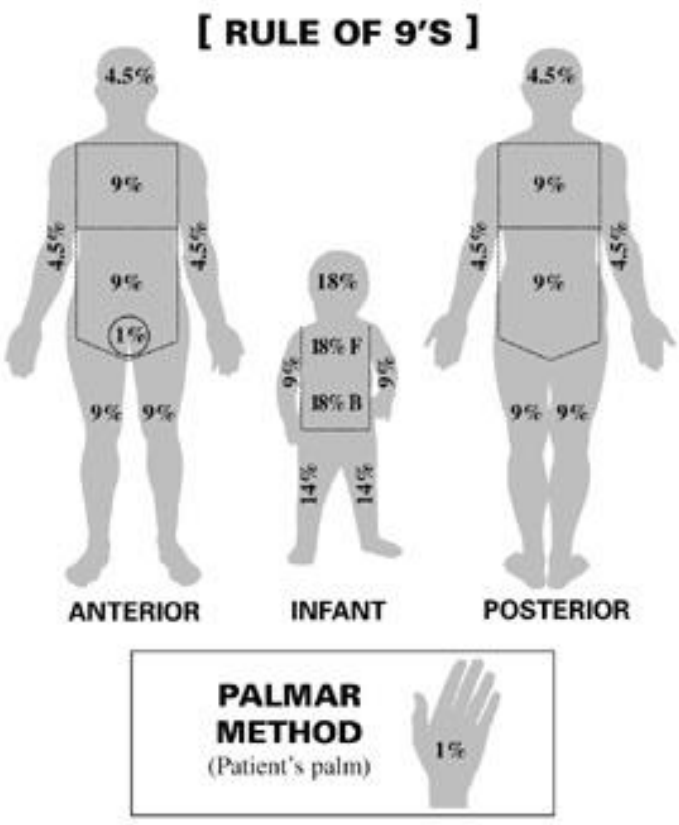
Radiological and Nuclear
- Ionizing
- Alpha
- Beta
- Gamma/x-rays
- Neutrons

Explosive
- High Order
- Low Order

Firearms

Disasters	Specific Type	Explanation
Natural Disasters	Fire	Burn management ▪ See wildfire acute pediatric care support from UCSF PEHSU: http://www.ucsf.edu/ucpehsu/Wildfires_Acute_Phase.pdf ▪ See Environmental Health Hazards for Children in the Aftermath of Wildfires: http://www.ucsf.edu/ucpehsu/Wildfires_Recovery_Phase.pdf ▪ Larger skin to body surface area ratio ▪ Smaller airways increase risk of airway compromise with smoke inhalation ▪ Different body proportions than adult result in alterations of "rule of 9's" for fluid resuscitation ▪ Post-Traumatic Stress Disorder (PTSD) increased risk in children

Body Surface Percentages



Disasters	Specific Type	Explanation
Natural Disasters	Flood	▪ Drowning risk increased in non-swimmers ▪ Increase in respiratory infections from exposure to elements ▪ Communicable disease ❖ GI Infections from waterborne and food-borne illness ❖ Vector borne illness from stagnant water (Mosquitoes) ❖ Wound infections from dirty water ▪ Hypothermia: Children especially at risk ▪ Loss of shelter ▪ Separation from family ▪ Psychological damage: Children at increased risk for PTSD
	Hurricane/ Tornadoes	▪ Risks similar to flood ▪ Additional risks ❖ Damage from blunt trauma due to flying debris ❖ Avoid windows during event
	Earthquake	▪ Vulnerable to trauma: Larger head, less circulatory volume reserves ▪ Psychologically more prone to PTSD
	Infectious Epidemic	▪ Children more vulnerable due to immature immune system ▪ Less fluid reserves in cases of infectious vomiting/diarrhea ▪ Children more likely to become infected due to poorer hygiene and more hand-to-mouth contact
Manmade Disasters: CBRNE **Chemical**	Nerve Agents	▪ Types of agents ❖ Sarin (ex. 1995 Japanese subway attack) ❖ VX ❖ Tabun ❖ Soman ▪ Liquid or gas ▪ Routes: inhaled or absorption through skin (some healthcare workers in the Japanese subway Sarin attack were off-gassed by liquid nerve agent from victim's clothing; this shows the important of decontamination of victims with unknown exposures and working in well-ventilated space) ▪ Mechanism ❖ Acts of blocking enzyme (Acetylcholine esterase) that breaks down acetylcholine (Ach) at neuromuscular junction. Leads to over-stimulation of nervous system

Disasters	Specific Type	Explanation
	Nerve Agents	▪ Symptoms: ❖ Muscarinic receptor effects: "SLUDGEM" symptoms (Salivation, Lacrimation, Urination, Defecation, GI upset, Emesis, Miosis (pupil constriction)) – 90% of receptors are this type ❖ Nicotinic effects: Muscle fasciculation (twitching), seizure, weakness, apnea: 10% of receptors are this type ▪ Treatment: use antidotes if SLUDGEM symptoms present (do not sue antidotes if symptoms are only constricted pupils/mild rhinorrhea) **Antidotes** <u>Antropine</u> ▪ Atropine works by blocking post-synaptic receptor from Ach. Reverses SLUDGEM symptoms ▪ Pediatric dose: 0.05 mg/kg IV/IM/IO repeat q 5-10 minutes until SLUDGEM symptoms start improving ▪ If out of atropine, *alternatives* can be used ❖ Glycopyrrolate o Anti-sialagogue o Parasympatholytic o Does not cross blood-brain barrier, therefore not helpful with CNS effects of agent ❖ Scopolamine o Causes deep sedation as side effect <u>2-PAM (a.k.a. pralidoxime)</u> ▪ 2-PAM acts by removing nerve agent from Ach-esterase. ▪ "Aging" is time it takes for nerve agent to bind covalently (permanently) with Ach-esterase. Different agents have different aging times that range from seconds to hours. After an agent's toxic effects ▪ Pediatric dose: 50 mg/kg (2g max/hr) IV or IM ▪ Autoinjectors (Mark I): dose is 2mg atropine, 600 mg 2-PAM (use one kit in kids 3-7 yrs, 2 kits for > 8 yrs) Supportive Treatments ▪ Respiratory support ❖ Beta agonists (albuterol)

Disasters	Specific Type	Explanation
	Nerve Agents	❖ Oxygen ❖ Ventilatory support: Expect high pressures due to airway resistance (50-70cm H20) ▪ Seizure Control ❖ Benzodiazepines are drug class of choice ○ Midazolam 0.15-0.2 mg/kg IM or IV (max 5mg/dose) - less apnea if used IM (slower absorption) ○ Diazepam 0.05-0.3 mg/kg /dose PR or IV ○ Lorazepam 0.05-0.2 mg/kg IV or IM Pediatric Consideration ▪ Small mass means smaller doses are lethal ▪ Higher respiratory rate: Higher dose received ▪ Smaller airways, larger tongue: Increased risk of obstruction from bronchorrhea ▪ Smaller intravascular volume: Increased effects from V/D losses ▪ Immature blood-brain barrier: Increased absorption of agent into CNS ▪ Less mature metabolic systems in place for natural detox of agents (Paraoxonase: Enzyme responsible for breakdown of nerve agents). At birth levels are ½ those of adults
Manmade Disasters: CBRNE **Chemical**	Toxic Industrial Chemicals	Types ▪ Chlorine ❖ Heavier than air, rapidly disperses ❖ Bleach-like odor ❖ Liquid or gas ❖ Inhaled, ingested or absorbed through skin ❖ Skin burns, coughing, nose/throat irritation, burns eyes, dizziness, congestion, tissue swelling if ingested, lung damage ❖ Symptoms usually appear within minutes of exposure ▪ Hydrogen cyanide ❖ Rapidly disperses

Disasters	Specific Type	Explanation
	Toxic Industrial Chemicals	❖ Bitter almond odor ❖ Liquid or gas ❖ Inhaled, ingested or absorbed through skin ❖ Skin burns, coughing, nose/throat irritation, blindness, lung damage Pediatric Considerations: ▪ Agents heavier than air remain lower to the ground where children tend to be. Accumulation of these agents leads to children being disproportionately affected ▪ Less pulmonary reserve, higher respiratory rate makes children more severely affected ▪ Thinner skin leads to higher absorption of agents
Manmade Disasters: CBRNE **Chemical**	Choking Agents	Types ▪ Phosgene ❖ Heavier than air, rapidly disperse ❖ Mown hay odor ❖ Solid, liquid or gas ❖ Inhaled ❖ Airway irritation, pulmonary edema, coughing occurs immediately on exposure ▪ Chlorine ❖ Heavier than air, rapidly disperse ❖ Bleach odor ❖ Liquid or gas ❖ Inhaled, ingested or absorbed through skin ❖ Skin burns, coughing, nose/throat irritation, burning eyes, dizziness, congestion, tissue swelling if ingested, lung damage ❖ Symptoms usually appear within minutes of exposure Pediatric Consideration ▪ Agents heavier than air remain lower to the ground where children tend to be. Accumulation of these agents leads to children being disproportionately affected ▪ Less pulmonary reserve, higher respiratory rate makes children more severely affected

Disasters	Specific Type	Explanation
	Toxic Industrial Chemicals	▪ Thinner skin leads to higher absorption of agents
Manmade Disasters: CBRNE **Chemical**	Vesicants- always Liquid	Types ▪ Mustard ▪ Lewisite ▪ Phosgene Mechanism of action ▪ Burns skin ▪ Damages lungs ▪ Damages eyes ▪ Suppresses bone marrow (3-5 days post exposure) Treatments ▪ Flush skin/eyes with water ▪ Topical antibiotics to skin ▪ Mydriatics (dilates eyes) ▪ Oxygen ▪ Bronchodilators ▪ Ventilatory support ▪ Antidote for Lewisite: BAL (British Anti-Lewisite)- chelates arsenic component Pediatric Considerations ▪ Thinner skin ▪ Larger body surface area to volume ratio in children vs. adults: Higher dose received
Manmade Disasters: CBRNE **Chemical**	Irritants	Types ▪ Tear gas ▪ Pepper spray Treatment ▪ Remove victim from area of exposure ▪ Flush eyes ▪ Beta agonists to relieve respiratory symptoms Pediatric Considerations ▪ Higher respiratory rates: Higher dose received

Disasters	Specific Type	Explanation
Manmade Disasters: CBRNE **Chemical**	Cyanides	Types ▪ Hydrogen cyanide- a.k.a. "Zyklon B", used in Nazi gas chambers ▪ Cyanogen chloride ▪ Volatility: rapidly disperse ▪ Odor: bitter almonds ▪ Mechanism: interrupts electron transport chain in mitochondria, depleting body of energy on a cellular level ▪ Symptoms: Gasping for air, frothing, vomiting, loss of consciousness, death (occurs within seconds to minutes of exposure) Treatment ▪ If breathing: ❖ Remove clothing ❖ Move to well-ventilated area ❖ Oxygen ❖ IV Fluids ▪ If not breathing ❖ Remove clothing ❖ Move to well-ventilated area ❖ Oxygen ❖ Advanced airway (intubated or bag-valve mask ventilation) ▪ Antidotes ❖ Amyl nitrite pearls: Bag ventilate pearls into patient after crushing into a gauze ❖ Sodium nitrite: 0.2-0.3 mg/kg IV (max 300mg) ❖ Sodium thiosulfate: 1.65 mg/kg U IV
Manmade Disasters: CBRNE **Biological**	Class A Biological Agents	▪ Anthrax <u>Inhalational</u> ❖ Most likely form of terrorism ❖ No person-to-person spread from respiratory droplets ❖ Flu-like illness ❖ CXR with wide mediastinum ❖ Treatment: Ciprofloxacin, doxycycline (amoxicillin if susceptible) x 60 days

Disasters	Specific Type	Explanation
	Class A Biological Agents	❖ Vaccine available ❖ Treat exposures with 7-10 days of oral antibiotics while monitoring for symptoms and vaccination ❖ Skin infection ❖ Gastrointestinal ▪ Plague <u>Pneumonic</u> ❖ Most likely form of intentionally spread disease ❖ Person-to-person spread via droplets possible ❖ Symptoms: Cough, hemoptysis, sepsis, multi-organ failure, disseminated intravascular coagulation (DIC) ❖ Treatment: Streptomycin, gentamicin <u>Septicemic</u> ❖ Symptoms: Fevers, low blood pressure and shock <u>Bubonic</u> ❖ Symptoms: Fevers and lumps (buboes) of infected lymph nodes ▪ Tularemia <u>Pneumonic</u> ❖ Symptoms: Fever, myalgias, headache, cough → rapidly progressing respiratory failure ❖ Treatment: Streptomycin ❖ No person-to-person transmission via droplets <u>Septicemic</u> ❖ Symptoms: Fever, nausea, vomiting, diarrhea, hepatosplenomegaly, sepsis, multi-organ failure ❖ Treatment: Streptomycin ❖ No person-to-person transmission via droplets <u>Ulceroglandular: most common form of natural disease</u> ❖ <u>Septicemic</u> ▪ Smallpox ❖ Symptoms: Malaise, fever, vomiting, headache, backache followed by typical rash (centrifugal: face/arms/legs → trunk) ❖ Treatment: None proven, anti-virals, immunoglobulin experimental

Disasters	Specific Type	Explanation
Manmade Disasters: CBRNE **Biological**	Class A Biological Agents	❖ Prevention of spread: "Ring" vaccination recommended ▪ Hemorrhagic fever ❖ Symptoms: Fever, rash, hypotension, bleeding ❖ Treatment: Supportive, experimental: ribavirin (anti-viral) ❖ Very infectious: Double glove, gown mask ▪ Botulism ❖ Mechanism: Toxin inhibits release of acetylcholine from presynaptic terminal ❖ Types: Infant botulism: baby ingest pre-formed toxin ❖ Food borne: Spore present in poorly canned foods ingested ❖ Wound: Spores/toxin directly invade open wound ❖ Airborne: Not naturally occurring; would be presumed to be terrorism if occurred. Easily deactivated by water, process plants, and heat ❖ Symptoms: Descending weakness ❖ Treatment: Botulinum anti-toxin ❖ Supportive Care: Ventilation
	Class B Biological Agents	Less easily spread, lower morbidity/mortality ▪ Brucellosis ▪ Viral encephalitides ▪ Ricin ▪ Staph enterotoxin B ▪ Food/water borne pathogens
Manmade Disasters: CBRNE **Radiation/ Nuclear**	Types of Radiation	▪ Ionizing ❖ High frequency radiation ❖ Does damage to biological tissues (DNA mutation) ▪ Alpha ❖ 2 protons, 1 neutron, usually naturally occurring ❖ Penetrates only depth of piece of paper, so external exposure not harmful ❖ Damages if ingested or inhaled (polonium on Russian journalist in 2007)

Disasters	Specific Type	Explanation
Manmade Disasters: CBRNE **Radiation/ Nuclear**	Types of Radiation	▪ Beta ❖ Comes from radionuclides used in medicine, or byproduct of nuclear reactor ▪ Gamma/x-rays ❖ Emitted from radioactive particles ❖ Penetrates deeply through body tissues ▪ Neutrons ❖ Powerful, rare ❖ Emitted after nuclear detonation
	Sources of Radiation	▪ Intentional ❖ "Dirty bomb": radioactive dispersal device ❖ Damage of nuclear facility releasing nuclear waste into environment ❖ Detonation of nuclear weapon ▪ Unintentional ❖ Power plan disaster (Chernobyl, Three-Mile Island)
	Mechanisms of Action	▪ External ❖ Exposure ❖ Contamination ▪ Internal ❖ Ingestion ❖ Inhalation
	Effects of radiation	▪ Short term (days → weeks post exposure) ❖ Nausea/vomiting/diarrhea ❖ Bone marrow suppression ❖ Burning of skin ▪ Long term (weeks →months/years post exposure) ❖ Cancer risk ❖ Psychological injury
	Treatments/ Management	▪ Issue protective clothing and dosimeters to staff ▪ Control ventilation ▪ Minimize time of exposure: evacuate early ▪ Maximize shielding ▪ Maximize distance from epicenter of release of radioactive material ▪ Decontamination those exposed ❖ Strip naked

Disasters	Specific Type	Explanation

- ❖ Soap/water
- ❖ Debride if radioactive material embedded in skin
- ❖ Perform surgery, in needed, within 48 hrs of exposure before bone marrow suppression ensues and impairs immunity and healing ability

- Potassium iodide (KI)
  - ❖ Use in exposure to radioiodines (common with nuclear reactor incidents)
  - ❖ Use ASAP after exposure or expected exposure
  - ❖ Floods thyroid with non-radioactive iodine protecting from thyroid cancer
  - ❖ Protection lasts 24 hrs, so repeated dosing may be needed if ongoing exposure is occurs

Potassium Iodide Dosing

Please pay attention to the number of teaspoonfuls recommended when using a potassium iodide 65 mg tablet as it is different from the number of teaspoonfuls given when using a potassium iodide 130 mg tablet.

Tablet: Recommended doses of KI for children and infants with predicted thyroid radioactivity exposures equal to or greater than 5 cGy, using 65 mg tablet preparations.

If your child is:	Give child this amount of potassium iodide (KI) *	Which is
Between 4 and 12 years old	**8 teaspoonfuls** (NOT tablespoonfuls)	65 mg of potassium iodide (KI)
Over 1 month through 3 years	**4 teaspoonfuls** (NOT tablespoonfuls)	32.5 mg of potassium iodide (KI)
An infant from birth through 1 month	**2 teaspoonfuls** (NOT tablespoonfuls)	16.25 mg of potassium iodide (KI)

Source: FDA, Guidance: Potassium Iodide as a Thyroid Blocking in Radiation Emergencies, December 2001.

Pediatric Considerations

- Higher breathing rates: Higher dose inhaled
- Fallout settles to ground where children are: Higher

Disasters	Specific Type	Explanation
		exposure ❖ Radioactive iodine collects in human and cow milk, which children are exposed to in proportionally higher amounts due to diet ❖ Greater number of dividing cells as they grow makes for increased risk of mutation of DNA ❖ Mental health vulnerability increased compared with adults ❖ Decontamination of children is challenging
Manmade Disasters: CBRNE **Explosive**	Explosives	▪ Locations ❖ Mortality: Structural collapse > confined space > outdoor ▪ High order ❖ Explosion faster than speed of sound ❖ Creates pressure wave that damages organs ▪ Low order ❖ Explosion slower than sound ❖ Damage of tissues by burning ** Explosives can be attached to other types of weapons (bio, nuclear, chemical)
	High Order Injuries	<u>Primary</u> – Damage caused by pressure wave (detonation) ▪ Affects air-fluid interfacing organs most commonly Ears ▪ Tympanic membranes (TM's) rupture at relatively low pressure ▪ If TM's intact, less likely to have other severe primary blast injury ▪ Symptoms o Hearing loss o Tinnitus Lungs ▪ Most common cause of mortality in high order explosions ▪ Hemo/pneumothorax ▪ Pulmonary contusion ▪ Systematic air embolism ▪ Pneumomediastinum ▪ Symptoms

Disasters	Specific Type	Explanation
Manmade Disasters: CBRNE	High Order Injuries	○ Respiratory distress ○ Cough ○ Hemoptysis ○ Hypoxemia
Explosive		Intestines ▪ Perforated viscus can present delayed with abdominal pain Brain ▪ Can prevent with headache, alteration of mental status or appear like behavioral problem ▪ Usually occurs when patient was in close proximity to epicenter of blast Eye ▪ Presents with changes in vision, eye pain, blurry vision <u>Secondary</u> – Damage caused by shrapnel striking body ▪ Penetrating Injury > blunt injury ○ Lacerations (check front/back of patient ○ Extremity amputation: Poor prognosis ○ Eye injury: 15 percent <u>Tertiary</u> – Damage caused by victim's body striking object ▪ Blunt injury > penetrating injury ○ Fractures ○ Contusions <u>Quaternary:</u> Any other injury from explosive ▪ Burns ○ Assess percentage burn surface area (BSA) burned with second/third degree burns ○ Rule of Nines ○ Pediatric victim's palm: One percent BS ▪ Smoke Inhalation ○ Look for signs of upper airway burn (singed nasal hair, soot around perioral area ▪ Building collapse ○ Very high mortality ▪ Crush injury ○ Risk of acute renal failure (ARF) ○ Risk of electrolyte abnormalities from ARF

Disasters	Specific Type	Explanation
Manmade Disasters: CBRNE **Explosive**	High Order Injuries	▪ Compartment syndrome ○ Assess compartments in extremity crush injury, if bleeding into compartments ○ Pressure >30 mm Hg: Likely need for fasciotomy *A note on Compartment Syndrome* Pressure assessment may not be possible. Other options for assessing compartment syndrome include: 1. Pain in extremity disproportionate to injury with acute or passive movement of hand or foot 2. Loss of distal pulses 3. Pallor 4. Paresthesia of limb ▪ Exacerbation of existing medical condition
	Low Order Injuries	Caused by burning of layers of tissue (deflagration) ▪ Burns ▪ Smoke inhalation ▪ Penetrating trauma ▪ Blunt trauma
	Treatment of Injuries	<u>Primary</u> Ears ▪ Tympanic membranes (TM's) rupture: no specific treatment Lungs * Any pulmonary injury may require advanced airway or mechanical ventilation if severe enough ▪ Hemo/pneumothorax: Chest tube, oxygen ▪ Pulmonary contusion: Oxygen, +/- chest tube ▪ Systemic air embolism ▪ Pneumomediastinum: Oxygen Intestines ▪ Perforated viscous: antibiotics, surgical repair perforated intestine Brain ▪ Monitor intracranial pressure ▪ Elevate head of bed ▪ Maintain normal pCO2 ▪ Neurosurgical release of intracranial bleed if needed/possible

Disasters	Specific Type	Explanation
		Eye ▪ Globe rupture: Antibiotics, ophtho consultation ▪ Hyphema: Ophtho consultation ▪ Retinal detachment: Ophtho consultation <u>Secondary:</u> Penetrating injury > blunt injury ▪ Pneumo/hemothorax: Chest tube, Oxygen ▪ Treat lacerations as dirty wounds o Control bleeding o Tetanus o Delayed closure if possible o Consider retained foreign body before closure ▪ Extremity amputation: Control bleeding, antibiotics, orthopedic consultation <u>Tertiary:</u> Damage caused by victim's body striking object ▪ Blunt > penetrating injury o Fractures: Stabilize by splinting unless neurovascular compromise o Contusions – r/o internal bleeding o Internal organ/viscous damage <u>Quaternary:</u> Any other injury from explosive ▪ Burns o Stop burning process o Evaluate for circumferential burns which could impede blood flow to an area o Topical antibiotics with non-stick dressing o Fluid resuscitation o Parkland formula based on estimated BSA burned - # of ml=4 x % of body surface area burned x weight (kg) ➢ Half of the volume administered over the first 8 hours ➢ Remaining half of volume administered over the following 16 hours o Intubate early if signs of upper airway obstruction are present o Administer pain medication

Disasters	Specific Type	Explanation
Manmade Disasters: CBRNE **Explosive**	Treatment of Injuries	▪ Smoke inhalation ○ Oxygen ○ Beta agonist trial ○ Check CO level ○ Maintain airway if signs of airway burn (singed nose hair, soot periorally, carbonaceous sputum, hoarseness, noisy breathing) ▪ Building collapse ▪ Crush injury ○ IV hydrate ○ Watch for hyperkalemia from intracellular release ○ Mannitol or Lasix once UOP established ○ Assess kidney function/need for dialysis ▪ Exacerbation of existing medical condition (ex. Asthma attack triggered by smoke) ▪ Compartment Syndrome ○ Assess compartments in extremity crush injury, if bleeding into compartments ○ Pressure > 30 mm Hg: Likely need for fasciotomy *A note on Compartment Syndrome* Pressure assessment may not be possible. Other options for assessing compartment syndrome include: 1. Pain in extremity disproportionate to injury with acute or passive movement of hand or foot 2. Loss of distal pulses 3. Pallor 4. Paresthesia of limb
	Pediatric Vulnerabilities	▪ Less circulating volume: Increased risk of exsanguinations ▪ Less protection of internal organs b/c less protection from ribs ▪ Larger head: More likely head trauma ▪ Psychological

BLAST INJURY/TRAUMA

http://www.bt.cdc.gov/masscasualties/explosions.asp

http://www.bt.cdc.gov/masscasualties/blastessentials.asp

Key points:

The surge created by an explosion (industrial, accidental, IED, VBIED, etc) can be rapid and devastating. In addition to preparing for a very rapid surge of patients, the following *incident specific* considerations are vital:

- Be cautious of unexploded ordinance (UXO) in/on patients
- As with any other possible/confirmed terrorism event, scene safety is paramount
- In addition to injury/trauma, patient may have partial to complete hearing loss & not readily follow commands

Blast Injuries: Essential Facts

Key Concepts

- Bombs and explosions can cause unique patterns of injury seldom seen outside combat
- Expect half of all initial casualties to seek medical care over a one-hour period
- Most severely injured arrive after the less injured, who bypass EMS triage and go directly to the closest hospitals
- Predominant injuries involve multiple penetrating injuries and blunt trauma
- Explosions in confined spaces (buildings, large vehicles, mines) and/or structural collapse are associated with greater morbidity and mortality
- Primary blast injuries in survivors are predominantly seen in confined space explosions
- Repeatedly examine and assess patients exposed to a blast
- All bomb events have the potential for chemical and/or radiological contamination

- Triage and lifesaving procedures should never be delayed because of the possibility of radioactive contamination of the victim; the risk of exposure to caregivers is small
- Universal precautions effectively protect against radiological secondary contamination of first responders and first receivers
- For those with injuries resulting in no intact skin or mucous membrane exposure, hepatitis B immunization (within 7 days) and age-appropriate tetanus toxoid vaccine (if not current)

Blast Injuries

- Primary: Injury from over-pressurization force (blast wave) impacting the body surface
    - TM rupture, pulmonary damage and air embolization, hollow viscous injury
- Secondary: Injury from projectiles (bomb fragments, flying debris)
    - Penetrating trauma, fragmentation injuries, blunt trauma
- Tertiary: Injuries from displacement of victim by the blast wind
    - Blunt/penetrating trauma, fractures and traumatic amputations
- Quaternary: All other injuries from the blast
    - Crush injuries, burns, asphyxia, toxic exposures, exacerbations of chronic illness

Primary Blast Injury

- **Lung Injury**
    - Signs usually present at time of initial evaluation, but may be delayed up to 48 hrs
    - Reported to be more common in patients with skull fractures, >10% BSA burns, and penetrating injury to the head or torso
    - Varies from scattered petechiae to confluent hemorrhages
    - Suspect in anyone with dyspnea, cough, hemoptysis, or chest pain following blast
    - CXR: “butterfly” pattern
    - High flow O2 sufficient to prevent hypoxemia via NRB mask, CPAP, or ET tube
    - Fluid management similar to pulmonary contusion; ensure tissue perfusion but avoid volume overload
    - Endotracheal intubation for massive hemoptysis, impending airway compromise or respiratory failure
        - Consider selective bronchial intubation for significant air leaks or massive hemoptysis
        - Positive pressure may risk alveolar rupture or air embolism
    - Prompt decompression for clinical evidence of pneumothorax or hemothorax
    - Consider prophylactic chest tube before general anesthesia or air transport
    - Air embolism can present as stroke, MI, acute abdomen, blindness, deafness, spinal cord injury, claudication

        - High flow O2; prone, semi-left lateral, or left lateral position
        - Consider transfer for hyperbaric O2 therapy
- **Abdominal Injury**
    - Gas-filled structures most vulnerable (esp. colon)
    - Bowel perforation, hemorrhage (small petechiae to large hematomas), mesenteric shear injuries, solid organ lacerations, and testicular rupture
    - Suspect in anyone with abdominal pain, nausea, vomiting, hematemesis, rectal pain, tenesmus, testicular pain, unexplained hypovolemia
    - Clinical signs can be initially subtle until acute abdomen or sepsis is advanced
- **Ear Injury**
    - Tympanic membrane most common primary blast injury
    - Signs of ear injury usually evident on presentation (hearing loss, tinnitus, otalgia, vertigo, bleeding from external canal, otorrhea)

Other Injury

- Traumatic amputation of any limb is a marker for multi-system injuries
- Concussions are common and easily overlooked
- Consider delayed primary closure for grossly contaminated wounds, and assess tetanus immunization status
- Compartment syndrome, rhabdomyolysis, and acute renal failure are associated with structural collapse, prolonged extrication, severe burns, and some poisonings
- Consider possibility of exposure to inhaled toxins (CO, CN, MetHgb) in both industrial and terrorist explosions
- Significant percentage of survivors will have serious eye injuries

Disposition

- No definitive guidelines for observation, admission, or discharge
- Discharge decisions will also depend upon associated injuries
- Admit 2nd and 3rd trimester pregnancies for monitoring
- Close follow-up of wounds, head injury, eye, ear, and stress-related complaints
- Patients with ear injury may have tinnitus or deafness; communications and instructions may need to be written

This fact sheet is part of a series of materials developed by the Centers for Disease Control and Prevention (CDC) on blast injuries. For more information, visit CDC on the Web at: emergency.cdc.gov/BlastInjuries

Pediatric Triage Tools

Guidelines for Care of Children in the Emergency Department

This checklist is based on the American Academy of Pediatrics, the American College of Emergency Physicians, and the Emergency Nurses Association 2009 joint policy statement "Guidelines for Care of Children in the Emergency Department," which can be found online at http://aappolicy.aappublications.org/cgi/reprint/pediatrics;124/4/1233.pdf. Use the checklist to determine if your emergency department (ED) is prepared to care for children.

Appointed Pediatric Physician and Nurse Coordinator

- ❍ Pediatric physician coordinator is a specialist in pediatrics, emergency medicine, or family medicine, appointed by the ED medical director, who through training, clinical experience, or focused continuing medical education demonstrates competence in the care of children in emergency settings including resuscitation. See policy statement for details.
- ❍ Pediatric Nurse coordinator is a registered nurse (RN), appointed by the ED nursing director, who possesses special interest, knowledge, and skill in the emergency medical care of children. See policy statement for details.

Physicians, Nurses and Other Healthcare Providers Who Staff the ED

- ❍ Physicians who staff the ED have the necessary skill, knowledge, and training in the emergency evaluation and treatment of children of all ages who may be brought to the ED, consistent with the services provided by the hospital.
- ❍ Nurses and other ED health care providers have the necessary skill, knowledge, and training in providing emergency care to children of all ages who may be brought to the ED, consistent with the services offered by the hospital.
- ❍ Baseline and periodic competency evaluations completed for all ED clinical staff, including physicians, are age specific and include evaluation of skills related to neonates, infants, children, adolescents, and children with special health care needs. Competencies are determined by each institution's medical staff privileges policy.

Guidelines for QI/PI in the ED

The pediatric patient care-review process is integrated into the ED QI/PI plan.

- ❍ Components of the process interface with out-of-hospital, ED, trauma, inpatient pediatric, pediatric critical care, and hospital-wide QI or PI activities.

Guidelines for QI/PI in the ED, Continued

Clinical and Professional Competency

Below are the potential areas for the development of pediatric competency and professional evaluations.

- ❍ Triage
- ❍ Illness and injury assessment and management
- ❍ Pain assessment and treatment, including sedation and analgesia
- ❍ Airway management
- ❍ Vascular access
- ❍ Critical care monitoring
- ❍ Neonatal and pediatric resuscitation
- ❍ Trauma care
- ❍ Burn care
- ❍ Mass-casualty events
- ❍ Patient- and family-centered care
- ❍ Medication delivery and equipment safety
- ❍ Training and communication

- ❍ Mechanisms are in place to monitor professional performance, credentials, continuing education, and clinical competencies.

Guidelines for Improving Pediatric Patient Safety

The delivery of pediatric care should reflect an awareness of unique pediatric patient safety concerns and are included in the following policies or practices.

- ❍ Children are weighed in kilograms.
- ❍ Weights are recorded in a prominent place on the medical record.
- ❍ For children who are not weighed, a standard method for estimating weight in kilograms is used (e.g., a length-based system).
- ❍ Infants and children have a full set vital signs recorded (temperature, heart rate, respiratory rate) in the medical record.
- ❍ Blood pressure and pulse oximetry monitoring are available for children of all ages on the basis of illness and injury severity.

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- A process for identifying age-specific abnormal vital signs and notifying the physician of these is present.
- Processes in place for safe medication storage, prescribing, and delivery that includes precalculated dosing guidelines for children of all ages.
- Infection-control practices, including hand hygiene and use of personal protective equipment, are implemented and monitored.
- Pediatric emergency services are culturally and linguistically appropriate
- ED environment is safe for children and supports patient- and family-centered care.
- Patient-identification policies meet Joint Commission standards
- Policies for the timely reporting and evaluation of patient safety events, medical errors, and unanticipated outcomes are implemented and monitored.

Guidelines for ED Policies, Procedures, and Protocol

Policies, procedures, and protocols for the emergency care of children should be developed and implemented in the areas listed below. These policies may be integrated into overall ED policies as long as pediatric specific issues are addressed.

- Illness and injury triage
- Pediatric patient assessment and reassessment
- Documentation of pediatric vital signs and actions to be taken for abnormal vital signs
- Immunization assessment and management of the under-immunized patient
- Sedation and analgesia for procedures, including medical imaging
- Consent including when parent or legal guardian is not immediately available
- Social and mental health issues
- Physical or chemical restraint of patients
- Child maltreatment and domestic violence reporting criteria, requirements, and processes.
- Death of the child in the ED
- Do not resuscitate (DNR) orders
- Families are involved in patient decision-making and medication safety processes
- Family presence during all aspects of emergency care
- Patient, family, and caregiver education
- Discharge planning and instruction
- Bereavement counseling
- Communication with the patient's medical home or primary care provider
- Medical imaging policies that address pediatric age- or weight-based appropriate dosing for studies that impart radiation consistent with ALARA (as low as reasonably achievable) principles.
- All-hazard disaster-preparedness plan that addresses the following pediatric issues:
  - Availability of medications, vaccines, equipment, and trained providers for children
  - Pediatric surge capacity for injured and non-injured children
  - Decontamination, isolation, and quarantine of families and children
  - Minimization of parent-child separation (includes pediatric patient tracking, and timely reunification of separated children with their family)
  - Access to specific medical and mental health therapies, and social services for children
  - Disaster drills which includes a pediatric mass casualty incident at least every 2 years
  - Care of children with special health care needs
  - Evacuation of pediatric units and pediatric subspecialty units.
- Interfacility transfer policy defining the roles and responsibilities of the referring facility and referral center.
- Transport plan for delivering children safely and in a timely manner to the appropriate facility that is capable of providing definitive care.
- Process for selecting the appropriate care facility for pediatric specialty services not available at the hospital (may include critical care, reimplantation or digits or limbs, trauma and burn care, psychiatric emergencies, obstetric and perinatal emergencies, child maltreatment, rehability for recovery from critical conditions).
- Process for selecting an appropriately staffed transport service to match the patient's needs
- Process for patient transfer (including obtaining informed consent)
- Plan for transfer of patient information (medical record, copy of signed transport consent), personal belongings, directions and referral institution information to family'
- Process for return transfer of the pediatric patient to the referring facility as appropriate.

Guidelines for ED Support Services

- Radiology capability must meet the needs of the children in the community served
- A process for referring children to appropriate facilities for radiological procedures that exceed the capability of the hospital is established.
- A process for timely review, interpretation, and reporting of medical imaging by a qualified radiologist is established.
- Laboratory capability must meet the needs of the children in the community served, including techniques for small sample sizes
- A process for referring children or their specimens to appropriate facilities for laboratory studies that exceed the capability of the hospital is established

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Guidelines for Equipment, Supplies, and Medications for the Care of Pediatric Patients in the ED

- ❍ Pediatric equipment, supplies, and medications are appropriate for children of all ages and sizes, easily accessible, clearly labeled, and logically organized. See list below for the medication, equipment, and supplies.
- ❍ ED staff is educated on the location of all items.
- ❍ Daily method in place to verify the proper location and function of equipment and supplies.
- ❍ Medication chart, length-based tape, medical software, or other systems is readily available to ensure proper sizing of resuscitation equipment and proper dosing of medications.

Medications

- ❍ Atropine
- ❍ Adenosine
- ❍ Amiodarone
- ❍ Antiemetic agents
- ❍ Calcium chloride
- ❍ Dextrose (D10W, D50W)
- ❍ Epinephrine (1:1000; 1:10 000 solutions)
- ❍ Lidocaine
- ❍ Magnesium sulfate
- ❍ Naloxone hydrochloride
- ❍ Procainamide
- ❍ Sodium bicarbonate (4.2%, 8.4%)
- ❍ Activated charcoal
- ❍ Topical, oral, and parenteral analgesics
- ❍ Antimicrobial agents (parenteral and oral)
- ❍ Anticonvulsant medications
- ❍ Antidotes (common antidotes should be accessible to the ED)
- ❍ Antipyretic drugs
- ❍ Bronchodilators
- ❍ Corticosteroids
- ❍ Inotropic agents
- ❍ Neuromuscular blockers
- ❍ Sedatives
- ❍ Vaccines
- ❍ Vasopressor agents

Equipment/Supplies: General Equipment

- ❍ Patient warming device
- ❍ Intravenous blood/fluid warmer
- ❍ Restraint device
- ❍ Weight scale in kilograms (not pounds)
- ❍ Tool or chart that incorporates weight (in kilograms) and length to determine equipment size and correct drug dosing
- ❍ Age appropriate pain scale-assessment tools

Equipment/Supplies: Monitoring Equipment

Blood pressure cuffs
- ❍ Neonatal
- ❍ Infant
- ❍ Child
- ❍ Adult-arm
- ❍ Adult-thigh

- ❍ Doppler ultrasonography devices
- ❍ Electrocardiography monitor/defibrillator with pediatric and adult capabilities including pads/paddles
- ❍ Hypothermia thermometer
- ❍ Pulse oximeter with pediatric and adult probes
- ❍ Continuous end-tidal CO2 monitoring device

Equipment/Supplies: Vascular Access Supplies

Arm boards
- ❍ infant
- ❍ child
- ❍ adult

Catheter-over-the-needle device
- ❍ 14 gauge
- ❍ 15 gauge
- ❍ 16 gauge
- ❍ 17 gauge
- ❍ 18 gauge
- ❍ 19 gauge
- ❍ 20 gauge
- ❍ 21 gauge
- ❍ 22 gauge
- ❍ 23 gauge
- ❍ 24 gauge

Intraosseous needles or device
- ❍ Pediatric
- ❍ Adult

- ❍ IV administration sets with calibrated chambers and extension tubing and/or infusion devices with ability to regulate rate and volume of infusate

Umbilical vein catheters
- ❍ 3.5F
- ❍ 5.0F

Central venous catheters
- ❍ 4.0F
- ❍ 5.0F
- ❍ 6.0F
- ❍ 7.0F

Intravenous solutions
- ❍ Normal saline
- ❍ Dextrose 5% in normal saline
- ❍ Dextrose 10% in water

Equipment/Supplies: Fracture-Management Devices

Extremity splints
- ❍ Femur splints, pediatric sizes
- ❍ Femur splints, adult sizes

- ❍ Spine-stabilization devices appropriate for children of all ages

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Equipment/Supplies: Respiratory

Endotracheal tubes
- ○ uncuffed 2.5 mm
- ○ uncuffed 3.0 mm
- ○ cuffed or uncuffed 3.5 mm
- ○ cuffed or uncuffed 4.0 mm
- ○ cuffed or uncuffed 4.5 mm
- ○ cuffed or uncuffed 5.0 mm
- ○ cuffed or uncuffed 5.5 mm
- ○ cuffed 6.0 mm
- ○ cuffed 6.5 mm
- ○ cuffed 7.0 mm
- ○ cuffed 7.5 mm
- ○ cuffed 8.0 mm

Feeding tubes
- ○ 5F
- ○ 8F

Laryngoscope blades
- ○ straight: 0
- ○ straight: 1
- ○ straight: 2
- ○ straight: 3
- ○ curved: 2
- ○ curved: 3

○ Laryngoscope handle

Magill forceps
- ○ pediatric
- ○ adult

Nasopharyngeal airways
- ○ infant
- ○ child
- ○ adult

Oropharyngeal airways
- ○ size 0
- ○ size 1
- ○ size 2
- ○ size 3
- ○ size 4
- ○ size 5

Stylets for endotracheal tubes
- ○ pediatric
- ○ adult

Suction catheters
- ○ infant
- ○ child
- ○ adult

Tracheostomy tubes
- ○ 2.5 mm
- ○ 3.0 mm
- ○ 3.5 mm
- ○ 4.0 mm
- ○ 4.5 mm
- ○ 5.0 mm
- ○ 5.5 mm

○ Yankauer suction tip

Bag-mask device, self inflating
- ○ infant: 450 ml
- ○ adult: 1000 ml

Masks to fit bag-mask device adaptor
- ○ neonatal

Equipment/Supplies: Respiratory, Continued

- ○ infant
- ○ child
- ○ adult

Nasogastric tubes:
- ○ infant, 8F
- ○ child, 10F
- ○ adult, 14-18F

Clear oxygen masks
- ○ standard infant
- ○ standard child
- ○ standard adult
- ○ partial nonrebreather infant
- ○ nonrebreather child
- ○ nonrebreather adult

Laryngeal mask airway
- ○ size: 1
- ○ size: 1.5
- ○ size: 2
- ○ size: 2.5
- ○ size: 3
- ○ size: 4
- ○ size: 5

Nasal cannulas
- ○ infant
- ○ child
- ○ adult

Equipment/Supplies: Specialized Pediatric Trays or Kits

○ Lumbar-puncture tray (including infant 22 gauge, pediatric –22 gauge, and adult 18-21 gauge), lumbar puncture needles

○ Supplies/kit for patients with difficult airway (supraglottic airways of all sizes, laryngeal mask airway, needle cricothyrotomy supplies, surgical cricothyrotomy kit)

○ Tube thoracostomy tray

Chest tubes to include:
- ○ infant: 10-12F
- ○ child: 16-24 F
- ○ adult: 28-40 F

○ Newborn delivery kit, including equipment for resuscitation of an infant (umbilical clamp, scissors, bulb syringe, and towel)

○ Urinary catheterization kits and urinary (indwelling) catheters (6F–22F)

NEW YORK STATE'S EMERGENCY MEDICAL SERVICES PEOPLE WHO CARE

PEDIATRIC ASSESSMENT

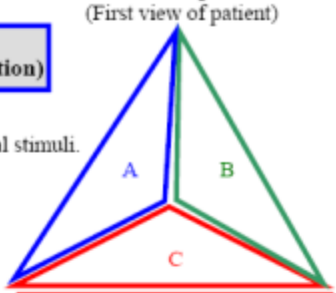
EMSC

General Impression
(First view of patient)

Airway & Appearance
(Open/Clear – Muscle Tone /Body Position)

Abnormal: Abnormal or absent cry or speech. Decreased response to parents or environmental stimuli. Floppy or rigid muscle tone or not moving.

Normal: Normal cry or speech. Responds to parents or to environmental stimuli such as lights, keys, or toys. Good muscle tone. Moves extremities well.



Work of Breathing
(Visible movement / Respiratory Effort)

Abnormal: Increased/excessive (nasal flaring, retractions or abdominal muscle use) or decreased/absent respiratory effort or noisy breathing.

Normal: Breathing appears regular without excessive respiratory muscle effort or audible respiratory sounds.

Circulation to Skin
(Color / Obvious Bleeding)

Abnormal: Cyanosis, mottling, paleness/pallor or obvious significant bleeding.
Normal: Color appears normal for racial group of child. No significant bleeding.

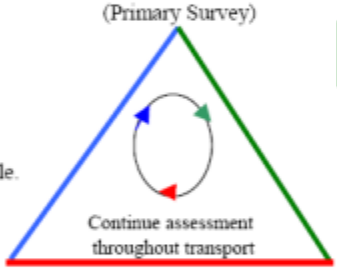
Decision/Action Points:
- **Any abnormal findings or life-threatening chief complaint** such as major trauma/burns, seizures, diabetes, asthma attack, airway obstruction, etc (urgent) – proceed to Initial Assessment. Contact ALS if ALS not already on scene/enroute.
- **All findings normal** (non-urgent) – proceed to Initial Assessment.

Initial Assessment
(Primary Survey)

Airway & Appearance
(Open/Clear – Mental Status)

Abnormal: Obstruction to airflow. Gurgling, stridor or noisy breathing. **V**erbal, **P**ain, **or U**nresponsive on AVPU scale.

Normal: Clear and maintainable. **A**lert on AVPU scale.



Breathing
(Effort / Sounds / Rate / Central Color)

Abnormal: Presence of retractions, nasal flaring, stridor, wheezes, grunting, gasping or gurgling. Respiratory rate outside normal range. Central cyanosis.

Normal: Easy, quiet respirations. Respiratory rate within normal range. No central cyanosis.

Circulation
(Pulse Rate & Strength / Extremity Color & Temperature / Capillary Refill / Blood Pressure)

Abnormal: Cyanosis, mottling, or pallor. Absent or weak peripheral or central pulses; Pulse or systolic BP outside normal range; Capillary refill > 2 sec with other abnormal findings.
Normal: Color normal. Capillary refill at palms, soles, forehead or central body ≤ 2 sec. Strong peripheral and central pulses with regular rhythm.

Decision/ Action Points:
- **Any abnormal finding (C, U, or P)**– Immediate transport with ALS. If ALS is not immediately available, meet ALS intercept enroute to hospital or proceed to hospital if closer. Open airway & provide O_2. Assist ventilations, start CPR, suction, or control bleeding as appropriate. Check for causes such as diabetes, poisoning, trauma, seizure, etc. Assist patient with prescribed bronchodilators or epinephrine auto-injector, if appropriate.
- **All findings on assessment of child normal (S)**– Continue assessment, detailed history & treatment at scene or enroute.

Normal Respiratory Rate:		Normal Pulse Rate:		Lower Limit of Normal Systolic BP:	
Infant (<1yr):	30- 60	Infant:	100-160	Infant:	>60 (or strong pulses)
Toddler (1-3yr):	24 -40	Toddler:	90-150	Toddler:	>70 (or strong pulses)
Preschooler(4-5yr):	22- 34	Preschooler:	80-140	Preschooler:	>75
School-age(6-12yr):	18 -30	School-age:	70-120	School-age:	>80
Adolescent(13-18yr):	12 -20	Adolescent:	60-100	Adolescent:	>90
		Pulses slower in sleeping child / athlete		Estimated min.SBP >70 + (2 x age in yr)	

This reference card should not be considered to replace or supercede regional prehospital medical treatment protocols.

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NEW YORK STATE'S EMERGENCY MEDICAL SERVICES PEOPLE WHO CARE

Pediatric CUPS (with examples)

Critical	**Absent airway, breathing or circulation** (cardiac or respiratory arrest or severe traumatic injury)
Unstable	**Compromised airway, breathing or circulation** (unresponsive, respiratory distress, active bleeding, shock, active seizure, significant injury, shock, near-drowning, etc.)
Potentially Unstable	**Normal airway, breathing & circulation but significant mechanism of injury or illness** (post-seizure, minor fractures, infant < 3mo with fever, etc.)
Stable	**Normal airway, breathing & circulation** **No significant mechanism of injury or illness** (small lacerations or abrasions, infant ≥ 3mo with fever)

Glasgow Coma Score

REMSC

Infants		Children /Adults
Eye Opening		
Spontaneous	4	Spontaneous
To speech/sound	3	To speech
To pain	2	To pain
No response	1	No response
Verbal Response		
Coos or babbles	5	Oriented
Irritable crying	4	Confused
Cries to pain	3	Inappropriate words
Moans to pain	2	Incomprehensible
None	1	None
Motor Response		
Spontaneous	6	Obeys commands
Withdraws touch	5	Localizes pain
Withdraws pain	4	Withdraws pain
Abnormal flexion	3	Abnormal flexion
Abnormal extension	2	Abnormal extension
No response	1	No response

Neonatal Resuscitation

Dry, Warm, Position, Tactile Stimulation.
Suction Mouth then Nose.
Call for ALS back-up. Administer O2 as needed.

Apnea/Gasping, HR <100 or central cyanosis

Ventilate with BVM @ 40-60/min

HR<60 after 30 sec BVM

Chest Compressions @ 120/min - 3:1
1/3 to 1/2 chest depth
2 thumb encircle chest or 2 fingers

ALS available & HR <60

Intubate
Epinephrine
0.01-0.03mg/kg
IV/IO/ET
1:10,000
q 3-5 min

Respiratory / Cardiac Arrest Treatment

	Infant <1yr	Child 1-8yr	Teen 9-18yr
Ventilation only	20/min	20/min	12/min
CPR method	2 fingers	1 hand	2 hand
Chest Depth	1/3-1/2	1/3-1/2	1/3-1/2
Compression Rate	≥ 100/min	100/min	100/min
Ratio	5:1	5:1	5:1

CPR should be started for HR<60.
Only AEDs with pediatric capabilities should be used on patients < 8 yrs. of age (approx. 25kg or 55lb).

APGAR Score

	0 pts	1 pt	2 pts
Pulse	Absent	<100	≥100
Resp	Absent	Slow Irregular	Good
Tone	Limp	Some flexion	Active motion
Reflex	None	Grimace	Cough Sneeze
Color	Blue	Pink Body Blue Limbs	All Pink

ALS Guidelines

Asystole or PEA

Assess airway & start CPR
Intubate & ventilate with oxygen

Epinephrine: 0.01 mg/kg 1:10,000 IV/ IO
0.1 mg/kg 1:1000 ET
Continue Epinephrine q 3-5 min, same dose
Consider hi dose 0.1 mg/kg 1:1000 IV/IO/ET

Consider possibility of hypoxia, hypovolemia, hypothermia, hyper/hypokalemia, tamponade, tension pneumothorax, toxins/poisons/drugs or thromboembolism & treat if present.

Bradycardia

Assess airway & give oxygen

Intubate if decreased consciousness
Start CPR if HR<60.

Epinephrine: 0.01 mg/kg 1:10,000 IV/ IO
0.1 mg/kg 1:1000 ET
Continue Epinephrine q 3-5 min, same dose

Atropine 0.02 mg/kg IV/ IO / ET
minimum dose 0.1 mg
maximum dose 0.5 mg child; 1.0 mg teen

VF or pulseless VT

Defibrillate up to 3 times as needed
2j /kg 4j /kg 4j /kg
Start CPR, intubate, ventilate with O_2

Epinephrine: 0.01 mg/kg 1:10,000 IV/ IO
0.1 mg/kg 1:1000 ET
Defibrillate 4j / kg
Amiodarone 5mg/kg IV/IO *or*
Lidocaine 1mg / kg IV/ IO/ ET *or*
Magnesium 25-50mg/kg IV/ IO
(for torsades de pointes or hypomagnesemia)
Defibrillate 4j / kg

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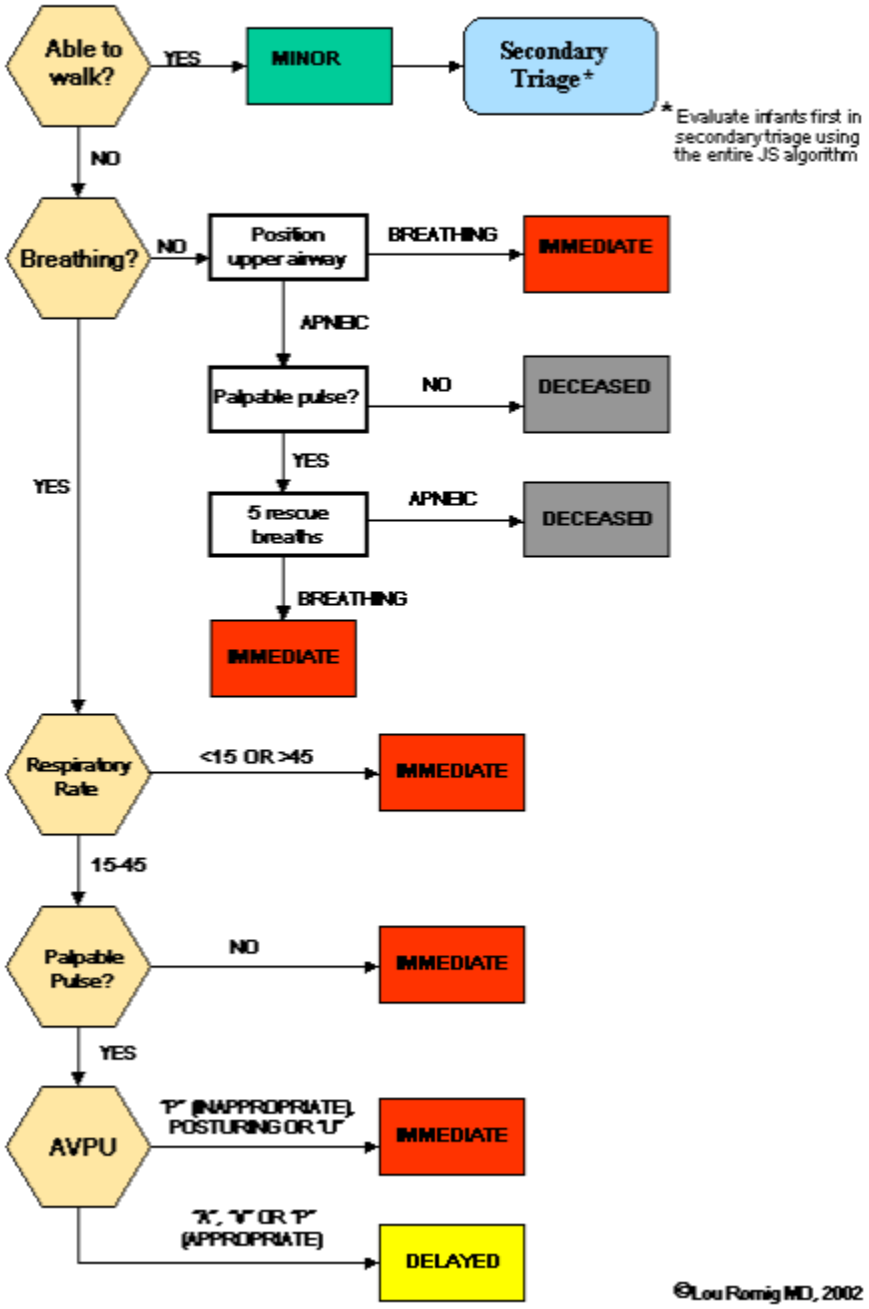
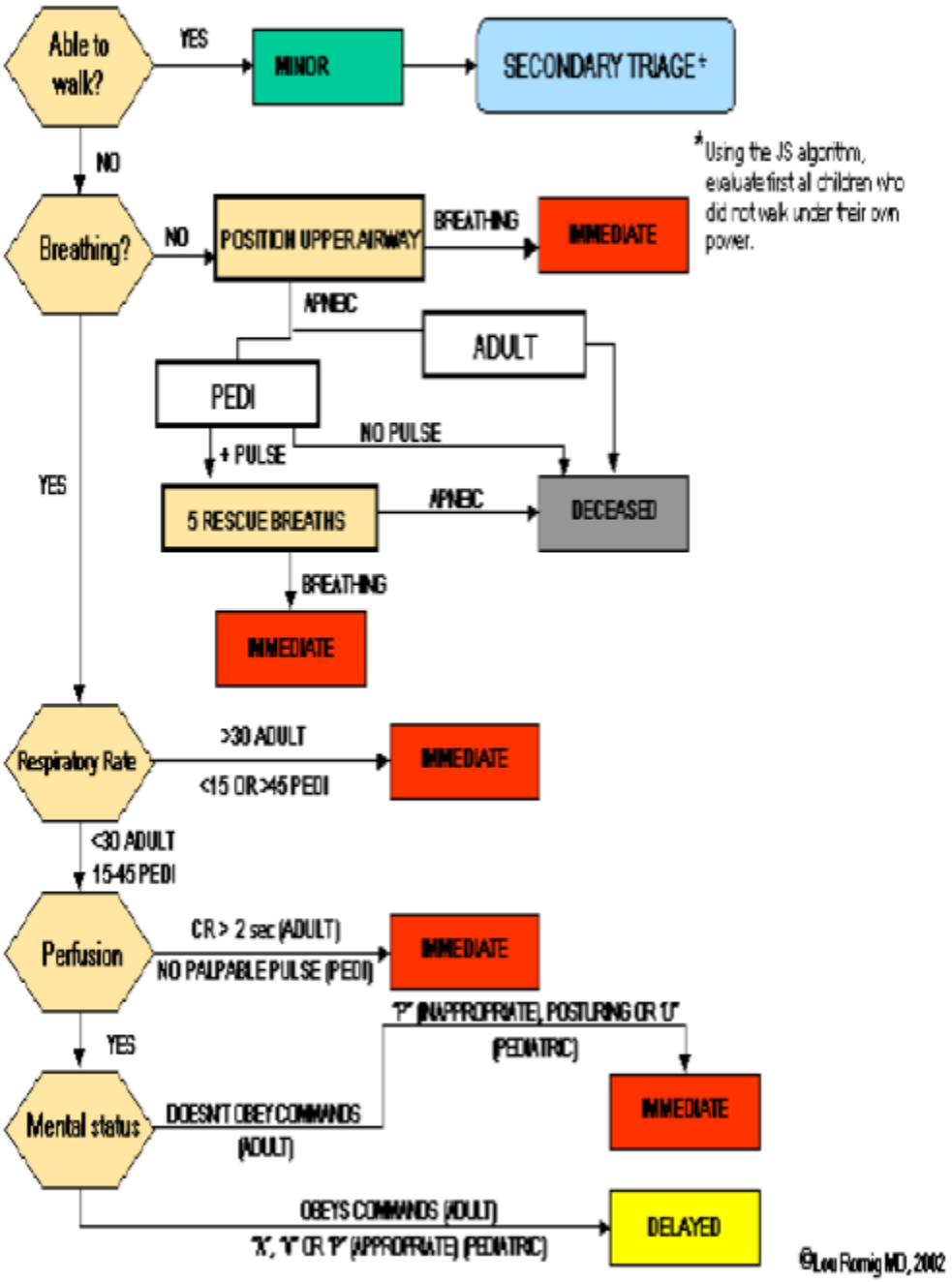
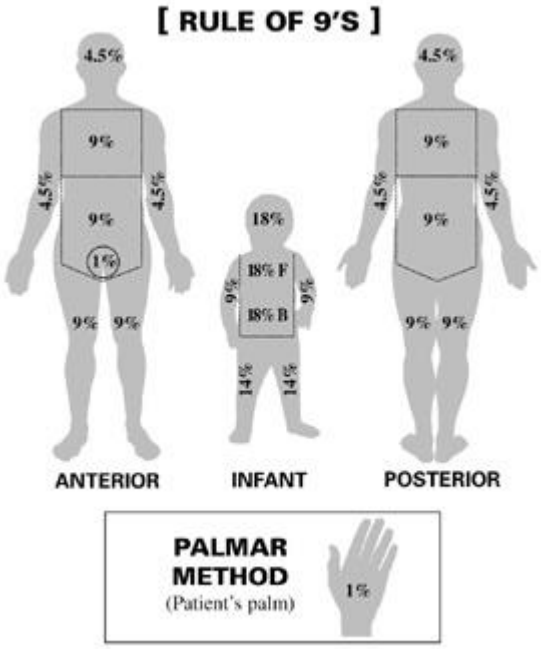
JumpSTART Pediatric MCI Triage©



Combined START/JumpSTART Triage Algorithm





Recommendation

Pediatric Advanced Life Support (PALS)

Children's Hospital Emergency Transport Team- Pediatric Team
CHET 858-277-3404

Vital Signs and Weight Norms for Age

Newborn:

1. Average Weight- 3.0 kg
2. Heart Rate (range)- 90-180
3. Systolic Blood Pressure- 60 (+/- 10)
4. Respiratory Rate (range)- 30 – 40

1 Month:

1. Average Weight- 4.0 kg
2. Heart Rate (range)- 80 - 160
3. Systolic Blood Pressure- 80 (+/- 10)
4. Respiratory Rate (range)- 30 – 40

3 Months:

1. Average Weight- 5.5 kg
2. Heart Rate (range)- 80-160
3. Systolic Blood Pressure- 80 (+/- 10)
4. Respiratory Rate (range)- 30 – 40

6 Months:

1. Average Weight- 7.0 kg
2. Heart Rate (range)- 80-160
3. Systolic Blood Pressure- 89 (+/- 20)
4. Respiratory Rate (range)- 30 – 40

1 Year

1. Average Weight- 10.0 kg
2. Heart Rate (range)- 80 – 160
3. Systolic Blood Pressure- 96 (+/- 20)
4. Respiratory Rate (range)- 30 – 40

2 Years

1. Average Weight- 12 kg
2. Heart Rate (range)- 80 – 130
3. Systolic Blood Pressure- 96 (+/- 20)
4. Respiratory Rate (range)- 28 – 32

3 Years

1. Average Weight- 14 kg
2. Heart Rate (range)- 80 –130
3. Systolic Blood Pressure- 99 (+/- 20)
4. Respiratory Rate (range)- 28 – 32

4 Years

1. Average Weight- 16 kg
2. Heart Rate (range)- 80 – 120
3. Systolic Blood Pressure- 99 (+/- 20)

4. Respiratory Rate (range)- 24 – 28

5 Years
1. Average Weight- 18 kg
2. Heart Rate (range)- 80 – 120
3. Systolic Blood Pressure- 105 (+/- 13)
4. Respiratory Rate (range)- 24 – 28

6 Years
1. Average Weight- 20 kg
2. Heart Rate (range)- 75 – 115
3. Systolic Blood Pressure- 105 (+/- 13)
4. Respiratory Rate (range)- 24 – 26

7 Years
1. Average Weight- 22 kg
2. Heart Rate (range)- 75 – 115
3. Systolic Blood Pressure- 105 (+/- 13)
4. Respiratory Rate (range)- 24 – 26

8 Years
1. Average Weight- 25 kg
2. Heart Rate (range)- 70 – 110
3. Systolic Blood Pressure- 112 (+/- 19)
4. Respiratory Rate (range)- 22 – 24

9 Years
1. Average Weight- 28 kg
2. Heart Rate (range)- 70 – 110
3. Systolic Blood Pressure- 112 (+/- 19)
4. Respiratory Rate (range)- 22 – 24

10 Years
1. Average Weight- 34 kg
2. Heart Rate (range)- 70 – 110
3. Systolic Blood Pressure- 112 (+/- 19)
4. Respiratory Rate (range)- 22 – 24

12 Years
1. Average Weight- 40 kg
2. Heart Rate (range)- 65 - 110
3. Systolic Blood Pressure- 112 (+/- 19)
4. Respiratory Rate (range)- 18 – 20

Pediatric Emergency Medications

Cardiovascular
1. Atropine
    a. 0.01 – 0.02 mg/kg IV
    b. Minimum dose 0.1 mg
    c. Maximum dose (infant/child) 1 mg
    d. Maximum dose (adolescent) 2 mg
2. Epinephrine
    a. 1:10,000, 0.01 – 0.02 mg/kg IV/IO

b. 1:1000, 0.1 mg/kg ET
c. 0.1 cc/kg either concentration or if asystole persists after the first dose

Antiarrythmics

1. Adenosine
    a. 0.1 – 0.2 mg/kg IV
    b. Maximum dose 0.2 mg/kg
2. Amiodarone
    a. 5 mg/kg IV
    b. Maximum dose 15 mg/kg/day
3. Lidocaine
    a. 1 mg/kg IV
    b. Repeat every 5 minutes as needed
    c. Maximum dose 5 mg/kg
4. Procainamide HCL
    a. 3 – 6 mg/kg IV over 5 minutes x 3
    b. Maximum dose 15 mg/kg not to exceed 500 mg over 30 minutes

Antihypertensives (also see drip section)

1. Hydralazine
    a. 0.2 mg/kg IM/IV Q4 – 6 hours
2. Labetolol
    a. 0.25 – 1 mg/kg IV

Anticonvulsant

1. Lorazepam (Ativan)
    a. 0.05 – 0.1 mg/kg IV
    b. Repeat in 5 minutes if necessary x 1
2. Versed
    a. 0.1 mg/kg
3. Phenobarbital
    a. 10 mg/kg IV push over 1 minutes
    b. Repeat in 5 minutes if necessary x 1
4. Fosphenytoin
    a. 10 – 20 mg PE/kg IV x 1
    b. PE = phenytoin equivalents
5. Phenytoin
    a. 200 mg/kg IV over 5 – 10 minutes
    b. Monitor for hypotension and bradycardia

Bronchodilators and Aerosols

1. Albuterol (5 mg/ml)
    a. 0.1 – 0.5 ml in 3 ml NS by nebulizer
2. Epinephrine (1:1000)
    a. 0.01 ml/kg SQ
    b. Maximum dose 0.4 ml
3. Racemic Epinephrine (20 mg/ml)
    a. 0.1 – 0.5 ml in 3 ml NS by nebulizer
4. Atrovent
    a. 250 – 500 mcg by nebulizer

Poison Therapy (California Poison Control 858-876-4766)

1. Naloxone HCL (Narcan)
    a. 0.01 – 0.04 mg/kg IV
    b. For narcotic reversal
2. Activated Charcoal
    a. 1 gm/kg PO/NG

Sedatives

1. Chloral Hydrate
    a. 20 – 50 mg/kg PO/PR Q 4 – 8 hours
2. Diazepam (Valium)
    a. 0.1 mg/kg IV Q 6 hours

Analgesics

1. Acetaminophen/Aspirin
    a. 10 – 15 mg/kg PO/PR Q 4 Hours
2. Fentanyl
    a. 1 mcg/kg IV Q 1 – 2 hours
3. Ibuprofen
    a. 5 mg/kg PO Q 6 hours
4. Meperidine HCL (Demerol)
    a. 0.5 – 1 mg/kg IM/IV Q 2 – 4 hours
5. Morphine Sulfate
    a. 0.1 mg/kg IM/IV Q 2 – 4 hours
6. Codeine
    a. 0.25 – 1 mg/kg PO Q 4 – 6 hours

Muscle Relaxants

1. Pancuronium
    a. 0.1 mg/kg IV Q 1 – 2 hours
2. Succinylcholine
    a. 0 – 2 years: 2 mg/kg IV
    b. > 2 years: 1 mg/kg IV
    c. Preceed with Atropine
3. Vecuronium
    a. 0.1 – 0.25 mg/kg IV Q 1 – 2 hours

Diuretics

1. Furosemide (Lasix)
    a. 0.2 – 1 mg/kg PO/IM/IV
2. Mannitol
    a. 0.25 – 1 gm/kg IV over 20 minutes

Metabolic

1. Sodium Bicarbonate
    a. 1 – 2 meq/kg over 1 – 2 minutes (With adequate ventilation)
2. Calcium Chloride
    a. 5 – 10 mg/kg IV slow push (may repeat)
3. Glucose
    a. 0.5 – 1 gm/kg IV (2 – 4 cc/kg D25)
    b. Maintenance 5 mg/kg/min

4. Insulin (regular)
    a. Infusion: 0.1 unit/kg/hr
5. Kayexalate (sodium polystyrene sulfonate)
    a. 1 – 2 gm/kg/dose PO/PR
    b. 1 gm will exchange 1 meq K+ for 1 meq Na+

To Initiate Antibiotics for Meningitis and Sepsis

1. < 2 months:
    a. Ampicillin 100 mg/kg IV AND
    b. Cefotaxime (Claforan) 50 mg/kg IV
2. ≥ 2 months:
    a. Ceftriaxone (Rocephin) 100 mg/kg IV
    b. Maximum dose 2 gm

To Initiate Antibiotics for Serious Staphlococcal Infections

1. Nafcillin or Cefazolin
    a. 50 mg/kg IV
    b. Maximum dose 2 gm
2. Vancomycin
    a. 10 – 15 mg/kg IV

To Initiate Antibiotics for Gram Negative/Anaerobic/Bowel Infections

1. Ampicillin
    a. 50 mg/kg IV
    b. Maximum dose 3 gm
2. AND Gentamicin
    a. 2.5 mg/kg IV over 20 minutes
    b. Maximum dose 120 mg
3. AND Flagyl
    a. 15 mg/kg IV over 30 – 60 minutes
    b. Maximum dose 1 gm

Medication Drips (These drugs require cardiovascular monitoring and a pediatric setting)

1. Epinephrine
    a. 0.02 – 2 mcg/kg/min IV
2. Isoproterenol (Isuprel)
    a. For slow A-V block or bradycardia
        i. 0.02 – 0.2 mcg/kg/min IV
    b. For severe asthma
        i. 0.2 – 1 mcg/kg/min IV
3. Norepinephrine
    a. 0.1-2 mcg/kg/min IV
4. Nitroprusside
    a. 0.1 – 2 mcg/kg/min IV

To obtain the concentration where 1 ml/hr = 0.1 mcg/kg/min, multiply the patient's weight (in kg) by 1.5 and add this amount of drug (in mg) to 250 ml of NS or D5W:

1.5 x kg weight = (x)mg/250 ml = 1 ml/hr = 0.1 mcg/kg/min

5. Dobutamine
    a. 2 – 20 mcg/kg/min IV

6. Dopamine
    a. 2 – 20 mcg/kg/min IV
7. Labetolol
    a. 5 – 20 mcg/kg/min

To obtain the concentration where 1 ml/hr = 1 mcg/kg/min, multiply the patient's weight (in kg) by 15 and add this amount of drug (in mg) to 250 ml of NS or D5W:

15 x kg weight = (x)mg/250 ml = 1 ml/hr = 1 mcg/kg/min

8. Lidocaine
    a. 25 – 50 mcg/kg/min IV
9. Esmolol
    a. 50 – 300 mcg/kg/min IV

To obtain the concentration where 1 ml/hr = 10 mcg/kg/min, multiply the patient's weight (in kg) by 150 and add this amount of drug (in mg) to 250 ml of NS or D5W:

150 x kg weight = (x)mg/250 ml = 1 ml/hr = 10 mcg/kg/min

Maintenance Fluids (DO NOT USE D5W)

1. D5LR, D5NS
2. Calculations of Maintenance Fluid Rate:
    a. 1 – 10 kg: 4 ml/kg/hr
    b. 11 –20 kg: 40 ml/hr + 2 ml/kg/hr (for every kg > 10)

Cardioversion/Defibrillation

1. Ventricular Fibrillation/Ventricular Tachycardia w/o pulse
    a. 2 – 4 joules/kg
2. Ventricular Tachycardia w/pulse
    a. 0.5 – 2 joules/kg (synchronized)

Intracranial Pressure Control Guidelines

1. Keep pCO2 30 – 35 with mild hyperventilation
2. Keep head midline
3. Paralyze (Vecuronium or Pavulon)
4. Mannitol (Must have adequate BP)
5. Give sedation as indicated if normotensive (Diazepam or Barbiturates)

Do not use hypotonic IV solutions> 20 kg: 60 ml/hr + 1 ml/kg/hr (for every kg > 20)

CHET INTUBATON

Intubation

1. Premie
    a. Size of ETT (approximately): 2.5 – 3
    b. Laryngoscope Blade (Miller): 0
    c. Oral insertion length (in cm) to the gums/teeth: 7 – 10
2. Newborn
    a. Size of ETT (approximately): 3.5
    b. Laryngoscope Blade (Miller): 0 – 1
    c. Oral insertion length (in cm) to the gums/teeth: 7 – 10
    d. NG/OG: 8 fr. Feeding tube
    e. Foley: 6 fr.

3. 6 months
    a. Size of ETT (approximately): 4
    b. Laryngoscope Blade (Miller): 1
    c. NG/OG: 8 fr. NG tube
    d. Foley: 6 fr.

Oral insertion length (in cm) to the gums/teeth = Child's age (yrs) + 10 cm
Nasal insertion length (in cm) to the nare = Child's age (yrs) + 13 – 15

4. 1 year
    a. Size of ETT (approximately): 4.5
    b. Laryngoscope Blade (Miller): 1 – 2
5. 2 years
    a. Size of ETT (approximately): 4.5
    b. Laryngoscope Blade (Miller): 1 – 2
    c. NG/OG: 10 fr.
    d. Foley: 8 fr.
6. 4 years
    a. Size of ETT (approximately): 5
    b. Laryngoscope Blade (Miller): 2
7. 6 years
    a. Size of ETT (approximately): 5.5
    b. Laryngoscope Blade (Miller): 2
    c. NG/OG: 12 fr.
    d. Foley: 10 fr.
8. 8 years
    a. Size of ETT (approximately): 6
    b. Laryngoscope Blade (Miller): 2
9. 10 years
    a. Size of ETT (approximately): 6.5
    b. Laryngoscope Blade (Miller): 2 – 3
    c. NG/OG: 14 fr.
    d. Foley: 12 fr.
10. 12 years and older
    a. Size of ETT (approximately): 7
    b. Laryngoscope Blade (Miller): 3

PALS Information (for PDA)

Summary of ABCD Maneuvers

1. Child (1-8 years old)
    a. Airway
        i. Head tilt-chin lift (if trauma is present, use jaw thrust)
    b. Breathing
        i. Initial: 2 breaths at 1 to 1.5 sec/breath
        ii. Subsequent: ≈20 breaths/min
        iii. FBAO: Heimlich maneuver
    c. Circulation
        i. Pulse check: Carotid

ii. Compression landmarks: Lower half of sternum
iii. Compression method: Heel of one hand
iv. Compression depth: 1 to 1.5 in. or approximately one third to one half depth of chest
v. Compression rate: 100/min
vi. Compression/ventilation ratio: 5:1 (Pause for ventilation until trachea is intubated.)

2. Infant (<1 year old)
    a. Airway
        i. Head tilt-chin lift (if trauma is present, use jaw thrust)
    b. Breathing
        i. Initial: 2 breaths at 1 to 1.5 sec/breath
        ii. Subsequent: ≈20 breaths/min
        iii. FBAO: Back blows and chest thrusts
    c. Circulation
        i. Pulse check: Brachial or femoral
        ii. Compression landmarks: 1 finger width below intermammary line
        iii. Compression method: 2 thumbs-encircled hands or, 2 or 3 fingers
        iv. Compression depth: 0.5 to 1 in. or approximately one third to one half depth of chest
        v. Compression rate: ≥100/min
        vi. Compression/ventilation ratio: 5:1 (Pause for ventilation until trachea is intubated.)
3. Newborn (Delivery room or neonatal ICU)
    a. Airway-
        i. Head tilt-chin lift
    b. Breathing
        i. Initial: 2 breaths at 1 to 1.5 sec/breath
        ii. Subsequent: ≈30-60 breaths/min
    c. Circulation
        i. Pulse check: Brachial or femoral
        ii. Compression landmarks: 1 finger width below intermammary line
        iii. Compression method: 2 thumbs-encircled hands or, 2 or 3 fingers
        iv. Compression depth: 0.5 to 1 in. or approximately one third depth of chest
        v. Compression rate: 120/min
        vi. Compression/ventilation ratio: 3:1 for intubated newborns (2 rescuers)

Newborn Initial Assessment

1. Assess and support
    a. Temperature (warm and dry)
    b. Airway (position and suction)
    c. Breathing (stimulate to cry)
    d. Circulation (heart rate and color)
2. Always needed by newborns

a. Assess baby's response to birth
b. Keep baby warm
c. Position, clear airway, stimulate to breathe by drying, and give oxygen (as necessary)

3. Needed less frequently
    a. Establish effective ventilation
        i. Bag and mask
        ii. Tracheal intubation
4. Rarely needed by newborns
    a. Provide chest compressions
    b. Administer medications

Modified Glasgow Coma Scale

Child

1. Eye Opening
    a. Spontaneous- score 4
    b. To verbal stimuli- score 3
    c. To pain only- score 2
    d. No response- score 1
2. Verbal Response
    a. Oriented, appropriate- score 5
    b. Confused- score 4
    c. Inappropriate words- score 3
    d. Incomprehensible sounds- score 2
    e. No response- score 1
3. Motor Response*
    a. Obeys commands- score 6
    b. Localizes painful stimuli- score 5
    c. Withdraws in response to pain- score 4
    d. Flexion in response to pain- score 3
    e. Extension in response to pain- score 2
    f. No response- score 1

Infant

1. Eye Opening
    a. Spontaneous- score 4
    b. To verbal stimuli- score 3
    c. To pain only- score 2
    d. No response- score 1
2. Verbal Response
    a. Coos and babbles- score 5
    b. Irritable cries- score 4
    c. Cries to pain- score 3
    d. Moans to pain- score 2
    e. No response- score 1
3. Motor Response*
    a. Moves spontaneously and purposefully- score 6

b. Withdraws to touch- score 5
c. Withdraws in response to pain- score 4
d. Abnormal flexion posture to pain- score 3
e. Abnormal extension posture to pain- score 2
f. No response- score 1

* If patient is intubated, unconscious, or preverbal, the most important part of this scale is motor response. Motor response should be carefully evaluated.

Pediatric Trauma Score

1. Weight (kg)
    a. >20 kg- score +2
    b. 10 to 20 kg- score +1
    c. < 10 kg- score –1
2. Airway
    a. Normal- score +2
    b. Maintained- score +1
    c. Unmaintained- score –1
3. Systolic blood pressure (mm Hg)
    a. >90- score +2
    b. 50 –90- score +1
    c. <50- score –1
4. Central nervous system
    a. Awake- score +2
    b. Obtunded- score +1
    c. Coma/decerebrate- score –1
5. Open wound
    a. None- score +2
    b. Minor- score +1
    c. Major/penetrating- score –1
6. Skeletal trauma
    a. None- score +2
    b. Closed fractures- score +1
    c. Open, multiple fractures- score –1

Add the value of each patient characteristic. Highest possible score is +12 and lowest possible score is –6.

Classification of Pediatric Hemorrhagic Shock

Class I- Very Mild Hemorrhage (<15% blood volume loss):

1. Cardiovascular
    a. Heart rate normal or mildly increased
    b. Normal pulses
    c. Normal blood pressure
    d. Normal pH
2. Respiratory
    a. Rate normal
3. Central nervous system

a. Slightly anxious
4. Skin
    a. Warm, pink mucous membranes and nail beds
    b. Capillary refill brisk
5. Kidneys
    a. Normal urine output

Class II- Mild Hemorrhage (15% to 25% blood volume loss):

1. Cardiovascular
    a. Tachycardia
    b. Peripheral pulses may be diminished
    c. Normal blood pressure
    d. Normal pH
2. Respiratory
    a. Tachypnea
3. Central nervous system
    a. Irritable, confused
    b. Combative
4. Skin
    a. Cool extremities, mottling
    b. Delayed capillary refill
5. Kidneys
    a. Oliguria, increased specific gravity

Class III- Moderate Hemorrhage (26% to 39% blood volume loss)

1. Cardiovascular
    a. Significant tachycardia
    b. Thready peripheral pulses
    c. Hypotension
    d. Metabolic acidosis
2. Respiratory
    a. Moderate tachypnea
3. Central nervous system
    a. Irritable or lethargic
    b. Diminished pain response
4. Skin
    a. Cool extremities, mottling or pallor
    b. Prolonged capillary refill
5. Kidneys
    a. Oliguria
    b. Increased blood urea nitrogen (BUN)

Class IV- Severe Hemorrhage (≥40% blood volume loss)

1. Cardiovascular
    a. Severe tachycardia
    b. Thready central pulses
    c. Significant hypotension
    d. Significant acidosis
2. Respiratory

    a. Severe tachypnea
3. Central nervous system
    a. Lethargic coma
4. Skin
    a. Cool extremities, pallor, or cyanosis
5. Kidneys
    a. Anuria

Drugs Used In PALS

Adenosine
1. 0.1 mg/kg (up to 6 mg)
2. 0.2 mg/kg for second dose
3. Rapid IV push
4. Maximum single dose: 12 mg

Amiodarone: for refractory pulseless VT/VF
1. 5 mg/kg rapid IV/IO
2. Maximum 15 mg/kg/day

Amiodarone: for perfusing tachycardias
1. Loading: 5 mg/kg IV/IO over 20 – 60 minutes
2. Repeat to maximum 15 mg/kg/day IV

Atropine Sulfate
1. 0.02 mg/kg IV/IO/ET
2. Minimum dose 0.1 mg
3. Maximum single dose 0.5 mg child, 1 mg adolescent
4. May double for 2ed dose

Ca+ chloride 10%
1. 20 mg/kg IV/IO
2. Slow IV bolus

Dobutamine
1. 2 – 20 mcg/kg/min
2. Titrate to desired effect

Dopamine
1. Alpha-pressor effects at higher doses > 15 mcg/kg/min

Epinephrine for bradycardia
1. IV/IO: 0.01 mg/kg (1:10,000, 0.1 ml/kg)
2. ET: 0.1 mg/kg (1:1000, 0.1 ml/kg)

Epinephrine for asystolic or pulseless arrest
1. First dose: IV/IO: 0.01 mg/kg (1:10,000, 0.1 ml/kg)
2. First dose: ET: 0.1 mg/kg (1:1,000, 0.1 ml/kg)
3. Subsequent doses: Repeat every 3 – 5 minutes during CPR
4. Consider a higher dose (0.1 mg/kg, 0.1 ml/kg of 1:1,000) for special conditions

Epinephrine Infusion
1. Initial at 0.1 mcg/kg/min
2. Titrate to desired effect (0.1 – 1 mcg/kg/min)

Glucose
1. 0.5 – 1 g/kg IV/IO

2. Maximum dose: 2 – 4 ml/kg of 25% solution
3. 5% = 10 – 20 ml/kg
4. 10% = 5 – 10 ml/kg
5. 25% = 2 – 4 ml/kg
6. In large vein

Lidocaine
1. 1 mg/kg
2. IV/IO/ET

Lidocaine Infusion
1. 20 – 50 mcg/kg/min

Magnesium Sulfate
1. 25 –50 mcg/kg IV/IO over 10 –20 minutes
2. Maximum dose: 2 g

Naloxone (Narcan)
1. If ≤ 5 years old or ≤ 20 kg: 0.1 mg/kg
2. If > 5 years old or > 20 kg: 2 mg
3. Titrate to desired effect

Prostaglandin E
1. 0.05 – 0.1 mcg/kg/min
2. Titrate
3. Monitor for apnea, hypotension, hypoglycemia, hypocalcemia

Sodium Bicarbonate
1. 1 mEq/kg dose
2. Infuse slowly and only if ventilation is adequate

Pediatric Resuscitation Supplies

Newborn/Small Infant (3 – 5 kg)
1. Resuscitation bag: Infant
2. O2 Mask: Newborn
3. Oral Airway: Infant/small child
4. Laryngoscope blade (size): 0 – 1 straight
5. Tracheal Tube (mm): Premature infant- 2.5, Term infant- 3.0 – 3.5 uncuffed
6. Tracheal Tube Length (cm at lip): 10 – 10.5
7. Stylet (F): 6
8. Suction Catheter (F): 6 – 8
9. BP Cuff: Newborn/Infant
10. IV catheter (G): 22 – 24
11. Butterfly (G): 23 – 25
12. Nasogastric tube (F): 5 – 8
13. Urinary Catheter (F): 5 – 8
14. Defibrillation/cardioversion external paddles: Infant paddles
15. Chest Tube (F): 10 – 12

Infant (6 – 9 kg)
1. Resuscitation bag: Child
2. O2 Mask: Newborn
3. Oral Airway: Infant/small child

4. Laryngoscope blade (size): 1 straight
5. Tracheal Tube (mm): 3.5 uncuffed
6. Tracheal Tube Length (cm at lip): 10 – 10.5
7. Stylet (F): 6
8. Suction Catheter (F): 8
9. BP Cuff: Newborn/Infant
10. IV catheter (G): 22 – 24
11. Butterfly (G): 23 – 25
12. Nasogastric tube (F): 5 – 8
13. Urinary Catheter (F): 5 – 8
14. Defibrillation/cardioversion external paddles: Infant paddles until 1yr or 10 kg
15. Chest Tube (F): 10 – 12

Toddler (10 – 11 kg)

1. Resuscitation bag: Child
2. O2 Mask: Pediatric
3. Oral Airway: Small child
4. Laryngoscope blade (size): 1 straight
5. Tracheal Tube (mm): 4.0 uncuffed
6. Tracheal Tube Length (cm at lip): 11 – 12
7. Stylet (F): 6
8. Suction Catheter (F): 8 – 10
9. BP Cuff: Infant/Child
10. IV catheter (G): 20 – 24
11. Butterfly (G): 23 – 25
12. Nasogastric tube (F): 8 – 10
13. Urinary Catheter (F): 8 – 10
14. Defibrillation/cardioversion external paddles: Adult paddles when ≥ 1yr or ≥ 10 kg
15. Chest Tube (F): 16 – 20

Small Child (12 – 14 kg)

1. Resuscitation bag: Child
2. O2 Mask: Pediatric
3. Oral Airway: Child
4. Laryngoscope blade (size): 2 straight
5. Tracheal Tube (mm): 4.5 uncuffed
6. Tracheal Tube Length (cm at lip): 12.5 – 13.5
7. Stylet (F): 6
8. Suction Catheter (F): 10
9. BP Cuff: Child
10. IV catheter (G): 18 – 22
11. Butterfly (G): 21 – 23
12. Nasogastric tube (F): 10
13. Urinary Catheter (F): 10
14. Defibrillation/cardioversion external paddles: Adult paddles
15. Chest Tube (F): 20 – 24

Child (15 – 18 kg)

1. Resuscitation bag: Child

2. O2 Mask: Pediatric
3. Oral Airway: Child
4. Laryngoscope blade (size): 2 straight or curved
5. Tracheal Tube (mm): 5.0 uncuffed
6. Tracheal Tube Length (cm at lip): 14 – 15
7. Stylet (F): 6
8. Suction Catheter (F): 10
9. BP Cuff: Child
10. IV catheter (G): 18 – 22
11. Butterfly (G): 21 – 23
12. Nasogastric tube (F): 10 – 12
13. Urinary Catheter (F): 10 – 12
14. Defibrillation/cardioversion external paddles: Adult paddles
15. Chest Tube (F): 20 – 24

Child (19 – 22 kg)

1. Resuscitation bag: Child
2. O2 Mask: Pediatric
3. Oral Airway: Child/small adult
4. Laryngoscope blade (size): 2 straight or curved
5. Tracheal Tube (mm): 5.5 uncuffed
6. Tracheal Tube Length (cm at lip): 15.5 – 16.5
7. Stylet (F): 14
8. Suction Catheter (F): 10
9. BP Cuff: Child
10. IV catheter (G): 18 – 20
11. Butterfly (G): 21 – 23
12. Nasogastric tube (F): 12 – 14
13. Urinary Catheter (F): 10 – 12
14. Defibrillation/cardioversion external paddles: Adult paddles
15. Chest Tube (F): 24 – 32

Large Child (24 – 30 kg)

1. Resuscitation bag: Child/adult
2. O2 Mask: Adult
3. Oral Airway: Child/small adult
4. Laryngoscope blade (size): 2 – 3 straight or curved
5. Tracheal Tube (mm): 6.0 cuffed
6. Tracheal Tube Length (cm at lip): 17 – 18
7. Stylet (F): 14
8. Suction Catheter (F): 10
9. BP Cuff: Child/adult
10. IV catheter (G): 18 – 20
11. Butterfly (G): 21 – 22
12. Nasogastric tube (F): 14 – 18
13. Urinary Catheter (F): 12
14. Defibrillation/cardioversion external paddles: Adult paddles
15. Chest Tube (F): 28 – 32

Adult (≥ 32 kg)

1. Resuscitation bag: Adult
2. O2 Mask: Adult
3. Oral Airway: Medium adult
4. Laryngoscope blade (size): 3 straight or curved
5. Tracheal Tube (mm): 6.5 cuffed
6. Tracheal Tube Length (cm at lip): 18.5 – 19.5
7. Stylet (F): 14
8. Suction Catheter (F): 12
9. BP Cuff: Adult
10. IV catheter (G): 16 – 20
11. Butterfly (G): 18 – 21
12. Nasogastric tube (F): 18
13. Urinary Catheter (F): 12
14. Defibrillation/cardioversion external paddles: Adult paddles
15. Chest Tube (F): 32 – 40

Postarrest Treatment of Shock and Maintenance Fluid Requirements

Postarrest Shock

1. Fluid Bolus
    a. 10 – 20 ml/kg NS or RL
    b. Monitor response
2. Reassess - Signs of Shock Continue >
3. What is the Blood Pressure?
4. Hypotensive (decompensated) Shock?
    a. Consider further fluid boluses
    b. Epinephrine (0.1 to 1.0 mcg/kg/min or >
    c. Dopamine at higher doses (up to 20 mcg/kg/min) or >
    d. Norepinephrine (0.1 to 2 mcg/kg/min)
5. Normotensive (compensated) Shock
    a. Consider further fluid boluses and/or >
    b. Dobutamine (2 to 20 mcg/kg/min) and/or >
    c. Dopamine (2 to 20 mcg/kg/min) and/or >
    d. Low-dose Epinephrine (0.05 to 0.3 mcg/kg/min) and/or >
    e. Inamrinone: Load with 0.75 to 1 mg/kg over 5 minutes, may repeat up to 3 mg/kg. Infusion: 5 to 10 mcg/kg/min and/or >
    f. Milrinone: Load with 50 to 75 mcg/kg over 5 minutes, may repeat up to 3 mg/kg. Infusion: 0.5 to 0.75 mcg/kg/min

Estimation of Maintenance Fluid Requirements

1. Infants < 10 kg: Infusion of 0.2% normal saline in 5% dextrose (D5/0.2% NaCl) at a rate of 4 ml/kg per hour. For example, the maintenance rate for a 8 kg baby is as follows:
    a. 4 ml/kg/hr x 8 kg = 32 ml/hr
2. Children 10 – 20 kg: Infusion of D5/0.2% NaCl at a rate of 40 ml/kg plus 2 ml/kg per hour for each kilogram between 10 and 20 kg. For example, the maintenance rate for a 15 kg child is as follows:

    a. 40 ml/hr + (2 ml/kg/hr x 5 kg) = 50 ml/hr
3. Children > 20 kg: Infusion of D5/0.2% NaCl at a rate of 60 ml/hr plus 1 ml/kg per hour for each kilogram above 20 kg. For example, maintenance rate for a 30 kg child is as follows:
    a. 60 ml/hr + (1 ml/kg/hr x 10 kg) = 70 ml/hr

Pediatric Bradycardia Algorithm

1. BLS Algorithm: Assess and support ABC's as needed
2. Provide oxygen
3. Attach monitor/defibrillator
4. Is bradycardia causing severe cardiorespiratory compromise? (Poor perfusion, hypotension, respiratory difficulty, altered consciousness)
5. No >
    a. Observe
    b. Support ABC's
    c. Consider transfer or transport to ALS facility
6. Yes >
    a. Perform chest compressions if despite oxygenation and ventilation heart rate <60/min in infant or child and poor systemic perfusion
    b. Epinephrine*
        i. IV/IO: 0.01 mg/kg (1:10,000; 0.1 ml/kg)
        ii. ET: 0.1 mg/kg (1:1,000; 0.1 ml/kg)
        iii. May repeat every 3 to 5 minutes at the same dose
    c. Atropine*
        i. 0.02 mg/kg (minimum dose: 0.1 mg)
        ii. May be repeated once
    d. Consider cardiac pacing
    e. If pulseless arrest develops, see Pulseless Arrest Algorithm

*Give atropine first for bradycardia due to suspected increased vagal tone or primary AV block

7. During CPR
    a. Attempt/verify: Tracheal intubation and vascular access
    b. Check: Electrode position and contact; paddle position and contact; Pacer position and contact
    c. Give: Epinephrine every 3 to 5 minutes and consider alternate medications: epinephrine or dopamine infusions
    d. Identify and treat possible causes: Hypoxemia; Hypothermia Head injury Heart block Heart transplant (special situation); Toxins/poisons/drugs

Algorithm for Pediatric Tachycardia with Poor Perfusion

1. BLS algorithm: Assess, support ABC's
2. Pulse Present?
3. No >
    a. Initiate CPR
    b. See Pulseless arrest algorithm
4. Yes >

a. Provide oxygen and ventilation as needed
b. Attach monitor/defibrillator
c. 12 lead ECG if practical
d. Evaluate QRS duration

QRS duration normal for age (approximately ≤ 0.08 sec)(narrow complex) >

1. Evaluate the tachycardia >

Probable sinus tachycardia

1. History compatible
2. P waves present/normal
3. HR often varies with activity
4. Variable RR with constant PR
5. Infants: rate usually < 220 bpm
6. Children: rate usually < 180 bpm

Probable supraventricular tachycardia

1. History incompatible
2. P waves absent/abnormal
3. HR not varible with activity
4. Abrupt rate changes
5. Infants: rate usually > 220 bpm
6. Children: rate usually > 180 bpm
7. Consider vagal maneuvers (no delays)
8. Immediate cardioversion
    a. 0.5 to 1 J/kg (may increase to 2 J/kg if initial dose is ineffective)
    b. Use sedation if possible; sedation must not delay cardioversion
9. Or Immediate IV/IO adenosine
    a. Use if IV/IO access is immediately available
    b. Dose: 0.1 mg/kg IV/IO (maximum first dose: 6 mg)
    c. May double dose and repeat dose once (maximum second dose: 12 mg)
    d. Use rapid bolus technique

QRS duration wide for age (approximately > 0.08 sec)(wide complex) >

1. Evaluate the tachycardia >

Probable ventricular tachycardia

1. Immediate cardioversion
    a. 0.5 to 1 J/kg (may increase to 2 J/kg if initial dose is ineffective)
    b. Use sedation if possible; sedation must not delay cardioversion
2. Consider alternative medications
    a. Amiodarone: 5 mg/kg IV over 20 to 60 minutes
    b. Or Procainamide: 15 mg/kg IV over 30 to 60 minutes (do not routinely administer amiodarone and procainamide together)
    c. Or Lidocaine: 1 mg/kg IV bolus (Wide complex only)
    d. Consult pediatric cardiologist
    e. 12 lead ECG

During the evaluation >

1. Provide oxygen and ventilation as needed
2. Support ABC's
3. Confirm continuous monitor/pacer attached

4. Consider expert consultation
5. Prepare for cardioversion (consider sedation)
6. Identify and treat possible causes: Hypoxemia; Hypoventilation; Hyperthermia; Hyper/hypokalemia and metabolic disorders; Tamponade; Tension pneuomothorax; Toxins/poisons/drugs; Thromboembolism; Pain

Pediatric Pulseless Arrest Algorithm

1. BLS Aligorithm: Assess and support ABC's
2. Provide oxygen
3. Attach monitor/defibrillator
4. Assess rhythm (ECG) >

Ventricular fibrillation/Ventricular Tachycardia >

1. Attempt defibrillation
    a. Up to 3 times if needed
    b. Initially 2 J/kg, 2 to 4 J/kg, 4 J/kg*
2. Epinephrine
    a. IV/IO: 0.01 mg/kg (1:10,000; 0.1 ml/kg)
    b. ET: 0.1 mg/kg (1:1,000; 0.1 ml/kg)
3. Attempt defibrillation with 4 J/kg* within 30 to 60 seconds after each medication
    a. Pattern should be CPR-drug-(CPR)-shock (repeat) or CPR-drug-(CPR)-shock-shock-shock (repeat)
4. Antiarrhythmic
    a. Amiodarone: 5 mg/kg bolus IV/IO or
    b. Lidocaine 1 mg/kg bolus IV/IO/ET or
    c. Magnesium: 25 to 50 mg/kg IV/IO for torsades de pointes or hypomagnesemia (maximum: 2 g)
5. Attempt defibrillation with 4 J/kg* within 30 to 60 seconds after each medication
    a. Pattern should be CPR-drug-(CPR)-shock (repeat) or CPR-drug-(CPR)-shock-shock-shock (repeat)

*Alternative waveforms and higher doses are class Indeterminate for children

Not Ventricular fibrillation/Ventricular Tachycardia (includes pulseless electrical activity and asystole) >

1. Epinephrine
    a. IV/IO: 0.01 mg/kg (1:10,000; 0.1 ml/kg)
    b. ET: 0.1 mg/kg (1:1,000; 0.1 ml/kg)
2. Continue CPR up to 3 minutes

During CPR >

1. Attempt/verify: Tracheal intubation and vascular access
2. Check: Electrode position and contact, paddle position and contact
3. Give: Epinephrine every 3 – 5 minutes (consider higher doses for second and subsequent doses)
4. Consider alternative medications: vasopressors, antiarrhythmics, buffers
5. Identify and treat possible causes: Hypoxemia; Hypovolemia; Hypothermia; Hyper/hypokalemia and metabolic disorders; Tamponade; Tension pneuomothorax; Toxins/poisons/drugs; Thromboembolism;

PALS Guidelines

Pediatric Pulseless Arrest Algorithm

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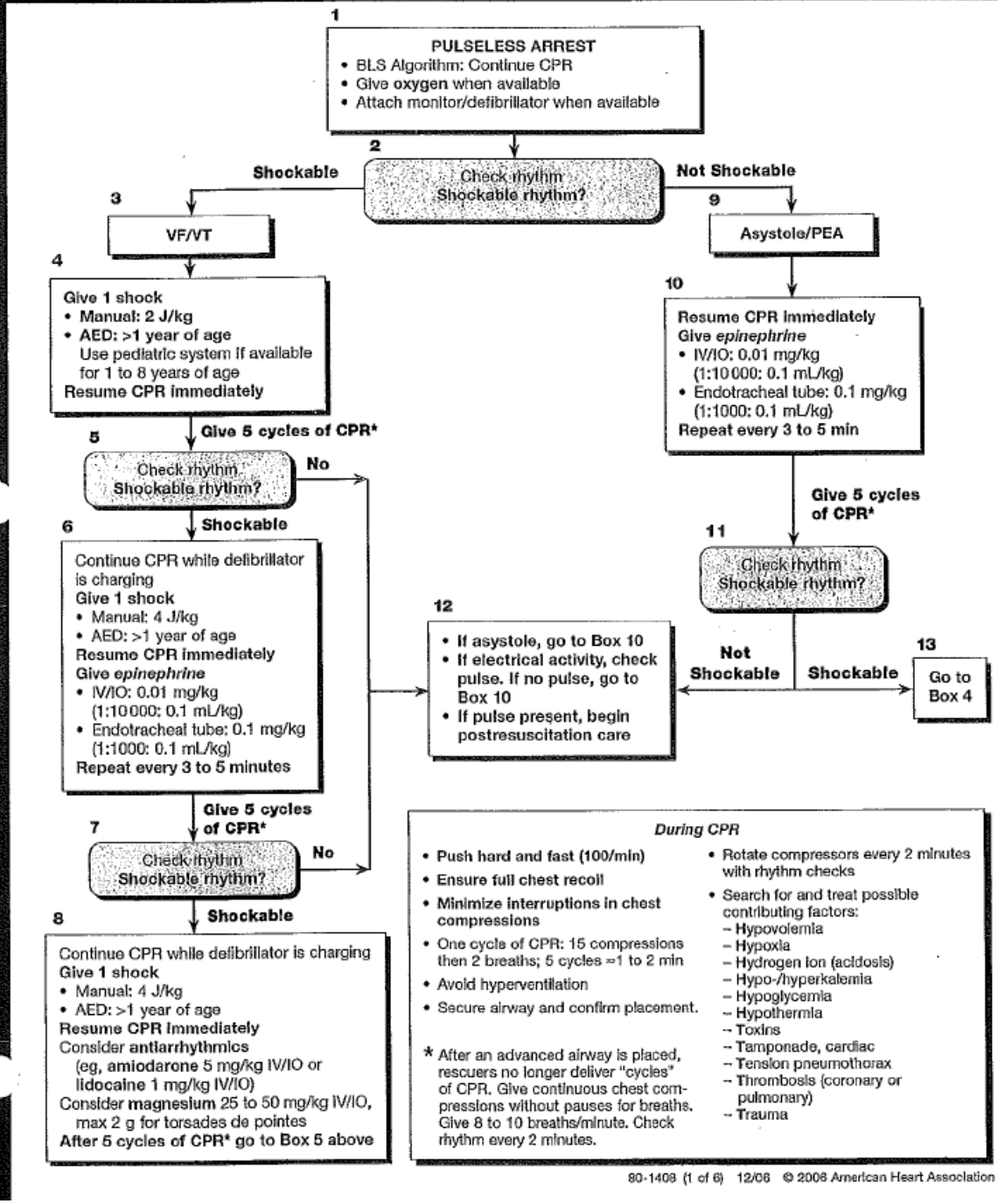

Pediatric Pulseless Arrest Algorithm

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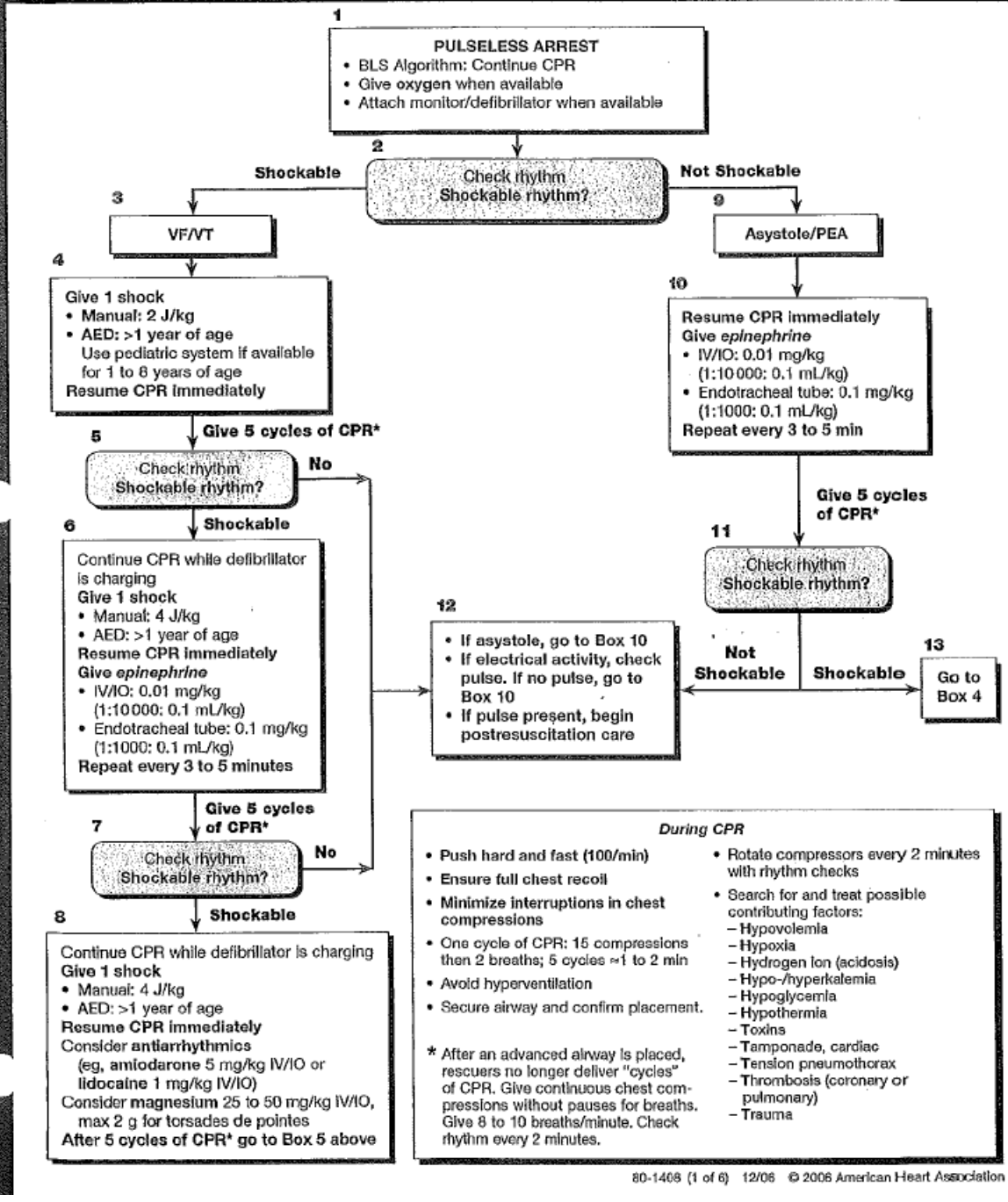

Pediatric Tachycardia With Pulses and Adequate Perfusion Algorithm

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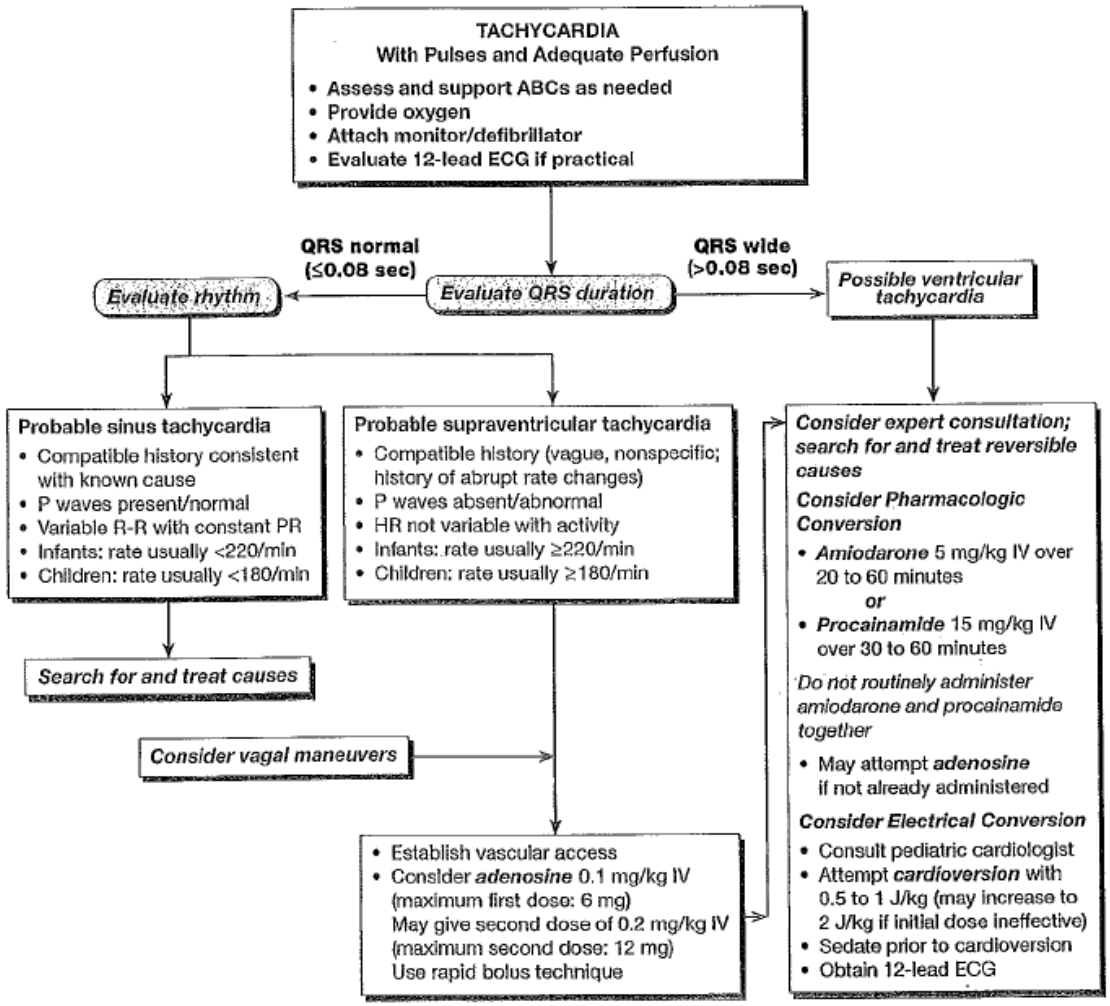

80-1408 (2 of 6) 12/06

Pediatric Tachycardia With Pulses and Poor Perfusion Algorithm

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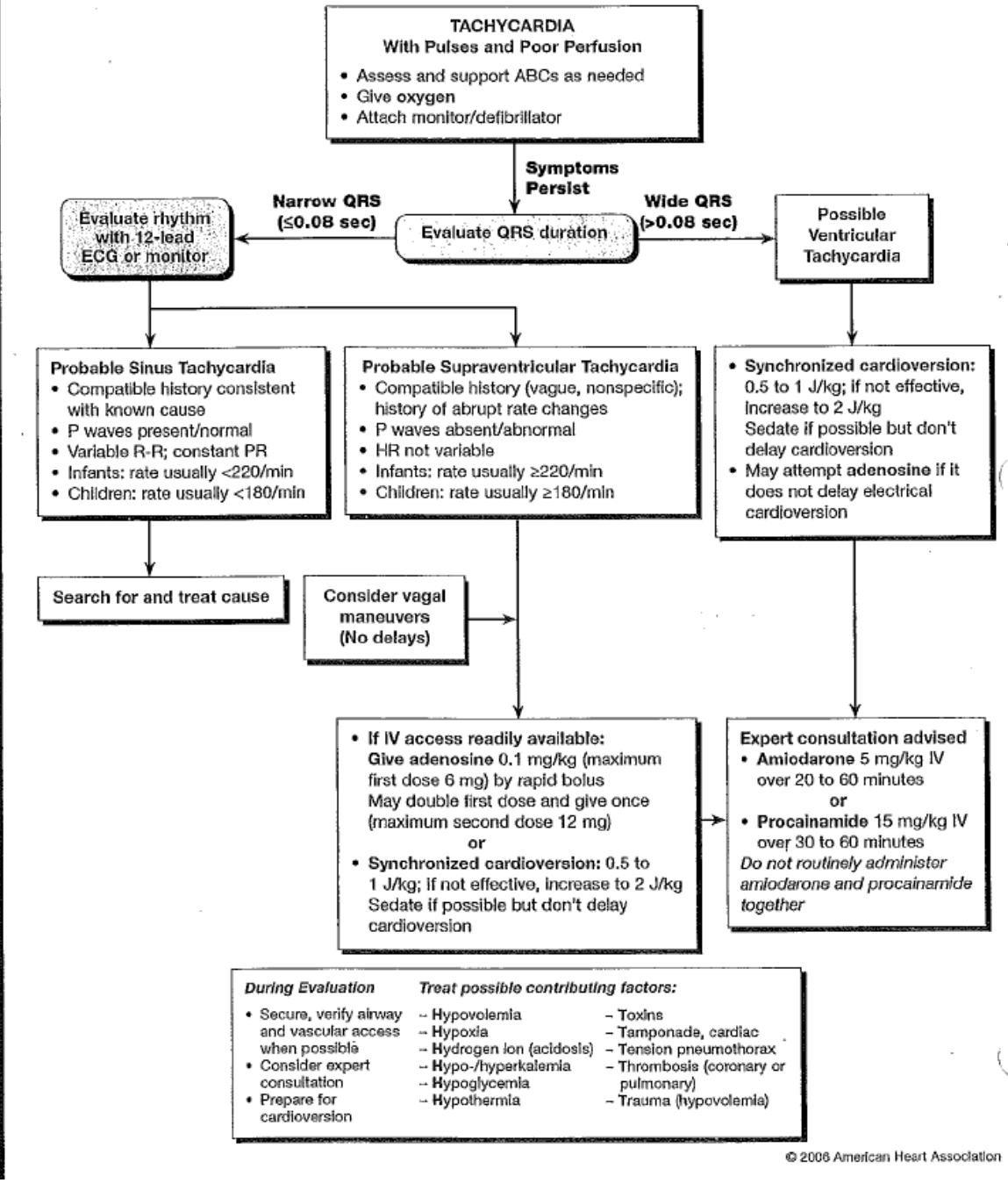

Pediatric Septic Shock Algorithm

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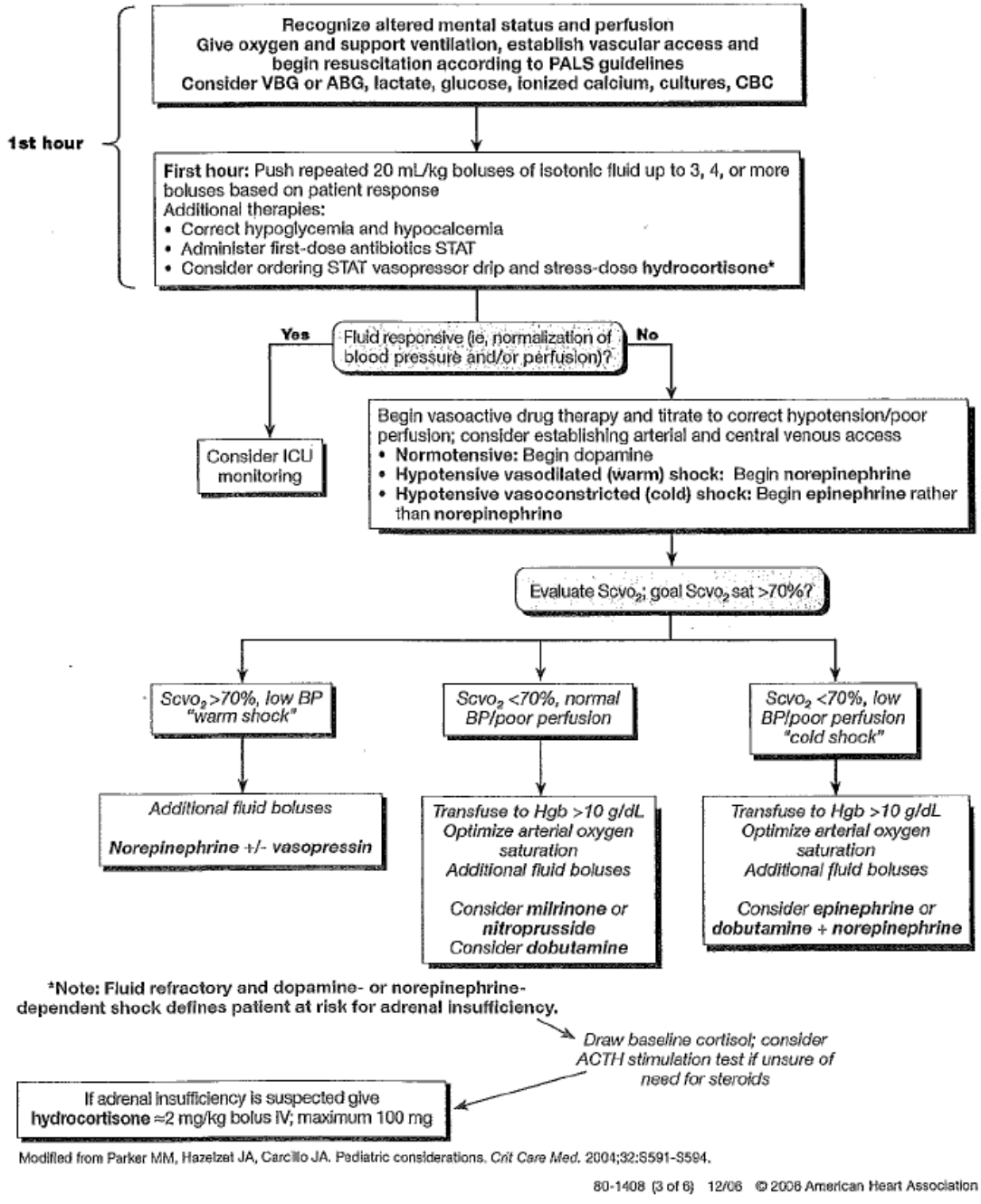

Modified from Parker MM, Hazelzet JA, Carcillo JA. Pediatric considerations. *Crit Care Med.* 2004;32:S591-S594.

Postresuscitation Treatment of Shock and Maintenance Fluid Requirements

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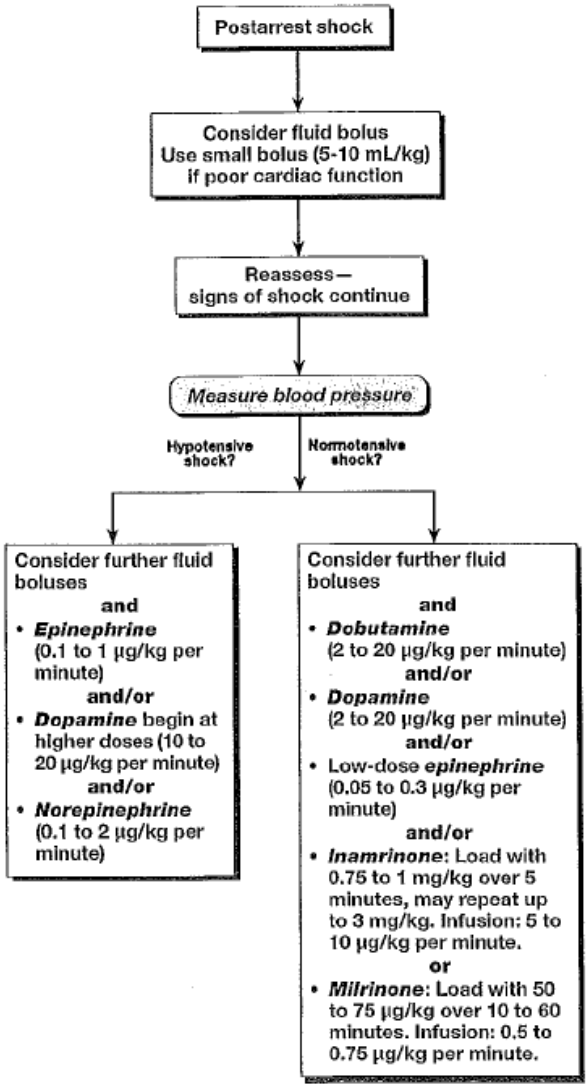

Estimation of Maintenance Fluid Requirements

- **Infants <10 kg:** Infusion of D_5 normal saline after initial stabilization at a rate of 4 mL/kg per hour. For example, the maintenance rate for an 8-kg baby is as follows:

  4 mL/kg per hour × 8 kg = 32 mL/h

- **Children 10 to 20 kg:** Infusion of 0.9% sodium chloride (normal saline) after initial stabilization at a rate of 40 mL/h plus 2 mL/kg per hour for each kilogram between 10 and 20 kg. For example, the maintenance rate for a 15-kg child is as follows:

  40 mL/h + (2 mL/kg per hour × 5 kg) = 50 mL/h

- **Children >20 kg:** Infusion of 0.9% sodium chloride (normal saline) after initial stabilization at a rate of 60 mL/hour plus 1 mL/kg per hour for each kilogram above 20 kg. For example, the maintenance rate for a 30-kg child is as follows:

  60 mL/h + (1 mL/kg per hour × 10 kg) = 70 mL/h

- Shortcut for patients weighing >20 kg:

  weight in kg + 40 mL/h

Adjust rate and composition of fluids to child's clinical condition (eg, pulse, blood pressure, systemic perfusion) and level of hydration.

Pediatric Resuscitation Supplies* Based on Color-Coded Resuscitation Tape

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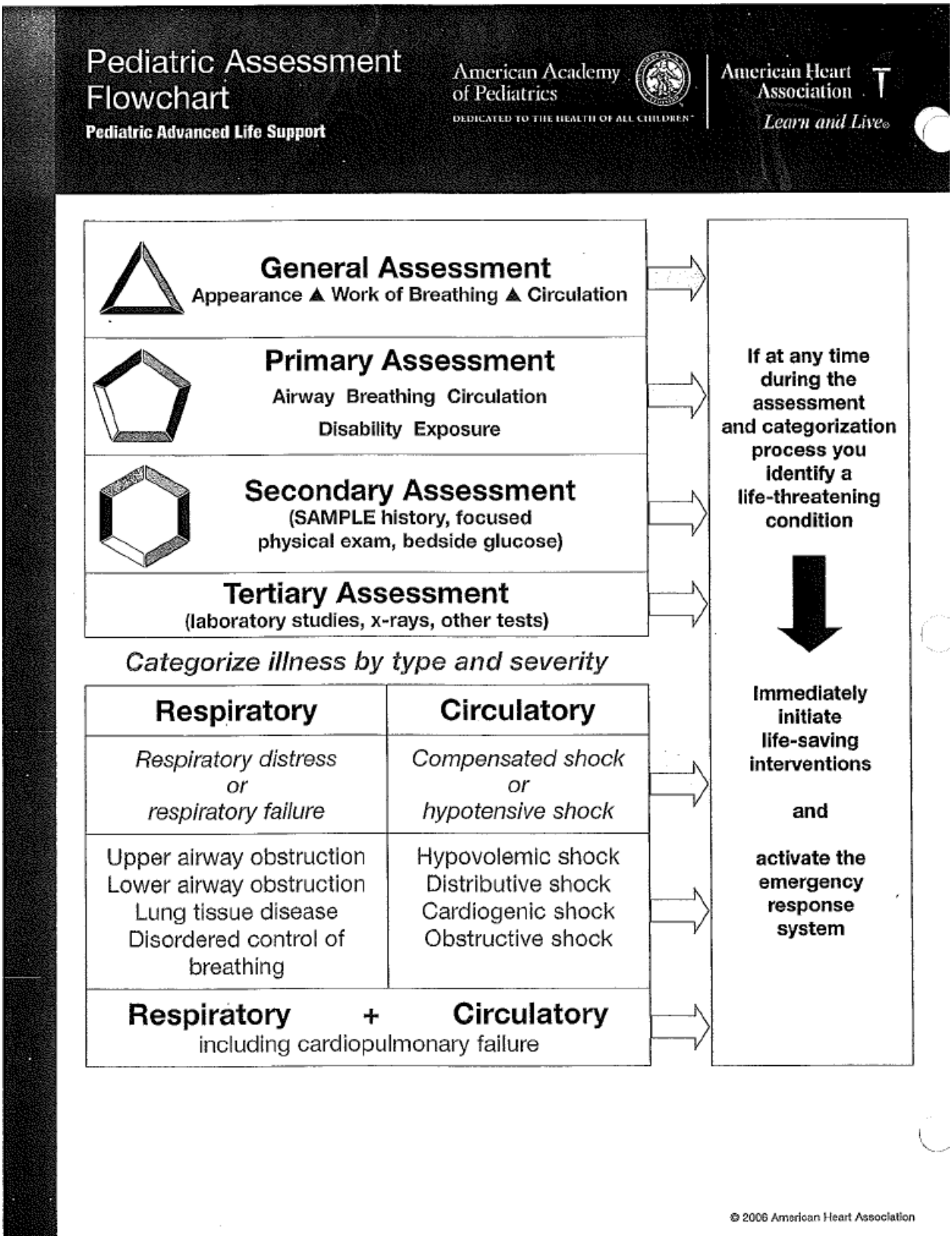
Equipment	PINK Newborn/ Small infant (3-5 kg)	RED Infant (6-9 kg)	PURPLE Toddler (10-11 kg)	YELLOW Small Child (12-14 kg)	WHITE Child (15-18 kg)	BLUE Child (19-22 kg)	ORANGE Large Child (24-28 kg)	GREEN Adult (30-36 kg)
Resuscitation bag	Child	Child	Child	Child	Child	Child	Child/adult	Adult
O_2 mask	Newborn	Newborn	Pediatric	Pediatric	Pediatric	Pediatric	Adult	Adult
Oral airway	Infant/small child	Infant/small child	Small child	Child	Child	Child/small adult	Child/small adult	Medium adult
Laryngoscope blade (size)	0-1 straight	1 straight	1 straight	2 straight	2 straight or curved	2 straight or curved	2-3 straight or curved	3 straight or curved
Tracheal tube (mm)	Premature infant 2.5 Term infant 3.0–3.5 uncuffed	3.5 uncuffed	4.0 uncuffed	4.5 uncuffed	5.0 uncuffed	5.5 uncuffed	6.0 cuffed	6.5 cuffed
Endotracheal tube length (cm at lip)	10-10.5	10-10.5	11-12	12.5-13.5	14-15	15.5-16.5	17-18	18.5-19.5
Stylet (F)	6	6	6	6	6	14	14	14
Suction catheter (F)	6-8	8	8-10	10	10	10	10	12
BP cuff	Newborn/ infant	Newborn/ infant	Infant/child	Child	Child	Child	Child/adult	Adult
IV catheter (G)	22-24	22-24	20-24	18-22	18-22	18-20	18-20	16-20
Butterfly (G)	23-25	23-25	23-25	21-23	21-23	21-23	21-22	18-21
Nasogastric tube (F)	5-8	5-8	8-10	10	10-12	12-14	14-18	18
Urinary catheter (F)	5-8	5-8	8-10	10	10-12	10-12	12	12
Defibrillation/ cardioversion external paddles	Infant paddles	Infant paddles until 1 yr or 10 kg	Adult paddles when ≥1 yr or ≥10 kg	Adult paddles	Adult paddles	Adult paddles	Adult paddles	Adult paddles
Chest tube (F)	10-12	10-12	16-20	20-24	20-24	24-32	28-32	32-40

*Adapted from the 2002 Broselow Pediatric Resuscitation Tape, with permission from Armstrong Medical Industries, Lincolnshire, Ill. Modified from Hazinski MF, ed. *Manual of Pediatric Critical Care*. St. Louis, Mo: Mosby–Year Book; 1999.


Pediatric Assessment Flowchart
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General Assessment
Appearance ▲ Work of Breathing ▲ Circulation
Primary Assessment
Airway Breathing Circulation
Disability Exposure
Secondary Assessment
(SAMPLE history, focused physical exam, bedside glucose)
Tertiary Assessment
(laboratory studies, x-rays, other tests)
If at any time during the assessment and categorization process you identify a life-threatening condition
Categorize illness by type and severity
Respiratory
Circulatory
Respiratory distress or respiratory failure
Compensated shock or hypotensive shock
Upper airway obstruction
Lower airway obstruction
Lung tissue disease
Disordered control of breathing
Hypovolemic shock
Distributive shock
Cardiogenic shock
Obstructive shock
Respiratory + Circulatory
including cardiopulmonary failure
Immediately initiate life-saving interventions
and
activate the emergency response system
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Pediatric Recognition of Respiratory Problems

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Recognition of Respiratory Problems

	Clinical Signs	Upper Airway Obstruction	Lower Airway Obstruction	Lung Tissue (Parenchymal) Disease	Disordered Control of Breathing
A	Patency	Airway open and maintainable/not maintainable			
B	Respiratory Rate/Effort	Increased			Variable
B	Breath Sounds	Stridor (typically inspiratory) Seal-like cough Hoarseness	Wheezing (typically expiratory) Prolonged expiratory phase	Grunting Crackles Decreased breath sounds	Normal
B	Air Movement	Decreased			Variable
C	Heart Rate	Tachycardia (early) Bradycardia (late)			
C	Skin	Pallor, cool skin (early) Cyanosis (late)			
D	Level of Consciousness	Anxiety, agitation (early) Lethargy, unresponsiveness (late)			
E	Temperature	Variable			

Categorize Respiratory Problems by Severity

	Respiratory Distress ⇨ Respiratory Failure
A	Open and maintainable ⇨ **Not maintainable**
B	Tachypnea ⇨ **Bradypnea to apnea**
B	Work of breathing (nasal flaring/retractions) **Increased effort** ⇨ **Decreased effort** ⇨ **Apnea**
B	Good air movement ⇨ **Poor to absent air movement**
C	Tachycardia ⇨ **Bradycardia**
C	Pallor ⇨ **Cyanosis**
D	Anxiety, agitation ⇨ **Lethargy to unresponsiveness**
E	Variable temperature

Pediatric Management of Respiratory Emergencies Flowchart

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General Management for All Patients

- Airway positioning
- Oxygen
- Pulse oximetry
- ECG monitor (as indicated)
- BLS as indicated

Upper Airway Obstruction

Specific Management for Selected Conditions

Croup	*Anaphylaxis*	*Aspiration of Foreign Body*
• Nebulized epinephrine • Corticosteroids	• IM epinephrine (or auto-injector) • Albuterol • Antihistamines • Corticosteroids	• Allow position of comfort • Specialty consultation

Lower Airway Obstruction

Specific Management for Selected Conditions

Bronchiolitis	*Asthma*
• Nasal suctioning • Bronchodilator trial	• Albuterol ± ipratropium • Corticosteroids • SQ epinephrine • Magnesium sulfate • Terbutaline

Lung Tissue (Parenchymal) Disease

Specific Management for Selected Conditions

Pneumonia/Pneumonitis *Infectious* *Chemical* *Aspiration*	*Pulmonary Edema* *Cardiogenic or Noncardiogenic (ARDS)*
• Albuterol • Antibiotics (as indicated)	• Consider noninvasive or invasive ventilatory support with PEEP • Consider vasoactive support • Consider diuretic

Disordered Control of Breathing

Specific Management for Selected Conditions

Increased ICP	*Poisoning/Overdose*	*Neuromuscular Disease*
• Avoid hypoxemia • Avoid hypercarbia • Avoid hyperthermia	• Antidote (if available) • Contact poison control	• Consider noninvasive or invasive ventilatory support

Pediatric Recognition of Shock Flowchart

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	Clinical Signs	Hypovolemic Shock	Distributive Shock	Cardiogenic Shock	Obstructive Shock
A	Patency	Airway open and maintainable/not maintainable			
B	Respiratory rate	Increased			
	Respiratory effort	Normal to increased		Labored	
	Breath sounds	Normal	Normal (± crackles)	Crackles, grunting	
C	Systolic blood pressure	**Compensated Shock → Hypotensive Shock**			
	Pulse pressure	Narrow	Wide	Narrow	
	Heart rate	Increased			
	Peripheral pulse quality	Weak	Bounding or weak	Weak	
	Skin	Pale, cool	Warm or cool	Pale, cool	
	Capillary refill	Delayed	Variable	Delayed	
	Urine output	Decreased			
D	Level of consciousness	Irritable early Lethargic late			
EM	Temperature	Variable			

Pediatric Management of Shock Emergencies Flowchart

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Management of Shock Emergencies

- Oxygen
- Pulse oximetry
- ECG monitor
- IV/IO access
- BLS as indicated
- Bedside glucose

Hypovolemic Shock

Specific Management for Selected Conditions

Nonhemorrhagic	*Hemorrhagic*
• 20 mL/kg NS/LR bolus, repeat as needed • Consider colloid after 3rd NS/LR bolus	• Control external bleeding • 20 mL/kg NS/LR bolus, repeat 2 or 3x as needed • Transfuse PRBCs as indicated

Distributive Shock

Specific Management for Selected Conditions

Septic	*Anaphylactic*	*Neurogenic*
Management Algorithm: • Septic Shock	• IM epinephrine (or auto-injector) • Antihistamines • Corticosteroids • Epinephrine infusion • Albuterol	• 20 mL/kg NS/LR bolus, repeat PRN • Vasopressor

Cardiogenic Shock

Specific Management for Selected Conditions

Bradyarrhythmia/Tachyarrhythmia	*Other (eg, CHD, Myocarditis, Cardiomyopathy, Poisoning)*
Management Algorithms: • Bradycardia • Tachycardia with poor perfusion	• 5 to 10 mL/kg NS/LR bolus, repeat PRN • Vasoactive infusion • Consider expert consultation

Obstructive Shock

Specific Management for Selected Conditions

Ductal-Dependent (LV Outflow Obstruction)	*Tension Pneumothorax*	*Cardiac Tamponade*	*Pulmonary Embolism*
• Prostaglandin E_1 • Expert consultation	• Needle decompression • Tube thoracostomy	• Pericardiocentesis • 20 mL/kg NS/LR bolus	• 20 mL/kg NS/LR bolus, repeat PRN • Consider thrombolytics, anticoagulants • Expert consultation

ACLS Guidelines

Pulseless Arrest Algorithm

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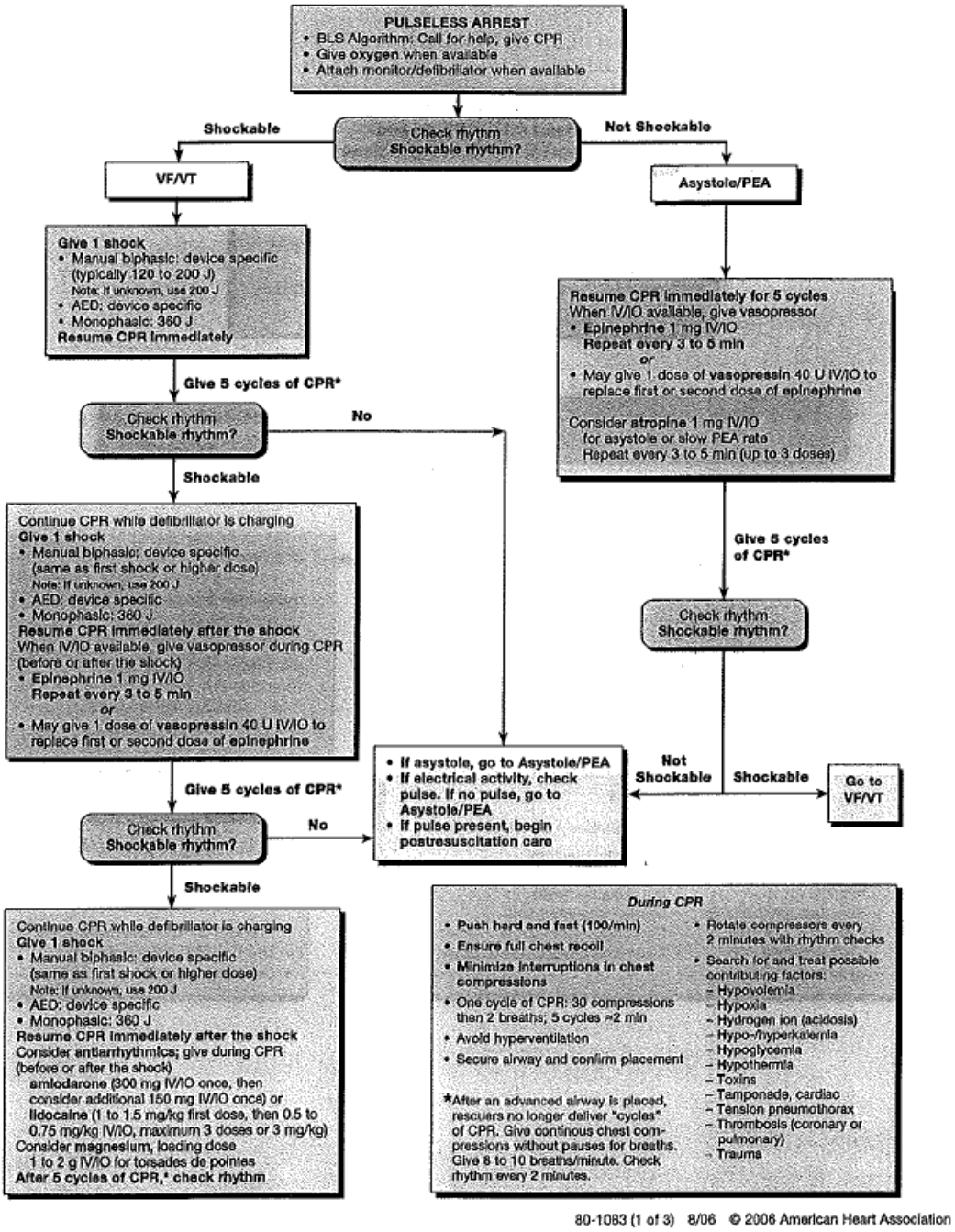
Adult Advanced Cardiovascular Life Support



Bradycardia Algorithm

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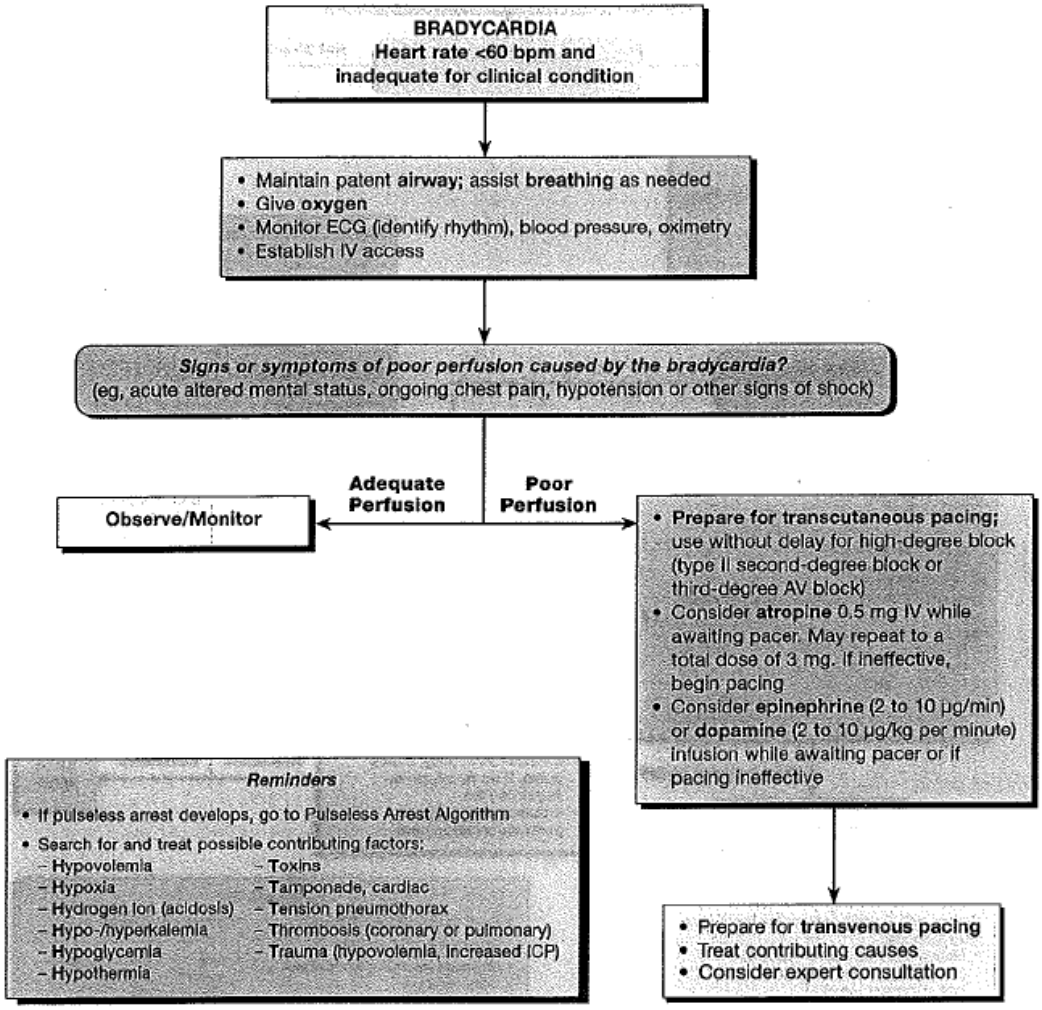

Tachycardia Algorithm

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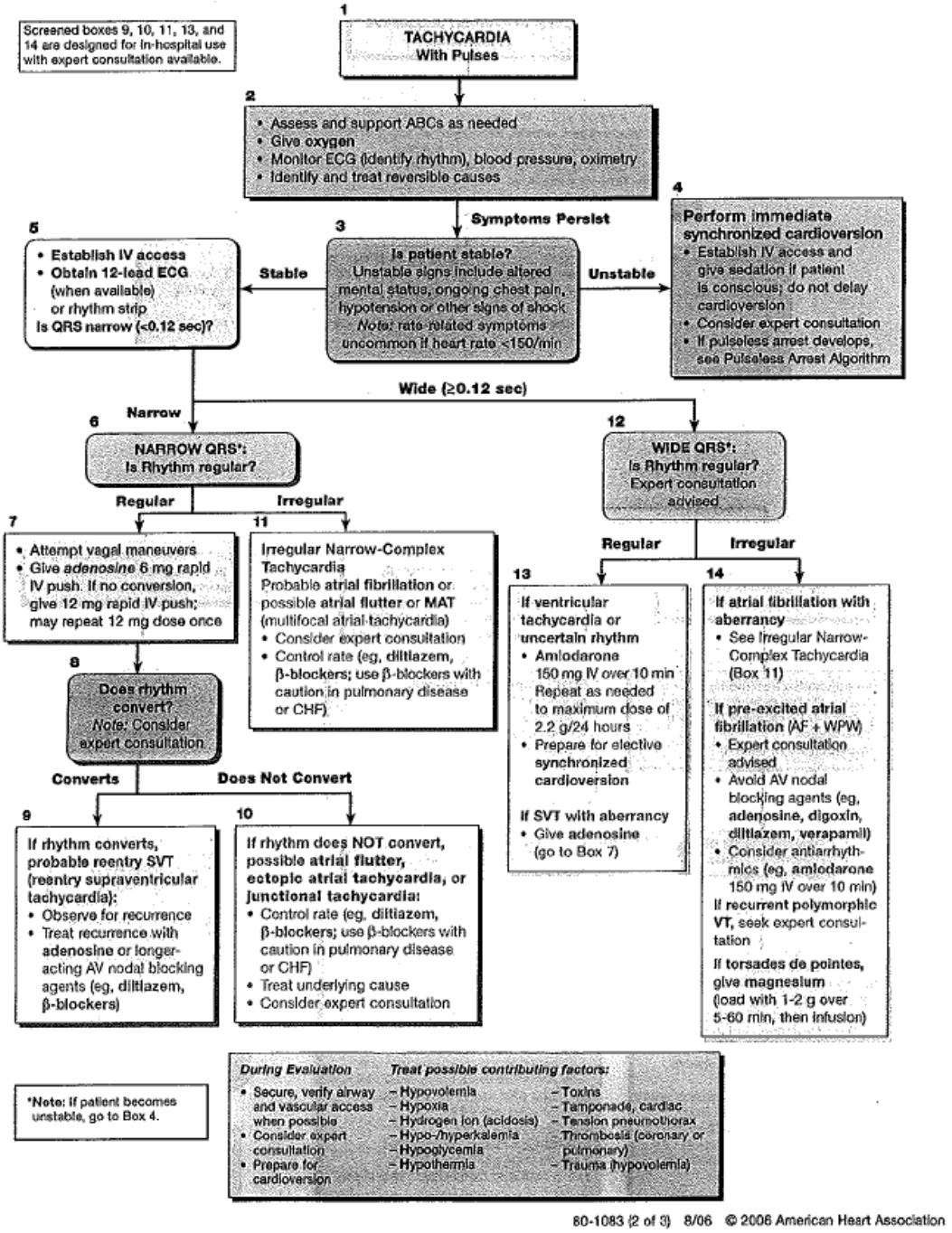

Acute Coronary Syndromes Algorithm

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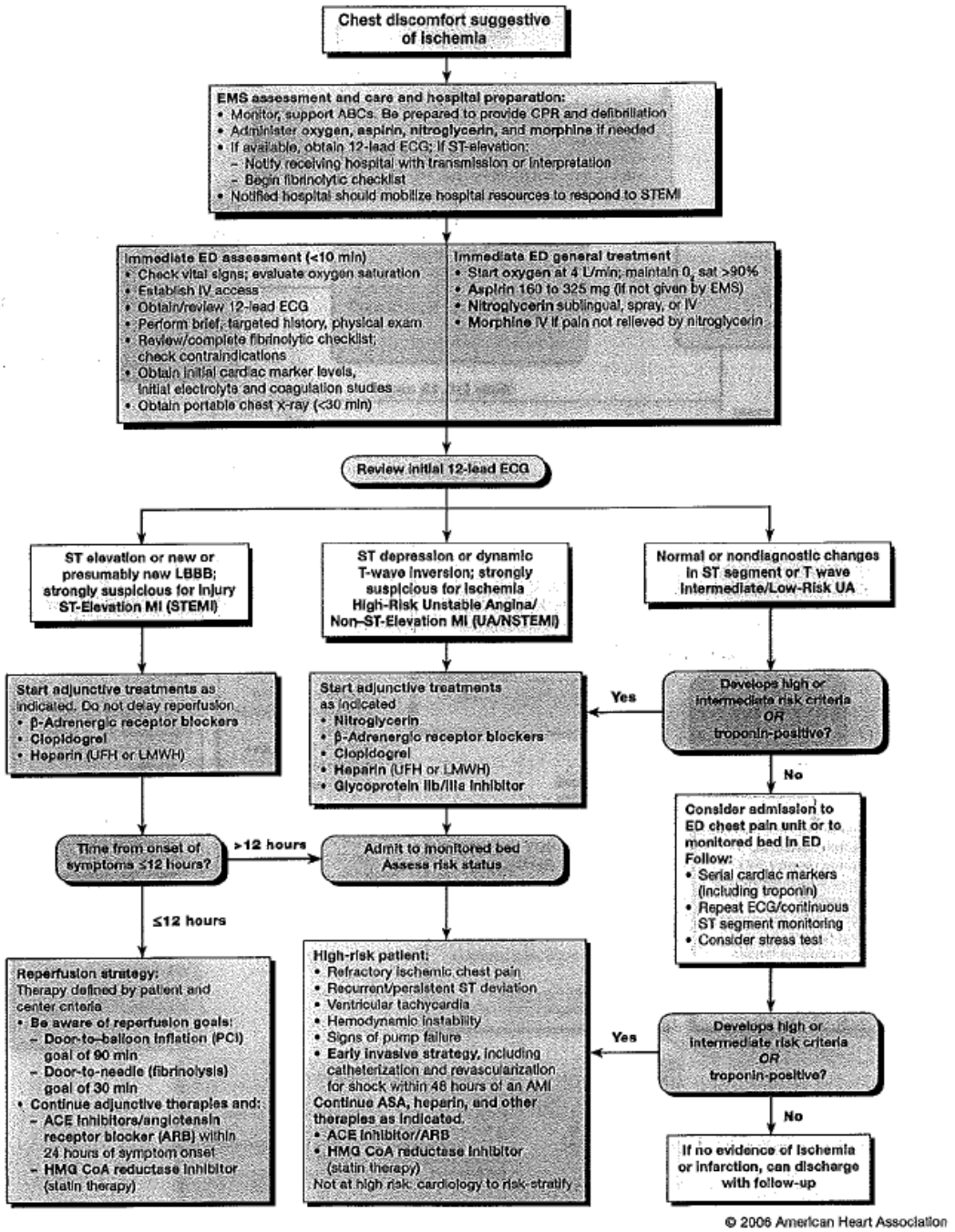

Suspected Stroke Algorithm

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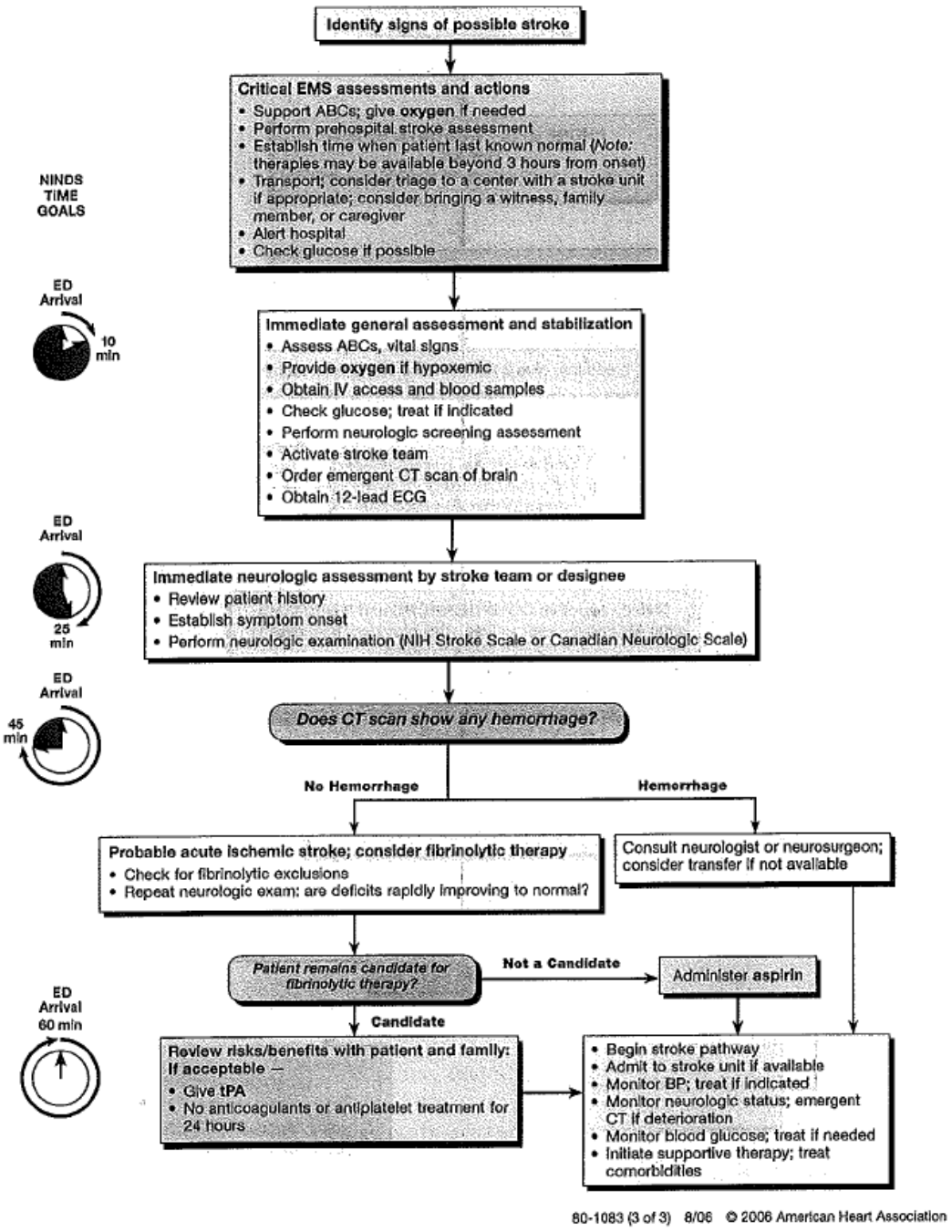

BLS Healthcare Provider Algorithm

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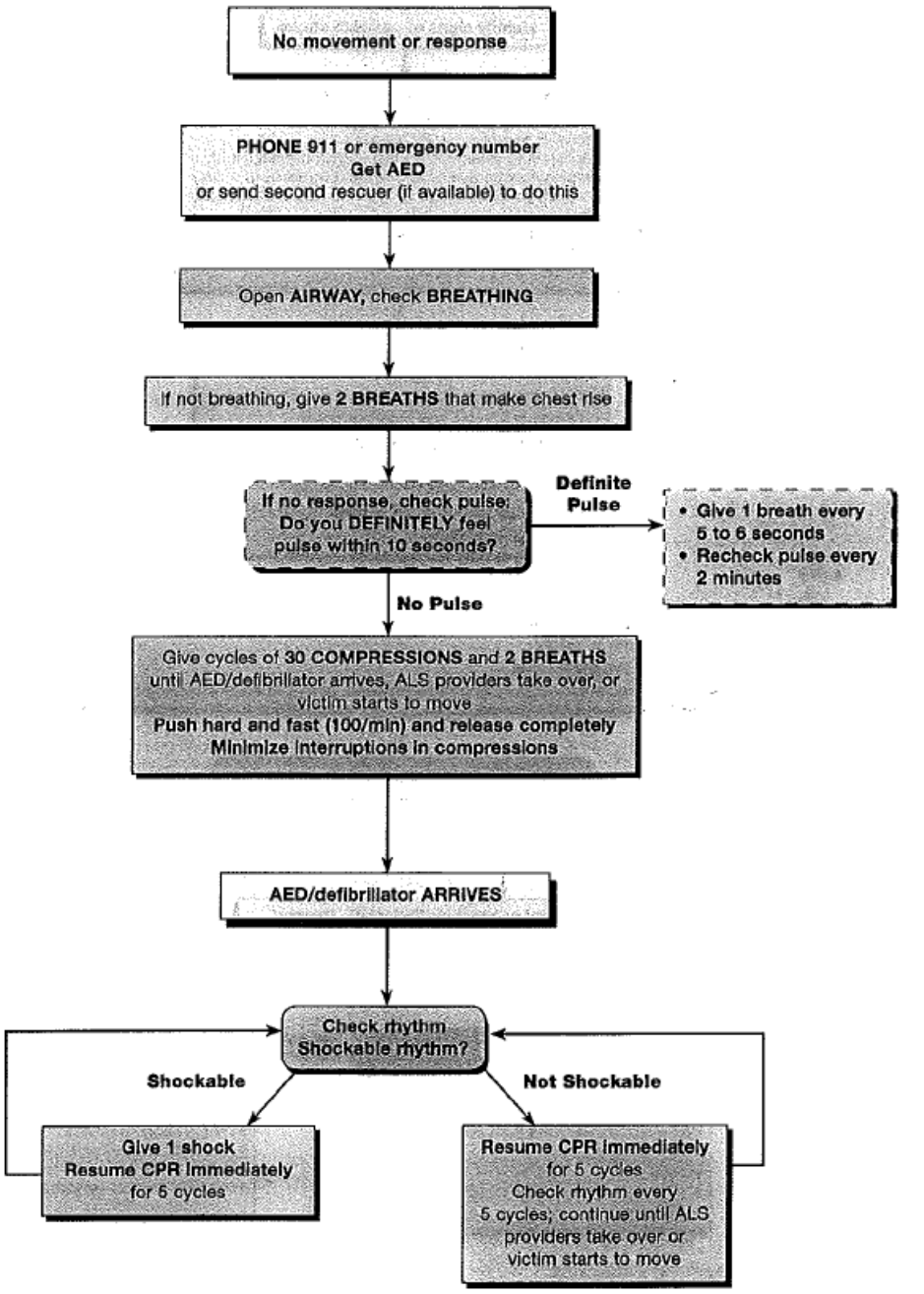

Weight Guidelines

CHHC San Diego Emergency Medication Dosing

PedCode 2.01
08/29/06
16:41:56

PATIENT: CODE BLUE SHEET 1KG [redacted] 1 Kg
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Amiodarone 50 mg/ml	5 mg	0.10 ml	5 mg/kg	Dilute in D5W 1.5mg/ml,filter
Atropine 0.10 mg/ml	0.10 mg minimum	1 ml	0.02 mg/kg	
Bicarb 4.2% 0.50 mEq/ml	1 mEq	2 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	10 mg	0.10 ml	10 mg/kg	PPT with bicarb
Ca Gluconate 10% 100 mg/ml	100 mg	1 ml	100 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	2 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Epi 1:10,000 0.10 mg/ml	0.01 mg	0.10 ml	0.01 mg/kg	Doses may be much higher
Naloxone 0.40 mg/ml	0.10 mg	0.25 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Epinephrine
Mix: 1.50 mg (1.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

:andard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.08 ml/hr = 1 mcg/kg/min

Free Text Notes

CHHC San Diego Emergency Medication Dosing

PedCode 2.01
08/29/06
16:42:05

PATIENT: CODE BLUE SHEET 2KG WEIGHT 2 Kg
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Amiodarone 50 mg/ml	10 mg	0.20 ml	5 mg/kg	Dilute in D5W 1.5mg/ml,filter
Atropine 0.10 mg/ml	0.10 mg minimum	1 ml	0.02 mg/kg	
Bicarb 4.2% 0.50 mEq/ml	2 mEq	4 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	20 mg	0.20 ml	10 mg/kg	PPT with bicarb
Ca Gluconate 10% 100 mg/ml	200 mg	2 ml	100 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	4 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Epi 1:10,000 0.10 mg/ml	0.02 mg	0.20 ml	0.01 mg/kg	Doses may be much higher
Naloxone 0.40 mg/ml	0.20 mg	0.50 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Epinephrine
Mix: 3 mg (3 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.15 ml/hr = 1 mcg/kg/min

Free Text Notes

CHHC San Diego Emergency Medication Dosing

PedCode 2.01
08/29/06
16:42:13

PATIENT: CODE BLUE SHEET 3KG [redacted]
OCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Amiodarone 50 mg/ml	15 mg	0.30 ml	5 mg/kg	Dilute in D5W 1.5mg/ml,filter
Atropine 0.10 mg/ml	0.10 mg minimum	1 ml	0.02 mg/kg	
Bicarb 4.2% 0.50 mEq/ml	3 mEq	6 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	30 mg	0.30 ml	10 mg/kg	PPT with bicarb
Ca Gluconate 10% 100 mg/ml	300 mg	3 ml	100 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	6 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Epi 1:10,000 0.10 mg/ml	0.03 mg	0.30 ml	0.01 mg/kg	Doses may be much higher
Naloxone 0.40 mg/ml	0.30 mg	0.75 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Epinephrine
Mix: 4.50 mg (4.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

andard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.23 ml/hr = 1 mcg/kg/min

Free Text Notes

CHHC San Diego Emergency Medication Dosing

PedCode 2.01
08/29/06
16:42:23

PATIENT: CODE BLUE SHEET 4KG WEIGHT: 4 KG
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Amiodarone 50 mg/ml	20 mg	0.40 ml	5 mg/kg	Dilute in D5W 1.5mg/ml,filter
Atropine 0.10 mg/ml	0.10 mg minimum	1 ml	0.02 mg/kg	
Bicarb 4.2% 0.50 mEq/ml	4 mEq	8 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	40 mg	0.40 ml	10 mg/kg	PPT with bicarb
Ca Gluconate 10% 100 mg/ml	400 mg	4 ml	100 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	8 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Epi 1:10,000 0.10 mg/ml	0.04 mg	0.40 ml	0.01 mg/kg	Doses may be much higher
Naloxone 0.40 mg/ml	0.40 mg	1 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Epinephrine
Mix: 6 mg (6 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.30 ml/hr = 1 mcg/kg/min

Free Text Notes

CHHC San Diego Emergency Medication Dosing

PedCode 2.01
08/29/06
16:42:33

PATIENT: CODE BLUE SHEET 5KG [redacted]
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Amiodarone 50 mg/ml	25 mg	0.50 ml	5 mg/kg	Dilute in D5W 1.5mg/ml,filter
Atropine 0.10 mg/ml	0.10 mg	1 ml	0.02 mg/kg	
Bicarb 4.2% 0.50 mEq/ml	5 mEq	10 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	50 mg	0.50 ml	10 mg/kg	PPT with bicarb
Ca Gluconate 10% 100 mg/ml	500 mg	5 ml	100 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	10 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Epi 1:10,000 0.10 mg/ml	0.05 mg	0.50 ml	0.01 mg/kg	Doses may be much higher
Naloxone 0.40 mg/ml	0.50 mg	1.25 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Epinephrine
Mix: 7.50 mg (7.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

andard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.38 ml/hr = 1 mcg/kg/min

Free Text Notes

CHHC San Diego Emergency Medication Dosing

PedCode 2.01
08/29/06
16:42:42

PATIENT: CODE BLUE SHEET 10KG [redacted]
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Amiodarone 50 mg/ml	50 mg	1 ml	5 mg/kg	Dilute in D5W 1.5mg/ml,filter
Atropine 0.10 mg/ml	0.20 mg	2 ml	0.02 mg/kg	
Bicarb 4.2% 0.50 mEq/ml	10 mEq	20 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	100 mg	1 ml	10 mg/kg	PPT with bicarb
Ca Gluconate 10% 100 mg/ml	1000 mg	10 ml	100 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	20 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Epi 1:10,000 0.10 mg/ml	0.10 mg	1 ml	0.01 mg/kg	Doses may be much higher
Naloxone 0.40 mg/ml	1 mg	2.50 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Epinephrine
Mix: 15 mg (15 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.75 ml/hr = 1 mcg/kg/min

Free Text Notes

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
PATIENT: CODE BLUE SHEET 5KG WEIGHT: 5 Kg 16:35:44
LOCATION:

Push Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.10 mg	0.25 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	5 mEq	5 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	50 mg	0.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	10 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	2.50 G	5 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.05 mg	0.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	0.50 mg	0.50 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	5 mg	0.25 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	0.50 mg	1.25 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 75 mg (0.94 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 7.50 mg (7.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
Mix: 750 mg (37.50 ml of 20 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 0.38 ml/hr = 1 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
PATIENT: CODE BLUE SHEET 10KG WEIGHT: 10 Kg 16:35:53
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.20 mg	0.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	10 mEq	10 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	100 mg	1 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	20 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	5 G	10 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.10 mg	1 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	10 mg	0.50 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	1 mg	2.50 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine	Mix: 150 mg (1.88 ml of 80 mg/ml) In : 250 ml Run @ 1 ml/hr = 1 mcg/kg/min
Epinephrine	Mix: 15 mg (15 ml of 1 mg/ml) In : 250 ml Run @ 1 ml/hr = 0.10 mcg/kg/min
Lidocaine	Mix: 1500 mg (75 ml of 20 mg/ml) In : 250 ml Run @ 1 ml/hr = 10 mcg/kg/min

Standard Concentration Drips

Dopamine	Mix: 200 mg (2.50 ml of 80 mg/ml) In : 250 ml Run @ 0.75 ml/hr = 1 mcg/kg/min

Free Text Notes

ET Tube	Tube Size = (Age + 16)/4 = inside diameter Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:36:03

PATIENT: CODE BLUE SHEET 15KG WEIGHT: 15 Kg

LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.30 mg	0.75 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	15 mEq	15 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	150 mg	1.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	30 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	7.50 G	15 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.15 mg	1.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	15 mg	0.75 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	1.50 mg	3.75 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine	Mix: 225 mg (2.81 ml of 80 mg/ml) In : 250 ml Run @ 1 ml/hr = 1 mcg/kg/min
Epinephrine	Mix: 22.50 mg (22.50 ml of 1 mg/ml) In : 250 ml Run @ 1 ml/hr = 0.10 mcg/kg/min
Lidocaine	Mix: 2250 mg (112.50 ml of 20 mg/ml) In : 250 ml Run @ 1 ml/hr = 10 mcg/kg/min

Standard Concentration Drips

Dopamine	Mix: 200 mg (2.50 ml of 80 mg/ml) In : 250 ml Run @ 1.13 ml/hr = 1 mcg/kg/min

Free Text Notes

ET Tube	Tube Size = (Age + 16)/4 = inside diameter Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:36:15

PATIENT: CODE BLUE SHEET 20KG WEIGHT: 20 Kg
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.40 mg	1 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	20 mEq	20 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	200 mg	2 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	40 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	10 G	20 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.20 mg	2 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	20 mg	1 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 300 mg (3.75 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 30 mg (30 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
Mix: 3000 mg (150 ml of 20 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 1.50 ml/hr = 1 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:36:33

PATIENT: CODE BLUE SHEET 30KG WEIGHT: 30 Kg

LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.60 mg	1.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	30 mEq	30 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	300 mg	3 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	60 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	15 G	30 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.30 mg	3 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	30 mg	1.50 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 450 mg (5.63 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 45 mg (45 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
Mix: 4500 mg (225 ml of 20 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 2.25 ml/hr = 1 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:36:24

PATIENT: CODE BLUE SHEET 25KG WEIGHT: 25 Kg
LOCATION:

Push Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.50 mg	1.25 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	25 mEq	25 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	250 mg	2.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	50 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	12.50 G	25 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.25 mg	2.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	25 mg	1.25 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 375 mg (4.69 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 37.50 mg (37.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
Mix: 3750 mg (187.50 ml of 20 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 10 mcg/kg/min

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 1.88 ml/hr = 1 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
PATIENT: CODE BLUE SHEET 35KG WEIGHT: 35 Kg 16:36:47
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.70 mg	1.75 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	35 mEq	35 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	350 mg	3.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	70 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	17.50 G	35 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.35 mg	3.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	35 mg	1.75 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 525 mg (6.56 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 52.50 mg (52.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine ** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 2.63 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 5.25 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:39:08

PATIENT: CODE BLUE SHEET 40KG WEIGHT: 40 Kg
LOCATION:

Push Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.80 mg	2 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	40 mEq	40 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	400 mg	4 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	80 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	20 G	40 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.40 mg	4 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	40 mg	2 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 600 mg (7.50 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 60 mg (60 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine ** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 3 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 6 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
PATIENT: CODE BLUE SHEET 45KG WEIGHT: 45 Kg 16:39:22
LOCATION:

Flash Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	0.90 mg	2.25 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	45 mEq	45 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	450 mg	4.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	90 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	22.50 G	45 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.45 mg	4.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	45 mg	2.25 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 675 mg (8.44 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 67.50 mg (67.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine ** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 3.38 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 6.75 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
16:39:34

PATIENT: CODE BLUE.SHEET 50KG WEIGHT: 50 Kg
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	1 mg	2.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	50 mEq	50 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	500 mg	5 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	100 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	25 G	50 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.50 mg	5 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	50 mg	2.50 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 750 mg (9.38 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 75 mg (75 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 3.75 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 7.50 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
PATIENT: CODE BLUE SHEET 55KG WEIGHT: 55 Kg 16:39:44
LOCATION:

Push Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	1 mg maximum	2.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	50 mEq maximum	50 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	550 mg	5.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	110 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	27.50 G	55 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.55 mg	5.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	55 mg	2.75 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 825 mg (10.31 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 82.50 mg (82.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine ** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 4.13 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 8.25 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:39:53

PATIENT: CODE BLUE SHEET 60KG WEIGHT: 60 Kg
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	1 mg maximum	2.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	50 mEq maximum	50 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	600 mg	6 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	120 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	30 G	60 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.60 mg	6 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	60 mg	3 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 900 mg (11.25 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 90 mg (90 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 4.50 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 9 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing — PedCode 2.01 — 08/29/06 16:40:50

PATIENT: CODE BLUE SHEET 65KG WEIGHT: 65 Kg
LOCATION:

ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	1 mg maximum	2.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	50 mEq maximum	50 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	650 mg	6.50 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	130 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	32.50 G	65 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.65 mg	6.50 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	65 mg	3.25 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 975 mg (12.19 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 97.50 mg (97.50 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 4.88 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 9.75 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

CHHC SAN DIEGO Emergency Medication Dosing PedCode 2.01
08/29/06
16:40:05

PATIENT: CODE BLUE SHEET 70KG WEIGHT: 70 Kg
LOCATION:

'ush Medication	Dose	mls	Dose/Kg	Comments
Atropine 0.40 mg/ml	1 mg maximum	2.50 ml	0.02 mg/kg	
Bicarb 8.4% 1 mEq/ml	50 mEq maximum	50 ml	1 mEq/kg	Infuse Slowly
Ca Chloride 10% 100 mg/ml	700 mg	7 ml	10 mg/kg	PPT with bicarb
Defibrillation 0 Joules/ml	140 Joules	0 ml	2 Joules/kg	Repeat with 4 Joules/kg
Dextrose 50% 0.50 G/ml	35 G	70 ml	0.50 G/kg	Dilute 1:1 with water for D25W
Epi 1:10,000 0.10 mg/ml	0.70 mg	7 ml	0.01 mg/kg	May repeat as needed.
Epi 1:1000 1 mg/ml	1 mg maximum	1 ml	0.10 mg/kg	Doses may be much higher.
Lidocaine 20 mg/ml	70 mg	3.50 ml	1 mg/kg	Repeat every 5 minutes
Naloxone 0.40 mg/ml	2 mg maximum	5 ml	0.10 mg/kg	Repeat dose q30-60 min prn

Custom Drips

Dopamine
Mix: 1050 mg (13.13 ml of 80 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 1 mcg/kg/min

Epinephrine
Mix: 105 mg (105 ml of 1 mg/ml)
In : 250 ml
Run @ 1 ml/hr = 0.10 mcg/kg/min

Lidocaine
** Custom drip volume overflow. Use Standard **

Standard Concentration Drips

Dopamine
Mix: 200 mg (2.50 ml of 80 mg/ml)
In : 250 ml
Run @ 5.25 ml/hr = 1 mcg/kg/min

Lidocaine
Mix: 2000 mg (100 ml of 20 mg/ml)
In : 500 ml
Run @ 10.50 ml/hr = 10 mcg/kg/min

Free Text Notes

ET Tube
Tube Size = (Age + 16)/4 = inside diameter
Secure at AGE + 10 cm at the gums

Crash Cart Contents List

Rady Children's Hospital - San Diego
Code Cart Contents - Charge Sheet - Appendix 3

Patient Information - Addresograph or Label

TOP OF CART				
DESCRIPTION	**LOCATION**	**PAR**	**STOCK #**	**Quantity Used**
DEFIBRILLATOR WITH LEADS **(Check function -- Appendix 4)**	UNIT	1		
NEEDLE BOX (top or side of cart)	UNIT	1		
CLIPBOARD WITH 1 RESUSCITATION RECORD and 1 PEN ATTACHED	UNIT	1		
CODE CART RESOURCE MANUAL - includes: Resuscitation Records (5), Code Cart Contents Verification Checklist - Appendix 5 (1), Current Pharmacy Expiration Sheet Copies of Emergency Medication Tray, Intubation Medication Tray, IV Start/Flush Bag, Emergency Fluids Tray, Code Cart Contents - Charge Sheet, Defibrillator Check - Appendix 4, ACLS & PALS Reference Cards	UNIT	1		
GLOVE NITRILE MEDIUM LF	J01A13	1	30110	
MASK FLUIDSHIELD (Face masks with shield)	K02D03	1	31450	

SIDE OF CART				
OXYGEN TANK WITH REGULATOR (Check function and adequate volume (>1500PSI))	UNIT	1		
OXGEN TANK WITH DUOVAC	UNIT	1		

BACK OF CART				
DESCRIPTION	**LOCATION**	**PAR**	**STOCK #**	**Quantity Used**
BACKBOARD	UNIT	1		
RESPIRATORY EQUIPMENT BAG (Check integrity of lock)	see below			
SELF-INFLATING BAG PEDIATRIC	RESP	1		
SELF-INFLATING BAG ADULT	RESP	1		
CPAP BAG (1/2L)	RESP	1		
CPAP BAG (1 L)	RESP	1		
MANOMETER	RESP	1		
O2 FLOW METER WITH NIPPLE	RESP	1		
O2 TUBING GREEN BUBBLE TUBING	RESP	1		
NON-REBREATHER MASK ADULT	RESP	1		
NON-REBREATHER MASK CHILD	RESP	1		
MASK PREMIE	RESP	1		
MASK INFANT	RESP	1		
MASK TODDLER	RESP	1		
MASK CHILD	RESP	1		
MASK ADULT	RESP	1		
SIMMS ADAPTER	RESP	1		

DRAWER ONE				
DESCRIPTION	**LOCATION**	**PAR**	**STOCK #**	**Quantity Used**
WASHCLOTH IN ZIPLOCK BAG	MM-LINEN	1		
PAPER RECORDING - EKG ROLL	M05D02	1	24510	
STETHESCOPE DUALHEAD LF	N06E02	1	24070	
TIP SUCTION TONSIL YANKAUER	N05E01	2	37670	

OXISENSOR O2 SAT PROBE - NEONATAL/ADULT	P01D01	1	80270	
DRAWER ONE - CONTINUED				
PAD DEFIB ADULT MULTIFUNTION (Defib or pacer pads)	L04E01	1	0028538	
PAD DEFIB PED MULTIFUNCTION (Defib or pacer pads)	L04E03	1	37127	
PAD DEFIB PADDLE GEL (Package of defib gel pads)	L04E02	1	0002057	
ELECTRODE PEDIATRIC ADULT	M05B01	3	32260	
STYLETTE INFANT 6FR	I02D04	2	35690	
STYLETTE PEDIATRIC	I02D05	2	36482	
STYLETTE ADULT	I02D06	2	35700	
TUBE ET 2.5 UNCUFFED	I04E02	1	37210	
TUBE ET 3.0 UNCUFFED	I04E03	1	37220	
TUBE ET 3.5 UNCUFFED	I04E04	1	37230	
TUBE ET 4.0 UNCUFFED	I04E05	1	37240	
TUBE ET 4.5 UNCUFFED	I04E06	1	37250	
TUBE ET 5.0 UNCUFFED	I04E07	1	37260	
TUBE ET 5.5 UNCUFFED	I04E08	1	37270	
TUBE ET 6.0 UNCUFFED	I04E09	1	37280	
TUBE ET 6.5 UNCUFFED	I04E10	1	37290	
TUBE ET 7.0 UNCUFFED	I04E11	1	37300	
TUBE ET 3.0 CUFFED	I04D01	1	0020220	
TUBE ET 3.5 CUFFED	I04D02	1	0029884	
TUBE ET 4.0 CUFFED	I04D03	1	20230	
TUBE ET 4.5 CUFFED	I04D04	1	20240	
TUBE ET 5.0 CUFFED	I04D05	1	20250	
TUBE ET 5.5 CUFFED	I04D06	1	37340	
TUBE ET 6.0 CUFFED	I04D07	1	37360	
TUBE ET 6.5 CUFFED	I04A03	1	20280	
TUBE ET 7.0 CUFFED	I04D09	1	37320	
TUBE ET 7.5 CUFFED	I04D10	1	37330	
TUBE ET 8.0 CUFFED	Buyer	1	0002059	
DRAWER TWO				
DESCRIPTION	**LOCATION**	**PAR**	**STOCK #**	**Quantity Used**
AIRWAY BOX (Check integrity of lock) INCLUDES:				
AIRWAY NASAL 12 FR	I04F01	1	42586	
AIRWAY NASAL 14FR	I04F02	1	42587	
AIRWAY NASAL 16FR	I04F03	1	42588	
AIRWAY NASAL 18 FR	I04F04	1	42589	
AIRWAY NASAL 20 FR	I04F05	1	42590	
AIRWAY NASAL 22 FR	I04F06	1	42591	
AIRWAY NASAL 24FR	I04F07	1	42592	
AIRWAY NASAL 26FR	I04F08	1	42593	
AIRWAY NASAL 28FR	I04F09	1	42594	
AIRWAY NASAL 30FR	I04F10	1	42595	
AIRWAY NASAL 32FR	I04F11	1	42596	
AIRWAY ORAL #000	F02F02	1	35060	
AIRWAY ORAL #00	F02F03	1	35050	
AIRWAY ORAL #0	F02F04	1	35040	
AIRWAY ORAL #1	F02F05	1	35000	
AIRWAY ORAL #2	F02F06	1	34950	
AIRWAY ORAL #3	F02G01	1	34940	
AIRWAY ORAL #4	F02G02	1	21770	
AIRWAY ORAL #5	F02G03	1	34840	

DRAWER TWO - CONTINUED				
DESCRIPTION	LOCATION	PAR	STOCK #	Quantity Used
ASPIRATOR MECONIUM	N06E04	1	36773	
BATTERY AA ALKALINE	E01E03	2	60190	
BATTERY C ALKALINE	E01E02	2	60140	
CO2 DETECTOR PEDI CAP	102D02	1	36158	
DETECTOR CO2 EASY CAP	102D01	1	0027122	
SKIN TRAC MEDIUM (replace if >1/2 used)	K05E02	1	35900	
NEEDLE HOLDER 5 1/2"	N05C03	1	21900	
PENLIGHTS DISPOSABLE	F02D06	1	30630	
SCALPEL DISPOSABLE #11	L02E11	1	33970	
SCISSOR SHARP BLUNT 5"	N05C02	1	21910	
ADHESIVE LIQUID MASTISOL	N03B02	2	20150	
SUTURE 3-0 PROLENE	F02D02	2	20190	
LARYNGYSCOPE TRAY **- (Check integrity of lock)** includes Handles (small and large) , Miller Blades (0,1,2,3,4), Macintosh Blades (1,2,3,4) McGill Forceps (small and large)	BIOMED	1		
INTUBATION MEDICATION TRAY **(CHECK INTEGRITY OF LOCK)**	PHARM	1		

DRAWER THREE				
DESCRIPTION	LOCATION	PAR	STOCK #	Quantity Used
ALCOHOL WIPES	MM-BULK	10	30080	
BUTTERFLY COLLECTIO SET 23G	R04B01	2	33550	
SYRINGE LUER LOCK 1CC TB	MM-BULK	5	39471	
SYRINGE LUER LOK 3CC	MM-BULK	10	24770	
SYRINGE LUER LOK 5CC	MM-BULK	5	24780	
SYRINGE LUER LOK 10CC	MM-BULK	10	24790	
NEEDLE FILTER 19G X 1"	R05E09	5	20720	
NEEDLE HYPO 18G X 1	MM-BULK	10	33370	
SPONGE STERILE 4 PLY 2 X 2	MM-BULK	5	35160	
SPONGE STERILE 4 PLY 4 X 4	MM-BULK	5	35200	
TAPE ADHESIVE 1" WR	N03D02	1	36820	
BLOOD GAS SYRINGES	MM-BULK	2	37950	
MEDICATION LABELS	MM-BULK	10	11100	
CALCULATOR	UNIT	1		
PERMANENT MARKER	MM-BULK	1		
EMERGENCY MEDICATION TRAY **(Check integrity of lock)** (NICU cart has Neonatal Med Tray - STANDARD Medication Tray is in Garage of NICU cart)	PHARM	1		

DRAWER FOUR				
DESCRIPTION	LOCATION	PAR	STOCK #	Quantity Used
IV CATH SAFE 16G X 1 1/4 #3062	R05B02	3	35906	
IV CATH SAFE 18G X 1 1/4 #3065	R05B03	3	35907	
IV CATH SAFE 20 X 1 1/4 #3066	R05B04	3	35908	
IV CATH SAFE 22G X 1 #3053	R05F04	3	36572	
IV CATH SAFE 24 X 3/4	R05F05	3	36556	
CATH RADIAL 20G ARROW	R05C03	2	34190	
CATH RADIAL 22G ARROW	R05C04	2	26590	

DRAWER FOUR - CONTINUED				
NEEDLE PERC 18G COOK	R04E08	2	12328	
NEEDLE PERC 20G COOK	R04E06	2	35250	
NEEDLE INTROSSEOUS 13G	R04E05	1	0013189	
NEEDLE INTROSSEOUS 15G	R04E03	1	0028042	
NEEDLE INTROSSEOUS 18G	R04E02	1	0028043	
SET EXT 6" 4WAY STOPCOCK NAMIC	P05D01	3	38500	
DISPENSING PIN W/VALVE	P05D02	3	39500	
CONNECTOR T LUER SLIP	P05C01	3	39100	
STOPCOCK 4 WAY MX234-1L	P03E01	3	35020	
MICROCLAVE	P03C01	3	39850	
ARMBOARD SMALL 2X4	M06D01	1	21780	
ARMBOARD MEDIUM CLOTH 3X6	M06C01	1	21790	
ARMBOARD LARGE CLOTH 3X9	M06C02	1	22060	
TOURNIQUET 18" X 1"	M04C09	2	339999	
ALCOHOL WIPES	MM-BULK	10	30080	
VENI GARD	L02C01	2	20140	
VENI GARD JR	L02C02	2	24240	
IV START / FLUSH BAG: includes 10ml NS vials (6), 10ml NS syringes(10), Povidine-Iodine 3 swab packs (2) Chloraprep kits(2)	PHARM	1		

DRAWER FIVE				
DESCRIPTION	LOCATION	PAR	STOCK #	Quantity Used
KIT CVP DL 4FR X 8CM ARROW	R06B01	1	27790	
KIT CVP DL 4FR X 13CM ARROW	R06B02	1	24250	
WIRE GUIDE 18X40 CDOC18X40-0	L04C01	1	39900	
TUBE FEEDING 8FR X 42"	M02E06	1	37380	
TUBE SALEM SUMP 10FR	M02C01	1	36470	
TUBE SALEM SUMP 12FR	M02C02	1	36490	
TUBE SALEM SUMP 14FR	M02C03	1	36500	
TUBE SALEM SUMP 16FR	M02C04	1	35720	
CATH SUCTION 5/6FR GLOVE KIT	B02A01	2	39750	
CATH SUCTION 8FR GLOVE KIT	B02A02	2	39760	
CATH SUCTION 10 FR GLOVE	B02A03	2	39770	
CATH SUCTION 12FR GLOVE	B02A04	2	44061	
CATH SUCTION 14FR GLOVE	B02A05	2	39780	
TUBE CONNECTING 6'	P02A03	1	37190	
SYRINGE LUER LOK 20CC	R03A05	5	27820	
SYRINGE LUER LOK 60CC	MM-BULK	5	24800	
SYRINGE CATHETER TIP 60CC	MM-BULK	2	36700	
TIP SUCTION TONSIL YANKAUER	N05E01	1	37670	
LUBRICANT JELLY 3G STERILE	N05D03	2	32940	
CUFF BP NEONATE	P01F05	1	31470	
CUFF BP INFANT LF	P01F06	1	31480	
CUFF BP CHILD LONG LF	P01E01	1	31530	
CUFF BP SMALL ADULT LF	P01E02	1	31540	
CUFF BP ADULT LF	P01E03	1	31560	
NON-DISP CUFF BP INFANT	MM	1		
NON-DISP CUFF BP CHILD LONG	MM	1		
NON-DISP CUFF BP SMALL ADULT	MM	1		
NON-DISP CUFF BP ADULT	MM	1		

GLOVE STERILE LATEX FREE 6	E03B03	2	0029553	
GLOVE STERILE LATEX FREE 6.5	E03C01	2	29554	
GLOVE STERILE LATEX FREE 7	E03C02	2	0029555	
GLOVE STERILE LATEX FREE 7.5	E03B01	2	29556	
GLOVE STERILE LATEX FREE 8	E03B02	2	0029557	
GLOVE STERILE LATEX FREE 8.5	E03A01	2	0029558	

DRAWER SIX (BOTTOM OR GARAGE)				
DESCRIPTION	**LOCATION**	**PAR**	**STOCK #**	**Quantity Used**
SET IV STRAIGHT STANDARD	P02B01	3	21320	
TRAY CVP DISPOSABLE	P02A05	1	26040	
TRAY THORACENTESIS	R07B03	1	35790	
TRAY VENESECTION DISPOSABLE	L06F03	1	38505	
TUBE ET 2.5 UNCUFFED	I04E02	1	37210	
TUBE ET 3.0 UNCUFFED	I04E03	1	37220	
TUBE ET 3.5 UNCUFFED	I04E04	1	37230	
TUBE ET 4.0 UNCUFFED	I04E05	1	37240	
TUBE ET 4.5 UNCUFFED	I04E06	1	37250	
TUBE ET 5.0 UNCUFFED	I04E07	1	37260	
TUBE ET 5.5 UNCUFFED	I04E08	1	37270	
TUBE ET 6.0 UNCUFFED	I04E09	1	37280	
TUBE ET 6.5 UNCUFFED	I04E10	1	37290	
TUBE ET 7.0 UNCUFFED	I04E11	1	37300	
TUBE ET 3.0 CUFFED	I04D01	1	0020220	
TUBE ET 3.5 CUFFED	I04D02	1	0029884	
TUBE ET 4.0 CUFFED	I04D03	1	20230	
TUBE ET 4.5 CUFFED	I04D04	1	20240	
TUBE ET 5.0 CUFFED	I04D05	1	20250	
TUBE ET 5.5 CUFFED	I04D06	1	37340	
TUBE ET 6.0 CUFFED	I04D07	1	37360	
TUBE ET 6.5 CUFFED	I04A03	1	20280	
TUBE ET 7.0 CUFFED	I04D09	1	37320	
TUBE ET 7.5 CUFFED	I04D10	1	37330	
TUBE ET 8.0 CUFFED	Buyer	1	0002059	
EMERGENCY MEDICATION TRAY **- NICU only (Check integrity of lock)** (NICU cart has Neonatal Med tray - STANDARD medication tray is in Garage of NI cart)	PHARM	1		
EMERGENCY FLUIDS TRAY **(Check integrity of lock)** Includes LR 1000ml, NS 500ml, NS 250 ml, Dopamine - 0.8mg/ml 250ml bag, Hespan 500ml bag	PHARM	1		

APPENDIX 4

BiPHASIC HEARTSTREAM XL DEFIBRILLATOR CHECK

PATIENT CONNECTIONS: EKG cable with leads attached (EKG electrodes (2pkgs) are in Drawer #1); paddles (adult & pediatric size), paddle cable & defib pad cables (defib pads [1 adult & 1 pediatric size] are in Garage) must be in good condition (call Biomed if any questions). Make sure there are no cracks, broken wires, or other visible signs of damage. Make sure the connectors engage securely.
RECORDER: Adequate paper in recorder (extra roll in Drawer #1)
POWER: Check AC power cord is plugged in. Ensure that the BATT CHARGE and AC POWER lights are on. (If the unit is plugged in and the BATT CHARGE or AC POWER light is not on, the power cord may be damaged. Request assessment of problem from Biomed immediately.) Check that the BATT CHARGE and AC POWER lights go off when the unit is unplugged.
OPERATIONAL TEST: Perform with the defibrillator unplugged.

EXTERNAL PADDLE TEST:

1. Turn the Heartstream XL off.
2. Unplug the AC power cord.
3. While pressing [STRIP], turn the energy select knob to Manual On to start the test. Hold [STRIP] until the screen flashes briefly.
4. Follow the prompts on the screen to proceed with test.
   - "Verify PADDLES are in Holders and Press the CHARGE"
   - "Stand Clear! Press Shock." - press shock buttons on paddles.
5. Strip will print with the following information - if strip prints differently than below, please contact Biomed immediately to resolve. DO NOT keep strip. Document defib check on "Code Cart Contents Verification Check Sheet".
   - General System Test: Pass
   - ECG Test: Pass
   - Backup Power Test: Pass
   - Data Card Test: No Data Card Present (CHSD does not use)
   - Defib Test: Pass/External Paddles
   - Pacer Test: Not Tested

MULTIFUNCTION DEFIB PAD TEST

1. Turn the Heartstream XL off.
2. Unplug the AC power cord.
3. Connect a 50 ohm test load (attached to left side of code cart) to the pads patient cable (instead of pads).
4. While pressing [STRIP], turn the energy select knob to Manual On to start the test. Hold [STRIP] until the screen flashes briefly.
5. Follow the prompts on the screen to proceed with test.
   - "Verify TEST LOAD is attached and Press the CHARGE"
   - "Stand Clear! Press SHOCK"
6. Strip will print with the following information - if strip prints differently than below, please contact Biomed immediately to resolve. DO NOT keep strip. Document defib check on "Code Cart Contents Verification Check Sheet".
   - General System Test: Pass
   - ECG Test: Pass

Drug Traysheets

Rady Children's Hospital - San Diego
3020 Childrens Way
San Diego, CA 92123
858-966-7795

Patient Name:	Date Used:	Tech Prep:
		RPH Ck:

LOCK # _____ LOCK # _____

EMERGENCY TRAY

Tray # _____

Exp of Tray: _____

Next Med to Expire: _____

	Quantity Supplied		EXP DATE	QTY USED
TRAY	1	DRUG TRAY RESTOCK		1
ADEN3IV	2	Adenosine 3 mg/ml 2ml vial		
ASA80T	4	Aspirin 81mg tablets		
		Place tablets in plastic bag with FOR ORAL USE ONLY label		
ATRO.4IV1	4	Atropine 0.4mg/ml 1ml vial		
CACL10IVS	1	Calcium Chloride 10% 10ml syringe		
DEXA4IV5	3	Dexamethasone 4mg/ml 5ml vial		
D50WIVS50	1	Dextrose 50% 50ml syringe		
EPI.1IVS10	2	Epinephrine 1:10,000 10ml syringe		
EPI1IV30	1	Epinephrine 1:1000 30ml vial		
ESM10IV10	1	Esmolol 10mg/ml 10ml vial		
FURO10IV10	1	Furosemide 10mg/ml 10ml vial		
HEP1MUIV1	1	Heparin 1000 units/ml 1ml vial		
LABE5IV20	1	Labetalol 5mg/ml 20ml vial		
		Light Sensitive - Leave in box		
LID100IVS5	2	Lidocaine Cardiac 100mg/5ml syringe		
MANN25IV50	4	Mannitol 25% 50ml vial		
		Check for CRYSTALS in each vial		
NALO.4IV10	2	Naloxone 0.4mg/ml 10ml vial		
		Light Sensitive - Leave in box		
NTG.4SLT	1	Nitroglycerin 0.4mg tablet (25 / bottle)		
		Seal bottle with TAMPER EVIDENT tape		
PHEN10IV1	1	Phenylephrine 10mg/ml 1ml vial		
		Place vial in plastic bag with CODE DRIP label		
PHEN50IV5	2	Phenytoin 50mg/ml 5ml vial		
PROC100IV	1	Procainamide 100mg/ml 10ml vial		
NAHC1IV50	3	Sodium Bicarbonate 1meq/ml 50ml vial		
NS10	4	Sodium Chloride 0.9% (PF) 10ml vial		

Narcotic Documentation

MIDA5IV2	1	Midazolam 5mg/ml 2ml vial		
Dose Given:		RN Signature	Date Given:	
Waste Amount:		RN Signature	Time: Given	
PB130IV1	4	Phenobarbital 130mg/ml 1ml vial		
Dose Given:		RN Signature	Date Given:	
Waste Amount:		RN Signature	Time Given:	

Rady Children's Hospital - San Diego
Childrens Way
Diego, CA 92123
858-966-7795

Patient Name: Date Used:

Tech Prep:

RPH Ck:

Exp of Tray:

Next Med to Expire:

EMERGENCY FLUIDS TRAY

Tray # _____

	Quantity Supplied		EXP DATE	QTY USED
TRAY	1	DRUG TRAY RESTOCK		1
LRL	1	Lactated Ringers IV Solution 1000 ml bag		
NSHL	1	Sodium Chloride 0.9% IV Solution 500 ml bag		
NSQL	1	Sodium Chloride 0.9% IV Solution 250 ml bag		
DOP200250	1	Dopamine 0.8 mg/ml 250 ml bag (with dosing chart)		
HETA6IV500	1	Hetastarch 6% / NS (Hespan) 500 ml bag		

Nursing Signature:

Date: RPH / TECH:

Please discard all previous med tray sheets when replacing with a new med tray. An Occurrence report will be generated if previous sheets are found on code cart.

Rady Children's Hospital
San Diego
3020 Childrens Way
San Diego, CA 92123
858-966-7795

Patient Name: Date Used:

Tech Prep:

RPH Ck:

INTUBATION TRAY

Exp of Tray:

LOCK #

Tray #

Next Med to Expire:

	Quantity Supplied		EXP DATE	QTY USED
TRAY	1	DRUG TRAY RESTOCK		1
ATRO.4IV1	1	Atropine 0.4mg/ml 1ml vial		
NS10	2	Sodium Chloride 0.9% (PF) 10ml vial		
Place in plastic bag labeled: WARNING: Paralyzing Agent				
PANC1IV10	1	Pancuronium 1mg/ml 10ml vial Expires in 6 months at room temperature		
Place in plastic bag labeled: WARNING: Paralyzing Agent				
SUCC20IV	1	Succinylcholine 20mg/ml 10ml vial Expires in 3 months at room temperature		
Place in plastic bag labeled: WARNING: Paralyzing Agent				
VECU10IV10	2	Vecuronium 10mg vial		
Place in plastic bag labeled: WARNING: For External Use Only				
AFRIN15SP	1	Oxymetazoline 0.05% Nasal Spray 15 ml bottle		
LID2GEL30	1	Lidocaine Jelly 2 % 30ml tube		
BENZOIN0.6	2	Tincture of Benzoin 0.6ml vial		

Narcotic Documentation

KETA100IV5	1	Ketamine 100mg / ml 5 ml vial		
Dose Given:		RN Signature	Date Given:	
Waste Amount:		RN Signature	Time: Given	
THIO500IVS	1	Thiopental 500mg / 20ml syringe		
Dose Given:		RN Signature	Date Given:	
Waste Amount:		RN Signature	Time Given:	

Nursing - Please account for all Controlled Medications before RETURNING this tray to pharmacy.

UNIT: RN SIGNATURE:

DATE: RPH / TECH:

Pharmacy staff - DO NOT accept tray if missing controlled medications or documentation is not complete.

Rady Children's Hospital - San Diego
Childrens Way
Diego, CA 92123
858-966-7795

Patient Name: Date Used:

Tech Prep:

RPH Ck:

IV START / FLUSH BAG

Exp of Tray:

BAG # _____

Next Med to Expire:

	Quantity Supplied		EXP DATE	QTY USED
TRAY	1	DRUG TRAY RESTOCK		1
NS10	6	Sodium Chloride 0.9% (PF) 10ml vials		
NS5	10	Sodium Chloride 0.9% (PF) 5ml syringe		
Place items in plastic bag labeled "FOR EXTERNAL USE ONLY"				
BETASWABST	2	Povidone - Iodine 10% swab sticks (3 swabs/pack)		
CHLORAPREP	2	ChloraPrep kits (1appl/kit)		

UNIT: NURSING SIGNATURE:

DATE USED: RPH or TECH:

Please discard all previous medication tray sheets when replacing a new medication tray. An Occurrence report will be generated if previous sheets are found on the code cart.

Pediatric Operating Room

The following list of OR (pre, intra, and post) specific considerations can be used to augment an existing surgical infrastructure. This list assumes that the user facility already has an existing operating room capable of treating Orthopedic, General Surgery, Vascular, and Neurosurgical injuries. The items listed are *pediatric specific*.

Types of Injuries to Be Expected

- Burns
- Penetrating
- Blunt

Patient ID Challenges

- No government issued photo ID
- NICU/Newborns: Unnamed or name variations
- Parent/Guardian ID band in order to release the child upon discharge

Family Considerations

- Keep child with family even if child does not need treatment
- Determine who the guardian is
- Respecting Developmental Levels, Privacy, and Dignity as you would for an adult

Talking to Children

- Communicate with child/family with the appropriate age and development level.
- Carefully chosen words: bed, sleepy, special air, opening into
- Use appropriate interpreters when possible
- Talk directly to child whenever possible & be at their eye level. Do not offer too many choices

Consent

- Emergency: No consent needed if life threatening

- Try to correctly identify caregiver (caregivers affidavit)
- Emancipated minors
- Court orders

NPO Guidelines

Infant Less than 6 Months:

- Formula or breast milk finished 4 hours prior
- Clear liquids finished 2 hours prior

Children 6 Months and Older:

- Formula or breast milk finished 6 hours prior.
- Clear liquids finished 2 hours prior.

Guidelines acceptable for General Anesthesia or Conscious Sedation

Non-Threatening Environment

- Keep family together whenever possible
- Allow child to stay in own clothes until under anesthesia
- Allow child to walk back to OR if possible
- Use toys, songs, games, etc. for distraction

Decreasing Anxiety

- Decrease your own anxiety. Anxiety is contagious.
- Be calm, prepared, reassuring & confident.
- Soft spoken voice.
- Warm smile.
- Do not rush.

Maintain Normothermia

- Normal temperature is defined as 36.4° C (97.6° F) temporal artery scanner.
- Keep babies warm, they have no shiver reaction before 3 months. Use blankets, head cover, warm room, Bair Buggers.

Hypothermia

- If the temperature is below 35.6°C (96.0°F) or the temperature is below the patient's baseline normal by more than 1.1 degrees C° or 2 degrees F°, we utilize one of the following measures post-op:
  - Apply warming device
  - Warming lights at a distance of 28".
  - Supplement patient with 2 or more warm blankets

Size-Appropriate Supplies

- Wide range of patients (1-350 lbs).
- Same size OR table for all patients, with an infant table attachment.
- Size specific, trauma related instrumentation you might need:
  - Small K-wires (.62 and smaller)
  - 12, 16, 20 and 24 french straight chest tubes
  - 4 fr, 5 fr, and 7 fr Central Lines
  - Pediatric Grounding Pads (dual electrode)
  - Small Suprapubic Catheter Kits (Stamey 10 and 14fr)
  - Braselow Tapes

Laryngospasm

- Maintain airway
- Use succinylcholine
- Extubate in controlled environment

Transportation to PACU

- Loss of IV: Tape it well, use IV board (may need to cut down to size)
- Appropriate size bed. Usually transported intubated with O2
- Injury upon emergence: Use two safety belts, bath blankets pad as needed
- Communicate:
  - Child's response during induction

PACU

- RNs with ICU or ED experience
- PALS Training
- Pain: Demerol & Dilaudid
- Nausea: Zofran or Reglan
- Parent Involvement

Discharge PACU Criteria

- Modified Aldrete greater than or equal to 8.
- Blood pressure and heart rate back to baseline or +/- 20% of pre-op BP/HR.
- Temperature: Greater than 35.6^{0}C (96^{0}F) or back to pre-op baseline (+ or -1 degree).
- LOC: Awake or back to pre-sedation state.
- Pain Score: FLACC/Visual Analog Scale less than or equal to 4/10.

Pediatric Pharmaceuticals

Pharmaceutical Care and the Pediatric/Neonatal Patient

Medication administration to pediatric and neonatal patients can have substantial differences from medicating adults. Pediatric patients should not be considered miniature adults. For successful medication therapy in this population of patients, there are fundamental issues that must be considered.

I. Physiological Differences between Neonates and Adults

Neonates and adults have significant differences physiologically. One must consider all of the factors below to ensure successful drug therapy.

Gastric pH	Decreased
Gastric Motility	Decreased
Gastric Emptying Time	Increased
Intestinal flora, pancreatic enzymes, bile salt	Decreased
Percutaneous absorption	Increased
Total body water % & Extracellular water	Increased
Plasma proteins	Decreased
Hepatic enzyme capacity	Decreased
Renal Function	Decreased

II. Pharmacodynamics

Differences Between Adult and Pediatric Patients

- Growth and development ongoing
    - Complications from steroid use, paradoxical excitement with antihistamines, tetracycline on bone development, altered rates of toxicity

- PD measurements, surrogate markers or target may be different
    - PFT determinations, pain assessments, BP, CD4+ Cells
- Altered disease manifestation or progression and exclusive diseases
    - Etiologic, receptor, co-morbid conditions, toxicity differences

General rule: adult maximum doses are generally not exceeded in children (but there are exceptions!)

Goal: **Avoid toxicity** which can happen easily in pediatric patients

The bottom line is that if any drug is not calculated or dosed correctly, it can lead to toxicity or ineffectiveness

Children are moving targets… Weight is always changing due to growth

Children are particularly vulnerable to medication dosing errors, Not only are there differences in absorption and elimination, but weights seen in children can vary from <500 grams to 150 kg pts (x 300 fold differences in weight).

To facilitate proper dosing of pediatric patients consider Unit dosing, and dilute drugs to enhance dose accurate measurement.

Because of the lack of available dosage formulations it can be necessary to compound existing dosage forms to deliver accurate doses to kids.

Renal Drug Elimination in Pediatric Patients

The kidneys undergo rapid change in the first years of life. Drugs eliminated primarily by this route should be used with a focus on this concept.

- Kidneys at birth receive only 5-6% of cardiac output compared to 15-25% in adults
- Renal blood flow is ~12 ml/min at birth compared to 1100 ml/min in adults
- GFR is directly proportional to gestational age (GA) beyond 34 weeks GA
- Tubular secretion increases 2 fold over the first week of life and 10 fold over first year of life

  Normal Serum Creatinine - Creatinine is a product of muscle metabolism. The normal range for serum varies in infants and as they mature, children and adolescents. Be cautious when evaluating renal function of children using serum creatinine.

Newborn	0.3 – 1 mg/dl
Infant	0.2 – 0.4
Child	0.3 – 0.7
Adolescent	0.5 - 1
Adult	0.5 – 1.2

III. Dosing

To ensure to appropriate amount of drug to be administered, pediatric and neonatal dosages are based on mg/kg/day, mg/kg/dose or mg/m^2

Determining the Pediatric Dosing, the following elements should be considered:

- Age
- Weight bands (eg 10-15kg)
- Weight (mg/kg)
- Body Surface Area (mg/m^2)
- Allometric Scaling
  - Adult Dose * $(WT/70)^{0.7}$
  - If no reference, use a mg/kg based on 70 kg patient→ mg/kg/dose or mg/kg/day

Once the dose is established there are additional considerations when medicating the pediatric patient.

IV. How to minimize dosing errors in Pediatric Patients:

- Avoid Dosing errors by:
  - Obtaining accurate patient weight
  - Conversion pounds → kilograms (1 kg = 2.2 pounds)
  - Caution in preterms < 1 kg—
    - 10X error due to misplaced decimal point
  - Dose checking is imperative for all health care practitioners!
  - Only use oral syringes to dose liquids

- OTC medications→ Many strengths
- Advise parents of dosing with package in hand

V. Dosage Forms

- Age/Development:
  - > 2 yoa→ Prefers Chew Tablets
  - >10 yoa→Pill Swallowers
  - Developmental Delayed→Liquids preferred

Be cautious when crushing or manipulating tablets and capsules. Be wary of extended release products in particular.

- 6 month old given adult crushed OTC antihistamine for colic and "fussiness
- Baby found unresponsive in the morning

Mom was midwife, Dad was an EMT (Benadryl given frequently)

Drug Absorption by Non-Enteral Routes

- Inhaled
  - Issues with administration
- Topical
  - Consistently better than adults
  - Toxicity seen in infants with
    - Hexachlorophane (phisoderm) – spongioform myelinopathy
    - Lindane – neurotoxicity / seizures

POST-EXPOSURE PROPHYLAXIS AND TREATMENT OF POTENTIALLY HARMFUL AGENTS

ATTACHMENT 1

BIOLOGICAL WEAPON	PEDIATRIC DOSING	ADULT DOSING
ANTHRAX	**Post-Exposure Prophylaxis:** • Ciprofloxacin 10-15mg/kg/dose PO BID x 60 days • Doxycycline 2.2mg/kg/dose PO BID x 60 days • Amoxicillin 80mg/kg/day divided into 3 doses x 60 days	**Post-Exposure Prophylaxis:** • Ciprofloxacin 500mg/dose PO BID x 60 days • Doxycycline 100mg/dose PO BID x 60 days • Amoxicillin 500mg/dose PO TID x 60 days[1]

	Cutaneous Anthrax Treatment:
	• Ciprofloxacin 10-15mg/kg/dose PO BID x 60 days (max 1gm/day)
	• Doxycycline:
	  ○ ≤8 yoa: 2.2mg/kg/dose PO BID x 60 days
	  ○ >8 yoa & ≤45kg: 2.2mg/kg/dose PO BID x 60 days
	  ○ >8 yoa & >45kg: 100mg/dose PO BID x 60 days
		Cutaneous Anthrax Treatment:
		• Ciprofloxacin 500mg/dose PO BID x 60 days
		• Doxycycline 100mg/dose PO BID x 60 days

	Inhalation, GI, and Oropharyngeal Anthrax Treatment:
	
	• Ciprofloxacin 10-15mg/kg/dose IV BID x 60 days
	• Doxycycline:
	  ○ ≤8 yoa: 2.2mg/kg/dose IV BID x 60 days
	  ○ >8 yoa & ≤45kg: 2.2mg/kg/dose IV BID x 60 days
	  ○ >8 yoa & >45kg: 100mg/dose IV BID x 60 days
	  ○ Plus one or two additional antibiotics
	(May switch to oral therapy and dosing when clinically appropriate)
		Inhalation, GI, and Oropharyngeal Anthrax Treatment:
		
		• Ciprofloxacin 400mg/dose IV BID x 60 days
		• Doxycycline 100mg/dose IV BID x 60 days
		  ○ Plus one or two additional antibiotics[2]
		
		(May switch to oral therapy and dosing when clinically appropriate)

POST-EXPOSURE PROPHYLAXIS AND TREATMENT OF POTENTIALLY HARMFUL AGENTS

BOTULISUM	**Treatment:** • Botulinum Equine Trivalent Antitoxin	**Treatment:** • Botulinum Equine Trivalent Antitoxin[3]
BIOLOGICAL WEAPON	**PEDIATRIC DOSING**	**ADULT DOSING**
BRUCELLOSIS	**Treatment if >8 yoa:** • Doxycycline PO 200mg/day x 6 weeks + Streptomycin IM 1g/day x 2 weeks or Gentamycin 3-5mg/kg/day IM or IV x 1 week • Doxycycline PO 200mg/d or TMP-SMX 2DS/d x 6 weeks + Rifampin PO 15-20mg/kg/day x 6 weeks **Treatment if <8 yoa:** • TMP-SMX PO 5 mg/kg/dose BID x 45 days + Gentamicin IV/IM 2 mg/kg/dose q8h x 2 wks	**Treatment:** • Doxycycline PO 200mg/day x 6 weeks + Streptomycin IM 1g/day x 2 weeks or Gentamycin 3-5mg/kg/day IM or IV x 1 week • Doxycycline PO 200mg/day x 6 weeks + Rifampin PO 15-20mg/kg/day x 6 weeks[4]
LASSA FEVER	**Treatment:** • Ribavirin 30mg/kg IV x 1 dose (max dose: 2g), then 16mg/kg/dose Q 6 hours x 4 days (max dose: 1g), then 8mg/kg/dose Q 8 hours x 6 days (max dose: 500mg) [5]	**Treatment:** Ribavirin 33mg/kg IV x 1 dose (max dose: 2g), then 16mg/kg/dose Q 6 hours x 4 days (max dose: 1g), then 8mg/kg/dose Q 8 hours x 6 days (max dose: 500mg)[6]

POST-EXPOSURE PROPHYLAXIS AND TREATMENT OF POTENTIALLY HARMFUL AGENTS

BIOLOGICAL WEAPON	PEDIATRIC DOSING	ADULT DOSING

PLAGUE	**Post-Exposure Prophylaxis:**
	• Doxycycline:
	  ○ <45kg: 2.2mg/kg/dose PO BID x 10 days
	  ○ ≥45kg: 100mg/dose PO BID x 10 days
	• Ciprofloxacin 20mg/kg/dose PO BID x 10 days
	• Chloramphenical 25mg/kg/dose PO QID x 10 days (avoid if <2yoa)
		Post-Exposure Prophylaxis:
		• Doxycycline 100mg/dose PO BID x 10 days
		• Ciprofloxacin 500mg/dose PO BID x 10 days
		• Chloramphenicol 25mg/kg/dose PO QID x 10 days

	Treatment:
	• Streptomycin 15mg/kg/dose IM BID (max daily dose: 2g) x 10 days
	• Gentamicin 2.5mg/kg/dose IM or IV TID x 10 days
	• Doxycycline:
	  ○ <45kg: 2.2mg/kg/dose IV BID (max: 200mg/day) x 10 days
	  ○ ≥45kg: 100mg/dose IV BID x 10 days
	• Ciprofloxacin 15mg/kg/dose IV BID x 10 days
	• Chloramphenicol 25mg/kg/dose IV QID x 10 days (avoid if <2yoa)
		Treatment:
		• Streptomycin 1g/dose IM BID x 10 days
		• Gentamicin 5mg/kg/dose IM or IV once daily or 2mg/kg LD x followed by 1.17mg/kg/dose IM or IV TID x 10 days
		• Doxycycline 100mg/dose IV BID x 10 days
		• Ciprofloxacin 400mg/dose IV BID x 10 days
		• Chloramphenicol 25mg/kg/dose IV QID x 10 days[7]

BIOLOGICAL WEAPON	PEDIATRIC DOSING	ADULT DOSING
Q FEVER	**Prophylaxis (<12 yoa):** • Erythromycin 50mg/kg/dose PO BID x 7 days (Start 8-12 days after exposure)	**Prophylaxis:** • Tetracycline 500mg/dose PO QID x 5-7 days • Doxycycline 100mg/dose PO BID x 5-7 days (Start 8-12 days after exposure)
	Treatment (<12 yoa): • Co-trimoxazole: trimethoprim 4mg/kg/dose PO BID x 2 weeks	**Treatment:** • Tetracycline 500mg/dose PO QID x 15-21 days • Doxycycline 100mg/dose PO BID x 15-21 days[2,8]

POST-EXPOSURE PROPHYLAXIS AND TREATMENT OF POTENTIALLY HARMFUL AGENTS TO SOCIETY

BIOLOGICAL WEAPON	PEDIATRIC DOSING	ADULT DOSING
SHIGELLOSIS	**Treatment:** • Ceftriaxone 50mg/kg/dose IV once daily (max: 2g/day) x 5 days • Cefixime 8mg/kg/day PO once daily or BID x 5 days • Azithromycin 10mg/kg/day PO once daily x 3 days • Ciprofloxacin 25mg/kg/day PO divided Q12 hours x 3-5 days (not approved for use in children)	**Treatment:** • Levofloxacin 500mg PO once daily x 3 days • Ciprofloxacin 500mg/dose PO BID x 3 days • Azithromycin 500mg PO once daily x 3 days[9]
SMALLPOX	**Post-Exposure Prophylaxis:** • Smallpox Vaccine (not recommended in infants)[6]	**Post-Exposure Prophylaxis:** • Smallpox Vaccine[10]

POST-EXPOSURE PROPHYLAXIS AND TREATMENT OF POTENTIALLY HARMFUL AGENTS TO SOCIETY

BIOLOGICAL WEAPON	PEDIATRIC DOSING	ADULT DOSING

TULAREMIA	**Post-Exposure Prophylaxis:**
	• Doxcycycline:
	  ○ <45kg: 2.2mg/kg/dose PO BID x 14 days
	  ○ ≥45kg: 100mg/dose PO BID x 14 days
	• Ciprofloxacin 15mg/kg/dose PO BID x 14 days (max: 1g/day)
		Post-Exposure Prophylaxis:
		• Doxycycline 100mg/dose PO BID x 14 days
		• Ciprofloxacin 500mg/dose PO BID x 14 days

	Treatment:
	• Streptomycin 15mg/kg/dose IM BID x 10 days (max: 2g/day)
	• Gentamicin 2.5mg/kg/dose IM or IV TID x 10 days
	• Doxycycline:
	  ○ <45kg: 2.2mg/kg/dose IV BID x 14-21 days
	  ○ ≥45kg: 100mg/dose IV BID x 14-21 days
	• Chloramphenicol 15mg/kg/dose IV QID x 14-21 days
	• Ciprofloxacin 15mg/kg/dose IV BID x 10 days (max: 1g/day)
	(can switch to oral therapy when clinically indicated)
		Treatment:
		• Streptomycin 1g/dose IM BID x 10 days
		• Gentamicin 5mg/kg/dose IM or IV once daily x 10 days
		• Doxycycline 100mg/dose IV BID x 14-21 days
		• Chloramphenicol 15mg/kg/dose IV QID x 14-21 days
		• Ciprofloxacin 400mg/dose IV BID x 10 days [11]
		(can switch to oral therapy when clinically indicated)

BIOLOGICAL WEAPON	PEDIATRIC DOSING	ADULT DOSING
TYPHOID FEVER	**Treatment (Complicated Typhoid Fever):** • Ceftriaxone 60mg/kg/day IV or IM x 10-14 days	**Treatment (Uncomplicated Typhoid Fever):** • Ciprofloxacin 7.5mg/kg/dose PO BID x 5-7 days • Ofloxacin 7.5mg/kg/dose PO BID x 5-7 days • Chloramphenicol 12.5mg/kg/dose PO QID x 14-21 days • Amoxicillin 25mg/kg/dose TID x 10-14 days • Trimethoprim-Sulfamethoxazole 4/20mg/kg/dose PO BID x 10-14 days • Cefixime 5mg/kg/dose PO BID x 7-14 days • Azithromycin 10mg/kg/dose PO once daily x 7 days • Ceftriaxone 1 to 2 g/day IV or IM x 10-14 days (complicated)[9]

References:

1. Abramowicz, Mark. Post-Exposure Anthrax Prophylaxis. The Medical Letter, Inc. 2001; 44: W1116-1117A.
2. Department of Health and Human Services Centers for Disease Control and Prevention. 2006. U.S. Government. 06 Feb. 2006 http://www.cdc.gov.
3. Arnon SS, Schecter R, Inglesby TV, et al. Botulinum Toxin as a Biological Weapon Medical and Public Management. JAMA. 2001; 285: 1059-1070.
4. Long: Principles and Practice of Pediatric Infectious Diseases. 2003. Churchill Livingstone, An Imprint of Elsevier. 06 Feb. 2006 http://home.mdconsult.com.
5. Markenson, David. The Treatment of Children Exposed to Pathogens Linked to Bioterrorism. Infect Dis Clin N Am 2005; 19: 731-745.
6. Clinical Pharmacology Online. 2006. Gold Standard Media. 06 Feb. 2006 http://www.cp.gsm.com.
7. Inglesby TV, Dennis DT, Henderson DA et al. Plague as a Biological Weapon Medical and Public Health Management. JAMA 2000; 283: 2281-2290.
8. Interim Guidelines for Action in the Event of a Deliberate Release: Q FEVER. HPA Centre for Infections. Vers 1.1. 2006.
9. Mandell, Bennet, & Dollin: Principles and Practice of Infectious Diseases, 6th ed. 2005. Churchill Livingstone, An Imprint of Elsevier. 6 Feb. 2006 http://home.mdconsult.com.
10. Henderson DA, Inglesby TV, Bartlett JG, et al. Smallpox as a Biological weapon Medical and Public Health Management. JAMA. 1999; 281: 2127-2137.
11. Dennis DT, Inglesby TV, Henderson DA, et al. Tularemia as a Biological Weapon Medical and Public Health Management. JAMA. 2001; 285: 2763-2773.
12. Taketome CK, Hodding JK, and Kraus DM. LEXI-COMP'S Pediatric Dosage Handbook 12th ed. 2005. Lexi-Comp Inc.

13. World Health Organization. 2006. 6 Feb. 2006 http://www.who.int/en/.
14. Diner, Barry. Toxicity, Mercury. 2005. eMedicine.com, Inc. 06 Feb. 2006 http://www.emedicine.com.
15. Management of Rodenticide Poisoning. 2000. Indegene Lifesystems Pvt. Ltd. 6 Feb. 2006 http://www.indegene.com.
16. Leikin JB and Paloucek FB. Leikin & Paloucek's Poisoning & Toxicology Handbook 3rd ed. 2002.

GUIDELINES

Increase dextrose 2.5 - 5% per 24 hours. Increase protein and fats 0.5 - 1 g / kg / day, over 3 - 4 days. GOAL: Maximum of 60% total calories from fat.

Monitor TG as the dose increases and keep below 100 - 250 mg / dL. (Check TG after lipids are off for 4 hours). Lipids may be contraindicated when low platelet count or hypertriglyceridemia are present.

* The standard protein source is Travasol. The NICU uses TrophAmine. TrophAmine will be used for all infants under one (1) year of age. When TrophAmine is used cysteine will be added in the amount of 40 mg/g TrophAmine.

Requirements: Positive nitrogen balance requires at least 150 - 250 non-protein calories per gram of nitrogen.

PER 24 HOURS	NEONATES		INFANTS & CHILDREN			ADOLESCENTS
	Preterm less than 3 kg	Full Term	10 kg	10 - 20 kg	greater than 20 kg	
Fluids (mL / kg)	100 - 200	100 - 150	100 - 125	1000 mL - Add 50 mL / kg for each extra kg greater than 10 kg		1500 mL - Add 20 - 25 mL / kg for each extra kg greater than 20 kg
Calories (Kcal / kg)	70 - 120	greater than 100	75 - 90	75 - 90	greater than 40	30 - 60
Protein (g / kg) Max Perip: 2 g / kg / day Max Central: 3.5 g / kg / day	2.5 - 3.5	2 - 2.5	2 - 2.5	1.5 - 2.5	1.5 - 2.5	1 - 2
Dextrose (%) Max Periph: 12.5% Max Central: 30%	5 - 25	5 - 25	5 - 30	5 - 30	5 - 30	5 - 30
Fat: (g / kg / day)	0.5 - 3	1 - 3	1 - 3	1 - 3	1 - 3	1 - 3

Vitamins (mL / day)	NEONATES		INFANTS / CHILDREN	Children / Adult
	less than 1 kg	1 - 2.5 kg	greater than 2.5 kg & less than 11 Years	greater than or equal to 11 Years
MVI - Peds (Contains Vitamin K = 0.2 mg / 5 mL)	1.5 mL / day	3.25 mL / day	5 mL / day	
MVI - 13 (Vitamin K = 0.15 mg / 10 mL)				10 mL / day
* Heparin	0.5-1 unit / mL		0 - 0.5 unit / mL	0 - 0.5 unit / mL
# Levocarnitine	10 - 20 mg / kg / day		greater than 30 days = 5 mg / kg / day	greater than 30 days = 1 - 5 mg / kg / day

* Recommended for slow infusion rates

Prematurity or TPN dependence

	PEDIATRICS	STANDARD ADULT SOLUTION (3L)
*Sodium	2 - 5 mEq / kg / day	100 mEq / day
Potassium	2 - 5 mEq / kg / day	100 mEq / day
Chloride	2 - 5 mEq / kg / day	100 mEq / day
Phosphate (as K+)	1 - 4 mEq / kg / day	45 mEq / day
Calcium Gluconate (Maximum peripheral conc = 2 mg / mL)	100 - 500 mg / kg / day	3000 mg / day
Magnesium	0.25 - 0.5 mEq / kg / day	24 mEq / day

*By Definition NS = 154 mEq / L; 1/4 NS = 38.5 mEq / L

TRACE ELEMENTS +	NEONATES		INFANTS GREATER THAN 3 MONTHS AND CHILDREN
	Preterm	0 - 3 Months	Average
Peds Multi-Trace	0.2 mL / kg		0.2 mL / kg (max 10 mL / day)
Additional Zinc (mcg / kg)	*300	150	

*(Premature infants weighing less than or equal to 3 kg require an additional 300 mcg / kg / day of zinc for total of 400 mcg / kg / day)

PEDIATRIC MULTI-TRACE ELEMENTS 0.2 mL / kg / day Provides:

ELEMENT:	DOSE:	NORMAL RANGE:
Zinc	100 mcg / kg / day	100 - 300 mcg / kg / day
Copper	20 mcg / kg / day	15 - 30 mcg / kg / day
Chromium	0.17 mcg / kg / day	0.14 - 0.2 mcg / kg / day
Manganese	5 mcg / kg / day	2 - 10 mcg / kg / day

SPECIAL CONSIDERATIONS:

A. Zinc	Catabolic States:	Add 30 mcg / kg / day
	Stool / Ileostomy:	Add 10 mcg / kg / day
B. Copper	Biliary Obstruction:	Decrease or Omit
C. Chromium	Renal Insufficiency:	Decrease
D. Manganese	Biliary Obstruction:	Decrease or Omit
E. Selenium	For greater than 30 days on TPN:	Add 3 mcg / kg

SUGGESTED MONITORING GUIDELINES

VARIABLES	NEW TPN/ CLINICALLY UNSTABLE	CLINICALLY STABLE
Plasma Electrolytes	daily	twice weekly
BUN, Cr	3 times a week	weekly
Magnesium, Phosphate, Calcium	daily	weekly
Blood Glucose	daily	twice weekly
Urine Glucose	daily	twice weekly
Serum Albumin	twice weekly	weekly
LFT's	twice weekly	weekly
Hg, Hct	twice weekly	weekly
CBC / DIFF	as indicated	as indicated
TG	daily	weekly
Fe, TIBC, Retic Count, Transferrin	pm	pm
Trace Elements	Mandatory to monitor after 30 days	

GUIDELINES

Physical Compatibility of Potassium Phosphate & Calcium Gluconate

grams. Calcium Gluconate per 250 mL

grams. TrophAmine per 250 mL	0.5	1	1.5
0	5	2	1
2.5	5	4	3
5	12	7	4
7.5	14	8	6

The numbers in the squares represent the maximum mEq Potassium Phosphate (as K+) that can be added to 250 mL.

NICU GUIDELINES

Increase dextrose 1-2 mg/kg/min per 24 hours. Increase fats by 0.5 - 1 g / kg / day, over 3 - 4 days. GOAL: Maximum of 60% total calories from fat.

Monitor TG as the dose increases and keep below 100 - 250 mg / dL. Lipids may be contraindicated when low platelet count or hypertriglyceridemia are present.

The NICU uses TrophAmine. TrophAmine will be used for all infants under one (1) year of age. When TrophAmine is used cysteine will be added in the amount of 40 mg/g TrophAmine.

Requirements: Positive nitrogen balance requires at least 150 - 250 non-protein calories per gram of nitrogen.

PER 24 HOURS	NEONATES	
	Preterm less than 3 kg	Full Term
Fluids (mL / kg)	100 - 200	100 - 150
Calories (Kcal / kg)	70 - 120	greater than 100
Protein (g / kg) Max Perip: 2 g / kg / day Max Central: 3.5 g / kg / day	2.5 - 3.5	2 - 2.5
Dextrose (%) Max Periph: 12.5% Max Central: 25%	5 - 25	5 - 25
Fat: (g / kg / day)	0.5 - 3	1 - 3

Other Considerations

Amphotericin	May require TPN to be infused over 22 hours. Flush with dextrose before and after infusion
Gentamicin*	6 mg/Liter
Prophylactic Heparin for cardiac shunts	10 units/kg/hr. Order under "other" category
Octreotide	100 mcg/kg/day
Ranitidine	2 mg/kg/day
Vancomycin*	15 mg/L

*Systemic treatment required, in addition

Vitamins (mL / day)	NEONATES	INFANTS / CHILDREN
	up to 2.5 kg	greater than 2.5 kg & less than 11 Years
MVI - Peds (Contains Vitamin K = 0.2 mg / 5 mL)	2 mL / kg / day	5 mL / day
Heparin	0.5-1 unit / mL	0 - 0.5 unit / mL
Levocarnitine	10 - 20 mg / kg / day	greater than 30 days = 5 mg / kg / day

	PEDIATRICS
*Sodium	2 - 5 mEq / kg / day
Potassium	2 - 5 mEq / kg / day
Chloride	2 - 5 mEq / kg / day
Phosphate (as K+)	1 - 4 mEq / kg / day
Calcium Gluconate (Maximum peripheral conc = 2 mg / mL)	100 - 500 mg / kg / day
Magnesium	0.25 - 0.5 mEq / kg / day

*By Definition NS = 154 mEq / L; 1/4 NS = 38.5 mEq / L

TRACE ELEMENTS +	NEONATES		INFANTS GREATER THAN 3 MONTHS AND CHILDREN
	Preterm	0 - 3 Months	Average
Peds Multi-Trace	0.2 mL / kg		0.2 mL / kg (max 10 mL / day)
Additional Zinc (mcg / kg)	*300	150	

*(Premature infants weighing less than or equal to 3 kg require an additional 300 mcg / kg / day of zinc for total of 400 mcg / kg / day)

PEDIATRIC MULTI-TRACE ELEMENTS 0.2 mL / kg / day Provides:

ELEMENT:	DOSE:	NORMAL RANGE:
Zinc	100 mcg / kg / day	100 - 300 mcg / kg / day
Copper	20 mcg / kg / day	15 - 30 mcg / kg / day
Chromium	0.17 mcg / kg / day	0.14 - 0.2 mcg / kg / day
Manganese	5 mcg / kg / day	2 - 10 mcg / kg / day

SPECIAL CONSIDERATIONS:

A. Zinc	Catabolic States:	Add 30 mcg / kg / day
	Stool / Ileostomy:	Add 10 mcg / kg / day
B. Copper (Cu)	*Biliary Obstruction:	Omit
C. Chromium (Cr)	Renal Insufficiency:	Decrease
D. Manganese	*Biliary Obstruction:	Omit
E. Selenium	For greater than 30 days on TPN:	Add 3 mcg / kg

SUGGESTED MONITORING GUIDELINES

VARIABLES	CLINICALLY UNSTABLE	CLINICALLY STABLE
Plasma Electrolytes	daily	twice weekly
BUN, Cr	3 times a week	weekly
Magnesium, Phosphate, Calcium	daily	weekly
Blood Glucose	daily	twice weekly
Urine Glucose	daily	twice weekly
Serum Albumin	twice weekly	weekly
LFT's	twice weekly	weekly
Hg, Hct	twice weekly	weekly
CBC / DIFF	as indicated	as indicated
TG	daily	weekly
Fe, TIBC, Retic Count, Transferrin	pm	pm
Trace Elements	Mandatory to monitor after 30 days	

GUIDELINES

Physical Compatibility of Potassium Phosphate & Calcium Gluconate

grams. Calcium Gluconate per 250 mL

grams. TrophAmine per 250 mL	0.5	1	1.5
0	5	2	1
2.5	5	4	3
5	12	7	4
7.5	14	8	6

The numbers in the squares represent the maximum mEq Potassium Phosphate (as K+) that can be added to 250 mL.

Emergency and Acute Care Medications

Drug	Concentration	Dose	Route	Remarks
Adenosine	3 mg/ml	0.1 mg/kg	IV	Second dose 0.2 mg/kg to Max dose of 12 mg. Fast
Amiodarone	50 mg/ml	2-5 mg/kg, Max 15 mg/kg/day	IV	Dilute to 1.5-3 mg/ml in D5W Pulseless VT/VFib
Atropine	0.4 mg/ml, 0.1 mg/ml	0.02 mg/kg	IM/IV	Max 1 mg x 2 Min 0.1mg
Calcium Chloride	100 mg/ml	10-20 mg/kg	IV	Slow Push. Central pref
Cefazolin		20 mg/kg/dose	IM/IV	
Ceftriaxone		50-100 mg/kg/24h	IM/IV	
Dexamethasone	4 mg/ml	Variable	IM/IV	Meningitis 0.15 mg/kg q6h x
Dextrose	50% 25%	1-2 ml/kg, 2-4 ml/kg	IV	=5-10 ml/kg of D10%
Diazepam	5 mg/ml	0.1-0.3 mg/kg	IV	Central pref / PR 0.5 mg/kg
Digoxin	100 mcg/ml	10-15 mcg/kg	IV	
Diphenhydramine	50 mg/ml	1 mg/kg	IM/IV	
Dobutamine		1-20 mcg/kg/min	IV	Central pref
Dopamine		1-20 mcg/kg/min	IV	Central pref
Edrophonium	10 mg/ml	5-10 mg	IV	Adult dose for PAT
Epinephrine	0.1 mg/ml, 1 mg/ml	0.01-0.1 mg/kg 0.01-1 mcg/kg/min 0.1 mg/kg **ETT**	IV	Repeat every 3-5 minutes
Esmolol	10 mg/ml 250 mg/ml	100-500 mcg/kg 25-1000 mcg/kg/min	IV	Dilute to 10-20 mg/ml Central pref
Etomidate	2 mg/ml	0.3-0.6 mg/kg	IV	
Fentanyl	50 mcg/ml	1-5 mcg/kg	IM/IV	
Flumazenil	0.1 mg/ml	0.01 mg/kg	IV	Max 0.2 mg/dose, total 1-3 mg
Furosemide	10 mg/ml	Max 1 mg/kg	IM/IV	
Glucagon	1 mg	0.5-1 mg	IM/IV	
Heparin		50 units/kg bolus 25 units/kg/hr drip	IV	
Insulin (Novolin) R	100 units/ml	0.05-0.1 unit/kg	SQ/IV	
Isoproterenol		0.01-1 mcg/kg/min		Concentration 20 mcg/ml up to 64mcg/ml
Labetalol	5 mg/ml	0.2-1 mg/kg	IV	Max 3 mg/kg/hr. Max 20 mg/dose
Lidocaine	20 mg/ml	1 mg/kg, 5-50 mcg/kg/min	IV	MR bolus x1 in 15 minutes
Lorazepam	2 mg/ml	0.05-0.1 mg/kg	IV	Remarks
Lipids	20%	1ml/kg over 1 min q5min., then 0.25 ml/kg/min	IV	For tx of local anesthetic toxicity. Max total=8 ml/kg
Magnesium Sulfate	500 mg/ml	25-50 mg/kg	IM/IV	125 mg =1 mEq, dilute to 20 mg/ml. Push over 5-20 min
Mannitol	25%	0.25-1 g/kg (=1.25-5 ml/kg)	IV	Filter, watch for crystals
Midazolam	5 mg/ml	0.05- 0.2 mg/kg	IM/IV	
Milrinone		0.5-1.5 mcg/kg/min	IV	
Naloxone	0.4mg/ml	10 mcg/kg (**AE** reverse), 100 mcg/kg (full reverse)	IM/IV	Adults 0.4-2 mg, repeat q2-3 min prn

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Emergency and Acute Care Medications

Drug	Concentration	Dose	Route	Remarks
Neostigmine	1 mg/ml	0.025-0.1 mg/kg, Max 5mg for adult	IM/IV	Give after atropine or glycopyrrolate
Nitroglycerin		0.25-5 mcg/kg/min	IV	
Nitroprusside		0.05-2 mcg/kg/min	IV	Dextrose only, protect from light/ Central pref
Norepinephrine		0.01-0.1 mcg/kg/min	IV	Central pref
Pentobarbital	50 mg/mL	1-5 mg/kg q 1-3 min	IV/IM	Max 100 mg/dose to 500 mg total dose
Phenobarbital	130 mg/ml	10-20 mg/kg	IM/IV	NTE 1mg/kg/min
Phenylephrine	10 mg/ml	0.1 mg/kg adult 5-20 mcg/kg child 0.01-1 mcg/kg/min	IV	Max 5 mg Central pref
Phenytoin	50 mg/ml	10-20 mg/kg	IV	Dilute with NS, NTE 1 mg/kg/min/ Central pref
Potassium Chloride	2 meq/ml	0.25-1 mEq/kg/hr	IV	0.4 mEQ/mL central, DILUTE
Procainamide	100 mg/ml	3-6 mg/kg bolus 20-80 mcg/kg/min Max total 15 mg/kg	IV	Dilute bolus to <=30 mg/ml, Infusion <=4 mg/ml.
Propranolol	1 mg/ml	0.01-0.1 mg/kg	IV	Max 1 mg, adults max 5 mg (total)
Protamine	10 mg/ml	1 mg/kg	IV	1 mg/ 100 units heparin
Rocuronium	10 mg/ml	0.5-1.2 mg/kg	IV	
Sodium Bicarbonate	0.5-1 mEq/ml	1 mEq/kg	IV	Central pref / 0.5 mEq/ml for preterm neonates
Succinylcholine	20 mg/ml	1-2 mg/kg	IV	Give with atropine
Thiopental	25 mg/ml	1-5 mg/kg	IV	(Pentothol) Central pref
Vasopressin	20 units/ml (1unit = 1000 milliunits)	0.4-1 unit/kg/dose DI: 0.5-10 Milliunits/kg/hr Shock: 0.1-3 Milliunits/kg/min GI:1-15 Milliunits/kg/min	IV	VF or pulseless VT Max 40 units (adult)
Vecuronium	1 mg/ml	0.1-0.3 mg/kg	IV	
Verapamil	2.5 mg/ml	0.1 mg/kg	IV	Not for < 1 year old

3/15/2011

Supply Chain Management

- RCHSD has (look in comments for cache vs. OPS)
- GAC MUST HAVE (RCHSD has)
- GAC NICE to have (RCHSD has)

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
Ambu bag -Infant						Cache
Ambu bag – Child						Cache
Arm board – Infant						OPS
Arm board - Child						OPS
needles – 23g						OPS
needles – 25g						OPS
Chest tube – 12f						Cache
Chest tube – 16f						Cache
Chest tube – 20f						Cache
Chest tube – 24f						Cache
Chest tube – 28f						Cache

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
Central venous catheters	Need Sizes input!!					OPS
C-spine collar - Infant						Cache
C-spine collar - Sm child						Cache
C-spine collar – Child						Cache
Cricothyrotomy kit						OPS
Defibrillator – Peds						OPS (or peds paddles if defib is capable)
ETCO2 detector - Peds						OPS
ET tubes – 2.5 cuffed						Cache
ET tubes – 2.5 uncuffed						Cache
ET tubes – 3.0 cuffed						Cache
ET tubes – 3.0 uncuffed						Cache
ET tubes – 4.0 cuffed						Cache
ET tubes – 4.0 uncuffed						Cache
ET tubes – 4.5 cuffed						Cache
ET tubes – 5.0 cuffed						Cache
ET tubes – 5.0 uncuffed						Cache

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
ET tubes – 5.5 cuffed						Cache
ET tubes – 6.0 cuffed						Cache
Feeding tube -5f						OPS
Feeding tube – 8f						OPS
Foley catheter – 8f						OPS
Foley catheter – 10f						OPS
Foley catheter – 12f						OPS
Gastro tube -12f						OPS
Gastro tube -14f						OPS
Gastro tube -16f						OPS
Glucometer						OPS
Infant scale						OPS
IV set – Ped						Cache
Intubation stylet – Sm						OPS
Intubation stylet – Lg						OPS
Laryngoscope blade – Macintosh 0						OPS

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
Laryngoscope blade – Macintosh 1						OPS
Laryngoscope blade – Macintosh 2						OPS
Laryngoscope blade – Miller 0						OPS
Laryngoscope blade – Miller 1						Cache
Laryngoscope blade – Miller 1.5						Cache
Laryngoscope blade – Miller 2						Cache
Laryngoscope handle						Cache
Magill Forceps						OPS
Monitor electrodes- Ped						OPS
Nasal Cannula –Neonate						OPS
Nasal Cannula –Infant						OPS
Nasal Cannula –Child						OPS
Nebulizer						Cache
NG tube – 6f						OPS
NG tube – 8f						OPS
NG tube – 10f						OPS

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
NG tube – 12f						OPS
NG tube – 14f						OPS
NG tube – 16f						OPS
O2 mask/tubing - Infant						Cache
O2 mask/tubing - Child						Cache
Non-rebreather - Infant						Cache
Non-rebreather - Child						Cache
Nasopharyngeal airways						Cache
Oral airway - 00						Cache
Oral airway - 01						Cache
Over the needle IV Cath 20g						Cache
Over the needle IV Cath 22g						Cache
Over the needle IV Cath 24g						Cache
Papoose/restraint						OPS

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
SAM-Splints – 24 inch Or larger						Cache
Suction catheter -5f						OPS
Suction catheter -8f						OPS
Suction catheter -10f						OPS
Syringes (60cc)						OPS
Thermometer – rectal						OPS
Thermometer - temporal						OPS
Tracheostomy tubes - 0						OPS
Tracheostomy tubes - 1						OPS
Tracheostomy tubes - 2						OPS
Tracheostomy tubes - 3						OPS
Tracheostomy tubes - 4						OPS
Tracheostomy tubes - 5						OPS
Umbilical vein caths						OPS
Warming device						Cache

Pediatric Specific Care Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
Baby food						
Baby cereal						
Bathing basin/tub						
Bottles & nipples						
Diaper wipes – fragrance free						
Diapers – Size 1						
Diapers – Size 2						
Diapers – Size 3						
Diapers – Size 4						
Diapers – Size 5						
Diapers - pull ups 4T-5T						
Diaper rash cream						
Disposable changing pads						
Formula - milk						
Formula - hypoallergenic						
Formula - soy						

Pediatric Specific Medical Supplies	Case/Box Size	Amount Ordered	Inventory	Expiration Date	Location	Comments
Infant hat/booties						
Infant spoons						
Infant wash – hypoallergenic						
Oral electrolytes						
Nutritional supplements						
Towels						
Washcloths						

Rady Children's Hospital San Diego

Equipment

Medical Equipment for Pediatric Surge

Equipment	Inventory	On Hand	Comments
Ventilators for infant And Child			Need at least a couple ventilators that can care for Infants and children. LTVs work well
Physiologic Monitors			Any monitor will work, need electrodes that will fit small infants and children
Infant scale			For infant weight a scale is needed. Ideally you can measure length with the scale. A sling scale can be used for toddlers if a standing scale is not working
Otoscope			Frequently used in Pediatrics.
IV Pumps			Any pump can work. Should be smart pump with pediatric profile. Due to drug dosing it is helpful to have syringe modules
Laryngoscopes, airways, bags and masks			Need all sizes.
Blood Pressure Cuffs			Need all sizes. Can be manual or with device
Cribs			You can use Bubble top cribs for all ages

Terrorism Tools

TERRORISM / MASS VIOLENCE

(ACTIVE SHOOTER)

Key points:

In addition to typical considerations of patient safety, the following are critical considerations for pediatric populations:

- Be cautious of WEAPONS on patients – victim/patient COULD be shooter
- As with any other possible/confirmed terrorism event, scene safety is paramount

If Active Shooter is on site (was patient, carry-on incident, etc)

HOW TO RESPOND WHEN LAW ENFORCEMENT ARRIVES

Law enforcement's purpose is to stop the active shooter as soon as possible. Officers will proceed directly to the area in which the last shots were heard.

- Officers usually arrive in teams of four (4)
- Officers may wear regular patrol uniforms or external bulletproof vests, Kevlar helmets, and other tactical equipment
- Officers may be armed with rifles, shotguns, handguns
- Officers may use pepper spray or tear gas to control the situation
- Officers may shout commands, and may push individuals to the ground for their safety

How to react when law enforcement arrives:

- Remain calm, and follow officers' instructions
- Put down any items in your hands (i.e., bags, jackets)
- Immediately raise hands and spread fingers

- Keep hands visible at all times
- Avoid making quick movements toward officers such as attempting to hold on to them for safety
- Avoid pointing, screaming and/or yelling
- Do not stop to ask officers for help or direction when evacuating, just proceed in the direction from which officers are entering the premises

Information to provide to law enforcement or 911 operators:

- Location of the active shooter
- Number of shooters, if more than one
- Physical description of shooter(s)
- Number and type of weapons held by the shooter(s)
- Number of potential victims at the location

HOW TO RESPOND

WHEN AN ACTIVE SHOOTER IS IN YOUR VICINITY

QUICKLY DETERMINE THE MOST REASONABLE WAY TO PROTECT YOUR OWN LIFE. CUSTOMERS AND CLIENTS ARE LIKELY TO FOLLOW THE LEAD OF EMPLOYEES AND MANAGERS DURING AN ACTIVE SHOOTER SITUATION.

1. EVACUATE

- Have an escape route and plan in mind
- Leave your belongings behind
- Keep your hands visible

2. HIDE OUT

- Hide in an area out of the active shooter's view.
- Block entry to your hiding place and lock the doors

CALL 911 WHEN IT IS SAFE TO DO SO

3. TAKE ACTION

- As a last resort and only when your life is in imminent danger.
- Attempt to incapacitate the active shooter
- Act with physical aggression and throw items at the active shooter

HOW TO RESPOND WHEN LAW ENFORCEMENT ARRIVES ON THE SCENE

1. HOW YOU SHOULD REACT WHEN LAW ENFORCEMENT ARRIVES:

- Remain calm, and follow officers' instructions
- Immediately raise hands and spread fingers
- Keep hands visible at all times
- Avoid making quick movements toward officers such as attempting to hold on to them for safety
- Avoid pointing, screaming and/or yelling
- Do not stop to ask officers for help or direction when evacuating, just proceed in the direction from which officers are entering the premises

2. INFORMATION YOU SHOULD PROVIDE TO LAW ENFORCEMENT OR 911 OPERATOR:

- Location of the active shooter
- Number of shooters, if more than one
- Physical description of shooter/s
- Number and type of weapons held by the shooter/s
- Number of potential victims at the location

RECOGNIZING SIGNS OF POTENTIAL WORKPLACE VIOLENCE

AN ACTIVE SHOOTER MAY BE A CURRENT OR FORMER EMPLOYEE. ALERT YOUR HUMAN RESOURCES DEPARTMENT IF YOU BELIEVE AN EMPLOYEE EXHIBITS POTENTIALLY VIOLENT BEHAVIOR. INDICATORS OF POTENTIALLY VIOLENT BEHAVIOR MAY INCLUDE ONE OR MORE OF THE FOLLOWING:

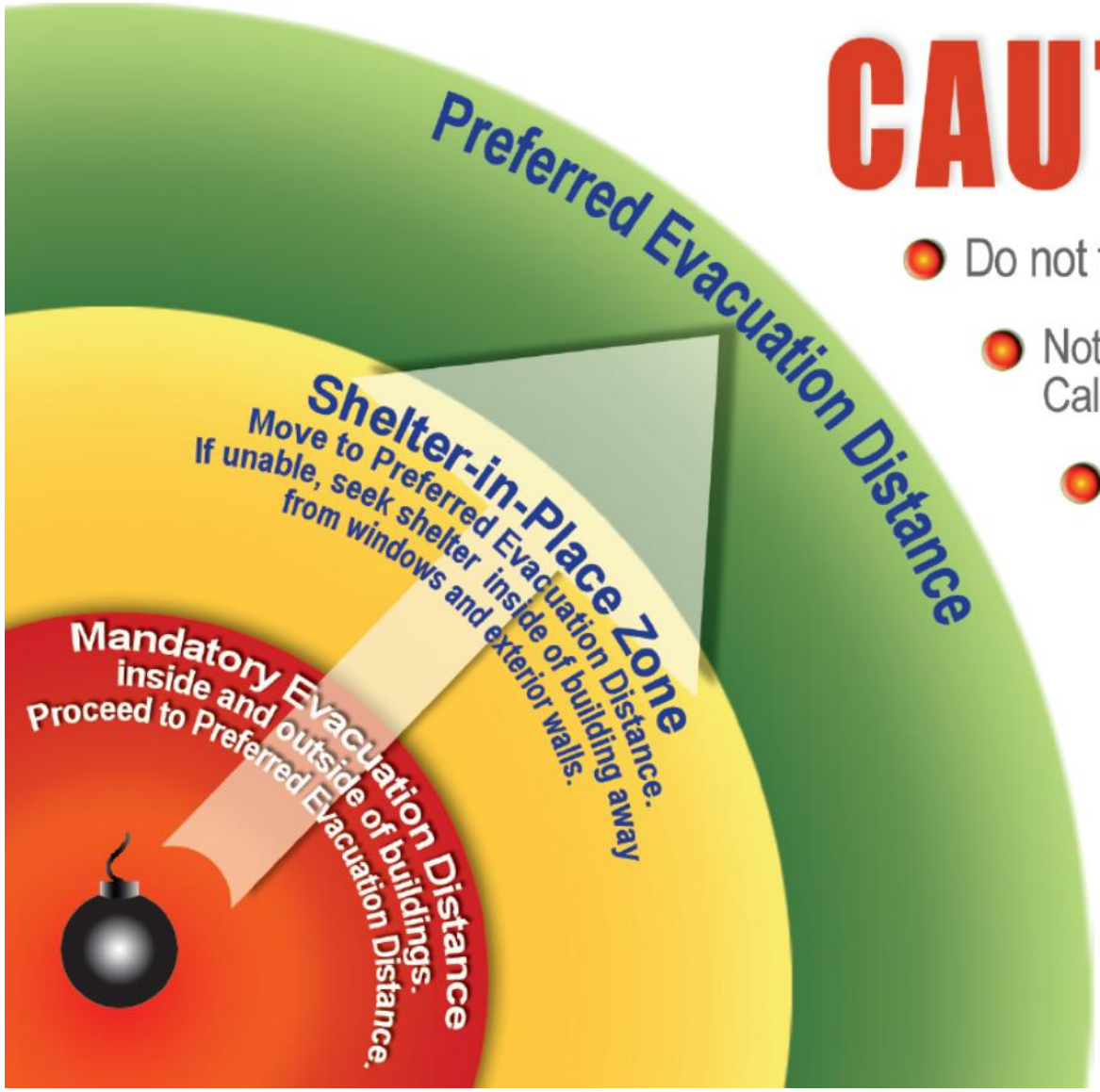
- Increased use of alcohol and/or illegal drugs
- Unexplained increase in absenteeism, and/or vague physical complaints
- Depression/Withdrawal
- Increased severe mood swings, and noticeably unstable or emotional responses
- Increasingly talks of problems at home
- Increase in unsolicited comments about violence, firearms, and other dangerous weapons and violent crimes

Contact your building management or human resources department for more information and training on active shooter response in your workplace.

Rady Children's Hospital San Diego

BOMB THREAT STAND-OFF CARD

Threat Description	Explosives Capacity	Mandatory Evacuation Distance	Shelter-in-Place Zone	Preferred Evacuation Distance
 Pipe Bomb	5 lbs	70 ft	71-1199 ft	+1200 ft
 Suicide Bomber	20 lbs	110 ft	111-1699 ft	+1700 ft
 Briefcase/Suitcase	50 lbs	150 ft	151-1849 ft	+1850 ft
 Car	500 lbs	320 ft	321-1899 ft	+1900 ft
 SUV/Van	1,000 lbs	400 ft	401-2399 ft	+2400 ft
 Small Delivery Truck	4,000 lbs	640 ft	641-3799 ft	+3800 ft
 Container/Water Truck	10,000 lbs	860 ft	861-5099 ft	+5100 ft
 Semi-Trailer	60,000 lbs	1570 ft	1571-9299 ft	+9300 ft



CAUTION!

- Do not touch suspicious item
- Notify proper Authorities - Call 911
- Ensure all witnesses are available to brief 1st responders
- Recommended stand-off data should be used in conjunction with your emergency evacuation plan

Sources: Department of Homeland Security,
Office for Bombing Prevention, Arlington, VA
FBI, Bomb Data Center, Quantico, VA
Technical Support Working Group, Arlington, VA

BIOTERROR

The release of a biological weapon would disproportionately affect children through several mechanisms. With aerosolized agents (e.g. anthrax), increased respiratory minute ventilation in children (500 ml/Kg/min) compared with adults (140 ml/Kg/min) results in the child's exposure to a relatively greater inoculum. The high vapor density of bioaerosols, such as those potentially used to disseminate airborne pathogens, places their highest concentration close to the ground in the lower breathing zone of children. The more permeable skin of newborns and children in conjunction with a larger surface-to-mass ratio results in greater than exposure to transdermally absorbed toxicants. Children, because of their relatively larger body surface area, lose heat quickly when showered. Consequently, skin decontamination with water may result in hypothermia unless heating lamps and other warming equipment are used. Having less fluid reserve increases the child's risk of rapid dehydration or frank shock after vomiting and diarrhea. Finally, children have significant developmental vulnerabilities. Infants, toddlers, and young children do not have the motor skills to escape from the site of a biological incident. Even if they are able to walk, they may not have the cognitive insight to decide in which direction to flee. All children are at risk of psychological injury, such as posttraumatic stress disorder, from experiencing or witnessing an act of terrorism. In a mass casualty incident, children witness injuries and deaths, possible of their parents, who would produce both short- and long-term psychological trauma requires intervention.

Children are difficult to care for by health care personnel wearing protective equipment, which is essential in the management of chemical, biological, and radiological events. Protective clothing is bulky and cumbersome; it impedes the ability of healthcare providers to perform procedures such as venipuncture or endotracheal intubation on small children

BIOTERRORISM: Infection Control Practices for Patient Management

Activation: HICS will be activated by the Incident Command who will notify the hospital operator to overhead page the disaster activation and status. Additionally the operator will notify the Disaster Team via pager.
External Contacts: State Health Department: 916/657-1493
FBI San Diego Field Office: 858/565-1255
CDC Bioterrorism Emergency Response: 770/488-7100
CDC Hospital Infections Program: 404/639-6413
Department Health Services, Epidemiology: 858/565-5255 or 619/575-6620

	BACTERIAL AGENTS	Anthrax	Bruceliosis	Cholera	Glanders (rarely seen)	Bubonic Plague	Pneumonic Plague	Tularemia	Q Fever	VIRUSES	Smallpox	Encephalitis	Viral Encephalitis	Viral Hemor Fever	BIOLOGICAL TOXINS	Botulism	Ricin	T-2 Mycotoxins	Staph Enterotoxin B
Isolation Precaution																			
Standard Precautions for all aspects of patient care		X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X
Contact Precautions		X									X			X					
Airborne Precautions					X						X								
Use of N95 mask by all individuals entering the room											X								
Droplet Precautions							X					X							
Wash handle with antimicrobial soap		X	X								X			X					
Patient Placement																			
No restrictions		X						X								X	X	X	X
Cohort patients when private room unavailable				X		X	X		X				X						
Private Room			X	X	X	X	X				X	X		X					
Negative Pressure											X								
Door closed at all times					X						X								
Patient Transport																			
No restrictions		X						X								X	X	X	X
Limit movement to essential medial purposes only			X	X	X	X	X				X	X		X					
Place mask on patient to minimize dispersal of droplets					X		X				X	X							
Cleaning, Disinfection of Equipment																			
Routine terminal cleaning of room with hospital approved. disinfectant upon discharge				X	X			X	X		X	X	X			X	X	X	X
Disinfect surfaces with bleach/water sol. 1:9 (10% sol.)		X	X			X	X							X					
Dedicated equipment that is disinfected prior to leaving room		X									X			X					
Linen management as with all other patients		X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X
Regulate Medical Waste handled per hospital policy		X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X
Discharges Management																			
No special discharge instruction necessary		X		X	X			X	X			X	X			X	X	X	X
Home care providers need to be taught principles of Standard Precautions		X	X			X	X							X					
Not discharged from hospital until determined no longer infectious							X				X			X					
Patient usually not discharged until 72 hours of antibiotics completed							X												
Post-mortem Care																			
Follow principles of Standard Precautions		X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X
Droplet Precautions							X												
Airborne Precautions											X								
Use of N95 mask by all individuals entering the room											X								
Negative Pressure											X								
Contact Precautions											X			X					
Routine terminal cleaning of room with hospital approved. disinfectant upon autopsy			X	X	X			X	X		X	X	X			X	X	X	X
Disinfect surfaces with bleach/water sol. 1:9 (10% sol.)		X				X	X							X					

Source: Walter Reed Army Medical Center, Washington, DC

Table 1: DISEASE ASSOCIATE WITH BIOTERRORISM

	Anthrax	Botulism	Plague	Smallpox
Etiology	**Bacillus anthracis** Gram-positive bacillus (spore forming)	**Clostridium botulinum** Anaerobic gram-positive bacillus produces a potent neurotoxin, botulinum toxin	**Yersinia pestis** Gram-negative bacillus	**Variola virus**
Clinical Features	**Pulmonary:** • Flu-like symptoms • 2-4 days, abrupt onset respiratory failure • hemodynamic collapse • widened mediastinum • gram-positive bacilli on blood culture (2-3 days) • treatable in early prodromal stage **Cutaneous:** • Local skin involvement • Head, forearms, hands • Localized itching • Papular to vesicular lesion • Usually non-fatal if treated **Gastrointestinal:** • Abdominal pain, nausea, vomiting, fever • Bloody diarrhea, hematemesis • Gram-positive bacilli on blood culture • Usually fatal after progression to toxemia and sepsis	• Responsive patient with absence of fever • Symmetric cranial neuropathies (drooping eyelids, weakened jaw clench, difficulty swallowing or speaking) • Blurred vision • Symmetric descending weakness in a proximal to distal pattern • Respiratory dysfunction from respiratory muscle paralysis or upper airway obstruction due to weakened glottis • No sensory deficits.	Pneumonic Plague: • Fever, cough, chest pain • Hemoptysis • Muco-purulent or watery sputum • Radiographic evidence of bronchopneumonia	• 2-4 days, non-specific prodromal fever, myalgias • rash most prominent on face and extremities (including palms and soles) in contrast to varicella with truncal distribution • rash scabs over in 1-2 weeks • rash has a synchronous onset in contrast to varicella rash, wheal arises in crops
Modes of Transmission	Spore form-delivered as an aerosol: • Inhalation of spores • Cutaneous contact with spores • Ingestion of contaminated food	Generally by ingestion of toxin-contaminated food. Aerosolization of toxin may be mechanism for bioterrorism exposure.	• Normally transmission from an infected rodent to man by infected fleas • Bioterrorism-related outbreaks likely through dispersion of an aerosol • Person-to-person transmission of pneumonic plague is possible via large aerosol droplets	Transmission via both large and small respiratory droplets. Patient-to-patient transmission is likely from airborne and droplet exposure by contact with skin lesions or secretions. Patients are considered more infectious if coughing or if they have a hemorrhagic form of smallpox.

	Anthrax	Botulism	Plague	Smallpox
Incubation Period	Pulmonary: 2-60 days Cutaneous: 1-7 days Ingestion: 1-7 days	Foodborne: 12-36 hours Inhalation: 24-72 hours	Fleaborne: 2-8 days Pulmonary: 1-3 days	10-14 days
Period of Communicability	Transmission of anthrax from person-to-person unlikely. Airborne transmission does not occur. Direct contact with skin lesions may result in cutaneous infection.	Botulism is not transmitted from person-to-person.	Until 48 hours of effective therapy an until clinical improvement	Most infectious during first week of rash and until all scabs have separated (usually 3-4 weeks)
Special Planning Information	• How additional ventilators can be obtained • How limited numbers of ventilators will be distributed	Any individuals suspected to have been exposed to botulinum toxin should be carefully monitored for evidence of respiratory compromise. Ventilatory support is required, on average 2-3 months	• Sources of bulk prophylactic antibiotics and planning for acquisition on short notice. • Locations, personnel needs and protocols for administering prophylactic Post-Exposure care to large numbers of potentially exposed individuals.	• Triage and management of large-scale exposure/potential exposures. • Sites within or outside the facility that can provide necessary parameters for cohorting large numbers of patients with Airborne Precautions. • Source of Smallpox vaccine. • Availability of large supply of N95 particulate respirators and purified air powered respirators (PAPRs). • Personnel needs for large numbers of patients on Airborne Precautions.
Decontamination of Exposed Patients	Only necessary immediately after exposure. Post-Exposure decontamination to be done in the ER as follows: • Instruct patient to remove clothing and store in biohazard bag. • Handle clothing minimally to avoid agitation • Instruct patient to shower thoroughly with soap and water (provide assistance if necessary).		Only necessary immediately after exposures. Post-Exposure decontamination to be done at the ER dock as follows: • Instruct patients to remove clothing and store in biohazard bag. • Handle clothing minimally to avoid agitation Instruct patient to shower thoroughly with soap and water (provide assistance if necessary).	Not indicated

Table 2: PREVENTIVE MEASURES

	Anthrax	Botulism	Plague	Smallpox
Decontamination of Environment	In possibly contaminated areas, decontaminate environmental surfaces with a phenolic disinfectant; allow 10-minute contact time.	No special precautions	See general instructions	Terminal cleaning of patient room and disinfection with a phenolic (10 minute contact time).
Cleaning, Disinfection, Sterilization of Equipment	After decontamination, standard cleaning procedures.	Standard cleaning procedures	Standard cleaning procedures	• Use dedicated patient care equipment (e.g. stethoscope, B/P cuff, thermometer, etc.) • All reusable equipment must be cleaned and disinfected with a phenolic (10 minute contact time) prior to use by other patients.
Isolation Precautions for Exposed Patients	Standard Precautions	Standard Precautions	**Droplet Precautions** for 2-7 days after exposure; observe for flu-like symptoms or pneumonia.	**Airborne & Contact Precautions** on days 7-17 after exposure; monitor for disease onset (see below).
Isolation Precautions for Patients with Disease	Standard Precautions	Standard Precautions	**Droplet Precautions** until patient has completed 72 hours of antimicrobial therapy.	**Airborne & Contact Precautions** for at least 3 weeks and only discontinue with approval from Infectious Diseases/Infection Control. • Use N95 mask or particulate respirator. • Place in negative pressure room. • For large numbers of patients cohort in a separate facility.
Patient Transport	Standard Precautions	Standard Precautions	Limit movement – only for essential medical purposes. Patient wears surgical mask.	Limit movement – only for essential medical purposes. **DO NOT** transport patient until Infection Control staff is notified. Patient wears surgical mask.
Patient Placement	Private room not necessary	Private room not necessary	Private room or cohort patients	Private room (negative air pressure); door must remain closed. Patients with same disease may be cohorted, but must be in a negative air pressure room.

	Anthrax	Botulism	Plague	Smallpox
Specimen Collection and Transport	Pulmonary: For early disease with productive cough; sputum sent on ice. 2-8 days post-exposure; blood culture in standard blood culture bottle. Cutaneous: Early disease; unroof vesicle and soak 2 sterile swabs in vesicular fluid; later disease; 2 sterile swabs rotated beneath the edge of the eschar. GI: early stage-stool culture; later stage-blood culture. **Must notify laboratory personnel of suspicions of bioterrorism-related agent before transporting to lab.**	In event of aerosolization specimens of choice include; serum for toxigenicity studies, feces or return from a sterile water or salne enema. In event of foodborne illness; serum, gastric contents, vomitus, stool or the return from a sterile water or saline enema are specimens of choice. **Must notify laboratory personnel of suspicions of bioterrorism-related agent before transporting to lab.**	Specimen of choice: pneumonic plague-tracheal or lung aspirates. Bubonic plague – material from infected bubo or series of blood cultures within 24 hours. Other sources: CSF, feces and urine. On autopsy, lymphoid tissue, lung tissue or bone marrow. Care should be taken to avoid the generation of aerosols from infectious materials. **Must notify laboratory personnel of suspicions of bioterrorism-related agent before transporting to lab.**	Notify Infection Control prior to collection of any specimens and await further instructions.
Laboratory Confirmation	Testing can only be performed in a BSL-2 laboratory. Contact Health Department for rapid testing capabilities.	Routine laboratory tests are of limited value in the diagnosis of botulism. Contact Health Department for special instructions.	Contact Microbiology Director for special instructions for Serum for capsular antigen testing Blood cultures Sputum or tracheal aspirate for Gram's, Wayson's, and fluorescent antibody staining Sputum or tracheal aspirates for culture.	Testing can only be performed in a BSL-4 laboratory. Contact CDC for special instructions and to obtain an appropriate specimen kit.
Lab Specimen Handling and Transport	Handling of clinical specimens will be coordinated with the local Health Department/FBI for transportation to Department of Defense laboratory. The chain of custody form, provided with the transportation kit, must be used to document all information. All specimens sent through the US mails must meet IOTA guidelines for transport.	All specimens sent through the US mails must meet IOTA guidelines for transport.	All specimens sent through the US mails must meet IOTA guidelines for transport.	Handling of clinical specimens will be coordinate with the local Health Department/FBI for transportation to Department of Defense laboratory. The chain of custody form, provided with the transportation kit, must be used to document all information. All specimens sent through the US mails must meet IOTA guidelines for transport.
Post Mortem Care	**Standard Precautions**	**Standard Precautions**	**Standard & Droplet Precautions**	**Airborne & Contact Precautions**
Post Exposure Management		Single cases of botulinum should immediately raise concerns of an outbreak potentially associated with shared contaminated food.	Risk for re-aerosolization of *Y. pestis* from contaminated clothing of exposed persons is low.	Contact Infection Control on pager (858) 493-0390. Depending on availability: • Give Smallpox vaccine (vaccinia virus) within 3 days of exposure. • If greater than 3 days, give vaccination and vaccinia immune globulin (VIG) 0.6 ml/kg IM.

	Anthrax	Botulism	Plague	Smallpox
Prophylaxis and Post-Exposure Immunization	Prophylaxis should be initiated upon confirmation of an anthrax exposure. See Table 6 for specific information.	Trivalent botulinum antitoxin is available by contracting state health departments or CDC. Skin testing should be performed prior to administration due to < 9% rate of hypersensitivity reactions.	Post-Exposure prophylaxis should be initiated following confirmed or suspected bioterrorism Y. pestis exposure, and for Post-Exposure management of healthcare workers and others who had unprotected face-to-face contact with symptomatic patients.	Post-Exposure immunization with smallpox vaccine (vaccinia virus) available and effective. Vaccine alone is recommended if given within 3 days of exposure. Passive immunization is also available in forms of vaccinia-immune-globulin (VIG). If given greater than 3 days has elapsed since exposure, both vaccination and VIG are recommended. See information for pregnant women andpersons with immunosuppression and eczema.
Vaccine Availability	Inactivated, cell-free anthrax vaccine - limited availability	Pentavalent toxoid vaccine available as an investigational new drug.	Formalin-killed vaccine exists for bubonic plague, but has not proven effective for pneumonic plague. Not currently available in the United States.	A live-virus intradermal vaccine is available from the CDC.
Immunization Recommendations	Routinely administered to military personnel. Routine vaccination of civilian population not recommended.	Routine immunization of the public including healthcare workers is not recommended.	Not recommended for the general population; Post-Exposure immunization has no utility.	Routine public vaccination is not recommended, since the last naturally acquired case in the world occurred more than 20 years ago. Vaccination against smallpox does not reliably confer lifelong immunity. Even previously vaccinated persons should be considered susceptible to smallpox.
Discharge Management	No special discharge instructions are indicated; teach home care providers Standard Precautions.	No special discharge instructions are indicated.	Generally, patients with pneumonic plague would not be discharged from a healthcare facility until no longer infectious and would require no special discharge instructions. In the event of a large bioterrorism exposure with patient receiving care in homes, home care providers should be taught to use Standard Precautions and Droplet Precautions for all patient care.	In general, patients with smallpox should not be discharge from a healthcare facility until determined if they are no longer infectious. Therefore, no special discharge instructions are required.
Patient, Visitor, and Public Information	Fact sheets – available from the Infection Control office.	Fact sheets – available form the Infection Control Office.	Fact sheets – available from the Infection Control office.	Fact sheets – available from the Infection Control office.

Table 5#: RECOMMENDED POST-EXPOSURE PROPHYLAXIS FOR YERSINIA PESTIS (PLAGUE)*

Antimicrobial agent	Adults	Children Ç
1st choice		
Doxycycline	100 mg twice daily	5 mg per kg of body mass per day, divided into two doses
2nd choice		
Ciprofloxacin	500 mg twice daily	20-30 mg per kg of body mass daily, divided into two doses

Ç Pediatric use of tetracyclines is associated with adverse effects. Fluoroquinolones are currently not approved for those <18 yrs. Due to concern of toxicity in animals. Use of these medications must be weighed against the risk of developing a lethal disease.

* Prophylaxis should continue for 7 days after last known or suspected *Y. pestis* exposure, or until exposure h as been excluded.

Table 6#: RECOMMENDED POST-EXPOSURE PROPHYLAXIS FOR BACILLUS ANTHRACIS (ANTHRAX)

Antimicrobial agent	Adults	Children Ç
Oral Fluoroquinolones		
One of the following:		
Ciprofloxacin	500 mg twice daily	20-30 mg per kg of body mass daily, divided into two doses
Levofloxacin	500 mg once daily	Not recommended
Ofloxacin	400 mg twice daily	Not recommended
If fluoroquinolones are not available or are contraindicated		
Doxycycline	100 mg twice daily	5 mg per kg of body mass per day, divided into two doses

Ç Pediatric use of tetracyclines is associated with adverse effects. Fluoroqquinolones are currently not approved for those <18 yrs. Due to concern of toxicity in animals. Use of these medications must be weighed against the risk of developing a lethal disease. If B. anthracis exposure is confirmed, the organism must be tested for penicillin susceptibility. If susceptible, exposed children may be treated with oral amoxicillin 40mg per kg of body mass per day divided every 8 hours (not to exceed 500mg, three times daily).

Prophylaxis should continue until B. anthracis exposure has been excluded. If exposure is confirmed, prophylaxis should continue for 8 weeks. In addition to prophylaxis, Post-Exposure immunization with an inactivated, cell-free anthrax vaccine is also indicated following anthrax exposure. If available, Post-Exposure vaccination consists of three doses of vaccine at 0, 2 and 4 weeks after exposure. With vaccination, Post-Exposure antimicrobial prophylaxis can be reduced to 4 weeks.

Reference: Bioterrorism Readiness Plan: A template for Healthcare Facilities, CDC website, accessed September 2010. **http://emergency.cdc.gov/bioterrorism/prep.asp**

CHEMICAL EXPOSURE/TERRORISM

Key points:

In addition to typical considerations of patient safety, the following are critical considerations for pediatric populations:

Specific Pediatric Vulnerabilities to Chemical Agents (AHRQ)

Children have inherent physiologic, developmental, and psychological differences from adults that may enhance susceptibility and worsen prognosis after a chemical agent exposure. Briefly, such physiologic differences include:

- Higher minute ventilation
- Increased skin permeability
- Greater body surface area to weight ratio (plays a key role in degree of contamination and in the ability to maintain thermal homeostasis after decontamination)
- Less intravascular volume reserve in defense of hypovolemic shock
- Shorter stature (which places children nearer the greatest gas vapor density at ground level)

Chemical Terrorism

- Chemical agents act quickly. Rapid response is essential.
- Learn to recognize and diagnose the health effects of chemical agents.
- Chemical agents may contaminate you and your facility
- Do not become a casualty! Implement procedures to decontaminate and treat incoming patients.

AWARENESS

RECOGNIZING CHEMICAL TERRORISM-RELATED ILLNESSES

Adequate planning and regular training are key to preparedness for terrorism-related events. This wall chart is only a summary of important information. For more detail to assist you in preparedness planning, review the resources at the bottom of this wall chart.

Healthcare providers should be alert to illness patterns and reports of chemical exposure that might signal an act of terrorism. The following clinical, epidemiological and circumstantial clues may suggest a possible chemical terrorist event:

- Any unusual increase in the number of people seeking care, especially with respiratory, neurological, dermatological or gastrointestinal symptoms
- Any clustering of symptoms or unusual age distribution (e.g., chemical exposure in childrend)
- Any unusual clustering of patients in time or location (e.g., persons who attended the same public event)
- Location of release not consistent with a chemical's use
- Simultaneous impact to human, animal and plant populations

Any unusual symptoms, illnesses or clusters of these should be reported immediately. Notify the County Health Department and regional Poison Control Center.

PHONE NUMBERS

Poison Control Centers	1-800-222-1222
County Health Department	
San Diego Departmetn of Health	

Rady Children's Hospital San Diego

Department of Pediatrics
Walter Reed Army Medical Center

Nerve Agents in Children: Guidelines

Joshua Rotenberg MD MMS
MAJ USAF MC

Symptoms	Triage Level: Disposition	Atropine Correct hypoxia before IV use (risk of torsades, Vfib)	Pralidoxime	Diazepam **May use other benzodiazepines (e.g. midazolam)**
Asymptomatic	**Delayed:** Observe	None	None	None
Miosis, mild rhinnorhea	**Delayed:** Admit or Observe prn	None	None	None
Miosis and any other symptom	**Immediate** -Moderate: Admit	**0.05 mg/kg IV or IM** • repeat as needed q5-10 minutes until respiratory status improves	**25-50 mg/kg IV or IM,** may repeat q 1 hour. • **Watch for:** ⇒ muscle rigidity ⇒ laryngospasm, ⇒ tachycardia	**For any neurologic effect:** • **30 days to 5 years – 0.05 to 0.3 mg/kg IV** to a max of 5mg/dose. • **5 years and older– 0.05 to 0.3 mg/kg IV** to a max of 10 mg/dose. May repeat q15-30 minutes
Apnea, Convulsions, Cardiopulmonary Arrest	**Immediate** - Severe: Admit intensive care status	**0.05-0.1 mg/kg IV, IM, per ETT** • **no maximum** • repeat q5-10 minutes as above	**25-50 mg/kg IV or IM as above**	**See above**

Consider other supportive agents as indicated: Oxygen, Bronchodilalors, Analgesics, Mydriatics, Environmental protection

Rady Children's Hospital San Diego

Department of Pediatrics
Walter Reed Army Medical Center
Washington, DC 20307-5001

Nerve Agents in Children: Guidelines

Joshua Rotenberg MD MMS
MAJ USAF MC

General Principles

- Nerve agent casualties will present in large numbers soon after the event and may continue to present for days.
- **Have a high index of suspicion for**
  - mixed agents (e.g. sarin and mustard)
  - secondary injuries (blast, trampling)
- Most casualties will arrive **without** adequate decontamination.
- **Most casualties and their parents will be**:
  1. Mildly poisoned and ambulatory and /or
  2. Psychologically traumatized
- Prepare for patient behavioral outbursts, child-care issues, security issues, the media.
- Guard against injury to health care workers from secondary exposure
- **Contact appropriate non-medical authorities** (e.g. Law Enforcement, Military Public Health) of suspicion of nerve agent exposure.
  - Determine: **time of first symptoms, liquid vs. vapor exposure, location of casualties**

Differential Diagnosis

- **Sudden mass casualties without sign of trauma ➔ suspect airborne toxin**
  - Hypoxemic, miosis, profuse secretions ➔ **organophosphate (nerve agent/pesticide)**
  - Unconscious, metabolic acidosis, non-hypoxemic ➔ **Cyanide**
    - venous blood gases arterialized
- **Progressive respiratory symptoms**:
  - Consider: phosgene, anthrax, plague, Botulinum toxin

Clinical Signs

- **Children may ONLY show CNS Effects**
  - **Neuromuscular Effects**: twitching, weakness, paralysis, respiratory failure
  - **Autonomic Nervous System Effects**: reduced vision, small pupil size, drooling, sweating, diarrhea, nausea, abdominal pain, vomiting
  - **Central Nervous System Effects**: headache, convulsions, coma, respiratory arrest, confusion, slurred speech, respiratory depression
- **Miosis** - most consistently indicates a significant exposure
- **RBC-Cholinesterase** level is **NOT** useful to screen for exposure in mass casualty situation

Treatment

- **Base treatment on clinical suspicion**
- **ABC's: Airway protection and pulmonary support are key for survival**
- **Terminate exposure**
  - **Triage: Attend infants and children in immediate and moderate categories first** (higher susceptibilities and more tenuous airways)
  - **Decontamination:**
    - **1) Full exposure** (bag and seal any clothes or personal items).
    - **2) Wash with copious water/soap and rinse**.
  - Consider 0.05% bleach, flour, talcum, dirt, powder and wash off with water/baby wipes.
- **In a possible liquid exposure to skin or mucous membranes**, regardless of findings, observe for 18 hours, at a minimum.
- **Antidotes: see reverse**
- **Atropine: Dose liberally to muscarinic effect**
  - In the Iran/Iraq War NA severely affected victims received 20-200 mg of atropine.
  - Atropine cannot reverse neuromuscular symptoms
  - Sinus Tachycardia - not an end-point for atropinization
- **Diazepam** - other benzodiazepines may be equally effective (consider midazolam or lorazepam).
- **Intubation**: consider a nondepolarizing agent

Supportive care:

- **Airway protection/bronchospsam/ pulmonary toilet**
  - Oxygen, **bronchodilators**, nasogastric tubes.
- **Cardiac**: Monitor for arrhythmias
- **Fluids, electrolytes, nutrition**
  - Nursing mothers -discard breast milk
- **Prevent hypothermia and hyperthermia**
- **Eye care**
  - Treat eye pain
  - Consider treating miosis
    - Atropine will not reverse miosis
- **Treat complicating injuries/infections**
  - Attend any iatrogenic skin lesions
- **Follow-up: chronic neuropsychiatric sequelae**

Rady Children's Hospital San Diego

CHEMICAL TERRORISM AGENTS AND SYNDROMES: Watch for these signs and symptoms

Agents	Signs	Symptoms	Onset	Clinical Diagnostic Tests	Exposure Route and Treatment	Differential diagnosis
Nerve Agents: Sarin (GB); Tabun (GA); Soman (GD); Cyclohexyl Sarin (GF); VX; Novichok agents, other organophosphorus compounds including carbamates and pesticides	Pinpoint pupils (miosis) Bronchoconstriction Respiratory arrest Hypersalivation Increased secretions Diarrhea Decreased memory, concentration Loss of consciousness Seizures	**Moderate exposure**: Diffuse muscle cramping, runny nose, difficulty breathing, eye pain, dimming of vision, sweating, muscle tremors. **High exposure**: The above plus sudden loss of consciousness, seizures, flaccid paralysis (late sign)	Aerosols: Seconds to minutes Liquids: minutes to hours	Red blood cell or serum cholinesterase (whole blood) Treat based on signs and symptoms; lab tests only for later confirmation	**Inhalation and dermal absorption** Atropine (2mg) IV; repeat q 5 minutes, titrate until effective, average dose 6 to >15 mg – use IM in the field before IV access (establish airway for oxygenation) Pralidoxime chloride (2-PAMCl) 600-1800 mg IM or 1.0 g IV over 20-30 minutes (maximum 2 g IM or IV per hour) Additional doses of atropine and 2-PAMCl depending on severity Diazepam or lorazepam to prevent seizures if >4 mg atropine given Ventilatory support	Poisoning from organophosphate and carbamate pesticides may occur as a result of occupational exposure Cyanide poisoning Myasthenia gravis
Cyanides: hydrogen cyanide (HCN), cyanogen chloride	**Moderate exposure:** Metabolic acidosis, venous blood-O_2 level above normal, hypotension, "pink" skin color **High exposure**: Above signs plus coma, convulsions, cessation of respiration and heartbeat	**Moderate exposure:** Giddiness, palpitations Dizziness, nausea, vomiting, headache, eye irritation, increase in rate and depth of breathing (hyperventilation), drowsiness **High exposure**: Immediate loss of consciousness, convulsions and death within 1 to 15 minutes	Seconds to minutes	Bitter almond odor associated with patient suggests cyanide poisoning Metabolic acidosis Cyanide (blood) or thiocyanate (blood or urine) levels Treat based on signs and symptoms; lab tests only for later confirmation	**Inhalation, ingestion and dermal absorption** 100% oxygen by face mask; intubation with 100% FiO_2 if indicated Amyl nitrite via inhalation, 1 ampule (0.2 mL) q 5 minutes Sodium nitrite (300 mg IV over 5-10 minutes) and sodium thiosulfate (12.5 g IV) Additional sodium nitrite should be based on hemoglobin level and weight of patient	Similar CNS illness can result from: Industrial/occupational exposure to HCN and derivatives; carbon monoxide (CO) exposure from incomplete combustion of natural gas or petroleum fuels (exhaust fumes in enclosed areas); hydrogen sulfide (H_2S) exposure from sewers, animal waste, industrial sources) Poisoning from nerve agents
Vesicants/Blister Agents: sulfur mustard, lewisite, nitrogen mustard, mustard lewisite, phosgene-oxime	Skin erythema and blistering; watery, swollen eyes; upper airways sloughing with pulmonary edema; metabolic failure; neutropenia and sepsis (esp. sulfur mustard, late in course)	Burning, itching, or red skin Mucosal irritation (prominent tearing, and burning and redness of eyes) Shortness of breath Nausea and vomiting	Lewisite, minutes; Sulfur mustard, hours to days	Often smell of garlic, horseradish, and/or mustard on body Oily droplets on skin from ambient sources Urine thiodiglycol Tissue biopsy (USAMRICD)	**Inhalation and dermal absorption** Mustards no antidote For lewisite and lewisite/mustard mixtures: British Anti-Lewisite (BAL or Dimercaprol) IM (rarely available) Thermal burn therapy; supportive care (respiratory support and eye care)	Diffuse skin exposure with irritants, such as caustics, sodium hydroxides, ammonia, etc., may cause similar syndromes. Sodium hydroxide (NaOH) from trucking accidents
Pulmonary/ Choking Agents: phosgene, chlorine, diphosgene, chloropicrin, oxides of nitrogen, sulfur dioxide	Pulmonary edema with some mucosal irritation (greater water solubility of agent = greater mucosal irritation) leading to ARDS or non-cardiogenic pulmonary edema Pulmonary infiltrate	Shortness of breath Chest tightness Wheezing Laryngeal spasm Mucosal and dermal irritation and redness	1-24 hours (rarely up to 72 hours); May be asymptomatic period of hours	No tests available but history may help identify source and exposure characteristics (majority of incidents generating exposures to humans involve trucking with labels on vehicle)	**Inhalation** No antidote Management of secretions; O_2 therapy; consider high dose steroids to prevent pulmonary edema (demonstrated benefit only for oxides of nitrogen) Treat pulmonary edema with PEEP to maintain PO_2 above 60 mm Hg	Mucosal irritation, airway reactions, and deep lung effects depend on the specific agent, especially water solubility
Ricin (castor bean oil extract)	Clusters of acute lung or GI injury; circulatory collapse and shock, tracheobronchitis, pulmonary edema, necrotizing pneumonia	**Ingestion:** Nausea, diarrhea, vomiting, fever, abdominal pain **Inhalation:** chest tightness, coughing, weakness, nausea, fever	18-24 hours 8-36 hours	ELISA (from commercial laboratories) using respiratory secretions, serum, and direct tissue	**Inhalation and Ingestion** No antidote Supportive care For ingestion: charcoal lavage	Tularemia, plague, and Q fever may cause similar syndromes, as may biological weapons and chemical weapon agents such as Staphylococcal enterotoxin B and phosgene
T-2 mycotoxins: Fusarium, Myrotecium, Trichoderma, Verticimonosporium, Stachybotrys	Mucosal erythema and hemorrhage (intestinal necrosis) Red skin, blistering Increased salivation Pulmonary edema Seizures and coma Liver/renal dysfunction	Dermal and mucosal irritation; blistering, necrosis Blurred vision, eye irritation, tearing Nausea, vomiting, and diarrhea Ataxia coughing and dyspnea	2-4 hours	ELISA from commercial laboratories Gas chromatography/Mass spectroscopy in specialized laboratories	**Inhalation and dermal contact** No antidote Supportive care For ingestion: charcoal lavage Consider high dose steroids	Pulmonary toxins (O_3, NO_x, phosgene, NH_3) may cause similar syndromes though with less mucosal irritation.

Modified from Chemical Terrorism General Guidance Pocket Guide, Employee Education System for the Office of Public Health and Environmental Hazards, Department of Veterans Affairs. October 2001.

- Centers for Disease Control and Prevention. Demilitarization of Chemical Weapons. http:// www.cdc.gov/nceh/demil/articles/initialtreat.htm.
- Centers for Disease Control and Prevention. Chemical Agents Listing and Information. http://www.bt.cdc.gov/Agent/AgentlistChem.asp.
- Committee on R&D Needs for Improving Civilian Medical Response to Chemical and Biological Terrorism Incidents, Institute of Medicine. Chemical and Biological Terrorism. Washington, DC: National Academy Press. 1999 http://www.nap.edu/catalog/6364.html
- The Henry L. Stimson Center. Chemical and Biological Weapons Nonproliferation Project. Table E: Medical Characteristics of Chemical Warfare Agents http://www.stimson.org.
- Macintyre AG, Christopher GW, Eitzen E, Gum R, Weir S, DeAtley C, et al. Weapons of mass destruction events with contaminated casualties: Effective planning for health care facilities. JAMA 2000;283:242-249.
- NIOSH/OSHA/USCG/EPA. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Washington, D.C.: Department of Health and Human Services. 1985.
- US Army Medical Research Institute of Chemical Defense (USAMRICD) Medical Management of Chemical Casualties Handbook. 3rd ed. USAMRICD: Aberdeen Proving Ground, MD. July 2000. http://ccc.apgea.army.mil/products/handbooks/mmccthirdeditionjul2000.pdf
- Wannemacher RW, Wiener ST. Trichothecene mycotoxins. In: Sidell FR, Takafuji ET, Franz DR, eds. Medical Aspects of Chemical and Biological Warfare. Washington DC:Borden Institute, Walter Reed Army Medical Center. 1997. pages 655-676.

UNIVERSAL PERSONAL PROTECTIVE EQUIPMENT (PPE)*	NOTIFICATION PROCEDURES	FOR MORE INFORMATION	UNIVERSAL DECONTAMINATION PROTOCOL	DETECTION OF OUTBREAKS
Level A: Maximum protection against vapor and liquids. Environment known to be immediately dangerous to life and health (harm occurs within 30 minutes). Fully encapsulating, chemical-resistant suit, chemically resistant gloves and boots, and a pressure-demand supplied air respirator (air hose) and escape self-contained breathing apparatus (SCBA) Level B: Minimum protection exposure to unknown hazards. Full respiratory protection is required but danger to skin/risk of dermal absorption from vapor is less. Agent not identified, or concentration not known to be safe (i.e., field decontamination or ambulatory setting). Nonencapsulating, splash-protective chemical resistant suit (splash suit), chemical resistant gloves and boots/shoes, and a pressure-demand supplied air respirator (air hose) and escape SCBA Level C: Until patient/victim decontamination completed. Organic vapor/P11 cartridge respirator or hood, nonencapsulating chemically-resistant (i.e., coated Tyvek) suit and gloves * Training required to properly and safely use PPE	1. First call the local Health Director; after hours contact local Health Director via 911. 2. If criminal activity is suspected, call your local law enforcement and the FBI. 3. Alert local HAZMAT team via fire department at 911.	• Contact your local poison control center or National Poison Control 800-222-1222 • Contact your public health regional surveillance team • Contact your institution industrial hygienist or safety officer • Department of Justice Domestic Preparedness National Response Hotline 800-424-8802 • If you need further help in clinical diagnosis, call CDC Emergency Response 770-488-7100 • Review US Army Chemical Casualty Care handbook (http://ccc.apgea.army.mil)	1. Remove clothing quickly and seal in plastic impervious bags (save for authorities). Strongly recommended even if exposure only to vapor or aerosol agent. 2. Wash skin and shampoo with hypoallergenic liquid soap and copious tepid water in sequential steps of rinse, soap, rinse, wait one minute, then final additional rinse (20 minutes). 3. Latent response from cyanide or pulmonary agents do not require decontamination. 4. Decontamination waste water may require special collection or treatment. (Discuss with local water authorities; notify local water authorities at the time of an event.) 5. Pure metals and strong corrosives require dry decontamination (i.e., gentle brushing or vacuuming of larger particles) before water is applied. 6. Clean and decontaminate the healthcare facility according to the specific agent involved. http://www.bt.cdc.gov/Agent/AgentlistChem.asp	**Epidemiologic Strategies** • A rapidly increasing disease incidence • An unusual increase in the number of people seeking care, especially with neurologic, respiratory, dermal and/or gastrointestinal symptoms • HIgher attack rate among persons who had attendance at similar activities or events (work site, convention, sports events) with either indoor or outdoor exposure. • Clusters of patients arriving from a single locale • Large numbers of rapidly fatal cases • Any patient presenting with symptoms and/or signs that suggest inhalation, ingestion, or dermal exposure to a toxic chemical agent

Support provided by:
The North Carolina Institute for Public Health and The North Carolina Center for Public Health Preparedness, in the School of Public Health at The University of North Carolina at Chapel Hill

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PERSONAL PROTECTIVE EQUIPMENT (PPE)

DO NOT BECOME A CASUALTY!

Exposure can occur from inhalation of vapors, dermal contact or eye contact. The following general information can help responders/healthcare providers determine appropriate PPE.

Inhalation Exposure

Protection from both vapors and particulates may be required when the chemcial agent is being released. After release, protect from vapors is most important. Half-face and full-face respiratorys, with the appropriate canister, can provide protection from vapors. These operate by negative pressure and must be fit tested for optimal protection. Powered , air-purifying respirators (PAPR) and self-contained breathing apparatus (SCBA) provide even greater protection and operate under positive pressure so that fit characteristics are less important. Surgical and N-95 masks will not protect against inhalation of vapors.

Dermal Exposure

Latex examination gloves provide very little protection from most chemical agents and can cause allergies. Gloves made of Viton, nitrile, butyl or neoprene provide better protection and, in some styles, allow adequate dexterity. However, the resistance of these materials to different chemicals varies and it is best to have a variety of gloves available. Double gloving may provide additional protection. Chemical-resistant aprons, suits and boots can also minimize dermal exposure.

Eye Exposure

Full-face respirators, PAPR and SCBA will provide protection from both splashes and vapors. Protective eyewear, such as goggles or a face shield, will **not** provide protection from chemical vapors. Protective eyewear is necessary during decontmation to prevent splashing into eyes.

For more information, refer to *OSHA Best Practices for Hospital-Based First Receivers of Victims from Mass Casualty Incidents Involving the Release of Hazardous Substances*. Available at:

http://www.osha.gov/dts/bestpractices/firstreceivers_hospital.pdf

Rady Children's Hospital San Diego

AGENTS

Table 1. RECOGNIZING, DIAGNOSING, AND TREATING HEALTH EFFECTS OF CHEMICAL AGENTS

Agent Type	Agent Names	Mode of Action	Any Unique Characteristics	Signs and Symptoms	Treatment	Other Patient Considerations
Nerve (See Table 2 below)	- Cyclohexyl sarin (GF) - Sarin (GB) - Soman (GD) - Tabun (GA) - VX - Some insecticides (cholinesterase inhibitors) - Novichok agents/ Soviet V	- Inactivate acetylcholinesterase enzymes, causing both muscarinic and nicotinic effects	- Miosis (pinpoint pupils) - Copious secretions/ sweating - Muscle twitching/ fasciculations	- Miosis (pinpoint pupils) - Blurred/dim vision - Headache - Nausea, vomiting, diarrhea - Copious secretions/ sweating - Muscle twitching/ fasciculations - Dyspnea - Seizures - Loss of consciousness	- Confirm patient decontamination - **See nerve agent antidote Table 2 below** - Atropine before other measures - Pralidoxime (2-PAM) chloride	- Onset of symptoms from dermal contact with liquid forms may be delayed - Repeated antidote administration may be necessary
Asphyxiant/ Blood (See Table 3 below)	- Arsine - Cyanogen chloride - Hydrogen cyanide	- Arsine: Causes massive intravascular hemolysis which may lead to anemia, jaundice and renal failure. - Cyanogen chloride/ hydrogen cyanide: Cyanide binds with iron in cytochrome a_3 preventing intracellular oxygen utilization. The cell then uses anaerobic metabolism, creating excess lactic acid and metabolic acidosis.	- Possible skin color changes: cherry-red (cyanide or cyanogen chloride); yellow or bronze (arsine) - Possible cyanosis - Possible frostbite*	- Confusion - Nausea - Gasping for air, similar to asphyxiation but more abrupt onset - Seizures - Metabolic acidosis (cyanide or cyanogen chloride)	- Confirm patient decontamination - Rapid treatment with oxygen - For cyanide, use sodium nitrite or amyl nitrite, if available, and then sodium thiosulfate - **See cyanide antidote Table 3 below** - Vigorous supportive care may aid recovery of some patients even without specific antidote - Arsine has no specific antidote	- Arsine and cyanogen chloride may cause delayed pulmonary edema
Choking/ Pulmonary-damaging	- Chlorine - Hydrogen chloride - Nitrogen oxides - Phosgene	- Acids or acid-forming agents which react with cytoplasmic proteins and destroy cell structure	- Chlorine is a greenish-yellow gas with pungent odor - Phosgene gas may smell like newly-mown hay or grass - Possible frostbite*	- Eye and skin irritation - Airway irritation - Dyspnea, cough - Sore throat - Chest tightness - Wheezing - Bronchospasm	- Confirm patient decontamination - Fresh air, forced rest - Semi-upright position - If signs of respiratory distress are present, oxygen with or without positive airway pressure may be needed - Maintain adequate oxygenation - No specific antidote	- May cause delayed pulmonary edema, even following a symptom-free period that varies in duration with the amount inhaled - May lead to ARDS (Acute Respiratory Distress Syndrome)

Agent Type	Agent Names	Mode of Action	Any Unique Characteristics	Signs and Symptoms	Treatment	Other Patient Considerations
Blistering/ Vesicant (See Table 4 below)	- Mustard/Sulfur mustard (HD, H) - Nitrogen mustard (HN-1, HN-2, HN-3) - Lewisite (L) - Phosgene oxime (CX)	- Exact mechanisms of biologic activity are unknown - Mustard: Forms metabolites that bind to enzymes, proteins and other cellular components - Lewisite: Binds to thiol groups in many enzymes -Phosgene oxime: Mechanism unknown, but corrosive like strong acids	- Mustard (HD) may have an odor like horseradish, garlic, or mustard - Lewisite (L) may have an odor like geranium - Phosgene oxime (CX) may have a pepper-like or pungent odor	- Skin, eye and mucosal irritation - Skin erythema and blistering - Tearing, conjunctivitis, corneal damage - Mild respiratory distress to marked airway damage	- Confirm patient decontamination - If dyspneic, give oxygen - Specific antidote British Anti-Lewisite (BAL) may decrease systemic effects of Lewisite - **See Lewisite antidote Table 4 below** - Mustard and phosgene oxime have no specific antidotes	- Possible pulmonary edema - Mustard has an asymptomatic latent period - Lewisite has immediate burning pain, blisters later - Phosgene oxime causes immediate pain - Monitor electrolyte balance; fluid loss is likely to be less than in comparable thermal burns - Neutropenia and sepsis
Incapacitating / Behavior-altering (See Table 5 below)	- Agent 15/BZ	- Competitively inhibits acetylcholine which disrupts muscarinic transmission in central and peripheral nervous systems (atropine-like action)	- May appear as mass drug intoxication with erratic behaviors, shared realistic and distinct hallucinations, disrobing and confusion - Hyperthermia - Mydriasis (dilated pupils)	- Dry mouth and skin - Initial tachycardia - Altered consciousness, delusions, denial of illness, belligerence - Hyperthermia - Ataxia (lack of coordination) - Hallucinations - Mydriasis (dilated pupils)	- Confirm patient decontamination - Evaluate mental status - Use restraints as needed - Monitor core temperature carefully - Specific antidote physostigmine may be available - **See Agent 15/BZ antidote Table 5 below**	- Hyperthermia and self-injury are greatest risks - Hard to detect because it is an odorless and non-irritating substance - Possible serious arrhythmias
Cytotoxic Protein	- Ricin - Abrin	- Inhibit protein synthesis	- Exposure by inhalation or injection causes more pronounced signs and symptoms than exposure by ingestion	- Latent period of 4-8 hours, followed by flu-like signs and symptoms - Progress within 18-24 hours to: - Nausea, cough, dyspnea, pulmonary edema (inhalation exposure) - GI hemorrhage with emesis and diarrhea; hypovolemic shock; hepatic, splenic and renal failure (ingestion exposure)	- Confirm patient decontamination - Maintain fluid/ electrolyte balance - Maintain adequate oxygenation - Provide pain management - No specific antidote	- Rapid progression of signs and symptoms - Death possible within 36 hours - If patient survives beyond 5 days without complications, recovery is likely

* Frostbite may occur from skin contact with liquid arsine, cyanogen chloride or phosgene.

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ANTIDOTES

Table 2. NERVE AGENT ANTIDOTE RECOMMENDATIONS

Nerve agent antidotes may be obtained as auto-injector syringes. These devices rapidly deliver antidotes intramuscularly, typically to the thigh or buttocks. Atropine, in auto-injector form, is available as the AtroPen in amounts of 0.5, 1, or 2 mg. 2-PAM chloride, in auto-injector form, is available as the 600 mg ComboPen. A Mark I kit contains two auto-injector syringes; the smaller one with 2 mg atropine and the larger one with 600 mg 2-PAM chloride.

The spring-loaded design of the auto-injectors provides a forceful delivery that may cause tissue damage, especially to children and smaller patients. Children weighing less than 15 lb (about 7 kg), generally those younger than 6 months old, should not ordinarily be treated with the nerve agent antidote auto-injectors. In this age group, atropine should be individualized at doses of 0.05 mg/kg.

Patient	Mild/Moderate Effects[1]	Severe Effects[2]	Other Treatment
Child	Atropine: 0.05 mg/kg IM **or** IV (minimum 0.1 mg, maximum 5 mg); **and** 2-PAM chloride: 25 mg/kg IM **or** IV (maximum 2 g IM **or** 1 g IV)	Atropine: 0.1 mg/kg IM **or** IV (minimum 0.1 mg, maximum 5 mg); **and** 2-PAM chloride: 50 mg/kg IM **or** IV (maximum 2 g IM **or** 1 g IV)	Assisted ventilation after antidotes for severe exposure. **Repeat atropine** at 2-5 minute intervals until secretions have diminished and breathing is comfortable or airway resistance has returned to near normal. **Repeat 2-PAM chloride** once at 30-60 minutes, then at one-hour intervals for 1-2 doses, as necessary. **Diazepam** for seizures: Child - 0.05 to 0.3 mg/kg IV (maximum 10 mg); Adult - 5 mg IV **Other benzodiazepines (e.g. lorazepam, midazolam)** may provide relief. **Phentolamine** for 2-PAM chloride-induced hypertension: 1 mg IV for children; 5 mg IV for adults.
Adult	Atropine: 2 to 4 mg IM **or** IV; **and** 2-PAM chloride[3]: 600 mg IM, **or** 25 mg/kg IV slowly	Atropine: 6 mg IM; **and** 2-PAM chloride[3]: 1,800 mg IM, **or** 50 mg/kg IV slowly	

1. **Mild/Moderate effects of nerve agents** include localized sweating, muscle fasciculations, nausea, vomiting, weakness, dyspnea.
2. **Severe effects of nerve agents** include unconsciousness, seizures, apnea, flaccid paralysis.
3. Dose selection of 2-PAM chloride for elderly patients should be cautious (usually starting at 600 mg IM, or 25 mg/kg IV slowly) to account for the generally decreased organ functions in this population.

NOTE: 2-PAM chloride is pralidoxime chloride or Protopam Chloride.

CHEMPACK: CHEMPACK is a federal program to provide nerve agent antidotes (Atropine, 2-PAM, Diazepam) to medical personnel during an emergency. Contact your county EMS coordinator, health department or emergency management office for more information.

Table 3. CYANIDE ANTIDOTE RECOMMENDATIONS

Victims whose clothing or skin are contaminated with hydrogen cyanide liquid or solution can secondarily contaminate response personnel by direct contact or through off-gassing vapors. Avoid dermal contact with cyanide-contaminated victims or with gastric contents of victims who may have ingested cyanide-containing materials. Victims exposed **only** to hydrogen cyanide gas do not pose contamination risks to rescuers. **If the patient is a victim of recent smoke inhalation (may have high carboxyhemoglobin levels), administer only sodium thiosulfate.**

Patient	Mild (conscious)	Severe (unconscious)	Other Treatment
Child	If patient is conscious and has no other signs or symptoms, antidotes may not be necessary.	Sodium nitrite[1]: 0.12 - 0.33 ml/kg, not to exceed 10 ml of 3% solution[2] (300 mg) slow IV over absolutely no less than 5 minutes, or slower if hypotension develops **and** Sodium thiosulfate: 1.65 ml/kg of 25% solution IV over 10 - 20 minutes[3]	For sodium nitrite-induced orthostatic hypotension, normal saline infusion and supine position are recommended. If still apneic after antidote administration, consider sodium bicarbonate for severe acidosis.
Adult	If patient is conscious and has no other signs or symptoms, antidotes may not be necessary.	Sodium nitrite[1]: 10 - 20 ml of 3% solution[2] slow IV over absolutely no less than 5 minutes, or slower if hypotension develops **and** Sodium thiosulfate: 50 ml of 25% solution (12.5 g) IV over 10 - 20 minutes[3]	

1. If sodium nitrite is unavailable, administer amyl nitrite by inhalation from crushable ampules. If neither is available, use sodium thiosulfate alone.
2. Available from Taylor Pharmaceuticals in cyanide antidote kit, formerly known as the Pasadena or Lilly Cyanide Antidote Kit.
3. If there is an inadequate clinical response after 30 minutes, administer a second dose of sodium thiosulfate which is half the initial dose.

Table 4. LEWISITE ANTIDOTE RECOMMENDATIONS

British Anti-Lewisite (BAL, dimercaprol) was developed as an antidote for Lewisite and is used medicinally as a chelating agent for heavy metals. BAL can be toxic; healthcare providers should read the package insert carefully prior to use. Consult your regional Poison Control Center.

British Anti-Lewisite dosing			
Indications	**Dosing for systemic effects**	**Contraindications**	**Other Treatment**
Due to toxic side effects, BAL should be administered **only** to patients who have signs of shock or significant pulmonary injury. There is evidence that BAL in oil, given intramuscularly, may reduce the systemic effects of Lewisite. BAL, administered IM, has no effect on local lesions of the skin, eyes or airways (See Other Treatment).	IM: 3-5 mg/kg every 4 hours for 4 doses **IV: Never administer BAL in oil via IV route.**	Do **not** administer BAL if the patient presents with any of the following: • pre-existing renal disease • pregnancy (except in life-threatening circumstances) • concurrent use of medicinal iron	BAL skin and ophthalmic ointment decreases the severity of skin and eye lesions when applied immediately after decontamination; however, neither is currently manufactured. They can be used if available.

Table 5. AGENT 15/BZ ANTIDOTE RECOMMENDATIONS

Consult your regional Poison Control Center.

Physostigmine dosing			
Test dose	**Dosing information** [1]	**All routes**	**Contraindications**
If the diagnosis is in doubt, a dose of 1 mg might be given. If slight improvement occurs, routine dosing should begin.	IM: 45 mcg/kg in adults (20 mcg/kg in children) **or** IV: 30 mcg/kg slowly (1 mg/min) **or** PO: 60 mcg/kg if patient is cooperative (dilute in juice due to bitter taste)	Titrate every 60 minutes to mental status.	Do **not** administer physostigmine if the patient is experiencing any of the following: • cardiopulmonary compromise • hypoxia • bronchospasm • acid-base imbalance with history of seizure disorder • acid-base imbalance with history of arrhythmias

1. Physostigmine may be minimally effective if given in the first 4-6 hours following exposure.

RADIOLOGIC EXPOSURE/TERRORISM

Key points:

In addition to typical considerations of patient safety, the following are critical considerations for pediatric populations:

Medical Treatment Unique to Pediatrics (AHRQ)

The clinical manifestations of radiation injury in children are generally similar to those in adults. However, a number of characteristics render the pediatric patient uniquely sensitive to the effects of radiation exposure. For example:

- Children have a greater body surface area to weight ratio than adults and the skin is more permeable and less keratinized, making them more vulnerable to both thermal and radiation burns.
- Young children may be unable to shield their eyes, making them more susceptible to ocular injury from blast, radiation, and thermal effects.
- Children have a higher baseline respiratory rate than adults and also exist in a lower breathing zone, making them more vulnerable to both generalized inhalation exposure and particulate exposure from radioactive fallout
- Children have a lower intravascular volume reserve than adults, making them more susceptible to dehydration from the gastrointestinal losses encountered in acute radiation syndrome.
- Infants and young children are more likely to come in close contact with radioactively contaminated materials in their environment
- Radioiodine, a common byproduct of nuclear reactor activity, is effectively transmitted through both human breast milk and cow's milk, which are staples of the childhood diet

Rady Children's Hospital San Diego	CURRENT EFFECTIVE DATE	REVISED DATE	MANUAL: TRACKING #
☒ **P O L I C Y/PROCEDURE** ☐ **STANDARDIZED PROCEDURE** ☐ **PLAN** ☐ **GUIDELINE**	TITLE: **DECONTAMINATION** PERFORMED BY:		

Specialty Review		**Council Review**	
☒ Multidisciplinary ☐ Nursing Council ☐ RT Council ☐ SW Council ☐ Child Life ☐ Human Resources ☐ EOC/Safety	☐ Information Services ☐ Infection Control ☐ Interdisciplinary Practice ☐ Pharmacy & Therapeutics ☐ Forms ☒ Med Staff ☒ Specialty Review	☐ Clinical Ops ☒ Med Staff Executive ☐ Center Ops ☐ Board	

1.0 PURPOSE:

1.1 To prepare for identification and decontamination of pediatric and adult patients who have been exposed to Chemical, Biological, or Radiological contamination.

1.2 To prevent the contamination of healthcare workers, facility, or other patients.

2.0 NOTIFICATION:

2.1 Upon notification or presentation of more than two patients who have had chemical, biological, or radiological exposure, the Emergency Department charge nurse will assume the role of the incident commander and activate RCHSD's Hospital Incident Command System (HICS).

2.2 Incident commander will notify Plant Operations to immediately set up decontamination tent, water heaters, and forced air warmers in decontamination area.

2.3 Incident commander will notify security to prepare for on-scene security and traffic flow.

- Security / Traffic management pallet will be brought to front of hospital from decon supply container.

- Security will establish security perimeter beginning at entrance of the ambulance circle and extending West to the main loading dock.
- Vehicles will not be allowed in this area except for those transporting patients to be decontaminated. Once a vehicle enters this area, that vehicle will require decontaminated before leaving.
- Normal ambulance traffic will be re-routed to the main hospital driveway and patients will enter hospital through East-side emergency room doors.
- Pedestrian traffic will be re-routed around hot-zone using signage and deliniators.
- Security will maintain security perimeter until hot zone is deemed safe by public authorities.

2.4 Incident commander will assign clinical staff to hot zone for intake and triage, warm zone for actual decontamination, and to cold zone for receipt after shower and transition into ED. Incident commander will ensure that all staff assigned to hot and warm zones don all PPE before entering the area.

2.5 If exposure is Radiological, Incident Commander or Command Center if open will immediately notify Radiology and ensure that Radiological detection equipment is brought to Hot zone immediately and that all hospital staff don radiological exposure badges.

3.0 <u>LOCATION:</u>

3.1 Primary - Adjacent to the ambulance circle directly outside of the Emergency Department.

3.2 Secondary – MAL Patio

4.0 <u>PERSONAL PROTECTIVE EQUIPMENT:</u>

4.1 All hospital staff involved in the hot or warm zones of decontamination will wear a minimum of level C PPE.

4.2 Level C PPE will include:

1. Full-face or half-mask (PAPR's), air purifying respirators (NIOSH approved).
2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
3. Coveralls.
4. Gloves, outer, chemical-resistant.
5. Gloves, inner, chemical-resistant.

4.3 Hospital staff working in cold zone may not enter hot or warm zones under any circumstances and must be decontaminated themselves if they do. Zones must be clearly delineated and monitored for cross contamination.

5.0 ZONES:

5.1 During all decontamination events, three zones will be established by the assigned incident commander,

- Hot zone will be the intake or receiving area for patients. Patients in this area will be triaged and disrobed. Patients suspected of Biological or Radiological exposure should be disrobed in the shower to prevent aerosolizing particles.
- Warm zone will be the actual decontamination area where patients will be washed.
- Cold zone will be the area where patients are received after wash down dressed, warmed, and transitioned into Emergency Department.
- Flow of patients and staff will occur in one direction only (hot to cold).

6.0 SHOWERS:

6.1 All patients will receive a five minute wash down with warm water. If the exposure is viscous or oily, a chemical soap will also be used. At no time will bleach be used in the decontamination of pediatric patients or patients with wounds that are deeper than superficial. Ambulatory patients will be instructed to stand with "arms out, legs apart" and be washed from head (top) to feet (bottom).

7.0 DRESSINGS/TOURNIQUETS/SPLINTS:

7.1 During initial decontamination in the decontamination areas bandages will be removed and wounds flushed. Bandages will be replaced only if bleeding recurs. Tourniquets are replaced with clean tourniquets and the sites of the original tourniquets decontaminated. Splints are thoroughly decontaminated, but removed only by a physician.

7.2 Dressings removed after decontamination in the operating room, emergency room, or inpatient care unit will be submerged in a 5% solution of hypochlorite or placed in a plastic bag and sealed.

8.0 THROUGHPUT:

8.1 RCHSD can decontaminate up to 24 patients per hour based on two stations at a rate of 5minutes per patient.

9.0 DECONTAMINATION OF ADULTS:

9.1 In a mass decontamination situation, family members are likely to show up with their children and should be considered "exposed". They should be disrobed in the hot zone and follow their child though the decontamination process before being allowed into the facility.

10.0 EVIDENCE/CHAIN OF CUSTODY

10.1 If the event causing the exposure is related to known or suspected terrorism or crime, all clothes and personal effects should be treated as evidence. Regardless, all clothes and personal effects should be documented, placed in a Biohazard Bag with the patient's identification, sealed, and placed in a rigid Biohazard container.

11.0 PRIVACY:

11.1 All efforts will be made to provide privacy for disrobed patients.

11.2 All efforts will be made to separate male from female disrobed patients

11.3 All efforts will be made to keep news camera's (including helicopters) from filming mass decontamination events.

12.0 THERMAL REGULATION:

12.1 Pediatric patients are much more likely to become hypothermic during decontamination. Water heaters, forced air warmers, will be used during all decontamination events.

12.2 Covering with appropriate gown, cloth, and/or emergency blankets will immediately take place in cold zone.

13.0 PATIENT IDENTIFICATION:

13.1 Identification cards will be affixed to patients in the cold zone. Documents handled in hot or warm zone will be considered contaminated and cannot be affixed to a disrobed patient.

14.0 DECONTAMINATION OF CARE GIVERS:

14.1 All care givers in the hot and warm zones must be decontaminated at the end of the event or as they are relieved.

List of Decontamination Supplies Needed for Pediatric Patients

Assumptions

1. Facility is already set up with primary decontamination equipment (i.e. showers, level C or higher PPE, lights, tape, stretchers, waste water collection equipment, etc).
2. Facility will perform primary decontamination independently (will not rely on SDFD for support).

The following list of equipment is pediatric specific and is meant to augment an already functioning and reviewed decontamination infrastructure.

Thermal Regulation Equipment

1. Hot water heater
2. Forced Air warmer
3. Appropriately sized patient gowns and emergency blankets

Transport

1. Appropriately sized gurneys and cribs

Monitoring

1. Pediatric/infant SAO2 probes
2. Pediatric/infant monitor leads/modules
3. Braselow tapes

Airway

1. Pediatric/Infant airway supplies

Cleaning Agents

1. Soap and water only, no bleach compounds.

Throughput

1. Pediatric patients will take longer to decontaminate. Allow for a minimum of five minutes per ambulatory patient (12 patients per hour for each decon shower)..

Pediatric Specific Decontamination Considerations

1. Pediatric patients have higher respiratory rates (higher exposure to inhaled agents)
2. Pediatric patients have higher skin permeability (higher exposure to skin agents)
3. Pediatric patients have weaker immune systems
4. Pediatric patients have less fluid reserves
5. Pediatric patients may not have verbal skills required to understand instructions or

communicate concerns

6. Pediatric patients will have increased anxiety (especially if separated from parents)
7. Pediatric patients are far more prone to hypo/hyperthermia.
8. Consider parents or caregivers transporting pediatric patients to facility contaminated as well and allow then to accompany child through decon process if possible.
9. Pediatric patients have increased psychosocial needs that need to be addressed
10. Pediatric patients are VERY difficult to hold when wet and must be handled securely/with great caution

Developing Your Own Surge Plan for Pediatrics General Acute Care (GAC) Hospitals

Preparation by General Health Care Facilities for a Surge of Critically Ill Children

All health care facilities, not simply pediatric hospitals, must be prepared for a surge of critically ill children. Although EMS field efforts will attempt to match the victims' needs with the nearest appropriate hospital, the most recent disaster literature suggest that up to 50 percent of the victims arriving at a hospital under surge (mass casualty) scenario will arrive by other means. To accommodate a possible surge of pediatric patients, hospitals that care for adult patients should ensure that adequate, up-to-date stocks of pediatric supplies - Broselow tapes, endotracheal tubes, intravenous catheters, interosseous needles, ambu bags, and other equipment - are on site (cache lists in appendix) Lastly, adult-only hospitals should diligently practice pediatric disaster drills. These activities should also include all staff that may be called on to deliver care to children, including respiratory technicians, radiologists, and others. RCHSD serves as a resource for community adult facilities. The goal is all acutely ill or injured children 14 years of age and under are sent to RCHSD. In the event of a surge event that impacts a significant number of pediatric patients that age limit may be lowered in collaboration with discussion from RCHSD Incident Commander and the San Diego County Emergency Operations Center.

A surge of ill children may present considerable staff challenges to general and adult-only hospitals. Although physicians who have undergone residency training in emergency medicine are prepared to manage acutely ill children, many general hospitals have limited numbers of pediatricians and pediatric support staff (e.g. child life specialists) on staff. Consequently, adult-only hospitals should develop lists with accompanying contact information (e.g. pager numbers, office phone numbers, home phone numbers, and cell phone numbers) of locally available pediatricians and nurses who will report to the hospital in the event of a surge. In metropolitan areas, adult-only hospitals should draft memoranda of understanding with local pediatric hospitals. These memoranda should 1) delineate protocols for patient transfers and other direct patient-care activities between the two facilities; 2) provide for pediatric hospital clinicians to staff inpatient locations such as intensive care units and operating suites; and 3) extend emergency staff privileges to pediatricians who are acutely needed to provide medical care in adult-only facilities. The last two points are vitally important; victims from a bioterror attack may not be appropriate for transfer and therefore must remain in the receiving facility. Since inpatient care is closely linked to that provided in the ED, sufficient numbers of pediatricians are required to staff inpatient beds, otherwise an ED will never decant its existing patient load and prepare for the arrival of more.

We cannot predict the nature of a future emergency that might occur, nor can we predict the date of its arrival, therefore we must prepare in advance for the possibility that they *will* occur; in this case, we must plan for pediatric surges.

Seriously/critically ill or injured children require an entirely different approach in terms of medical management and the physical infrastructure to provide for their care. They require specialized training, knowledge, procedures, medications, and handling. While Rady Children's Hospital of San Diego (RCHSD) remains the region's premier pediatric medical facility (and Level 1 trauma center) it is likely that in a large medical crisis, all of our hospital and clinical partners will have a part to play and will likely need manage pediatric patients at their own

facilities. “Children under the age of 18 comprise nearly 25 percent of the U.S. population and have important and often complex planning and response needs (FEMA). It is the intention of RCHSD to help prepare our community and regional healthcare partners for this task; and this manual serves as the cornerstone in the framework of our partnership.

This guide will provide familiarization, training, planning and preparation considerations, resources (tools, links, etc) and contact information for your Pediatric Surge Liaison partners at RCHSD. (Tools TBD/TBA)

Planning for Pediatric Surge in a General Acute Care Facility

Purpose: Providing strategic direction for hospital surge for pediatric facility.

Objectives:

1. Perform an Educational Needs Assessment
2. Perform an Organizational Needs Assessment
3. Develop Relationships with Pediatric Experts/Facilities
4. Practice Disaster Surge Response
5. Evaluate Education Plan

1. Perform an Educational Needs Assessment:

The potential needs of physicians, nurses and other staff in a crisis situation are determined by a number of methods. Direct methods include conducting interviews and employing written questionnaires, which include online surveys and focus groups. The Joint Commission Hazard and Vulnerability Analysis (HVA) is another valuable and important tool to assist with the assessment of the following 6 critical areas:

- Communication
- Resources and assets
    - Staffing
    - Supplies
    - Equipment
    - Pharmaceuticals
    - Space
- Safety and security
- Staff responsibilities
- Utilities management
- Patient clinical care and support

Indirect methods include disaster drill observations and review of standards published by others, including The Joint Commission.

2. Prepare an Organizational Needs Assessment:

In preparation of an overall organizational needs assessment, it is vital to address the following key elements:

<u>Identify Appropriate Child Care Space</u>
Pre-identify areas in the hospital for utilization during a surge. Use these areas for triage, treatment, holding and possibly admissions.

Ensure access control and monitor to prevent child predators. Avoid separation of children from their caregivers. Address childproofing strategies to avoid unnecessary injury.

Convert patient care areas appropriately for the care of children in the event of a disaster. Identify essential supplies required for proper care of children during a crisis event. Assess current pediatric supplies on hand. Include non-medical supplies such as diapers, pajamas, cribs, bottles, and pacifiers. Adjust and supplement current supplies for the number of children estimated to arrive during a disaster. Pre-arrange delivery of additional items with your hospitals' supplier and pre-identify important stock numbers.

Identify Child-Appropriate Food and Formula Supplies

The list includes milk and soy-based formulas. Adult foods modified into child-appropriate foods through the process of pureeing or dicing are worthy substitutes. Note: Additional food handling duties require additional staff. Always consider food allergies.

Determine Available Pharmaceutical Types

Maintain a cache of medication preparations suitable for children. Make available a standard means of dose calculation consistent with hospital practice, such as Broselow tapes and/or a pediatric pharmacy reference book to perform weight-based dose calculations.

Identify Staff Members for Child Care and Supervision

Assess current staff for specialty skills or experience in treating pediatric patients. Additionally, assess employees working in non-clinical areas regarding their experience in supervisory care of children. Develop a plan to notify identified staff rapidly in the event of a pediatric patient surge. Encourage key staff to maintain current credentials in pediatric training programs such as Neonatal Advance Life Support (NALS), Pediatric Advance Life Support (PALS), Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support (ATLS), Emergency Nursing Pediatric Course (EPNC), as well as current Just-in-Time training modules. Assign pediatric staff members to supervise those staff members lacking pediatric experience.

Develop Pediatric Disaster Response Team (PDRT)

Develop a Pediatric Disaster Response Team to address pediatric-specific issues which may arise during a disaster, whether your institution specializes in pediatric care or not. Identify team members, their level of training, and staff resources (sufficient to cover 24 hours, 7 days a week). Obtain commitments early in the process from team members as well as their supervisors.

3. Develop Relationships with Pediatric Experts/Facilities

Locate pediatric experts and pediatric facilities outside of your institution. Approach them pre-event. Discuss pediatric disaster issues with local departments of public health, hospitals and healthcare systems. Use Memos of Understanding (MOU's) where necessary

to define roles and expectations between institutions. Use technology systems to help coordinate education disseminated by outside experts.

4. Practice Disaster Response

Pre-event drills are an important part of surge preparedness. Perform small drills and tabletop exercises with staff to practice and test policies and protocols. Schedule larger scale drills and perform them regularly. Incorporate scenarios involving pediatric victims into all hospital drills. The value of practice is immeasurable. Always include experienced observers in these exercises.

5. Evaluate Education Plan

Evaluation plays an important role in the education process. Use drill assessments and After-Action Reports to identify skill gaps. Use questionnaires to capture participant observations and suggestions. Develop a summary evaluation report including both formal assessments and informal participant comments. Update or modify education plans based on assessment results.

> We need to convey to people that the theoretical risk of a disaster
> is an eventual reality. A catastrophic disaster will occur;
> We just don't know when."
> Alan L. Nager, M.D.

Rady Children's Hospital San Diego

Staffing Assessment Grid
Surge Planning

Purpose: Identify staff clinical experience with different age groups for planning for any surge event.

Name	Licensure	Neonate	Infant 0-2 yrs.	Pediatrics 2-12 yrs.	Adolescent 13-17 yrs.	Adult >18 yrs.	Adult Psych	Geriatric	Burn	PALS	ACLS	ICU	Peds ICU	ER

Rady Children's Hospital San Diego

Diversion Activities/ Toys

Suggested Diversion for Children

INFANTS / TODDLER

Baby music CD's/players
Board books
Fisher-Price baby cars and trucks
Infant Duplo (large Legos)
Musical crib toys
Musical pop-up boxes
Pacifiers
Plastic colored linking toys
Plastic/soft blocks
Play phones
Pound and play action toys
Rattles
Shape sorters
Sipper cups
Stacking nesting cups
Stacking rings
Teething toys
Wind up musical toys

PRESCHOOL

Baby doll sets
Beginner games – Candyland, Chutes and Ladders, Don't Break the Ice, Memory
Books/magazines
Building blocks
Duplo sets
Fisher-Price cars, trucks, bus, ambulance, helicopter
Hot wheel and match box cars
Magna Doodle
Midsize die-cast cars and trucks
Musical books
Midsize die-cast cars and trucks
Musical books
Plastic farm/barnyard/dinosaurs animals
Pop-up books
Puzzles (20-60 pieces)
See-N-Says
Small travel size Fisher-Price doll sets (people, furniture, animals)
Stuffed animals
View masters and reels

SCHOOL AGE / ADOLESCENTS

Action figures
Art and craft kits for boys and girls
Barbie dolls/clothes
Board games: Monopoly, Sorry, Checkers, Guess Who, Connect 4, Perfection, Uno, Checkers, Chess
Books/Magazines
Electronic hand held video games – Monopoly, Battleship, sports-themed games
Hot Wheels
Lego theme sets for boys and girls
Paint by number sets
Playing cards
Puzzles (100-200 pieces)
Travel-size games (Connect 4, etc.)

MISCELLANEOUS

Bubbles (made in USA)
Colored pencil sets
Coloring books for all ages
Construction paper
Crayons
Floor mats/blankets for children to play on
Foam Art pieces
Glue sticks
Marker sets
Pre-assembled art kits for easy distribution
Scissors (child size)
Stickers

Resources & References

Links for SURGE plan training:

NATIONAL CENTER FOR DISASTER PREPAREDNESS Pediatric Preparedness for Disasters and Terrorism A National Consensus Conference

http://www.bt.cdc.gov/children/pdf/working/execsumm03.pdf

BURN RESOURCE MANUAL

COUNTY OF LOS ANGELES DEPARTMENT OF HEALTH SERVICES

EMERGENCY MEDICAL SERVICES AGENCY

DIASTER SERVICES

http://ems.dhs.lacounty.gov/Disaster/BurnManual.pdf

Pediatric Disaster Toolkit: Hospital Guidelines for Pediatrics during Disasters (2nd Edition 2006)

http://www.nyc.gov/html/doh/html/bhpp/bhpp-focus-ped-toolkit.shtml

NATIONAL CENTER FOR DISASTER PREPAREDNESS Pediatric Preparedness for Disasters and Terrorism A National Consensus Conference

www.bt.cdc.gov/children/pdf/working/execsumm03.pdf

Radiation Event Medical Management: Guidance on Diagnosis & Treatment for Health Care Providers

U.S. Department of Health & Human Services.

http://www.remm.nlm.gov/

Pediatric Terrorism and Disaster Preparedness: A Resource for Pediatricians

Agency for Healthcare Research and Quality (AHRQ) by the American Academy of Pediatrics (AAP).

http://www.ahrq.gov/research/pedprep/resource.htm

IS-200.HCa Applying ICS to Healthcare Organizations

EMI/FEMA

http://training.fema.gov/EMIWeb/IS/is200HCa.asp

In a Moment's Notice: Surge Capacity in Terrorist Bombings

Centers for Disease Control and Prevention

http://www.bt.cdc.gov/masscasualties/surgecapacity.asp

Active Shooter: how to respond

U.S. Department of Homeland Security

http://www.alerts.si.edu/docs/DHS_ActiveShooterBook.pdf

Reporting Suspicious Activities for Hospitals

http://www.calhospitalprepare.org/category/content-area/planning-topics/terrorism

Recommended Training:

Various Topics

http://www.calhospitalprepare.org/

Psychological First Aid (Online)

Learning Center for Child and Adolescent Trauma

http://learn.nctsn.org/course/category.php?id=11

Radiation Event Medical Management: Guidance on Diagnosis & Treatment for Health Care Providers - U.S. Department of Health & Human Services.

http://www.remm.nlm.gov/