

Planning for Children in Disasters:

A Hospital Toolkit



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Introduction

Introduction

Children are a highly vulnerable segment of the population in times of disaster and pandemic disease outbreaks. On a daily basis, there are governmental and private entities which form the foundation on which children depend to help guide their development and protect them from harm. Most children also have the supervision of parents, guardians or caregivers. However once a disaster occurs, many of the people in the child's life may become unavailable. Day care centers and schools may be damaged, destroyed or used for shelters. Parents or guardians may be unable to address all their children's needs because of work or community obligations during the disaster response, or their own injuries or deaths. Pediatric patients who have physical and psychological injuries could easily overwhelm existing pediatric resources in Michigan hospitals. To accommodate the initial stabilization and treatment of these victims, the Emergency Medical System must have triage protocols in place to maximize the potential for pediatric patients being taken to a hospital that has the resources for adequate care. In addition, all hospitals should have surge plans in place for a Mass Casualty Incident (MCI), with the aim of increasing the pediatric bed capacity.¹



The unique vulnerabilities of children make it vital that their special needs are addressed in every stage of disaster planning – prevention, preparation, response and recovery. Federal targets for hospital surge capacity recommend accommodating 500 adult and pediatric patients per million populations in a disaster.² According to the 2010 census report, 23.7% (2,344,068) of Michigan's population is between the ages 0-17 years.² The 191 hospitals in Michigan have a total of 1981 pediatric beds, and five of the eight Regional Healthcare Coalitions have Pediatric Intensive Care Units in at least one hospital in their region. Currently the State of Michigan has 849 pediatric beds per million population, well above Federal recommendations.

Although Michigan has more than the recommended number of beds, there are large rural areas with long transport times to hospitals with pediatric services, which creates challenges to accessing specialized pediatric care rapidly. It is with this idea in mind, that this document was created to assist healthcare organizations in preparing for the care of children during disasters.

Nicole Lurie, M.D., M.S.P.H., Assistant Secretary for Preparedness and Response, in her speech before The Committee on Homeland Security and Governmental Affairs Ad Hoc Subcommittee on Disaster Recovery United States Senate stated, "The Department of Health and Human Services (HHS) is committed to the highest level of response for children before, during, and after emergency incidents, and continues to focus on integrating pediatric issues into the public health and medical response to natural and human-caused emergencies and disasters, including pandemic influenza. As part of this commitment, HHS has initiated programs and policies on a number of fronts to ensure that children receive the highest level of response before, during and after an incident. HHS

^{1,2} Health Resources and Services Administration, US Department of Health and Human Services. (2004). Continuation Guidance, National Bioterrorism Hospital Preparedness Program. Critical benchmark #2-1: surge capacity—beds.

² Census Viewer. (2010). Population by Age. Retrieved March 1, 2014, from <http://www.censusviewer.com/state/MI>

recognizes that the needs of children are different when planning for disasters. Children require different skills and resources to treat their injuries and illnesses because they are far more than just small adults.”³ Children can get sicker faster, but they can also heal quicker. Determining the most beneficial treatment for children during an emergency situation requires a different set of criteria than those used for adults.

During a disaster or pandemic illness, hospitals may receive critically ill or injured children and be charged to triage, treat and stabilize them while awaiting assistance or transport to a pediatric specialty center. The State of Michigan continues to prepare. The Michigan Department of Health & Human Services (MDHHS), through the Bureau of EMS, Trauma & Preparedness (BETP) has worked with all hospitals for this possibility. In an effort to further prepare hospitals for the surge of pediatric patients that may occur during a disaster, MDHHS BETP has worked with regional pediatric leadership personnel to develop this toolkit. The goal is to provide hospitals with useful, scalable and achievable strategies and tools for providing protection, treatment and acute care for children during a disaster.

Assumptions

All plans are developed with some underlying assumptions. The following assumptions should be considered when developing the facility hospital pediatric disaster plans:

- Pediatric care, not normally available at some hospitals, may have to be provided during a disaster until transfer for definitive care can be arranged. Healthcare providers, not used to caring for critically ill or injured pediatric patients may have to provide initial stabilization and continued care, until the patient can be transferred.
- Pediatric patients are not little adults and, as such, the extent and intensity of care and resources required will vary significantly within the targeted population. This is critical in assessing existing pediatric resources as it relates to the development of pediatric preparedness plans. Hospitals without pediatric services such as pediatric critical care or a pediatric trauma service may need guidelines and recommendations to provide protection, treatment and acute care for pediatric patients in disasters.
- Healthcare providers need access to pediatric-specific training, guidance, exercises and supplies. Federal assets may not be readily available in the immediate aftermath of an incident or if all regions of the country are experiencing mass medical illness.

Medical Surge and Medical Surge Triggers

In a disaster, the number of patients presenting for care may cause a “surge”. Surge is determined by the number of patients a hospital can receive while maintaining usual standards of care. For each of the critical system components needed to respond to a medical surge incident, space, staff and supplies, there are three measurements that provide guidance to overall surge capacity at each of the tiered levels. An incident does not have to overwhelm assets in all of the categories to have an impact on healthcare.

Conventional capacity is the ability for hospitals to manage a surge, while operating daily practices with little or no impact to the patients or facility.

³ Lurie, N. (2009). Children and disasters: The role of HHS in evacuation planning and mental health recovery. Testimony before the Committee on Homeland Security and Governmental Affairs Ad Hoc Subcommittee on Disaster Recovery, United States Senate. Retrieved August 1, 2014 from <http://www.hhs.gov/asl/testify/2009/08/t20090804a.html>

Contingency capacity affects the ability for hospital daily practices to be consistent, but has minimal impact to usual patient care. At this point, the demand for resources has not exceeded community resources.

Crisis capacity may require adjustments in care not consistent with daily practices, but the standard of care is coherent within the setting of an emergency. The best possible care is provided to patients under these circumstances.⁴

Once contingency or crisis capacity is reached during a surge of pediatric patients, hospitals without pediatric resources will require greater assistance from regional, state and federal partners. In a mass casualty incident, it is likely that the resources to assist children will be scarce, and staff inexperience with pediatric critical injury and illness will result in an inadequate “surge capacity.” Each Regional Healthcare Coalition should maintain knowledge of the total capacity for pediatric casualties and have a plan in place to be able to support an increase in pediatric surge capacity during an incident. Strategies to increase surge capacity within the hospital should be consistent with and integrated within Regional Healthcare Coalition operational guidelines. All appropriate available space should be utilized. Some areas to consider include the following:⁵

- Discharging inpatients and emergency department patients as soon as feasible and safe.
- Converting outpatient procedure beds into inpatient beds.
- Establishing a discharge holding area.
- Using hallways or creating alternate treatment areas (e.g., ambulatory clinics, on-site fitness center etc.)
- Strategies to create pediatric emergency treatment capacity outside the hospital.
- Initiate mutual agreements with other health care facilities, such as pediatric long-term care and rehabilitation facilities.
- Utilize mobile clinics, hospital-based ambulances, faith-based facilities, fitness centers and/or schools as alternate treatment areas.
- Establish relationships with pediatric tertiary care centers.

⁴ Altevogt, B.M., Stroud, C., Hanson, S.L., Hanfling, D., Gostin, L.O. (2009). Guidance for establishing crisis standards of care for use in disaster situations: A letter report. <http://nap.edu/catalog/12749.html>. Retrieved November 26, 2015

⁵ *Illinois Emergency Medical Services for Children*. Pediatric Disaster Preparedness Guidelines <http://www.luh.org/depts/emsc/HospPedPreparednessToolkitOct2015Final.pdf>

Table 1 below demonstrates how each stage of surge capacity could potentially be managed as the number of pediatric patients increase.

Table 1 Potential Medical Surge Response Strategies

	Conventional Capacity	Contingency Capacity	Crisis Capacity
Medical Surge Capacity Capability Tiers	<i>Tier 1</i>	<i>Tier 2</i> <i>Tier 3</i>	<i>Tier 4</i> <i>Tier 5</i> <i>Tier 6</i>
<i>Supplies</i>	<ul style="list-style-type: none"> • Stockpiled supplies used • Medical Supply Chain able to resupply on request 	<ul style="list-style-type: none"> • Hospital MOUs • Regional Equipment, Supply, and Pharmaceutical Caches • MEDDRUN/CHEMPACK 	<ul style="list-style-type: none"> • State Caches • Strategic National Stockpile (SNS) • Great Lakes Healthcare Partnership (GLHP) • Emergency Medical Assistance Compact (EMAC) • Allocation of Scarce Medical Resources
<i>Space</i>	<ul style="list-style-type: none"> • Cancel elective procedures • Use in-place bed additions • Begin surge discharge 	<ul style="list-style-type: none"> • Clear patients from pre-induction and procedure areas • Fill all available beds • Bed availability reporting (EMResource) 	<ul style="list-style-type: none"> • Place patients in hallways or lobby areas • Activate Alternate Care Sites (ACS), Casualty Transport System (CTS) • MI-TESA Medical Unit
<i>Staffing</i>	<ul style="list-style-type: none"> • Use all staff trained to care for pediatrics to provide care 	<ul style="list-style-type: none"> • Request pediatric trained staff from regional hospitals • MI Volunteer Registry • Medical Reserve Corps (MRC) • Mobile Medical Field Teams • Ambulance Strike Teams • MI-MORT 	<ul style="list-style-type: none"> • GLHPP • EMAC • National Disaster Medical System (NDMS) • Michigan Volunteer Registry • Utilize staff not trained for pediatric care

Staffing Plans^{6,7}

A team of selected members with skills or training in treating children should be the primary caregivers to children during a disaster. Identifying pediatric care providers is more important at hospitals with few pediatric services. Ideally, medical staff should be selected from pediatric emergency medicine, emergency medicine, pediatrics or family medicine divisions. Other staff members with some experience treating children may serve as additional or ancillary personnel. It is important to look for staff with airway management, resuscitation and critical care skills.

⁶ <http://pediatrics.aappublications.org/content/99/1/130> Accessed March 3, 2016

⁷ <http://www.emscimprovement.center/> Accessed August 25, 2016

Staff may include physicians, nurses, and advanced care providers such as physician assistants and nurse practitioners who are trained in the fields of anesthesia, critical care, otolaryngology, pediatric surgery, trauma surgery, general surgery, orthopedics, urology, neurosurgery and thoracic surgery. Staff members should have appropriate life support training certifications and hospital credentials.

- Identify these pediatric disaster team members before a disaster and incorporate into facility exercises.
- Provide their names and contact information to the Disaster Committee and Command Center.
- Maintain this information on a pediatric disaster call down roster.
- Update team member roster including contact information at least annually.



Planning Tips

- Identify key pediatric disaster team members early in the planning process and include them in protocol development and all exercises.

Key Personnel

The following key personnel will coordinate pediatric disaster care and planning, serving as regular members of the Disaster Preparedness Committee. Assign qualified clinical personnel to these three key positions:

Physician Coordinator for Pediatric Emergency Care in a Disaster

Nominated by the ED Medical Director and approved by the facility disaster preparedness committee, this individual should be responsible for:

- Ensuring staff physicians have necessary skills and knowledge for emergency care and resuscitation of infants and children.
- Helping develop and periodically review ED medications, equipment, supplies, policies and procedures as a member of the general disaster committee.
- Helping develop and update the hospital emergency response plan, focusing on children's needs.
- Serving as liaison to a definitive care hospital (regional pediatric referral center with pediatric-capable trauma center) should the need arise to facilitate pediatric transfers.
- Organizing emergency and disaster pediatric education for ED health care providers.
- Identifying staff qualified to provide immediate or extended care of pediatric patients during a disaster
- Developing liaison relationships with pre-hospital providers and systems for purposes of community preparedness and transport readiness.
- Providing emergency care and resuscitation to children during a disaster.

Pediatric Champion

The pediatric champion responsibilities should include:

- Serve as a liaison to standing hospital pediatric care committees (if hospital cares for children at all during normal operations) or having the ability to stand up such a committee during an incident.
- Serve as a liaison to inpatient nursing and a definitive care hospital (regional pediatric referral center with pediatric-capable trauma center), integrating services and facilitating patient transfers.
- Organize ED nursing continuing education in emergency/disaster pediatric care and providing pediatric orientation for new staff members.
- Help develop, and periodically review and revise policies and procedures for pediatric emergency care.
- Monitor pediatric medical equipment and medication availability.
- Provide emergency evaluation and care to children during a disaster.

Nursing Coordinator for Pediatric Emergency Care in a Disaster

This individual's responsibilities should include:

- Serving as liaison to in-hospital standing pediatric care committees (if hospital cares for children at all during normal operations) or having the ability to stand up such a committee during incident.
- Serving as liaison to inpatient nursing and a definitive care hospital (regional pediatric referral center with pediatric-capable trauma center), integrating services and facilitating patient transfers.
- Organizing ED nursing continuing education in emergency/disaster pediatric care and providing pediatric orientation for new staff members.
- Helping develop, and periodically review policies and procedures for pediatric emergency care.
- Monitoring pediatric medical equipment and medication availability.
- Providing emergency evaluation and care to children during a disaster.

Response

A hospital's pediatric disaster team should be as broad as possible, accounting for the many levels of staffing needed to care for children during a disaster. The team should include clinical staff as well as ancillary ED and inpatient personnel who will unite to provide emergency care for children. Additional staff may be needed to respond to children's non-clinical needs.

Sample Job Action Sheets (Appendix III) will help assign tasks to specific team members and help to support leadership positions. While the Physician and Nursing Coordinators will oversee clinical care in the ED, a general Pediatric Logistics Unit Leader and a Pediatric Services Unit Leader should monitor non-clinical areas. These unit leader positions will facilitate communication between non-clinical areas while overseeing disaster response in Procurement, Materials/Supplies, Transportation and Nutrition. These unit leader positions may be a part of the logistics section of the hospital incident command center.

Procurement Unit Leader

- Receives briefing from Logistics Section Chief and Pediatric Logistics Unit Leader
- Contacts personnel on Procurement Disaster call list, if warranted.
- Works with vendors for pediatric supplies.
- Develops a plan for back-up resources (hospital vendors, community resources, pharmacies, grocery stores).

Materials/Supplies Leader

- Receives briefing from Logistics Section Chief and Pediatric Logistics Unit Leader.
- Contacts personnel on Materials/Supplies Disaster Call list, if warranted.
- Collects and coordinates distribution of essential children's medical equipment and supplies.
- Helps Pediatric Service Unit Leader prepare pre-designated Pediatric Disaster Care Areas and Pediatric Safe Area.

Transportation Unit Leader

- Receives briefing from Logistics Section Chief and Pediatric Logistics Unit Leader.
- Contacts personnel on Transportation Disaster Call list, if warranted.
- Counts available stretchers, carts, cribs and wheelchairs available for transporting children.
- Ensures safety for transporting children and proper modification of adult transport equipment.
- Reports transportation resources to Logistics Section Chief.
- Coordinates delivery of transportation resources to designated pediatric area or ED, depending upon scenario.
- Designates transporters from Incident Command System staff or labor pool as needed.
- Ensures that all transporters aware of child safety issues, including never leaving children unattended.

Nutrition Unit Leader

- Receives briefing from Logistics Chief and Pediatric Logistics Unit Leader.
- Contacts personnel on Nutritional Call list, if warranted.
- Estimates number of children's meals needed for 48 hours.
- Estimates Pediatric Safe Area's food, snacks and water needs.

Behavioral Health

In addition to caring for children's physical needs during a disaster, it is essential that hospitals provide age appropriate emotional support to foster psychological resilience post disaster. According to the Substance Abuse and Mental Health Services Administration (SAMHSA), "adult support and reassurance is the key to helping children through a traumatic time." Disasters can result in long lasting psychological effects such as post-traumatic stress disorder in addition to the acute psychological issues such as fear, anxiety, grief, anger and confusion. Hospitals should include mental health providers, social workers and the hospital chaplain in all disaster response plans.



Planning Resource: Behavioral Health

Maintain a Healthy State of Mind: Parents and Caregivers:

<http://emergency.cdc.gov/preparedness/mind/parents/>

Volunteer Utilization

Experience has shown that during an emergency or crisis, many people want to volunteer their assistance. The Michigan Volunteer Registry (MVR) is a centralized database that provides access to contact information of interested and credentialed personnel. The credentialing process includes Michigan criminal background checks. This advanced registration process allows the Michigan Volunteer Registry to provide qualified and credentialed personnel to organizations in need. Volunteers with all skill levels and experiences are able to register online at: <http://www.mivolunteerregistry.org>. Information about the Michigan Volunteer Registry can be found at: <http://www.michigan.gov/DEPR>

To request volunteers, the hospital should contact their regional HCC Coordinator using the pre-established process.



Planning Resource: Pediatric Emergency Policies

Checklist: Essential Pediatric Domains and Considerations for Every Hospital's Disaster Preparedness Policies:
<http://emscimprovement.center/resources>. Accessed August 1, 2016

Pediatric Triage

This section includes general principles of triage as well as more specific guidelines for disaster triage, especially applied to the pediatric population. Tools in this section can guide hospitals both with and without pediatric specific units. The goal is to ensure accurate sorting of patients and optimal use of limited resources.

Background

Few hospitals have disaster plans that specifically address pediatric needs. A CDC analysis of the 2008 National Hospital Ambulatory Medical Care Survey found only about 68% of 294 hospitals had planned response strategies for six incidents, including epidemic-pandemic disease outbreaks and bioterrorism attacks. Researchers said the most important deficiency was in pediatric planning. Only 56.2% of hospitals reported having pediatric patient transfer agreements with other hospitals in case of patient overload and fewer than 50% had a system to track accompanied or unaccompanied children.⁸

⁸ Gausche-Hill M, Schmitz, C, Lewis RJ. (2003). Pediatric Preparedness of UW Emergency Departments: A 2003 Survey. *Pediatrics*.207:120(6):1229-1237. <http://pediatrics.aappublications.org/cgi/reprint/120/6/1229>. Accessed August 25, 2016.

Of the 119 million ED visits each year, 24 million are for children and 90% of these visits occur in non-children's hospitals.⁹ Only about 6 percent of EDs in the United States have all of the supplies deemed essential for managing pediatric emergencies and only half of hospitals have at least 85 percent of the supplies.¹⁰ It is important to note that children are more vulnerable than adults in many ways:^{11 12}

- A child's condition can shift from stable to life-threatening quite rapidly because he/she has less blood and fluid reserves, which means that relatively small amounts of blood/fluid loss can lead to irreversible shock or death. Children are also more sensitive to changes in body temperature, and have a higher metabolic rate.
- Infants, toddlers and young children do not have the motor skills to escape from the site of a chemical, biological or other terrorist incident. Children also lack cognitive decision-making skills to effectively flee from danger or to follow directions from others.
- Children are particularly vulnerable to aerosolized biological or chemical agents because they have a higher respiratory rate than adults and would inhale larger doses of the substance in the same period of time. Some agents (e.g., sarin and chlorine) are heavier than air; they accumulate close to the ground—in the breathing zone of children.
- Children are more vulnerable to the effects of agents that produce vomiting and/or diarrhea. Due to having less fluid reserve than adults, they can become dehydrated faster.
- Children are more vulnerable to agents that act on the skin because their skin is thinner and they have a larger surface-to-mass ratio than adults.



Acutely, the majority of pediatric care is not in specialized children's hospitals, but rather in community based hospitals and Emergency Departments, which is not likely to change during a disaster. Ideally, it is best to transport pediatric victims to regional pediatric hospitals, but logistically that may be impossible. In a large scale disaster or mass casualty incident, children's hospitals may become overwhelmed quickly and exceed their surge capacity to care for the incoming patients. A lack of qualified pediatric transport teams, or available EMS crews may contribute to further delays or even an inability to transfer children to available pediatric centers due to the size or nature of the incident.

Parents or caregivers may also be injured and need treatment. Every effort must be made to keep children and their caregivers together; therefore, hospitals need to be prepared to provide care to these patients as a "unit". Hospitals not normally accustomed to delivering pediatric care may be forced to do so, and pediatric hospitals may need to care for adult victims, both for an unknown duration of time.

⁹ Gausche-Hill M, Schmitz, C, Lewis RJ. (2003). Pediatric Preparedness of UW Emergency Departments: A 2003 Survey. *Pediatrics*.207:120(6):1229-1237., <http://pediatrics.aappublications.org/cgi/reprint/120/6/1229>. Accessed August 25, 2016.

¹⁰ Hogan, E.D., Lairet, J., Burnstein, J.L. (2002). *Triage in Disaster Medicine*. Lippincott, Williams and Wilkins: Philadelphia.

¹¹ Emergency Care for Children: Growing Pains. <http://books.nap.edu/catalog/11655.html>. Accessed August 25, 2016.

¹² Illinois Emergency Medical Services for Children. (2005). *Pediatric Disaster Preparedness Guidelines*.



Planning Tips:

- All hospital emergency plans should have a pediatric specific component
- Include community representation when developing plans.
- Written transfer agreements should be in place with other hospitals that have pediatric capabilities.
- Plan to care for the family as a unit, adults and children.
- Continuing education in pediatric care is highly recommended for hospital and pre-hospital emergency medical personnel.

Triage Principles

A mass casualty incident (MCI) can be characterized by an imbalance between needs and resources; there is not a pre-determined number of patients that equates to a mass casualty incident. In a mass casualty incident/disaster response, triage should be the first step in patient care. It is the keystone of successful and fair disaster medical management, because the decisions made during this phase will impact on the community at large. As the incident changes, the triage process should evolve. Disaster triage requires a paradigm shift from the daily routine to transport and treatment priorities, as well as accomplishing the greatest amount of good for the greatest number of patients.

Daily triage identifies the sickest patient to receive evaluation and treatment as early as possible. This allows for the highest intensity of care provided to most seriously ill patients regardless of the probability for survival.

Disaster triage is employed when local resources are unable to provide timely care to all victims needing it due to limited availability of resources.

The use of disaster triage involves a change of thinking from everyday care to:

- High intensity care should go to the sickest patient doing the greatest good for greatest number.
- Identify victims with best chance of survival for immediate intervention focusing care on those with serious and critical injuries but who are salvageable.
- Identify victims at extremes of care by sorting those who are lightly injured and those who are so severely injured that they will not survive.
- Immediate treatment to only those victims that procedure or intervention may make difference in survival.
- Altered standards of care based on resource availability.

Disaster triage must be dynamic and fluid in its execution. **Primary triage** is done at the scene by first responders; the triage category is assigned in less than 30 seconds and is based on physiologic parameters and survivability. **Secondary triage** occurs typically at the facility where the patient is transported. The initial triage assignments may

change and evolve as the patient's condition changes so reassessment is crucial. It is essential that medical personnel prioritize transport and treatment based on level of injury and available resources.¹³

An important skill in disaster triage is the ability to distinguish those requiring immediate lifesaving care and those who can receive delayed care and making these decisions based on survivability. During times of disaster and mass medical surge, medical personnel must remember that resources will become scarce quickly so they must be conserved and utilized efficiently.¹⁴ The objective of pediatric triage is to optimize the number of pediatric victims triaged in an MCI, to improve resource allocation, and reduce emotional burden on triage personnel.

As of yet there is no one standardized approach to triage that is accepted nationally. The type of system used can be dependent upon local, regional or state protocols. This can cause inconsistency or a lack of interoperability between jurisdictions. The State of Michigan uses triage tags with the five color coded categories: red, yellow, green, gray, and black.



- Red signifies that the patient has immediate or life threatening injuries, but could be salvageable with immediate action such as, relief of an airway obstruction or by controlling significant external bleeding.
- Yellow signifies potentially serious injuries, but the patient is stable enough at the time of assessment that they could wait a short time for care. A person classified as yellow may have injuries like penetrating trauma, long bone fracture or a severe eye injury.
- Green signifies minor injuries and many times these patients are called “walking wounded.” Green patients can wait longer periods for care and may have injuries such as minor burns, laceration and sprains.
- Grey signifies injuries so grave they are expected to die.
- Black indicates already dead. Any attempt to resuscitate these patients will use too many resources and are likely to have a negative outcome.

The physiologic criteria of the Field Triage Decision Scheme are well supported in determining who requires a trauma center. Parameters include:

- Glasgow Coma Scale (GCS) < 14.
- Systolic Blood Pressure (SBP) < 90.
- Respiratory Rate (RR) < 10 or > 29.
- Palpable radial pulses can be an acceptable form of assessment of perfusion.
- The motor component of the GCS and the patient's ability to follow commands may be enough to identify patients in need of immediate care/ transport.

Triage Models Reviewed

Many triage models exist across the nation. The Federal Interagency Committee on EMS (FICEMS) Preparedness Committee reviewed several models and developed the Model Uniform Core Criteria (MUCC) for Mass Casualty Incident Triage (2011). The MUCC for Mass Casualty Triage is an evidence and consensus based national guideline that recommends 24 core criteria to be included in all mass casualty triage systems.¹⁵ Of all the triage models

¹³ Hogan, E. D., Laird, J., Burnstein, J. L. (2002). Triage in Disaster Medicine. Lippincott, Williams and Wilkins: Philadelphia.

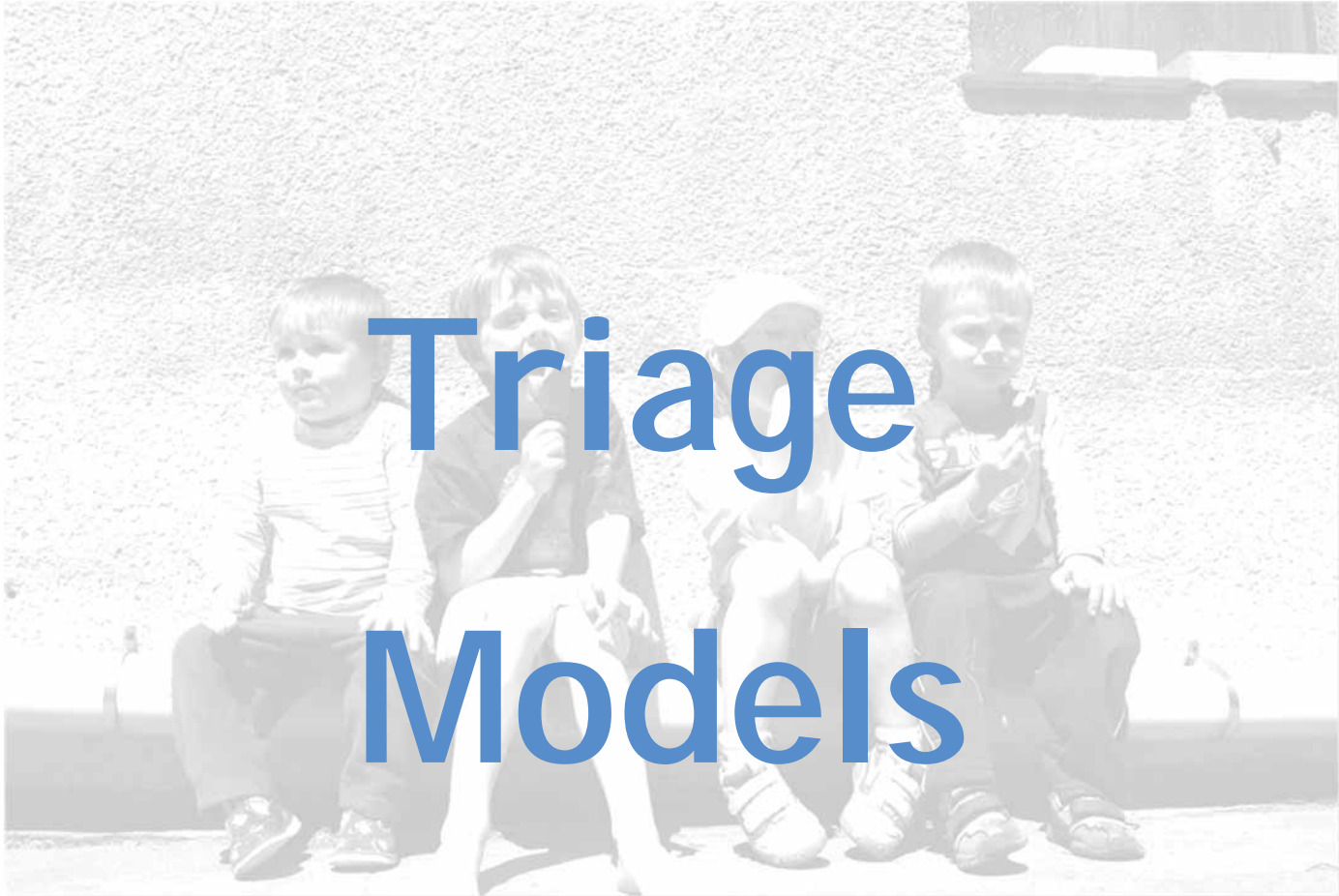
¹⁴ Burkle, F. M., Antosia, R. E., Cahill, J. D. (2006). Handbook of Bioterrorism and Disaster Medicine. Springer Science: NY

¹⁵ Federal Interagency Committee on EMS. (2011). National Implementation of the Model Uniform Core Criteria for Mass Casualty Incident Triage: A Report to the FICEMS.

evaluated by the FICEMS, there was not sufficient evidence to recommend any one model to become the national model. Therefore, several of the most commonly utilized triage models are shared in this toolkit.



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START Triage¹⁶

Simple triage and rapid treatment (START) is a method used by first responders to effectively and efficiently evaluate all of the victims during a mass casualty incident (MCI). The first arriving medical personnel will use a triage tag to categorize the victims by the severity of their injury. The victims will be easily identifiable in terms of what appropriate care is needed by the triage tags they were administered. The whole evaluation process is generally conducted in 60 seconds or less. Once the evaluation is complete, the victims are labeled with one of the four triage categories:

- **Minor** –delayed care/can delay up to three hours.
- **Delayed** - urgent care / can delay up to one hour.
- **Immediate** immediate care / life-threatening.
- **Deceased** - victim is dead or mortally wounded / no care required.

The START MCI triage method uses a quick assessment of:

- Ambulation/ ability to walk.
- Airway.
- Circulation.
- Neurologic function.



Planning Tips:

- Mass Casualty triage differs from daily field and ED triage.
- Physiology is the driving factor for MCI triage including children.
- Resources, patient acuity and numbers are limiting factors.
- "MCI triage will never be logistically, intellectually, or emotionally easy... but we must be prepared to do it using the best of our knowledge and abilities." Lou Romig.

MASS Triage

The MASS Triage (Move, Assess, Sort, Send) was developed by the National Disaster Life Support (NDLS) Foundation and involves an initial global sorting of patients before individual evaluation. All ambulatory patients are asked to walk to a specific location for care.

¹⁶ <http://www.remm.nlm.gov/startadult.htm>. Accessed August 25, 2016

Any non-ambulatory patients who are cognizant enough to understand and follow commands are asked to wave their hands so they can be categorized. A responder then goes to each patient who is not moving or waving and assesses them for their injuries. Individual patients are categorized into 1 of 4 classes:

- Immediate (Red).
- Delayed (Yellow).
- Minimal (Green).
- Expectant or Dead (Black).

Once the triage process is complete, patients are prioritized for transport.

JumpSTART Triage¹⁷

The JumpSTART Pediatric triage framework is an adaptation of the START triage method that takes into account the physiologic differences between adults and children. It was designed specifically for mass casualty incidents not daily triage. According to its developer, Dr. Lou Romig, JumpSTART is intended for, "children with acute injuries and may not be appropriate for the primary triage of children with medical illnesses in a disaster setting."¹⁸ The issues with using adult START for children that JumpSTART addresses include:

- Physiological differences in respiration.
- Different levels of mentation or social integration that affect the mentation check.
- Common non-ambulatory evaluations that should not affect Green status.
- Creating a special class of triage evaluation to help the triage officer control his or her own psychological reactions.

Currently JumpSTART is the most widely used pediatric mass casualty triage tool in the US at present. This pediatric triage model:

- Focuses on pediatric parameters.
- Is well known and widely adopted.
- Is designed for any pediatric victim who appears < 8 yrs. of age.
- Allows for age dependent physiologic parameters of child such as respiratory rate, circulation, and mental status.

JumpSTART objectives:

- Optimize the primary triage of injured children in the MCI setting.
- Enhance the effectiveness of resource allocation for all MCI victims.
- Reduce the emotional burden on triage personnel who may have to make rapid life-or-death decisions about injured children in chaotic circumstances.

Figure 1 below outlines the JumpSTART triage process for categorizing victims of a MCI.

¹⁷ http://www.jumpstarttriage.com/JumpSTART_and_MCI_triage.php. Accessed August 25, 2016.

¹⁸ Romig, L. (2012). The JumpSTART Pediatric MCI Triage Tool and other pediatric disaster and emergency medicine resources. The JumpSTART Pediatric MCI Triage Tool: Principles of Multi-casualty Triage.

http://www.jumpstarttriage.com/JumpSTART_and_MCI_Triage.php. Accessed August 25, 2016

Figure 1: JumpSTART Triage Process

JumpSTART Pediatric MCI Triage[®]

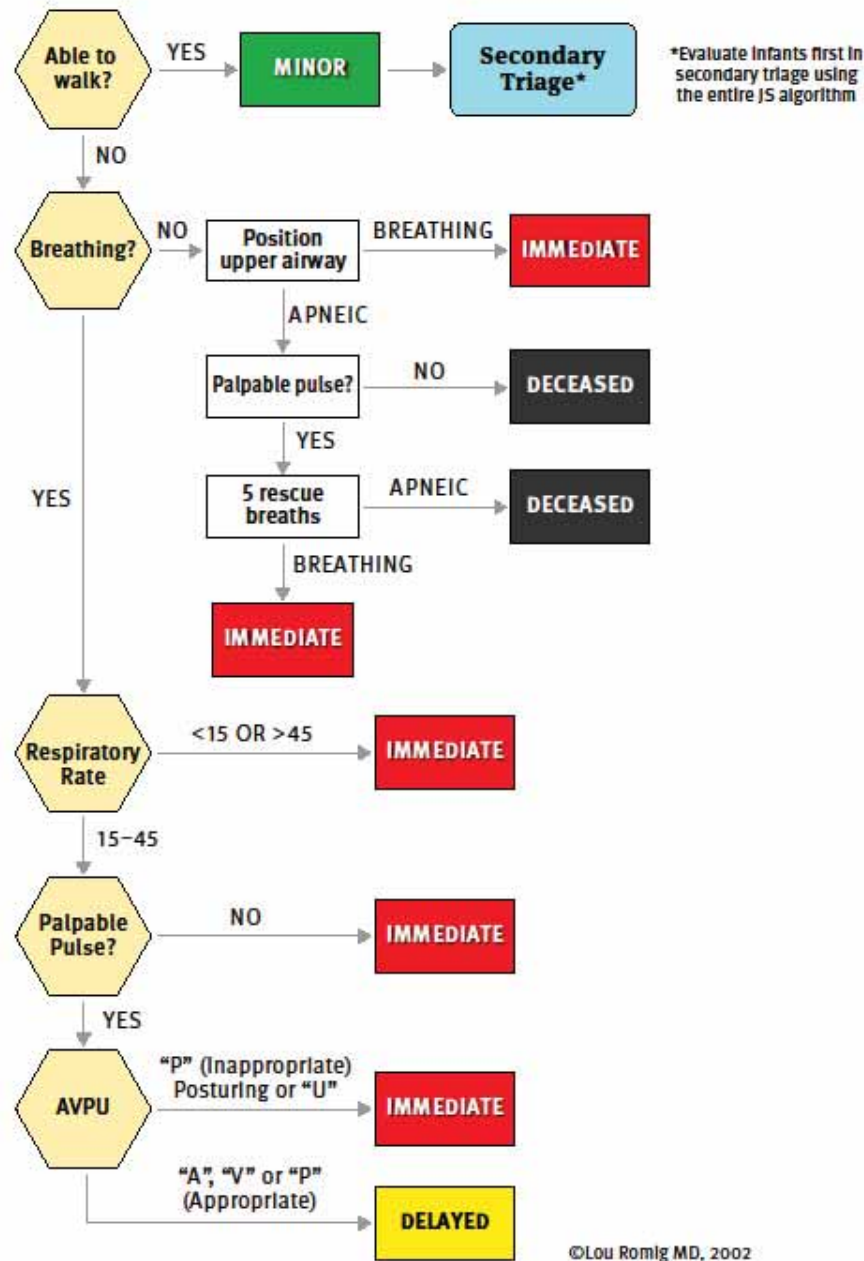


Table 2: AVPU Scale

Mental Status AVPU Scale	
A	Alert
V	Responds to Verbal Stimuli
P	Responds to Painful Stimuli
U	Unresponsive

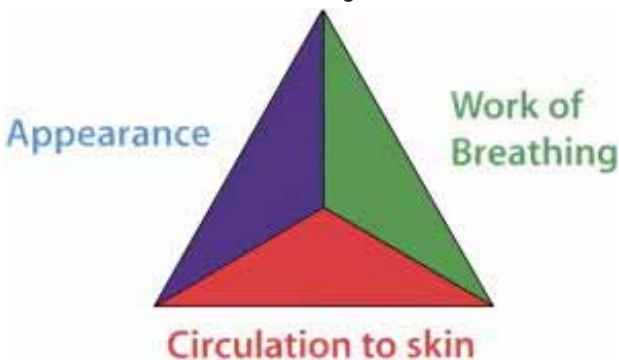
Figure 2 JumpSTART Triage Categories



Pediatric Assessment Triangle (PAT)^{19,20}

The Pediatric Assessment Triangle (PAT), developed by the American Academy of Pediatrics (AAP) is intended to be a rapid (30-60 second) severity of illness assessment. The method relies on visual clues of appearance, work of breathing and circulation to determine the urgency of needed interventions. Basically, the determination of sick or not sick is made. PAT is not designed for disaster triage.

Figure 3 Pediatric Assessment Triangle



The SALT Triage Method^{21,22}

The SALT triage method uses the principals of Sort, Assess, Life-saving interventions, and Treatment and transport. This methodology was created by CDC's Federal Interagency Committee on Emergency Medical Services Preparedness Committee in response to requests to simplify and standardize disaster triage for all aged victims. It

¹⁹ <http://www.health.ny.gov/professionals/ems/pdf/pediatricreferencecard-04.pdf>. Accessed August 25, 2016

²⁰ Lyle, K. (2009). et.al. *Pediatric Mass Casualty: Triage and Planning for the Pre-hospital Provider*. Clinical Pediatric Emergency Medicine. Sept 2009 10:3 p.173-185.

²¹ <http://www.ncbi.nlm.nih.gov/pubmed/?term=19947863>. August 25, 2016

²² Lerner, B. E., et al. (2008). *Mass Casualty Triage: An Evaluation of the Data and Development of a Proposed National Guideline*. Disaster Med. Public Health Preparedness. 2(sup 1): (S24-34)

incorporates the Model Uniform Core Criteria for mass casualty triage. The SALT method adds an existing triage category to the traditional 4 categories as indicated in Figure 4 below. SALT places an emphasis on continual reassessment. SALT Lifesaving interventions include:

- Open airway/jaw thrust.
- 2 rescue breaths for child (consistent with American Heart Association guidelines).
- Control major hemorrhage.
- Use of auto-injector antidotes.

The lifesaving interventions should be completed quickly prior to assignment to a triage category, but only if the supplies are readily available and the provider is trained in their use. These specific actions were chosen because they have a profound effect on patient survival.

The SALT method offers 5 levels of severity as indicated in Figure 4 below.

Figure 4: SALT Triage Categories^{23,24}



Planning Tips:

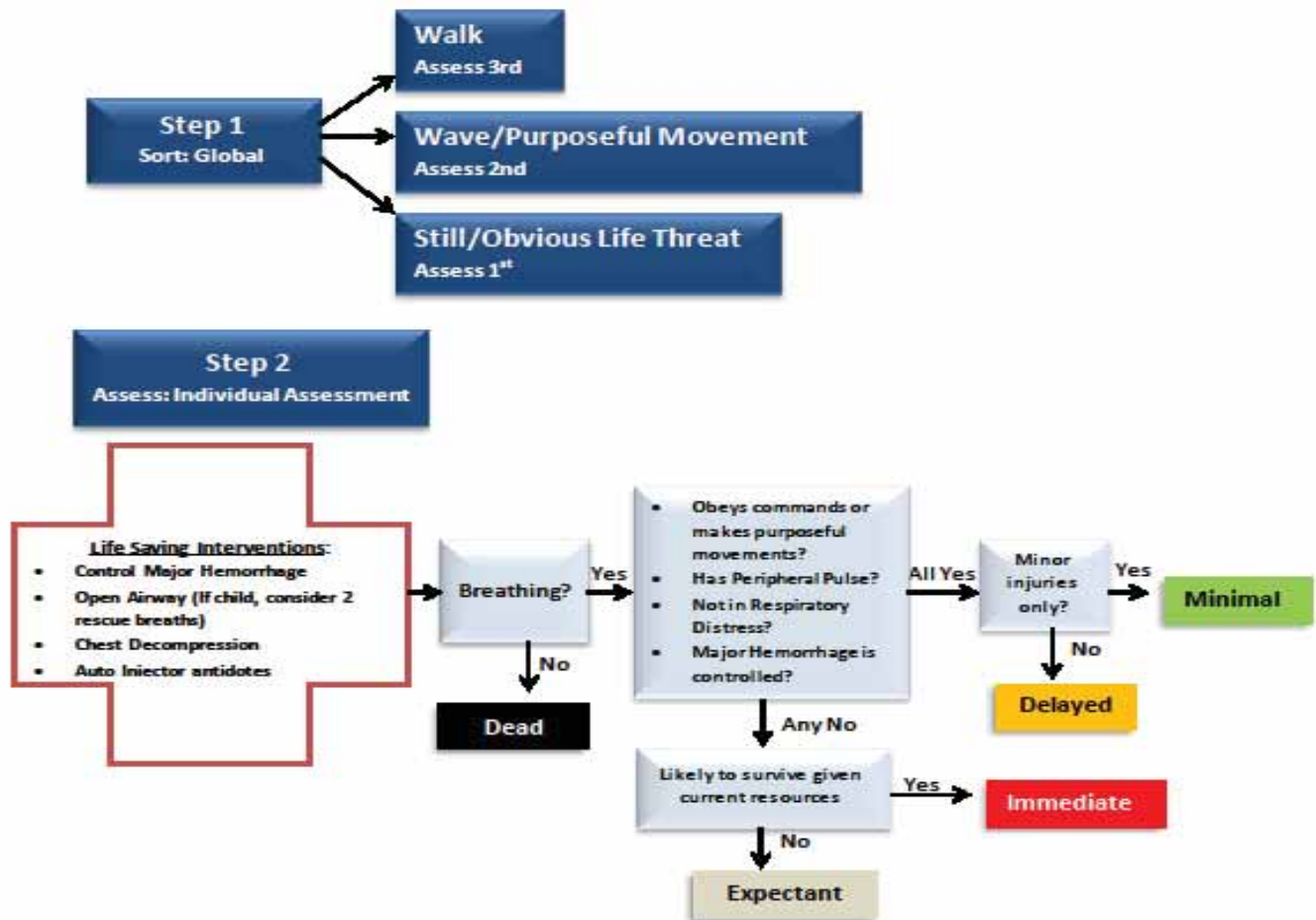
- Gray patients have severe injuries, and are not dead at the time of primary triage. These patients would benefit from more resources as they become available.
- The gray classification allows focus of resources on potentially salvageable patients.
- As more resources and providers become available, resuscitation or comfort care can be provided, however prioritization may change as patient conditions change, resources become scarce, or scene safety becomes hazardous.
- SALT Mass Casualty Triage training is available on-line at: <http://register.ndlsf.org/mod/page/view.php?id=2056>.

Figure 5 depicts the triage decision making process utilized with the SALT method.

²³ Burkle, F. M., Antosia, R.E., Cahill, J.D. (2006). Handbook of Bioterrorism and Disaster Medicine. Springer Science: NY.

²⁴ Eastridge, B. J., et al. (2010). *Field Triage Score in Battlefield Casualties: Validation of a Novel Triage Technique in a Combat Environment*. The American Journal of Surgery. 200, 724-727

Figure 5: The SALT Triage Decision Making Process²⁵



²⁵ Federal Interagency Committee on EMS. (2011). National Implementation of the Model Uniform Core Criteria for Mass Casualty Incident Triage: A Report to the FICEMS.

Hospital Based Triage

Assessment of Breathing:

The triage officer will form a first impression about a patient's respiratory status as indicated in table 2.

- If critical or unstable, the patient will be considered RED and sent to the decontamination ahead of the line or to the resuscitation area as appropriate.
- If potentially unstable after decontamination, the patient will be considered YELLOW and sent to the Triage or to the appropriate treatment area after decontamination.
- If breathing is stable, then continue assessment for circulation and appearance.

Table 2: Airway Assessment

Assessment	Critical/Unstable	Potentially Unstable	Stable
Airway	Partial to complete obstruction including by secretions or blood	Patent with secretions.	Patent
Work of breathing	Absent or increased work with periods of weakness	Normal	Normal
Central skin color	Pallid, mottled, or cyanotic	Pink	Pink
Inspection	Absent to decreased chest movements	Normal	Normal

Modified from Sandal ND et al.

Assessment of Circulation

The triage officer will form a first impression about a patient's circulatory status as indicated in table 3 below.

- If critical or unstable, the patient will be considered RED and sent to decontamination ahead of the line or to the Resuscitation area as appropriate.
- If potentially unstable, the patient will be considered YELLOW and sent to an area or other designated area after decontamination.
- If circulation is stable, then continue assessment for appearance.

Table 3: Circulatory Assessment

Assessment	Critical/ Unstable	Potentially unstable	Stable
Skin	Pallid, mottled, or cyanotic.	Normal	Normal

Modified from Sandal ND et al.

Assessment of Appearance – "TICLS"

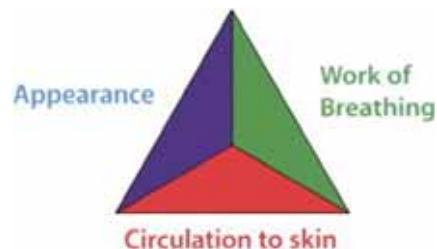
The triage officer will form a first impression about a patient's appearance, based on evaluating muscle tone and mental status as indicated in table 4 below. To make the determination whether the patient is critical or unstable. The patient will be sent to decontamination ahead of the line or to the Resuscitation/RED area as appropriate. Based on any abnormal findings, if potentially unstable, the patient will be sent to Triage/YELLOW area or other designated area after decontamination.

Table 4: Characteristics of Appearance "TICLS"²⁶

Tone	<ul style="list-style-type: none"> Is there vigorous movement with good muscle tone, or is the child limp?
Interactivity	<ul style="list-style-type: none"> Is the child alert and attentive to surroundings, or apathetic? Will the child reach for a toy? Does the child respond to people, objects, and sounds?
Consolability	<ul style="list-style-type: none"> Does comforting the child alleviate agitation and crying?
Look/Gaze	<ul style="list-style-type: none"> Do the child's eyes follow your movement, or is there a vacant gaze?
Speech/Cry	<ul style="list-style-type: none"> Are vocalizations strong and spontaneous, or are they weak, muffled, or hoarse?

Key Visual Assessment Points of the Pediatric Assessment Triangle:

- Any Critical/Unstable elements of the Pediatric Assessment Triangle, the patient is immediately sent to Resuscitation/RED.
- Any Potentially Unstable elements of the Pediatric Assessment Triangle, the patient is immediately sent to Triage/YELLOW.
- When Stable elements for ALL THREE elements of the Pediatric Assessment Triage occur, the patient is sent to Stable Area/GREEN.
- Patient will be sent to Triage/YELLOW, by default, when the criteria for Critical/Unstable and Stable are not clearly met.



Planning Tip: Special Circumstances

The following circumstances require a more thorough history and physical. Patients in these circumstances should not be considered stable by visual inspection alone and should be triaged to the **yellow** category:

- Patients who appear to be 8 years of age or less without an accompanying caretaker.
- Children with special needs.
- All patients 5 years of age or less.

Assessment of Mental Health

Assessment of mental status in children is age-dependent, but can quickly be assessed by gauging the level of responsiveness as indicated in table 5 below. An answer that demonstrates an abnormal response by the patient requires that the patient be sent to Resuscitation/Red.

²⁶ Adapted from, Dieckman, R., Brownstein, D., Gausche-Hill, M. eds. (2000). *Pediatric Education for Prehospital Professionals*. Sudbury, MA: Jones and Bartlett Publishers, American Academy of Pediatrics. (Used with permission)

Table 5: AVPU Scale

Category	Stimulus	Response Type	Reaction
<u>A</u>lert	Normal environment	Appropriate	Normal interactions for age
<u>V</u>erbal	Simple command or sound stimulus	Appropriate	Responds to name
		Inappropriate	Nonspecific or confused
<u>P</u>ain	Pain	Appropriate	Withdraws from pain
		Inappropriate	Sound or motion without purpose or localization of pain
		Pathological	Posturing
<u>U</u>nresponsive		Pathological	No response to any stimulus

The Glasgow Coma Scale (GCS) is more specific and predictive of patient outcomes than the AVPU scale²⁷, but it is more complex as it assigns a score. There are 2 GCS scoring tables based on age of the individual being assessed as indicated in the following tables.

Table 6: Standard Glasgow Coma Scale

Eye Opening	
Spontaneous	4
To verbal stimuli	3
To pain	2
None	1
Best Verbal Response	
Oriented	5
Confused	4
Inappropriate words	3
Incomprehensible sounds	2
None	1
Best Motor Response	
Follows commands	6
Localizes pain	5
Withdraws to pain	4
Flexion to pain	3
Extension to pain	2
None	1
Total	

²⁷ Tepas, J. J., Fallat, M. E., Moriarty, T. M. (2004). *Trauma, in APLS: The Pediatric Emergency Medicine Resource*. Gausche-Hill, M., Fuchs, S., and Yamamoto, L. (eds.) Sudbury, MA: Jones and Bartlet Publishers.

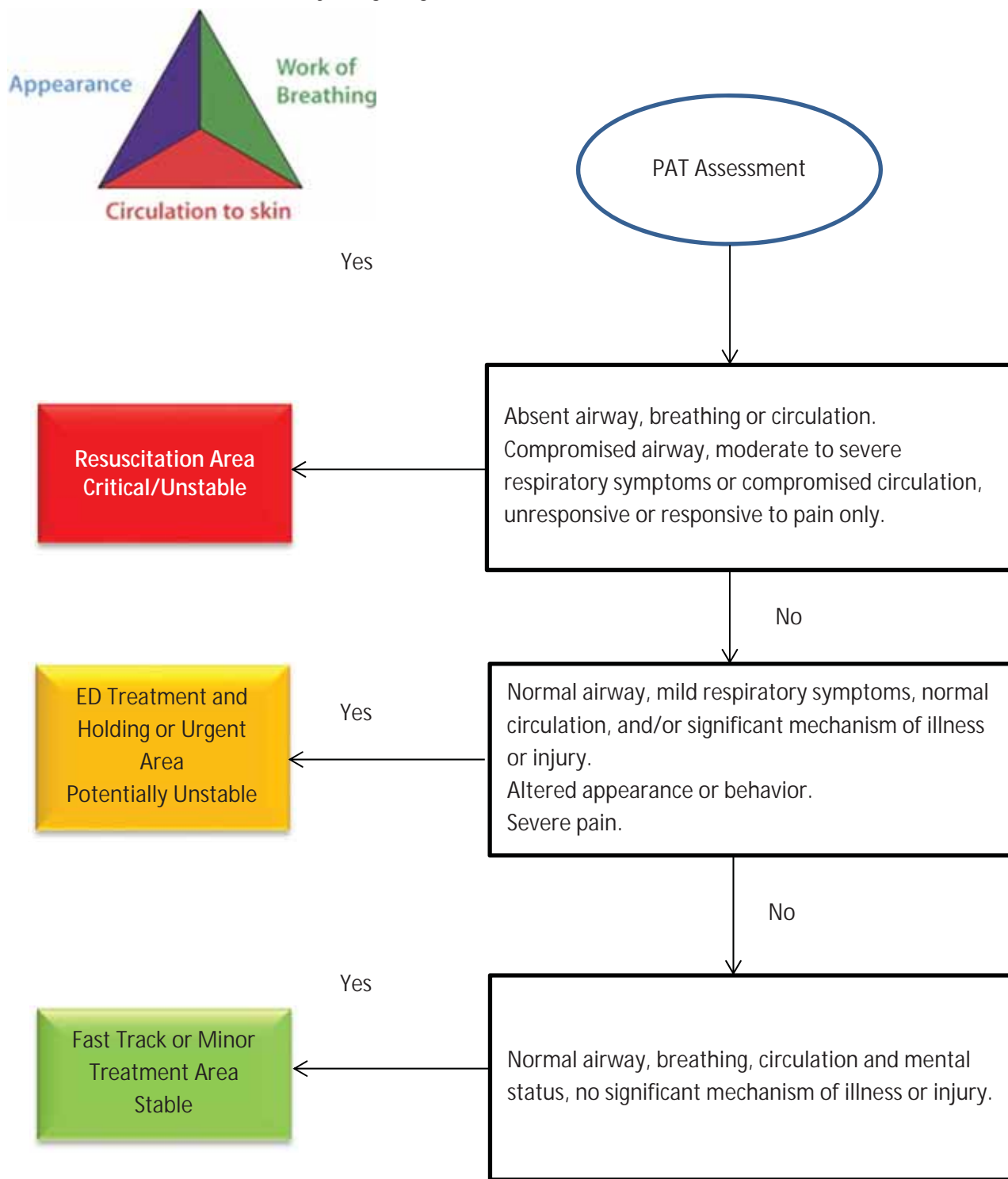
Table 7: Pediatric Glasgow Coma Scale for Infants and Young Children

Eye Opening		
Infants	Children	
Opens eyes spontaneously	Opens eyes spontaneously	4
Opens eyes to speech	Opens eyes to speech	3
Opens eyes to pain	Opens eyes to pain	2
No response	No response	1
Verbal Response		
Infants	Children	
Coos and babbles	Oriented	5
Irritable cry	Confused	4
Cries to pain	Inappropriate words	3
Moans to pain	Incomprehensible words	2
No response	No response	1
Motor Response		
Infants	Children	
Spontaneous movements	Obeys commands	6
Withdraws to touch	Localizes	5
Withdraws to pain	Withdraws to pain	4
Flexion to pain	Flexion to pain	3
Extension to pain	Extension to pain	2
No response	No response	1
Total		

Triage Algorithm

Patients 8 years or less of age without accompanying caretaker or those with special needs and all patients 5 years or less of age in the presence of a caretaker should all go through this Triage assessment and should not be considered stable by visual inspection alone. These groups of patient require more detailed history and physical.

Figure 6: Pediatric Assessment Primary Triage Algorithm²⁸



²⁸ Pediatric Disaster Toolkit: Hospital Guidelines for Pediatrics during Disasters (2nd Edition 2006)

RED

Resuscitation Area

General:

- The received patients are classified as Critical/Unstable from triage.
- Resuscitation personnel should be trained in evaluation and management of critical pediatric patients.
- There will be a designated Unit leader in this area.
- A more detailed history and physical needs to be obtained. An example is the SAMPLE history and physical.

Once stabilized, the patients are sent to ED Treatment and Holding Area for continued care and management. This decision to send the patient is based on reassessment. In general, these patients do not require additional critical care and/or resuscitation.

Reassessment criteria include the following:

- Breathing.
- Circulation.
- Appearance (TICLS).
- Mental Status (AVPU scale).
- Average Pediatric Heart Rate by Age.
- Average Pediatric Respiratory Rate by Age.

In some cases, patients will be sent to areas for Definitive Management such as the Operating Room or intensive care areas.

Patients who die will be sent to the area designated as the Morgue.

YELLOW

ED Treatment and Holding or Urgent Area

General:

- The received patients are classified as Potentially Unstable from Triage.
- Resuscitation personnel should be trained in evaluation and management of pediatric patients.
- There will be a designated Unit Leader in this area.
- A more detailed history and physical needs to be obtained, an example is the SAMPLE history (see appendix B and appendix C).

The physical exam will include criteria from the Pediatric Assessment Triangle and a “hands on” physical exam with the focus on detecting signs specific to the suspected injury or illness. This step is an interactive process, reassessment identifies potentially critical/unstable at this later moment in time.

Reassessment criteria include:

- Breathing.
- Circulation.
- Appearance (TICLS).
- Mental Status (AVPU scale).
- Average Pediatric Heart Rate by Age.
- Average Pediatric Respiratory Rate by Age.

Based on the Pediatric Assessment Triangle and CUPS classification, the patients will be sent to Resuscitation Area, ED Treatment and Holding Area/ Urgent Treatment, and Fast Track or Minor Treatment Area. Patients are transferred to definitive management or home, when appropriate. In cases where the patient’s clinical status declines or improves dramatically, they will be sent either to Resuscitation or Fast Track, respectively.

GREEN

Fast Track or Minor Area

General:

The received patients are classified as stable from triage

- Fast Track personnel should be trained in evaluation and management of pediatric patients.
- There will be a designated Unit Leader in this area.
- A more detailed history and physical needs to be obtained, an example is the SAMPLE history (see appendix A and appendix B).

The physical exam will include criteria from the Pediatric Assessment Triangle and a “hands on” physical exam with the focus on detecting signs specific to the suspected injury or illness. This step is an interactive process, reassessment identifies potentially critical/unstable at this later moment in time.

Reassessment criteria include:

- Breathing.
- Circulation.
- Appearance (TICLS).
- Mental Status (AVPU scale).
- Average Pediatric Heart Rate by Age.
- Average Pediatric Respiratory Rate by Age.

Based on the Pediatric Assessment Triangle, the patients will be sent to ED treatment and holding area, definitive management, and home.

Here, patient flow and area volume is dictated by patient volume and staffing, and capacity.

Patients waiting for assessment or treatment will be monitored in regular intervals using criteria from the Pediatric Assessment Triangle.²⁹

²⁹ Pediatric Disaster Toolkit: Hospital Guidelines for Pediatrics during Disasters (2nd Edition 2006)

SAMPLE History

After initial triage, the healthcare provider should try to obtain a focused history from first responders, caregivers, and patient. This focused history will be obtained by performing a secondary survey and asking SAMPLE history questions.

SAMPLE History Includes:

- **S**igns/symptoms—assessment findings and history.
- **A**llergies—particularly drug allergies.
- **M**edications the child is currently taking.
- **P**ast medical problems (chronic medical conditions, which may predispose to greater morbidity/mortality).
- **L**ast food or liquid the child has taken.
- **E**vent leading to the illness or injury (this will be of special relevance in a disaster; questions will depend on type of incident).

Reassessment Criteria

Once the child has been triaged, had their initial assessment and has received initial treatment, it is important that the healthcare provider continues to regularly reassess their status. The following criteria are utilized for the reassessment of children in each of the areas listed above.

Table 8: Critical, Unstable, Potentially Unstable, Stable (CUPS) Assessment for Breathing

Assessment	Critical /Unstable	Potentially Unstable	Stable
Airway	Complete or partially obstructed or significant blood or secretions	Patient with minimal secretions	Patent
Work of breathing	Absent or increase work with periods of weakness	Normal	Normal
Breath sounds	Absent or decreased breath sounds; Grunting, wheezing, stridor	Normal or slight wheezing	Normal
Respiratory rate	Apnea, bradypnea, tachypnea: irregular breathing rate	Occasionally increased	Normal
Central skin color	Pallid, mottled, cyanotic	Pink	Pink
Inspection	Absent, decreased chest movement	Normal	Normal
Pulse ox	Less than 85%	85% or higher	95% or higher

Sandal ND et al. CUPS assessment

Table 9: CUPS Assessment for Circulation

Assessment	Critical /Unstable	Potentially unstable	Stable
Heart rate	Tachycardia or bradycardia	Normal	Normal
Pulse strength	Weak central pulse, absent or weak peripheral pulse	Normal	Normal
Capillary refill	>3 to 5 seconds	<2-3 seconds	<2-3 seconds
BP	Hypotensive	Normal	Normal
Skin	Pallid, mottled, or cyanotic; cool	Normal	Normal



Purpose

These recommendations are intended to facilitate timely decontamination of children presenting to any hospital during a disaster or terrorist attack resulting in a need for decontamination. Children require special considerations that may not be addressed in a general Hospital Decontamination Plan.

General Guidelines

Infants and children have unique needs that require special consideration during the process of hospital based decontamination, such as:

- Avoiding separation of families during decontamination, especially under conditions that involve large numbers of patients in a chaotic situation; however, medical issues take priority.
- Older children may resist or be difficult to handle due to fear, peer pressure and modesty issues (even in front of their parents or caregivers).
- Since parents or caregivers may not be able to decontaminate both themselves and their children at the same time, decontamination (“hot zone”) personnel may be needed to assist them.
- Incorporating high –volume, low –pressure water delivery systems (e.g., handheld hose sprayers) that are “child– friendly” into the hospital decontamination showers.
- Risk of hypothermia increases proportionally in smaller, younger children when the water temperature in the decontamination shower is below 98°F.
- Attention to airway management, a priority in decontamination showers.

The smaller the child, the bigger the problem regarding any of the above considerations (hypothermia, airway management, the ability to effectively decontaminate the child) and the separation of families.

Decontamination Recommendations Based on Estimated Age Group

The following recommendations are based on the child’s estimated age based on appearance, since asking may be impractical due to the limitations of personal protective equipment (PPE) worn by decontamination team members and/or due to a large influx of patients.

- Undress child (by caregiver and hot zone personnel). If child is able to undresses without assistance, respect modesty and privacy if at all possible.
- Place child on stretcher or a restraining device.
- Escort child through the decontamination shower (by hot zone staff and caregiver).
- Directly supervise caregiver and child decontamination.
- Monitor airway.
- Child decontaminates him/herself, but goes through decontamination shower in succession with caregiver, or parent or classmates.
- Treat or prevention hypothermia (towels, gowns, warming blankets).
- Immediately give a unique identification number on a wristband (or equivalent).
- Triage to an appropriate area for further medical evaluation.

Infants and Toddlers (Children Typically Younger than Two Years of Age)

Infants and toddlers are the most challenging group to treat; special needs considerations are of the utmost importance in this group. Follow the guidelines below during treatment to assure the patient is properly and thoroughly decontaminated. It is not recommended that the child be separated from family members or adult caregivers. Caregivers should not carry the child because of the possibility of injury from a fall, or from dropping a slippery and squirming child. Special attention must be given to the child's airway while in the shower.

Non-ambulatory children should be placed on a stretcher by hot zone personnel and undressed (using trauma shears if necessary). All clothes and items that cannot be decontaminated should be placed in appropriate containers or bags as provided by the hospital and labeled. All non-ambulatory children should then be escorted through the decontamination shower by either the child's caregiver or decontamination personnel to ensure the patient is properly and thoroughly decontaminated. Special attention must be paid to the child's airway while in the shower.

Once through the shower, the child's caregiver or post decontamination ("cold zone") personnel will be given a towel and sheets to dry off the child, and a hospital gown. Remember to prevent or treat hypothermia by providing additional towels, gowns or warming blankets as necessary. The child should immediately be given a unique identification number on a wristband and then triaged to an appropriate area for medical evaluation. Children and their parents or caregivers should not be separated unless critical medical issues take priority.



Planning Tip: Estimate Child's Age

For decontamination purposes, children are divided into 3 groups by ages:

- Infants and toddlers typically 0-2 years of age.
- Preschool children typically older than 2 up to 6-8 years of age.
- School aged children approximately 8-18 years of age.

Preschool Aged Children (Typically Two to Eight Years of Age)

Children ages two to eight years are able to walk and speak, yet (with considerable variations in physical characteristics), are clearly children. Each child should be directly accompanied through the shower by either the child's caregiver or hot zone personnel to ensure the entire patient is properly and thoroughly decontaminated. The child should not be separated from family members or the adult caregiver.

Ambulatory children should be assisted in undressing with help from either the child's caregiver or "hot zone" personnel. All clothes and items that cannot be decontaminated should be placed in appropriate containers or bags as provided by the hospital and labeled.

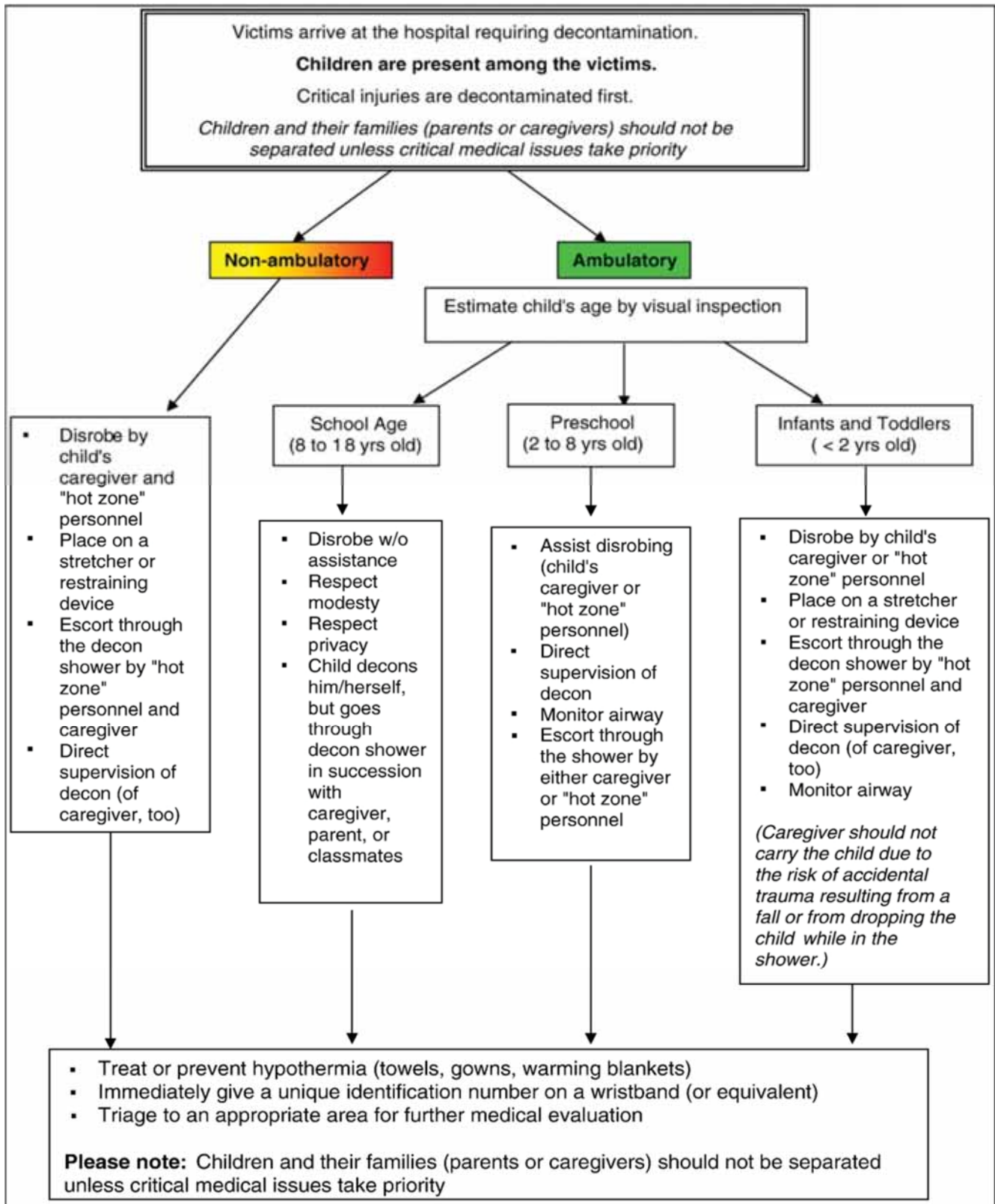
Non-ambulatory children should be placed on a stretcher by hot zone personnel and undressed (using trauma shears if necessary). All clothes and items that cannot be decontaminated should be placed in appropriate containers or bags as provided by the hospital and labeled.

Each non-ambulatory child on a stretcher should be escorted through the decontamination shower and assisted with decontamination to ensure the patient is thoroughly and properly decontaminated.

Once through the shower, each child should be given a towel and sheets to dry themselves, and a hospital gown. Remember to prevent or treat hypothermia by providing additional towels, gowns or warming blankets as necessary. The child should immediately be given a unique identification number on a wristband and then triaged to an appropriate area for medical evaluation.

Children and their parents or caregivers should not be separated unless critical medical issues take priority.

Figure7: Pediatric Decontamination Process³⁰



³⁰ Heon D, Foltin G. *Principles of Pediatric Decontamination*. Pediatric Disaster Readiness Vol. 10, Issue 3 (p 186-194). <http://www.clinpedemergencymed.com/article/S1522-8401%2809%2900054-8/fulltext> Accessed 2-18-2016

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**Post-Stabilization
Needs: Transporting
Children during a
Disaster**

Purpose

This section contains recommendations for transporting children after a disaster. General guidelines outlining the transport of children within a hospital and between two facilities are discussed. During a disaster all hospitals should be prepared to provide extended care for pediatric patients, even if they do not have pediatric staff and services.

Hospitals lacking pediatric and pediatric subspecialty care may need to transfer children to facilities with pediatric capabilities. All hospitals are encouraged to make pre-arranged agreements with EMS agencies and receiving hospitals in their area. Transfer may be difficult (or impossible) after a disaster due to local conditions, safety concerns, lack of personnel or vehicles, or lack of capacity at the referral center.

The logistics of transporting hospitalized children during a disaster are likely to require the mobilization of local, regional or even state assets. All hospitals should determine the location of the nearest sites that could provide appropriate care for:

- Neonatal Intensive Care Unit (NICU) patients.
- Pediatric Intensive Care Unit (PICU) patients.
- Special needs children.
- Pediatric psychiatric care.
- Children requiring special medical equipment.
- Children with complex chronic medical needs such as dialysis.

A vital component of care will include the transport of children between clinical areas, to another area (inpatient unit) or for diagnostic testing (imaging). Ideally, all patient care transports are performed by specially trained individuals. The hospital should develop contingency plans for disaster situations in which specialized personnel may not be available for pediatric transports.³¹

Personnel who transport stable patients within the hospital should understand:

- The special needs of children during a disaster.
- They are never to leave children alone.
- How and who to call for assistance if required.

Personnel who transport unstable patients should be professional personnel such as paramedics, nurses, air ambulance flight crews, pediatric transport teams etc.

Know who to call for help – call Pediatric Hospitals for information to assist in caring for the child. Consider calling for an air ambulance or pediatric transport team if child is extremely unstable or it is a long transport.

³¹http://www.health.ny.gov/facilities/hospital/emergency_preparedness/guideline_for_hospitals/docs/emergency_preparedness_manual.pdf. Accessed August 25, 2016

Transportation Equipment³²



Planning Tip: Transport Equipment

The following equipment should be available prior to transporting a child.

- Pediatric specific airway management equipment.

Transportation Precautions

It is imperative when transporting a pediatric patient that safety personnel or chaperones are provided during transport. Parents or adult caregivers must stay with their children when it is possible. If no family supervision is possible, appropriate hospital personnel must accompany and supervise children at all times. Children must be provided with some type of identification and their caregivers must be given something signifying their relationship to the child in order to avoid the child being lost or stolen.

Children less than 6 years old on stretchers require continuous one-on-one direct supervision if no crib is available. Children older than 6 must be evaluated for their ability to comply with safety rules while on the stretcher. Continuous one-on-one monitoring is recommended if compliance is questionable. If separated from caregivers, they need continuous one-on-one direct supervision. Stable ambulatory patients require one-on-one direct supervision if transported out of the Emergency Department. If transported to a pediatric safe area, staff that is experienced at observing groups of children should accompany the patients.

Transporting Children to Other Facilities

Disaster conditions might prevent safe or efficient travel on roadways, or may cause overflow at pediatric referral centers. Therefore, all hospitals must prepare to provide short- and long-term care to children during disasters. Even when inter-facility transport is possible, resources will likely be stretched thin. Therefore, hospitals should develop alternative mechanisms for safely transferring children based upon the following guidelines. If ambulances are not available, other transport options including cars, vans and buses may be used for children who can sit up. School buses may be used for children who are at least 5 years old who can sit up. Drivers must be able to communicate with hospital emergency command centers by mobile phone or radio at all times.

If stable children will be transported by car, be sure to arrange for child car safety seats and follow the appropriate guidance as indicated in table 10 below. All children less than 12 years of age should ride in the back seat³³

³²http://www.health.ny.gov/facilities/hospital/emergency_preparedness/guideline_for_hospitals/docs/emergency_preparedness_manual.pdf. Accessed August 25, 2016

³³<http://www.nwhrn.org/media/King-Co-Pediatric-Toolkit-2010.pdf>. Accessed August 25, 2016.

Table 10: Car Safety Seat Guidance

	Infants	Toddlers	Young Children
Seat Positioning	Rear-facing seat	Forward-facing seat	Forward facing seat
Seat Type	Infant-only or rear-facing seats	Convertible/forward-facing seats	Belt-positioning booster seat
Age/Weight	Up to 2 years of age ³⁴	Between 1 - 4 years of age and > than 20 lbs.	4-8 years of age, unless more than 4'9" and > than 40 lbs.

Appropriate medical personnel must accompany children during transport. Acceptable options include:

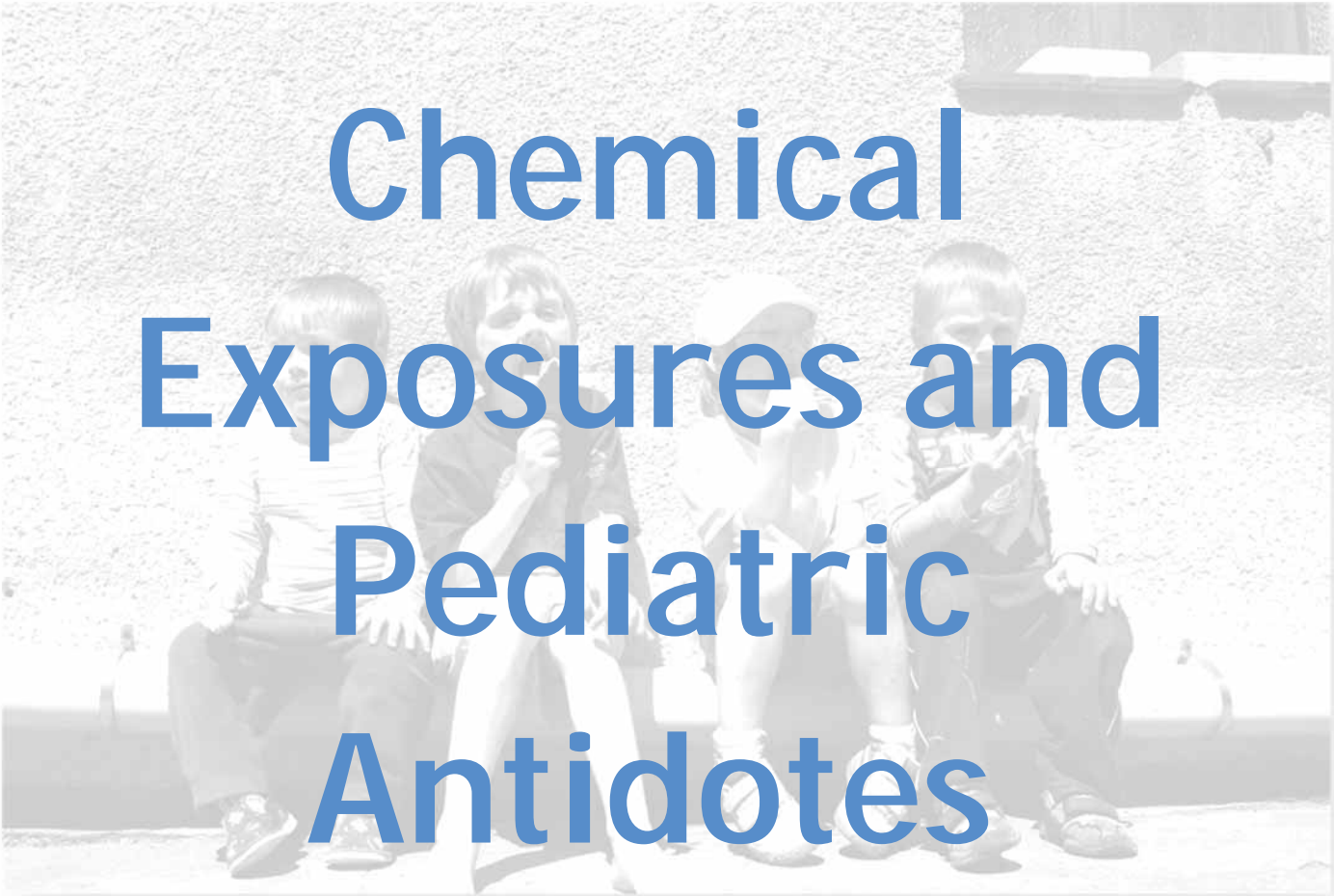
- Emergency medical technicians.
- Nurses.
- Physician assistants/nurse practitioners.
- Physicians.
- Mental health personnel.

Unstable or Potentially Unstable or Ill Children

Consider obtaining a Memoranda of Understanding (MOU) with ambulance providers at distant locations since they are less likely to be involved with local disaster response and may have available staff, transportation and resources. All children should be transported by a team with the appropriate level of training and supplies. Acceptable transport options include:

- Basic EMS transport for stable patients.
- Advanced EMS transport with no additional hospital staff for non-critical patients.
- Pediatric transport vehicles and teams for unstable patients.

³⁴ American Academy of Pediatrics. (2012). Healthy Children.org. *AAP Updates Recommendations on car Seats*. <http://www.healthychildren.org/English/news/pages/AAP-Updates-Recommendations-on-Car-Seats.aspx>. Accessed August 25, 2016



Chemical Exposures and Pediatric Antidotes

Purpose

A chemical exposure presents an additional set of problems and concerns in the pediatric population versus the adult population. It is important to consider anatomic and physiologic differences as well as developmental considerations if the pediatric patient is exposed to a chemical substance.

A number of anatomic and physiologic factors make the pediatric patient more vulnerable to chemical exposures. The pediatric patient has higher minute ventilation, which leads to increased respiratory exposure. Shorter stature places children nearer to the greatest gas vapor density at ground level. Increased skin permeability leads to increased dermal exposure. Relatively larger body surface area increases the risk of dehydration and shock, increases dermal exposure and increases the risk of hypothermia during decontamination. Less intravascular volume reserve increases the risk for dehydration and shock in the pediatric patient.

Developmental immaturity, limited coping skills makes the pediatric population more challenging. Children, especially those that are preverbal, non-ambulatory, or have special needs considerations, are less able to evade danger, escape, or seek attention. Children have a normal dependence on adult caregivers and will need more assistance than an adult patient in a similar situation. A chemical exposure would be extremely frightening to children and children are at increased risk for posttraumatic response to stress.

Understanding the basic differences both anatomically and developmentally will aid the caregiver in providing optimal care for the pediatric patient in a chemical exposure. Following are guidelines to address specific chemical exposures in the pediatric patient.

Triage/Decontamination

Airway and cardiopulmonary support should be provided as needed. For specific exposures, emergent intramuscular antidote therapy should be initiated. Contaminated clothing should be removed as soon as possible. It is important to remember that the relatively large body surface area of children plays a key role in the degree of contamination and also affects the ability of children to maintain thermal homeostasis after decontamination.

Nerve Agents (Tabun, Sarin, Soman, VX)

Nerve agents are readily absorbed via the respiratory tract; liquid nerve agents are readily absorbed via the skin and eyes. Children may manifest primarily central and/or neuromuscular effects. Infants may be drowsy or unconscious with muscular floppiness. CNS manifestations include headache, confusion, slurred speech, seizures, and coma. Respiratory depression and respiratory arrest may occur.

Autonomic nervous system effects can be extensive and include tachycardia or bradycardia; hypertension or hypotension; metabolic problems (hyperglycemia, hypokalemia, metabolic acidosis); miosis, eye pain, blurred vision, lacrimation; watery rhinorrhea; increased bronchial secretions and bronchospasm; AV block; flushing and sweating; salivation; nausea, vomiting, diarrhea, and abdominal cramps; urinary frequency, urgency, and incontinence.

Neuromuscular effects include muscle fasciculation and twitching followed by weakness progressing to flaccid paralysis and respiratory failure.

A simple mnemonic to remember these symptoms is DUMBELS:

- **D** = diarrhea
- **U** = urination
- **M** = miosis
- **B** = bronchoconstriction **B** = bronchorrhea
- **E** = emesis
- **L** = lacrimation
- **S** = salivation

Diagnosis

Diagnosis is made by clinical recognition of signs and symptoms and a positive response to the antidote.

Treatment

Treatment includes airway and ventilatory support, antidotes (atropine and pralidoxime (2-PAM)); control of seizures with benzodiazepines, and decontamination.

Antidotes

Atropine dosing: 0.05 mg/kg IV, IM (minimum dose 0.1 mg, maximum dose 5 mg); repeat every 2-5 min as needed for marked secretions and bronchospasms. End point for treatment is diminished secretions and comfortable breathing.

Pralidoxime (2-PAM) dosing: 25 mg/kg IV, IM (maximum dose 1 g IV; 2 g IM); may repeat within 30-60 min as needed then again every hour for 1 or 2 doses as needed for persistent weakness or high atropine requirement.

Mark 1 nerve agent antidote kits: contain Atropen® 2 mg auto injector and pralidoxime 600 mg auto injector.

Duodote auto injector contains 2.1 mg atropine and 600 mg pralidoxime in one injector.

Similar kits with pediatric doses are currently not available in the United States.

Duodote Auto Injector



Mark 1 Kit



Pediatric auto-injectors of atropine in 0.25 mg, 0.5 mg, and 1.0 mg sizes are available. In dire circumstances, the adult 2-PAM auto-injector (600 mg) might be used in children older than 2-3 years or weighing more than 13 kg.

Anticonvulsants

Benzodiazepines as needed for seizures or severe exposures.

- Diazepam 0.3 mg/kg (max 10 mg) IV
- Lorazepam 0.1 mg/kg (max 4 mg) IV, IM
- Midazolam 0.2 mg/kg (max 10 mg) IM

Cyanide

Cyanide is readily absorbed by the lungs as well as the skin and eyes. In general, clinical manifestations include tachypnea, coma, seizures, and apnea. Exposure to low concentrations of vapor may result in tachypnea, hyperpnea, tachycardia, flushing, dizziness, headache, diaphoresis, nausea, and vomiting. Exposure to high concentrations of vapor may result in tachypnea, hyperpnea, seizures, coma, apnea, and cardiac arrest within several minutes.

Diagnosis

Diagnosis is primarily made clinically based on CNS symptoms and rapid respiratory compromise.

Decontamination

Decontamination includes exposure to fresh air and washing the skin with warm soap and water.

Treatment

Rapid treatment is critical. Assess the need for airway and cardiopulmonary support and provide 100% O₂.

- Sodium bicarbonate as needed for metabolic acidosis
- Benzodiazepines for seizure control
- Diazepam 0.3 mg/kg (max 10 mg) IV
- Lorazepam 0.1 mg/kg (max 4 mg) IV. IM
- Midazolam 0.2 mg/kg (max 10 mg) IM

Antidote

Inhaled amyl nitrite or IV Sodium nitrite (3%) (avoid with mild symptoms, uncertain diagnosis, or smoke inhalation); inhale amyl nitrite for 30 sec of every minute; IV sodium nitrite (3%) 0.33 ml/kg given over 5-10 minutes (max 10 ml) assuming hemoglobin concentration of 12 g/dl (Dose adjusted for patient with significant anemia but this is difficult to know in an emergency situation).

Sodium thiosulfate (may be used alone if uncertain diagnosis or with smoke inhalation) 1.65 mL (of the standard 25% solution)/kg, IV (with a maximal, or adult, dose of 50 mL). Each agent may be given a second time at up to half the original dose as needed, or in the case of thiosulfate, even a full dose would be unlikely to pose inherent toxicity. Both these medications are packaged together in commercially available "cyanide antidote kits," along with amyl nitrite pearls.

Chlorine and Phosgene

Clinical manifestations include mucosal irritation with coughing, sneezing, hoarseness, inspiratory stridor, choking sensation (chlorine), wheezing, dyspnea, pulmonary edema (delayed onset). Bronchospasm and pulmonary edema are especially associated with phosgene. Irritation of the eyes, nose and throat may also occur, especially with chlorine exposure. Children are at increased risk for rapid dehydration or frank shock with pulmonary edema after exposure to these chemicals.

Decontamination

Fresh air and copious water irrigation are important for decontamination.

Treatment

Treatment includes symptomatic care.

Vesicants (Mustard, Lewisite)

Clinical manifestations include skin erythema, vesicles, ocular inflammation, and respiratory tract inflammation. Effects may be delayed for hours although onset of skin manifestations may be shorter in children compared to adults.

- Skin findings occur within 2-48 hours after exposure and include erythema, pruritus, yellowish blisters and bullae.
- Ocular symptoms occur 4-6 hours after exposure and include pain and irritation, photophobia, worsening conjunctivitis, severe lid edema, corneal ulceration, and globe perforation with severe exposure.
- Respiratory symptoms are delayed for several hours. These symptoms include rhinorrhea, hoarseness, dry and painful cough with expectoration, toneless voice due to vocal cord damage, tracheobronchitis with pseudomembrane formation and airway obstruction, laryngospasm, and respiratory failure. Early onset dyspnea and hypoxia is consistent with poor prognosis.
- Facial and eye involvement are more common in children and pulmonary involvement may be more extensive due to lower breathing zone for children where vapors settle and increased respiratory rate of children.

Decontamination

Rapid decontamination is the most effective treatment. Wash skin with soap and warm water (to avoid hypothermia). Ocular irrigation has major impact only if done within minutes of exposure.

Treatment

Treatment is symptomatic care.

- BAL (British antilewisite or dimercaprol) 3 mg/kg IM every 4-6 hours for systemic effects in severe cases may be helpful.
- Skin lesions are treated similarly to those of burn victims.
- Eye treatment includes irrigation, cycloplegics for comfort and prevention of formation of synechiae; topical antibiotics and lubricating ointments to eyelids to prevent adhesions and subsequent scarring.
- Pain management consideration is important (especially in very young nonverbal child). Children may need more aggressive fluid replacement.

Riot Control Agents

Symptoms occur quickly after exposure and typically resolve in 1-2 hours once the victim has been removed from the agent. Rapid resolution of symptoms is a distinguishing factor from other chemical agents. Symptoms include eye burning, eye pain, tearing, blepharospasm, periorbital edema, photophobia; nasal burning and pain, copious rhinorrhea, persistent sneezing, oral irritation, salivation; chest tightness and burning, dyspnea, bronchospasm, bronchorrhoea, coughing; pulmonary failure (rare); skin pruritus, erythema and dermatitis, vesicles and bullae.

Decontamination

Victims should be moved to a well-ventilated, uncontaminated space. Outer clothing should be removed. Copious eye irrigation is important; skin should be washed with warm soap and water.

Treatment

Treatment is symptomatic.

- Oxygen should be provided for dyspnea.

- Treatment of bronchospasm includes 0.5% inhaled albuterol; 2.5 mg if patient is less than 15 kg and 5.0 mg if patient is greater than 15 kg. Ipratropium bromide 500 mcg inhaled may also be added for significant bronchospasm.
- Atropine or glycopyrrolate can be helpful for treating bronchorrhea. Dosing for atropine IV or IM is 0.02 mg/kg/dose (minimum dose 0.1 mg, maximum dose 5 mg). Dosing for glycopyrrolate IV or IM is 0.004 mg/kg/dose (max 0.1 mg).
- Oral antihistamines such as diphenhydramine 5mg/kg/day divided into 4 does or an equivalent medication are effective in treating pruritus.
- Topical steroids are used for treating erythema or dermatitis.
- Vesicles or bullae are treated with burn dressings and topical antibiotics.

Methamphetamine Decontamination

Remove clothing, shower with soap and warm water.

Vapor-exposed Victims

Remove clothing and wash hair.

Liquid Dermal Exposure

- Remove clothing and dispose of in double bags
- Irrigate eyes with copious amounts of saline or water if ocular exposure
- Wash skin and hair thoroughly with soap and tepid water.

Additional Chemical Exposure Resources

Web-based references:

- <http://www.atsdr.cdc.gov/MMG/index.asp>
- <http://www.atsdr.cdc.gov>



Planning Tip: Michigan Poison Control Center

- Provides immediate advice on possible poisoning, toxic substance or any other environmental hazard emergency.
- 24/7 contact number: 1-800-222-1222
<http://www.childrensdmc.org/?id=747&sid=1>



Purpose

The purpose of this section is to provide basic infection control measures and concepts as they would relate to, and are applied during a large scale communicable disease incident.

Background

In an emergency caused by communicable disease, the management of children and their caregivers will be complicated by variables such as exposure and infectious status. In addition to the basic challenges of providing emergency shelter for a sudden influx of dependent children, hospitals will need to:

- Prevent exposure and contamination
- Manage contact of cases
- Separate, isolate and care for persons who are ill and/or possibly infectious

The SARS 2003 epidemic and H1N1 2009 pandemic continue to provide lessons for managing a surge of patients with a communicable disease. Successful national surveillance methods and infection prevention measures were instituted during the SARS epidemic. Fortunately, the United States did not experience a significant disease outbreak. Nonetheless, clinical suspicion for SARS-like illness and rapid institution of infection prevention measures were important during this outbreak. Signs and symptoms of SARS are very similar to other respiratory illnesses thus making disease identification more difficult.

During the H1N1 pandemic, emergency departments were overwhelmed with patients ranging from critically ill to the worried well. Even though the overall morbidity and mortality from H1N1 was low, patients younger than 25 years of age experienced the greatest disease burden. Reduction of emergency department overcrowding, improved patient flow and quality of care are ongoing research topics.

Even though the characteristics of the next epidemic or pandemic cannot be predicted, careful surveillance, rapid institution of infection prevention measures and continued analysis of the response to the H1N1 pandemic will help hospitals become better prepared for the next communicable disease outbreak.

Basic Infection Prevention Strategies

This section discusses the basic infection prevention measures that must be used when caring for young children (i.e., infants, toddlers and those requiring diapering, feeding, toileting and assistance with hand hygiene). Specific information about standard precautions in child care settings may be found at:

<http://aspe.hhs.gov/hsp/ccquality-ind02/#Handwashing>

Infection Prevention Definitions

A Communicable Disease Event is an infectious disease incident that is severe, moves quickly from person-to-person, to which there is little or no immunity and for which countermeasures may be non-existent or not widely or immediately available. Agents that could cause a communicable disease emergency may occur naturally or maybe deliberately induced. Such agents are characterized by:

- Person-to-person transmission.
- High attack rates.
- High morbidity.
- High mortality.

Standard Precautions are the basis for infection prevention in all health care and group child care settings.

Standard Precautions:

- Must be used whether or not other “transmission-based” precautions are in place.
- Are based on the principle that any moist body substance (blood, secretions, excretions, non-intact skin) may contain infectious organisms regardless of the patient’s diagnosis or assumed state of health.
- Must be used in health and child care settings whenever contact with moist body substances is anticipated.
- Must be implemented in managing children in group settings. (For more information, refer to the Centers for Disease Control and Prevention, Standard Precautions, at:
http://www.cdc.gov/hicpac/2007IP/2007ip_part3.html

Transmission-based precautions are designed to supplement standard precautions in treating patients with documented or suspected to be infected with highly transmissible pathogens. Both Standard Precautions and Transmission-based Precautions should be applied when managing adults and children who are ill with a communicable disease. Specific information on transmission-based precautions may be found in:
http://www.cdc.gov/hicpac/2007IP/2007ip_part2.html#e **Note:** Certain organisms cause disease that is transmissible prior to the onset of symptoms (e.g., influenza virus).

Person-to-Person Transmission occurs only in one or more of the following three ways:

Droplet transmission – the organism is sneezed or coughed into the environment within large, wet, respiratory droplets; organisms land on the mucosal surfaces of the nose, mouth or eyes, are absorbed and enter the body.

Contact transmission – the organism enters the body through the mucosa of the mouth, eyes, or nose either directly (skin-to-skin contact with an infectious individual or with infectious secretions) or indirectly when a contaminated intermediate object (unwashed hands or equipment) transfers organisms to mucosal surfaces and is absorbed.

Airborne transmission – the organism enters the body when tiny droplet nuclei are coughed or sneezed into the environment and are inhaled into the lungs.

Assumptions about Large Scale Communicable Disease Emergencies

In the incident of a large scale communicable disease outbreak:

- Children and caregivers will arrive at hospitals in large numbers.
- Some will be symptomatic (cases) and some will have no symptoms but will have been exposed to their symptomatic charges or caregivers (contacts).
- Cases and contacts will be separated because:
 - Ill caregivers accompanying asymptomatic children will require admission.
 - Asymptomatic caregivers may need to accompany an ill child into the clinical setting, leaving other children who are in their care in hospital custody
 - Emergency conditions will delay the arrival of parents or alternate caregivers
 - Hospitals will be required to provide temporary ad hoc shelter for exposed/asymptomatic child contacts to cases.
 - Hospital staffing will be reduced following the emergency, which will required parent/caregiver assistance on the clinical pediatric units.

Exposure and Infection Prevention Measures in Communicable Disease Emergencies

Point-of-Entry Infection Prevention Measures

Once a hospital is alerted to the potential for severe communicable disease conditions, exposure prevention measures should be instituted at or before the point of entry to the facility. Rapid identification of symptomatic individuals will permit actions to protect the facility, its patients, visitors and the physical environment from exposure and contamination.

Obtain case definition from the local health authority in order to instruct screening, triage and reception staff in procedures related to:

- Symptom recognition.
- Mode of transmission.
- Specific infection and exposure prevention measures.

Screen to identify symptomatic individuals at or before the point of entry in order to implement exposure prevention measures.

Instruct patients and/or caregivers about respiratory etiquette, hand hygiene and other relevant infection and exposure prevention measures and observe and supervise them to ensure compliance.

Mask symptomatic adults and, as feasible, mask symptomatic children who are old enough to tolerate a surgical mask (generally, three years of age and older) to prevent the release of organisms into the environment. In addition: instruct accompanying adult caregivers to use Standard Precautions to manage the secretions of ill children who cannot be masked.

Signage Ensure that respiratory etiquette signs are prominently placed in the entry and waiting areas.

Provide adequate supplies of tissues and provide an easy, sanitary, way of disposing of used tissues.

Separate persons with symptoms from persons who are asymptomatic; except exposed adult caregivers, who may need to remain with ill children to provide care and comfort. These adults will require instruction and supervision.

Separate contacts to ill individuals from persons who have not been exposed. Manage separation as follows:

- Place symptomatic individuals in single rooms either alone (if adults) or with prepared and instructed parent/caregivers if children, and if necessary and feasible.
- If possible separate symptomatic, masked individuals by at least three feet. If masking is not possible: instruct and supervise parents/caregivers in Standard Precautions and emphasize the importance of respiratory etiquette and hand hygiene.



- **Cohort masked** symptomatic individuals in an area that is separate from asymptomatic individuals, preferably in a room that is large enough to permit social distancing and that has a door that can be closed.
- Symptomatic children who cannot be masked may be included in this cohort if Standard Precautions are employed, as advised by the hospital's infectious disease department and/or the local health authority.
- Ideally: Cohort non-masked symptomatic individuals only when the diagnosis is confirmed and only if diagnoses are the same.

Emergency cohorting decisions: In the absence of confirmatory diagnostic information, make decisions according to symptoms and epidemiology, as advised by the local health authority and/or the hospital's infectious disease department.

Conduct contact identification procedures among persons accompanying an ill child or adult to the facility: As requested by the local health authority, obtain identification and locate information for contacts. Ensure that children's identification bands include information about contact status.

Instruct, observe and supervise to ensure that appropriate infection and exposure control measures are being followed by contacts, cases, personnel and adult caregivers providing care to ill children.

Cohorting Procedures for Asymptomatic Exposed Children

Cohort asymptomatic children and asymptomatic caregivers who have sustained the same exposure (the same apparent disease within roughly the same time period) as advised by the local health authority or the hospital infectious disease department.

Certain diseases are infectious prior to symptom onset—seek guidance from the local health authority and/or the hospital infectious disease department about specific cohorting restrictions.

Ensure that spaces used are child safe, and that facilities and supplies are adequate to permit sanitary toileting, hand hygiene, diaper changes, disposal of soiled diapers and other items, and frequent cleaning and disinfection.

Consult with the local health authority or with hospital infectious disease department for specific recommendations about cohorting pediatric contacts to cases.

Maintain appropriate group size and staff-to-child ratio by keeping groups as small as possible (smaller group size is associated with a lower risk of infection in child care settings). Table 11 shows both group size and staff to-child ratios for child care centers, and should guide hospital cohorting practices for grouping asymptomatic children.

Table 11: Recommended Staff to Child Ratios-Child Day Care

Age	Staff to Child Ratio*	Maximum Group Number**
Less than 6 weeks	1:3	6
6 weeks-18 months	1:4	8
18 months-36 months	1:5	12
3 Years	1:7	18
4 Years	1:8	21
5 Years	1:9	24
6 Years-9 years	1:10	20
10 Years-12 years	1:15	30

*Staff- to-child ratio refers to the maximum number of children per staff person

**Group size refers to the number of children cared for together as a unit. Group size is used to determine the minimum staff-to-child ratio based upon the age of the children in the group

Screen children and accompanying adults (again) for symptoms at the point of entry into the shelter/cohort area; exclude, mask and redirect symptomatic individuals.

Ensure that all children have been issued hospital identification bands that include parent/caregiver information and contact status.

Create a Log or Tracking Mechanism that lists all persons, including personnel that enter the cohort setting and include the following information:

- Date.
- Name and brief identifying information (child, caregiver, staff).
- Time in/time out.
- Information about any subsequent exposure within cohort including date, time, duration of exposure and name of symptomatic individual.

Establish a basic record for each cohorted individual that includes:

- Assigned record number.
- Identifying and locating information.
- Responsible adult(s) name and details.
- Initial exposure information (date of exposure, name of person to whom exposed).
- Symptom monitoring information.
- Subsequent exposure information.

Monitor cohorted children, adult caregivers and hospital personnel for symptom onset at intervals and using methods advised by the local health authority or by the hospital infectious disease department and document the results.

Promote social distancing as much as possible; maintain a space of three feet between cohorted asymptomatic children (consult pediatric activities therapist to identify games and other activities that might be used to maintain distancing).

Use Standard Precautions and the Day Care Protocol for routine care of the cohorted asymptomatic/exposed children, ensuring that staff understand and can implement Standard Precautions.

Ensure scrupulous and frequent hand washing with soap and water among staff, adult caregivers, and children. Be sure to:

- Provide instructions about hand hygiene.
- Ensure that caregivers wash the hands of young children before and after meals, after toileting, and frequently in between.
- Supervise children who are able to wash their own hands—encourage them to wash their hands for at least 15 seconds (the duration of the Happy Birthday song).
- Consider that anxious children may regress to earlier behaviors – provide comfort and non-judgmental assistance with toileting and hygiene.
- Ensure that caregivers wash their hands before feeding children (and prior to preparing formula) and after diapering, toileting, cleaning, or any contact with moist body substances or with items soiled with moist body substances even if gloves are used.



Establish diapering protocols and ensure that caregivers follow them. Hospitals without pediatric services should adapt adult diapering protocols for infants and children.

- Set up sanitary changing stations for infants and young children.
- Ensure that waste and soiled linen collection units are child safe, plentiful and designed to be hands-free.

Toys should not be shared among children unless washed and disinfected first. In addition:

- Toys should be made of hard plastic.
- Disinfectants must be safe for mouthed toys.

Provide an adequate supply of clean linen: gowns, disposable diapers and, if possible, clothing for infants and young children.

Establish policies for routine and targeted cleaning of environmental surfaces according to the nature and degree of contamination or soiling. Be sure to:

- Use an EPA-registered disinfectant that has microbicidal properties effective against organisms most likely to be present in the environment (consult with local health authority or hospital infectious disease department) or use a chlorine bleach solution (1/4 cup of bleach per gallon of cool water).
- Establish schedules for cleaning and disinfecting changing stations, sleeping mats, toys (disinfectants used on toys that may be mouthed by children must be non-toxic).
- **All sanitizers, disinfectants and other potentially toxic materials must be kept out of the reach of children.**

Infection Prevention Scenarios

A Child or Adult Becomes Symptomatic in the Cohorted Setting:

Rapidly identify symptomatic individuals using routine, scrupulous, symptom monitoring, close and ongoing observation.

- Immediately separate, mask, counsel and comfort children and adults at the first sign that they have become symptomatic; remove them from the cohorted setting.
- Arrange transport for symptomatic children or adults to a clinical care unit where they can be isolated.
- During transport place a surgical mask on children older than three years of age and supervise them closely to ensure that the mask remains in place; for younger children or infants use respiratory hygiene and cough etiquette as alternatives to masks.
- Transporters escorting masked, symptomatic, individuals do not require respiratory protection themselves, but may need to wear disposable gowns and gloves in case physical contact with the symptomatic individual is required. (See CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings available at: <http://www.cdc.gov/ncidod/dhqp/pdf/guidelines/Isolation2007.pdf>)
- Clean and disinfect transport equipment such as wheelchairs or stretchers with Environmental Protection Agency (EPA)-registered disinfectants after use.
- Identify contacts to a person who becomes symptomatic as advised by the local health department or the facility's infectious disease department, including children, caregivers and staff in the space shared with the symptomatic individual. Be sure to:
 - Document the exposure in individual records and in a log
 - Include the name of the individual exposed
 - Document the names of those exposed (in the log only).
 - Note the duration of exposure and other information requested by the local health authority or by the hospital's infectious disease department.
 - Counsel, comfort and reassure cohorted adults and children following separation from the symptomatic individual.
 - Clean and disinfect surface areas in the cohort area using a child-safe EPA registered disinfectant.

Infectious or Potentially Infectious Parent/Caregiver Must Have Contact with an Asymptomatic/Exposed Child

- Arrange that the visit takes place in a single room and avoid exposing other children.
- Ensure that parents/caregivers are masked and that they understand that both physical contact and the amount of time spent with the child must be limited.
- Prepare the child, according to age and comprehension level, for the masked appearance of parents/caregivers and for restrictions on contact with, or proximity to, the caregiver.
- Supervise the visit to ensure that standard and transmission-based precautions are used and followed.
- Firmly limit the amount of time parents/caregivers spend with child.

Asymptomatic Caregivers/Parents Must Provide Nursing Care for an Ill Child

- Ensure that parents/caregivers are instructed in procedures for complying with Standard Precautions and relevant Transmission-based Precautions including hand hygiene and the correct use and disposal of personal protective equipment (PPE).
- Observe/supervise parents/caregivers by providing guidance, answering questions and ensuring compliance.

Parents/Alternate Caregivers Arrive at Hospital to Assume Care of Their Asymptomatic/Exposed Children

- Consult with the local health authority or the hospital's infectious disease department for recommendations for managing the exposed children in the home setting.
- Inform and counsel parents/caregivers about the nature of the exposure.
- Tell parents to inform the child's pediatrician of the exposure.
- Provide information necessary for parents to comply with instructions for contact management in accordance with the local health authority and/or the hospital's department of infectious disease.
- Give parents a contact number they may call for information related to the incident and the child's exposure (such as an appropriate contact at the local health department).
- Use standard and transmission-based precautions according to recommendations of the local health authority, the hospital's infectious disease department and facility guidelines for pediatric infectious disease.

Hospitals with no pediatric units that are caring for pediatric patients as an emergency measure should apply established infection control guidelines and should adopt the relevant day care protocols including:

- Maintain a log or tracking mechanism of personnel assigned to patients who are ill with the disease causing the emergency, including:
 - Names, dates, shifts worked, patient names
 - Consider including non-personnel adult caregivers/parents in the log if they are significant care providers to their children on the pediatric unit
 - Monitor personnel for symptom onset (work with employee health services)
 - Instruct nursing, medical and other personnel in infection and exposure control measures, emphasizing any enhanced or additional measures (needed due to the nature or severity of the disease). Be sure to:
 - Observe, monitor and supervise personnel in order to ensure competence and compliance
 - Ensure that there is a mechanism for updating personnel about changed directives and new information about the outbreak.
 - Increase the frequency of surface cleaning throughout the unit.

The use of parents and other adult caregivers to provide routine care to pediatric patients during the emergency will require the oversight of facility staff, which will provide instruction and supervision to ensure compliance with infection control guidelines.

- Limiting the number of visitors and the duration of the visits.
- Instruction and supplies (including PPE) necessary for the safety of visitors, personnel and the environment.

Procedures for Requesting Laboratory/Epidemiology Consult from the State of Michigan

When a physician or a laboratory suspects the presence of a designated condition but does not have sufficient information to be certain that the condition or agent is present, the physician or laboratory must report the designated condition or agent as suspected. Upon confirmation of the disease or presence of the agent, the physician shall report the confirmation to the appropriate local health department as a case.

http://michigan.gov/documents/Reportable_Disease_Chart_2005_122678_7.pdf

The Michigan Department of Health and Human Services, Bureau of Laboratories (BOL) is equipped to respond to acts of biological or chemical terrorism, emerging infectious diseases or other public health threats and emergencies. The role of the BOL is to provide rapid identification of etiologic agents, allowing the medical community to provide appropriate prophylaxis and or treatment to minimize morbidity and mortality.

The Laboratory Response Network (LRN) is an integrated national network of laboratories that are capable of responding to biological or chemical public health emergencies. Established by the Centers for Disease Control and Prevention (CDC) and the Association of Public Health Laboratories (APHL) in 1999, the LRN is now a partnership between government and private organizations that have a stake in all public health threat incidents. The LRN is comprised of laboratories that follow consensus protocols developed by the CDC and the Food and Drug Administration (FDA).



Planning Resource:

If requesting a consult from the MDHHS Epidemiology or Laboratory divisions they can be contacted 24/7/365 at their **EMERGENCY PHONE NUMBER: 517-335-9030**

The LRN in Michigan includes Reference Level Laboratories located in several regions of the state, including the MDHHS Bureau of Laboratories in Lansing. If requesting a consult from the MDHHS Epidemiology or Laboratory divisions they can be contacted 24/7/365 at their EMERGENCY PHONE NUMBER: 517-335-9030. Additional information and contact numbers can be found at:

- MDHHS Laboratories: http://www.michigan.gov/MDHHS/0,1607,7-132-2945_5103---,00.html
- MDHHS Epidemiology: http://www.michigan.gov/MDHHS/0,4612,7-132-2945_5104---,00.html



Unaccompanied Minors and Family Reunification

Purpose

As a consequence of disasters, family reunification becomes one of the most challenging processes to plan for, implement, and accomplish. One critical piece in this process is to rapidly identify and protect displaced children in order to reduce the potential for maltreatment, neglect, exploitation, and emotional injury. A critical aspect of pediatric disaster response is to effectively address the needs of children who have been displaced from their parent or guardian.³⁵

Assuring success with family reunification efforts in times of disaster involves the collaboration of local, regional and state partners, having clear lines of communication, and strict adherence to reunification protocols. Linking pediatric victims with family members is ideal; however, without available family members, efforts should be made to create a system that links children to other shelter volunteers or medical care providers.

As an aid to reunification efforts, reliance on personnel within and outside a healthcare institution contributes to the success of monitoring, tracking, and identifying children. These ancillary support providers such as the shelter volunteers and nonclinical staff work with local public health and emergency management to create safe areas for children and families who have been displaced from their homes. Volunteers, social workers, and public health personnel can accompany children who have been separated from their families throughout the triage and treatment process so that patients are comforted and supported as they move through the process.

Exemplar: Operation Child-ID

To maximize reunification efforts, one model used at Camp Gruber, a reunification center created in the aftermath of Hurricane Katrina, involved the use of "Operation Child-ID." This program was created to identify separated children, to help prevent intentional injuries, and to help thwart abductions. With the use of volunteers, nurses, and staff, "strike teams" were created who used a standardized survey form, along with specified identification procedures (bracelets on children and their accompanying adults), along with National Center for Missing and Exploited Children (NCMEC) personnel, and demonstrated significant success at reuniting affected children and their families.³⁶

A standardized survey form was used to collect specific information about the location of the child in the camp, the identity of the accompanying adults and whether an accompanying adult was the legal guardian of the child. The form asked specific questions regarding the relationship between the adult and the child, and whether the adult currently with the child was the supervising adult before the disaster incident. Information about the accompanying adult was recorded and the adult was given a matching bracelet that matched the child's. These hospital bracelets enabled camp staff to identify the children already registered and served as a method for matching children with their supervising adults; this was an effort to thwart any attempt that might be made by other adults to abduct a child from Camp Gruber. A copy of the intake survey used by medical personnel at Camp Gruber, shown in figure 8 below, as well as the procedures they followed as they moved through the identification process is provided. This process should be used as a starting point for local, regional and state partners to assure the safety of the children in

³⁵ Brandenburg, M.A., Watkins, S.M., Brandenburg, K.L., et al. (2007). *Operation Child-ID: Reunifying Children with Their Legal Guardians after Hurricane Katrina*. Disasters. 31:277-87.

³⁶ Brandenburg, M.A., Watkins, S.M., Brandenburg, K.L., et al. (2007). *Operation Child-ID: Reunifying Children with Their Legal Guardians after Hurricane Katrina*. Disasters. 31:277-87.

all mass care shelters, as well as creation of a protocol for getting all unaccompanied minors into the national database for missing and exploited children.

Figure 8: Sample Child Registration Form

Operation Child ID Survey	
National Center for Missing and Exploited Children (NCMEC) Katrina Missing Persons Hot Line' phone number: 1-888-544-5475	
Name: _____	Barrack # _____
Age: _____ Months/Years	
Gender: Male Female	
Who is currently the supervising adult in this camp? _____	
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 Hurricane Katrina? Yes No	
If the adult(s) is not a Parent or Grandparent, what is the relationship to this child?	
	Aunt/Uncle Sibling Friend Other (next-of-kin)
Does the child appear to be ill or have an injury? Yes No	
If yes, please describe: _____	
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: _____	

Operation Child-ID Steps:

- Recognize that some children in the shelter were not with their usual guardians and that these children were at 'high-risk' of being listed as missing by family members.
- Create a group of volunteers (primarily MDs and RNs, in this case) to conduct pediatric social assessments.
- Find and register all the children in the shelter.

- Use a survey form to question each child about their sleeping location in the shelter, age and relationship to the adult who was currently supervising the child.
- Attach a hospital-style identification bracelet to the child and a matching one to the supervising adult(s) and monitor frequently to ensure that the wristband matched that of the adult(s) seen with the child while in, or when leaving, the evacuee shelter.
- Review the data sheets promptly to identify those children not travelling with their legal guardians, consider these children to be at 'high-risk' and submit the names of these children to the NCMEC.
- Generate a complete list of all children in the shelter, including those not on the 'high-risk' list, and submit these names to the NCMEC.
- When a response is received from NCMEC that a child in the shelter has been listed as missing, immediately locate the child in order to pursue reunification, and establish and monitor the safety and well-being of the 'missing' child.

"Local public health and emergency management need to work together to create and utilize an intake form to collect the specific information needed to safeguard all children who are staying at disaster shelters. Furthermore, once this information is collected the children found to be unaccompanied and looking for family members need to be entered into the national database for missing children and local law enforcement, hospitals and other shelters need to be alerted to their presence in order to make every effort to reunify the child with family members. If the disaster crosses state lines or is on a national level, state agencies will work with other agencies to be sure the information regarding unaccompanied minors goes out to law enforcement, hospitals and other shelters in the affected states. This working relationship will need to be utilized in the event injured and ill pediatric patients are transferred across state lines to meet medical needs or due to medical surge overload. Identification and tracking of patients is paramount to the success of getting patients from one location to another and in supporting timely family reunification. Examining all potential sources of information for the identification and tracking of children will ultimately create a greater ability to monitor patients through the system at all levels and allow for greater, more efficient, and timely family reunification. The methods used for tracking patients are varied and include:

- Photographing
- Placing identification markings on the skin (tracking number)
- Wristbands
- Bar coding
- Forensic odontology
- Geographical information systems
- Global positioning systems (GPS)
- Radio Frequency Identification (RFID), including implantable chips
- Wireless communication devices
- Personal Digital Assistants (PDA)
- Wireless internet
- Biometrics, (passwords, fingerprint scans, signature analysis, voice recognition, digital certificates, iris/retina scan, face recognition, hand geometry)
- Intelligent triage tags".³⁷

³⁷ Nager, A. (2009). *Family Reunification Concepts and Challenges*. *Clinical Pediatric Emergency Medicine*. 10:3 (195-207).

There are no set guidelines or uniformity among patient tracking methods, especially for child victims. National services available for assisting in locating and/or tracking children may include law enforcement, public health, social services, as well as




Planning Resource: Child/Family Locators

- National Emergency Family Registry and Locator System (1-800-588-9822), which can be activated during a disaster.
- National Emergency Child Locator Center (1-866-908-9570), which can be activated 24 hours a day and functions to help locate children separated from their parent or guardian.
- National Center for Missing and Exploited Children (1-800-THE-LOST).
- American Red Cross Safe and Well: <https://safeandwell.communityos.org/cms/>. Accessed August 25, 2016.

More recently, a comprehensive document published by FEMA in conjunction with the American Red Cross, National Center for Missing and Exploited Children and the U.S. Department of Health and Human Services, was made available, called "Post-Disaster Reunification of Children: A Nationwide Approach." This document contains a "holistic and fundamental baseline for reunifying children separated as a result of a disaster and aims to assist local, state, tribal, territorial, and insular area governments and those responsible for the temporary care of children." It also contains many useful answers to questions about management of temporary guardianship or unaccompanied minors, a compendium of organizations that could provide resources and governmental agency's contact information. It is available on the FEMA site at <http://www.fema.gov/media-library/assets/documents/85559>.

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Psychological Support

Purpose

Children involved in a disaster suffer immediately, during, and possibly even long after the incident. Depending on the age of the child, their developmental level and cognitive abilities, and whether the child is separated from his/her parent or guardian, a vast array of reactions may be seen. Many disaster victims require treatment strictly for psychological stress.³⁸ Working together with their local, regional and state partners, public health and healthcare personnel can create the tools needed in the hospital and shelter settings to screen for children that are suffering psychological and emotional issues and work together to provide appropriate intervention, stabilization, and treatment.

Reactions to disasters and the associated anxiety that accompanies it manifests differently according to the ages and development level of the child. Mental health staff should be actively involved in recruiting and training personnel and possibly volunteers, become a pediatric champion in the mental health system, or assist with communication efforts between patients, families, and caregivers.

Fostering Resilience

Some of the ways to help children deal with disasters include:³⁹

Listen to them:

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

Try to make them feel safe

Let children know that many people are working hard to:

- Take care of the hurt people.
- Help keep them safe.
- If they are worried that their home is not safe, explain the nature of the incident as simply as possible.
- Try to keep their regular routines as much as possible.

³⁸ Nager, A. (2009). *Family Reunification Concepts and Challenges*. *Clinical Pediatric Emergency Medicine*. 10:3 (195-207).

³⁹ <http://www1.nyc.gov/assets/doh/downloads/pdf/bhpp/hepp-peds-childrenindisasters-010709.pdf>. Accessed June 23, 2016



Appendices

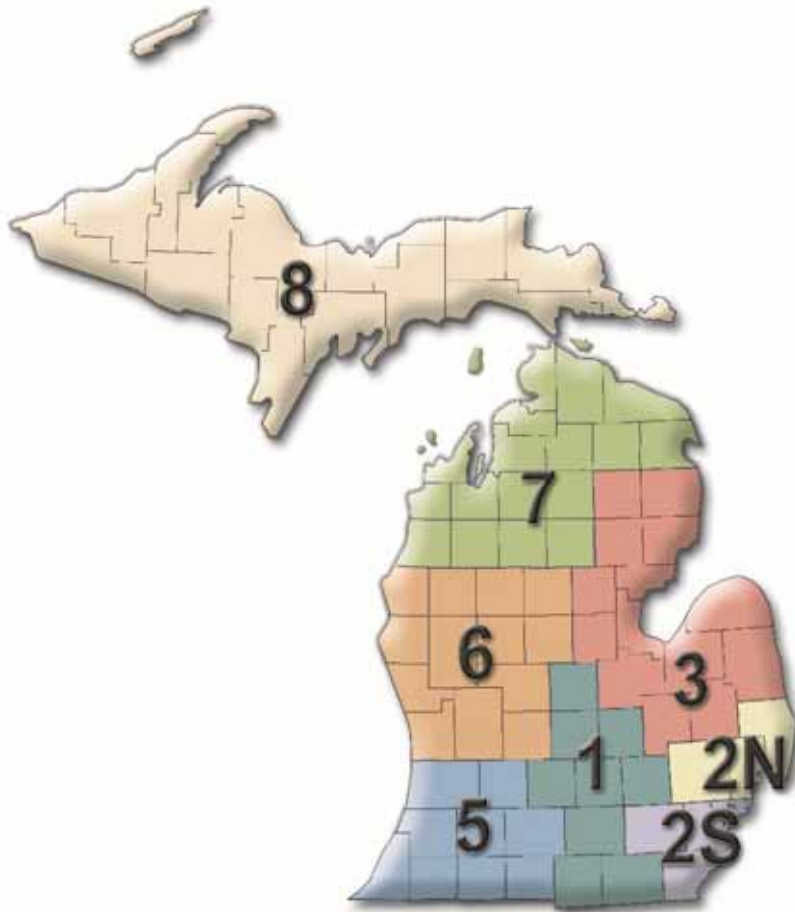
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Appendix 1 Regional Structure

Michigan Emergency Preparedness Regions

The Michigan Healthcare Coalition preparedness regions are consistent with the Michigan State Police Emergency Management Division regions. Each region has Regional Coordinator, (b) a Medical Director and a 24/7/365 Medical Coordination Center that can be activated during a disaster or emergency incident to assist hospitals and healthcare entities with resource coordination. Map 1 below illustrates the location of each region.

Map 1: Michigan Emergency Preparedness Regions



Contact Information for the Regional Medical Coordination Centers

Region	Phone	Email Contact
1	517-546-9111	d1rmrc@sbglobal.net
2N	248-267-0535	RMCC@region2north.com
2S	863-203-7733	email@2south.org
3	800-571-8859	btddnregion3@gmail.com
5	269-337-2500	communication@aircare.org
6	855-734-6622	Region6mcc@mcmca.org
7	989-732-5141	rc@miregion7.com
8	866-276-4443	R8MCC@r8hcc.org

Appendix II Scarce Resources

Purpose

This attachment is meant to be a resource for hospitals and healthcare facilities. These Guidelines are not a formalized series of instructions, but rather a set of criteria that can be employed by decision-makers in various circumstances during a public health emergency using their best professional discretion. Thus, the criteria offered within these Guidelines are meant to be scalable, adaptable, and functional. Some facilities may not have the capacity to implement all of the suggestions offered in this document. Others will choose to adopt different strategies that are nonetheless consistent with the ethical framework presented in the Guidelines. However, it is presumed that many hospitals and healthcare facilities will adapt the approaches and strategies contained in this document, tailored to fit the circumstances of their specific facility.

The allocation of resources and services during emergency-induced situations of scarcity must be based on a sound ethical framework. This is an excerpt from an attachment offered in the Guidelines for Ethical Allocation of Scarce Medical Resource and Services during Public Health Emergencies in Michigan, which provides specific guidance to hospitals and other healthcare facilities to assist these entities in planning for resource and service scarcity that may arise during public health emergencies. It also offers potential strategies for implementation of the Guidelines in hospital and healthcare facility settings. Healthcare facilities, whether individual hospitals, multi-site health systems, or other inpatient care delivery facilities, should review the ethical framework presented in the main Guidelines document to ensure that their decision-making strategies for allocating scarce resources and services during public health emergencies comport with the principles and considerations outlined in the Guidelines.

Structuring guidance for hospitals and health systems presents obvious challenges. Each organization has its assets and areas of expertise, which can be vastly different from other organizations. Each organization must proactively examine its plans for continuing to deliver care to the public during a Mass Medical Event (MME), including how it would allocate scarce medical resources and services. The guidance discussed in this attachment is based primarily on a proposal developed by the University of Michigan Health System using the existing medical and ethics literature and ethical guidance documents available from some other states and from the federal agencies charged with health preparedness.⁴⁰



⁴⁰ Association for Healthcare Research and Quality. (2009). Mass Medical Care with Scarce Resources: The Essentials AHRQ pub. 09-0016, September 2009, Phillips, Kneel and Johnson, editor's archive. <http://archive.ahrq.gov/prep/mmcessentials/>. Accessed August 25, 2016

Hospital/Health System Ethical Duty to Plan

Just as the state has a duty to prepare, so do hospitals and health systems. Most hospitals have an incident management team and must drill to fulfill regulatory agency mandates. Specific planning to care for patients in an atmosphere of scarce resources, for at least some period of time while awaiting assistance, must be undertaken. Hospital leadership must have a thorough understanding of the local, regional and state emergency plans, have active relationships with those organizations and exercise their plans. Planning for hospital surge, communications, public messaging, command and control, prevention of further casualties, business continuity, vulnerable population management and security must take place in advance and be communicated to the members of the hospital organization.

In the normal course of care delivery, many hospitals do not care for pediatric patients and would transfer them out of their facility to a pediatric center. During public health emergencies which affect a large region, pediatric facilities may not be able to accommodate an excessive surge of patients from other regional facilities. "Sheltering in place" or caring for these pediatric patients not normally kept at facility, may be the most ethical solution, despite the high level of stress this would place on any system. Planning for potential situations where providers would have to practice outside their normal scope includes an assessment of hospital and staff capabilities, and the mechanism for augmenting their capabilities through "just in time" training assets.

Scarce Resource Allocation Committees

Recognizing that each hospital organization is unique and planning for the allocation of resources should be proactive, this section proposes the composition and function of a Scarce Resource Allocation Committee (SRAC), Triage Officers Corps for hospital floors or units, and the Clinical Review Committee (CRC) which serves as a decision making body around issues of withdrawal of care when there is no likelihood of recovery and others might benefit from the scarce resource. Triage officers would act as liaisons between the primary physicians providing care for these committees. Caregivers, physicians, and administrators will need clear guidance regarding how to distribute resources, and family members will need to know that a just and thoughtful process is in place.

Indicators and Triggers

"Indicators are measurements or predictors of change in demand for health care service delivery or availability of resources. Triggers are decision points that are based on changes in the availability of resources that require adaptations to health care services delivery along the care continuum."⁴¹

Triggers

When a public health emergency is imminent, or has been declared by a relevant public health agency, the Medical Care Director, or his/her designee as predetermined in the Incident Management System, will direct the relevant emergency planning committees to:

- Identify resources which are likely to become scarce.
- Develop a method (or implement a previously developed method) for tracking such resources.
- Establish trigger points which indicate when conservation of a particular resource(s) is necessary.

⁴¹ Institute of Medicine. (2013). *Crisis Standards of Care: A toolkit for indicators and triggers*. Washington, DC: The National Academies Press

Scarce Resource Allocation Committee (SRAC)

Once the trigger point is reached for a particular resource, the Incident Management Team must determine whether to activate the Scarce Resource Allocation Committee (SRAC) or a subset of the membership (dependent on the scarce resource) as shown in table 12. The groups identified have been recommended because they represent the leadership in clinical care, the leadership in areas most likely to be faced with scarce resources, and experts in the ethics of health care delivery. This is one proposed structure for a SRAC, but recognizing that some organizations would not have access to an ethicist, intensive care or ambulatory care leaders (because they do not normally deliver intensive care or ambulatory clinic services), such organizations should consider appropriate equivalent committee members. Ad hoc advisors may include representatives from the Office of the General Counsel, Pharmacy, Material Services, Epidemiology, Infection Control, Human Resources, etc. Ad hoc advisors will not be permitted to vote in matters to be decided by the SRAC.

It is understood that some small hospitals may not have the staffing capacity to fill all the recommended positions in the SRAC. Therefore, it would be reasonable that the hospital leadership looks to different entities from the healthcare services in the community to fill those vacancies. The hospital may look to private healthcare providers such as local physicians to help guide decisions in their area of expertise. Community religious leaders may fill some of the roles that might normally be filled by hospital employed ethicists and pastoral care staff. Furthermore, it may be advantageous in rural areas for hospitals that would likely be challenged in staffing such an allocation committee to form a regional committee to include representation from all involved. This will help to ensure consistent decision making in all areas of the region as well as decrease the burden of dual functioning roles on the staff from the affected hospitals.

A SRAC committee, comprised of representation from regional Medical Control Authorities, Healthcare Coalitions and healthcare personnel from areas such as long term care and pediatrics, could be created as part of the regional emergency operational plans, and would only become active during times of scare medical resources.

Table 12: Scarce Resource Allocation Committee (SRAC) Description

Statement of Purpose	SRAC should have the full authority to make necessary allocation decisions to assign or conserve resources for patient care.
Objectives	In the incident of a shortage of services, supplies, or staffing, the SRAC should determine when and how these resources should be allocated or conserved. In addition, the SRAC will have responsibility for determining when Triage Protocols will be activated and deactivated.
Scope	All supplies, equipment, staffing (faculty and staff) and any other resource of the hospital or health system organization.
Membership	<p>In the incident of a disaster declaration and/or the establishment of the Incident Management System (IMS), the SRAC structure should be consistent with this system. At this point, the Incident Commander (or designee) will chair the SRAC. The SRAC composition should include appropriate patient group representation (e.g., adult, pediatric, geriatric, obstetric) from each of the following groups:</p> <ul style="list-style-type: none"> • Medical Care Director, e.g. Chief of Staff or designee. • Nursing Care Director, e.g. Director of Nursing or designee. • Ambulatory Care Medical Director or designee. • ICU Medical Director(s) or designees. • Respiratory Therapy Medical Director and Technical Director or designees. • Emergency Medicine Medical Director or designee. • Admissions/Bed Capacity Manager or designee. • Ethicist. <p>Each position on the SRAC should be filled by 3 people who will rotate shifts on this committee. Those members who are off shift should be available to rotate on an appeals committee if needed.</p>
Timeline	May be activated upon determination of one or more scarce resources.
Voting	If consensus among the members of the SRAC cannot be reached regarding the assignment or conservation of a scarce resource, the Incident Commander will call for a vote. Voting consists of one vote for the Incident Commander and one vote for each of the eight groups for a total of nine votes. A simple majority vote will be required, the Incident Commander given the authority to decide in the case of tie votes.

Clinical Review Committee

While decisions to discontinue life sustaining interventions will be made in conjunction with the Triage Officers, in consultation with the primary clinician caring for the patient, any patient, family member or clinician (including the

Triage Officer) can request consultation with the Clinical Review Committee (CRC). The makeup of the CRC might include:

- Medical Care Director, e.g. Chief of Staff or designee
- Triage Officer for that unit (non-voting)
- Adult Triage Officer from another unit
- Pediatric Triage Officer from another unit
- Respiratory Therapy Medical Director or designee
- Emergency Medicine Medical Director or designee
- Nursing Director or designee (non-voting)
- Social Work Director or designee (non-voting)
- Ethicist, ad hoc advisor (non-voting)
- Office of the General Counsel, ad hoc advisor (non-voting)

The Functions of the CRC include:

- The CRC will serve as a consultative body that will advise clinicians regarding clinical decision-making in complex patient care situations and identify principles that will serve as guidelines for triage officers.
- The CRC will be involved in all decisions to discontinue a life-saving therapy. The CRC will have real-time information on all currently available life-saving scarce resources in the hospital system.
- The CRC will maintain a list of all patients who, based on objective clinical parameters, have the lowest chance of survival. The CRC will discontinue a life-saving resource for a particular patient only when:
 - The life-saving resource has been depleted throughout the organization and cannot be obtained from any outside source.
 - Another person with a greater chance of survival, based on objective clinical parameters that have been selected for triage guidelines, requires the same life-saving resource.
- Once a decision to discontinue a life-sustaining scarce resource has been made for a particular patient the CRC will instruct the Triage Officer and the primary clinicians to implement the process for discontinuing that resource.

Triage Officers

The Triage Officer will have the responsibility to assure that the clinicians caring for the patient perform an assessment, for triage purposes, at 48 and 120 hours (or a time deemed appropriate by leadership, given the type of pathology being seen with the particular mass illness) and attests that the assessments are accurate. Day-to-day clinical care decisions for individual patients will continue to be made by the primary clinician caring for the patient.

If Triage Protocols need to be implemented to manage a scarce resource (i.e. ICU care or ventilators), the Triage Officer will notify the clinicians within their assigned units to communicate regarding Triage Protocols and collect data about patient assessments as often as needed, but at least daily. The Triage Officers should communicate frequently with the Clinical Review Committee to assess the needs of all patients within the institution. Using the Triage Protocols, the Clinical Review Committee and the Triage Officers will determine which patients no longer meet criteria for the use of a scarce resource. When a patient no longer meets criteria for a particular resource, the Triage Officer will advise the primary clinician to discontinue its use. Decisions to discontinue any intervention based on resource conservation will only occur after the SRAC has determined that conservation of that particular resource is necessary.

Staffing Resources

Personnel may be the most important scarce resource in a Mass Medical Event, especially if the emergency lasts for weeks or months. Equipment, medications, and vaccines cannot treat or prevent illness without trained personnel to prescribe, administer and oversee their use. Most hospital organizations have mechanisms in place for planning human resource needs and strategies. The following ethical guidelines may be useful for allocating scarce human resources during an emergency:

- As is the case for material resources, institutions should increase the “supply” of scarce human resources by prospectively training individuals whose current roles will be less urgently required during an MME to work in areas of likely shortfall, and consider training community members as well.
- Professional ethics for clinicians generally discourage or prohibit practice outside the scope of one’s expertise. During conditions of extreme scarcity of trained personnel, however, standards of competence may justifiably be lower than during normal conditions.
- Individuals who assume the risks and burdens of working during a pandemic (e.g., extended hours and quarantine) should:
 - Receive appropriate protection (e.g., vaccine, protective gear) to minimize their risk of infection.
 - Receive priority for antivirals, antibiotics and other mid-level scarce resources, with the exception of life-sustaining interventions such as ventilators.



Planning Tip: Anticipating Potential Staffing Shortfalls

- Assess pediatric surge capacity (beds, ventilators, etc.) to meet expected increased needs.
- Determine how the hospital will meet staffing needs-develop a plan to expand staff capacity.
- Develop contingency staffing plans to account for staff absence-particularly in the ED.
- Create procedures and policies for the use of supplemental providers and volunteers.
- Ensure that policies are in place to test and manage supplemental personnel.

Key issues planners should anticipate, to the degree possible, include the types of health care needs and potential resource shortfalls that may occur as well as policy and operational adjustments that will be needed in response.

- Develop a plan to expand staff capacity. Determine how the hospital will meet staffing needs.
- Develop contingency plans for staff absences, particularly ED staff.
- Create procedures and policies for use of supplemental providers.
- Consider volunteers, ESAR VHP, CERT, MRC, clinic staff, out-of-State licensed staff, National Guard, retirees, non-health-care staff, among others.
- Ensure policies are in place to test and manage deployment of non-hospital personnel at both at the community and hospital levels.

Initiate discussions of allocation of hospital resources. Hospital administrators meet with hospital ethics committee early in the planning process to:

- Establish hospital process for scarce resource allocation.
- Develop communication process so the community understands the rationale behind resource allocation policies.
- Stockpile supplies and equipment including PPE equipment (e.g., gloves, masks).
- Estimate increased need for medical equipment/supplies and develop strategy to acquire additional equipment/supplies if needed. Consult with local and State health departments about access to the Strategic National Stockpile.

Define essential and non-essential visitors and develop policies for restricting visitors during a pandemic or other special emergency that may require limiting exposure to visitors (and mechanisms for enforcing the policies):

- Plan to limit hospital entry to a few key entrances.
- Plan for increased security needs.
- Develop a health care risk communications messages, including criteria for seeking health care, and postponement of elective procedures or surgeries.

Ventilator/ICU Resources

During a severe MME such as a pandemic respiratory illness, it is possible that the number of existing ventilators/ICU beds could be inadequate to meet the needs of patients. There have been several proposed mechanisms for initial triage of patients to critical care units, ventilator use or transport to definitive care. Hicks (2006), proposed a triage system for ventilator assignment during an infectious disease disaster for adults⁴². This system uses only clinical and not laboratory assessments and includes a reassessment of resource use for each patient with a requirement for improvement to continue use of the ventilator. Another proposal put forth by Christian (2006) used the Sequential Organ Failure Assessment (SOFA) score for adult patients in a similar respiratory pandemic scenario to create triage criteria for critical care admission. The SOFA scores require both laboratory and radiology resources.⁴³

After the SARS epidemic in Toronto, Christian (2006) proposed a triage system for ventilator access based on pre-existing health status and SOFA scores. The New York Department of Health was the first U.S. governmental body to issue a proposed triage system for ventilator access during a pandemic influenza incident.⁴⁴ None of the triage criteria designed for infectious disease disasters have included pediatric specific recommendations and this will be addressed in a subsequent section.

Clinical Evaluation

Evaluation criteria to predict potential morbidity and mortality of severe cases of a pandemic respiratory illness should be discussed, vetted, and adopted prior to their needed utilization and should use simple and straightforward metrics that most clinicians recognize and can assess. As the physiology of adult and pediatric patients is often quite different, we have determined that separate triage tools are required to evaluate adults and pediatric patients. To comply with the need for equitable access to care, we have used the same expected mortality criteria for both groups. For the purposes of this publication only pediatrics will be included. Adult criteria are included in the State

⁴² Hicks, J.L. and O'Laughlin, D.T. (2006). *Concept of Operations for Triage of Mechanical Ventilation in an Epidemic*. *Academy Emergency Medicine*, 13(2): p: 223-229.

⁴³ Christian, M.D. et al. (2006). *Development of a Triage Protocol for Critical Care during an Influenza Pandemic*. *CMAJ*, 175(11):p.1377-81

⁴⁴ Powell T., Christ, K.C, and Birkhead, G.S. (2008) *Allocation of Ventilators in a Public Health Disaster*. *Disaster Medicine Public Health Preparedness*. 2(1): p. 20-26.

of Michigan Ethical Guidelines for Allocation of Scarce Medical Resources and Services during Public Health Emergencies in Michigan. When a pediatric patient presents to the ED, or a decision is required for admission to ICU, or the patient is determined to need ventilator support, the appropriate triage tool will be used to determine whether the patient is allocated a ventilator. We have also included a requirement to systematically review the clinical progress of each pediatric patient who is currently receiving mechanical ventilation or ICU care with a requirement of improvement at agreed upon intervals thereafter.

In an incident that results in a severe shortage of ventilators or ICU beds, not all patients will be eligible for mechanical ventilation or ICU care. The following inclusion and exclusion criteria are recommended (Table 13). These criteria have been informed by both the Toronto triage tool and the New York tool. Initiation of ventilatory support should be determined by the following inclusion and exclusion criteria: allocation of scarce resources will not only need to have a clear determination of criteria for initiation, but also clear criteria to determine if the pediatric patients currently using resources are obtaining the needed benefit to insure the lowest morbidity and mortality for the population at risk. When patients are not progressing to the desired outcomes, these resources may need to be reallocated to insure the stated goal. Patients will be evaluated for worsening potential for mortality at 48 hours and 120 hours by the following adult and pediatric criteria described in Table 13. These decisions will be both difficult and necessary, and to insure their fairness there will be a monitoring and appeals process to best insure a cautious and moderated approach to these decisions.

Table 13: Inclusion and Exclusion Criteria for Mechanical Ventilation

Inclusion Criteria	
<i>The patient must have one of the following:</i>	
A.	Requirement for invasive ventilatory support: <ul style="list-style-type: none"> • Refractory hypoxemia (SpO₂ < 90% on non-rebreather mask or FIO₂ > 0.85). • Respiratory acidosis (pH < 7.20). • Clinical evidence of impending respiratory failure. • Inability to protect or maintain airway.
B.	PEDS: Hypotension (systolic BP < 70 + 2x age (years)) or clinical shock state (as evidenced by altered level of consciousness, decreased urine output, or other evidence of end-organ failure) refractory to volume resuscitation requiring vasopressor or inotrope support that cannot be managed in ward setting.
Exclusion Criteria	
<i>The patient is excluded from admission or transfer to critical care if any of the following is present:</i>	
A.	Severe trauma.
B.	Severe burns of patient with any 2 of the following: <ul style="list-style-type: none"> • Age > 60 yr. • > 40% of total body surface area affected. • Inhalation injury.
C.	Cardiac arrest <ul style="list-style-type: none"> • Unwitnessed cardiac arrest. • Witnessed cardiac arrest, not responsive to electrical therapy (defibrillation or pacing). • Recurrent cardiac arrest.
D.	Metastatic malignant disease with poor prognosis.
E.	Advanced and irreversible immunocompromised.
F.	Severe and irreversible neurologic incident or condition with highly expected mortality.
G.	End-stage organ failure meeting the following criteria: <p>Heart.</p> <ul style="list-style-type: none"> • NYHA class III or IV heart failure. • Lungs. • Severe chronic lung disease with FEV₁ < 25% predicted, baseline PaO₂ < 55 mm Hg, or secondary pulmonary hypertension. • Previously diagnosed primary pulmonary hypertension with NYHA class III or IV heart failure, or mean pulmonary arterial pressure > 50 mm Hg. • Liver. • Child–Pugh score ³ 7 or Meld scored of > 20.

Triage of Eligible Patients

Once a patient is deemed eligible for triage by meeting the above inclusion criteria, the appropriate pediatric triage tool will be used to determine initial and continuing use of mechanical ventilation and/or ICU care. When utilizing critical care resources for children, the Pediatric Logistic Organ Dysfunction (PELOD)scoring method, discussed below in table 14, is felt to be more easily applied when data may be scarce, but decisions regarding allocation must be based on both clinical and laboratory data.

Table 14: The PELOD Scoring System

Organ System	Variable	SCORE				Max Score
		0	1	10	20	
Neurologic						20
	<i>Glasgow coma score</i>	12-15	7-11	4-6	3	
		AND		OR		
	<i>Papillary reaction</i>	Both reactive		Both fixed		
Cardiovascular						20
	<i>Heart rate</i>					
	< 12 yrs.	≤ 195 bpm		> 195 bpm		
	> 12 yrs.	≤ 150 bpm		>150 bpm		
		AND		OR		
	<i>Systolic blood pressure</i>					
	< 1 month	> 65 mmHg		35-65mmHg	< 35 mmHg	
	≥ 1month & < 1yr	> 75 mmHg		35-75mmHg	< 35 mmHg	
	≥ 1 yr. & < 12 yr.	>85 mmHg		45-85 mmHg	< 45 mmHg	
	≥ 12 yr.	> 95 mmHg		55-95 mmHg	< 55 mmHg	
Renal						10
	<i>Creatinine</i>					
	< 7 days	< 1.59 mg/dl		≥1.59 mg/dl		
	≥ 7 days & < 1 yr.	<0.62 mg/dl		≥ 0.62 mg/dl		
	≥ 1 yr. & < 12 yrs.	< 1.13 mg/dl		≥ 1.13 mg/dl		
	≥12 yrs.	< 1.59 mg/dl		≥ 1.59 mg/dl		
Pulmonary						10
	<i>PaO2/FiO2 ratio</i>	> 70mmHg		≤ 70mmHg		
		AND		OR		
	<i>PaCO2</i>	≤ 90 mmHg		>90 mmHg		
		AND				
	<i>Mechanical vent</i>	No	Yes			
Hematologic						
	<i>WBC</i>	≥ 4.5K	1.5-4.4 K	<1.5		
		AND	OR			
	<i>Platelets</i>	≥ 35 K	< 35			
Hepatic						1
	<i>AST</i>	< 950 IU/L	≥ 950 IU/L			
		AND				
	<i>Prothrombin time</i>	> 60%	≤ 60%			

In the validation study a PELOD score of >33 had a mortality rate of 100%. Table 3 gives a predicted PELOD score associated with different mortality probability. To use the PELOD scoring system on a daily basis, the score is calculated as at presentation. If new data is not available (i.e. new laboratory values), the values can either be assumed to be unchanged or normal depending on the physician's clinical judgment.

Using similar mortality levels for pediatric and adult patients leads to using a PELOD score of 33 as a reasonable proxy for a SOFA score of 11. The calculated probability of mortality with a score of 33 is 53%; however the validation study showed 100% mortality at this score. This seems a reasonable compromise since to use a score of 29 (approximately 85% mortality) may prioritize some children who would receive futile allocation of scarce resources.

Table 15: Predicted mortality levels for a given PELOD score

PELOD Score	Predicted Mortality Probability	Predicted Mortality Rate
< 10	0.009	<1%
15	0.04	4%
20	0.1625	16%
22	0.26	26%
24	0.3917	40%
25	0.46	
26	0.53	53%
27	0.61	
28	0.68	68%
>30	0.98	98%

Table 16: Critical Care Triage Tool – PEDIATRIC PATIENTS (<18 yrs.)

	Initial Assessment		48 Hour Assessment		120 Hour Assessment	
Color Code	Criteria	Priority/ Action	Criteria	Priority/ Action	Criteria	Priority/ Action
Blue	Exclusion Criteria* or PELOD \geq 33*	Medical Mgmt. +/- Palliate & d/c	Exclusion Criteria or PELOD > 33 or PELOD 21-33 & no Δ	Palliate & d/c from CC	Exclusion Criteria ** or PELOD > 33 ** or PELOD 21-33 no Δ	Palliate & d/c from CC
Red	PELOD < 21 or Single Organ Failure	Highest	PELOD < 33 and decreasing	Highest	PELOD < 33 and decreasing progressively	Highest
Yellow	PELOD 21-33	Intermediate	PELOD < 21 no Δ	Intermediate	PELOD < 21 minimal decrease (< 3 point decrease in past 72 hrs.)	Intermediate
Green	No significant organ failure	Defer or d/c, reassess as needed	No longer ventilator dependent	d/c from CC	No longer ventilator dependent	d/c from CC

*If exclusion criteria or PELOD > 33 occurs at any time from the initial assessment to 48 hours change triage code to Blue and palliate.

** If exclusion criteria or PELOD > 33 occurs at any time from 48 – 120 hours change triage code to Blue and palliate.
 Δ = change CC = critical care d/c = discharge

Blue: High probability of mortality; should be discharged from critical care and should receive medical management and palliative care as appropriate.

Red: Highest priority for critical care.

Yellow: Intermediate priority for critical care.

Green: Low probability of mortality; defer admission/ discharge from critical care.

The initiation of other, more sophisticated methods of ventilatory support, such as ECMO, may be evaluated and allocated using the same criteria as conventional ventilatory support. There is concern that these already scarce resources will become more frequently requested interventions, but their use strains the efficient and maximal use of all available resources and thus will be limited by established medical criteria.

Oxygen Therapy

Given that in the worst case scenario, 15-20% of influenza patients may acquire pneumonia⁴⁵ during a pandemic, it is likely that oxygen therapy will be in great demand. In addition, the current needs for oxygen supplementation for COPD, heart failure, cystic fibrosis, and other respiratory diseases will remain the same. As such rationing decisions may need to be implemented. If rationing of oxygen therapy is required; oxygen will be administered based on the following guidelines:

- Ventilated patients.
- Pediatric patients > 1 year with oxygen saturation <88% on room or respiratory rate of >40.
- Pediatric patients with oxygen saturation <88% on room air or respiratory rate >60.
- Hypoxic patients with pneumonia.

It is unlikely that oxygen supplies will be depleted because of the storage capacity of hospitals, technology to concentrate oxygen and the ease of delivery without constant attendance of trained personnel. If oxygen supplies or personnel required to administer oxygen therapy become scarce, those patients categorized as Blue (expectant) who are not be eligible for ventilators will also not be eligible for oxygen therapy. Every effort will be made using other therapeutic means to keep these dying patients' comfortable (see Palliative Care Section). Outpatients who currently receive home oxygen therapy will be resupplied based on oxygen availability and the guidelines listed above.

Palliative Care Resources

Regardless of modeling or assumptions, a major pandemic incident will require significant resources to care for dying patients and their families. The impact of pandemic death will stress all parts of our system and require clear, executable strategies for supporting very large numbers of patients and their families through the end of life. The ethical imperative to provide pandemic palliative care is well-supported under the framework used to create these guidelines for ventilator allocation; specifically, our obligations to individual patients, institutional competence and utility. In addition to the ethical imperative, and in contrast to prior pandemics, palliative care is now recognized as a core institutional competency by multiple organizations including the Joint Commission (JC) and the National Quality Forum (NQF). Formal palliative care clinical guidelines have been developed and widely endorsed. The guidelines are available at:

<http://www.nationalconsensusproject.org> and stress the importance of care in four key areas: physical symptom management (pain, dyspnea, nausea, etc.); psychological symptom management (anxiety, depression, agitation, delirium); support for family and close persons; and spiritual care for patients and loved ones.

⁴⁵ Gupta, R.K., George, R., Nguyen-Van-Tam, J.S. (2008). *Bacterial Pneumonia and Pandemic Influenza Planning*. *Emerging Infectious Disease*. Aug; 14(8), 1187-92.



Planning Resource: Palliative Care Clinical Guidelines

4 key areas:

- Physical Symptom Management.
- Psychological Symptom Management.
- Support for Family and Close Persons.
- Spiritual Care for Patients and Loved Ones.

Available at: <http://www.nationalconsensusproject.org>. Accessed August 25, 2016.

As with all clinical resources mobilized for a mass illness, palliative care providers are limited and will need to be allocated based upon need and availability. Unlike some resources that can be concentrated geographically (i.e. ventilators, critical care providers), palliative care support will be needed across all care settings, including inpatient and intensive care, the alternative care center (ACC), and outpatient and community contact points. It should be assumed that patients with life-threatening illness could (and will) receive care in all parts of the system, which creates a formidable task to source palliative care throughout.

The broad need for palliative care during a pandemic does not dictate that resources will be distributed evenly among settings, but that reasonable efforts will be made to provide the support likely to be most useful in each. Those who require mechanical ventilation but do not receive it due to exclusion criteria or removal from the resource are most likely to require prompt, competent palliative care. The distribution of palliative care resources is thus closely connected to ventilator allocation, and should be integrated into the universal triage process for pandemic response.

Palliative Care Resource Allocation

Pandemic palliative care resources can broadly be divided into personnel and non-personnel categories. Non-personnel resources include oxygen, space and medications for control of anticipated symptoms among those severely ill with influenza. As many of these resources are finite, if not scarce, it is possible that allocation for palliative care will compete with allocation for potentially curative care. Oxygen is a good candidate for such a conflict, if supplies become critically low. Prioritizing oxygen to probable survivors can be justified, if sufficient medications are available to manage the dying patients' distress acceptably. As with all potential scarce resources, distribution will be guided by SRAC. Personnel specifically trained in Palliative Care are still quite few, though many more have skills and experience in caring for patients through end-of-life. The factors affecting availability of personnel to support palliative care are similar to those affecting all (illness, willingness to work, etc.). Allocating available personnel will need to be coordinated along with other SRAC functions, and will be guided by need and patterns of volume. It is possible for much end-of-life care to be delivered by unit-based providers. It may be reasonable to identify one or two staff from each unit to serve as pandemic

palliative care 'leads' to facilitate training and serve as resources in preparation and execution of a mass care plan. It will be necessary to develop written palliative care protocols to help unit providers care for patients and families through end of life.

"Advanced planning about indicators and triggers involves considering what information about demand and resources is available across the health care spectrum (from pre-hospital to end-of-life-care), how the information is shared and integrated, how this information drives actions, and what actions might be taken to provide the best health care possible given the situation."⁴⁶

⁴⁶ Institute of Medicine. (2013). *Crisis Standards of Care: A Toolkit for Indicators and Triggers*. Washington, DC: The National Academies Press.

Appendix III Burn Surge Plan

Introduction

Nationally there are not enough designated “burn care” beds or burn centers at present to manage the day to day needs of pediatric burn patients. Current practice recommends transfer of seriously burned patients to burn centers for specialized care; however, these resources will be quickly overwhelmed by an incident that results in large numbers of pediatric victims. So in the event a disaster occurs in which there is a surge of pediatric burn patients, it is not possible for these limited centers to provide specialized burn care for all of the affected patients. The capacity for local and regional burn center beds would be quickly exceeded. If this incident should ever occur, existing health care centers must accommodate and care for these patients until specialized burn care resources/beds become available. It is likely those healthcare facilities will be caring for the burn patients for 3-5 days at minimum until safe discharge or transfer to tertiary care facility can occur. The definitions these kinds of burn incidents are as follows:

Burn Mass Casualty Incident (MCI): Small number of victims easily cared for by existing burn units.

Burn Disaster: incident resulting in a number of victims that overwhelm existing burn care resources. In a mass casualty burn incident each one of Michigan’s eight regions should plan on receiving 50 burn casualties per million. This capacity planning should incorporate the development of non-traditional “burn bed” resources to include: initial and ongoing training in burn triage, categorization of injuries, patient care, and supply caches capable of supporting patient care for at least 72 hours.

Many burn patients will be critically ill and require time/resource/labor intensive care:

- Initial resuscitation in EDs.
- Fluid managements.
- Airway control/ mechanical ventilation.
- Surgical debridement/ escharotomy/ grafting.
- Pain control.
- Infection control.

The State of Michigan has created a plan that incorporates the utilization of “adjusted environments of care,” by planning for the provision of stabilizing care for burn patients in facilities that are not normally associated with providing definitive care to burn patients. The ability to standardize the care that will be provided in hospitals that do not provide definitive burn care has been agreed upon in an effort to safeguard critical resources, and ultimately improve outcomes for patients.

This plan incorporates the use of “burn stages” to provide context for the scope of an incident, and should not be viewed as prescriptive. Given even the limited availability of definitive burn care at the national level, it is understood that even a “relatively minor” incident may indicate a need for accessing resources from one or more of the planning partners to ensure the best possible outcomes for patients.

Burn Stage I

Any incident in which **local** trauma/burn resources are overwhelmed with patients (example: 10-24 patients).

Burn Stage II

Any incident in which **regional** trauma/burn resources are overwhelmed with patients (example: 25-100 patients).

Burn Stage III

Any incident in which **state** trauma/burn resources are overwhelmed with patients (example: Exceeds 100 patients).

This plan develops non-traditional burn care resources to provide surge capacity during a multi-casualty incident, and to protect those facilities with definitive care capacity from being overwhelmed through the use of "off-site" triage and stabilization. By developing this type of surge capacity we can maximize the use of our critical definitive care resources.

State Burn Coordinating Center

The state has established one healthcare facility to act as the State Burn Coordinating Center (SBCC). The SBCC must be a healthcare facility with recognized expertise in the care of burn patients, as well as the ability to provide staff assistance to the local and regional partners from beyond their geographic region, the state, or other states involved with the Great Lakes Healthcare Preparedness Partnership coordinated plan for mass casualty burn incidents.

Burn Centers

Michigan currently has six healthcare facilities recognized as "burn centers". They have been identified as accepting burn referrals, and are able to provide definitive care for burn patients.

These centers will work in conjunction with the SBCC to manage the flow of burn surge patients to ensure the optimal use of the state's definitive burn care capacity.

Burn Surge Facilities

The state has established 13 Regional Burn Surge Facilities (BSFs) within each of the eight Emergency Preparedness Regions. Given the expectation that established state Burn Centers may initially be overwhelmed and transportation limited, Regional BSFs will be responsible for the initial evaluation and stabilization of burn patients and preparation for transfer, if necessary, during the initial 72 hours. Regional BSFs will have 24-hour coverage with Advanced Burn Life Support (ABLS)-trained nurses and physicians. Patients treated and discharged by regional BSFs should be referred to a Burn Center for complications and any needed long-term follow-up.

The Purpose of the Burn Surge Plan is to:

- Assign responsibility.
- Define treatment sites.
- Outline response measures.

The Goal of the plan is to:

- Provide highest level of care for a large number of burn patients.
- Expand ability to provide burn care.
- Prioritize use of limited resources.
- Plan for provision of “stabilizing care” for burn patients in facilities not routinely required or expected to do so.

Standardization of care in hospitals not normally associated with provision of definitive burn management is intended to:

- Safeguard limited resources.
- Improve patient outcomes.
- Maximize staff training to care for burn injuries (especially important when staff resources exceeds capacity):
 - Use of long acting silver impregnated dressing to treat burn patients, which will simplify patient care

When activated, BSFs will report patient information to the SBCC. The Burn director at the SBCC will triage and determine definitive care facility. Burn surge teams are available to be deployed to a BSF to provide support for triage, treatment and transfers. Burn surge teams available for deployment outside hospital system consist of:

- Flight Nurse/Paramedic.
- Senior burn nurse.
- Physician, Fellow or Senior Resident in Emergency Medicine, Pediatric Critical Care or Pediatric Surgery.

Basic Treatment Considerations during a Burn Mass Casualty Incident

Provide Initial First Aid:

- Stop the burning process.
- Use universal precautions.
- Remove clothing or jewelry.
- Cool any burns that are warm to touch with tepid water and then pat dry.
- Rinse liberally with water if chemicals suspected according to protocols, then dry.
- Cover with clean DRY sheet or bedding to prevent hypothermia.

Perform Primary Survey

Airway Maintenance with Cervical Spine Protection:

- Chin lift/jaw thrust with cervical spine precautions as needed.
- Assess for signs of airway injury such as hypoxia, facial burns, carbonaceous sputum, stridor, and nasal hair singes.
- Assess for history of a closed space fire.
- Insert an oral pharyngeal airway or endotracheal tube (ETT) in the unconscious patient (Intubate early).

Breathing and Ventilation:

- Assess for appropriate rate and depth of respirations with adequate air exchange 100% (15L) FIO2 non-rebreather face mask or by ETT until ABG result. An ABG with Carboxyhemoglobin (COHgb) level is required for suspected inhalation injury. COHgb levels are decreased by 50% every 40 minutes while on 100 % FIO2. COHgb level goal is <10 %.
- Mechanical ventilation as needed.
- If extensive facial burns or >40% TBSA, intubation for airway protection prior to expected facial swelling is indicated.
- Monitor pulse oximetry while checking COHgb level (as needed).
- Head of bed (HOB) elevated.

Circulation with Hemorrhage Control:

- Vital Signs.
- Heart rate.
- Blood pressure.
- Capillary refill.
- Temperature.
- Skin color of unburned skin.

Cardiac monitoring as needed

- May be needed if there is an electrical injury, concurrent trauma or cardiac issues.

Fluid Resuscitation

- Oral resuscitation can be used in the following circumstances:
 - Patient is not intubated.
 - Injury is not an electrical injury.
 - No other injuries.
- Heplock/Saline lock IV (as needed) if taking adequate PO fluids

IV fluid resuscitation is indicated in the following circumstances:

- If patient is intubated:
 - Start maintenance fluids
 - One large bore peripheral IV in non-burned, upper extremities
 - Place a soft feeding tube
- Pediatric patients with burns > 10% TBSA require resuscitative fluids and maintenance fluids
- Pediatric patients less than 30 kg require D5 LR at maintenance rate if not taking adequate PO or are intubated. Pediatric calculation for maintenance fluid formula:
 - For the first 10 kg of body weight: 4 mL per kg per hour
 - For the second 10 kg of body weight: 2 mL per kg per hour
 - For the remaining kg of body weight up to 30kg: 1ml per kg per hour

Diagnostic studies on admission and then as dictated by medical condition

- Arterial blood gas.
- Carboxyhemoglobin (COHgb) level, always add this to a blood gas.
- Electrolyte panel.

- CBC.
- EKG for electrical injury or cardiac history.
- CXR if intubated, inhalation injury suspected or underlying pulmonary condition.
- Tetanus prophylaxis unless given in the last 5 years.

Disability:

- Neurologic checks every 4-8 hours and prn.
- Goal is an alert and oriented patient.
- If altered neurological status consider the following:
 - Associated injury.
 - CO poisoning.
 - Substance abuse.
 - Hypoxia.
 - Pre-existing medical condition.
- Determine level of consciousness. Consider using the "AVPU" method:
 - Alert
 - V- Responds to verbal stimuli.
 - P- Responds to painful stimuli.
 - U- Unresponsive.

Exposure

- Remove all clothing and jewelry.
- Initially place a clean, dry sheet over the wounds until a thorough cleaning is done.
- Keep patient normal thermic, especially during wound care. This may be accomplished by:
 - Keeping patient covered.
 - Covering the patients head.
 - Warming the room.
 - Warming IV fluids.

Perform Secondary Survey

History:

- Obtain circumstances of injury
- Obtain medical history:
 - A – Allergies.
 - M – Medications.
 - P – Previous illness, past medical history.
 - L – Last meal or fluid intake.
 - E – Incidents/environment related to the injury.

Complete Physical Examination:

- Head to toe exam:
 - If eye involvement or facial burns, consult an Ophthalmologist.
- Determine extent/size of the burn by calculating the TBSA burn:

- Rule of Nines.
- Lund-Browder chart.
- Rule of the Palm.
- Determine the depth of the burn (Superficial thickness burns are not included in the TBSA):
 - Superficial PARTIAL thickness (2nd degree).
 - Involves the epidermis and a thin layer of dermis.
 - Red, moist, with blisters and blanches.
 - Deep PARTIAL thickness (2nd degree).
 - Involves the entire epidermis and variable portion of the dermis.
 - Red, blistered and edematous.
 - Full thickness (3rd degree).
 - Involves the destruction of the entire epidermis and dermis.
 - White, brown, dry, leathery with possible coagulated vessels.
- Assess Need for Escharotomies: Monitor the following signs and symptoms in full thickness, circumferential burn injuries which may indicate a circulation deficit requiring decompression by incision of burn wound:
 - Cyanosis of distal unburned skin on a limb.
 - Unrelenting deep tissue pain.
 - Progressive paresthesia.
 - Progressive decrease or absence of pulses.
 - Inability to ventilate in patients with deep circumferential burns of the chest.
- Comfort:
 - Frequent pain/sedation assessment.
 - Every hour.
 - Before and after pain/sedation medications given.
 - Use age appropriate pain scales for pediatric patients.
 - Give whatever pain medication is required:
 - Narcotic/Analgesic PO/IV.
 - Oxycodone PO.
 - Ativan/Versed PO/IV.

Wound Care:

- Assess and monitor the wound for:
 - Change in wound appearance.
 - Change in size of wound.
 - Signs or symptoms of infection.
 - Wound care should include:
 - Washing the wounds with soap and warm tap water using a wash cloth
 - Remove water by patting dry.
- Wound care should be performed every day, if using the following to the face:
 - Silver sulfadiazine cream.
 - Triple antibiotic ointment.
- Burned scalps and faces should be shaved daily.
- All blisters should be debrided, except for the following:
 - Intact blisters on hands and feet.

- Ears are poorly vascularized and at risk for chondritis. Topical sulfamylon cream should be used; if unavailable, use silvadene. Avoid external pressure including pillows and constrictive dressings.
- For extensive and severe burns to the face:
 - Apply a thin layer of silver sulfadiazine cream, approximately a nickels thickness or enough to cover the wound, so that it doesn't dry out prior to the next dressing change. The purpose of a dressing is to keep the cream from rubbing off before the next dressing change.
 - Avoid creams near the eyes.
- For moderate facial burns:
 - Bacitracin or another antibiotic ointment without dressing can be used.
- If fingers and toes are burned:
 - Dress and wrap separately to promote range of motion and prevention adhering together
- Genitalia and perianal burns require:
 - A greasy gauze and/or lubricant between the labia and in the foreskin to prevention adhesions.
 - A foley is never indicated to maintain patency.
 - May be used to monitor urine output, if needed.
- Elevate burned extremities above the level of the heart.
- If applying an Acticoat dressing:
 - Apply a single layer of the dressing moistened with water over burn wounds so that all areas are covered.
 - Water should be used to keep the Acticoat and overlying gauze moist to maintain the dressing's antimicrobial activity.
 - Should be held in place with water-moistened gauze dressing, this should be periodically moistened throughout the use of the dressing. Acticoat needs to be damp in order to have full use of its antimicrobial therapy.
 - Dressing does not need to be changed for 7 days.
 - The overlying gauze can be changed as necessary, but kept damp.

Ongoing Resuscitation (as needed)

- Monitor urine output
 - Adjust fluids to keep urine output between the following:
 - Patients > 30kg = 30-50 ml/hr.
 - Pediatrics = 2 ml/kg/hr.
- Additional fluid needs can occur with:
 - Very deep burns.
 - Inhalation injury.
 - Associated injuries.
 - Electrical injury.
 - Delayed resuscitation.
 - Prior dehydration.
 - Alcohol or drug dependence.
 - Small children.
- Children, the elderly and patients with pre-existing cardiac disease are particularly sensitive to fluid management.
- If Myoglobin in the urine (burgundy color): (treatment algorithm still under discussion)

- Maintain urine output of 100 ml/hour for adults and 4ml/kg/hr. for pediatrics by increasing fluid rate.
- Place a foley.
- Increase fluid rate (LR).
- Diuretics are never indicated with myoglobinuria.
- Mannitol may be used only as a last resort to maintain urine output.
- Intravenous sodium bicarbonate may be administered to maintain an alkaline urine with a pH > 6.

For circumferential burns to extremities:

- Perform pulse checks (CMS) every 1 hour to determine need for emergent escharotomy.
- Monitor by palpation or Doppler exam for:
 - Decreased sensation.
 - Severe deep tissue pain.
 - Diminished distal pulses.
 - Slowed capillary refill.
 - After 24-48 hours, decrease frequency of pulse checks to every 2 hours if stable.
 - Elevate extremities above the level of the heart.

Nutrition:

- Obtain dry weight on admission.
- Keep NPO until assessment has been completed.
- Dietary consultation, as needed.
- Regular high calorie, high protein diet if able to take PO.
- If intubated, begin tube feeding at full strength increasing to goal rate:
 - Soft feeding tubes are preferred over hard naso-gastric tubes.
 - If possible post-pyloric placement is more beneficial for patients who need frequent dressing changes.
 - Ensure stool softeners are ordered to prevention constipation due to pain medications.

Mobility:

- Physical Therapy/Occupational Therapy consultation, as needed.
- In a disaster, therapists may just splint patients in functional positions as needed.
- HOB elevated at all times.

Ear burns

- No external pressure should be applied.
- No pillows or blankets under the head.

Neck burns

- Maintain the head in a neutral position.
- No pillows or blankets under the head flexing the neck forward.

Axilla burns:

- Keep arms extended to decrease contractures.
- Elevate burned extremities above the level of the heart to decrease swelling.

If legs are burned, apply ace wraps when OOB (Out of Bed)

- Encourage active range of motion hourly, when awake.

Encourage Activities of daily living

- Patient should have enough pain control to perform these activities.

Infection Control:

- Utilize universal precautions.
- For patients with > 10% TBSA wounds, when they are exposed:
 - Gown, mask, surgical hat and gloves will need to be worn to protect patient
 - No systemic antibiotics are required for the burn injuries

Psychosocial:

- Explain any procedures:
 - Involve patient and family.
 - Consider Social Worker consultation.
 - Offer Spiritual Care.

Included in this annex is reference material useful in caring for the pediatric burn patient. Healthcare providers in the State of Michigan also have access to the University of Michigan website designed specifically for use during a burn surge incident at: <http://www.michiganburn.org>.

BURN TREATMENT: FLUID RESUSCITATION

Fluid Resuscitation Formula: 3 - 4 mL / kg / %TBSA burn

For Infants (0 - 2 years; less than 30 kg):

Use maintenance fluid containing 5% dextrose is D5 Lactated Ringer's

Maintenance fluid requirements

- 1st 10kg of body wt.: 4 mL/kg/hr.
- 2nd 10kg of body wt.: 2 mL/kg/hr.
- Remaining kg of body wt.: 1 mL/kg/hr.

Table 17: Exemplar Burn Resuscitation Fluid Calculations

Patient Weight	TBSA burn	Calculation	Estimated 24h Resuscitation Total (NOT including maintenance fluids)	Fluid type (dependent on patient weight)
8 kg	20%	3 x 8 x 20	480 ml	D5 LR
8 kg	40%	3 x 8 x 40	960 ml	D5 LR
8 kg	60%	3 x 8 x 60	1,440 ml	D5 LR
8 kg	80%	3 x 8 x 80	1,920 ml	D5 LR
10 kg	20%	3 x 10 x 20	600 ml	LR
10 kg	40%	3 x 10 x 40	1,200 ml	LR
10 kg	60%	3 x 10 x 60	1,800 ml	LR
10 kg	80%	3 x 10 x 80	2,400 ml	LR
20 kg	20%	3 x 20 x 20	1,200 ml	LR
20 kg	40%	3 x 20 x 40	2,400 ml	LR
20 kg	60%	3 x 20 x 60	3,600 ml	LR
20 kg	80%	3 x 20 x 80	4,800 ml	LR
30 kg	20%	3 x 30 x 20	1,800 ml	LR
30 kg	40%	3 x 30 x 40	3,600 ml	LR
30 kg	60%	3 x 30 x 60	5,400 ml	LR
30 kg	80%	3 x 30 x 80	7,200 ml	LR
40 kg	20%	3 x 40 x 20	2,400 ml	LR
40 kg	40%	3 x 40 x 40	4,800 ml	LR
40 kg	60%	3 x 40 x 60	7,200 ml	LR
40 kg	80%	3 x 40 x 80	9,600 ml	LR
50 kg	20%	3 x 50 x 20	3,000 ml	LR
50 kg	40%	3 x 50 x 40	6,000 ml	LR
50 kg	60%	3 x 50 x 60	9,000 ml	LR
50 kg	80%	3 x 50 x 80	12,000 ml	LR

Table 18: Daily Maintenance Fluid and Electrolyte Requirements

Calculation	
Fluids Per Hour	4mL/kg/hr. for first 10kg of weight 2mL/kg/hr. for next 10 kg of weight 1mL/kg/hr. for remaining kg of body weight
Maintenance Electrolyte Calculations for IV Fluid	Sodium: 3-4 mEq/kg/day or 30-50 mEq/m2/day Potassium: 2-3 mEq/kg/day or 20-40 mEq/m2/day

Table 19: Clinical Features of Dehydration

Feature	Mild (<5%)	Moderate (5% to 10%)	Severe (<10%)
Heart rate	Normal	Slightly increased	Rapid, weak
Systolic BP	Normal	Normal to orthostatic, >10 mmHg change	Hypotension
Urine output	Decreased	Moderately decreased	Marked decrease, anuria
Mucous membranes	Slightly dry	Very dry	Parched
Anterior fontanel	Normal	Normal to sunken	Sunken
Tears	Present	Decreased, eyes sunken	Absent, eyes sunken
Skin	Normal turgor	Decreased turgor	Tenting
Skin perfusion	Normal capillary refill (<2 seconds)	Capillary refill slowed (2-4 seconds); skin cool to touch	Capillary refill markedly delayed (>4 seconds); skin cool, mottled, gray

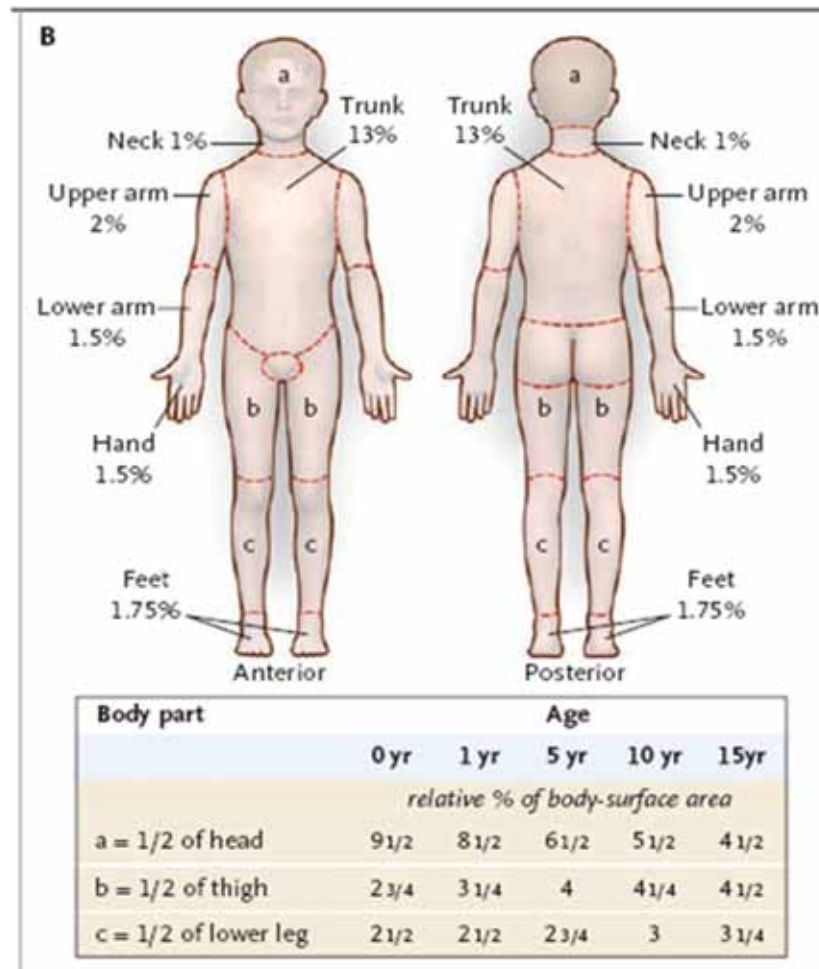
Pediatric Burn Assessment: Palm Method/Rule of Nines

The **Palm method** is extremely easy and is very helpful when the burns are scattered over the body. With this method and using the PATIENT'S hand as a guide, the palmar surface is equal to 1% of the patient's body. Extremely helpful in determining burns in infants, toddlers and small children.



The "Rule of Nines" is a convenient, quick method to determine burn size. Only second and third degree burn injury are used to calculate the extent of burn that is applied to burn formula calculations. (See Figure 9 below)

Figure 9: Pediatric Rule of Nine's



Pediatric considerations include:

- Increased fluid requirements relative to adults.
- Increased surface area.
- Hypoglycemia may occur in infants (<30 kg) due to limited glycogen reserves.

Equipment Estimations

- Method to estimate Endotracheal Tube (ETT) size:
 - Internal tube diameter (mm) = $[16 + \text{age}(y)] / 4$
 - ETT Depth in cm at lip = $3 \times \text{ETT size}$

Table 20: Equipment Sizes: Newborn - 6 Years Old

Equipment	Newborn	3-6 mos.	1 year	2-3 yrs.	4-6 yrs.
Weight	3 kg	5 kg	10 kg	15 kg	20 kg
ETT	3-3.5	3.5-4.0	4-4.5	4.5-5/0	5.0-5.5
L Blade	Miller 0-1	Miller 0-1	Miller 0-1	Miller 1-2	Miller 2
Suction	6-8 Fr	8-10 Fr	10 Fr	10 Fr	10 Fr
NG Tube	5-8 Fr	5-8 Fr	8-10 Fr	10-12 Fr	12-14 Fr
Foley	6-8 Fr	6-8 Fr	8-10 Fr	10-12 Fr	10-12 Fr
Chest Tube	10-12 Fr	12-16 Fr	16-20 Fr	20-24 Fr	24-32 Fr
LMA (cuff)	1 (4 mL)	1.5 (7 mL)	2 (10 mL)	2 (10 mL)	2-2.5 (14 mL)

Table 21: Equipment Sizes: 7 Years and Older

Equipment	7-9 yrs.	10-12 yrs.	13-15 yrs.	>15 yrs.
Weight	25 kg	30 kg	40 kg	> 50 kg
ETT	5.5-6.0 cuff	6.0-6t.5 cuff	7.0-7.5 cuff	7.5-8.0 cuff
L Blade	Mil/Mac 2	Mil/Mac 2-3	Mil/Mac 3	Mil/Mac 3
Suction	10 Fr	10 Fr	12 Fr	12-14 Fr
NG Tube	12-14 Fr	14-26 Fr	14-16 Fr	16-18 Fr
Foley	12 Fr	12 Fr	12-14 Fr	12-14 Fr
Chest Tube	28-32 Fr	28-32 Fr	32-40 Fr	32-40 Fr
LMA (cuff)	2.5 (17 mL)	3 (20 mL)	3 (20 mL)	4-6 (30-50 mL)

NUTRITION

Nutrition in a pediatric patient should be considered early in the treatment phase. Place enteral feeding tube as early as possible in all patients with burns > 20% TBSA. If none are available or if the patient is awake and alert and able to drink and eat encourage patient to do so.

- If patient has an NG/OG, check residuals Q 4 hr. If residuals are more than 3 times the hourly rate stop the tube feedings and notify MD.
- Consult dietician for appropriate formula.

Figure: Pediatric Nutrition

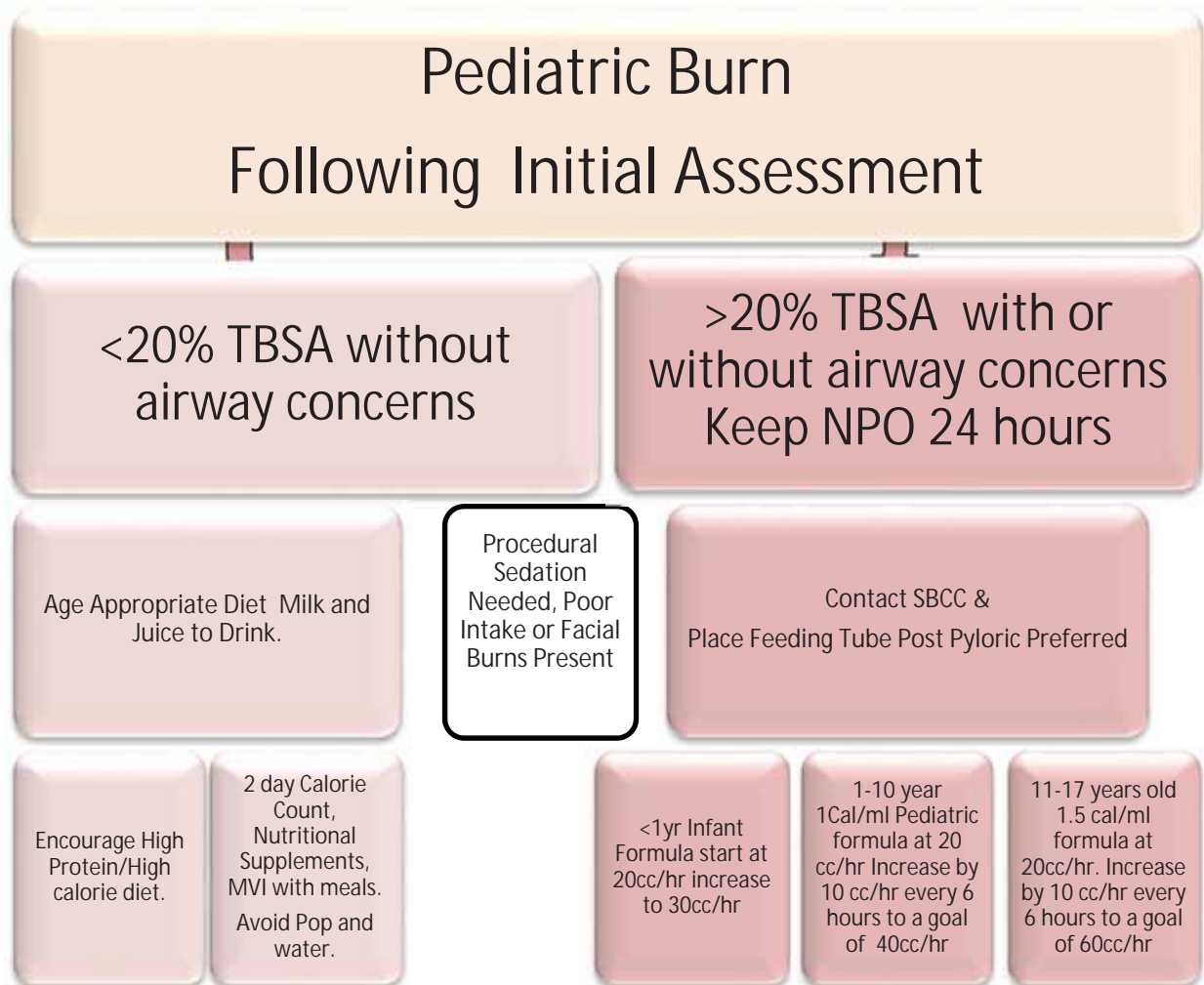


Table 22: Appropriate Infant Nutritional Components

Age	
Birth - 1 month	2-3 ounces (6-90 mL) per feeding breast or bottle every 2-3 hours
2-4 months	3-4 ounces (90-120 mL) per feeding every 3-4 hours
4-6 months	4-5 ounces (120-150 mL) per feeding, four or more time daily Begins baby food, usually rice cereal
6-8 months	6-8 ounces (180-240 mL) per feeding, four times daily Eats baby food such as rice cereal, fruits and vegetables
8-10 months	6 ounces (180 mL) per feeding, four times a day Soft finger foods
10-12 months	6-8 ounces (180-240 mL) per feeding, four times a day Soft table foods, uses spoon and cup with lid
Formulas	Milk Based: Enfamil, Enfacare & Similac Soy Based: Prosobee & Isomil

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Appendix IV Job Action Sheets⁴⁷

Pediatric Services Unit Leader

You report to: _____ (Operations Chief)

Command Center: _____

Mission: To ensure that the pediatric treatment and holding areas are properly assigned, equipped, and staffed during an emergency.

Immediate (Operational Period 0-2 Hours):

- ____ Receive appointment from Unit Leader.
- ____ Read this entire job action sheet.
- ____ Obtain briefing from Unit Leader.
- ____ Gather external information from Treatment Area Supervisor/ED Charge Nurse regarding:
 - ____ Number of expected pediatric patients and their conditions.
 - ____ Current total number of ED patients.
 - ____ Expected time of patient arrival.
- ____ Determine number of available pediatric/crib beds [inpatient] and report to Operations Chief for planning Purposes.
- ____ Determine qualified, on-site pediatric staff members.
- ____ Determine additional staff needed based on expected patient volume.
- ____ Alert Discharge Unit Leader to institute early discharge/transfer of patients.
- ____ Initiate Pediatric Response Team as per plan.
- ____ Predetermined Physicians for Pediatric Response (Pediatric/Family/Practice/Staff/Community).
- ____ Predetermined Nurses (with pediatric experience and/or PALS/ENPC certification).
- ____ Predetermined ancillary technicians with pediatric experience.
- ____ Others as predetermined.
- ____ Determine need for opening of a Pediatric Safe Area (dependent on expected number of unaccompanied children during the disaster).
- ____ Assign Pediatric Safe Area Coordinator.
- ____ Communicate with Operations Chief to assure coordination of non-pediatric ancillary/support personnel are assigned to each area.
- ____ Assure preparation of a pre-designated Pediatric Disaster Care Areas.
- ____ Clear area.
- ____ Designate each specific area per plan and based on expected casualties.
- ____ Assure support personnel are assigned to each area.

⁴⁷ Northwest Healthcare Response Network. (2010). Hospital guidelines for Management of Pediatric Patients in Disasters

- _____Assure delivery of medical and non-medical pediatric equipment.
- _____Assure set-up of pediatric equipment by clinical staff.
- _____Receive pediatric patients.
- _____Communicate findings to Treatment Area Supervisor for dissemination as per disaster plan.
- _____Following triage of all children, move uninjured/unaffected children to pre-designated Pediatric Safe Area.

Intermediate (Operational Period 2-12 Hours):

- _____Assess on-going staffing needs based on patient status report form:
- _____Pediatric healthcare personnel (emergency department, inpatient, and OR).
- _____Non-pediatric ancillary/support personnel.
- _____Pediatric Safe Area Coordinator.
- _____Assess additional medical and non-medical equipment/supply needs.
- _____Communicate with Pediatric Logistics Unit Leader via Operations Chief to Logistics Chief.
- _____Assure delivery of needed supplies to pediatric designated areas.
- _____Assess Pediatric Response Team basic needs:
- _____Food.
- _____Rest.
- _____Psychological support.
- _____Obtain status of pediatric casualties (discharges, admissions, transfers, and Pediatric Safe Area) and report to the Operations Chief.
- _____Hold information sessions with Public Information Officer as needed.
- _____Obtain Child Survey Forms (See Section 5. Security) from all pediatric patient areas.
- _____Report any unidentified or unaccompanied pediatric patients to Operations Chief.

Extended (Operational Period Beyond 12 Hours):

- _____Debrief Pediatric Response Team and Pediatric Safe Area Coordinator regarding:
- _____Summary of Incident.
- _____Review of areas of success.
- _____Identify opportunities of success.

Pediatric Logistics Unit Leader

You report to: _____ (Logistics Chief)

Command Center: _____

MISSION: To ensure that the pediatric needs are addressed by Procurement, Transportation, Materials Supply, and Nutritional Supply during an emergency.

IMMEDIATE:

- ____ Receive appointment from Logistics Chief.
- ____ Read this entire job action sheet.
- ____ Obtain briefing from Logistics Chief.
- ____ Number of expected pediatric patients and their conditions.
- ____ Timeline for supply needs.
- ____ Depending on the extent of elcs activation, meet with Logistics Chief and
- ____ Distribute tasks to the following Unit Leaders:

Procurement Unit Leader:

- ____ Receive briefing from Logistics Chief and Pediatric Logistics Unit Leader.
- ____ Initiate Procurement Disaster Call list if warranted.
- ____ Work with vendors for pediatric supplies including hospital vendors and community resources (Local pharmacies and grocery stores) for back-up resources.

Transportation Unit Leader:

- ____ Receive briefing from Logistics Chief and Pediatric Logistics Unit Leader.
- ____ Initiate Transportation Disaster Call list if warranted.
- ____ Count open stretchers, carts, cribs, and wheelchairs for pediatric transportation.
- ____ If adult transport equipment options are used, ensure all are appropriately modified and safe for pediatric transport.
- ____ Report transportation options to Logistics Chief.
- ____ Coordinate delivery of transportation options to designated pediatric area or ED depending on scenario.
- ____ Designate transporters as needed from CS staff or Labor pool.
- ____ Ensure that all transporters are aware of pediatric safety issues and are not to leave pediatric patients unattended (see Section 9 - Transportation for more information).

Materials/Supplies Unit Leader:

- ____ Receive briefing from Logistics Chief and Pediatric Logistics Unit Leader.
- ____ Initiate Materials/Supplies Disaster Call list if warranted.
- ____ Collect and coordinate essential pediatric medical equipment and supplies.
- ____ Assist in preparation of pre-designated Pediatric Disaster Care Areas with Pediatric Services Unit Leader (See Section 4 - Equipment Recommendations for more information).
- ____ Assist in preparation of pre-designated Pediatric Safe Area with Pediatric Services Unit Leader (See Section 5 - Security for more information).

Nutritional Supply Unit Leader: (See Section 12 - Pediatric Dietary Needs for additional information)

- ____ Receive briefing from Logistics Chief and Pediatric Logistics Unit Leader.
- ____ Initiate Nutritional Call list if warranted.
- ____ Estimate number of pediatric meals needed for 48 hours (See Section 12 - Pediatric Dietary Needs for more information).
- ____ Estimate pediatric food/snacks/hydration needs for Pediatric Safe Area.

INTERMEDIATE:

- ____ Obtain regular updates from Logistics Chief.
- ____ Assess additional equipment/supply needs for pediatrics.
- ____ Address pediatric concerns, questions and issues as needed.

EXTENDED:

- ____ Document actions and decisions, submit reports to Logistics Chief.
- ____ Participate in debriefing.
- ____ Review areas of success.
- ____ Identify opportunities for improvement.
- ____ Thank and congratulate team.

Medical/Technical Specialist - Pediatric Care

Mission: Advise the Incident Commander or Operations Section Chief, as assigned, on issues related to pediatric emergency response.

Date: _____ Start: _____ End: _____ Position Assigned to: _____

Initial: _____

Position Reports to: _____ Signature: _____

Hospital Command Center (HCC) Location: _____ Telephone: _____

Fax: _____ Other Contact Info: _____ Radio Title: _____

Immediate (Operational Period 0-2 Hours)	Time	Initial
Receive appointment and briefing from the Incident Commander or Operations Section Chief, as assigned.		
Read this entire Job Action Sheet and review incident management team chart (HICS Form 207). Put on position identification.		
Notify your usual supervisor of your elcs assignment.		
Document all key activities, actions, and decisions in an Operational Log (HICS Form 214) on a continual basis.		
Meet with the Command staff, Operations and Logistics Section Chiefs and the Medical Care Branch Director to plan for and project pediatric patient care needs.		
Communicate with the Operations Section Chief to obtain: Type and location of incident. Number and condition of expected pediatric patients. Estimated arrival time to facility. Unusual or hazardous environmental exposure.		
Request staffing assistance from the Labor Pool and Credentialing Unit Leader, as needed, to assist with rapid research as needed to determine hazard and safety information critical to treatment and decontamination concerns for the pediatric victims.		
Provide pediatric care guidance to Operation Section Chief and Medical Care Branch Director based on incident scenario and response needs.		
Ensure pediatric patient identification and tracking practices are being followed.		
Communicate and coordinate with Logistics Section Chief to determine pediatric: Medical care equipment and supply needs. Medications with pediatric dosing. Transportation availability and needs (carts, cribs, wheel chairs, etc.)		
Communicate with Planning Section Chief to determine pediatric: Bed availability. Ventilators. Trained medical staff (MD, RN, PA, NP, etc.) Additional short and long range pediatric response needs.		
Ensure that appropriate pediatric standards of care are being followed in all clinical areas.		
Immediate (Operational Period 0-2 Hours)	Time	Initial
Collaborate with the PIO to develop media and public information messages specific to pediatric care recommendations and treatment.		

Participate in briefings and meetings and contribute to the Incident Action Plan, as requested.		
Document all communications on an Incident Message Form (ICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		
Intermediate (Operational Period 2-12 Hours)	Time	Initial
Continue to communicate and coordinate with Logistics Section Chief the availability of pediatric equipment and supplies.		
Coordinate with Logistics and Planning Section Chiefs to expand/create a Pediatric Patient Care area, if needed.		
Continue to monitor pediatric care activities to ensure needs are being met.		
Meet regularly with the Operations Section Chief and Medical Care Branch Director for updates on the situation regarding hospital operations and pediatric needs.		
Extended (Operational Period Beyond 12 Hours)	Time	Initial
Ensure the provision of resources for pediatric mental health and appropriate incident education for children and families.		
Continue to ensure pediatric related response issues are identified and effectively managed.		
Continue to meet regularly with the Operations Section Chief or Incident Commander, as appropriate, for situation status updates and to communicate critical pediatric care issues.		
Ensure your physical readiness through proper nutrition, water intake, rest and stress management techniques.		
Observe all staff and volunteers for signs of stress and inappropriate behavior. Report concerns to the Mental Health Unit Leader. Provide for staff rest periods and relief.		
Upon shift change, brief your replacement on the status of all ongoing operations, issues and other relevant incident information.		
Demobilization/System Recovery	Time	Initial
Ensure return/retrieval of equipment and supplies and return all assigned incident command equipment.		
Upon deactivation of your position, ensure all documentation and Operational Logs (HICS Form 214) are submitted to the Operations Section Chief or Incident Commander, as appropriate.		
Upon deactivation of your position, brief the Operations Section Chief or Incident Commander, as appropriate, on current problems, outstanding issues and follow-up requirements.		
Submit comments to the Operations Section Chief or Incident Commander, as appropriate, for discussion and possible inclusion in the after-action report; topics include: Review of pertinent position descriptions and operational checklists. Recommendations for procedure changes. Section accomplishments and issues.		
Participate in stress management and after-action debriefings. Participate in other briefings and meetings as required.		

INCIDENT COMMANDER

Mission: Organize and direct the Hospital Command Center (HCC). Give overall strategic direction for hospital incident management and support activities, including emergency response and recovery. Authorize total facility evacuation if warranted.

Date: _____	Start: _____	End: _____	Position Assigned to: _____
Signature: _____		Initial: _____	
Hospital Command Center (HCC) Location: _____		Telephone: _____	
Fax: _____	Other Contact Info: _____	Radio Title: _____	

Time	Initial	Immediate (Operational Period 0-2 Hours)
		Assume role of Incident Commander and activate the Hospital Incident Command System (HICS).
		Read this entire Job Action Sheet and put on position identification.
		Notify your usual supervisor and the hospital CEO, or designee, of the incident, activation of HICS and your ICS assignment.
		Initiate the Incident Briefing Form (ICS Form 201) and include the following information: <ul style="list-style-type: none"> • Nature of the problem (incident type, victim count, injury/illness type, etc.) • Safety of staff, patients and visitors. • Risks to personnel and need for protective equipment. • Risks to the facility. • Need for decontamination. • Estimated duration of incident. • Need for modifying daily operations. • HICS team required to manage the incident. • Need to open up the HCC. • Overall community response actions being taken. • Status of local, county, and state Emergency Operations Centers (EOC).
		Contact hospital operator and initiate hospital's emergency operations plan.
		Appoint Public Information Officer, Security Officer, and Liaison Officer. Determine need for and appropriately appoint Command Staff and Section Chiefs; distribute corresponding Job Action Sheets and position identification. Assign or complete the Branch Assignment List (ICS Form 204), as appropriate.
		Announce a status/action plan meeting of all Section Chiefs and Medical Staff Director to be held in 5-10 minutes. Brief all appointed staff of the nature of the problem, immediate critical issues and initial plan of action. Designate time for next briefing.

Time	Initial	Immediate (Operational Period 0-2 Hours)
		Assign one or more clerical personnel from current staffing or make a request for staff to the Labor Pool and Credentialing Unit Leader, if activated, to function as the Hospital Command Center (HCC) recorder(s).
		Distribute the Section Personnel Time Sheet (ICS Form 252) to Command Staff and Medical/Technical Specialist assigned to Command, and ensure time is recorded appropriately. Submit the Section Personnel Time Sheet to the Finance/Administration Section's Time Unit Leader at the completion of a shift or at the end of each operational period.
		Initiate the Incident Action Plan Safety Analysis (ICS Form 261) to document hazards and define mitigation.
		<p>Receive status reports from and develop an Incident Action Plan with Section Chiefs and Command Staff to determine appropriate response and recovery levels. During initial briefing/status reports, discover the following:</p> <ul style="list-style-type: none"> • If applicable, receive initial facility damage survey report from Logistics Section Chief and evaluate the need for evacuation. • If applicable, obtain patient census and status from Planning Section Chief, and request a hospital-wide projection report for 4, 8, 12, 24 & 48 hours from time of incident onset. Adjust projections as necessary. • Identify the operational period and HCC shift change. • If additional beds are needed, authorize a patient prioritization assessment for the purposes of designating appropriate early discharge. • Ensure that appropriate contact with outside agencies has been established and facility status and resource information provided through the Liaison Officer. • Seek information from Section Chiefs regarding current "on-hand" resources of medical equipment, supplies, medications, food, and water as indicated by the incident. • Review security and facility surge capacity and capability plans as appropriate.
		Document all key activities, actions, and decisions in an Operational Log (ICS Form 214) on a continual basis.
		Document all communications (internal and external) on an Incident Message Form (ICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.

Time	Initial	Intermediate (Operational Period 2-12 Hours)
		Authorize resources as needed or requested by Section Chiefs.
		<p>Designate regular briefings with Command Staff/Section Chiefs to identify and plan for:</p> <ul style="list-style-type: none"> • Update of current situation/response and status of other area hospitals, emergency management/local emergency operation centers, and public health officials and other community response agencies. • Deploying a Liaison Officer to local EOC. • Deploying a PIO to the local Joint Information Center. • Critical facility and patient care issues. • Hospital operational support issues. • Risk communication and situation updates to staff. • Implementation of hospital surge capacity and capability plans. • Ensure patient tracking system established and linked with appropriate outside agencies and/or local EOC. • Family Support Center operations. • Public information, risk communication and education needs. • Appropriate use and activation of safety practices and procedures. • Enhanced staff protection measures as appropriate. • Public information and education needs. • Media relations and briefings. • Staff and family support. <p>Development, review, and/or revision of the Incident Action Plan, or elements of the Incident Action Plan</p>
		<p>Consult with section chiefs on need for staff, physician and volunteer responders and food and shelter.</p> <p>Oversee and approve revision of the Incident Action Plan developed by the Planning Section Chief. Ensure that the approved plan is communicated to all Command Staff and Section Chiefs.</p>
		Communicate facility and incident status and the Incident Action Plan to CEO or designee, or to other executives and/or Board of Director members on a need-to-know basis.
Time	Initial	Extended (Operational Period Beyond 12 Hours)
		Ensure staff, patient, and media briefings are being conducted regularly. Approve media releases submitted by PIO.
		Ensure your physical readiness, and that of the Command Staff and Section Chiefs, through proper nutrition, water intake, rest periods and relief, and stress management techniques. Provide for staff rest periods and relief.
		Observe all staff and volunteers for signs of stress and inappropriate behavior. Report concerns to the Employee Health & Well-Being Unit Leader.

		Review and revise the Incident Action Plan Safety Analysis (ICS Form 261) and implement correction or mitigation strategies.
		Evaluate/re-evaluate need for deploying a Liaison Officer to the local EOC.
		Evaluate/re-evaluate need for deploying a PIO to the local Joint Information Center.
		Ensure incident action planning for each operational period and a reporting of the Incident Action Plan at each shift change and briefing.
		Evaluate overall hospital operational status, and ensure critical issues are addressed.
		Review /revise the Incident Action Plan with the Planning Section Chief for each operational period.
		Ensure continued communications with local, regional, and state response coordination centers and other HCCs through the Liaison Officer and others.
		Upon shift change, brief your replacement on the status of all ongoing operations, critical issues, relevant incident information and Incident Action Plan for the next operational period.

Demobilization/System Recovery

- Assess the plan developed by the Demobilization Unit Leader for the gradual demobilization of emergency operations according to the progression of the incident and facility/hospital status. Demobilize positions and return personnel to their normal jobs as appropriate until the incident is resolved and there is a return to normal operations.
- Briefing staff, administration, and Board of Directors.
- Approve announcement of "ALL CLEAR" when incident is no longer a critical safety threat or can be managed using normal hospital operations.
- Ensure outside agencies are aware of status change.
- Declare hospital/facility safety.
- Ensure demobilization of the HCC and restocking of supplies, as appropriate including:
 - Return of borrowed equipment to appropriate location.
 - Replacement of broken or lost items.
 - Cleaning of HCC and facility.
 - Restock of HCC supplies and equipment;
 - Environmental clean-up as warranted.
- Ensure that after-action activities are coordinated and completed including:
 - Collection of all HCC documentation by the Planning Section Chief.
 - Coordination and submission of response and recovery costs, and reimbursement documentation by the Chiefs.
 - Conduct staff debriefings to identify accomplishments, response and improvement issues.
 - Identify needed revisions to the Emergency Management Plan, Emergency Operations Plan, Job Action Sheets, operational procedures, records, and/or other related items.
 - Writing the facility/hospital After Action Report and Improvement Plan.

- Participation in external meetings and other post-incident discussion and after-action activities.
- Post-incident media briefings and facility/hospital status updates.
- Post-incident public education and information.
- Stress management activities and services for staff.

PEDIATRIC SAFE AREA (PSA) COORDINATOR

You report to: _____ (PEDIATRIC SERVICES UNIT LEADER)
Command Center location _____ Phone number _____

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 incident (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.


Pediatric Safe Area 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?
		Plug-in covers or safety wiring for electrical outlets?
		Strangulation hazards removed (cords, wires, tubing, curtain/blinds drawstrings)?
		Can you contain children in this area (consider stairwells, elevators, doors)?
		Do you have distractions for the children (age and gender appropriate videos, games, toys)?
		Poison-proof the area (cleaning supplies, Hemocult developer, choking hazards, cords should be removed or locked)
		Are your med carts and supply carts locked?
		Do you need to create separate areas for various age groups?
		Have you conducted drills of the plans for this area with all relevant departments?
		Do you have a plan for security for the unit?
		Do you have a plan to identify the children?
		Do you have a plan for assessing mental health needs of these children?
		Are there any fans or heaters in use? Are they safe?
		Do you have an onsite or nearby daycare? Could they help you?
		Do you have enough staff to supervise the number of children (Younger children will require more staff)?
		Do you have a sign-in, sign-out sheet for all children and adults who enter the area?
		Will children need to be escorted away from safe area to bathrooms?
		Are age-appropriate meals and snacks available for children?
		Are various-sized diapers available?
		Does the PSA have hand hygiene supplies?
		Are there cribs, cots or beds available for children who need to sleep?
		Does the PSA have a policy/protocol for handling minor illness in children (Tylenol dosing, administering routine meds, etc.)?
		Do you have an evacuation plan?

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Appendix V⁴⁸

⁴⁸ https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/Children-and-Disasters/Documents/Checklist_ED_Aug2010.pdf#search=ED%20Checklist

 <h1 style="margin: 0;">Guidelines for Care of Children in the Emergency Department</h1>	
<p>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.</p>	
Appointed Pediatric Physician and Nurse Coordinator	Guidelines for QI/PI in the ED, Continued
<ul style="list-style-type: none"> <input type="radio"/> 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. <input type="radio"/> 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. 	<p>Clinical and Professional Competency</p> <p>Below are the potential areas for the development of pediatric competency and professional evaluations.</p> <ul style="list-style-type: none"> <input type="radio"/> Triage <input type="radio"/> Illness and injury assessment and management <input type="radio"/> Pain assessment and treatment, including sedation and analgesia <input type="radio"/> Airway management <input type="radio"/> Vascular access <input type="radio"/> Critical care monitoring <input type="radio"/> Neonatal and pediatric resuscitation <input type="radio"/> Trauma care <input type="radio"/> Burn care <input type="radio"/> Mass-casualty events <input type="radio"/> Patient- and family-centered care <input type="radio"/> Medication delivery and equipment safety <input type="radio"/> Training and communication <p><input type="radio"/> Mechanisms are in place to monitor professional performance, credentials, continuing education, and clinical competencies.</p>
Physicians, Nurses and Other Healthcare Providers Who Staff the ED	
<ul style="list-style-type: none"> <input type="radio"/> 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. <input type="radio"/> 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. <input type="radio"/> 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	Guidelines for Improving Pediatric Patient Safety
<p>The pediatric patient care-review process is integrated into the ED QI/PI plan.</p> <ul style="list-style-type: none"> <input type="radio"/> Components of the process interface with out-of-hospital, ED, trauma, inpatient pediatric, pediatric critical care, and hospital-wide QI or PI activities. 	<p>The delivery of pediatric care should reflect an awareness of unique pediatric patient safety concerns and are included in the following policies or practices.</p> <ul style="list-style-type: none"> <input type="radio"/> Children are weighed in kilograms. <input type="radio"/> Weights are recorded in a prominent place on the medical record. <input type="radio"/> For children who are not weighed, a standard method for estimating weight in kilograms is used (e.g., a length-based system). <input type="radio"/> Infants and children have a full set vital signs recorded (temperature, heart rate, respiratory rate) in the medical record. <input type="radio"/> Blood pressure and pulse oximetry monitoring are available for children of all ages on the basis of illness and injury severity.

Produced by the AAP, the EMSC National Resource Center, and Children's National Medical Center

- 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

Produced by the AAP, the EMSC National Resource Center, and Children's National Medical Center

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

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

Equipment/Supplies: General Equipment

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

Equipment/Supplies: Monitoring Equipment

- | | |
|--|--|
| <input type="radio"/> Blood pressure cuffs <ul style="list-style-type: none"> <input type="radio"/> Neonatal <input type="radio"/> Infant <input type="radio"/> Child <input type="radio"/> Adult-arm <input type="radio"/> Adult-thigh | <input type="radio"/> Electrocardiography monitor/defibrillator with pediatric and adult capabilities including pads/paddles |
| <input type="radio"/> Doppler ultrasonography devices | <input type="radio"/> Hypothermia thermometer |
| | <input type="radio"/> Pulse oximeter with pediatric and adult probes |
| | <input type="radio"/> Continuous end-tidal CO2 monitoring device |

Equipment/Supplies: Vascular Access Supplies

- | | |
|--|--|
| <input type="radio"/> Arm boards <ul style="list-style-type: none"> <input type="radio"/> infant <input type="radio"/> child <input type="radio"/> adult | <input type="radio"/> IV administration sets with calibrated chambers and extension tubing and/or infusion devices with ability to regulate rate and volume of infusate |
| <input type="radio"/> Catheter-over-the-needle device <ul style="list-style-type: none"> <input type="radio"/> 14 gauge <input type="radio"/> 15 gauge <input type="radio"/> 16 gauge <input type="radio"/> 17 gauge <input type="radio"/> 18 gauge <input type="radio"/> 19 gauge <input type="radio"/> 20 gauge <input type="radio"/> 21 gauge <input type="radio"/> 22 gauge <input type="radio"/> 23 gauge <input type="radio"/> 24 gauge | <input type="radio"/> Umbilical vein catheters <ul style="list-style-type: none"> <input type="radio"/> 3.5F <input type="radio"/> 5.0F |
| <input type="radio"/> Intraosseous needles or device <ul style="list-style-type: none"> <input type="radio"/> Pediatric <input type="radio"/> Adult | <input type="radio"/> Central venous catheters <ul style="list-style-type: none"> <input type="radio"/> 4.0F <input type="radio"/> 5.0F <input type="radio"/> 6.0F <input type="radio"/> 7.0F |
| | <input type="radio"/> Intravenous solutions <ul style="list-style-type: none"> <input type="radio"/> Normal saline <input type="radio"/> Dextrose 5% in normal saline <input type="radio"/> 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

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

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

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

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)



American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™



Acronyms & Mnemonics

AAP – American Academy of Pediatrics
ACS – Alternate Care Site
AMPLE – Allergies, Medications, Previous illness, Past Medical History, Last Meal or Fluid Intake, Incidents/Environment Related to the Injury
AVPU – Alert, Verbal, Pain, Unresponsive
BETP – Bureau of EMS, TRAUMA & PREPAREDNESS
BSF – Burn Surge Facility
CBC – Complete Blood Count
CDC – Centers for Disease Control and Prevention
CHEMPACK Resources – a CDC-supplied, state manage supplemental source of pre-positioned nerve agent/organophosphate antidotes and associated pharmaceuticals
CMS – Circulation, Movement, Sensation
CRC – Clinical Review Committee
CTS – Casualty Transport System
CXR – Chest X-Ray
DEPR – Division
DUMBELS – Diarrhea, Urination, Miosis, Bronchoconstriction, Bronchorrhea, Emesis, Lacrimation, Salivation
ED – Emergency Department
EMAC – Emergency Management Assistance Compact
EMResource – EMResource is an interoperable emergency communications solution that streamlines communications required to prepare for, respond to, and recover from individual and large-scale incidents across the entire emergency services spectrum. EMResource facilitates monitoring of healthcare assets, emergency department capacity, behavioral health and dialysis bed status.
EMSC – Emergency Medical Services for Children
EMS – Emergency Medical Services
EOC – Emergency Operations Center
ETT – Endo Tracheal Tube
FEMA – Federal Emergency Management Agency
FICEMS – Federal Interagency Committee on EMS
GCS – Glasgow Coma Scale
GLHP – Great Lakes Healthcare Partnership
HCC – Hospital Command Center
HCO – Healthcare Organization
HHS – Health and Human Services
IC – Incident Command or Incident Commander
ICS – Healthcare Organization
ICU – Incident Command System
LSI – Life Saving Interventions
MASS MEDICAL EVENT - defined as a situation that stresses the first responders (such as firefighters and emergency medical technicians/paramedics) as well the healthcare system in general.
MASS Triage – Move, Assess, Sort, Send
MCI – Mass Casualty Incident

MDHHS – Michigan Department Health & Human Services
MEDDRUN – Michigan Emergency Drug Delivery and Resource Utilization Network
MI-MORT – Michigan Mortuary Response Team
MI-TESA – Michigan Transportable Emergency Surge Assistance Medical Unit
MMFT – Mobile Medical Field Teams
MOU – Memorandum of Understanding
MSCC – Medical Surge Capacity and Capability
MUCC – Model Uniform Core Criteria
NCMEC – National Center for Missing and Exploited Children
NG –Naso-gastric
NPO – Nothing by mouth
PAT – Pediatric Assessment Triangle
PELOD – Pediatric Logistic Organ Dysfunction
PO - Oral
PSA – Pediatric Safe Area
RMCC – Regional Medical Coordination Center
SALT Triage – Sort, Assess, Life-saving Interventions, Treatment & Transport
SAMHSA – Substance Abuse and Mental Health Services Administration
SAMPLE History – Signs/Symptoms, Allergies, Medications, Past Medical Problems, Last food or liquid taken, Event leading to the illness or injury
SBCC – State Burn Coordinating Center
SBP – Systolic Blood Pressure
SNS – Strategic National Stockpile
SOFA score – Sequential Organ Failure Assessment
SRAC – Scarce Resource Allocation Committee
START Triage – Simple Triage and Rapid Treatment
TBSA – Total Body Surface Area
TICLS – Tone, Interactivity, Consolability, Look/gaze, Speech/cry

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