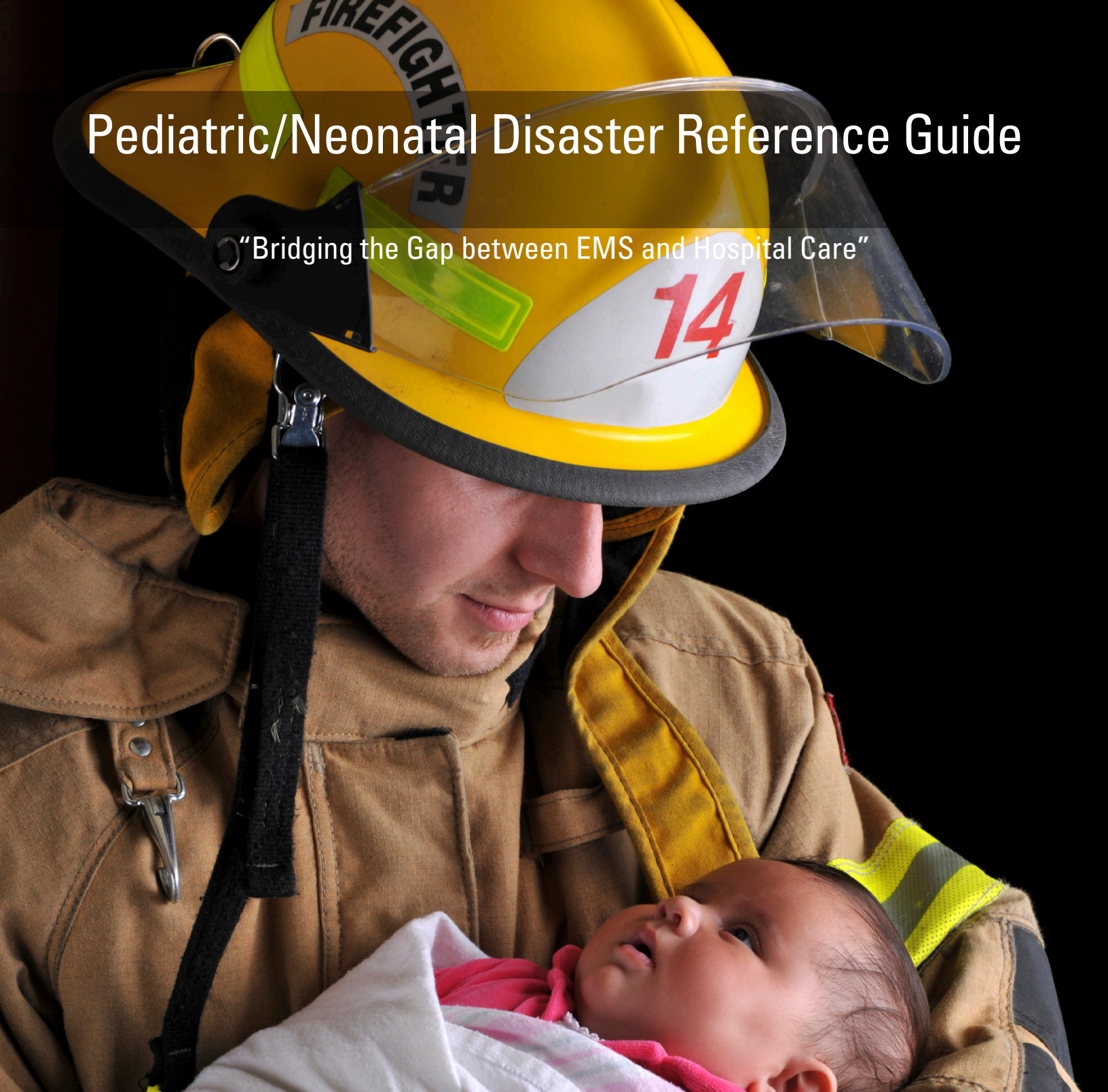# Pediatric/Neonatal Disaster Reference Guide

"Bridging the Gap between EMS and Hospital Care"

Resources to aid in the development or enhancement of
Emergency, Obstetrical, Neonatal and Pediatric Emergency Operations Planning

LOMA LINDA UNIVERSITY
CHILDREN'S HOSPITAL

This is why we do it…

http://www.youtube.com/watch?v=xm9bGII7kh4

Background

In 2007 The National Commission on Children and Disasters was established by Congress and the President as an independent, bipartisan body to identify gaps in disaster preparedness, response and recovery for children and make recommendations to close those gaps. In October of 2009, the 10 member Commission submitted an interim report and in August 2010 approved a progress report to the President and Congress citing that children are 25 percent of our nation's population and neglected in all areas of disaster preparedness. The report called for a "cohesive national strategy to address the unique needs of children as we are simply not prepared to protect children during disasters."

The Commission report found large gaps in:

+ Funding for school disaster preparedness

+ Insufficient coordination among federal, state and local agencies responsible for children and lack of preparedness in the private healthcare system

+ Inadequate essential pediatric equipment to support emergency response for even normal conditions.

In 2009, the California Neonatal/Pediatric Disaster Coalition was founded as a collaborative effort in response to H1N1 by Contra Costa and Alameda County Emergency Medical Services. During H1N1 children were disproportionately affected in emergency department surges of 30-50% and with pediatric hospital inpatient occupancy rates of over 95%. If the H1N1 pandemic had lasted a little longer, affected a few more children or resulted in longer inpatient stays, state and national pediatric capacity and capability would have been completely overwhelmed.

The California Neonatal/Pediatric Disaster Coalition is a network of pediatric, neonatal, emergency care and disaster professionals from all disciplines working to support Neonatal and Pediatric Disaster and Medical Surge Preparedness in our local communities. Our focus is on helping translate guidance into action.

Coalition members are connected to each other through a listserve. The listserve connects participants with ideas, information, resources and strategies supporting disaster planning on the local, regional and state level. Coalition partners are invited to share their projects and progress on the Coalition Google site at https://sites.google.com/site/pedineonetwork/.

Over the last three years the Coalition has:

+ Conducted a statewide pediatric and neonatal bed capacity report to inform communities of their local bed capacity.

+ Coalition neonatal and pediatric disaster champions have successfully engaged numerous organizations, regional healthcare systems, pediatric and community hospitals and counties in implementing national guidance and best practices gaining both state and national recognition.

+ Helped generate pediatric and neonatal specific disaster plans, templates throughout California.

Purpose Statement

This guide was created to help emergency managers/coordinators/hospitals in their efforts to develop their own specific departmental Emergency Operations Plan (EOP) that addresses the special needs of children and infants. This guide is meant to drive the active planning process, not to take its place. There is no single format that can adequately fit every community so this document is a culmination of best practice, expert opinions and other plans intended to assist in building your plan.

This guide is intended primarily for use by personnel responsible for the development and maintenance of the hospital specific in-patient unit Emergency Operations Plan (EOP). It is strictly a guide. It establishes no requirements and its recommendations may be used, adapted or disregarded. It is our intent that this document will provide the foundation for discussions about emergent pediatric care during a wide-scale disaster. It is not intended to prescribe action, mandate responses or direct activity, but simply to provide a framework for continuing discussions. As with all plans of this nature, it will require regular review, refinement and revisions.

Why Develop a Specific Pediatric Disaster Planning Hospital Resource?

The mission of the CA Neonatal/Pediatric Disaster Coalition is to enhance the ability of hospitals and healthcare systems to prepare for and respond to neonatal/pediatric medical surge health and emergencies. The United States constantly faces the real possibility of catastrophic health and medical incidents that could involve thousands, or tens of thousands of patients. Therefore it is critically important for health systems to identify, plan and prepare for the possibility of a medical surge and /or mass-casualty incident.

Children Hospitals that are accredited by the Joint Commision are required by regulatory agencies to have a hospital Emergency Operation Plan. In-Patients Units need to be prepared for large scale disasters and not rely on other areas for their specific population. Education about disasters and how the units deliver communication to the Hospital Command Center (HCC) so that every unit's unique needs are addressed in a uniform fashion. Our role does not stop with planning at the Unit level; we must include the hospital leadership, emergency managers and the local county Emergency Planners including the Medical Health

Operational Area Coordinator (MHOAC). The MHOAC is a position unique to California State. Be sure to check with local Emergency Operational Area planners in each state to which EMS agencies are used. These agencies have a large role in moving our critically ill pediatric and obstetrical patients safely in a disaster, and it is vitally important that hospitals work with them to develop a plan that addresses the critical needs of these specific populations.

With proper planning and guidance, emergency management agencies can minimize the risk faced by the community's children that require critical care management in the hospital.

Key Areas for the Overall Plan

A common process is important in minimizing potential chaos associated with any disaster or emergency. It is recommended all personnel with a supervisory role including medical leadership staff follow the National Incident Command System (NIMS) and Hospital Incident Command System (HICS) guidelines to coordinate a well-managed approach for any incident, assist in resource allocation and develop consistent patient tracking processes.

A common thread among the lessons learned from Hurricanes Katrina and Rita include deficient planning related to communication systems. It is recommended that facilities test for communication redundancies due to the inherently fragile condition of the perinatal, PICU and NICU populations and their needs.

A common component of disaster planning is bridging the gap between EMS partners and in-patient hospital departments. During a disaster, some infants and children will require advanced life support and they may require transport to a higher level of care. With limited resources, this may not be possible right away. We have added "Clinical Considerations" in each specialty area to assist outlaying facilities and our EMS partners.

Hospital plans should include written processes for coordinating efforts with the incident management staff and the assignment of evacuation roles to ancillary staff to assist with non-clinical tasks to mobilize special populations of patients.

In disasters, departmental leaders need to plan for a minimum of 96 hours for staff needs, as well as patient care needs and supplies that may be depleted as supplies are moved with the patients. In the event that supplies or equipment cannot be replenished, staff may need to improvise. It is important that staff become familiar with non-traditional methodologies to assist equipment-dependent emergency, obstetrical, neonatal or pediatric patients. A back-to-the-basics approach without the aid of technology may prove challenging to novice nurses. Patient ventilation techniques using intermittent positive pressure breathing machines, monitoring electrocardiograms of unstable patients using defibrillators, titrating IV rates using IV flow-rate devices, headlamps as light sources and using piston syringes for suctioning are a few examples used by staff during past emergencies. For more information on altered standards of care guidelines, see http://www.bepreparedcalifornia.ca.gov/CDPHPrograms/PublicHealthPrograms/EmergencyPreparednessOffice/EPOProgramsandServices/Surge/SurgeProjectBackground/ProjectWorkGroups/Documents/DraftSuppliesPharmEquipWTO.pdf

Staff should maintain proper records for the patients during a surge or when being evacuated to other facilities. Given the circumstances, it may not be feasible to obtain access to electronic records or complete medical charts, so plan on other formats to pass pertinent patient care information to the next provider.

Patient tracking and transport needs prove to be a challenge during disasters. Lessons learned from Hurricanes Katrina and Rita emphasize the need for community-wide planning.

Hospital plans should include a comprehensive emergency management strategy rather than a hospital-centric focus. Consider executing Memorandums of Understanding (MOU) with private ambulance agencies, critical care aeromedical transportation providers and bus companies. Keep in mind that during a disaster, other entities may be competing for these same resources so the availability even with an MOU might not be available, hence the work towards 96 hours of self-sustainability is necessary until assets can be mobilized for support. It is important to coordinate with local government entities during planning and response to decrease the probability of lacking resources such as transportation and bed availability at accepting facilities.

The pre-planning process should also consider neighboring hospitals with critical care capabilities within your city and county. It has been proven in past disasters that communities do come together and assist those who are vulnerable and at high risk. Use the pre-planning phase to build relationships within your community.

Summary

Disaster planning is a challenge, especially when considering the complexity of care required in the emergency department, obstetrical, pediatric and neonatal populations. This places additional strain on an already taxed system.

Your expertise and actions are therefore sought, so that limited obstetrical, pediatric and neonatal resources are effectively incorporated into executable plans.

At the local level:

- Hospitals with pediatric and neonatal patient populations should work with emergency local preparedness partners

- Incorporate recommendations of "best-practice," lessons learned and current pediatric disaster publications

- Ensure a pediatric subject matter expert (SME) is included in the planning to advocate on behalf of the pediatric/neonatal/perinatal population.

At the state level:
- Work with the pediatric leaders and facilities in your jurisdiction to ensure a pediatric SME is included in the planning and response phases

- Identify and support a coordinating entity to assist in the pediatric/neonatal/perinatal response efforts

- Establish and maintain a pediatric/neonatal/perinatal database to include capability, capacity, resources and asset availability

- Execute contracts and/or mutual aid agreements with pediatric/neonatal/perinatal facilities for specialty strike team development and specialty transport assets

- Support healthcare facilities in their decision to shelter-in-place or evacuate

- Author legislature and policy changes to include the unique needs of the population

At the federal level:
- Identify and adapt transportation assets to be capable of transporting this unique population

- Improve and streamline accessibility to federal transport assets earmark funding to improve pediatric preparedness and response efforts and ensure pediatric/neonatal/perinatal needs are addressed in federal planning and response

- Include a pediatric/neonatal/perinatal component to federally sponsored exercises and drills

- Author legislature and policy changes to include the unique needs of the population

The current disaster planning literature from published experts recommends all free-standing children's hospitals and facilities with dedicated pediatric/neonatal/perinatal units, along with emergency departments, utilize this information and address the above recommendations when developing their specific emergency preparedness and response plans.

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ADMINISTRATIVE PLANNING

ADMINISTRATIVE PLANNING

Administrative Planning

Area 1- Federal and State Response Planning Overview

National Incident Management System (NIMS) is a system that works across the nation among all jurisdictions to manage incidents. NIMS works within all disciplines to allow members to collaborate together to "prevent, protect against, respond to, recover from and mitigate the effects of incidents, regardless of cause, size, complexity, in order to reduce the loss of life and property and harm to the environment" (U.S. Department of Homeland Security, 2008). After 9/11 the Federal Government realized the importance in dealing with catastrophic events in a systematic approach. They adopted the Incident Command System (ICS) structure that has proven effective in large scale events for fire departments for many years. This ensures that responding agencies at all levels: federal, state, counties, cities, hospitals and front line staff are all speaking the same language. Hospitals adapted the Incident Command Structure (ICS) to the healthcare environment in the late 1980's. It was known as the Hospital Emergency Incident Command System (HEICS). This was later updated to the Hospital Incident Command System (HICS) in 2006. With this systematic approach, disciplines can communicate similarly in a disaster.

For more information, see:
http://nv.gov/search/?q=nims700study_guide.pdf

California has a Standardized Emergency Management System (SEMS) that provides the fundamental structure for emergency response in California, incorporating the use of the Incident Command System (ICS), Operational Area (OA)concept, multi-agency coordination and the California Disaster and Civil Defense Master Mutual Aid Agreement. The State Emergency Plan in accordance with the California Emergency Services Act, outlines the activities of all California jurisdictions within a statewide emergency management system. Within the public health and medical systems in California, coordinating functions exist at the level of the Operational Area, Mutual Aid Region and State. California Public Health and Medical Emergency Operations Manual, commonly referred to as the *EOM*, was adopted in July 2011 by the California Department of Public Health (CDPH) and the Emergency Medical Services Authority (EMSA) to provide a framework and mechanism for local governments to provide situational awareness (SIT-REP) and request resources when necessary.

For more information, see:
http://emsa.ca.gov/disaster/files/EOM712011.pdf

Area 2- Regional Response Planning Overview

At the regional level, the Emergency Medical Services Authority (EMSA) and Department of Health Services (DHS) jointly appoint a Regional Disaster Medical and Health Coordinator (RDMHC), whose responsibilities include supporting the mutual aid requests of the Medical Health Operational Area Coordinator (MHOAC) for disaster response within the region and providing mutual aid support to other areas of the state in support of the state medical response system. The RDMHC also serves as an information source to the state medical and health response system. Similar to the MHOAC Program, it is recognized that effective regional coordination requires a comprehensive RDMHC Program.

The Regional Disaster Medical and Health Coordinator (RDMHC) is an appointed position in each of the six Mutual Aid Regions established by Health and Safety Code §1797.152. The RDMHC coordinates disaster information and medical and health mutual aid and assistance

within the Mutual Aid Region or in support of other affected Mutual Aid Region(s). The RDMHC may be a county health officer, county coordinator of emergency services, local emergency medical services administrator or local emergency medical services medical director. Appointees are nominated by a plurality of the votes of local health officers in the Mutual Aid Region and jointly appointed by the Directors of CDPH and EMSA.

The Regional Disaster Medical and Health Specialist (RDMHS) is a component of the RDMHC Program who directly supports regional preparedness, response, mitigation and recovery activities. Similar to the MHOAC Program, effective coordination within the Mutual Aid Region may require the involvement of various organizations and State agencies, e.g., CDPH, EMSA and the California Emergency Management Agency (Cal-EMA). The support of activated Medical and Health Branches at Regional Emergency Operations Centers (REOCs) is coordinated by RDMHC Programs, CDPH, EMSA and Cal-EMA.

In order to accomplish the functions specified in statute, a comprehensive RDMHC Program will:

+ Maintain a 24 hour-per-day, 365 day-per-year single point of contact for the RDMHC Program and provide contact information to the MHOAC Programs within the Mutual Aid Region, CDPH and EMSA

+ Provide the 24 hour-per-day, 365 day-per-year single point of contact information for the MHOAC Programs in the Mutual Aid Region to CDPH and EMSA

+ Provide trained backup personnel capacity during emergencies.

+ Coordinate with MHOAC Programs in the Mutual Aid Region to ensure that all 17 MHOAC Program functions are met

+ Ensure that situational information is provided in accordance with the processes identified in the RDMHC Program Manual

+ Coordinate with MHOAC Programs in the Mutual Aid Region to maintain directories of public health, environmental health and EMS resources, including equipment, supplies, personnel and facilities, within each Operational Area

+ Coordinate the identification, acquisition and delivery of public health and medical mutual aid and assistance to affected Operational Areas within the Mutual Aid Region, or if necessary, to affected Operational Areas in other Mutual Aid Regions

+ Utilize resource requesting and management procedures in accordance with the processes identified in the RDMHC Program manual

+ Coordinate with CDPH and EMSA to support the Medical and Health Branch of the REOC if activated

Area 3 - Coordination with the Community, County and Local Public Health Partners

In the event of a local, state or federal declaration of emergency, the MHOAC coordinates disaster medical and health resources within the operational area (OA) and is the point of contact for coordination with the RDMHC/S and State agencies. The MHOAC role is established by statute in the California Health and Safety Code, Division 2.5, Chapter 3, Article 4, Section 1797.153.

Each local health officer and Local EMS Agency (LEMSA) administrator may function as, or appoint, a MHOAC to provide a 24-hour, seven day a week single point of contact fordisaster medical and health operations within the OA. The county health officer and local emergency medical services administrator will jointly act as the MHOAC or appoint another individual to fulfill the responsibilities.

Responsibilities of the MHOAC include:

* Ensuring a system (plan) for staffing and operations of the medical and health branch of the OA EOC, including authorizing and directing the activation of the medical and health branch of the OA EOC

* Identifying resources and coordinating the procurement and allocation of public and private medical, health and other resources required to support disaster medical and health operations in affected areas

* Communicating the medical and health status and needs within and outside of the OA to local, regional and state governmental agencies and officials and to hospital and medical care entities and providers

* Participating in periodic training and exercises to test plans, policies, procedures and structures for the activation and implementation of the disaster medical and health response system

* Contacting the RDMHC to obtain mutual aid support from other OAs within the mutual aid region or from local and state resources from

It is widely recognized that the responsibilities of the MHOAC are too great for an individual and as a result most OAs have developed MHOAC Programs consisting of several individuals that share MHOAC responsibilities. Many OAs utilize their Public Health and/or EMS Agency Duty Officer programs as the initial, single MHOAC point of contact (POC) for public health and medical emergencies.

In order to accomplish the functions specified in statute, a comprehensive MHOAC Program will: Recommend to the Operational Area Coordinator of the Office of Emergency Services a medical and health disaster plan for the provision of medical and health mutual aid within the Operational Area." Furthermore, "the medical and health disaster plan shall include preparedness, response, recovery and mitigation functions in accordance with the State Emergency Plan, and at a minimum, the medical and health disaster plan, policy and procedures that include all of the

following 17 functions during a disaster:

1. Assess immediate medical needs

2. Coordinate disaster medical and health resources

3. Coordinate patient distribution and medical evaluation

4. Coordinate with inpatient and emergency care providers

5. Coordination of out-of-hospital medical care providers

6. Coordination and integration with fire agency personnel, resources, and emergency fire pre-hospital medical service

7. Coordination of providers of non-fire based pre-hospital emergency medical services

8. Coordination of the establishment of temporary field treatment sites

9. Health surveillance and epidemiological analyses of community health status

10. Assurance of food safe

11. Management of exposure to hazardous agents

12. Coordination of mental health services

13. Provision of medical and health public information protective action recommendations

14. Provision or coordination of vector control services

15. Assurance of drinking water safety

16. Assurance of the safe management of liquid, solid, and hazardous wastes

17. Investigation and control of communicable disease

The appointed MHOAC is responsible for ensuring the development of the medical and health disaster plan in cooperation with the:

* County office of emergency services

* Local health department

* Local health officer

* Local environmental health department

+ Local department of mental health

+ Local emergency medical services agency

In order to accomplish the above listed 17 functions specified in statute, a comprehensive MHOAC Program will:

+ Maintain a 24 hour-per-day, 365 day-per-year single point of contact for the MHOAC Program and provide contact information to the RDMHC Program who provides this information to CDPH and ICEMA Duty Officer

+ Ensure that contact information is readily available to Public Health and Medical System participants within the Operational Area

+ Provide trained backup personnel capacity during emergencies

+ Provide situational reports in accordance with the processes identified in this manual

+ Maintain a directory of public health, environmental health and EMS resources, including equipment, supplies, personnel and facilities within the Operational Area

+ Coordinate the identification, acquisition and delivery of Public Health and Medical mutual aid and assistance within the Operational Area

+ Utilize resource requesting and management procedures in accordance with the processes identified in this manual

+ Support the Medical and Health Branch of the Operational Area EOC if activated

California Public Health and Medical Emergency Operations Manual Public Health and Medical Coordination

The requesting of resources during a disaster will follow SEMS that includes the Cal-EMA MutualAid Regions and will require communication between regions. Coordinating the care and disaster response across such a vast area and involving so many different agencies/ entities will be particularly challenging – yet critically important to try to provide the best care to as many children as possible in an equitable and orderly manner.

The regional activities include but are not limited to:

+ Collect real time information from all hospitals throughout the area regarding patientcounts, hospital needs, etc. (provided by hospitals to the LEMSAs, i.e. HAVBED)

+ Determine the admitting criteria/acuity levels for admission to Children's Hospitals vs. non-pediatric hospitals (EMTALA waiver, physician to physician transfer, PHD guidance based on the event).

It is recognized that there is no formalized process or regional entity within the service area to perform this function at the present time. This is considered one of the recognized gaps and opportunities for future planning

+ Provide appropriate communication to both the healthcare community and the general public. (Public Health Department, LEMSA, Office of Emergency Services, Joint Information Center)

+ Assist in providing clinical technical assistance, i.e. clinical pathways, pediatric clinical consultation, etc. to those hospitals providing care to more acute pediatric patients than they typically do

+ Work together within the Regional/State/ Federal disaster response to aid in acquiring and distributing resources as needed. (SEMS)

Transition to SEMS (Standardized Emergency Management System)

The primary assumption for SEMS is that an event has reached an Emergency System Activation Level 2 or 3 event as defined in the *California Public Health and Medical Emergency Operations Manual* (EOM, see table below) outside of traditional general acute care facility day to day operations. It should be noted an event does not need to reach an ESA Level 2 or 3 event prior to using these guidelines. Once an event has become an *Unusual Event*, as described in Unusual Event, the user

should evaluate the incident and determine if the use of the framework is appropriate for the event.

The second assumption understands general acute care facilities have exhausted all day-to-day agreements, MOUs and vendor agreements prior to use of the SEMS processes. Moreover, general acute care facilities have exhausted any and all secondary transfer agreements.

It should also be understood this document does not supersede any of the day-to-day general acute care facilities' and/or pre-hospital processes and regulatory requirements such as code triage and Local Emergency Medical Services Agency (LEMSA) pre-hospital destination policies.

The last assumption is once SEMS is in process, stakeholders understand that all resources, including patient movement and bed availability, will be coordinated through the proper emergency management channels as defined in both the Standardized Emergency Management System (SEMS) and the EOM.

Coordination at this level will be conducted through the MHOAC Program via the Medical/Health Branch at the County EOC (if activated) or the ICEMA or Public Health Department Operations Center (DOC), respectively.

Incident Considerations for entry into SEMS

An Unusual Event **is defined as an incident that significantly impacts or threatens public health, environmental health or emergency medical services.** An unusual event may be self-limiting or a precursor to emergency system activation. (EOM, 2011). ***Note: this condition differs from the specialized use of the term "Unusual Event" in reference to nuclear reactors.***

Criteria for an Unusual Event

✦ The incident significantly impacts or is anticipated to impact public health or safety

✦ The incident disrupts or is anticipated to disrupt the Public Health and Medical System

✦ Resources are needed or anticipated to be needed beyond the capabilities of the Operational Area, including those resources available through existing agreements (day-to-day agreements, memoranda of understanding, or other emergency assistance agreements)

✦ The incident produces media attention or is politically sensitive

Emergency System Activation **is defined when, Hospital Command Centers (HCCs),**

Department Operations Centers (DOCs) and/or Emergency Operations Center (EOCs), are activated within the Operational Area (OA). (EOM)

Level 1
Requires resources or distribution of patients within the affected Operational Area only or as available from other Operational Areas through existing agreements (including day-to-day agreements, memoranda of understanding or other emergency assistance agreements).

Level 2
Requires resources from Operational Areas within the Mutual Aid Region beyond existing agreements (including day-to-day agreements, memoranda of understanding or other emergency assistance agreements) and may include the need for distribution of patients to other Operational Area.

Level 3
Requires resources or distribution of patients beyond the Mutual Aid Region. May include resources from other Mutual Aid Regions, State or federal resources.

Utilization of SEMS

Each incident will be dependent upon the resources contained within the OA. It should be understood each OA has some capacity and capabilities to care for the sick and injured children.

The HCC should make initital contact with the Medical/Health Operational Area Coordinator (MHOAC), or his/her designee, in the event of any disaster. Once the HCC has exhausted all capacity and capabilities to care for the sick and injured child, resource requesting must go through the MHOAC.

Resource requests can range from staffing, durable and non-durable medical goods, pharmaceuticals, bed availability and transport resources, including specialized transports.

- Once the MHOAC Program has received a resource request from an HCC(s), the MHOAC Program will attempt to fill the request through day to day agreements, MOUs and vendor agreements within the OA. The status of the resource request will be communicated to the HCC(s).
- If the MHOAC Program is unable to fill the resource request from within the OA, the MHOAC Program will contact the Regional Disaster Medical/Health Coordinator (RDMHC) Program for assistance

The Pediatric Disaster Surge Framework will follow the normal pre-hospital and hospital facility transfer processes. For example, regardless of immediate event, such as mass casualty vehicle accident, or long term event, pandemic influenza, the transporting ambulance shall adhere to local pre-hospital destination policies established by the LEMSA. The LEMSA does have the authority to change pre-hospital destination policies if the event warrants.

If the event should require movement of patients from general acute care facilities to other general acute care facilities or specialty hospitals, the sending facility shall follow the normal, EMTALA compliant, inter-facility transfer processes.

- Only when the sending facility has exhausted existing processes should the facility contact the MHOAC Program for transport and bed space coordination

During a disaster, the management of patient transfers will require continual assessment and reassessment of demand, bed availability and acuity needs. All hospitals will need to consider the downgrading, repatriation, transfer and/or potential discharge of existing patients where appropriate as part of their internal surge plan to allow for decompression. For instance, if facilities are able to accept and care for lower acuity pediatric patients, this may provide for decompression to occur at a higher level of facility to care for higher acuity pediatric patients.

For more information, see:
http://www.ena.org/IQSIP/Practice/Documents/
PedInterfacilityToolkit2013.pdf

Area 4- Hospital Command Center Structure and Interface with In-patient Units

NIMS and HICS structure
(What is the Connection?)
The National Incident Management System (NIMS) provides a consistent nationwide template for governmental, nongovernmental and private sector organizations to work together during an incident response. Essentially, NIMS is a core set of concepts, principles, terminology and organizational processes that enable interoperability, compatibility and collaborative incident management. One of the many key elements of NIMS is the Incident Command System ICS). ICS is a NIMS management tool that is used in the command, control and coordination of an incident response. ICS is applicable not only across a variety of disciplines, but a variety of incidents as well. This makes ICS an extremely valuable tool because it provides a structure and process for proper incident management that can be used in an all-hazards

approach to coordinate the efforts of many different response agencies.

Currently, the Hospital Incident Command System (HICS) is the standard for hospital-based incident management. HICS is an ICS-based management tool that can be used by all hospitals, regardless of their size or patient care capabilities, to coordinate their response to all incidents. Hospitals utilize HICS to coordinate with the standard ICS used by other response entities. By implementing the concepts and incident command design outlined in HICS, a hospital is positioned to be consistent with NIMS incident command guidelines (EMSA,2006). Hospital implementation of HICS ensures that the hospital is in compliance with NIMS Objectives 7, 11 and 12, but is only one of 11 NIMS compliance standards for healthcare agencies. Hospitals will still be responsible for implementing the remaining NIMS Objectives for 2010 & 2011 which focus on NIMS preparedness, resource management, training and exercises and communications and information management

For more information see:
http://www.fema.gov/pdf/emergency/nims/FY2010_FederalNIMSImplementationObjectivesMetrics.pdf

Each participant should be clearly identified by means such as a vest with the wearer's responsibility written on it (e.g. Medical Technical Specialist: Medical Staff Officer). Each member should also read his/her facility-specific HICS Job Action Sheets that delineate individual responsibilities during the disaster.

The physician leadership should designate a predetermined location in the ED. Here the ED-based strategies are formulated and management objectives are defined under the guidance of the Medical Care Branch under Operations. These strategies are shared with the Hospital Command Center staff to better coordinate surge activities outside of the ED. Once the surge capacity plan is activated, each member of the Hospital Command Center should immediately attend an action plan meeting in the designated area. Any

communication with patient families or the press must remain under the control of the Public Information Officer who works with the Incident Commander and the Medical Technical Specialist: Medical Staff Officer. Once convened, the Hospital Command Center priorities should include:

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

The HCC should be stocked with sufficient supplies to ensure operations. Supplies should include clerical supplies, redundant and mobile communication systems, Incident Team Chart, hospital and city emergency contact directories, WebEOC and State Operational Area Bed Tracking site log-in information, disaster related tracking forms, hospital charts, patient flow board and reference documents such as triage protocols, surge capacity plans, patient reporting guidelines, HICS Job Action Sheets, area maps, copies of vendor memoranda of understanding and risk communication templates and protocols.

Communication sets should not interfere with other networks used by the police, emergency medical services and fire departments. However interoperability needs to be considered and planning with all community partners is highly recommended. Tactical radio channels such as those used for local communications have many different configurations.

Some systems are dedicated EMS channels, some share channels with fire or police operations and others have special channels for on-scene operations. In a small event, such as a motor vehicle crash, first response agencies may operate on a single channel. As operational complexity increases, incident commanders should decide the point at which communications transition from a single channel to a tactical (or "on-scene") channel. The use of tactical channels prevents the overload of the primary EMS channel and prevents interference between agencies with different primary function. The Incident Commander: Medical Staff Officer from the ED and other agencies should, however, communicate on a pre-designated (mass casualty incident) channel when needed.

Emergency department communication nets should use multichannel portable radios that have talk around capacity, although these systems are susceptible to missed messages if a dispatcher transmits over direct messages. Usually the portable radios used in ED communications are relatively low power and therefore have a limited service radius.

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

Additional Emergency Preparedness Information

The Public Health Emergency Medical Countermeasures Enterprise (PHEMCE) is a coordinated interagency effort by the Office of the Assistant Secretary for Preparedness and Response (ASPR) and includes three primary HHS internal agencies: the Centers for Disease Control and Prevention (CDC), the Food and Drug Administration (FDA) and the National Institutes of Health (NIH). The mission of the PHEMCE is to:

+ Define and prioritize requirements for public health emergency medical countermeasures

+ Integrate and coordinate research, early- and late-stage product development and procurement activities addressing the requirements

+ Set deployment and use strategies for medical countermeasures held in the Strategic National Stockpile(SNS)

The PHEMCE considers medical countermeasures to address CBRN, as well as naturally emerging infectious diseases and pandemic threats, including pandemic influenza.

For more information, see:
http://www.hhs.gov/aspr/barda/phemce/index.html

Emergency System for the Advance Registration of Volunteer Health Professionals (ESAR-VHP) is a federal program created to support states and territories in establishing standardized volunteer registration programs for disasters and public health and medical emergencies. The program, administered on the state level, verifies health professionals' identification and credentials so that they can respond more quickly when disaster strikes. By registering through ESAR-VHP, volunteers' identities, licenses, credentials, accreditations and hospital privileges are all verified in advance, saving valuable time in emergency situations.
http://www.phe.gov/esarvhp/Pages/default.aspx

Disaster Healthcare Volunteers (DHV) system
California has developed the Disaster Healthcare Volunteers (DHV) system to meet its ESAR-VHP requirements. The DHV is administered by the Emergency Medical Services Authority (EMSA) at the state level. Each OA has a designated administrator to coordinate volunteer services at the local level. The MHOAC is responsible for maintaining the list of available resources and this includes volunteers.
http://emsa.ca.gov/disaster/Health_Care_Volunteers/

Homeland Security Presidential Directive-5 (HSPD-5)
A Presidential directive was issued February 28, 2003 on the subject of "Management of Domestic Incidents." The purpose is to "enhance the ability of the United States to manage domestic incidents by establishing a single, comprehensive national incident management system."
http://www.dhs.gov/xabout/laws/gc_1214592333605.shtm

Emergency Management Assistance Compact (EMAC)
A congressionally ratified organization that provides form and structure to interstate mutual aid, through EMAC, a disaster impacted state can request and receive assistance from other member states quickly and efficiently, resolving two key issues upfront: liability and reimbursement.
http://www.emacweb.org/

Emergency Support Function (ESF)
A grouping of government and certain private-sector capabilities into an organizational structure to provide support, resources and services. ESF 8 - Health and Medical Services is the principal ESF with which hospitals will coordinate activities.

Emergency Support Function (ESF) #8 — Health and Medical Services provide coordinated Federal assistance to supplement State and local resources in response to public health and medical care needs following a major disaster or emergency, or during a developing potential medical situation. Assistance provided under ESF #8 is directed by the Department of Health and Human Services (HHS) through its executive agent, the Assistant Secretary for Health (ASH). Resources will be furnished when State and local resources are overwhelmed and public health and/or medical assistance is requested from the Federal Government.
http://www.fema.gov/pdf/emergency/nrf/nrf-esf-08.pdf

California has adopted Emergency Functions (CA-EF) to compliment the federal system and Medical and Health is located in EF #8. For more information on California's EF system:
http://www.calema.ca.gov/PlanningandPreparedness/Pages/Emergency-Functions.aspx

National Incident Management System (NIMS)
A system mandated by HSPD-5 that provides a consistent nationwide approach for Federal, State, local and tribal governments; the private-sector, and nongovernmental organizations to work effectively and efficiently together to prepare for, respond to and recover from domestic incidents, regardless of cause, size, or complexity. To provide for interoperability and compatibility among federal, state, local and tribal capabilities, the NIMS includes a core set of concepts, principles and terminology. HSPD-5 identifies these as the ICS; multiagency coordination systems; training; identification and management of resources (including systems for classifying types of resources); qualification and certification; and the collection, tracking and reporting of incident information and incident resources.
http://www.fema.gov/emergency/nims/

National Response Framework
The National Response Framework (NRF) presents the guiding principles that enable all response partners to prepare for and provide a unified national response to disasters and emergencies. It establishes a comprehensive, national, all-hazards approach to domestic incident response. The National Response Plan was replaced by the National Response Framework effective March 22, 2008. The National

Response Framework defines the principles, roles and structures that organize how the nation responds. The National Response Framework:

+ Describes how communities, tribes, states, the federal government, private-sectors and nongovernmental partners work together to coordinate national response

+ Describes specific authorities and best practices for managing incidents

+ Builds upon the National Incident Management System (NIMS), which provides a consistent template for managing incidents

http://www.fema.gov/emergency/nrf/

References
CA Emergency Functions (CA-EF): http://www.calema.ca.gov/PlanningandPreparedness/Pages/Emergency-Functions.aspx

Children's Hospital Central California www.childrenscentralcal.org

Children's Hospital Los Angeles www.chladisastercenter.org

"Children in Disasters: Hospital Guidelines for Pediatric Preparedness", 3rd Edition (2008), available at: www.nyc.gov/html/doh/downloads/pdf/bhpp/hepp-pedschildrenindisasters-010709.pdf

CHA Emergency Preparedness Resources www.calhospitalprepare.org

Contra Costa EMS for Children http://cchealth.org/ems/emsc-disaster-prepare.php

Hospital Council of Northern and Central California

www.hospitalcouncil.net
This site will house the pediatric disaster plan, Steering Committee meeting agendas/summaries and other regional materials.

EMSC Pediatric Disaster Preparedness Guidelines: Hospitals
http://www.emsa.ca.gov/pubs/docs/EMSA198.pdf

Hospital Guidelines for Management of Pediatric Patients in Disasters (Seattle and King County plan)
http://www.kingcountyhealthcarecoalition.org/media/PediatricToolkit.pdf

Los Angeles County Pediatric Surge Plan Pocket Guide:
http://publichealth.lacounty.gov/eprp/docs/Emergency%20Plans/Pediatric%20Surge%20Pocket%20Guide.pdf

http://www.ncdp.mailman.columbia.edu/files/peds_consensus.pdf

Regional Pediatric Disaster Surge Framework Leveraging our region's assets to care for kids in times of disaster December 2012

Please note that the tools/resources included in the following appendices are provided as recommendations and best practices from nationally recognized resources. They are not prescriptive or a mandate to a specific process.
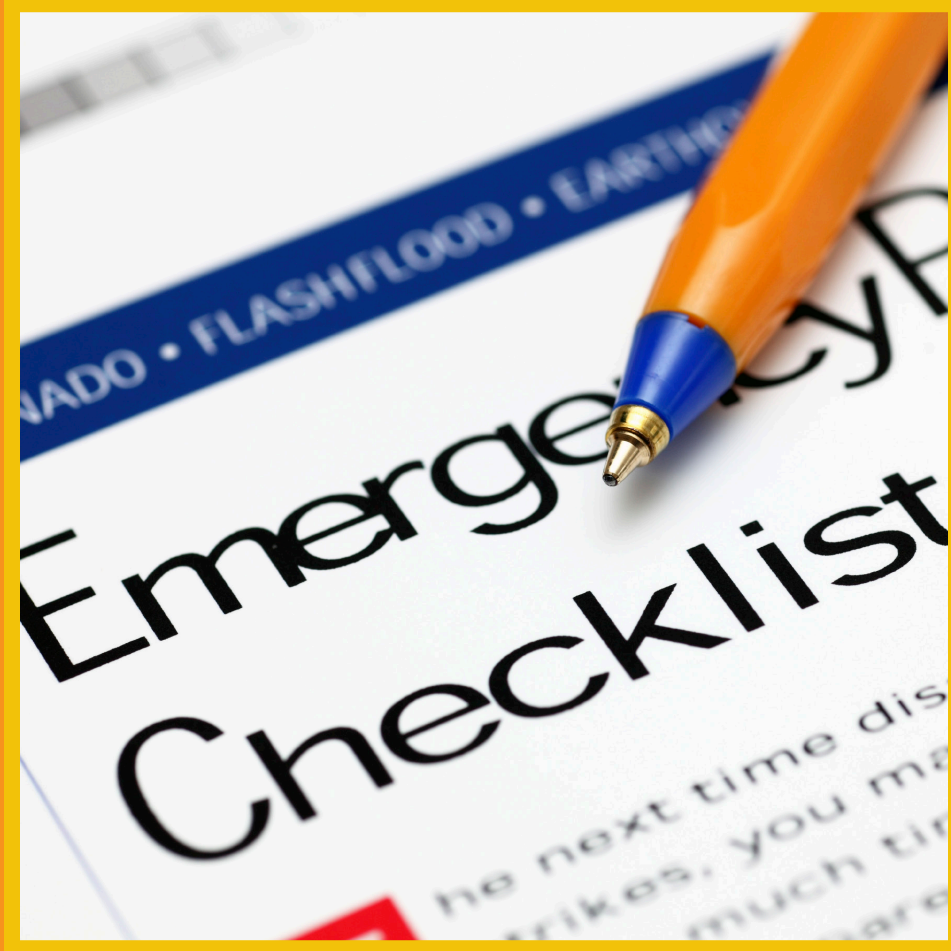
GENERAL PREPAREDNESS

PREVENTION/MITIGATION

Unit Specific Mitigation and Hazard Vulnerably Planning

Disasters can strike at any time and lead to extended operation interruptions, unstable infrastructure and catastrophic devastation. When standards of patient care cannot be met or the safety of the hospital infrastructure is compromised, the need to evacuate and transfer patients to other facilities may be necessary.

The evacuation of any patient population is a challenging activity, however the mobilization and evacuation of our vulnerable patients populations – is a high risk activity. Transporting these vulnerable patients requires a carefully planned approach, since these patients frequently depend on complex medical/technical equipment for survival.

It must be determined that receiving facilities are prepared to care for incoming critically ill and complex infants, children and obstetrical patients, so it is important to take overall surge capacity and regional transfer patterns into account when anticipating an increase this patient population.

Mitigation activities include efforts that reduce or eliminate risk to patients, staff and property as a result of emergencies and disasters. Preparedness consists of plans and preparations that are aimed at saving lives and facilitating response and recovery operations. Response efforts focus on saving lives and reducing damage at the time of an emergency.

A central command system is essential to managing emergency efforts and minimizing chaos during any evacuation. Experts recommend following the National Incident Command System (NIMS) and Hospital Incident Command System (HICS) guidelines

to coordinate and manage any incident or event, assist in resource allocation and develop consistent patient tracking processes. It is highly recommended that leadership staff complete FEMA training courses:

IS 100HC, IS 200HC and NIMS 700
Visit http://training.fema.gov/IS/crslist.asp for online course listings. For more information see the Education and Training section of this guidebook.

As part of emergency planning, hospitals that are accredited by the Joint Commission must have an Emergency Operations Plan (EOP), which is a document that provides the structure and processes used by the facility to respond to and recover from all hazards. Each facility's EOP is intended to provide a framework for dealing with hospital-wide emergencies. However, it is difficult for a hospital-wide plan to address the needs of individual hospital departments or patient populations. Therefore, in addition to the hospital-wide plan, each hospital department and nursing unit must consider taking steps to develop an individualized and detailed EOP to minimize the impact on department or unit operations. The development of such a plan is as follows:

+ Planning and education at the unit level should include ALL disciplines and must be aligned with the hospital-wide EOP. It is important to follow the National Incident Command System (NIMS) and Hospital Incident Command Systems (HICS), so working with the emergency planning personnel is essential.

+ Develop a unit disaster planning committee

+ Take Hospital Incident Command System Class through your hospital Education Department which is funded through Hospital Preparedness Program

- Develop partnerships with those at your facility who are responsible for disaster planning and response and update current unit plans

Hospitals that anticipate an influx of sick infants, children and/or pregnant or laboring women must have staff on hand with the skills necessary to care for these patient populations. It is likely that the number of pediatric or obstetrical patients requiring admission will exceed the capacity or expertise of hospital staff in hospitals without specialty pediatric or obstetrical services. Thus, the transfer of these patients to a higher-level of care facility may become necessary.

For additional information see: **Pediatric and Obstetric Emergency Preparedness Toolkit Section 2-Planning Guidelines**:
http://www.health.ny.gov/facilities/hospital/
emergency_preparedness/guideline_for_hospitals/
docs/emergency_preparedness_manual.pdf

- Hospitals should establish relationships ahead of time with facilities that can accommodate neonatal-pediatric-obstetrical patients to enable smooth transfer (in accordance with a signed transfer and affiliation agreement), if transport conditions permit

- Consider creating a staff roster to poll employees for specialized neonatal-NRP, pediatric-PALS, or obstetrical experience/certifications and update the roster annually

Due to the need for specialized equipment and supplies necessary for caring for a specific patient population, each unit should evaluate their ability to routinely stock additional equipment such as ventilators, monitors, incubators, pumps, phototherapy lights, evacuation equipment build up caches of supply items and increase par levels for critical items, such as pharmaceuticals. This prevents the need for relying on city, county, state or federal entities to build up and maintain caches. Work with county EMS representatives regarding population-specific equipment and supply type.

- Plan to review critical equipment stock, including current vendor supply list with hospital departments and county representatives

Carefully and systematically evaluate surge capacity (considering square footage, outlets, oxygen and gas sources) to accurately determine ways to safely optimize the number that can be cared for on a given unit.

- Map out vertical evacuation and medical surge areas for number of outlets (including red plugs), suction, and medical air in advance and place in unit plan

Hospitals typically have hospital-wide Emergency Operations Plans (EOP) that is well understood by a select group of people. Hospital and unit leadership need to work on Unit specific planning, addressing the critical needs of this specialized population.

- Review template suggestions for creating a unit specific Emergency Operations Plan in the proceeding section of this guidebook

Definitions

All-Hazards: An approach for prevention, protection, preparedness, response and recovery that addresses a full range of threats and hazards, including domestic terrorist attacks, natural and manmade disasters, accidental disruptions and other emergencies.

Assisting Agency: An agency or organization providing personnel, services, or other resources to the agency with direct responsibility for incident management.

Cache: A predetermined complement of tools, equipment and/or supplies stored in a designated location, available for incident use.

Emergency Operations Plan: An ongoing plan for responding to a wide variety of potential hazards.

Evacuation: The organized, phased and supervised

withdrawal, dispersal or removal of civilians from dangerous or potentially dangerous areas and their reception and care in safe areas.

Incident: An occurrence, natural or manmade, that requires an emergency response to protect life or property. Some examples of incidents include, but are not limited to, earthquakes, hurricanes, tornadoes, tsunamis, wild land and urban fires, floods, nuclear accidents, hazardous materials spills, aircraft accidents, war-related disasters, terrorist attacks, civil unrest and public health emergencies.

Mitigation: Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Mitigation is taking action ahead of time to reduce human safety and financial consequences after disasters. Thus, mitigation efforts prevent or minimize losses, in the event that an incident does occur. These actions reduce or eliminate the need for emergency response and greatly reduce the recovery period.

National Incident Management System: The National Incident Management System (NIMS) identifies concepts and principles that guide how to manage emergencies from preparedness to recovery. The NIMS provides a consistent, nationwide approach and vocabulary for multiple governmental, nongovernmental, or private sector agencies from multiple jurisdictions to work together in response efforts, regardless of cause, magnitude, or location of an incident. This ensures effective and integrated preparedness, planning and response and reduces the loss of life or property and harm to the environment.

Preparedness: A continuous cycle of planning, organizing, training, equipping, exercising, evaluating and taking corrective action in an effort to ensure effective coordination during incident response. Within the National Incident Management System, preparedness focuses on the following elements: planning; procedures and protocols; training and exercises; personnel qualification and certification; and

equipment certification.

Prevention: Actions to avoid an incident or to intervene to stop an incident from occurring. Prevention involves actions to protect lives and property. It involves applying intelligence and other information to a range of a or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice.

Resources: Personnel and major items of equipment, supplies and facilities available or potentially available for assignment to incident operations and for which status is maintained. Resources are described by kind and type and may be used in operational support or supervisory capacities at an incident or at an Emergency Operations Center.

References

Chicago Healthcare System Coalition for Preparedness and Response NIMS Committee. (2008). National Incident Management System [pdf]. Retrieved from http://www.luhs.org/depts/emsc/National_Incident_Management_System(NIMS)_Resource_and_Implementation_Guide.pdf

Phillips, P., Niedergesaess, Y., Powers, R. and Brandt, R. (2012). Disaster preparedness: Emergency planning in the NICU. *Neonatal Network*, *31*(1).

New York State Department of Health Emergency Preparedness Program. (2010). Pediatric and obstetric emergency preparedness toolkit: A guide for pediatric and obstetric emergency planning [pdf]. Retrieved from http://www.health.ny.gov/facilities/hospital/emergency_preparedness/guideline_for_hospitals/docs/emergency_preparedness_manual.pdf

PREVENTION/MITIGATION

Unit Specific Emergency Operations Planning

The Emergency Operations planning section provides the ins and outs of unit-specific disaster preparation in accordance with regulatory agencies. This information is meant to be an introductory example of how a departmental-specific disaster plans can be updated.

Introduction: The plan begins with an introduction that defines and contextualizes the unit by incorporating basic information, providing the reader with an overview of the unit's function, patient population and requirements for the provision of care. Information considered and contained in the introduction includes:

+ Type of unit
+ Population it serves
+ Unique patient needs that complicate the provision of care
+ Patient acuity
+ Average unit census
+ Potential to temporarily increase census (surge capacity)
+ Usual staffing ratios and numbers of staff required for care
+ Staffing ratios that may occur as a result of shortage of care providers
+ Basic consumption rates and predetermined supply levels that would be needed to sustain the unit for at least 96 hours

Mission Statement: A mission statement spells out the overall purpose of the program and ensures a sense of direction in terms of what the department is attempting to achieve through its efforts. This short and formal mission statement focuses on providing safe care under all circumstances and guides the unit's emergency planning program.

+ Every facility will have a different mission statement

Plan: Hospitals are responsible for responding to emergencies in a manner that protects the health and safety of patients, visitors and staff. Emergency Operations Plans provides a set of basic principles that guide emergency planning efforts. The plan addresses the unit's guide for activating the plan, implementing response and recovery procedures and restoring disrupted services. The plan briefly outlines the unit's guide for working in collaboration with the Hospital Command Center and external agencies in the event of an emergency.

+ Review hospital EOP to integrate into the departmental plan

Scope: It is important to set the tone for emergency planning efforts and provide focus for the work that leads to the formation of the Emergency Operations Plan. The scope takes the unique requirements of emergency planning into account to establish criteria and incorporates the principles and considerations of mitigation, preparation, response and recovery. Thus, in the creation of the Emergency Operations Plan, the scope is aimed at:

+ Providing a multi-hazard approach to disaster planning
+ Considering and prioritizing all threats to the department and/or the facility
+ Creating responses that are integrated with hospital emergency planning efforts
+ Incorporating Hospital Incident Command System and National Incident Management System concepts and principles
+ Satisfying emergency management requirements of the Joint Commission and Centers for Medicare and Medicaid Services

+ Ensuring maximum compatibility with national and local government response plans

+ Meeting other local and state codes and regulations

Mitigation: Mitigation includes ongoing efforts that reduce or eliminate risk to patients, staff and property as a result of emergencies and disasters. Emergency Operations Plans must be written with an all-hazards approach to mitigation and based on the perceived internal and external threats identified by the Hazards Vulnerability Analysis. Planning and training priority is given to the top ranking threats for the unit, hospital characteristics and any pertinent hazards related to geographical region. Mitigation activities may include, but are not limited to:

+ Process involved in obtaining critical care equipment (i.e. ventilators)

+ Alarmed entrances

+ The presence of security cameras

+ Personnel stationed to detect breeches in security

+ Chemicals remaining in original containers or labeled appropriately when transferred

+ Availability of Personal Protective Equipment (PPE) in each room

+ Clearly labeled emergency supplies to ensure visibility

+ Availability and placement of fire extinguishers

+ Keeping loose paper to a minimum to avoid combustibles

+ Securing equipment, furniture, shelves and pictures to the walls

+ Policies to lock wheels on equipment

Roles and Responsibilities: In case of emergency, some or all of the positions associated with the Hospital Incident Command System may be activated in the Hospital Command Center (HCC). In addition to the Hospital Command Center and hospital-wide roles, each unit must identify and define roles and responsibilities for key staff positions that may

be needed to respond to emergencies. Whether hospital-wide or within a particular unit, these roles are created as Job Action Sheets and/or Job Cards utilizing the Hospital Incident Command System and outlined using common terminology. In addition, staff must receive training to rehearse their roles and responsibilities at staff meetings, departmental workshops and periodic drills and exercises. The Hospital Incident Command System positions that may be activated and those who are capable of assuming those roles may include:

+ Medical Care Branch Director (Unit Manager)

+ Physician Unit Leader (Physician)

+ Inpatient Unit Leader (Charge Nurse)

+ Bedside Nurse Room Leader (RN)

+ Bedside Nurse (RN)

+ Logistics Unit Leader (Relief/Transport Nurse)

+ Respiratory Unit Leader (Respiratory Therapist)

+ Unit Clerical Leader (Secretary/Unit Clerk)

Preparedness: Hospital preparedness consists of plans and preparations that may ultimately save lives and facilitate response and recovery operations in a timely and organized manner. Preparedness efforts address (a) emergency staffing resources, (b) preservation of vital records, (c) communication systems, (d) staff training and education, (e) facility and community-wide integration efforts, (f) resource and asset management and (g) 96-hour contingency planning. Therefore, a large portion of the Emergency Operations Plan is devoted to preparedness efforts.

Emergency Staffing Resources: In the event of a staff shortage, preparedness efforts in the Emergency Operations Plan address medical and non-medical care providers that may be utilized during an emergency or disaster along with contact information for such providers. Contingency emergency staffing resources to be considered may include:

+ Calling in off duty unit staff

- Internal rapid response team members
- Contracted staffing agencies
- Medical Reserve Corps (MRC)
- Trained hospital volunteers
- Parents and family members
- Specialized transport teams
- Disaster Medical Assistance Teams (DMAT)

Preservation of Vital Records: Hospitals must identify the most critical information needs for patient care, treatment and services when creating an Emergency Operations Plan. Plans must be in place to identify alternative means for processing data, providing for recovery of data and returning to normal operations. Many hospitals rely on electronic medical records. In the event of an emergency or disaster, these electronic charts may not be available. The types of vital records that will accompany patients in the event of a disaster, how charting will occur when computer systems are down and how records will be stored must be considered.

The Hospital Incident Command System Documentation Forms are used to collect patient information and track patients, victims and fatalities. Hospital Incident Command System forms are also used to account for communications, decisions, operational activities, personnel time and resources utilized. In addition, after a disaster, these forms may be valuable tools when seeking reimbursement from government agencies. Hospital Incident Command System forms and downtime charting forms necessary for the preservation of vital records are included in the Disaster Documentation and Forms Go-Kit.

Communications Systems: In case of an emergency, redundant communication strategies must be established to direct staff and communicate information to patients, families and external agencies. It is important to address all communications systems available to staff as well as the person or department that is responsible for maintaining such systems or devices. Landline phones, cell phones, 2-way radios, fax machines, mass notification systems, television/radio stations and internet websites all the way down to couriers or runners are all methods that may be listed as communication systems in hospitals. These devices may be used alone or in combination, should one or more systems fail. This information should be included in unit-specific emergency plans as well as in the hospital-wide Emergency Operations Plan.

Training and Education: The unit's accountability to train staff on facility emergency codes, Hospital Incident Command System positions and functions, unit Emergency Operations Plan procedures, equipment use and utilization of communication devices must be addressed in the plan. Staff training provides an opportunity to enhance competencies and emergency response skills. This training is often accomplished in workshops, skills labs and staff meetings. The plan is tested during drills, exercises and tabletops, which provide opportunities to evaluate emergency performance and capability and ensure the competency of staff in the use of emergency equipment and supplies.

Facility-Wide and Community Integration: It is essential to maximize healthcare resources and ensure the coordination of scarce resources during a disaster. It is also important to share planning efforts and lessons learned with other units within the hospital and the community. In addition, in order to streamline communication between hospitals and facilitate movement of patients to alternate care settings, hospitals must consider developing plans for responding collaboratively to disasters within large geographic regions (Cohen, Murphy, Ahern &Hackel, 2010). This may involve establishing alliances with healthcare agencies spanning several counties. The Emergency Operations Plan outlines efforts that integrate the unit with the hospital's overall emergency management program activities, alliances forged with other similar units and collaborative efforts with other organizations and community partners.

Resources and Assets: Resource and asset management strategies that allow hospitals to continue to care for patients and support staff are essential to the Emergency Operations Plan. It is important to identify, inventory and maintain emergency supplies and equipment as part of emergency planning. Standard par levels of medical supplies (72-108 hour supply), critical portable equipment located on the unit (including battery life) and emergency supplies that are essential to the provision of care are identified in the Emergency Operations Plan. The person or department that is responsible for managing, maintaining and conducting annual inventory of supplies for the unit must be identified and a rotation schedule for expired supplies must also be included in the plan.

Since medication administration is a key component of care most hospitalized patients, it is essential to incorporate planning for pharmaceuticals in the Emergency Operations Plan. This may include medications designated for transport or medications ordinarily located in code carts. In addition, the hospital pharmacy must create a plan that addresses the need to provide medications for hospitalized patients in case of emergency. The pharmacy must stock, inventory and prepare lists of medications most commonly used in hospital units. These medications are to be utilized when resources become scarce as part of the hospital's emergency planning efforts.

Transport: In the event of an emergency or disaster, alternative arrangements for transport of patients to other hospitals may become necessary. Establishing community relationships and mutual aid agreements to ensure the ability to reliably and safely transport patients to a safer location for care is important in preparedness efforts. Guidelines for transporting patients to other hospitals are addressed in the Emergency Operations Plan. In case of emergency, the hospital's Incident Commander is responsible for decision-making and coordinating patient transports. However, it is important to have documentation and consent forms for transport readily available in the

Disaster Documentation and Forms Go-Kit for easy access and completion.

- Develop a transport documentation forms kit. This forms kit will be utilized by the Medical Technical Specialist in the Hospital Command Center. Forms such as transport consents, phone numbers of referring hospitals, and distances to outlying facilities should be included.

96-hour Contingency Planning: The Emergency Operations Plan must identify the hospital's capability to provide care for at least 96 hours and establish contingency plans to sustain or stretch resources until help arrives or services are restored. Therefore, protocols that outline procedures for stretching resources or curtailing services that allow for the continued provision of care with limited supplies and equipment are addressed in the Emergency Operations Plan. Procedures for conserving and rationing resources that may become scarce must be planned and staff must be educated regarding the conservation of supplies in advance. In the event that resources are at risk of depletion in the Emergency Operations Plan directs staff to implement strategies aimed at eliminating waste and consolidating and/or rationing supplies. Other contingency plans, such as Memorandums of Understanding with vendors and stockpiles located externally, are also addressed in the Emergency Operations Plan.

Response: Response efforts encompass activities aimed at saving lives and reducing damage from an emergency or disaster. This includes providing emergency assistance to victims, restoring critical infrastructure and ensuring the continuation of critical services. Hazards that would most likely threaten a particular unit are identified and specific response procedures that are unique to that particular patient population, location and floor plan must be created as checklists. Any required reporting forms must also accompany these response procedures. Factors that make response plans unique may include:

+ Inability of patients to ambulate

+ Patient requirements for certain types of complex support

+ Risks to patients as a result of exposure to certain circumstances

+ Large and complicated equipment that is difficult to move or obtain

+ Floor plan/layout of the unit (without or without individual room doors)

Evacuation: When the infrastructure of the hospital is compromised and patients are in danger or an adequate standard of patient care cannot be provided, it may become necessary to evacuate patients to a safer area. However, an evacuation is a very challenging and high risk activity for many units. Thus, special consideration must be given to planning for this particular response procedure. For an emergency evacuation to be effective, it would require the coordination of all staff members, the rapid mobilization of equipment and a flexible evacuation response plan. Careful consideration must be given to establishing clear roles and responsibilities, rehearsing of roles and quick and easy access to emergency equipment, supplies and documentation forms prepared in advance.

In case of emergency, the hospital's Incident Commander is responsible for making the decision whether or not to evacuate. Unless there is imminent danger, this decision can be made by someone on the unit who is responsible. Evacuation procedures will differ depending on the type of evacuation. Horizontal evacuations occur when moving patients and staff to a safer area on the same floor is sufficient. Vertical evacuations involve moving those in danger to a lower or higher area. Vertical evacuation is often performed when the entire hospital structure is threatened and all floors need to be emptied. A great deal of equipment can be mobilized during a horizontal evacuation, if time allows. However, when vertical evacuation becomes necessary, elevators may be unsafe or unusable. In this case, it may be safer to use stairs. Therefore, if a vertical evacuation becomes necessary, some types of

equipment, such as ventilators, and monitors would most likely be left behind.

The procedure for evacuating a unit and methods for continuing to provide various types of support must be outlined in the evacuation response procedure and the staff must be trained accordingly. The following considerations are listed to facilitate a safe evacuation:

+ More than one staff member may be needed to evacuate patients requiring oxygen

+ Self-inflating ambu bags with or without oxygen may be used to deliver manual breaths

+ The temporary use of nasal cannula or "Bubble CPAP" may be considered for patients receiving Continuous Positive Airway Pressure (CPAP)

+ Methods for portable suction should be available for use in evacuation

+ Non-critical IV infusions may be stopped, temporarily, for the purpose of evacuation

+ Intermittent infusions of IV fluids may be necessary, if no pumps are available

+ Chemical warming mattresses or mylar blankets may be used to prevent hypothermia

+ Neopuff or T-piece resuscitator is the preferred method for intubated neonatal patients

+ Critical infusions need to be continued on a pump with battery backup

+ Epidural infusions need to be stopped and tubing secured

+ Perform intermittent fetal heart rate monitoring for OB patients using a doppler

To address a potential evacuation, a list of critical evacuation equipment must be compiled. Since those who respond to help in an emergency may be labor pool employees or outside emergency responders, it is wise to have photos of each piece of equipment to aid in equipment identification and a more rapid response. Finally, guidelines that detail procedures for providing routine and emergency care during and after evacuation

must be evaluated and included in the Emergency Operations Plan.

In case of evacuation, the hospital's Incident Commander, working in collaboration with the Physician Unit Leader, is responsible for deciding which patients to evacuate first. The sequence of evacuation will depend on patient acuity and type of emergency. When evacuating an entire hospital, the sequence of evacuation usually begins on the ground floor, working upward. When time allows, the most critical patients are usually evacuated first. There are other circumstances, however, when the sequence of evacuation focuses on saving the greatest number of lives in a short amount of time. In this case, the decision is often made to evacuate lower acuity patients first. This may be deemed necessary when patients are in immediate danger or building structure is clearly compromised (Agency for Healthcare Research and Quality, 2010).

Demobilization and Recovery: Demobilization refers to activities that focus on disengaging resources after objectives are met and operations return to normal function, while recovery efforts include more long term activities, such as rehabilitating personnel, repairing equipment and restocking resources. In order to facilitate recovery and system improvement, the following steps are listed in the Emergency Operations Plan and are considered priority in the recovery phase after an emergency:

+ Treating and reporting injuries
+ Implementing staff shortage plans
+ Providing emotional support for patients, visitors and staff and uniting families
+ Inventorying supplies and equipment/Reordering or replacing supplies
+ Evaluating equipment function/Removing and repairing broken equipment
+ Evaluating the use and effectiveness of Hospital Incident Command System forms
+ Assuring charts have copies of Hospital Incident

Command System and paper charting
+ Returning to normal staffing levels as soon as possible
+ Conducting debriefings for staff involved in the incident
+ Compiling After Action reports
+ Implementing Corrective Action Plans and establishing target completion dates

Definitions

HICS: The Hospital Incident Command System (HICS) is an incident management system based on the Incident Command System (ICS) that assists hospitals in improving their emergency management planning, response and recovery capabilities. In an emergency, HICS Documentation Forms are used to collect patient information, track patients, victims and fatalities and to account for personnel time, utilization of resources and track communication and operational activities.

Horizontal Evacuation: The evacuation of patients, visitors and staff from one room or unit to another on the same floor.

HVA: A Hazard Vulnerability Analysis (HVA) serves as a "needs assessment" for emergency planning and provides a systematic approach to recognizing hazards that may impact hospital services or its ability to provide those services. The risks associated with each hazard are prioritized and planning, mitigation, response and recovery activities are aimed at the most likely hazards to impact the facility.

Job Action Cards: Based on Job Action Sheets, these cards serve as a quick reference for staff to identify duties in the event of an emergency or disaster.

Mitigation: Mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. Mitigation is taking action ahead of time to reduce human safety and financial consequences after disasters. Thus, mitigation efforts prevent or minimize losses, in the event that an incident does occur. These

actions reduce or eliminate the need for emergency response and greatly reduce the recovery period.

NIMS: The National Incident Management System (NIMS) identifies concepts and principles that guide how to manage emergencies from preparedness to recovery. The NIMS provides a consistent, nationwide approach and vocabulary for multiple governmental, nongovernmental, or private sector agencies from multiple jurisdictions to work together in response efforts, regardless of cause, magnitude, or location of an incident. This ensures effective and integrated preparedness, planning and response and reduces the loss of life or property and harm to the environment.

Partial Evacuation: The removal of patient or patients from the scene of an emergency to an area of refuge within the same unit or department.

Preparedness: A continuous cycle of planning, organizing, training, equipping, exercising, evaluating and taking corrective action in an effort to ensure effective coordination during incident response. Within the National Incident Management System, preparedness focuses on the following elements: planning; procedures and protocols; training and exercises; personnel qualification and certification; and equipment certification.

SEMS: The Standardized Emergency Management System (SEMS) is a system required by the state of California for managing emergencies involving multiple jurisdictions and agencies. All state government agencies must use SEMS when responding to multi-jurisdictional or multi-agency emergencies. All local government agencies must use SEMS in multi-jurisdictional or multi-agency emergency responses to be eligible for state reimbursement of response-related personnel costs.

Vertical Evacuation: The evacuation of patients, visitors and staff from one floor to another floor.

Resources

Agency for Healthcare Research and Quality. (2010). Hospital evacuation decision guide.Retrieved October 29, 2010 from http://www.ahrq.gov/prep/hospevacguide/hospevac4.htm.

Cohen, R. S., Murphy, B. Ahern, T. &Hackel, A. (2010). Disaster planning: Triaging resource allocation in neonatology. *Journal of Investigative Medicine, 58*(1), 188.

Phillips, P., Niedergesaess, Y., Powers, R. and Brandt, R. (2012). Disaster preparedness: Emergency planning in the NICU.*Neonatal Network, 31*(1).

PREVENTION/MITIGATION

Staffing, Education and Training

Disasters can strike at any time. During the 2005 hurricane season, which included devastating storms such as Hurricane Katrina and Rita, pregnant women, newborns and pediatric patients were among the most vulnerable populations. Involvement of perinatal and pediatric professionals in disaster management is crucial to minimize these risks to women, newborns and children. Training for disaster preparedness is the only way to ensure staff, unit and hospital readiness. Disaster preparedness starts at the top but also requires leadership from key unit staff to ensure the proper training and education is received. The recommendations included in this section suggest training to ensure that neonatal, pediatric and obstetrical patients receive appropriate care at all hospital facilities during a mass casualty, disaster or terrorism related event. General medical and disaster training as well as patient population-specific education options are recommended to enhance hospital response.

Key Unit Leadership Roles

Without proper leadership and guidance on how to plan and implement a unit-specific Emergency Operations Plan, a unit may struggle. It is important for each unit to designate a group of staff members to serve as the Unit Emergency Preparedness Planning Committee. From this group, two key leaders should emerge: a physician and a nurse to serve as planning coordinators. Below is a description of each member's role:

Physician Coordinator – A qualified unit physician staff approved by the unit Emergency Preparedness Planning Committee will assume the following responsibilities:

- Assist with development of policies and procedures that include "grab and go" medications, specialized equipment lists, patient disaster backpack supply list, document kit, job action cards for staff, etc.

- Lead and assist with the development and updating of the individual unit Emergency Operations Plan, granting special attention to the needs of specialized unit population

- Serve as a liaison to appropriate in-hospital and out-of-hospital pediatric/obstetric care committees in the community/state (if they exist)

- Serve as a liaison/Medical Technical Specialist to the Hospital Command Center.

- Take required ICS classes: 100IS, 200IS, 700IS and serve as a *Medical Technical Specialist* (see below for detailed explanation) in the Hospital Command Center when requested during an emergency

- Facilitate pediatric/obstetric emergency education for neonatal/pediatric/obstetrical unit healthcare providers

- Present/Publish current disaster planning efforts for "lessons learned" educational review

- Serve as a liaison for other smaller community hospitals should they need phone or telemedicine assistance to stabilize a neonatal/pediatric or obstetrical patient awaiting transfer

- Participate in the Local Department of Public Health County Surge Plan to ensure needs for specialty patient populations are considered

- Identify, in advance, appropriately qualified staff that can/will accept responsibility for the immediate or extended care of pediatric/obstetric patients during a disaster

Nursing Coordinator – A qualified member of the nursing staff approved by the unit Emergency Preparedness Planning Committee will assume the following responsibilities:

- Ensure adequate skill and knowledge of hospital's nursing staff in the specific Emergency Operations Plan of the specialized unit and ensure staff participates in tabletop/full scale statewide wide exercise

- Identify, in advance, appropriately qualified staff that can/will accept responsibility for the immediate or extended care of pediatric/obstetric patients during a disaster

- Lead in the development and updating of the hospital's unit Emergency Operations Plan policies and procedures

- **Participate in Medical and Health Statewide Exercise** (November of every year) to keep knowledge and disaster skills current. By continually practicing drills it allows for interfacing with the Hospital Command Center and outside emergency agencies to properly address gaps in caring for specialized patient populations

- Serve as a liaison to appropriate in-hospital pediatric/obstetric care committees

- Participate in the Local Department of Public Health County Surge Plan to ensure needs for specialty patient populations are considered

- Serve as a liaison to inpatient nursing as well as to facilitate transfer for the continuum of care of the patient

- Assist with development and periodic review of pediatric medications, equipment and supplies as a member of the Emergency Preparedness Planning Committee

- Review current policies and procedures for emergency childbirth and identify staffing needs

- Identify gaps in Emergency Preparedness planning at the unit and Hospital Incident Command Center level and train staff and during for annual competency training, Skills day, staff in-service education emails/boards, yearly drills

Medical Technical Specialist – The Medical Technical Specialist (MTS) is a physician who advises the Incident Commander on issues related to specialty specific emergency response. The MTS will also work with the Liaison Officer, to provide transport needs, surge availability, and current unit status.

Neonatologists will assist the hospital Liaison Officer located in the Hospital Command Center (HCC) and the Medical Health Operational Area Coordinator (MHOAC) located in the Emergency Operational Area, by utilizing the California Perinatal Transport System and ReddiNet to move high-risk pregnant women and critical neonatal patients to the appropriate level of care. The bed availability, listed in California Perinatal Transport System, is updated daily by all neonatal intensive care units within California. The bed availability in California Perinatal Transport System needs to be correlated against or entered into ReddiNet*. During a disaster, the Neonatologist who is serving as the MTS in the HCC will utilize the California Perinatal Transport System and ReddiNet to act as a resource in assisting the County and State in triaging and transporting patients. For more information see http://www.perinatal.org/

*Bed polling information for the NICU units **MUST** still be entered in ReddiNet and on EMResource or other emergency communications modality used in the Operational Area, by the ED Charge Nurse or designee. This process will follow the Standardized Emergency Management System (SEMS) and is critically important to update the Statewide HAvBED bed polling system within a specific time frame.

Pediatric Intensivist serving as the unit Medical Technical Specialist (MTS) will assist in triage classification and unit request for transfer or evacuation of critical pediatric patients to the appropriate level of care. The physician will work with the Hospital Liaison Officer in the Hospital Command Center (HCC) and the Medical Health Area Operational Coordinator (MHAOC) located in the Emergency Operational Area to facilitate transport and assign bed placement through ReddiNet. ReddiNet is updated daily through the Emergency Department or HCC. It serves as an emergency communication network allowing hospitals, paramedics, EMS agencies, dispatch centers, law

enforcement, public health officers and homeland security to all communicate quickly and effectively during disaster situations on both a local and regional levels.

For more information, see:
 http://www.reddinet.com

For hospitals without pediatric or obstetric-specialized care, the Medical Technical Specialist will act as a point-person for clinical care. This unit leader will facilitate accurate communication for non-clinical areas along with overseeing disaster response in areas such as procurement, transportation, materials/supplies and nutrition.

In order to hold the position of the unit Medical Technical Specialist the following coursework and the respective final exams are listed at http://training.fema.gov/EMIWeb/IS/crslist.asp and are entitled:

- IS-100.HC Introduction to the Incident Command System for Healthcare/Hospitals (HICS Awareness)
- IS-200.HC Applying ICS to Healthcare Organizations
- IS-700 National Incident Management System (NIMS), An Introduction

We recommend documenting a comprehensive plan that outlines a timeline for specific target personnel (Medical Technical Specialist) to have completed specific coursework at your facility.

Target Staff Requirements

HICS Awareness recommend taken by **all staff** (training not required for funding)

ICS-100 must be taken by staff who will occupy a command, section chief, unit leader, supervisor or branch director position in Hospital Incident Command Center (HICS) during an event (i.e. those who fill a box on the organizational HICS chart).

This staff might occupy a command position (e.g. serve as Incident Commander or Section Chief) at the beginning of the "immediate" period of the event but would be *relieved by designated staff with additional expertise and training* as the event moves further into operations during the immediate period

ICS-200/ICS-700 must be taken by staff who will occupy a command or section chief position in HICS during an event (i.e. those who fill a box on the organizational HICS chart designated as section chiefs or command staff). This staff is intended to occupy the command and section chief positions during the immediate phase of the event – the phase where incident management / action planning is occurring.

Once these courses have been completed an electronic certificate of completion will be sent via email to the participant. It is mandatory for a copy of this certificate to be kept on file through the hospital Emergency Disaster Planner.

- For those hospitals with neonatal and pediatric intensive care units, the Medical Technical Specialist will serve as a possible tele-medicine advisor to outlying facilities that have received a surge of critical pediatric patients. Again, if these patients require transport to a higher level of care, the Medical Transport Specialist will assist the Hospital Command Center and EMS agencies in categorizing patients according to level of acuity and subsequent transport needs.

Staff Shortage

In the event of a staff shortage, preparedness efforts in the EOP address medical and nonmedical care providers that may be used during an emergency or disaster along with contact information for such providers. Contingency and emergency staffing resources to be considered for specialty care units may include the following:

- Staff Roster
- Rapid Response Team

- In-House Transport
- Specialized Transport Team
- Available in house facility-wide labor pool
- Medical Reserve Corps (MRC)
- Disaster Medical Assistance Team (DMAT)
- Approved facility-wide volunteers
- On-site parents and family members

These medical and nonmedical resources are potential resources that should be considered and utilized after collaborating with the HCC. Some of them can be broken down further and implemented at the unit level. For example, every unit has a staff roster. The staff roster can be enhanced for disaster preparedness by sorting staff according to their home address and proximity to the hospital. This helps to ensure that not all staff shows up during the immediate operational period. A unit specific call back system is implemented for continued staffing needs. Mass communication notification system is best. If this is not already in place, then utilize the call back system. See Appendix D for ideas on creating a staff call back tree. The process for opening the Hospital Incident Command Center must be initiated from the administrator in charge. Once the medical physician in charge has identified a patient surge or evacuation, hospital operators will contact department chairs, division chiefs and unit directors. These persons will, in turn, contact their associate directors, nurse managers, or another associate. That person will contact two to three individuals under their supervision, each of whom will repeat the practice until all personnel have been notified. An important element of the disaster notification process is to make staffing requests based on distance from the hospital for:

1. Staff who can immediately respond to the disaster and able to reach the hospital within a defined period, such as within 30 minutes, within 60 minutes or greater than 60 minutes.

2. Staff who will be responsible for relieving the current staff at the next operational period.

3. Staff that are not being requested, but should remain on alert in case they are needed.

To serve as a redundant system for employee notification, all employees should report to their immediate supervisor or department manager when a large-scale disaster is declared. If the supervisor or manager is not in the hospital, that person should be contacted by telephone or hospital pager. Each department or workgroup should have specific responsibilities assigned to them; if there are no responsibilities assigned, then members of that department should report to the labor pool. Employees who are called into the hospital should have parking available in the most convenient lot. No employees should make any comment or responses to the media, nor should they respond to requests for patient information.

For an example of a Medical Technical Specialist HICS Job Action Sheet:

- Appendix A- NICU MTS example
- Appendix B- PICU MTS example
- Appendix C- Obstetrics MTS example
- Appendix D- Additional ideas on creating a staff call back tree

Specialized Rapid Response Teams

Some specialized units, such as a NICU or PICU or Labor and Delivery, have specialized rapid response team or in-house transport teams that include a physician, a nurse and a respiratory therapist with specialized supplies needed to care for the specific patient population. These teams are critical in responding to day-to-day emergencies and are always on-call as unit response teams. During a disaster situation, these teams are critical to help with patient movement, transport, emergency codes and off-loading patients in the emergency room.

- Consider developing a unit-specific rapid response team to address population-specific issues that may arise on other areas within the hospital.

In a large-scale disaster, hospital staff resources are always utilized first. Sometimes if a specific unit is requesting additional staff clinical licensed professionals from other departments of the hospital may be cross-trained to provide additional resources. This training is given in the form of "Just-in-Time" training modules specific for that unit's needs (i.e. similar to training a float nurse for a shift). These staff members will be supervised by specialized unit staff members. Therefore is crucial for each unit to maintain a staff roster on those staff that are cross-trained to other areas and may be utilized during a disaster. See Appendix E for recommended pediatric and obstetrical certifications for all direct care providers.

The following are recommended staffing points to consider:

+ Pre-identify hospital staff with specialty skills or experience

+ Develop a plan to utilize the specific skills of the above personnel, including call-down and notification procedure

+ If necessary, train additional staff who are willing to care for specialty population patients

+ Integrate the pediatric staffing plan into your hospital's Emergency Operations Plan

If the disaster continues, it may deplete the hospital's ability to adequately staff for the in-patient unit needs. Unit staff requests must go through the Hospital Command Center to request additional staffing. It may become necessary to use outside personnel or volunteers to assist with both clinical and non-clinical elements of the disaster response. Any non-employee volunteers responding to support the incident by adding the logistic, supply and material distribution, administrative functions, or unit staffing needs must be clearly identified as disaster volunteers and assigned a supervisor who will oversee their activities. This group of support personnel is typically protected from civil liability by falling under "Good Samaritan" laws. For clinical licensed professionals, regulatory agencies like

the Joint Commission have instituted clear disaster privileging protocols. Federal programs like Emergency System for Advance Registration of Volunteer Health Professionals (ESAR-VHP) and local Medical Reserve Corps programs are an attempt to organize potential healthcare responders should the need arise.

Unit Education and Drills

Unit-Level Staff Drills

Each in-patient unit has a responsibility to train their staff on facility emergency codes, HICS positions and functions, unit EOP procedures, equipment use and the use of communication devices addressed in the plan. Staff training provides an opportunity to enhance competencies and emergency response skills. There are multiple ways to accomplish this training such as workshops, skills labs/simulation labs, staff meetings, nurse competency days and statewide exercises. The unit-specific EOP is tested during drills, exercises and tabletops to provide opportunities to evaluate emergency performance and capability and to ensure the competency of staff members in the use of emergency equipment and supplies.

+ HICS positions and functions need to be outlined as role and responsibility cards at the unit level

+ The unit-specific EOP must be further defined to include the procedures outlined in the EOP.

+ The EOP includes how to acquire equipment and additional supplies, how to use communication and evacuation equipment

+ During the exercise or drill, designate an individual at the unit-level who will be responsible to monitor exercise performance and document opportunities for improvement. This will be discussed in the unit-specific After Action Report and Corrective Action Plan (Review Statewide Drill section below for further instructions).

Suggested items to monitor include:

+ Effectiveness of communication with outside entities, including the Hospital Command Center

+ Resource mobilization and asset allocation (i.e.

Pediatric ventilators, fetal monitoring devices, specialty neonatal, pediatric, or obstetrical equipment)

* Management of safety and security, staff roles and responsibilities, utility systems (gas, medical air, suction, laboratory, and radiology), and patient clinical and support care services.

* Utilize free online courses through the Federal Emergency Management Agency's (FEMA) Independent Study program to become more familiar with disaster management concepts

* For more information: http://www.training.fema.gov/is/crslist.asp?page=all

Facility and Community-Wide Integration and Statewide Drills

Evacuation of a specialized ICU is a high-risk activity and requires a carefully planned approach due to the fragile medical condition of the patients and various medical technology/devices they depend on for survival. Due to the critical nature and dependency on medical devices, moving these patients during a surge or evacuation becomes a challenge because of the specialized care they require. Historically, pediatric and perinatal professionals have not been included in disaster planning or exercises, which have led to the needs of the maternal child health (MCH) populations being overlooked.

Scarce resources in a disaster require coordination with other hospitals, Public Health, Incident Commanders, public safety and emergency planners.

These are the following recommendations:

* Work in partnership with local, regional, and other community healthcare providers to organize training and exercises that reflect the use of NIMS/HICS

* Develop goals and objectives to achieve during drills and exercises that test the organization's ability to activate HICS, open the Incident Command

Post and at the unit-level follow the instructions as provided by the Hospital Command Center

Specialized Pediatric and OB Emergency Preparedness Medical and Health Statewide Drill Planning

The overall purpose of drills and exercises is to gather information that improves the emergency plan and response during an event. Drills can train staff, identify weaknesses in a plan and response and provide opportunities to educate staff and improve the emergency operations plan.

Another advantage of exercises and drills is its ability to acquaint key personnel with emergency plans, procedures, equipment and responsibilities as well as with each other. This can be especially true when an exercise brings together groups such as emergency preparedness and perinatal professionals who do not typically work together on a day-to-day basis.

Disaster training should include education for the care of specialty populations and include core principles of disaster management and emergency treatment of high-risk populations.

The following points outline the guidelines for participating in California's Medical and Health Statewide Drill and Exercise:

* Performing a "preparedness needs" assessment is the first step in identifying what training is required and the type of exercise needed. This "needs assessment" can help identify the goals and objectives for the units.

* The MD Liaison and Nurse Coordinator should attend annual planning conferences through the California Statewide Medical and Health Exercise (often held through Health Department or EMS division).

These planning sessions include: Concept and Objectives Meeting, Initial Planning Meeting, Midterm Planning Meeting, Master Scenario Events List

(MSEL) Conference, Final Planning Meeting, and After Action Conference. This provides the unit leaders (MD Liaison and Nurse Coordinator) with knowledge regarding how the Statewide Drill and Exercise is conducted and allows the unit to voice specific needs and resource requests for specialized populations.

+ The unit leaders will also attend hospital disaster committee meetings to assist in developing the documents to be used during the exercise, including the Situation Manual (SitMan), Master Scenario Event List (MSEL), any player handouts, the Exercise Evaluation Guide (EEG), and the presentation.

+ The exercise objectives serve as a guide for determining the scope and length of the exercise in addition to determining if the exercise will be a simple or advanced drill.

+ Participants for the drill may include specialized ICU personnel and external agencies. There are many roles in which a participant can serve: moderator/facilitator, evaluator, observer, player, and scribe.

+ Immediately after the drill is completed, perform a "Hot Wash." This is an opportunity to review key decisions that were made, identify strengths, areas of improvement, and any gaps discovered during the exercise.

+ Shortly after the drill create a unit specific After Action Report (AAR) and send it to the hospital Emergency Disaster Planning Coordinator. This allows a follow up to create corrective action plans, identify gaps in policies and procedures, and present an opportunity for a unit, hospital, or agency to make necessary revisions.

+ While creating the AAR, an Improvement Plan is also developed. The recommendations and corrective actions should be linked to the capabilities identified during the planning process. This should be a mix of short and long term goals. Some of the recommendations may focus on an individual unit or policy while others may require multiple agencies or hospitals to collaborate in

order to achieve the goal. It is important to assign the person, unit, or agency that will be responsible for completing the action items.

+ For more information regarding Homeland Security Exercise and Evaluation Program See: https://hseep.dhs.gov/pages/1001_HSEEP10.aspx

+ For Loma Linda University video reference of "full scale" NICU 2010 evacuation California's Medical and Health Statewide Drill and Exercise: See: http://www.youtube.com/watch?v=co8t4soXWyw

Definitions

Situation Manual (SitMan): The Situation Manual, or SitMan, is a handbook used primarily for discussion-based exercises such as a tabletop. Its role is to provide the background information related to the scope and the objectives of the exercise and the schedule of the drill. In addition, the SitMan provides a narrative for the scenario that should be based on the objectives of the exercise and personalized to match the capabilities that need to be tested.

Master Scenario Exercise List (MSEL): The Master Scenario Exercise List, or MSEL, is a timeline of the events and the expected outcomes for the exercise. MSELs are typically used for operation-based exercises but can also be beneficial for discussion based exercises as well.

Exercise Evaluation Guide (EEG): The Exercise Evaluation Guide or EEG is a tool for the exercise evaluators to collect and interpret observations from the players during the exercise. There are many variations to the layout and content of the EEG. It is important to ensure that the EEG is easy to use, has enough space to record observations, mirrors the capabilities and objectives being tested during the exercise and has the expected tasks the players should accomplish. The information gathered in the EEG will help in the development of the After Action Report.

Participant Evaluations: Developing an evaluation form for the exercise participants is also beneficial. Since the drill is likely one of a series of exercises

involving the unit or the facility, the information gathered from the participants can help improve future exercises (logistically as well as content related) and ensure the learning objectives were met. For example, if the players comment that there were too many injects and they did not have enough time to focus on a specific issue, allow more time during future exercises to improve the overall learning.

Moderators/Facilitators: The term moderators and facilitators are typically used interchangeably. The moderator/facilitator provides the overall management, control and direction during the exercise. They are essentially the Emcee of the day, presenting the narrative, explaining the process and encouraging the participants to interact and discuss the issues presented. They are also responsible for limiting side conversations and determining appropriate use of the injects into the MSEL. When identifying the person to facilitate the unit-based exercise, look for someone with good communication skills strong facilitation skills, and familiarity with the unit emergency operations plans. Having a co-facilitator or moderator may be beneficial as well.

Evaluators: The evaluators will play a key role during the exercise to capture the information needed to determine if the goals, objectives and capability tasks were achieved. Through the use of the EEGs, evaluators become the "record keepers" and will observe the players' performance and the degree to which they perform the expected tasks and meet the objectives. The evaluators can have varying degrees of interaction with the players and should receive specific instruction prior to the exercise as to the degree of interaction. Some exercises restrict interaction with the participants to only observation of their behavior and responses, while other exercises allow limited interaction to help stimulate conversation if the participants need assistance. However, the evaluator must never tell the participants how they should respond.

Observers: Observers play a passive role in the exercise and attend in order to watch the exercise. They have no interaction with the players, nor do they contribute anything during the exercise itself. They can, however, contribute their observations during the Hot Wash as well as in the evaluation of the exercise.

Players: The participants performing tasks and responding to injects during the exercise are considered the players. They have an active role in the scenario and initiate actions based on the information provided in the scenario and injects. All players should be encouraged to contribute to the exercise and they can be from any level within the institution. For enhanced or advanced full-scale exercises, the players are typically those in decision-making positions within the unit (i.e. nursing supervisor, attending physician, in-patient unit leader, pharmacist, etc.).

Recorders/Scribes: Having pre-assigned recorders or scribes can be extremely helpful to gather information that is exchanged during the exercise. It may be beneficial to have multiple scribes in different areas (i.e. a scribe to follow in-patient supervisor, a scribe at the evacuation tent, a scribe to follow the lead physician, etc…). By assigning a recorder or scribe to each unit or key player, the evaluation process and the resulting After Action Report can be more complete. During the exercise, the recorder or scribe should have minimal interaction.

Hot Wash: The Hot Wash is essentially a review of the performance within the exercise and occurs immediately at the end of the exercise. It provides an opportunity to review key decisions that were made, identify strengths, weaknesses and any gaps discovered during the exercise and determine issues and concerns with policies and procedures that were utilized during the exercise.

After Action Report: The After Action Report (AAR) is the record of what occurred during the exercise and is used to implement changes. The AAR includes the exercise scenario, any activities and observations, identified strengths and areas for improvement. The AAR also analyzes the capabilities that were determined during the planning stages and if the corresponding tasks were completed during the

exercise. Information gathered from the EEGs and Hot Wash should be utilized to develop the AAR. An After Action Report should be developed after every exercise and finalized within 45 days of the drill completion.

Improvement Plan: The Improvement Plan (IP) is a matrix that identifies key recommendations and corrective actions, the timeline for completion and the responsible person for completion of the task. The plan should be developed within 45 days of the exercise.

Appendix A:

Sample HICS Job Action Sheet–Medical/Technical Specialist – Neonatal 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 HICS 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 neonatal patient care needs.		
Communicate with the Operations Section Chief to obtain: • Type and location of incident • Number and condition of expected neonatal 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 infant victims.		
Provide neonatal care guidance to Operation Section Chief and work with the Liaison Officer, to provide transport needs, surge availability and current unit status based on incident scenario		
Ensure neonatal patient identification and tracking practices are being followed.		

Communicate and coordinate with Logistics Section Chief to determine neonatal: • Medical care equipment and supply needs • Medications with pediatric/neonatal dosing • Transportation availability and needs (utilize specialized transport teams)		
Communicate with Planning Section Chief to determine pediatric: • Bed availability (utilize patient acuity) • Ventilators (neonatal specific) • Trained medical staff (MD, RN, PA, NP, etc.) • Additional short and long range neonatal response needs		
Ensure that appropriate pediatric/neonatal 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 neonatal care recommendations and treatment.		
Participate in briefings and meetings and contribute to the Incident Action Plan, as requested.		
Document all communications (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		

Immediate (Operational Period 2-12 Hours)	**Time**	**Initial**
Continue to communicate and coordinate with Logistics Section Chief the availability of neonatal equipment and supplies.		
Assist Liaison Officer during evacuation of NICU areas with transfer facility bed placement. MTS will utilize California Perinatal Transport System and ReddiNet to act as a resource in assisting the County in triaging and transporting patients		
Continue to monitor neonatal 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 neonatal needs.		

Extended (Operational Period Beyond 12 Hours)	Time	Initial
Ensure the provision of resources for mental health for staff and appropriate event education for children and families.		
Continue to ensure neonatal 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 NICU 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.		

Documents/Tools
Incident Action Plan
HICS Form 207 - Incident Management Team Chart
HICS Form 213 - Incident Message Form
HICS Form 214 - Operational Log
Hospital emergency operations plan
Hospital organization chart
Hospital telephone directory
Radio/satellite phone
Local public health reporting forms

Appendix B:

Sample HICS Job Action Sheet–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 HICS 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, wheelchairs, 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 (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		

Immediate (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 event 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.		

Documents/Tools
Incident Action Plan
HICS Form 207 - Incident Management Team Chart
HICS Form 213 - Incident Message Form
HICS Form 214 - Operational Log
Hospital emergency operations plan
Hospital organization chart
Hospital telephone directory
Radio/satellite phone
Local public health reporting forms

Appendix C:
Sample HICS Job Action Sheet–Medical/Technical Specialist – Obstetric Care

Mission: Advise the Incident Commander or Operations Section Chief, as assigned, on issues related to obstetric 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 HICS 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 obstetric patient care needs.		
Communicate with the Operations Section Chief to obtain: • Type and location of incident • Number and condition of expected obstetric 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 obstetric victims.		
Provide obstetric care guidance to Operation Section Chief and Medical Care Branch Director based on incident scenario and response needs.		
Ensure obstetric patient identification and tracking practices are being followed.		

	Time	Initial
Communicate and coordinate with Logistics Section Chief to determine obstetric: • Medical care equipment and supply needs • Medications • Transportation availability and needs (carts, wheelchairs, etc.)		
Communicate with Planning Section Chief to determine obstetric: • Bed availability • Ventilators • Trained medical staff (MD, CNM, RN, PA, NP, etc.) • Additional short and long range obstetric response needs		
Ensure that appropriate obstetric 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 obstetric care recommendations and treatment.		
Participate in briefings and meetings and contribute to the Incident Action Plan, as requested.		
Document all communications (internal and external) on an Incident Message Form (HICS Form 213). Provide a copy of the Incident Message Form to the Documentation Unit.		

Immediate (Operational Period 2-12 Hours)	**Time**	**Initial**
Continue to communicate and coordinate with Logistics Section Chief the availability of obstetric equipment and supplies.		
Coordinate with Logistics and Planning Section Chiefs to expand/create a Obstetric Patient Care area, if needed.		
Continue to monitor obstetric 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 obstetric needs.		

Extended (Operational Period Beyond 12 Hours)	**Time**	**Initial**
Ensure the provision of resources for obstetric mental health and appropriate event education for mothers, infants and families.		
Continue to ensure obstetric 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 obstetric 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.		

Documents/Tools
Incident Action Plan
HICS Form 207 - Incident Management Team Chart
HICS Form 213 - Incident Message Form
HICS Form 214 - Operational Log
Hospital emergency operations plan
Hospital organization chart
Hospital telephone directory
Radio/satellite phone
Local public health reporting forms

Appendix D:

Staff Call Tree Roster Example

Unit Management Staff:

Name	Title	Contact Numbers	Contact Status		Arrival Time	Has Family Plan	Needs Family Care		Incident Assignment
			Received Message	Left Message		Y/N	Y/N	How Many	
		H: C: W:							
		H: C: W:							
		H: C: W:							

Department Staff Residing within <u>30 MINUTES</u> of Hospital:

Name	Title	Contact Numbers	Contact Status		Arrival Time	Has Family Plan	Needs Family Care		Incident Assignment
			Received Message	Left Message		Y/N	Y/N	How Many	
		H: W: C:							
		H: W: C							
		H: W: C							

Department Staff Residing within <u>60 MINUTES</u> of Hospital:

Name	Title	Contact Numbers	Contact Status		Arrival Time	Has Family Plan	Needs Family Care		Incident Assignment
			Received Message	Left Message		Y/N	Y/N	How Many	
		H: W: C:							
		H: W: C							
		H: W: C							

Department Staff Residing more than <u>60 MINUTES</u> of Hospital:

Name	Title	Contact Numbers	Contact Status		Arrival Time	Has Family Plan	Needs Family Care		Incident Assignment
			Received Message	Left Message		Y/N	Y/N	How Many	
		H: W: C:							
		H: W: C							
		H: W: C							

Appendix E:
Additional Staff Training Resources

Training Recommendations for Neonatal	
All Direct Care Providers (Nurses and Physicians)	• Neonatal Resuscitation Program (NRP) • Basic Disaster Life Support (BDLS) Additional suggested training program recommendations for nurses and physicians include: • Disaster Drill which includes neonatal patients
Training Recommendations for Pediatrics	
All Direct Care Providers (Nurses and Physicians)	• Pediatric Advanced Life Support (PALS) • Basic Disaster Life Support (BDLS) Additional suggested training program recommendations for nurses and physicians include: • Disaster Drill which includes pediatric patients
Nurses	• Emergency Nursing Pediatric Course (ENPC)
Physicians	• Advanced Trauma Life Support (ATLS) • Advanced Burn Life Support (ABLS) • Advanced Cardiac Life Support (ACLS)
Training Recommendations for Obstetrics	
All Direct Care Providers (Nurses and Physicians)	• Advanced Cardiac Life Support (ACLS) • Neonatal Resuscitation Program (NRP) • Basic Disaster Life Support (BDLS) • Emergency Childbirth Training Additional suggested training program recommendations for nurses and physicians include: • Disaster Drill which includes obstetric patients or obstetric simulators • For more Information see: Perinatal Section for Table-top Disaster Drill Example

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PREPAREDNESS

In-Patient Triage (TRAIN©)

The Join Commission defines a disaster as "a type of emergency that, due to its complexity, scope or duration, threatens the organizations capabilities and requires outside assistance to sustain patient care, safety or security functions." Hospitals and pediatric and obstetrical units may have internal emergency protocols for moving patients. However few, if any, hospitals have protocols for moving patients throughout a region collaboratively during a widespread disaster. Planning for regional collaboration during future disasters requires a shift from previous triage systems (i.e. JumpSTART). Instead hospitals within a region should move towards a resource-based triage plan that would facilitate communication, transportation and resource allocation between hospitals.

The Triage by Resource Allocation for IN-patient (TRAIN©) matrix is a tool for hospital disaster "pre-planning". It categorizes inpatients according to their resource and transportation needs during an evacuation or mass casualty event requiring increased surge capacity. This tool can be implemented manually or within an electronic medical record. It *accurately* assesses patients *quickly* and easily to determine transport needs, allowing institutions to request and receive resources required for vertical movement in disaster.

This innovative tool applies to hospitalized patients with regards to their current resource and vtransportation needs. Previous triage tools are primarily used in the pre-hospital setting and are based on severity of illness or predictors of mortality, which are not applicable to the inpatient population. *This tool is most effective when incorporated into daily practices prior to a disaster.*

This tool was originally created for the neonatal population and then modified for hospitalized pediatric and obstetrics patients. Plans to incorporate the adult inpatient population are currently underway.

OB TRAIN©

The OB TRAIN© (Obstetrical Triage by Resource Allocation for IN-patient) matrix has been developed and is currently being piloted. It is not yet ready to be published in this guidebook, but will be provided to all interested parties as soon as it is ready.

There are two versions of OB TRAIN© currently in testing: 1) OB TRAIN© for Antepartum and Labor & Delivery and 2) OB TRAIN© for Postpartum. As is the case with the existing TRAIN© model, each matrix includes 5 levels of resource needs in increasing severity, for each of 5 categories, including: 1) Transport, 2) Delivery, 3) Mobility, 4) Post-op and 5) Maternal Risk.

The remainder of this section discusses the TRAIN© matrix as applied to pediatric and neonatal patients.

TRAIN
Triage by Resource Allocation for IN-patients

Transport	Car	BLS	ALS	CCT	Specialized
Life Support	Stable	Stable	Minimal	Moderate	Maximal
Mobility	Car/Carseat	Wheelchair or Stretcher	Wheelchair or Stretcher	Transport Rig	Immobile
Nutrition	All PO	Intermittent Enteral	Continuous Enteral or Partial Parenteral	Complete TPN	NPO & TPN
Pharmacy	PO Meds	IV Lock	IV Fluids	IV Drip x1	IV Drip x2

Life Support	Minimal = Hood or Low Flow Cannula O2, Chest Tube, etc. Moderate = CPAP/BiPAP/Hi-Flow, Conventional Ventilator, Peritoneal Dialysis, Externally paced, wt ? 3kg, continuous nebulizer treatments, etc. Maximal = Highly specialized equipment: i.e. HFOV, ECMO, iNO, CVVH, Berlin Heart, wt ? 1.5kg, etc.
Mobility	Car/Carseat = able to ride in automobile with age-appropriate restraints Transport Rig = Age-appropriate rig with equipment for connecting to ambulance Immobile = Unable to move without special equipment, i.e. neurosurgical/bariatric

See TRAIN[+] Toolkit from Lucile Packard Children's Hospital

By implementing the above color-coding system on a daily basis, patients would be pre-triaged allowing for rapid communication between units and the Hospital Command Center. Pediatric and Perinatal units could be categorized routinely either on rounds or automatically by electronic medical record systems according to the above color-coding system (See Appendix A-Helpful hints for computer coding).

It is important to note, that the TRAIN© triage patient categorization can also be incorporated into the HICS-260 Patient Evacuation Tracking Form using colored stickers at the unit level (See chapter on HICS Forms and Patient Tracking).

Instructions On Using The Train© Matrix

1. Look at each patient and assess by the following methods:

✦ Airway/Breathing – What equipment is being used? BiPAP, oxygen, etc.

✦ Circulation – IV medications running (type and number), feeding tube, ECMO, etc.

✦ Physical assessment – CT, casts, drains

✦ Mobility – Specialized wheelchair

✦ Equipment – What is in the room that may only be used intermittently?

2. Each patient will be categorized by maximum needs of each resource type (farthest category to the right)

✦ For example, a patient who is on room air on a regular diet but is on a basal rate narcotic medication would be categorized as Yellow.

Daily Process

1. Assign one person *daily* to complete the TRAIN© assessment form.

✦ This individual may be whoever you decide is capable of completing the process accurately (i.e., Staff Nurse, Charge RN, Nurse Manager, Physician).

✦ The accuracy of this tool is best when administered by someone familiar with the patients.

2. Enter each of the Unit's bed numbers on the TRAIN© assessment form.

3. Enter the name of the patient occupying each associated bed space.

4. Complete the information, including:

✦ Date

✦ Time

✦ Unit

5. Assign the appropriate color to each patient, according to the TRAIN© matrix.

6. At the bottom of the table, total the number of patients in each TRAIN© category.

7. Have the TRAIN© matrix and completed assessment forms readily available with disaster plans on your unit, in hospital administration, with RN supervisors and in the Hospital Command Center
+ The form can either be computerized or faxed once a disaster strikes. However given the nature of disasters and the panic that strikes it is better to have it available beforehand.

NOTE: In using the TRAIN© matrix it is important to realize that while patients are generally evacuated from lowest acuity to highest acuity, this may not always be the case. For example, if the hospital must evacuate and the first ambulance rigs to arrive at the hospital are ALS certified, then the patients requiring ALS support (triage color yellow) will be evacuated before the patients requiring BLS support (triage color green). Another example would be during a situation like Hurricane Katrina or Sandy. Hospitals knew evacuation was necessary, however they had time to plan the evacuations. Therefore they could move the most critical patients (triage color red) before some of the less critical patients. It is important to remember that the TRAIN© matrix is a guide for patient classification to aid in evacuation but is in no way a definitive order in which an evacuation must occur. Below are additional guidelines for triaging patients according to the TRAIN© matrix.

BLUE

These are the most stable patients in the hospital. During a disaster hospitals often operate under an altered standard of care. The stable patients may either be discharged home or transported to an alternate care site with a low level of care via car or bus. There are two reasons the rapid discharge or transport of these patients could become necessary: a) damage to the hospital infrastructure or b) the hospital experiences a large surge of patients. These patients would be the first to be evacuated because they require the fewest number of resources. The following information below explains the criteria for this category:

Transport: Car/Bus or Home with parent/caregiver

Life Support: Stable
+ On room air
+ Off monitoring
+ Uncomplicated drains (i.e. JP or bili drains)

Mobility: Car/Car Seat
+ No specialized equipment needed to transport patient

Nutrition: PO Feeds
+ Oral feeds only
+ No tube feeds

Pharmacy: PO Medications
No intravenous medications
Oral meds only

GREEN

These are patients who require little or no support/assistance. The following information below explains the criteria for this category:

Transport: BLS Ambulance

Life Support: Stable
- On room air or low-flow nasal cannula
- May require pulse oximetry

Mobility: Wheelchair/stretcher
- Baseline requirement (i.e. Cerebral Palsy)
- Restricted mobility due to devices (i.e. Spica Casts, Traction, Halos)

Nutrition: Intermittent Enteral
- Intermittent tube feeds (i.e. G-tube, J-tube, nasogastric, nasoduodenal, nasojejunal, orogastric)
- Oral feeds in combination with tube feeds (i.e. A baby who is nipple/gavage feeding)

Pharmacy: IV Lock
- Intermittent intravenous medications

YELLOW

These are patients who require minimal assistance. The following information below explains the criteria for this category:

Transport: ALS Ambulance

Life Support: Minimal
- Low flow nasal cannula or hood oxygen or trach mist mask
- Pertioneal dialysis (intermittent)
- May require cardiorespiratory monitoring

Mobility: Wheelchair/Stretcher
- Baseline requirement (i.e. cerebral palsy)
- Restricted mobility due to devices (i.e. spica casts, traction, halos, etc)

Nutrition: Continuous Enteral or Partial Parenteral
- Continuous tube feeds (i.e. G-tube, J-tube, nasogastric, nasoduodenal, nasojejunal, orogastric)
- Intermittent TPN/IL (i.e. Patients on 16-hour cycle)

Pharmacy: IV Fluids
- Standard IV fluids (i.e. Dextrose with electrolytes, etc)

ORANGE

These patients are usually stable but require moderate assistance and advanced monitoring by a Nurse, Respiratory Therapist and/or Doctor. The increased amount of equipment and resources needed to manage these patients makes them more difficult to maneuver during an evacuation. The following information below explains the criteria for this category:

Transport: Critical Care
+ Ambulance with RN +/- RT +/- MD

Life Support: Moderate-Stable
+ Conventional Ventilator
+ CPAP/BiPAP/Hi-Flow Nasal Cannula/ Continuous Nebulizer
+ External Pacemaker
+ Chest Tube
+ Hemodialysis (intermittent)
+ Weight ≤ 3 kg (NICU)

Mobility: Transport Rig
+ As based on equipment required to safely transport patient
+ Examples: External Ventricular Drains, etc…

Nutrition: Continuous Enteral or Complete TPN
+ Combination of enteral feeds (by mouth or tube feed) and parenteral nutrition (total parenteral nutrition/intralipid)

Pharmacy: IV drips x1
+ Can have intermittent intravenous medications
+ Single intravenous non-titratable medication drip (i.e. Insulin, basal narcotic drip, pressors, sedation, etc.)

RED

These are the most critical patients in the hospital. They require maximum resources and staffing. Because of this increased need for resources, including hospital staff to care for these patients once they are moved, these are usually the last patients to be moved during a disaster. If there is a lengthy evacuation time, then the physician may want to consider moving these patients first so they don't exhaust a hospital's resources. Additionally, physicians will need to further categorize these patients in an ICU setting when considering a patient is may be a DNR or status-post cardiac arrest. These patients have a poor prognosis when compared with a recently intubated patient that would also be categorized as a "red." The following information below explains the criteria for this category:

Transport: Specialized Transport Teams
+ Ambulance or Military
+ Supported transport with combination of RN(s) +/- RT +/- MD

Life Support: Max-Unstable
+ Highly specialized equipment
+ High Frequency Oscillatory Ventilation
+ ExtraCorporeal Membrane Oxygenation (ECMO)
+ Inhaled Nitric Oxide
+ Whole Body Cooling (NICU)
+ < 1.5 kg (NICU)
+ Continuous Veno-Venous Hemofiltration (i.e. CRRT)
+ Ventricular Assist Devices
+ Surgical/Cardiac Patients on Prostaglandin Infusion (NICU)

Mobility: Immobile

Nutrition: NPO & TPN/IL
+ No enteral feeds
+ Parenteral nutrition only

Pharmacy: IV drips ≥ 2

- Intermittent intravenous medications
- Multiple intravenous mediation drips that may require titration (i.e. Insulin, basal narcotic drip, pressors, sedation, etc.

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Appendix A:

HELPFUL HINTS FOR COMPUTER CODING
(see TRAIN© toolkit)

The computerization of this matrix has been found to decrease the impact to nursing workflow and is more accurate and timely than when used manually. There may be institutions which do not yet have this capability, but which may grow to have them. It is also recognized that multiple electronic medical record products are available. Each product will require different algorithms and coding elements. The following are helpful hints that have been used to successfully code the TRAIN© matrix into an electronic medical record:

- The most accurate data for Life Support, Mobility and Nutrition resource types were pulled from nursing documentation

- The most accurate data for Pharmacy was pulled from the electronic medical administration record

- When programming the algorithm using the TRAIN© matrix, categorization occurs with the highest resource need

- If data is documented in multiple places within the electronic chart, the coding should include both places and use the most recently charted data

- For Life Support and Nutrition, data is pulled over time (8 hours) to include patients who need intermittent ventilatory or nutritional support

- All categorization should be compiled into a report that is easily accessible

- It is recommend that the reports are printed once a shift for hospitals with high acuity where patient status can fluctuate more frequently

- It is recommend that these reports are made available to both unit and administrative leadership

PREPAREDNESS

Role Responsibilities

Patient Care Area Job Action Cards

In the case of an emergency, it is important to have well-defined staff roles to lessen the chaos and confusion created by disasters. Some or all of the positions associated within the HICS may be activated hospital-wide. In addition to the Hospital Command Center and hospital-wide roles, each unit must identify and define roles and responsibilities for key staff positions that may be needed to respond to emergencies. Whether hospital-wide or within a particular unit, these roles are created as Job Action Sheets and are outlined using common terminology.

These unit-based Job Action Sheets are quick reference cards. They are color coded, laminated and they simplify the actions required by each discipline in checklist format. They should be durable, waterproof and clearly visible at the bedside. These cards allow clinical staff to quickly identify their role and focus on prioritizing their duties and rapid mobilization of resources.

The unit-based Job Actions Cards that may be activated include the following roles:

- Physician Unit Leader
- Inpatient Unit Leader (Charge Nurse/Team Leader)
- Bedside Nurse (RN)
- Team Leader (Logistics Activity Leader)
- Supervisor Unit Leader (Operational Activity Leader)
- Respiratory Unit Leader (Respiratory Therapist)
- Unit Clerical Leader (Secretary)
- Pharmacist
- Each one of these roles is explained in greater detail below.

Every unit has unique leadership roles and these roles need to be adapted to fit unit needs during an emergency. The following are key points:

- Survey the unit and identify key leadership roles to carry out unit-specific tasks during an emergency
- Create unit-based Job Action Cards (see Appendix A on how to make these)
- Job Action Cards should be displayed in prominent clinical areas for staff to become familiar with disaster roles on a daily basis
- Educate physicians and staff member on card roles and responsibilities during drills and exercises

Physicians

- Account for all physicians, fellows, residents and CNM/NP/PAs on the unit at the time of disaster. (Check for injuries – this needs to be done in the 1st 30 minutes)

- Obtain Disaster Radios from _____ storage area. Upon hearing CODE _____ overhead, turn on radio and use for communicating with the HCC.

- Collaborate with the Unit Supervisors in triaging patients. This will most often be done by acuity, with the lowest acuity patients being evacuated first

- NOTE: DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER OR HOSPITAL ADMINISTRATOR OR FIRE MARSHALL

- Initiate the "Triage Guidelines for Evacuation or Surge/TRAIN"

- Initiate the physician emergency call list

- Assist with stabilization and transport of the sickest patients

- Notify Department Chief of emergency. Interact with HCC as appropriate until relieved of this duty

- Determine the number of Physicians/Fellows/Resident/CNM/NP/PAs needed on the unit

- Communicate with Medical Branch in the HCC regarding:

  ✓ Transport needs

  ✓ Review short and long term operational response needs

  ✓ Equipment, supply, medication, and staffing needs

- Assist teams with preparation of appropriate documentation and triaging

- Assist with notification of parents/family members regarding the situation and if transfers should become necessary

- Assign responsibilities to Fellows, Residents, CNM/NP/PAs as appropriate to the situation (i.e. Evacuation, Triage, Care in surge tent)

- Monitor staff for signs of fatigue, stress or difficulty coping

In-Patient Unit Leader

- **This is the Nurse Manager or Lead Supervisor**

- Immediately assume role of Unit Leader

- Obtain Disaster Radios from _____ storage area. Upon hearing CODE _____ overhead, turn on radio and use for communicating with the HCC

- Direct Unit Clerical Leader (Secretary) to notify Attending Physician on service and the Unit Nurse Manager on duty of the Emergency.

- Have quick status meeting with leadership (5-10 minutes)

- Retrieve the following from the Go-Kit:

    ✓ HICS 213 Form (Incident Message Form)

    ✓ HICS Form 214 (Operational Activity Log) of your actions

    ✓ Assign Recorder Aide to document unit leader actions and decisions

- Receive an update that the "Disaster Condition Assessment Form" has been completed and information on that form has been sent to the HCC by phone, fax, or runner

- Discuss initial action plan with unit leadership and Medical Branch Director (HCC)

- Ensure patient ID and tracking practices are being followed (HICS 260)

- Distribute remaining Job Cards to Team Leaders, Charge Nurse, Respiratory Unit Leader (RT), Unit Clerical Leader (Secretary) and Pharmacy. Instruct them to follow the steps on the card

- Request assistance to determine hazard and safety information critical to treatment and/or evacuation of patients

- Coordinate with Medical Branch/Logistics/Planning Chiefs in the HCC to expand and/or create specific patient care areas, if needed

- Ensure attempts have been taken to reach patient families to notify of potential evacuation

Unit Supervisors (Operational Coordinator)

- Retrieve the Unit Disaster Documentation & Forms Go-Kit from the designated location

- Pull the following from the Go-Kit:
  - ✓ ALL HICS Forms (214, 255 and 260)
  - ✓ Emergency/Disaster Status Report Form

- Use HICS Form 214 – Operational Activity Log for documenting your actions (i.e. communications, moving patients, etc.)

- Fill out the Emergency/Disaster Status Report Form and relay information on that form to the HCC by phone, radio, fax, or runner (within 30 min)

- Review Disaster Responsibility Role Cards. Assure all Multi-Disciplinary Teams have their Role Cards and instruct them to follow their responsibilities

- Assign one Area Leader (RN) to assist with nursing disaster responsibilities (Working in teams with one leader for every five co-workers if possible)

- Consult with the Physician to review patients and determine order of potential evacuation based on level of acuity (lowest acuity patients are evacuated first)

- Direct support personnel to assist Area Leaders & Team Leaders in gathering and carrying supplies

- If ordered to evacuate the patient care unit, bring Disaster Documentation & Forms Go-Kit and daily assignment sheet

NOTE: DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER

Bedside Nurse (RN)

- Ensure each patient is properly identified with the appropriate ID bands

- Triage patients using the "Triage Resource Allocation for In-Patient (TRAIN)"

- Place colored triage label on patient and all THREE (3) copies of the 260 Form

- Support personnel will assist in carrying supplies as needed

- Fill out a HICS "260 - Patient Evacuation Tracking Form" for each patient. There are 3 copies:

  - ✓ A copy must stay with the patient

  - ✓ A copy for the Unit Secretary (to go to the HCC)

  - ✓ A copy to the transferring agency

- Pull 1 Face Sheet, 1 sticker of each patient and physical chart and give to Unit Secretary or Supervisor for Master Tracking Form (HICS 255) when leaving the unit with the patient for evacuation

- Gather blank MAR and downtime documentation forms (if not already in emergency backpacks) for downtime charting

- Gather/fill the disaster backpacks, patient labels and shift kardex or SBAR Handoff report

NOTE: DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER

- If ordered to evacuate by the Incident Commander:

  - ✓ Disconnect as many tubes and wires as possible

  - ✓ Disconnect chest tubes from suction and use Heimlich valve

  - ✓ Heplock IV's (keep critical medications or drips running)

Team Leaders
(Logistics Coordinator)

- Bring code cart with portable suction along, if ordered to evacuate

- Gather portable evacuation supplies (disaster evacuation beds are located in each specialized in-patient unit storage room #_____)

- Mobilize additional resources needed for transporting patients

- Assign support personnel to help gather and carry supplies. Photos of supplies are available in the Disaster Documentation & Forms Go-Kit (each unit must customize for specific unit needs). Some supplies to consider bringing include:

  - ✓ Vertical evacuation equipment (I.e. medsleds, Stryker chair, aprons)

  - ✓ Backpacks (filled with patients supplies)

  - ✓ Oxygen Tanks

  - ✓ Obstetrical Delivery Packs

  - ✓ Blankets

  - ✓ Transport Bags (Take these 1st to the surge site)

  - ✓ Emergency Evacuation Pharmaceutical Supplies

  - ✓ Glucose Meters

  - ✓ Medfusion Pumps

  - ✓ Portable Monitors

  - ✓ Portable Blood Pressure Machine

  - ✓ Pulse Oximeters

  - ✓ Neopuffs

  - ✓ Available Vents (must have electrical power)

  - ✓ Code Cart/Red Bags

  - ✓ Flashlights/Headlamps

  - ✓ Infant Formula/Breastmilk (on ice) if available

  - ✓ Nutrition for Pediatric/ Obstetrical Patients (supplied by Nutritional Services)

- Help to stock surge tent with necessary supplies at the location designated by the Incident Commander and remain there to receive incoming patients

- Take roll call of all staff and patients at evacuation site/surge tent on the Unit Census Sheet as they arrive

Respiratory Care Practitioner (RCP)

- Assist with patients on respiratory support

- Contact Lead Respiratory Care Practitioner (At ext. _____ or on hospital issued cell phone _____)

- Gather/organize E-cylinders and H-cylinders along with regulators to be used during and after evacuation

- Gather respiratory supply bag and available vents as time allows, to be used at the surge tent after evacuation

NOTE: IF ORDERED BY INCIDENT COMMANDER OR HOSPITAL ADMINISTRATOR OR FIRE MARSHALL/FIRE CHIEF shut off gas valves to the unit using the Medical Gas Algorithm (each unit must have plans for medical gas use)

LEAD – *Respiratory Care Practitioner*

- Contact House Supervisor

- Distribute portable vents/Ambu bags to bedsides of patients on ventilators to be used during evacuation and at the Surge Tent, located in _____ storage room

- Assist nursing staff with Positive Pressure Ventilation on intubated patients

- Call for extra RCP support and extra oxygen tanks

- As rooms are evacuated, mark the outside of the door with a large ORANGE placard "EVACUATION" sign to indicate that there are no patients or staff inside (The placards are located in the "To Go Kit" in the designated location)

Unit Secretary

- ✦ Remain stationed at the desk as long as possible to facilitate communications

- ✦ Notify the Medical Director, Nurse Manager and Supervisors of the disaster (Phone numbers found in the unit Disaster Documentation & Forms Go-Kit located in _____)

- ✦ Use Family Contact Information to notify families of evacuation. If unable to contact family, update In-Patient Unit Leader of needed assistance from the PIO (Public Information Officer)

- ✦ Receive HICS "260 – Patient Evacuation Tracking Form" from Area Leaders. Send copies to the HCC via phone, fax, or send by runner

- ✦ Complete HICS 255 - Master Tracking Form after supervisors have affixed patient labels and triage is complete

- ✦ Give the large ORANGE placard "EVACUATION" signs to the Lead Respiratory Care Practitioner

- ✦ Prepare by gathering the following in case evacuation is ordered:

    - ✓ Telephone call Rolodex

    - ✓ Updated census sheet

    - ✓ Notebook with Family Contact information

    - ✓ Patient Addressograph Cards/Labels

    - ✓ Take hard charts to surge tent

Pharmacy

- Immediately report to pharmacy (call ext. _____ or pager # _____) to communicate with In-Patient Unit Leader immediately following a declared disaster (within 5 minutes of notification)

- Contact pharmacy supervisor regarding immediate needs of the unit (staffing, medications, runner, security)
  - ✓ Days – Supervisor _____ @ ext. _____
  - ✓ Nights – Supervisor _____ @ ext. _____

- Secure algorithm for Acudose emergency access

- Print inpatient medication profiles (if available)

- Assist with patient-related medication management

- Assist Anesthesia for patients receiving epidurals or continuous patient analgesia

- Gather necessary downtime forms and laptop/portable workstation

- Obtain disaster pharmacy lists (located in _____). Examples include:
  - ✓ Other supply bag (needles, syringes, gloves, pens, etc.)
  - ✓ Unit-specific pharmaceutical guidebook
  - ✓ Controlled substance downtime form (tracks narcotic usage/waste)
  - ✓ Emergency evacuation pharmaceutical supply list

- Gather and fill pharmacy bags with necessary pharmaceuticals as listed above

- Report to evacuation site/surge tent within 30 minutes

- Remain at surge tent and assist MDs/RNs with continuing providing medication needs to patients

Additional Suggestions for Staff Role

In addition to the roles and responsibilities listed above, there are additional tasks during an evacuation for the following unit based staff members:

- *Supervisor Charge Nurse/Manager in conjunction with the Physician -* Utilizes the Job Action sheets "Charge Nurse-Operations Supervisor", requests additional staff from the Labor Pool, is aware of the number and acuity of patients and transportation required and designates a person to record the location and destination of patients.

- *Physician/Fellow/Medical designee -* Works with Unit Charge Nurse to determine triage priorities recognizing that literature shows sicker patients require more time and energy, to conserve supplies and staff and realize that sicker patients may need to be moved first, which is the opposite of standard evacuation principles.

- *Advanced Practice Neonatal Nurses/Resident Physicians -* Prepare medical record summaries for evacuation or transport.

- *Clerical Staff –* Prepare transfer documents, including a Demographic/"Face Sheet" as directed by Unit Team Leader. It is recognized that patient chart formats may differ depending on whether an electronic medical record is available and as much clinical data as possible should be provided upon evacuation include recent progress notes, vital signs, medication records and any additional clinical data such as laboratory testing results and radiology results if time allows.

- *Support Personnel –* Examples of support personnel include:
  - Technicians
  - Nursing Assistants
  - Students
  - Social Work
  - Clinical Engineering
  - Transport Team
  - Child Life
  - Physical Therapy/Occupational Therapy/ Speech Therapy

Support personnel availability may vary by time of day. These personnel are to report to the Unit Supervisor/ Operational Coordinator for assignments.

References

Phillips, P., Niedergesaess, Y., Powers, R. and Brandt, R. (2012). Disaster preparedness: Emergency planning in the NICU. *Neonatal Network, 31*(1).

Job Action Sheets courtesy of Loma Linda University Children's Hospital (2013).

New York State Department of Health. (2008). Pediatric disaster toolkit: Hospital guidelines for pediatrics in disasters, 3rd edition [pdf]. Retrieved from www.nyc.gov/html/doh/

Appendix A:

How to Create Job Action Sheets

Purpose:
To be used as a quick-reference guide to performing critical duties during an evacuation.

Format:
Each page has a list of one or more duties to be performed by an individual with the title listed at the top.

Disclaimer:
These duties should only be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. These sheets are subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Printing Instructions:
Step 1: Print out all Job Action Sheets. This can be done on single color paper or multi-color paper for easy identification.

Step 2: Stack sheets in order (sheet with most actions on bottom and least actions on top).

Step 3: Starting with the second-to-last page, move each page down until only the title is showing from the page below (approx. 1").

Step 4: Cut off any unused space at the bottom of the pages that overlap.

Step 5: Connect the pages together by stapling (or other method of attachment) at the bottom. This creates an at-a-glance reference guide that can be thumbed through by titles at the top of the page. Alternatively, these could be hole-punched and placed in a disaster/safety binder.

Example:

PREPAREDNESS
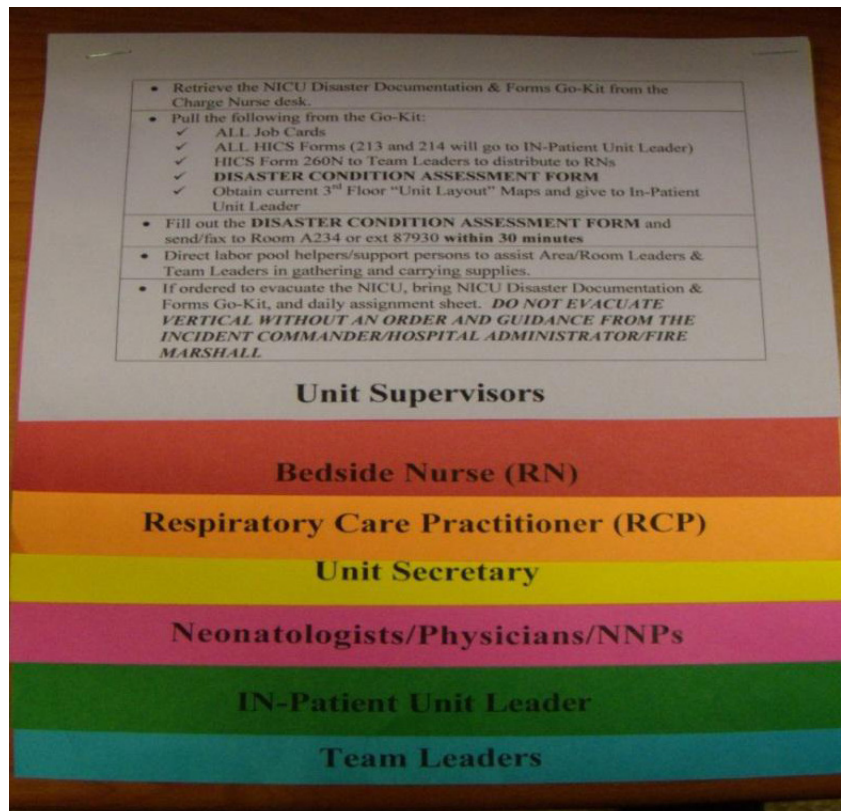
Hospital Incident Command System Paperwork

The Hospital Incident Command System (HICS) is a flexible organizational structure and management concept. It includes defined responsibilities and reporting channels. The Hospital Incident Command System employs the use of common language to promote internal and external communication and integration with community responders. Implementing the Hospital Incident Command System helps hospitals improve their emergency management planning, response and recovery capabilities and helps hospitals interface more effectively with community response agencies during a disaster. To supplement the Hospital Incident Command System, the California Emergency Medical Services Authority (EMSA) developed a number of HICS related forms to aid in incident planning and response. These forms are National Incident Management System (NIMS) compliant. Each form is designed for a particular purpose, which is identified at the bottom of each form. This management system allows hospitals to track communications and actions taken during an incident, convey information concerning patient care needs and transmit information regarding building damage and injuries to patients, visitors and staff members to the Hospital Command Center (HCC). These forms are sometimes modified by hospitals to best suit the needs of a particular patient population. This is true particularly in the case of HICS Form 260 (Patient Evacuation Tracking Form), which contains specific information related to equipment required to provide care to each patient. The Hospital Incident Command System forms are mandatory by NIMS to be compliant. The Joint Commission and other regulatory agencies require that the Incident Command Structure (ICS) is used to manage disasters of all sizes. Additionally, these forms allow hospitals to

qualify for federal reimbursement after a disaster. The following Hospital Incident Command System forms and an explanation of each form are listed below: HICS 213, HICS 214, HICS 255, HICS 260-P, HICS 260-N, HICS 260 (generalized) and the Disaster Condition Assessment Form.

For PDF and Microsoft Word formatted HICS forms, see: http://www.emsa.ca.gov/hics/forms.asp

These forms may be downloaded and modified to suit each in-patient unit's specific needs.

Explanation and Origin of HICS Forms

Each HICS form included in this guidebook has a specific origin and purpose. Some of these forms have been customized to accurately represent a specialty patient population. The forms can either be filled out electronically or as a hard copy. However it is best for every unit to carry these forms on triplicate paper because during a disaster computers may no longer function and electronic copies may not be available. A brief explanation of each form and where they originate is included below, as well as who fills out and receives a copy of every form. A copy of every form should be sent via fax or runner to the Hospital Command Center.

HICS 213 – Incident Message Form:

This form provides a standardized method for recording messages received by phone or radio. It should be used when the intended receiver is unavailable to speak with the sender. This form may be transported via a runner when a communication contains specific details that need to be accurately conveyed.

ORIGIN: MD, Unit Supervisor, TL or Nursing Staff
COPIES: Hospital Command Center, Unit and Message Scribe

HICS 214 – Inpatient Unit Operational Activity Log:

This form is used to document incident issues encountered, decisions made and notifications conveyed, including information received and actions taken. Both the Incident Command Staff and Unit Leadership Staff document all decisions made on this form. If necessary, a scribe may be assigned to the leadership staff solely for the purpose of recording all decisions made and actions taken on this form out.

ORIGIN: Specific In-Patient Units
COPIES: Unit Charge Nurse, MD in Charge, Hospital Command Center.

HICS 255 – Master In-Patient Evacuation Tracking Form

This form records pertinent information concerning patient tracking and disposition during a hospital/facility evacuation. A Team Leader (TL) should be assigned to collect all pertinent patient information such as patient name, MRN and TRAIN triage color on this form.

ORIGIN: Specific In-Patient Units
COPIES: Unit Charge Nurse, MD in Charge, Hospital Command Center (Patient Tracking Manager)

HICS 260 – Patient Evacuation Tracking Form

This form documents details vital to patient care and accounts for patients transferred to another facility. It is to be filled out by the bedside nurse as each patient is identified for evacuation. This form has been modified to more accurately reflect the acuity of pediatric and neonatal patients. Initially this form originated in the Hospital Command Center, however it is recommended to keep copies of these forms on each unit to facilitate an expedited evacuation.

ORIGIN: Specific In-Patient Unit
COPIES: Patient, Patient Tracking Managerv and Evacuating Clinical Location

Disaster Condition Assessment Form

This form was created by Loma Linda to give the command staff a snapshot of what each areas needs are when a disaster or emergency arises for everyone on their unit including visitors. This form MUST be sent to the Hospital Command Center within 30 minutes of the initial incident via fax AND runner.

ORIGIN: Specific In-Patient Units
COPIES: Patient Bed Placement, Hospital Command Center

HICS 213 – INCIDENT MESSAGE FORM

1. FROM (Sender):			2. TO (Receiver):
3. DATE RECEIVED	**4. TIME RECEIVED**	**5. RECEIVED VIA**	**6. REPLY REQUESTED:**
		☐ Phone ☐ Radio	☐ Yes ☐ No
		☐ Other	If Yes, REPLY TO (if different from Sender):

7. PRIORITY

☐ Urgent - **High** ☐ Non Urgent **– Medium** ☐ Informational - **Low**

8. MESSAGE *(KEEP ALL MESSAGES / REQUESTS BRIEF, TO THE POINT, AND VERY SPECIFIC)*:

9. ACTION TAKEN *(if any)*:

Received by:	Time Received:	Forward to:
Comments:		

Received by:	Time Received:	Forward to:
Comments:		

10. FACILITY NAME

Purpose: Provide standardized method for recording messages received by phone or radio **Origination:** All Positions HICS 213
Original to receiver. **Copies to:** Documentation Unit Leader and Message Taker

HICS 214 Operational Log

HOSPITAL
INCIDENT
COMMAND
SYSTEM

1. Unit:

2. Date/Time Prepared	3. Operational Period Date/Time (circle time frame):		
	Immediate (0-2hrs)	**Intermediate** (2-12hrs)	**Extended** (12+hrs)

4. Type of Disaster:	5. Title of person in charge:

6. Activity Log	
Time	Major Events, Decisions made, information received, actions taken, etc..

7. Prepared by (Sign and Print)

8. Unit Supervisor

Filled out by designated person under the supervision of person in-patient unit leader
Purpose: Document incident timeline: including time of disaster declaration, delegation of duties, decisions made by whom, and notifications conveyed.
Origination: Specific In-Patient Units
Original White:-Charge Nurse, **Yellow-**Physician In Charge, **Pink-**Command Center   HICS 214

HICS 255 Master (In Patient) Evacuation Tracking Form — *Loma Linda Children's Hospital*

Hospital Incident Command System

1. Unit Location	2. Date / Time Prepared	3. UNIT Tracking Person

4. Patient Evacuation Information

Patient Name/ MR # — Room # — Nurse:	Triage Color: circle (Blue, Green, Yellow, Orange, Red)	Disposition (Home or Transfer)	Transport Triage Guidelines (Minor, Delayed, Immediate, Expectant)	Accepting Hospital	Receiving Location (Floor, ICU, ER)	Time Hospital Contacted and Report Given
Transfer Initiated (Time/Transport Company)	Medical Record Sent (Yes / No)	Medication Sent (Yes / No)	Family Notified (Yes / No)	Arrival Confirmed (Yes / No)		Expired (Time)
Patient Name/MR # — Room # — Nurse:	Triage Color: circle (Blue, Green, Yellow, Orange, Red)	Disposition (Home or Transfer)	Transport Triage Guidelines (Minor, Delayed, Immediate, Expectant)	Accepting Hospital	Receiving Location (Floor, ICU, ER)	Time Hospital Contacted and Report Given
Transfer Initiated (Time/Transport Company)	Medical Record Sent (Yes / No)	Medication Sent (Yes / No)	Family Notified (Yes / No)	Arrival Confirmed (Yes / No)		Expired (Time)
Patient Name/MR# — Room # — Nurse:	Triage Color: circle (Blue, Green, Yellow, Orange, Red)	Disposition (Home or Transfer)	Transport Triage Guidelines (Minor, Delayed, Immediate, Expectant)	Accepting Hospital	Receiving Location (Floor, ICU, ER)	Time Hospital Contacted and Report Given
Transfer Initiated (Time/Transport Company)	Medical Record Sent (Yes / No)	Medication Sent (Yes / No)	Family Notified (Yes / No)	Arrival Confirmed (Yes / No)		Expired (Time)
Patient Name/MR# — Room # — Nurse:	Triage Color: circle (Blue, Green, Yellow, Orange, Red)	Disposition (Home or Transfer)	Transport Triage Guidelines (Minor, Delayed, Immediate, Expectant)	Accepting Hospital	Receiving Location (Floor, ICU, ER)	Time Hospital Contacted and Report Given
Transfer Initiated (Time/Transport Company)	Medical Record Sent (Yes / No)	Medication Sent (Yes / No)	Family Notified (Yes / No)	Arrival Confirmed (Yes / No)		Expired (Time)

5. Submitted by	6. Area Assigned to	7. Date / Time Submitted

8. Facility Name

Filled out by In-Patient Unit incident leadership staff
Purpose: Record information concerning patient disposition during a hospital/facility evacuation.
Origination: Specific In-Patient Units
Original white-Charge Nurse, **yellow-**Physician In Charge, **pink-**Command Center

HICS 255

HICS 260-N – PATIENT EVAUCATION TRACKING FORM

Triage Category:

1. DATE	2. UNIT NICU	3. ATTENDING PHYSICIAN
4. PATIENT NAME	5. MR #	6. BIRTH DATE

7. DIAGNOSIS (ES)

Place Patient Label / Bar Code Here

8. RESPIRATORY SUPPORT
- ☐ Oxygen   FiO2_____% Liter Flow _____L/minute
- ☐ Continuous Positive Airway Pressure   Level____cm H2O
- ☐ Ventilator Type _____
- ☐ Ventilator Settings _____
  _____
- ☐ Chest Tube(s) # _____
- ☐ Bulb Syringe Sent
- ☐ Bag/Mask with Tubing Sent

9. FAMILY NOTIFIED
   ☐ YES   ☐ NO   CONTACT INFORMATION:

10. ACCOMPANYING EQUIPMENT/TUBES/LINES (CHECK THOSE THAT APPLY)

Bed Type	**Lines / IV's**	**Equipment**	**Nutrition**
☐ Isolette	☐ Peripheral IV	☐ Cardiac Monitor	☐ NPO
☐ Radiant Warmer	☐ Peripheral Arterial Line	☐ Pulse Oximetry (stand alone)	☐ Breast Milk
☐ Bassinette	☐ Umbilical Artery Catheter	IV Pumps	☐ Formula _____
☐ Crib	☐ Umbilical Vein Catheter	☐ # Syringe_____	☐ NG/OG Feeding Tube
☐ _____	☐ Peripherally Inserted Central Catheter (PICC)	☐ # Volume Pump_____	☐ Gastrostomy
	☐ Surgically Placed Central Line	☐ Foley Catheter	**Misc.**
	☐ _____	☐ _____	☐ _____
		☐ _____	☐ _____

ISOLATION ☐ YES ☐ NO	TYPE
REASON	VITAL SIGNS: Temp HR RR B/P O2%

11. DEPARTING LOCATION / 12. ARRIVING LOCATION

ROOM#	TIME	Facility	TIME
ID Band Confirmed: ☐ YES ☐ NO	By:	ID Band Confirmed: ☐ YES ☐ NO	By:
Medical Record Sent: ☐ YES ☐ NO		Accepting Physician:	
Patient Labels Sent: ☐ YES ☐ NO		Admission Location: ☐ NICU ☐ ER ☐ Ward ☐ Other _____	
Belongings: ☐ with Patient ☐ Left in Room ☐ None			
Valuables: ☐ with Patient ☐ Left in Safe ☐ None		Place Triage Category Sticker Here	
Medications: ☐ with Patient ☐ Left on Unit ☐ to Pharmacy		Upon Evacuation	

13. TRANSFERRING TO ANOTHER FACILITY

TIME TO STAGING AREA	Time Referral Facility Contacted
DESTINATION:	ARRIVAL TIME TO RECEIVING FACILITY:
TRANSPORTATION: ☐ Ambulance Unit ☐ Helicopter ☐ Other:	
DEPARTURE TIME FROM Loma Linda University Children's Hospital	
13. FACILITY NAME: Loma Linda Children's Hospital	UNIT: NICU

PURPOSE: Document details and account for patients transferred to another facility. **Bedside Nurse to Fill Out**
ORIGINATION: Medical Care Branch Director
COPIES: #1-Stays with Patient, **#2**-Patient Tracking Manager, **#3**-Departing Location   **HICS 260-N**

HOSPITAL INCIDENT COMMAND SYSTEM

HICS 260-P – PATIENT EVAUCATION TRACKING FORM

Triage Category:

1. DATE	2. UNIT	3. ATTENDING PHYSICIAN

4. PATIENT NAME	5. MR #	6. BIRTH DATE

7. DIAGNOSIS (ES)

Place Patient Label / Bar Code Here

8. RESPIRATORY SUPPORT
☐ Oxygen   FiO2_____% Liter Flow _____L/minute
☐ CPAP/BiPAP Settings _____
☐ Ventilator Type _____
☐ Ventilator Settings _____
_____
☐ Chest Tube(s) # _____
☐ Bag/Mask with Tubing Sent
☐ _____

9. FAMILY NOTIFIED
   ☐ YES   ☐ NO   CONTACT INFORMATION:

10. ACCOMPANYING EQUIPMENT/TUBES/LINES (CHECK THOSE THAT APPLY)

Bed Type	Lines / IV's	Equipment	Nutrition
☐ Hospital Bed/Crib	☐ Peripheral IV	☐ Cardiac Monitor	☐ NPO
☐ Gurney	☐ Arterial Line	☐ Pulse Oximetry (stand alone)	☐ Diet For Age
☐ Isolette/Warmer	☐ Peripherally Inserted Central	IV Pumps	☐ Formula _____
☐ Wheelchair	Catheter (PICC)	☐ # Syringe_____	☐ NG/OG Feeding Tube
☐ Ambulatory	☐ CVL: Type _____	☐ # Volume Pump_____	☐ Gastrostomy
☐ _____	☐ IO Device	☐ Cranial Bolt/EVD	**Misc.**
	☐ _____	☐ Foley Catheter	☐ _____
	☐ _____	☐ _____	☐ _____

ISOLATION ☐ YES ☐ NO	TYPE
REASON	VITAL SIGNS: Temp HR RR B/P O2%

11. DEPARTING LOCATION / 12. ARRIVING LOCATION

11. DEPARTING LOCATION		12. ARRIVING LOCATION	
ROOM#	TIME:	Facility:	TIME:
ID Band Confirmed: ☐ YES ☐ NO	By:	ID Band Confirmed: ☐ YES ☐ NO	By:
Medical Record Sent: ☐ YES ☐ NO		Accepting Physician:	
Patient Labels Sent: ☐ YES ☐ NO		Admission Location: ☐ PICU ☐ ER ☐ Ward ☐ Other _____	
Belongings: ☐ with Patient ☐ Left in Room ☐ None		Place Triage Category Sticker Here Upon Evacuation	
Valuables: ☐ with Patient ☐ Left in Safe ☐ None			
Medications: ☐ with Patient ☐ Left on Unit ☐ to Pharmacy			

13. TRANSFERRING TO ANOTHER FACILITY

TIME TO STAGING AREA	Time Referral Facility Contacted
DESTINATION:	ARRIVAL TIME TO RECEIVING FACILITY:
TRANSPORTATION: ☐ Ambulance Unit ☐Helicopter ☐ Other:	
DEPARTURE TIME FROM Loma Linda University Children's Hospital	
13. FACILITY NAME: Loma Linda Children's Hospital	UNIT:

PURPOSE: Document details and account for patients transferred to another facility. **Bedside Nurse to Fill Out**
ORIGINATION: Medical Care Branch Director
COPIES: #1-Stays with Patient, #2-Patient Tracking Manager, #3-Departing Location   **HICS 260-P**

HICS 260 – PATIENT EVACUATION TRACKING FORM

1. DATE	2. UNIT

3. PATIENT NAME	4. AGE	5. MR #

6. DIAGNOSIS (-ES)	7. ADMITTING PHYSICIAN

8. FAMILY NOTIFIED

☐ YES   ☐ NO   CONTACT INFORMATION:

9. ACCOMPANYING EQUIPMENT (CHECK THOSE THAT APPLY

☐ Hospital Bed	☐ IV Pumps	☐ Isolette/Warmer	☐ Foley Catheter
☐ Gurney	☐ Oxygen	☐ Traction	☐ Halo-Device
☐ Wheel Chair	☐ Ventilator	☐ Monitor	☐ Cranial Bolt/Screw
☐ Ambulatory	☐ Chest Tube(s)	☐ A-Line/Swan	☐ IO Device
☐ Other	☐ Other	☐ Other	☐ Other

ISOLATION ☐ YES ☐ NO	TYPE
REASON	

10. DEPARTING LOCATION		11. ARRIVING LOCATION	
ROOM#	TIME	ROOM #	TIME
ID Band Confirmed ☐ YES ☐ NO	By:	ID Band Confirmed ☐ YES ☐ NO	By:
Medical Record Sent ☐ YES ☐ NO		Medical Record Sent ☐ YES ☐ NO	
Addressograph Sent ☐ YES ☐ NO		Addressograph ☐ YES ☐ NO	
Belongings ☐ with Patient ☐ Left in Room ☐ None		Belongings Received ☐ YES ☐ NO	
Valuables ☐ with Patient ☐ Left in Safe ☐ None		Valuables ☐ YES ☐ NO	
Medications ☐ with Patient ☐ Left on Unit ☐ to Pharmacy		Medications Received ☐ YES ☐ NO	
PEDS/INFANTS			
Bag/Mask with Tubing Sent ☐ YES ☐ NO		Bag/Mask with Tubing Received ☐ YES ☐ NO	
Bulb Syringe Sent ☐ YES ☐ NO		Bulb Syringe Received ☐ YES ☐ NO	

12. TRANSFERRING TO ANOTHER FACILITY	
TIME TO STAGING AREA	TIME DEPARTING TO RECEIVING FACILITY
DESTINATION	
TRANSPORTATION ☐ Ambulance Unit ☐Helicopter ☐ Other:	
ID BAND CONFIRMED ☐ YES ☐ NO BY: (please print)	
DEPARTURE TIME	

13. FACILITY NAME

PURPOSE: Document details and account for patients transferred to another facility. **ORIGINATION:** Medical Care Branch Director
ORIGINAL TO: Patient **COPIES TO:** Patient Tracking Manager and Departing Location

HICS 260

LOMA LINDA UNIVERSITY
ADVENTIST HEALTH
SCIENCES CENTER

DISASTER CONDITION ASSESSMENT
Patients/Staff/Visitors Condition Report

Date of Occurrence		Time		Shift	☐ Weekday	☐ Weeknight	☐ Weekend
Location			Department/ Unit #			Room #/ Unit #	
Entity	☐ MC ☐ BMC ☐ ECH ☐ FMO Other:						

Patient Care Areas Complete This Section

Unit/Area		Contact Person		Ext.		Pager	
Current census		Beds available					

Patient Classification:				OR's Available:	
	I	_____	(discharge after MD approval)	At Present	_____
	II	_____	(transfer/discharge in emergency)	In 30 Min	_____
	III	_____	(transfer only; may not be discharged)	In 1 Hr	_____
	IV	_____	(cannot be moved out of the unit)	In 2 Hr	_____

All Areas: Internal Damage Report

Utilities: Damage or Loss of Function (describe)

- ☐ Electricity
- ☐ Natural Gas
- ☐ Medical Oxygen
- ☐ Medical Air
- ☐ Medical Vacuum
- ☐ HVAC (Ventilation
- ☐ Sewer Waste
- ☐ Pneumatic Tube Systems
- ☐ Water (potable)
- ☐ Deionized Water
- ☐ Steam
- ☐ Elevators
- ☐ Door Card Access
- ☐ Badge Entrance Doors
- ☐ Other

**Return within 30 minutes to:

UH/CH/HSH: Fax to 87930 (Patient Placement) **and** 80115 or 80114 (HCC)   **ECH:** Heritage Hall and fax same as UH/CH
MVP: Suite 9 or fax to 33541   **BMC:** GYM or fax to 34350
Patient Placement contact number #87511
**Please note, due to Supervisor and Bed Placement move to MVP, if you haven't received confirmation that your form was received, please deliver to Hospital Command Center (HCC)

Department / Unit #

Please fill out below only in case of Internal Disaster. List all present on location at time of assessment, including visitors.

Name (Please print)	Work Status (√ Appropriate)		Name (Please print)	Work Status (√ Appropriate)	
	Injured	Not Injured		Injured	Not Injured

**Return within 30 minutes to:

UH/CH/HSH: Fax to 87930 (Patient Placement) **and** 80115 or 80114 (HCC) **ECH:** Heritage Hall and fax same as UH/CH
MVP: Suite 9 or fax to 33541 **BMC:** GYM or fax to 34350
Patient Placement contact number #87511
**Please note, due to Supervisor and Bed Placement move to MVP, if you haven't received confirmation that your form was received, please deliver to Hospital Command Center (HCC)

References

Center for HICS Education & Training. (2013). Using the HICS Forms. Retrieved from http://www.hicscenter.org

HICS forms courtesy of Loma Linda University Children's Hospital. (2013).

RESPONSE

Equipment and Supplies

A large influx of patients can quickly deplete a hospital's resources. In the same manner, an evacuation of patients to another facility can also deplete resources. Therefore it is important for hospitals and individual units to prepare before a disaster strikes.

The availability of appropriate and adequate supplies is important for timely emergency response efforts, so the unit's disaster team should compile a list of essential supplies required to provide routine assessments, respiratory care, nutritional support and thermoregulation for 12-24 hours in the event of emergency. However keep in mind regulatory agencies require hospitals to have a 96 hour cache of food and supplies or a documented contingency plan on how the hospital will receive these if they do not.

At the unit level, the supply list will be used to create disaster backpacks/boxes for each patient. One suggestion for how to implement disaster backpacks is as follows: one emergency bedside backpack is placed at each patient bedside with a contents list and breakaway plasticlock attached. If a lock is found to be broken the contents of the backpack are inventoried and supplies replaced as needed. The backpacks are also checked after drills and exercises, emergency events and semi-annually for expiration of their contents. Items that are due to expire in the next year are returned to hospital circulation and replaced with more current stock. The backpacks are considered a permanent part of the bedspace. Therefore, when patients are relocated or discharged, the exterior of the backpacks are wiped clean.

A rolling supply box or cart filled with emergency supplies might also be an option to conserve costs on units where patients are mobile and individual backpacks in patient rooms cannot be kept secure. Supply carts may save time on a daily basis, as maintenance and evaluation of supplies is simplified. However, during an emergency supply carts may involve additional steps in distributing supplies, delaying emergency response times. In addition, supplies on the carts are readily visible and easily used for daily or routine care of patients, therefore care must be taken to ensure that supply carts are labeled and reserved for emergency use only.

To facilitate the quick mobilization of necessary guidelines, forms and paperwork, a Disaster Documentation and Forms Go-Kit should be created for each unit. Downtime Charting Forms are utilized for patient charting in the event that the computerized charting system is not functioning. The "HICS Documentation Forms" will be used to collect patient information and track patients, victims and fatalities. They will also be used to account for personnel time, utilization of resources, track communication and operational activities. The Downtime Forms and "HICS Documentation Forms" should be located in the Disaster Documentation and Forms Go-Kit. It is the responsibility of Unit-Specific Disaster Coordinator to stock the Go-Kit with an adequate number of forms based on the unit size.

When planning and purchasing equipment for specialized populations, hospitals should prepare for the number of patients expected based on the anticipated surge in patients. These patients will require specialized devices and equipment, large numbers of which may not be adequate in the normal hospital inventory.

Suggested Equipment (Generalized List)

+ Utilize HICS 260 to document all equipment transported with the Patient

+ Know battery life/promote extension of battery life by plugging in electrical equipment

- Charge all equipment in emergency outlets if power is available while preparing for evacuation

- Consider bed batteries as back up

- Consider purchase of back up batteries for equipment and a method to assure charging capabilities and testing based on recommendations of manufacturer or hospital based Biomedical/Clinical Engineering

- Portable cardio-respiratory monitors

- Pulse oximetry monitors

- Point of Care Testing (i.e. EPOC, AccuCheck)

- Syringe pumps/IV

- Drug box/Transport bag/Organized supply kit, i.e. Kangaroo Board

- Airway kit and supplies

- O2 source and supplies

- Portable Suction Equipment

- Transport Ventilators, if available

- Consider taking a Crash Cart/Transport Bags if going to a non-clinical Staging Area on a horizontal move

- Consider additional hospital locations of Crash Carts that could easily be moved to the designated Staging Area (i.e. additional NICU Crash Cart maintained in an Outpatient OB setting or Emergency Department)

Evacuation Equipment

- Recognize that there are multiple types of evacuation equipment made specifically for specialty populations (i.e. Stryker Chair, Med Sled, neonatal pocket vest)

- Purchase and drill with evacuation supplies and equipment so that staff become familiar with their use

- Members of the Committee that developed this guide can be contacted to share specific equipment purchased for their hospitals

Below are examples of specialized equipment to consider in evacuation

NICU Specific	*PICU Specific*	*OB Specific*
• **Infant Med Sled** • **EPOC (Electronic Point of Care Testing)** • **T-Piece Resuscitator Vent** • **Chemical warming mattress** • **Neowrap** • Specialized evacuation equipment for premmies • **NICU transport bags** *includes supplies needed for short term use • **Unit code carts** (removable drawers) • **Bedside patient disaster kits**(see NICU equipment Section) • Transport Ventilator, Monitors,Suction, Bed	• **Stryker Chair** • **EPOC (Electronic Point of Care Testing)** • **Portable Pulse Oximetry** • **PICU transport bags** *includes supplies and medications needed for short term use • **Unit code carts** (removable drawers) • **Patient Disaster supply Backpack** (see PICU Supply section) • Transport Ventilator, Monitors,Suction	• **Birthing kits** • **Dopplers** • **Emergency bags** *off unit delivery supplies • **Postpartum Transport bags**(See OB Equipment Section) *includes general supplies for mother and baby • **Unit code carts** (removable drawers)

Supplies

+ Determine whether evacuation boxes or bags/backpacks are the most appropriate transport method based on unit storage capability and previous hospital planning

+ Place content list in and on evacuation boxes/backpacks and in policy and secure with breakaway lock or heat sealed bag

+ Have one supply backpack/box per patient (included enough supplies for a minimum of 12-24 hours)

+ Move all available supplies and medications with the patient; be cognizant that the receiving hospital/staging area may not have the needed supplies or medications immediately available

+ Plan for pod/unit based evacuation bags with general supplies for all patients

+ Store supplies in a low position for easy access if possible and in ante rooms for patients in isolation to prevent contamination of supplies

+ Consider how to transport dietary needs/breastmilk for infants

+ Bring Hats/Blankets/Thermoregulatory Methods

Considerations for Evacuating Infants/Children

+ Evacuate Infants/ Children in beds or isolettes for Horizontal Evacuation, if possible

+ Evacuate Infants/Children in specialized evacuation equipment made for vertical evacuation

  *This is especially critical to avoid extubation and pulling on central IV lines or chest tubes

+ **Infants who are the least sick** (without oxygen, chest tubes, etc.) may be transported using evacuation vests with a limit of 2 infants in each vest

+ Unstable Infants/Children should be secured in a specialized infant or child evacuation device (i.e. bassinet insert/infant evacuation bed/sled/stryker chair, pediatric Med-Sled)

+ **Infants/Children receiving oxygen via nasal cannula or hood** should be evacuated using oxygen tanks and blended oxygen, when possible

+ **Infants/Children requiring Continuous Positive Airway Pressure (CPAP)** may be switched over to high flow nasal cannula or bubble CPAP with oxygen tank during evacuation. Use blended oxygen, if possible

+ **Infants requiring mechanical ventilation** should be evacuated using the Neopuff and blended oxygen, if possible. Otherwise, hand-ventilate using the patient's bedside ambu bag or self-inflating bag with oxygen attached, if needed

+ **Children requiring mechanical ventilation** should be evacuated using hand ventilation using the patient's bedside ambu bag or self-inflating bag attached to oxygen (if transport ventilator is available this is the preferred method)

+ Additional ancillary staff may carry oxygen tanks and other equipment during evacuation

Maintaining Ventilation

+ If electricity or generator power is unavailable, intubated infants should be ventilated using the Neopuff and blended oxygen, if possible

+ May hand-ventilate using the patient's bedside ambu bag, or self-inflating bag with oxygen tank

+ Care should be taken to hand-ventilate for short periods of time, switching off with another healthcare provider, as needed

Suction

+ Use portable suction to maintain airway patency for ventilated patients

+ Maintain chest tube systems to water seal, keeping collection chambers below the level of the infant's chest. Heimlich Valves are preferred for transport.

Maintaining Heat

+ Closely monitor the temperature and glucose of all Infants/Children

* Use regular and warmed blankets and hats, as needed, to maintain temperature

* Place infants weighing less than 2,000 grams in isolettes or on open warmers, if available

* Consider using K-pads or chemical mattresses, as needed and if available

Maintaining Infusions

* Check battery power for IV pumps. If not working, locate another pump with functional battery

* If unable to locate battery-powered pump, give slow IV pushes of appropriate IV fluids

* Do not exceed the hourly IV rate ordered

* Provide continuous feedings manually if necessary, with small boluses every 30-60 minutes

Monitoring Vital Signs

* Use battery-powered pulse oximeters for patients who require continuous monitoring

* If portable monitoring equipment is temporarily unavailable, assess Infant/Childs color visually and respiratory rate and heart rate via auscultation

At the Evacuation Assembly Area or Alternate Care Site

* Assessment and stabilization should occur to ensure patients tolerated evacuation

* Ensure all patients are returned to support devices and all equipment is functioning properly

* Each patient's nurse will document an objective assessment of the patient's condition using downtime forms, if computerized charting is not available

* An assessment of each patient's needs must be performed and supplies will be distributed from supplies in caches

Transport to Outside Facilities

* Once evacuation is initiated, alternative arrangements for transport of Patients to other facilities will be made through the Hospital Command Center

* Communication must be established between the Incident Commander and the County Department Emergency Operation Command Center (DEOC) through the designated NICU, PICU or OB Medical Technical Specialist

* Bed availability for NICU's in the area can be ascertained through the California Perinatal Transport System website at http://www.perinatal.org/

* The highest acuity Infants/Children must be sent to other comparable facilities

* Lower acuity Infants/Children can be sent to lower level facilities in the surrounding area

* Required forms for transporting patients should be available in the Departments Disaster Documentation and Forms Go-Kit

References

King County *Hospital Guidelines for Management of Pediatric Emergency*

RESPONSE

Patient Tracking Considerations

Early registration and tracking of pediatric/neonatal and perinatal patients is of paramount importance for family re-unification as well as for clinical operations. Because younger children cannot participate verbally in their care it may be difficult assigning names – thus pictures of all unaccompanied children should be taken and a numeric system used until identity can be established (Phillips, Niedergesaess, Powers & Brandt 2012). ALL unaccompanied children < 18 who are hospitalized or are checked into the Pediatric Safe Area must wait for a parent or guardian prior to being discharged, unless they are an emancipated minor.

A band system should be used to identify the child/infant to the parent (New York State Department of Health, 2008):

- *Matching* bands should be assigned to the parent/guardian and the child

- If an unaccompanied child has/is receiving medical care at the facility – and a parent arrives to claim them, parental ID information must be scanned or copied to assist in the identification/reunification process

- Bands must be kept on patients at all times

- Matching bands numbers must be verified every time a parent calls or visits the child

- Photo ID must be presented and scanned

- Unit Sign In/Out sheets for Parents and Visitors should be utilized for accountability during a disaster event

If the child is transferred to another institution, the HICS 260 form accompanying the patient should note the patient's triage (TRAIN©) color, transport crew, the referring facility, time of departure, any belongings and/or parents/caregivers accompanying the child. Ideally the accepting hospital, unit and staff section of the form should also be completed upon arrival to the alternate care site. An unaccompanied patient who is ready for discharge should be guided to the Pediatric Safe Area after medical care is complete. The discharge paperwork should reflect the transfer to assure that parents/caregivers can locate the child in the hospital-designated Pediatric Safe Area (Phillips, 2012).

Identify infants/children in multiple ways

- Consider both standard ID bands/ID stickers on diapers/attached medical equipment, as well as direct patient marking. Consider utilizing a surgical marking pen or waterproof marker to write on a transparent dressing that is then applied to the skin of the neonate on neonatal units. Utilizing a dressing avoids the possibility of tattooing on very low birth weight infants (Phillips, 2012)

- ID band/ID stickers ideally contain the following information: patient name, age/date of birth, medical record number and Mother's name (perinatal/NICU patients) (Phillips, 2012).

- Track all evacuated children (in conjunction with the Transportation Coordinator) to provide a central repository of patient location/information for concerned parents, guardians and family members (King County Healthcare Coalition Pediatric Triage Task Force Public Health, 2010).

- Work with EMS to develop an accountability system to identify and track the movement and location of children from the field to hospital discharge

- All hospitals should be prepared to handle a surge in pediatric patients

- Make every effort to keep families together within hospitals

+ Develop a system to provide concerned parents or guardians with information regarding the whereabouts and safety of their children

+ Utilize the "HICS 260 Patient Evacuating Tracking Form" to reflect critical care needs and acuity of specialized populations. In-patient care units should use triplicate (NCR) format paper: one copy will stay with patient, a second copy will be faxed or hand delivered to the Hospital Command Center and a third copy will go to referring facility if evacuation is imminent.

+ Utilize the "HICS 255 Master Patient Tracking Form" for all patients being admitting to the unit as well as potential movement off the unit (ie. MRI, CT, surgery, evacuation). Patient bar-code identification stickers should be utilized to assist unit secretary or designated person in quickly completing the form.

+ Paper charting and other unit specific documentation must be located in a central location for quick access and reference

+ See Appendix A for a sample Child ID form

Prioritizing/Tracking Patients

+ Maintain a list of patients that may be candidates for rapid discharge

+ Identify which patients may be transferred to a general pediatric floor

+ Employees must be required to wear their ID badge in plain view. Armbands should be on patients at all times.

+ Prioritize patients according to TRAIN© and update as patient acuity/condition changes

+ Track all newborn infants by banding each baby and parent with a corresponding band to match up with parents at the earliest contact point; if possible, take a digital picture of parents

Appendix A: Child ID Form

Hospital Guidelines for Management of Pediatric Patients in Disasters

Child ID Form

PHOTO
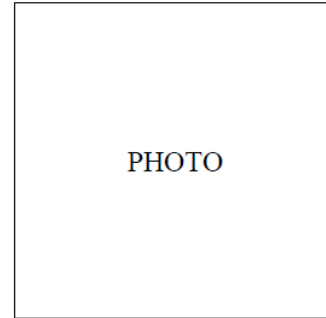
☐ Child is unaccompanied

☐ Child is patient with lone adult who is a patient

☐ Child is visitor with lone adult who is a patient

Date _____

Name of child: _____

Age: _____   DOB _____   Male _____Female _____

Address, if available _____   Phone number_____

If unaccompanied minor, circumstances (who, where, when, clothing, etc.) _____

_____

_____

Eye color_____ Hair color_____ Distinguishing marks_____

Name of adult_____   DOB_____

Male _____Female_____ Relationship to child_____

Accompanying adult treated for illness or injury?   Yes_____ No _____

Admitted? No_____ Yes_____ Where? _____

Child was treated for illness or injury? Yes _____ No_____

Describe_____

Admitted? No _____ Yes_____ Where? _____

If "No," disposition (include Safe Area): _____

Identification bands placed
☐   Child _____(initial when completed)
☐   Adult _____(initial when completed)

Unaccompanied minor
☐ Photographed and catalogued _____(initial when completed)
☐ Reported to law enforcement or FAC _____ (initial when completed)

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RESPONSE

Utilization of NICU/PICU Transport Teams During a Disaster

Each Regional Children's Hospital has a transport team which is utilized to stabilize and transport the critically ill patients of that region. Transport teams are composed of highly trained personnel with advanced practice skills. The team usually consists of a combination of Medical Doctor (MD), Registered Nurse (RN), Respiratory Therapist (RT) or an Emergency Medical Technician (EMT). The resource and expertise of these specialized teams should be utilized during a disaster requiring critical care of the pediatric population. A disaster can occur anytime and having access to these specialized transport teams can help save lives. It is crucial that these teams are incorporated into the local and regional disaster plans that include multiple hospitals within those regions. Without access to these specialized teams there is an increased risk of morbidity and mortality during transport especially during or after a disaster.

Every disaster is unique to the event and each transfer of the patient is also unique. When an outlying hospital is called to help transfer patients from a facility that must be evacuated, the teams must be assembled according to the event and the specific needs of the patient. The best way to mitigate a disaster is by being prepared. Providing transport teams with the necessary training to respond for those in need in a manner that may differ from routine, day-to-day transports is highly encouraged. Additionally, testing the plans by practicing will greatly increase the competency and resiliency of the teams. Ideally, team members should participate in organizations such as federal disaster medical assistance teams (DMATs), state medical assistance teams (Cal-MATS), Medical Reserve Corps (MRC), or

local community emergency response teams (CERTs) to enhance skills in an uncontrolled environment. Remember, routine participation in hospital drills at the county, regional and state levels will help to practice these skills and improve readiness of all staff involved. The following guidelines may be useful for transport teams during the event of an emergency:

+ Develop a call-in process for activating the transport team after a disaster
  – Consider self-deployment as a strategy for large, catastrophic events such as a major earthquake rather than waiting for call in
  – Train for members to call in to their supervisors for briefing rather than waiting to be called

+ Team members must be briefed on:
  – The type of disaster that has occurred and special circumstances affecting transportation such as hazardous weather or road conditions
  – The number of patients and sizes that need to be transferred
  – Chemical exposures that may involve decontamination

+ The incident command center will coordinate where each patient is to be transferred in cooperation with the Medical Technical Specialist preferably a Neonatologist or Pediatric Intensivist

+ Utilize specialized transport teams for the higher acuity patients, determined by the TRAIN© matrix

+ Coordinate transport through the Hospital Command Center (HCC)
  – HCC will communicate resource requests to the appropriate Emergency Operations Center (EOC); City, County or the Local Emergency Medical Services Agency (LEMSA) Department Operations Center (DOC)
  – The LEMSA serves as the Medical and Health Operational Area Coordinator

(MHOAC) and controls all medical and health resources within the Operational Area (County) and is the conduit for all Medical and Health Resources requests outside of the OA (Region, State and Federal)

- The MHOAC will coordinate with transport providers on the best route to evacuate the patients according to acuity and type of transport ground, rotary or fixed wing aircraft

- Provide the MHOAC with the following detail when requesting transport resources:
  – Acuity and number of patients to be transported
  – Destination (if known). If not known, MHOAC will arrange the destination.
  – Specialty equipment needs, if any
  – Any additional information available to prevent delays in fulfilling requests

- Evaluate equipment and maximize the use of transport equipment

- Increase the par level of transport medication for prolonged transports

- Designate one individual to delegate the type of transport team that will be utilized for each patient; i.e. stable vented 30 week infant may only require a nurse to transfer the patient where as an unstable 24 week infant may need an RN and RT to provide the safest care during transfer

- Develop equipment check off lists for patient care needs as guidance for staff in the event of expedited evacuation

- Develop and practice clear communication pathways for team members so they can execute safe, methodical transports

- Ensure each team member has an adequate bag to carry any urgent supplies and any identifiable paperwork on each patient

- Provide adequate hydration and nutritional supplements for transport team members (they may be out on multiple runs)

When a disaster strikes no one is forewarned; having a disaster preparedness program in place will help to ensure the safety of patients and staff during the response and recovery phases. Should the need for the evacuation of patients be necessary the following are guidelines that may be found useful in preparing for the arrival of the teams coming to evacuate patients.

- Identification in multiple locations on each patient is absolutely crucial

- Each patient should already been triaged according to acuity and clearly marked

- If at all possible provide a face sheet and/or History and Physical on each patient and any current problems that may alter how the patient is transferred

- Provide the necessary provisions for the care of that patient in a bag or container, such as medications

- Provide charting of each patient and a medication administration record

- When possible obtain consent from the parents to move the patient; legally a patient can not be moved without the permission of the parent until the government has proclaimed (authority from Local Health Officer or Governor) or declared (authority from the US President) the event a disaster.

- Call ahead to receiving facilities to ensure qualified staff beds prior to departure of team (may be done by MHOAC if not done by sending hospital)

When disaster strikes, utilize personnel who have specialized training, are familiar with working outside of the normal hospital setting and have the team compatibility to get in and get out safely with each patient.

References

Transport Considerations courtesy of Loma Linda Children's Hospital NICU and PICU Transport Teams (2013).

Inland Counties Emergency Medical Agency (ICEMA), (2013).

RESPONSE

Pharmaceutical Considerations

Disasters and terrorist attacks are low-probability incidents, but as of September 11, 2001, the New York City Neonatal Unit evacuation during Hurricane Sandy and the recent pressure cooker bombing at the Boston Marathon have proven disasters can occur any time and any place. Private citizens, hospitals, businesses, and government agencies must weigh the benefits of preparing for disasters against the cost of not planning.

All disaster preparedness starts *locally*. Pharmaceutical needs are an essential part of disaster preparations. Natural and man-made events affecting a community will also affect local pharmaceutical vendors and healthcare facilities. It is important to realize that without mitigation and preparedness efforts, the actions taken by pharmacists and disaster committees are less effective during the response and recovery phases. Therefore pharmacists should be involved with developing the disaster operation plans in the hospital and critical patient care areas. As always, it is better to focus on proactive activities *before* an event occurs rather than becoming reactive *after* the fact.

Pharmacists can relay valuable pharmaceutical information to disaster-related committees. By utilizing multi-disciplinary collaboration with local community-based committees, healthcare facilities, emergency management teams, public health and other relevant groups approaches needed to enhance area preparedness can be determined.

At the facility level, disaster exercises allow healthcare providers and other staff to rehearse their individual responsibilities as well as team roles. Pharmacy personnel are encouraged to actively participate in hospital disaster planning during hospital exercises.

Pharmacists should:
- Have a role in pharmaceutical distribution and control
- Monitor drug therapy management of patients during disaster

Disaster pre-planning for a critical care in-patient pharmacist includes: ensuring proper packaging, storage, handling, labeling and dispensing of emergency supplies of pharmaceuticals. Pharmacy personnel should be prepared for medical management of anticipated injuries and illnesses and ensure appropriate education and counseling for unit staff receiving and dispensing pharmaceuticals from an emergency supply.

A detailed plan for the hospital in-patient units is critical when planning for a large scale disaster. The following are suggested actions to review and include in a hospital/unit Emergency Operations plan:

After a disaster has occurred the first step is:
- Contact pharmacy supervisor—phone or pager
- Initiate Team: Coordinate personnel and review pharmacy/technician roles and immediate tasks for the initial (first 2 hours) operational period along with completing the Emergency Evacuation Pharmaceutical Supplies (listed on Pharmacy Supply Checklist – see Appendix B)
- During a large-scale disaster a pharmacist will initiate printing/furnishing paper MARs for affected unit
- Pharmacist in charge of critical care area will provide a current list of patients on vasopressors (Dopamine, Dobutamine) or any continuous narcotic infusion
- Other pharmacists will immediately stock medication/supplies from main pharmacy; controlled substances are filled from the narcotic vault with critical patient care areas

needing a re-supply of medications receiving priority

+ If normal communication systems are not working a pharmacist/tech should hand deliver medications to designated area

+ Once a specialty area has requested assistance for medical surge or evacuation, the pharmacist should go to the unit location immediately to assist with medication needs

+ One pharmacist and one technician should set up a dispensing area (planned area) or multiple areas if necessary, i.e. dispensing IV infusions, IV piggybacks, oral medications, etc.

+ Provide medications for patient transport, i.e. evacuation of critical care pediatric/neonatal patients on vasopressors and continuous narcotic infusions. Ensure there will be enough medication to last the estimated transit time to the referring facility destination.

During an emergency, critical care pharmacists should perform the following responsibilities:

+ Consider tiered staffing to incorporate non-critical care/outpatient pharmacists into an ICU environment. It would be best to use a 2:1 staffing ratio of 2 non-critical care pharmacists to 1 critical care pharmacist in a disaster, ICU setting.

+ Distribute/implement care protocols/standard order sets

+ Assist in monitoring drug levels, drug interactions, timely administration of antibiotics, monitor continuous vasopressor/narcotic infusions

+ Keep pharmacy administration, the Hospital Command Center and support personnel apprised of expected medication requirements

+ Maintain a narcotic dispensing log, inventory count and security

+ Monitor drug usage and supply

+ Pharmacists should plan on working on site with a physician to attend the needs of medication for specific patients during an evacuation or at an alternate care site (ACS)

+ Continue communication with the Hospital Command Center

In the Mitigation and Planning phase, creating pharmacy core group will assist various specialty units in the development of the pharmaceutical component of a unit-specific Emergency Operations Plan. Specialized units need continual revision of the Emergency Operations Plan with regards to pharmaceuticals needed and establishing pharmacy service teams for units such as the NICU, PICU, or ER. It is also important to have the drug inventory list, and dosing guidelines for specific area made available.

Pharmacy pre-planning suggestions:

+ Set up pharmacy core group and focus on team building

+ Continually revise disaster plan for response and pharmaceuticals needed

+ Set up unit-specific pharmacy service teams, such as NICU, PICU, ER

+ Have drug inventory list and dosing guidelines for specific areas readily available

+ For more information, see: http://legacy.uspharmacist.com/index.asp?show=article&page=8_1217.htm

See Appendix A for NICU Pharmacy Job Card (example)

See Appendix B for NICU Pharmacy Supply Check Lists (example)

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Appendix A: Pharmacy Job Card

Pharmacy

- Immediately report to NICU Satellite pharmacy (Ext. _____) or pager
- Communicate with In-Patient Unit Leader immediately following disaster (within 5 minutes of pager notification)
- Contact Pharmacy Supervisor regarding immediate needs of the unit (Staffing, Medications, Runner, Security)
  - ✓ Days – Supervisor Ext. _____
  - ✓ Nights – Supervisor Ext. _____
- Secure Algorithm for Acudose emergency access
- Print inpatient medication profiles- if able
- Assist with patient-related medication management
- Gather paperwork and Laptop (Workstation on Wheels)
- Obtain Disaster Pharmacy Lists (located in Satellite Pharmacy Notebook)
  - ✓ "Other Supply List (syringes, needles, gloves, pens, calculator, alcohol)
  - ✓ "NICU Manual"
  - ✓ "Controlled Substance List"
  - ✓ "Rapid Sequence Intubation Kit List"
  - ✓ "Hospital Phone List"
  - ✓ "Emergency Evacuation Pharmaceutical Supply List"
- Gather and fill the NICU pharmacy bags (2 bags) according the Supply List and needs of the unit (Bags are located on 3800 storage room #3830)
- Distribute medications to designated evacuation sites within 30 minutes

Appendix B: Pharmacy Supply Checklists (NICU Specific)

Emergency Evacuation Pharmaceutical Supplies

Medication	Strength/size	Quantity	Category	Route
Acetaminophen supp	80 mg	10	Antipyretic	Rectal
Acetaminophen oral liquid	80mg/2.5ml	10	Antipyretic	Oral
Albumin	5% (50 ml size)	4	Vol expander	INJ
Albuterol	0.5%	30 (1 box)	Resp	MN
Racepinephrine	2.25%	2	Resp	INH
Alprostadil (refrigeration)	500 mcg/ml	5 (1 box)	Cardiac	INJ
Ampicillin vial	500 mg	20 (2 x 10)	Antibiotic	INJ
Budesonide	0.5mg/2ml	2 x 5	Resp	MN
Caffeine	60mg/3ml	3 (1 box)	Resp	IV
Calcium gluconate 10ml vial	100 mg/ml	25	Electrolyte	INJ
Cefotaxime vial	1gm	10	Antibiotic	INJ
D10W	250 ml	12	IV fluid	INJ
D10W	500 ml	5	IV fluid	INJ
D5.2NACL	250 ml	2	IV fluid	INJ
D5.45NACL	250 ml	2	IV fluid	INJ
D5/LR	1000 ml	2	IV fluid	INJ
D5W	250ml	10	IV fluid	INJ
Desitin Oint	30 gm	2	Rash	Topical
Dextrose vial	50% (50ml)	4	IV fluid	INJ
Dobutamine	250mg/20 ml	10 (1 pack)	Pressor	INJ
Dopamine	400mg/5ml	25 (1 pack)	Pressor	INJ
epinePhrine	0.1mg/ml (10ml)	5	Pressor	INJ
Erythromycin OPHTH	0.5% 1 gm	50	Antibiotic	Ophth
Furosemide	10mg/ml 2ml	25 (1 box)	Diuretics	INJ
Gentamicin	10mg/ml 2ml	25 (1 box)	Antibiotic	INJ
Glycerin infant laxative supp	1	10	stool	Rectal
Heparin Flush	10 units/ml (2ml)	2 x 30	flush	INJ
Heparin Flush	100 units/ml (1ml)	20	flush	INJ
Hyaluronidase (vitrase)	200 units/ml (1.2ml vial)	2	Infiltration	Intradermal
Fentanyl 50mcg/ml			*Intubation kit*	*INJ*
Lorazepam	*2mg/ml*	*10 (1 box)*	*Seizure*	*INJ*
Midazolam	*2mg/2ml*	*10*	*Sedation*	*INJ*
Morphine	*2 mg/ml carbuject*	*10*	*Pain*	*INJ*
Nafcillin pwd	1gm vial	10	Antibiotic	INJ
Naloxone	1mg/ml (2ml)	10	Antidote	INJ
Phenobarbital	*65 mg/ml (1ml)*	*25*	*Seizure*	*INJ*
Phenytoin	50mg/ml (2ml)	25	Seizure	INJ
Phytonadione (vitamin K)	1 mg/ml	25	Vitamin K	IM
Rapid sequence intubation kit	See below **	2	Intubation	INJ
Saline 0.9% vial	50 ml vial	25	IV fluid	INJ

Saline Flush	0.9% (2.5ml)	5 x 30	flush	INJ
Sodium bicarbonate 4.2%	0.5mEq/ml 10 ml syringe	25	Acidosis	INJ
Sodium Chloride 0.45%	500 ml	2		
Sodium Chloride 0.9%	250 ml	2		
Vecuronium	10 mg/vial	10 (1 pack)	Paralytic	INJ

**Rapid sequence intubation kit content:
Atropine 0.1mg/ml (5ml syringe x 1)
Vecuronium 10 mg/vial x 1
Fentanyl 50mcg/ml 2ml x 2
Neostigmine 0.5ml/ml 10 ml x 1

Other Supplies

Other Supplies	Size	Quantity		
Syringe	1 ml	2 x 100		
Syringe	3	1 x 100		
Syringe	10 ml	50		
Syringe	30 ml	50		
Needles	18G x 1 inch	2 x 100		
Alcohol Swab	n/a	3 x 100		
RX labels	standard	Small stag		
Plastic bag	5x8	200		
Syringe cap		100	N7820	
Dispensing Pin		5		
Gloves	Medium	1 box		
Gloves	Large	1 box		
NICU manual		1		
Pediatric Handbook		1		
Patient profile in paper				
Pen/Marker		6		
Calculator		4		
Miscellaneous (from nursing)				
Pen/Marker		6		
Calculator		4		
Lap top		1		

Comment: quantity and drug lists can be modified
Narcotics supplied will be handled in a separate procedure
IV solution will in a separate bag itself
Pharmacy will work on procedure to get all the med filled.

RESPONSE

Respiratory Care Considerations

Introduction

Respiratory Care plays an important role during an emergency/disaster. The Respiratory Care Practitioner (RCP) needs to triage in-house patient care, mobilize life support equipment, provide staff to help transport patients on life support equipment, keep track of available life support equipment and monitor the medical gas supply that may become disrupted during an emergency. In reviewing disaster plans for Respiratory Care Departments the focus is on what the RCP should do during a medical gas emergency or power outage. Very little information is available for the RCP's role when it comes to surge or evacuation. Also, there is a lack of information when it comes to the respiratory care of the pediatric or neonatal population during a disaster.

It is important to make sure that all members of the Respiratory Care department are familiar with both the Respiratory Care Department and hospital Emergency/ Disaster Plans. The plans should be part of the department orientation. Also, periodic disaster drills should be held to reinforce the RCPs roles and the possible duties that they may assigned to during an emergency.

The focus of this section is to describe the roles of the RCP when an emergency results in a surge or evacuation of pediatric or neonatal patients along with managing the equipment that is specific to those populations.

The Role of Respiratory Care during an Emergency

When an emergency/disaster occurs, either internal or external, it disrupts the normal workflow and RCPs must be reallocated. Routine patient cares, such as scheduled treatments and ventilator checks may be put on hold so staff can respond to the emergency. Extra staff may be needed and reassigned to cover duties that they are not accustomed to or even out of the realm of Respiratory Care.

Due to the nature of hospitals, the size of the Respiratory Care department will vary from facility to facility. Some departments may have enough staff to fill all the roles required while other departments may only have as few as two or three people working during a shift. If this is the case, members from other departments may need to take roles such as "Department Disaster Coordinator" and someone from another department may need to inventory available equipment. While the regular Respiratory care staff is deployed to the Emergency Department and ICU's.

When an emergency has been declared the routine operations of the Respiratory Care department will cease its normal operations and the following things should occur:

A **Respiratory Care Disaster Coordinator** needs to be named. This may be a supervisor on shift or someone appointed by the Hospital Disaster Coordinator. The role of the Respiratory Disaster Coordinator is to assign staff as needed, keep track of available equipment, allocate equipment as needed, arrange for needed equipment to be brought in from external sources and call staff in from home as deemed necessary. The person assigned to this role needs to be familiar with the disaster plans and the operation of the department. This is not a role that should be learned during an emergency. The first thing that the Respiratory Care Disaster Coordinator needs to do is assign **Lead Therapists** to the Emergency Department, PICU and NICU. They should also assign someone to inventory available ventilators, gas cylinders and other emergency equipment that might be needed.

The **Lead Therapist** is to coordinate the Respiratory Care activities in the area that they have been assigned to such as the Pediatric Intensive Care (PICU) or Neonatal Intensive Care (NICU). They work closely with the Unit Leader (Charge Nurse) and Lead Physician to coordinate activities in the assigned area. They will also assign tasks to the RCPs that have been directed to their area. Calls for help in the area should be directed to the Lead Therapist. It's important that staff assignments come from a single source. The Lead Therapist may also be responsible for inventorying the available equipment in the area such as ventilators, T-Piece Resuscitators and gas cylinders. They may also get equipment ready in case of a surge or evacuation. It should be the responsibility of the Lead Therapist to contact the Respiratory Disaster Coordinator when additional equipment or manpower is needed.

When an emergency is announced those who have not been assigned a role such as Lead Therapist will be considered **staff RCPs**. Those who are working should report back to the department to await assignment. Members of the department that are off duty should not automatically report for work. They should wait to be notified by an official source. RCP staff may be asked to do things that are outside their normal roles. For example, the department secretary or RCP may be asked to help transport in-house patients.

Equipment and Patient Care

Two of the biggest challenges that a PICU or NICU therapist will face are taking care of critical patients, either in-house or surge victims, and the availability of ventilators that are appropriate for the age groups.

Inventories must be taken to conserve supplies and medical gasses. The facility may have power and the oxygen delivery system may be intact, but oxygen delivery may be cancelled or delayed due to disaster conditions. Flow meters can be turned off and oxygen blenders that are not actively being used can be unplugged. RCPs should also evaluate patients who are on high flow devices to see if they can be switched to Venturi systems.

Make sure that all life support equipment and monitors are plugged into emergency outlets. This should be a routine practice but mistakes do occur. RCPs should also make sure that air compressors and backup batteries for ventilators are working properly.

The RCP should also prepare for a surge or evacuation. The duffle bags should be ready with the needed equipment that the RCP or medical staff would need if they are not able to get supplies. Items in the bag should include O_2 connective tubing, cannulas, O_2 masks, resuscitator masks that are appropriate for the age group, updraft nebulizers, suction catheters, laryngoscopes, endotracheal tubes, tape, scissors, self-inflating bags, flow-inflating bags and manometers or T-Piece Resuscitators if available. Pack as if you are going to be evacuated and need to be self-sufficient for a period of time. (See Appendix A – Respiratory Disaster Bags)

If the time comes for those patients needing to be transported or evacuated, care should be taken to make sure that ventilated patients are being transported and maintained on the same settings that they were previously on. Although adult patients and some pediatric patients may tolerate 100% FiO_2, this is not the case for NICU patients. If this is not possible, the situation should be discussed with the Lead Physician.

A major concern during a disaster is the availability of pediatric and neonatal ventilators during an emergency. In the case of a surge, there may not be enough ventilators. In case of evacuation, the same ventilator the patient is currently on may not be available. This poses a grave problem for the NICU and PICU.

Federal emergency preparedness agencies have purchased transport ventilators to be allocated during a disaster. The majority of these are LTV 1200/1150 ventilators (CareFusion Pulmonetics).

These ventilators have a minimum patient weight of 5 kilograms and cannot provide a specific FiO_2 that needs to be used in the neonatal population. An alternative is the NeoPuff (Fisher & Paykel Healthcare) or the Neo-Tee (Mercury Medical).

The NeoPuff is a pneumatic device (non-disposable T-Piece Recusitator) that can be used to deliver positive pressure ventilation or CPAP via an endotracheal tube, mask or nasal interface. It can be connected to a flow meter or blender. The flow needed is 5-15Lpm and can be used on patients up to 10 kilograms. It can deliver pressures up to 70cmwp. It uses a proprietary circuit. There is a knob on the T-piece that is adjusted for PEEP or CPAP. The port is occluded to deliver positive pressure. There is a high pressure pop-off and peak pressure control knob on the device. Once these controls are set, the delivered pressure is very consistent. Breaths are delivered by the user occluding the port. It is very easy to use and quickly learned by EMT or others.

The Neo-Tee is a disposable T-Piece Resuscitator. It can be attached to a flow meter gas cylinder or blender. It can be used in the same way as a NeoPuff. It is cheaper than the NeoPuff and is a good cost effective alternative if there are a large number of patients who need to be evacuated or maintained.

There are large numbers of PICU patients who will do well on the LTV, but there some considerations. Cyanotic Heart Lesion patients have a narrow FiO_2 range that they will tolerate. The RCP needs to collaborate with the Lead Physician to determine if the LTV is suitable for these patients and discuss what alternatives might be available.

Since there will be a limited number of RCPs assigned to the area, it may not be appropriate to have the RCP transport the patients off the units if they will not be able to return. This may be the situation in some circumstances. Once the evacuation area is determined, a Lead Therapist should be assigned to the area. They can help receive patients and set up ventilators. However, someone else may have to transport the patients off the

unit and ventilate them. In this case, the RCP should set up the equipment for transport and hand off ventilation to a qualified person. Quick instruction may need to be given to the person doing the transport.

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Tufts Medical Center Respiratory Care Disaster Plan. Available at: http://160.109.101.132/respcare/disastr.htm

Loma Linda University Medical Center Department of Respiratory Care Patient Care Technical Procedure: Department Disaster Plan

Department of Consumer Affairs, Respiratory Care Board of California: Disaster Response. Available at: http://www.reb.ca.gov/about_us/disaster_response.shtml

Calhospitalprepare.org: Chapter 7: Defining and Managing Staff Roles and Responsibilities. Available at: http://www.calhospitalprepare.org

Calhospitalprepare.org: Chapter 9: Managing Clinical and Support Activities. Available at: http://www.calhospitalprepare.org

Resources

BabyPac neonatal transport ventilator. Smith's Medical, Dublin, Ohio. Information available at: http://www.smiths-medical.com

LTV 1200/1150 ventilator. Cardinal Health Pulmonetics Division CareFusion. San Diego, CA. Information available at: http://www.carefusion.com

NeoPuff. Fisher & Paykel Health Care INC. Irvine, CA. Information available at: http://www.fphcare.com/products/neopuff

Neo-Tee. Mercury Medical. Clearwater, Florida. Information available at: http://www.mercurymedical.com

Appendix A – Respiratory Disaster Bags (2)

	BAG 1				BAG 2
Qty	**Stock Item**			**Qty**	**Stock Item**
6	ETT 2.5 Uncuffed			6	Suction Catheters 5fr
6	ETT 3.0 Uncuffed			6	Suction Catheters 6fr
6	ETT 3.5 Uncuffed			6	Suction Catheters 8fr
6	ETT 4.0 Uncuffed			6	Pressure Manometer
6	RSP 2.5 Mask			6	Anesthesia Bag 500cc
6	RSP 3.0 Mask			6	Tubing Connector
6	RSP 3.5 Mask			6	15mm Adapter
6	RSP 4.0 Mask			6	22mm Adapter
6	Stylette 6fr.			6	Bennett Straight Adapter
12	Benzoin Swab			6	Bennett Tapered Adapter
3	Roll Cloth Tape 1"			6	Tapered Adapters (plastic)
6	Laryngoscope kits			6	T-piece adapter
20	Pedicap			6	ET Adapter #4
6	Pulse Ox Probe N-25			6	ET Adapter #6
2	ABG Kits Exp. Date ____			6	ET Adapter # 7
box	Capillary Tubes Exp. Date ____			6	ET Adapter # 9
5	Micro Lancets			6	**High flow cannulas**
box	Alcohol Wipes			6	neonate
6	Spot Bandages			6	pediatric
2	2x2 Sterile Gauze			6	Nasal Cannula Infant
2	Heel Warmers				**Argyle Prongs**
1	Trach Care Catheter 5fr			box	x small
10	Normal Saline Exp_____			box	small
4	Yankauer Suction			box	large
6	Laerdal Bag Infant				
6	Silicon Mask Small				
6	Silicon Mask Medium				
2	Silicon Mask Large				
10	Med Neb				
6	Vent Circuit				

RESPONSE

Unit Recovery

According to the DHHS, demobilization refers to activities that focus on disengaging resources after objectives are met and operations return to normal function, whereas recovery efforts include more long-term activities, such as rehabilitating personnel, repairing equipment and restocking resources. To facilitate recovery and system improvement, the following steps should be listed in the In-Patient Emergency Operations Plan and are considered priority in the recovery phase after an emergency.

- Treating and reporting injuries
- Implementing staff shortage plans
- Providing emotional support for patients, visitors and staff
- Uniting families with patients
- Inventory supplies and equipment
- Evaluating equipment function
- Removing and repairing broken equipment
- Reordering/replacing supplies
- Evaluating the use and effectiveness of HICS forms
- Assuring that copies of HICS and downtime charting forms are on charts
- Returning to normal staffing levels as soon as possible
- Conducting debriefings for staff involved in the incident
- Compiling after action reports send to Emergency Management Program Manager
- Implementing corrective action plans and establishing target completion dates
- Monitor mental health needs and provide support for patients visitors, and staff

An evacuation can be voluntary or mandatory. A voluntary evacuation decision is made by the Incident Commander (IC) and is based on the hospital's Emergency Operations Plan and available internal and external information. A mandatory evacuation is an evacuation that is ordered by an authorized governmental authority having jurisdiction. Government authorities with jurisdiction include, but are not limited to, fire, law enforcement, OSHPD and local emergency services.

Recovery and repopulation of evacuated facilities should be included in hospital preparedness activities and its Emergency Operations Plan. Steps taken prior to, or at the time of evacuation, will facilitate more efficient repopulation of facilities, for example:

- Hospital Command Center representatives will report partial or full evacuation to licensing and certification district office, Operational Area Office of Emergency Services (OES) and the Local Emergency Medical Services Agency (LEMSA) and other agencies, as appropriate
- Maintain surveillance monitoring of temperatures, refrigeration, air/water quality, pharmaceuticals and facility security, as feasible

The hospital CEO, his/her designee or the Incident Commander has the ultimate responsibility to ensure a safe environment for patients, staff and visitors. In making a decision to evacuate or repopulate, the CEO or Incident Commander should use the Hospital Incident Command System (HICS) and in doing so give consideration to consulting with key departments, the chief of the medical staff, the Licensing and Certification district office, LEMSA, the local department of health and other public safety and utility agencies, as appropriate.

Also, the CEO or Incident Commander will:

- Give consideration to whether an evacuation may be more harmful to the patients, staff and visitors than sheltering in place

- Consult with appropriate hospital departments and external agencies in making a determination regarding whether the facility has adequate resources and is clean, sanitary and safe to repopulate and/or receive patients after an evacuation. Each decision shall be considered on a case-by-case basis. It is understood that an evacuated hospital/building will not be staffed, nor will perishable resources be re-stocked until necessary approvals are received and repopulation plans are initiated.

- Base the decision of whether to repopulate on the merits of the evacuated area alone and not be biased by the argument that returning to the evacuated area is better than where patients are currently located. Whether patients need to move from their current temporary location is a separate issue. An alternate temporary location may be more appropriate than repopulating them in an evacuated building.

- Be aware that any evacuation is considered a reportable event to Licensing and Certification (L&C). Therefore, L&C may visit the facility as part of the reportable event process. A reportable event visit and repopulation visit are separate visits; however, it is possible that both could be done at the same time depending on the nature of the evacuation. The CEO or Incident Commander may call L&C at any time to request a repopulation approval visit. However, this should be done only upon the CEO's assessment and confirmation that the facility is ready for repopulation. This is to ensure that L&C and, if needed, OSHPD and fire marshal staff will not have to make multiple visits to facilities during a disaster event.

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Focus Area:
Emergency Department
Pediatric Triage

There are three types of triage: primary, secondary and tertiary. Each hospital will have different policies and guidelines for all three types of triage, and it is important to be familiar with individual hospitals expectations.

Primary triage is done immediately upon arrival to the hospital. All EMS units should be directed to a specific treatment area. It is important that each area be clearly visible and labeled as to its purpose. There will be a separate area where walk in patients can come and be directed to the appropriate staging area. This designated area will need to be much larger than the normal triage area, as you will see a huge number of the population migrate here for help, both initially as well as during the aftermath of the disaster. It should be designated outside of the hospital as to not contaminate your hospital with patients that potentially will need decontamination. Appendix A shows an algorithm for hospital decontamination of pediatric patients. A triage officer should quickly identify each patient arriving and assign them to a triage area. There will typically be more than one triage officer with a midlevel provider or a doctor. Having runners and the appropriate resources in this area are vital to the success of primary triage (American College of Emergency Physicians, 2009).

The typical tool used for most pediatric disaster situations is the Jump START (simple triage and rapid transport) model. See Appendix B.

Secondary Triage is typically where a bottleneck is started, so an organized process and quick thinking are essential. The secondary triage is after the initial assessment and is where all care is ordered and rendered. Typically a senior ER resident, ER Attending or Surgery Attending would be directing the care of the secondary triage areas. There should be one for each of your care areas (Green, Yellow and Red). Medical records and communication to radiology need to be readily available to each of the providers in this area for best utilization of resources.

Tertiary triage happens on the patients who have received care and are pending a decision to admit, discharge, transfer, or to terminate resuscitation efforts. When the decision is made to admit to the hospital it must be determined what level of care this patient will need, as well as if there is adequate resources in the patient area to care for them. If there is not adequate resources or if there is not patient space then the decision must be made to transfer the patient out to another facility. This decision is made by experienced clinical staff and must use the leading clinical predictive models available to ensure the best decisions are made. The utilitarian approach is used in most emergency departments in disaster mode (American College of Emergency Physicians, 2009).

Care Areas

If a major incident occurs and hospital capacity is overwhelmed, non-hospital locations may be used for patient care. Alternative care sites need to be developed at the state and regional level. These care sites should be established *prior* to an incident occurring. The functions and the roles of the sites will vary dramatically depending on the resources that each alternative care site has to offer. It will also differ as the needs of the community change. The level of care is usually very basic and is intended to allow the critical care sites to focus on the critically injured. This is where EMS systems are imperative in designating and transporting patients to the assumed areas. Most alternative care sites have already been designated, but this does not negate the need to find more, as communities grow and change. Know where yours are, and what is available (www.calhospitalprepare.org).

When using alternative care sites it is imperative to know what the resources in those areas are and how are they utilized. If no oxygen is available make sure that portable oxygen is easily accessible. Suction is another resource that is often taken for granted. The level of education and experience of the providers in each of the

alternative care sites needs to be assessed before sending patients. Sending what an experienced ER Nurse would think of as a basic green level triage patient may not be the same as what the urgent care or convalescent home LVN may think of as a non-urgent patient. Knowing this in advance can save patients from being transported from destination to destination. Also making sure that each patient is triaged appropriately is essential to ensure that each care team can function to the top of their potential.

Patient Tracking, Safety and Security

Patient tracking can become an epidemic catastrophe if not done correctly and effectively. This can be one of the most difficult areas to succeed in when in a disaster situation happens with a massive influx of patients. It becomes even more burdensome when working with children who cannot easily express their needs and have parents who are victims of the disaster as well. Taking photos has proven to be one of the best methods of reuniting children with family members when a parent or guardian is not available for identification. Contact the National Center for Missing and Exploited Children (NCMEC) **1-800-THE-LOST** if a child presents at your location without a caregiver. The child's information is entered into the national database (www.missingkids.com).

Children who do have parents or guardians that can identify them should be banded along with the parents to keep them connected in some way. The identification bands given to the parents should have the child's name, date of birth and the name of the adult and the adult birthdate. If the adult is admitted they should bear both bands to alert providers that the adult has a child that is accompanying them (http://www.emscnrc.org).

In order to remain organized each hospital should use a mechanism for registering and tracking patients during the disaster. This could be via paper or on a computer system, whichever is more effective and readily available for the hospital. Whatever system is used, it should be used on a daily basis so that when a disaster arises this is not something that you are struggling with. Whichever system chosen should be able to expand

to meet the demands that a disaster will put on any system. The system should easily transfer to any regional or state system so that patients can be reunited. Using EMS as well as hospital based programs that are interchangeable is the key to success of tracking patients (American College of Emergency Physicians, 2009).

Safety and Security should be a top priority and always in the forefront of any disaster. The safety and security of hospital staff is the most important. In past events medications were a hot commodity and were ravished in the Joplin, MO tornado. The safety and security of all supplies and staff should be the responsibility of local police and federal agencies; however it may take hours for this to be enforced. Therefore plans should be in effect to maintain safety and security before the outside agencies respond (www.fema.gov).

Communication

Internal communication should involve a wide range of methods to communicate to staff, patients, as well as the hospital command center. Current standards in communication rely profoundly on landlines and radio communication during disasters. Some complications to these methods are that landlines are not portable and can incapacitate a leader in a unit. Radio airwaves can become very congested due to numerous participants on the same radio waves which can cause detrimental errors in communication. Radio waves also have difficulty with some hospital infrastructures and can become ultimately un-functional. The loss of cellular phones can also be an effect of the disaster, leaving you with ultimately no form of communication (www.calhospitalprepare.org).

Satellite media have been proven to be one of the most reliable forms of communication during disaster situations. Using wireless technology along with high speed broadband connectivity can change the face of disaster communication, and help keep everyone informed (www.calhospitalprepare.org).

Usages of products that are able to create mass notifications are becoming widely used in businesses and large corporations. This mass notification creates

information to those that need it in a timely and organized fashion. Information is sent out to all that it is intended for at the same time with the same consistent information. This removes the need for phone trees and can free up staff to help with the disaster at hand. In cases where no mass notification system is set up a phone tree is used and manual labor to call staff in as needed for back up (Chan, Killeen, Griswold, & Lenert, 2004).

Appendix

A. Algorithm for hospital decontamination of pediatric patient

Victims arrive at the hospital requiring decontamination.

Children are present among the victims.

Critical injuries are decontaminated first.

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

Non-ambulatory

Ambulatory

Estimate child's age by visual inspection

School Age
(8 to 18 yrs old)

Preschool
(2 to 8 yrs old)

Infants and Toddlers
(< 2 yrs old)

Non-ambulatory:
- Disrobe by child's caregiver and "hot zone" personnel
- Place on a stretcher or restraining device
- Escort through the decon shower by "hot zone" personnel and caregiver
- Direct supervision of decon (of caregiver, too)

School Age:
- Disrobe w/o assistance
- Respect modesty
- Respect privacy
- Child decons him/herself, but goes through decon shower in succession with caregiver, parent, or classmates

Preschool:
- Assist disrobing (child's caregiver or "hot zone" personnel)
- Direct supervision of decon
- Monitor airway
- Escort through the shower by either caregiver or "hot zone" personnel

Infants and Toddlers:
- Disrobe by child's caregiver or "hot zone" personnel
- Place on a stretcher or restraining device
- Escort through the decon shower by "hot zone" personnel and caregiver
- Direct supervision of decon (of caregiver, too)
- Monitor airway

(Caregiver should not carry the child due to the risk of accidental trauma resulting from a fall or from dropping the child while in the shower.)

- Treat or prevent 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

Please note: Children and their families (parents or caregivers) should not be separated unless critical medical issues take priority

B. Jump Start Triage Tool www.jumpstarttriage.com

JumpSTART Pediatric MCI Triage ©

Able to walk? — YES → MINOR → Secondary Triage*

*Evaluate infants first in secondary triage using the entire JS algorithm

Able to walk? — NO

Breathing? — NO → Position upper airway → BREATHING → IMMEDIATE

Position upper airway → APNBC → Palpable pulse? — NO → DECEASED

Palpable pulse? — YES → 5 rescue breaths → APNBC → DECEASED

5 rescue breaths → BREATHING → IMMEDIATE

Breathing? — YES

Respiratory Rate — <15 OR >45 → IMMEDIATE

Respiratory Rate — 15-45

Palpable pulse? — NO → IMMEDIATE

Palpable pulse? — YES

AVPU — "P" (INAPPROPRIATE) POSTURING OR "U" → IMMEDIATE

AVPU — "A", "V" OR "P" (APPROPRIATE → DELAYED

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EMERGENCY DEPARTMENT

ED Disaster
Responsibility Role Cards

ED-RN Supervisor

- Retrieve all Disaster necessities; disaster cart in break room, folder located at the main nursing station and ED disaster radios in Radio Room. Turn on radio and use for communicating with the HCC

- Direct ED-Tech's to assist in gathering the disaster cart, moving patients, setting up triage areas, decontamination areas and carrying supplies

- Pull the following from the disaster folder:
  - ✓ ALL HICS Forms from folder
  - ✓ Emergency/Disaster Status Report Form

- Use HICS Form 214 – Operational Activity Log for documenting your actions (i.e. communications, moving patients, etc)

- Fill out the Emergency/Disaster Status Report Form and relay information on that form to the HCC by phone, radio, fax, or runner (Within 30 Min.)

- Review Disaster Responsibility Role Cards. Assure all Multi-Disciplinary Teams have their Role Cards and instruct them to follow their responsibilities

- Assign roles, for nurses who don't have a bed assignment. Area/Room Leaders (RN) within each area to assist with nursing disaster responsibilities

- Consult with the Physician to review patients and determine order of potential Admit/Discharges/Relocation based on level of acuity

- If ordered to evacuate the ED, bring the Disaster Documentation & Forms, and daily assignment sheet. *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER*

Bedside Nurse (RN)

- Calmly inform patients and family members that the ED is expecting a surge of people. They might be relocated to a floor or another area sooner than they expected

- Prepare patients by affixing ID band allergy band/ fall risk

- Triage patients using the "Triage Guidelines shown in the Start or Jump Start Algorithm." Notify ED-RN Supervisor in patient changes

- Maintain patient care, give short report/ hand off if assigned in another area (Using SBAR Format)

- If ED- Tech is needed request through the ED-RN Supervisor

- Pull 1 Face Sheet or patient sticker of each patient and give to Unit Secretary for Master Tracking Form

- Gather blank MAR for inputting current medication information

- Notify ED-RN Supervisor of discharges and open beds

- *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER.* If ordered to evacuate the ED by the Incident Commander:

  ✓ Disconnect as many tubes and wires as possible

  ✓ Locate /fill the disaster backpacks, patient charts, patient labels

Treatment Area Supervisors

- Put on ID Vest

- Place the tarp in the area designated by the ED-RN Supervisor "found in the ED Disaster Cart"

- Gather supplies and mobilize additional resources needed for transporting patients

- Assign Ancillary Helpers to help gather and carry supplies. Lists of supplies are available in the Disaster Cart , other supplies to consider bringing/ordering include:

  - ✓ Backpacks
  - ✓ Oxygen Tanks
  - ✓ Disaster Bags
  - ✓ Emergency Pharmaceutical Supplies
  - ✓ Glucose Meters
  - ✓ Medfusion Pumps
  - ✓ Portable Monitors
  - ✓ Portable Blood Pressure machine
  - ✓ Pulse Oximeters
  - ✓ Available Vents
  - ✓ Code Cart/Red Bags/ Defibrillators
  - ✓ Flashlights/Headlamps
  - ✓ Infant Formula/Breastmilk (on ice) if applicable

- Help to equip Surge at the location designated by the Incident Commander and remain there to receive incoming patients

- Take changes in patient condition to the ED Supervisor

- Assist treatment RN with patient care

Respiratory Care Practitioner (RCP)

- Assist with patients on respiratory support

- Gather/organize E-cylinders and H-cylinders along with regulators to be used during and after disaster

- Gather respiratory supply bag and available vents as time allows, to be used at the surge tent/area during disaster

- *IF ORDERED BY INCIDENT COMMANDER OR HOSPITAL ADMINISTRATOR OR FIRE MARSHALL/FIRE CHIEF,* shut off gas valves to the ED using the Medical Gas Algorithm

- **LEAD RCP**

- Contact Children's House Supervisor

- Contact Med Center House Supervisor

- Distribute ventilators to be used during evacuation and at the Surge Tent

- Call for extra RCP support and extra oxygen tanks

- *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER*

Pharmacy

- Immediately report to ED-RN Supervisor/ Emergency Branch Director
- Contact 2nd floor Pharmacy Supervisor regarding immediate needs of the unit (Staffing, Medications, Runner, Security)
  - ✓ Days – Supervisor _____ @ ext. _____
  - ✓ Nights – Supervisor _____ @ ext. _____
- Secure Algorithm for Acudose emergency access
- Assist with patient-related medication management
- Gather paperwork and Laptop (Workstation on Wheels)
- Obtain Disaster Pharmacy Lists
- "Other Supply List (syringes, needles, gloves, pens, calculator, alcohol)
  - ✓ "Controlled Substance List"
  - ✓ "Rapid Sequence Intubation Kit List"
  - ✓ "Hospital Phone List"
  - ✓ "ABC Trays"
  - ✓ "Emergency Pharmaceutical Supply List"
- Distribute medications to designated area within 30 minutes

Unit Secretary

- Remain stationed at the desk as long as possible to facilitate communications

- If ED- Tech is needed go through ED-RN Supervisor

- Gather as much info regarding event as possible

- Notify the Medical Director, Nurse Manager and Supervisors of the disaster. Phone numbers found in the ED Disaster Documentation & Forms folder (Mass Notification)

- Maintain the most current info in Board Rounds with ED-RN Supervisor; for outside inquires refer to the HCC PIO (Public Information Officer)

- Receive HICS "Patient Forms" from Area/Room Leaders. Assist Communications lead, with Sending copies to the HCC via phone, fax, or send by runner

- *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER.* If ordered to evacuate the ED by the Incident Commander:

  ✓ Locate /fill the disaster backpacks, patient charts, patient labels

  ✓ Telephone number list in Blue Folder (Mass Notification) if more staff is needed

  ✓ Updated census sheet

ED – Tech

- **Check in with Emergency Nurse Supervisor**
- Inform ED-RN Supervisor of Training (i.e. HICS, HAZMAT and DMAT)
- Immediately assume role of gathering the disaster cart
- Assist in Obtaining ED Disaster Radios upon the ED-RN Supervisor Request. Turn on radio and use for communicating with the HCC
- Notify unit secretary of involvement, to go through ED-RN Supervisor
- Have quick status meeting with ED-RN Supervisor
- Discuss initial action plan ED-RN Supervisor
- Assist with completion of the "Disaster Conditions Assessment Form" and sent/faxed to room A234 (fax #_____) by the Supervisors
- Depending on Incident gather needed supplies from ancillary services (i.e. linen, central supply, and housekeeping)
- Assist Bedside RN with identifying hazards and/or safety concerns information critical to treatment and/or evacuation of patients
- Insure patient ID band and allergy bands are being placed
- Communicate with ED-RN Supervisor with the need for additional equipment, supplies, medication and staffing
- Communicate with ED-RN Supervisor in with transporting needed patients to the floors.
- Ensure attempts have been taken to continue with patient care, and assisting with areas designated by ED-RN Supervisor

OBSTETRICS

Obstetrics Job Action Cards

As previously mentioned in the Roles and Responsibilities overview, it is important during a disaster to have well-defined roles to lessen the chaos. While the Job Action Cards outlined in the Roles and Responsibilities section are vitally important pieces to a well-designed disaster plan, each unit has its own specific needs and roles. The following Job Action Cards are additional suggestions for how various Obstetrical units (Antepartum, Labor and Delivery and Postpartum) can tailor their role cards to meet the specific needs of that patient population.

OB DISASTER ROLES

Unit leaders (UL) - Who: On Call Labor and delivery Attending Obstetrician or back up MFM md, And Charge/Manager RN

Floor leaders (FL)-Who: Charge nurse and assigned OB attending/resident for each unit

TASK: Management of the inpatient care area L&D, Antepartum, Postpartum
Coordinate activities for Disaster Response.

Operational period 0-2 hours

A.   **Unit leaders (UL)** meet with all available on-site MD (residents and attendings) and nursing staff at Labor and Delivery Nursing Station.
(Alternative meeting sites if L&D incapacitated - Main elevators near NICU entrance, outside site = Parking Garage)

1.   **Assign 1-MD and 1-RN as Floor Leaders (FL)** to each area -L&D, Antepartum, and Postpartum

2.   **Complete census form**, send to Command Center – form in binder

3.   **Determine where to move vertically/horizontally if needed**

4.   **Contact Administrative Nursing Supervisor** to report unit status

5.   If notified by Command Center to evacuate:

   + Activate Rapid Discharge via OB TRAIN

   + Prepare disaster transfer summary and orders for all pts

B.   Floor leaders: (FL)

1.   Do head count for all pts and personnel and report to DL unit leader

2.   Assess the floor using the structured language CAN (Conditions/Actions/Needs)

3.   Patient status

4.   Personnel status

5.   Water supply

6.   Fire hazard

7.   Gas leaks - listen for leaks

8.   0xygen working from wall and how many tanks on baby warmers

9.   Electrical working

Unit Leader (Charge Nurse/Nurse Manager), Antepartum

- Assign Floor Leaders and Runners
- Notify Command Center and Nursing Staffing who the Unit Leaders and Runners are
- Set a predetermined meeting site and time schedule for all involved staff to meet, debrief and plan (i.e. q 30 min)
- Determine and notify staff of best form of communication (e.g., phone texting/Runners)
- Gather facilities report and send to Command Center
- Use Runner to keep units informed of any status changes
- Obtain information from Command Center, re: available hospitals for transfer
- Gather Transfer Forms from Floor Leader and send information to Command Center
- Determine when to ask Command Center for help for complicated patients
- Know locations of flashlights, Pyxis keys, valve shut-offs; only engineers can turn valves back on
- Determine how to cohort patients should that become necessary
- In case patients need to be moved urgently (i.e., can't wait for instructions from Command Center), determine relocation site (i.e., on or off-unit; vertical/horizontal; out of building)
- Unit Leader Checklist:
  - ✓ Unit Leader should be Charge Nurse whenever possible (alternative UL – On-call OB, Nurse Manager)
  - ✓ Assign Floor Leader, Runner and Supply Person
  - ✓ Delegate completion of Disaster Status Form to OB Tech/CAN/NA (must be familiar with lock codes for all rooms)
  - ✓ Use Disaster Book for reference
  - ✓ Know location of flashlights, Pyxis keys, valve shut-offs
  - ✓ Determine how to cohort patients if necessary
  - ✓ If urgent need for patient relocation (i.e., can't wait for instructions from Command Center), determine where to go and inform Nursing Supervisor
  - ✓ Set a predetermined meeting site and time schedule for all involved staff to meet, debrief and plan; give very clear instructions (i.e., "We are going to check personnel, facility and patient status first, then return here in 30 minutes")
  - ✓ Obtain facility information from Floor Leader; send completed Disaster Status Report to Command Center
  - ✓ Receive information from Command Center/Runner and disperse to Floor Leaders
  - ✓ Instruct Floor Leaders to initiate OB TRAIN and Transfer Notes when instructed by Command Center
  - ✓ Assign one OB and one Pediatrician to be available for signing Transfer and Discharge Notes
  - ✓ Ask Command Center which hospitals are accepting OB patients
  - ✓ Receive Transfer Forms from Floor Leader; collaborate with Command Center on assigning hospital for transfer

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Floor Leader (RN/OB), Antepartum

✦ **Assign OB tech/CNS or NA to do facilities check and fill out Disaster Status Report.**

<u>Facility Checklist:</u>

✦ Locations of valves and electrical panels

✦ Debris management

✦ Check stairwells

✦ Designate a room has been cleared using national guidelines

✦ Clarify that only engineering can turn valves back on

✦ Ensure doors are open

✦ Locate and distribute flashlights/headlamps

✦ Complete Disaster Status Form and return to Unit Leader

<u>Patient Checklist:</u>

✦ Obtain patient census from front desk clerk

✦ Assess mobility status of each patient (ambulatory, injured)

✦ **Report findings to Unit Leader**

✦ **Begin OB TRAIN and Transfer Notes and Orders when instructed**

✦ **Start with huddle of Charge Nurse and L&D RNs to determine potential patient discharges.** Fill out Discharge Forms, NOT transfer forms.

✦ **Begin filling out Transfer Forms** using information from OB/OB Resident/CNM sign-out notes for Faculty-practice patients and Charge Nurse notes for Private OB patients

✦ **Go to patient's Primary RN for other information.** Always check with Primary RN before finalizing forms.

✦ **Give Transfer Forms to Unit Leader for hospital assignment**

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Runner (RN/Tech), Antepartum

- Facilitate communication between Command Center and the Antepartum Unit as instructed by Unit Leader

- Assess status of supplies for Antepartum Unit and report to Unit Leader

- Ask Command Center which hospitals are receiving patients if transfer is required, and report to Unit Leader

- Deliver list of transfer patients from the Unit Leader to the Command Center, including:

  ✓ Where they are

  ✓ What type of transport they need

  ✓ Type of hospital they need transfer to

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Unit Leader (Charge Nurse/Nurse Manager/OB), Labor and Delivery

- ✦ Assign Floor Leaders and Runners
- ✦ Notify Command Center and Nursing Staffing who the Unit Leaders and Runners are
- ✦ Set a predetermined meeting site and time schedule for all involved staff to meet, debrief and plan (i.e. q 30 min)
- ✦ Determine and notify staff of best form of communication (e.g., phone texting/Runners)
- ✦ Gather facilities report and send to Command Center
- ✦ Use Runner to keep units informed of any status changes
- ✦ Obtain information from Command Center, re: available hospitals for transfer
- ✦ Gather Transfer Forms from Floor Leader and send information to Command Center
- ✦ Determine when to ask Command Center for help for complicated patients
- ✦ Know locations of flashlights, Pyxis keys, valve shut-offs; only engineers can turn valves back on
- ✦ Determine how to cohort patients should that become necessary
- ✦ In case patients need to be moved urgently (i.e., can't wait for instructions from Command Center), determine relocation site (i.e., on or off-unit; vertical/horizontal; out of building)
- ✦ Unit Leader Checklist:
    - ✓ Unit Leader should be Charge Nurse whenever possible (alternative UL – On-call OB, Nurse Manager)
    - ✓ Assign Floor Leader, Runner and Supply Person
    - ✓ Delegate completion of Disaster Status Form to OB Tech/CAN/NA (must be familiar with lock codes for all rooms)
    - ✓ Use Disaster Book for reference
    - ✓ Know location of flashlights, Pyxis keys, valve shut-offs
    - ✓ Determine how to cohort patients if necessary
    - ✓ If urgent need for patient relocation (i.e., can't wait for instructions from Command Center), determine where to go and inform Nursing Supervisor
    - ✓ Set a predetermined meeting site and time schedule for all involved staff to meet, debrief and plan; give very clear instructions (i.e. "We are going to check personnel, facility and patient status first, then return here in 30 minutes")
    - ✓ Obtain facility information from Floor Leader; send completed Disaster Status Report to Command Center
    - ✓ Receive information from Command Center/Runner and disperse to Floor Leaders
    - ✓ Instruct Floor Leaders to initiate OB TRAIN and Transfer Notes when instructed by Command Center
    - ✓ Assign one OB and one Pediatrician to be available for signing Transfer and Discharge Notes
    - ✓ Ask Command Center which hospitals are accepting OB patients
    - ✓ Receive Transfer Forms from Floor Leader; collaborate with Command Center on assigning hospital for transfer

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Floor Leader (RN/OB), Labor and Delivery

- **Assign OB tech/CNS or NA to do facilities check and fill out Disaster Status Report**

<u>Facility Checklist:</u>

- Locations of valves and electrical panels

- Debris management

- Check stairwells

- Designate a room has been cleared using national guidelines

- Clarify that only engineering can turn valves back on

- Ensure doors are open

- Locate and distribute flashlights/headlamps

- Complete Disaster Status Form and return to Unit Leader

<u>Patient Checklist:</u>

- Obtain patient census from front desk clerk

- Assess mobility status of each patient (ambulatory, injured)

- **Report findings to Unit Leader**

- **Begin OB TRAIN and Transfer Notes and Orders when instructed**

- **Start with huddle of Charge Nurse and L&D RNs to determine potential patient discharges.** Fill out Discharge Forms, NOT transfer forms.

- **Begin filling out Transfer Forms** using information from OB/OB Resident/CNM sign-out notes for Faculty-practice patients and Charge Nurse notes for Private OB patients

- **Go to patient's Primary RN for other information.** Always check with Primary RN before finalizing forms.

- **Give Transfer Forms to Unit Leader for hospital assignment**

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Runner (RN/Tech), Labor and Delivery

- Facilitate communication between Command Center and the Labor and Delivery Unit as instructed by Unit Leader

- Assess status of supplies for Labor and Delivery Unit and Operating Suites and report to Unit Leader

- Ask Command Center which hospitals are receiving patients if transfer is required, and report to Unit Leader

- Deliver list of transfer patients from the Unit Leader to the Command Center, including:

  ✓ Where they are

  ✓ What type of transport they need

  ✓ Type of hospital they need transfer to

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Unit Leader (Charge Nurse/Nurse Manager), Postpartum

- Assign Floor Leaders and Runners
- Notify Command Center and Nursing Staffing who the Unit Leaders and Runners are
- Set a predetermined meeting site and time schedule for all involved staff to meet, debrief and plan (i.e. q 30 min)
- Determine and notify staff of best form of communication (e.g., phone texting/Runners)
- Gather facilities report and send to Command Center
- Use Runner to keep units informed of any status changes
- Obtain information from Command Center, re: available hospitals for transfer
- Gather Transfer Forms from Floor Leader and send information to Command Center
- Determine when to ask Command Center for help for complicated patients
- Know locations of flashlights, Pyxis keys, valve shut-offs; only engineers can turn valves back on
- Determine how to cohort patients should that become necessary
- In case patients need to be moved urgently (i.e. can't wait for instructions from Command Center), determine relocation site (i.e. on or off-unit; vertical/horizontal; out of building)
- Unit Leader Checklist:
  - ✓ Unit Leader should be Charge Nurse whenever possible (alternative UL – On-call OB, Nurse Manager)
  - ✓ Assign Floor Leader, Runner and Supply Person
  - ✓ Delegate completion of Disaster Status Form to OB Tech/CAN/NA (must be familiar with lock codes for all rooms)
  - ✓ Use Disaster Book for reference
  - ✓ Know location of flashlights, Pyxis keys, valve shut-offs
  - ✓ Determine how to cohort patients if necessary
  - ✓ If urgent need for patient relocation (i.e., can't wait for instructions from Command Center), determine where to go and inform Nursing Supervisor
  - ✓ Set a predetermined meeting site and time schedule for all involved staff to meet, debrief and plan; give very clear instructions (i.e. "We are going to check personnel, facility and patient status first, then return here in 30 minutes")
  - ✓ Obtain facility information from Floor Leader; send completed Disaster Status Report to Command Center
  - ✓ Receive information from Command Center/Runner and disperse to Floor Leaders
  - ✓ Instruct Floor Leaders to initiate OB TRAIN and Transfer Notes when instructed by Command Center
  - ✓ Assign one OB and one Pediatrician to be available for signing Transfer and Discharge Notes
  - ✓ Ask Command Center which hospitals are accepting OB patients
  - ✓ Receive Transfer Forms from Floor Leader; collaborate with Command Center on assigning hospital for transfer

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Floor Leader (Charge Nurse/OB), Postpartum

- **Assign OB tech/CNS or NA to do facilities check and fill out Disaster Status Report**

Facility Checklist:

- Locations of valves and electrical panels
- Debris management
- Check stairwells
- Designate a room has been cleared using national guidelines
- Clarify that only engineering can turn valves back on
- Ensure doors are open
- Locate and distribute flashlights/headlamps
- Complete Disaster Status Form and return to Unit Leader

Patient Checklist:

- Obtain patient census from front desk clerk
- Assess mobility status of each patient (ambulatory, injured)
- **Report findings to Unit Leader**
- **Begin OB TRAIN and Transfer Notes and Orders when instructed**
- **Start with huddle of Charge Nurse and L&D RNs to determine potential patient discharges.** Fill out Discharge Forms, NOT transfer forms.
- **Begin filling out Transfer Forms** using information from OB/OB Resident/CNM sign-out notes for Faculty-practice patients and Charge Nurse notes for Private OB patients
- **Go to patient's Primary RN for other information.** Always check with Primary RN before finalizing forms.
- **Give Transfer Forms to Unit Leader for hospital assignment**

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

Runner (RN/Tech), Postpartum

- Facilitate communication between Command Center and the Postpartum Unit as instructed by Unit Leader

- Assess status of supplies for Postpartum Unit and report to Unit Leader

- Ask Command Center which hospitals are receiving patients if transfer is required, and report to Unit Leader

- Deliver list of transfer patients from the Unit Leader to the Command Center, including:
  - ✓ Where they are
  - ✓ What type of transport they need
  - ✓ Type of hospital they need to transfer to

Disclaimer: These duties should be performed as time permits. Individuals should not perform these duties at the risk of endangering their own lives. This job action card is subject to situational changes by the Incident Commander or other individual in authority during an evacuation.

References
OB Job Action Cards courtesy of Stanford Hospital Perinatal Department (2013).

Obstetrics Training & Drills – Tabletop Example

Tabletop simulations can be an effective way to train staff about how to utilize a unit-specific Emergency Operations Plan. Tabletop exercises are primarily discussion-based exercises that focus on familiarizing staff to roles, procedures and responsibilities during a disaster. One of the biggest benefits of a tabletop exercise is that it is an open and stress-free environment to allow for a discussion-based test of disaster processes. The following example outlines how an obstetrical unit has practiced a tabletop simulation. It is important to also participate in a full-scale drill in addition to tabletop exercises because some areas of the Emergency Operations Plan may not be adequately tested until staff work together with the Hospital Command Center, utilize Hospital Incident Command Paperwork (HICS Forms), trial evacuation equipment and test communication systems.

Under Construction-due to be completed Fall 2013

NICU

NICU Job Action Cards

As previously mentioned in the Roles and Responsibilities overview, it is important during a disaster to have well-defined roles to lessen the chaos. While the Job Action Cards outlined in the Roles and Responsibilities section are vitally important pieces to a well-designed disaster plan, each unit may have its own specific needs and roles. The following Job Action Cards are additional suggestions for how a Neonatal Intensive Care Unit (NICU) can tailor their role cards to meet the specific needs of that patient population.

Bedside Nurse (RN)

- ✦ Infants should be wearing hats and wrapped in blankets

- ✦ Prepare infants by affixing ID band (Bar Code Label) to hat and blanket

- ✦ Triage infant using the "Triage Guidelines for NICU Evacuation/TRAIN"

- ✦ Place colored triage labels on hat and all **THREE (3)** copies of the 260N Form

- ✦ Labor Pool/Ancillary Helpers will assist in carrying supplies, as needed

- ✦ Fill out a HICS "260N - Patient Evacuation Tracking Form" for each patient.
  There are 3 copies:

    - ✓ A copy must stay with the patient

    - ✓ A copy for the Unit Secretary (to go to the HCC)

    - ✓ A copy to the transferring agency

- ✦ Pull 1 Face Sheet and 1 sticker of each patient and give to Unit Secretary or Supervisor for Master Tracking Form (HICS 255)

- ✦ Gather blank MAR for inputting current medication information(located in backpacks)

- ✦ Gather/fill the disaster backpacks, patient charts, patient labels, and shift kardex.

- ✦ *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER.* If ordered to evacuate the NICU by the Incident Commander:

    - ✓ Disconnect as many tubes and wires as possible

    - ✓ Disconnect chest tubes from suction and use Heimlich valve

    - ✓ Heplock IV's (keep critical medications or drips running)

Neonatologists/Physicians/NNPs

- Account for all physicians, residents, fellows and NNPs on the unit at the time of disaster. (Check for injuries – this needs to be done in the 1st 30 minutes)

- Collaborate with the unit Supervisors in triaging infants. This will most often be done by acuity, with the lowest acuity patients being evacuated first.

- *NOTE: DO NOT EVACUATE VERTICALLY WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER OR HOSPITAL ADMINISTRATOR OR FIRE MARSHALL*

- Initiate the "Triage Guidelines for NICU Evacuation or Surge/TRAIN"

- Initiate the neonatologists emergency call list

- Assist with stabilization and transport of the sickest infants

- Notify Division Chief of emergency. Interact with HICS as appropriate until relieved of this duty

- Determine the number of Neonatologists/NNPs needed on the unit

- Identify available regional beds through Perinatal Dispatch, if possible

- Assist teams with preparation of appropriate documentation and triaging

- Assist with notification to parents regarding the situation and if transfers should become necessary

- Assign responsibilities to Residents, Fellows, NNPs as appropriate to the situation (i.e. Evacuation, Triage, Care in surge tent)

- Monitor staff for signs of fatigue, stress or difficulty coping

Team Leaders

- ✦ Bring code cart with portable suction along, if ordered to evacuate (pull drawers out if necessary)

- ✦ Gather portable evacuation supplies and mobilize additional resources needed for transporting infants

- ✦ Assign Labor Pool/Ancillary Helpers to help gather and carry supplies. Photos of supplies are available in the NICU Disaster Documentation & Forms Go-Kit. Some supplies to consider bringing include:

  - ✓ Evacuation Aprons/Med-sleds
  - ✓ Backpacks
  - ✓ Room Disaster Evacuation Bags
  - ✓ Oxygen Tanks
  - ✓ Transport Bags
  - ✓ Emergency Evacuation Pharmaceutical Supplies
  - ✓ Bassinettes
  - ✓ Glucose Meters
  - ✓ Transilluminators
  - ✓ Medfusion Pumps
  - ✓ Portable Monitors
  - ✓ Portable Blood Pressure Machine
  - ✓ Pulse Oximeters
  - ✓ Neopuffs
  - ✓ Available Vents
  - ✓ Code Cart/Red Bags
  - ✓ Flashlights/Headlamps
  - ✓ Infant Formula/Breastmilk (on ice) if available

- ✦ Help to equip Surge tent at the location designated by the Incident Commander and remain there to receive incoming patients

- ✦ Take role call of all staff and patients at evacuation site on the Unit Census Sheet as they arrive

Respiratory Care Practitioner (RCP)

- Assist with infants on respiratory support

- Contact Lead RCP

- Gather/organize E-cylinders and H-cylinders along with regulators to be used during and after evacuation

- Gather respiratory supply bag and available vents as time allows, to be used at the surge tent after evacuation

- *IF ORDERED BY INCIDENT COMMANDER OR HOSPITAL ADMINISTRATOR OR FIRE MARSHALL/FIRE CHIEF,* shut off gas valves to the NICU using the Medical Gas Algorithm

- **LEAD RCP**

- Contact Children's House Supervisor

- Distribute Neopuffs to bedsides of babies on ventilators to be used during evacuation and at the Surge Tent

- Call for extra RCP support and extra oxygen tanks

- As rooms are evacuated, mark the outside of the door with a large ORANGE placard "EVACUATION" sign to indicate that there are no patients or staff inside. (The placards are located in the **"To Go Kit"**)

Pharmacy

✦ Immediately report to NICU Satellite pharmacy

✦ Communicate with In-Patient Unit Leader immediately following disaster

✦ (within 5 minutes of pager notification)

✦ Contact 2nd floor Pharmacy Supervisor regarding immediate needs of the unit (Staffing, Medications, Runner, Security)

    ✓ Days – Supervisor _____ @ ext. _____

    ✓ Nights – Supervisor _____ @ ext. _____

✦ Secure Algorithm for Acudose emergency access

✦ Print inpatient medication profiles- if able

✦ Assist with patient-related medication management

✦ Gather paperwork and laptop (Workstation on Wheels)

✦ Obtain Disaster Pharmacy Lists (located in Satellite Pharmacy Notebook)

    ✓ "Other Supply List (syringes, needles, gloves, pens, calculator, alcohol)

    ✓ "NICU Manual"

    ✓ "Controlled Substance List"

    ✓ "Rapid Sequence Intubation Kit List"

    ✓ "Hospital Phone List"

    ✓ "Emergency Evacuation Pharmaceutical Supply List"

✦ Gather and fill the NICU pharmacy bags (2 bags) according the Supply List and needs of the unit (Bags are located _____)

✦ Distribute medications to designated evacuation sites within 30 minutes

Unit Secretary

- Remain stationed at the desk as long as possible to facilitate communications.

- Notify the Medical Director, Nurse Manager and Supervisors of the disaster. (Phone numbers found in the NICU Disaster Documentation & Forms Go-Kit location in 3700 equipment room and front desk)

- Using Family Contact Information, notify families of evacuation. If unable to contact family, update In-Patient Unit Leader of needed assistance from the PIO (Public Information Officer).

- Receive HICS "260N – Patient Evacuation Tracking Form" from Area/Room Leaders. Send copies to the HCC via phone, fax, and send by runner. Complete HICS 255 Master Tracking Form after supervisors have affixed patient labels and triage is complete

- Give the large ORANGE placard "EVACUATION" signs to the Lead Respiratory Care Practitioner.

- Prepare by gathering the following in case evacuation is ordered:
  - ✓ Staff Telephone flip chart
  - ✓ Updated census sheet
  - ✓ Notebook with Family Contact information (picture, ID information)

In-Patient Unit Leader

- **This is the Nurse Manager or Lead Supervisor**

- Immediately assume role of Unit Leader

- Obtain NICU Disaster Radios upon hearing CODE _____ overhead. Turn on radio and use for communicating with the HCC

- Notify NICU Manager and Medical Director on duty of disaster

- Have quick status meeting with leadership (5-10 minutes)

- Document on HICS 213 Form (Incident Message Form) and HICS Form 214 (Operational Activity Log) of your actions (i.e. communications, evacuation, etc.). Assign Recorder Aide to assist with documentation.

- Receive an update that the "Disaster Conditions Assessment Form" was completed and sent/faxed to room _____ by the Supervisors

- Discuss initial action plan with leadership/Medical Branch Director (HCC)

- Request assistance to determine hazard and safety information critical to treatment and/or evacuation for infants

- Insure infant patient ID and tracking practices are being followed (HICS 260N)

- Communicate with Medical Branch in the HCC with the need for equipment, supplies, medication and staffing

- Communicate with Medical Branch in the HCC regarding transport needs (review short and long range neonatal response needs)

- Coordinate with Medical Branch/Logistics/Planning Chiefs in the HCC to expand and/or create Neonatal patient care areas if needed

- Ensure attempts have been taken to reach patient families to notify of evacuation

Unit Supervisors

- Retrieve the NICU Disaster Documentation & Forms Go-Kit

- Pull the following from the Go-Kit:
  - ✓ ALL HICS Forms (214, 255 and 260)
  - ✓ Emergency/Disaster Status Report Form (located in grey Box at front Desk)

- Use HICS Form 214 – Operational Activity Log for documenting your actions (i.e. communications, moving patients)

- Fill out the Emergency/Disaster Status Report Form and relay information on that form to the HCC and bed placement by fax, or runner. (Within 30 Minutes)

- Review Disaster Responsibility Role Cards. Assure all Multi-Disciplinary Teams have their Role Cards and instruct them to follow their responsibilities

- Assign one Area/Room Leader (RN) within each room to assist with nursing disaster responsibilities

- Consult with the Physician/Neonatologist to review patients and determine order of potential evacuation based on level of acuity (lowest acuity patients are evacuated first).

- Direct labor pool helpers/support persons to assist Area/Room Leaders & Team Leaders in gathering and carrying supplies

- If ordered to evacuate the NICU, bring NICU Disaster Documentation & Forms Go-Kit and daily assignment sheet. ***DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER.***

NICU Suggested Supply and Equipment List

Every unit should have a generalized set of supplies necessary for patient care as outlined in the supplies and equipment section. However, when dealing with specialty patient populations it is important to consider the very diverse needs of these patients.

Patients in the Neonatal ICU often have high acuity needs that require specialized equipment to help them survive. Therefore, it is important to have disaster backpacks ready-to-go that are prefilled at the bedside. The backpacks should have essential downtime charting forms in them, at a minimum. Disaster lighting such as headlamps and flashlights are also critical items. Neonates require thermoregulation, so blankets and hats are essential. The very low birth weight (VLBW) infant will require a chemical warming mattress or neowrap, if there is a loss of electricity or vertical evacuation is imminent. Nurses should utilize the backpack supplies and add patient specific items needed to care for the patient in the 24 hours following an evacuation. The backpacks do not become patient specific until the disaster occurs. These bags are used for training during disaster drills and are closely monitored by the unit disaster committee for quarterly resupply or expiration dates.

During an emergency or loss of utilities, some infants may need more invasive basic procedures. Therefore, a list of medical supplies that would be needed for intubation and intravenous (IV) access were created. These supplies were assembled and stored in red disaster bags and are located in each NICU room for quick and easy access. To facilitate the quick mobilization of necessary guidelines, forms and paperwork, a NICU Disaster Documentation and Forms Go-Kit needs to be created for the unit.

The following lists are suggested supply and equipment needs for Neonatal Intensive Care units facing an evacuation of patients.

Emergency Bedside Go-Kit (Backpack)

Purpose: Backpacks were assembled to provide equipment necessary to maintain life-sustaining care for 12-24 hours when resources are limited.

Quantity: 84 (Number of patients your unit is licensed)

Storage Location: Each Bedside in the NICU

Maintenance: Semi-Annually

Responsibility: NICU Disaster Committee

ADD TO BAG CONTENTS:
Self-Inflating Resuscitation Bag
Bedside Stethoscope
Formula (or breastmilk)
Medications (At bedside or refrigerator)
Bedside supplies

Contents
Full Term Mask (1)
Premature Mask (1)
IV Claves (2)
Saline Flush Syringes (2)
Bulb Syringe (1)
Mylar Blanket (1)
Blanket
Chux (4)
Hat (1)
Nipples/Bottles (4)
Feeding Syringes (4)
Gavage Tube (1)
Diapers (4)
Diaper Wipes (1)
Flashlight (1)
Notepad, Pen and Pencil
Med Gloves (small bag)
Hand Sanitizer (1)
Alcohol Wipes (4)
Transpore Tape (1)

Paper Work In Envelope
Triage Labels (all triage colors)
TRAIN Definition for resources
NICU Systems Assessment Form
NICU MAR
NICU RN Flow sheet
NICU Progress Notes
MD Order Sheet
260-N Patient Evac Tracking Form

NICU Disaster Documentation and Forms Go-Kit

Purpose: The NICU Disaster Documentation and Forms Go-Kit Red Disaster Boxes were assembled to provide the paperwork and policy necessary to shelter in place or evacuate in emergencies or disasters.

Quantity: 1

Storage Location: Supervisor's Office

Maintenance: Annually

Responsibility: NICU Disaster Committee

- Triage Labels
- Staff Phone Numbers
- Internal Phone Numbers
- External Phone Numbers
- Map to Command Center
- LLU Disaster Condition Assessment Form
- HICS Form 201- Incident Briefing (Unit Level)
- HICS Form 255- Master In- Patient Evacuation Tracking Form
- HICS Form 214- In-Patient Unit Operational Activity Log
- HICS 213- Incident Message Form
- HICS Form 260 (Neonatal) – Patient Evacuation Tracking Form
- NICU Emergency Operations Plan
- Evacuated Room Orange Placards
- Job Responsibility Cards (Supervisors and Staff)
- NICU Assessment Form
- NICU Paper MAR
- NICU RN Flow sheet
- NICU Progress Note
- NICU MD Order
- NICU Blood Product Order
- NICU Ancillary Requisition Form (Downtime)
- NICU Kardex
- NICU Transfer Record

Red Disaster Bags

Purpose: Assembled to provide equipment necessary to maintain respiratory care and intra-venous hydration when supplies are limited.
Quantity: 19
Storage Location: Every Patient Room (each room holds 6-8 infants) The bags are located to the right of the sink in each room.
Responsibility: NICU Disaster Committee
Maintenance: Annually

CONTENTS	
Item	Quantity
Larygoscope (added at evacuation)	1
Blades for Laryngoscope	2
Stylettes	3
2.5 Endotracheal Tubes	2
3.0 Endotracheal Tubes	2
3.5 Endotracheal Tubes	2
4.0 Endotracheal Tubes	2
CO2 Detectors	3
Inline Suction	3
Suction Tubing	2
6 Fr Suction Catheters	2
8 Fr Suction Catheters	2
10 Fr Suction Catheters	2
Nasal Aspirators	2
IV Catheters	8
T-Connectors	8
Chlorhexidine	8
Saline Wipes	2 packages
Alcohol Wipes	1 box
0.9 Normal Saline Vials	1 box
3cc Syringes	12
18g Needles	20
Microtubing	8
IV Tubing	2
1 cc Syringes	12
Heimlich Valve	2
Neowrap and chemical warming mattress	2
Cotton Balls	1 bag
Transparent Dressing	8
Adhesive Tape	1 roll
Scissors	1 pair
Calculators	2

Storage Supplies (Cache)

Purpose: Storage containers were assembled to provide equipment necessary to maintain routine care and feeding of infants for an additional 48 hours when resources are limited.

Storage Location: Storage Shed

Maintenance: Annually

Responsibility: NICU Disaster Committee

Contents:

- Sterile Water for Irrigation (12)
- Sterile Water 4 oz bottles (192)
- Bottles/Snappies (200) +100
- Nipples (250)
- Warming Buckets/Graduates (40)
- Basins (15) + 15
- 5 Fr Feeding Tubes (4)
- 6.5 Fr Feeding Tubes (8) +4
- Feeding Syringes 35ml (200)
- Pacifiers (40)
- Baby Soap (10)
- Chloraprep (50) +50
- Medication Syringes 1cc (10) +30
- Medication Syringes 3cc (20) +10
- Medication Syringes 5cc (20) +10
- Medication Syringes 10cc (20)
- Medication Syringes 20cc (20)
- Medication Syringes 60cc (10)
- 18 Gauge Needles (20) +20
- TB Needles (10)
- Microbore Tubing (20)
- Small Exam Gloves (2 boxes) +1
- Medium Exam Gloves (2 boxes) +1
- Large Exam Gloves (2 boxes)
- Purell Hand Sanitizer (6) +4
- Avagard Hand Sanitizer (3)
- 6.5 Sterile Gloves (12)
- 7.0 Sterile Gloves (12)
- 7.5 Sterile Gloves (12)
- Tenderfoots (40)

- Heel Warmers (40)
- CBC Collection Tubes (40)
- Chemistry Collection Tubes (40)
- Blood Culture Mediums (4)
- IV Catheters (20) +10
- 0.9 NS Vials (50)
- Sterile Water Vials (25)
- Sterile 2x2's (100)
- Sterile 4x4's (50)
- Non-Sterile 2x2's (200) +200
- Transparent Dressings (100)
- Alcohol Wipes (200) +200
- Saline Wipes (72)
- Saline Bullets (200)
- Tape (5 rolls)
- Coban (5 rolls)
- Measuring tapes (40)
- Needle Aspiration Kits
- UAC/UVC Kits (4) +2
- Newborn Diapers (200) +100
- Small Diapers (200) +100
- XS Diaper (150)
- Diaper Wipes (20 pks) +10
- Bath Blankets (4) +2
- Baby Blankets (20) +10
- Cloth Diapers (20) +10
- Wash Cloths (20) +10
- Sanicloths (2 containers) +2
- Paper Hats (20)
- Masks (40)
- Downtime Charting Forms (120)
- Paper MARS (80) +40
- Kardexes (80)
- Lab Slips (50)
- Consent Forms (50)
- Transport Forms
- MD Orders (50)
- TPN Sheets (50)
- Progress Notes (50)

Storage Supplies Cache courtesy of Good Samaritan Hospital NICU, San Jose, CA.

PICU

PICU Job Action Cards

As previously mentioned in the Roles and Responsibilities overview, it is important during a disaster to have well-defined roles to lessen the chaos. While the Job Action Cards outlined in the Roles and Responsibilities section are vitally important pieces to a well-designed disaster plan, however each unit has its own specific needs and roles. The following Job Action Cards are additional suggestions for how a Pediatric Intensive Care Unit (PICU) can tailor their role cards to meet the specific needs of that patient population.

Lead Respiratory Therapist

Assist with patients on respiratory support

✦ Distribute portable ventilators to bedsides of patients requiring them during evacuation and at an alternate care site

✦ Gather/organize e-cylinders to be used during evacuation and at an alternate care site

✦ Gather airway kits, available vents and CPAP machines, as time allows, to be used at alternate care sites after evacuation

✦ Shut off gas valves to unit **AS ORDERED BY INCIDENT COMMANDER OR FIRE MARSHALL/CHIEF**

✦ As rooms are evacuated, mark outside of door with large "X" using white tape to indicate there are no more patients or staff inside

Attending MD, Triage MD, Treating MD

* ATTENDING: Collaborate with Charge Nurse in triaging patients for possible evacuation or discharge
    * ✓ This is typically by acuity, with the lowest acuity patients being evacuated first
    * ✓ *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER!*
* TRIAGE MD: Assess surge in-patients and triage according to evacuation color-coding system
    * ✓ Direct treatment plan and flow of incoming patients
* TREATING MD: Follow through on assessment and stabilization of patients
    * ✓ Intubation
    * ✓ Chest tubes
    * ✓ Central lines
    * ✓ Wound management

Bedside Nurse

- Prepare patients by affixing ID band to a limb and placing neck cards on patient

- Fill out a HICS Form 260-P – Patient Evacuation Tracking Form for each patient (within 30 minutes of a declared disaster)

- A copy must stay with the patient and other copies are to be turned into the charge nurse

- Gather disaster backpack (or other hospital specified bag), equipment from equipment list, patient chart, kardex and patient labels

- *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER!*

- If order to evacuate the PICU by Incident Commander:

  - ✓ Disconnect as many tubes and wires as possible

  - ✓ Heplock all possible IV's (including central lines)

  - ✓ Disconnect chest tubes from suction and use Heimlich valve (or per hospital protocol)

- Patients should be wrapped in blankets for warmth

- Have helpers assist in carrying supplies, as needed

Pod Leader Nurse (most senior RN)

- Oversee stations and assist in proper Evacuation ID of patients by affixing evacuation triage ID band to limb

- Work with Charge Nurse to triage/color code each patient

- Place triage color neck card on each patient

- Assess staff experience and designate RN to help assist with triage surge

- Gather disaster backpacks, patient charts and patient labels

- Assist others in completing tasks on their Role Card

- Provide updates regarding your area's progress/status to Inpatient Unit Leader (Charge Nurse)

- Keep bedside nurses in your area updated with information as it comes

- If you have not heard from the unit leader, try to reach him/her for an hourly update.

- Direct helpers assigned to your area to gather/carry backpacks, charts and other supplies for evacuation

- ***DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER!***

- If order to evacuate the PICU by Incident Commander:

  - ✓ Disconnect as many tubes and wires as possible

  - ✓ Heplock all IV's (including central lines)

  - ✓ Disconnect chest tubes from suction and use Heimlich valve (or per hospital protocol)

- NOTE: Based on hospital and unit structure this may be a designated differently

Unit Secretary

+ Remain stationed at the desk as long as possible to facilitate communications

+ Notify Medical Director, Nurse Manager/Supervisors of the emergency (it would be helpful to have a unit disaster notebook with phone numbers listed)

+ Call phone tree leaders with a get ready call to begin calling for support staff

+ Complete the HICS Form 214 - Operational Log

+ Obtain HICS Form 255 - Master Patient Evacuation Tracking Form from the Unit Leader

+ Complete by placing patient labels on each sheet or fill them out by hand with patient names

+ Send copies to the Hospital Command Center (HCC) via phone, fax, or send by runner once form is completed

+ Receive HICS Form 260-P – Patient Evacuation Tracking Form from Charge Nurse/Pod Leaders/Nurses

+ Send copies to the HCC via phone, fax, or send by runner

+ Prepare by gathering the following in case evacuation is ordered:

    ✓ Telephone Rolodex or printed unit phone list

    ✓ Updated census sheet

    ✓ Binder containing labels for all patients

    ✓ Visitor binder containing family contact information

    ✓ Clipboard containing visitor sign-in sheet

+ Get updates from the Charge Nurse regarding the number of personnel needed from the phone tree

    ✓ Call phone tree leaders with number of staff needed and estimated time frame (Immediate need, 12-hour standby and 24-hour standby)

Circulator

- Get updates from Unit Leader (Charge Nurse)

- Hand out walkie-talkies or unit/hospital specified communication devices

- Gather supplies and mobilize additional resource needed for transporting patients

- Assign helpers to gather and carry supplies.

- Consider bringing:

Med Sled	O2 Tanks	IV Pumps
Baby-carrying Vests	Portable Suction	Syringe Pumps
Stryker Chairs	Pulse Oximeter	Formula/Feeds
Supply Backpacks	Portable Monitor	Feeding Pumps
Code Carts	Portable Vents	Head Lamps
Boxes of Gloves	Available Vents	Bath Blankets

- If ordered to evacuate by the Incident Commander, set up alternate care site at the location designated by the Incident Commander and remain there to receive incoming patients

- Take role of all staff and patients at evacuation site on the Unit Census Sheet as they arrive

- Assist with triage set-up if needed

Charge Nurse

- Retrieve Disaster Unit Leader Notebook or disaster manual as set up by your hospital
- Consult with the ATTENDING MD to review patients
    - ✓ Determine order of potential evacuation/discharge based on the level of acuity
    - ✓ Lowest acuity patients are evacuated or discharged first
- Pull the following forms:
    - ✓ ALL HICS FORMS (214, 255, 260-P)
    - ✓ Emergency/Disaster Status Report Form
- Direct Unit Secretary to notify Medical Director and Unit Manager on duty of emergency, activate phone tree
- Assign each Pod/Station a POD Leader
    - ✓ Give each a Role Card and disaster forms to be filled out (Including HICS Form 260-P – Patient Evacuation Tracking Form)
- Distribute remaining Role Cards (Respiratory Lead, Unit Secretary, Circulator, Bedside Nurse)
    - ✓ Instruct them to follow the steps on the Role Cards
- Obtain 2-way Disaster Radios or other wireless communication device per hospital protocol
    - ✓ Upon hearing "CODE TRIAGE" (or hospital designated code activation) overhead, turn on radio and use for communicating with the Hospital Command Center (HCC)
    - ✓ Direct Circulator to hand out radios
- Use HICS Form 214 - Operation Activity Log for documenting your actions (i.e. communications, moving patients, etc)
    - ✓ Note: This job can be delegated
- Fill out the Emergency/Disaster Condition Assessment Form and relay information on the form to the HCC by phone, radio, fax, or runner.
- Give HICS Form 255 - Master Patient Evacuation Tracking Form and Emergency/Disaster Status Report form to the Unit Secretary and instruct him/her to follow the steps listed on the card.
- Direct helpers/support personnel to assist POD Leader and Circulator in gathering and carrying supplies
- If ordered to evacuate the unit, bring unit disaster forms and master patient list
    - ✓ *DO NOT EVACUATE WITHOUT AN ORDER AND GUIDANCE FROM THE INCIDENT COMMANDER!*
- Send completed HICS Forms 260-P and 255 and Emergency/Disaster Status Report Form to HCC by fax or runner

NOTE: Based on the size or layout of your unit and leadership structure your hospital may or may not have all of these roles i.e. POD Leader and Circulator. These are simply guidelines to help you develop your own working disaster plan that fits your hospital and unit needs. It is important during a disaster to be flexible and adaptable.

References

PICU Job Action Cards courtesy of Loma Linda Children's Hospital Pediatric Intensive Care Unit (2013).

PICU Suggested Equipment List

Every unit should have a generalized set of supplies necessary for patient care as outlined in the supplies and equipment section. However when dealing with specialty patient populations it is important to consider the very diverse needs of those patients. Patients in the Pediatric ICU often bring a variety of diagnoses, sizes and equipment needs making it difficult to have disaster backpacks ready-to-go. Therefore a suggested equipment list has been made and is broken down by diagnosis. The backpacks should have essential downtime charting forms in them already, at a minimum. Nurses should be instructed to gather the most essential supplies needed to care for the patient in the 24 hours following an evacuation. The form is developed in such a way for nurses to write down how many of each supply they have taken, as the forms will later be used for billing purposes. The following list is suggested supply and equipment needs for pediatric units facing an evacuation of patients.

PICU Suggested Equipment List

Basic Supplies

____/___ ID Band	____/___ IV Start (18-24g)	____/___ Hand Sanitizer
____/___ Code Sheet	____/___ Tourniquet	____/___ Gloves, Face Mask
____/___ Printed MAR	____/___ T-set or	____/___ Isolation Gowns
____/___ Pt. Medications	____/___ 4x4 gauze	____/___ 1ml Syringes
____/___ Bag/Valve/Mask	____/___ Scissors, Kellys	____/___ 3ml Syringes
____/___ Stethoscope	____/___ Sterile Water	____/___ 10ml Syringes
____/___ Transport Monitor	____/___ Formula	____/___ 60ml LL Syringes
____/___ BP Cuff	____/___ Feeding Bag	____/___ 60ml Cath Tip
____/___ Cardiac Leads	____/___ Feeding Pump	____/___ 3ml NS Flushes
____/___ Pulse Ox Probe	____/___ OG/NG Tube	____/___ 10ml NS Flushes
____/___ Suction with Tubing	____/___ Bottles/Nipples	____/___ 10unit Hep Flush
____/___ Yaunker	____/___ Diapers	____/___ 18g Needles
____/___ Thermometer	____/___ Baby Wipes	____/___ Insulin Syringes
____/___ Pen light/Flashlight	____/___ Bio Hazard Bags	____/___ Accu Check
____/___ Plastic/Paper Tape	____/___ Towel, Wash Cloth	____/___ D50 or Glucagon
____/___ Alcohol Swabs	____/___ Blankets	____/___ Downtime Forms

Airway & Breathing

____/___ Transport Vent	____/___ O_2/Trach Mask/ Nasal Cannula	____/___ Portable Suction
____/___ Suction Catheters		____/___ Salem Sump
____/___ Oxygen E Cylinder	____/___ Humidification	____/___ I Stat
____/___ Ventilator Circuit	____/___ Benzoin	____/___ ET CO_2 Detector
____/___ LMA	____/___ ETT Tape	____/___ Trach-Same Size
____/___ Oral Airway	____/___ Correct size ETT	____/___ Trach ½ Smaller
____/___ Chest Tube & Kit	____/___ Intubation Meds	____/___ Trach Ties
____/___ Capnometer	____/___ Saline Bullets	____/___ _____

Circulation

____/___ IV Fluid Pumps	____/___ IV Pump Tubing	____/___ A-Line Pressure Bag
____/___ Med Infusion Pumps	____/___ Hemodynamic Meds	____/___ A-Line Heparin Bag
____/___ 100ml NS Bag or 60ml Syringe for gtt	____/___ IVF, TPN, or appropriate Dextrose Solution	____/___ Pressure Dressing
		____/___ _____

Neuro

____/___ EVD	____/___ 3% Saline	____/___ Seizure Meds
____/___ EVD drainage bag	____/___ Zofran/Antiemetic	____/___ C-Collar
____/___ String or Laser Level	____/___ Sedation Meds	____/___ Pen Light

Other

____/___ _____	____/___ _____	____/___ _____
____/___ _____	____/___ _____	____/___ _____

Pediatric Safe Areas

During a disaster pediatric patients may arrive at the hospital with or without an accompanying guardian. Once that child has been medically cleared it is necessary to make room for the continuing surge of patients. However if that child does not have a legal guardian with whom they may be discharged, the child needs a safe place to stay until a guardian can be located. The safety and security of these children is very important to providing proper reunification. Previous sections have talked about ways of tracking and banding patients with their accompanying guardian. However if there is no legal guardian the need for a pediatric safe area arises. The following steps outline how to set up a Pediatric Safe Area:

- Set-up an area or room that is in a central and safe location for children away from crowds and near bathrooms
  - Electrical cords and outlets should be covered and kept out of reach
  - Medications, chemicals and sharp objects should be cleared out of the area
  - Cribs and floor mats should be provided for small children to protect them from falling
  - Windows should be locked and entry ways and stairwells barricaded to prevent children from wandering away
  - Area should be adequately supplied with diapers, baby wipes, formula/age-appropriate food, toys, infant seats, age-appropriate toys, craft/art supplies, DVDs, etc.
  - See Appendix A: Pediatric Safe Area Checklist

- A Pediatric Safe Area Coordinator should be assigned to supervise the Pediatric Safe Area
  - If the hospital has pediatric units and a Child Life Program, Child Life Specialists are the most experienced and qualified staff to set up and care for these children
  - Pediatric Safe Area volunteers and assistants should be identified, credentialed and cleared *before* a disaster strikes to ensure the safety of the children in their care
  - See Appendix B: Pediatric Safe Area Coordinator Job Action Sheet

- Create a Pediatric Safe Area registry sheet to document child's status such as transfer status, location and final disposition.
  - See Appendix C: Pediatric Safe Area Registry

- All children who are separated from the legal guardian or are unaccompanied after a disaster are considered "high risk". These children should be reported to the Hospital Command Center as well as on the National Center for Missing and Exploited Children (NCMEC) or other designated family reunification process.
  - National Center for Missing and Exploited Children hotline: 1-800-THE-LOST (1-800-843-5678). This hotline is available 24 hours/day, 7 days/week. OR http://www.missingkids.com/home
  - Immediately following a disaster, there may be other agencies such as the American Red Cross that also set up family reunification websites or processes. It is important to follow the instructions from the Hospital Command Center on how to best begin the family reunification process.
  - See Appendix D: Child ID Survey

Appendix A: Pediatric Safe Area Checklist

Area Reviewed:			
Date Reviewed:		Time Reviewed:	
Reviewer:			

Area of Concern	**Finding**		**Follow-up Action Needed**
1. Is access to the area selected as the Pediatric Safe Area able to be controlled? Can children be contained in this area? (Consider stairwells, elevators, doors.)			
2. Is there a plan for security of the unit?			
3. Have you conducted drills of the plans for this area with relevant departments?			
4. Do you have a plan to identify the children?			
5. Do you have a plan for identifying the mental health needs of these children?			
6. If there is need, can various age groups be separated into different areas? (Consider whether older children pose a safety issue for younger children.)			
7. Are enough staff available to adequately supervise the children? (Consider that younger children need more staff to supervise.)			
8. Do you have a sign-in/sign-out sheet for all children and adults who enter the area?			
9. Are all children admitted to the area required to have appropriate identification bracelets?			
10. If children need to leave the area to use bathrooms, are there appropriate methods to escort them?			
11. Is there a safe, stable area near a sink but away from eating areas for diapering?			
12. Are there appropriate facilities for hand washing?			
13. Does the area have fire and smoke alarms?			
14. Is there adequate egress in case of fire?			
15. Do the windows open? (Consider whether the windows could be used for egress in case of fire.)			
16. Are the windows appropriately protected? Do they have window guards?			
17. Is the area free of blinds, drapes or cords that could pose a strangulation hazard?			
18. Are electrical outlets child-safe/covered?			
19. Is the area free of any water basins/buckets/sinks that could pose a drowning hazard?			
20. Is the area free of fans and heaters that could pose a safety risk? If fans or heaters are used, are they sectioned-off at a safe distance so that they do not pose a risk for burns or amputation?			

Area of Concern	Finding		Follow-up Action Needed
	Yes	**No**	
21. If radiators or hot pipes run through the area, are they covered to prevent burn hazards?			
22. Are under sink areas and cupboards appropriately locked?			
23. Is the area free of small toys and parts that would pose choking hazards?			
24. Are cabinets and tables free of items that might topple on children? Is the area free of unstable, heavy items or carts that might topple on children?			
25. If medical supplies are in the area, are medication carts and supply carts locked? Is access sufficiently controlled? Are medications and syringes at least 48" off the floor?			
26. Are there safe, adequate sleeping accommodations available (i.e. foam mats on the floor) to avoid co-sleeping?			
27. Are infants placed on their backs to sleep to reduce the risk of SIDS?			
28. Are mattress surfaces firm and soft pillows and toys removed from infant sleeping areas?			
29. Is the area smoke-free?			
30. Are there adequate age-appropriate games, videos and toys to occupy the children?			
31. Are there nutritious, age-appropriate snacks available for the children, avoiding foods that comprise a choking hazard for younger children?			
32. Are there nearby childcare centers or other experts who could be approached to help or advise should it be necessary?			
33. Have staff/volunteers who will be working in this unit received security clearance (e.g., no known child protection issues or criminal history)?			

Sample Job Action Sheet–Pediatric Safe Area (PSA) Coordinator

You report to: _____ (Pediatric Services Unit Leader)

Hospital Command Center Location: _____ Telephone: _____

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

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

Immediate (0 to 2 hours):

_____ Receive appointment from Pediatric Services Unit Leader (PSUL)

_____ Read the entire Job Action Sheet

_____ Obtain briefing from the PSUL

_____ Ascertain that the predestinated 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 security staff is available for the PSA

_____ Make sure that there is adequate communication in the PSA

_____ Make sure that there is a sign-in/sign-out log for the PSA

_____ Make sure that all items in the PSA checklist have been met; if there are any deficiencies, address them as soon as possible and report them to the PSUL

Intermediate (2 to 12 hours):

_____   Ascertain the need for ongoing staff for the PSA

_____   Maintain a registry of children in the PSA as they arrive or as they are released to an appropriate adult

_____   Determine estimated length of time for the expected operational period of the PSA

_____   Maintain communication with the PSUL for planning needs

_____   Determine if any pediatric persons in the PSA have specific medical or non-medical needs

_____   Prepare an informational session for the pediatrics person in the PSA

_____   Prepare to make arrangements for sleeping capacities if needed

_____   Ascertain if there will be any additional needs required for this event
(volunteers, staff, security and equipment)

_____   Make sure that pediatric persons have the appropriate resources such as food, water, medications, age-appropriate reading materials and entertainment for their stay

_____   Report frequently to the PSUL concerning the number of children in the PSA

Extended (Operational period beyond 12 hours):

_____   Make sure the PSA staff have enough breaks, water and food during their working periods

_____   Coordinate with Psychological Support for ongoing mental health evaluations of volunteers and pediatric persons in case there is a need for psychosocial resources

_____   Document all action/decisions with a copy sent to the PSUL

_____   *Other concerns*: _____

Appendix C: Pediatric Safe Area Registry

PEDIATRIC SAFE AREA REGISTRY SHEET

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

* **Disposition:** Admit to Hospital (A); Discharged to Parent (D-P); Discharged to relative (D-R); Discharged to Other (D-O); Social Services Placement (SS); Police (NYPD)
** **Responsible Adult:** Adult responsible for child at time of discharge. PSA Coordinator should determine if child can be discharged to this adult based on hospital policy.

Appendix D: Child ID Survey

Child ID Survey

Name: _____   Hospital # _____

Age: _____ Months/Years   DOB _____

Gender: Male_____   Female_____

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

Name of currently the supervising adult? _____Age ____

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

    Is this parent the usual guardian?   Yes   No

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

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

    If Yes, please describe or attach a copy:
    _____

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

    Aunt/Uncle_____ Age _____

    Sibling_____ Age _____

    Friend_____ Age _____

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

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

If yes, please describe: _____

_____

Was the child admitted to the hospital?   Yes   No

If Yes, give room or location _____

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

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

If yes, please list: _____

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

If yes, please list: _____

References

CBPP Pediatric Task Force. (2006). Pediatric disaster toolkit: Hospital guidelines for pediatrics in disasters, 1st edition [pdf].

CBPP Pediatric Task Force. (2008). Pediatric disaster toolkit: Hospital guidelines for pediatrics in disasters, 3rd edition [pdf].

LA County Department of Public Health. (2009). Pediatric surge pocket guide [pdf].

OBSTETRICS

Obstetrical Clinical Considerations

Preeclampsia/Eclampsia/Severe Preeclampsia:

+ Defined as a multi-system disorder of pregnancy, usually associated with elevated blood pressure (preeclampsia - $\geq$ 140/90; severe preeclampsia – 160/110) and proteinuria ($\geq$ 0.3 g in 24 hours), occurring after 20 weeks gestation

+ **Maternal risk factors include:**

  + First pregnancy

  + History of preeclampsia in previous pregnancy

  + Family history of preeclampsia

  + Diabetes

  + Obesity

  + History of chronic hypertension

  + History of renal disease

  + History of periodontal disease

  + Other pregnancy-associated risk factors including:

    + Multifetal pregnancy

    + Hydatidiform mole

    + Oocyte donation or donor insemination

+ **Major complications of these disorders include hypertension and seizures, but may also include:**

  + Pulmonary edema

  + Cerebral edema/hemorrhage

  + Subcapsular hepatic hematoma or rupture

  + Renal failure

  + Thrombocytopenia/DIC

  + Fetal growth restriction

  + Placental abruption

+ **Management should focus on:**

  + Blood pressure control

  + Seizure prophylaxis and treatment

  + Fluid management

  + Delivery of the fetus

Acute Treatment:

+ Antihypertensive medications administered within 15-30 minutes of arrival at a healthcare facility for blood pressures of 160 systolic and/or 105 diastolic or greater

    + Antihypertensive therapy is reserved for patients with systolic blood pressure greater than 160 mm Hg or diastolic blood pressure greater than 105-110 mm Hg. Increasingly, risk of stroke is felt to be correlated with maximum systolic blood pressure.

    + The goal of blood pressure control is not to return it to "normal" but rather to lower it to approximately 140/90, a level at which the risk of intracranial hemorrhage is felt to be reduced. Lowering the blood pressure below this range may reduce placental perfusion and harm the fetus.

    + Hydralazine and labetalol are the two "first line" agents used for hypertension in preeclampsia:

        + Hydralazine is an arteriolar dilator and will cause tachycardia. Possible side effects are headache and upper abdominal ("epigastric") pain, which may be confused with worsening preeclampsia and risk of delayed maternal hypotension which can be associated with fetal bradycardia.

        + Labetalol is a combined alpha and beta blocking agent, which reduces blood pressure by dilating arterioles and decreasing heart rate. Labetalol should be used intravenously for acute hypertensive emergencies.

+ Oral nifedipine (calcium channel blocker), IV esmolol (beta blocker) and IV nicardipine (calcium channel blocker) are second line drugs. Esmolol, a very short acting agent, can cause fetal bradycardia, which usually resolves quickly when esmolol is stopped.

+ Sodium nitroprusside is a very potent vasodilator, which acts immediately and is rarely used. It must be used by experienced providers and with invasive blood pressure monitoring in place.

+ Magnesium sulfate therapy for seizure prophylaxis administered to any patients with severe preeclampsia, atypical preeclampsia with subjective neurological symptoms (head ache or blurry vision) and considered in patients with mild preeclampsia:

    + Magnesium sulfate is the primary medication used in the prevention and management of eclamptic seizures.

Protocol for Administration of Magnesium Sulfate

A. Dosage

Dosage	Volume	Infusion Rate
4 gm loading dose	100 mL	Over 15-20 minutes
6 gm loading dose	150 mL	Over 15-20 minutes
Maintenance Dosage		
20gms Magnesium sulfate	500 mL	Infuse at 1-2 gms per hour via infusion pump

B. Side Effects

Side Effects/Toxicity		Nursing Intervention
1. Cutaneous flushing, sweating, malaise, weakness, drowsiness		1. Keep room cool, educate pt., provide fan, usually strict bed rest – do not allow pt. to get up without assistance.
2. Decreased amplitude and frequency of contractions		2. Continuous external fetal and uterine monitoring.
3. Soreness/phlebitis at IV site.		3. Warm soaks or ice to site prn, change IV; may need to switch to 40 gm/L if pt. unable to tolerate or increase the IV rate.
4. Decreased respiratory rate and depth of respiration, SOB.		4. Check Respiratory Rate, depth and oxygen saturation q 1 hr. Discontinue treatment if SOB not relieved with oxygen.
5. Diuresis		5. Strict Input & Output; document output per orders, since magnesium sulfate is excreted exclusively in urine and an output of <30ml/hr may lead to toxicity.
6. Disappearance of deep tendon reflexes.		6. DTR's q 1 hour during initiation of therapy, q 2 hours after. Notify physician if absent.
7. Heart block (decreased PR interval, increased QRS), chest pain.		7. Avoid use in pts with cardiac conduction abnormalities.
8. Pulmonary edema		8. Strict I&O's, fluid restrict as ordered (usually 60-100 ml/per hour).

C. Nursing care and assessment

Assessments	Antepartum & Labor & Postpartum
Respiratory rate/depth Oxygen saturation Strict & O as ordered Vital signs Level of consciousness	Hourly
DTRs Lung Sounds	Every 2 hours
Fetal Assessment	Continuous EFM monitoring during the magnesium sulfate infusion
Increase frequency of assessments as indicated by patient condition	

D. Key Learning Points:

✦ Dosage: Loading dose of 4-6gm over 15-20 minutes. Maintenance dose of 1-2 g/hr. In the setting of prophylaxis, a loading dose over 15 minutes is suggested. In the setting of eclampsia, a loading dose over 5 minutes is suggested.

✦ Signs of magnesium toxicity: discontinue magnesium sulfate infusion and obtain a stat serum magnesium level in the following situations: respiratory rate < 12 breaths/min, complaint of shortness of breath, lethargy, nausea, vomiting, absent deep tendon reflexes, apnea, urine output < 30cc/hour

✦ Magnesium levels: If magnesium levels are followed, a target magnesium range considered to be therapeutic is 4.8-8.4 mg/dL (4-7 mEq/L). Toxicity with magnesium sulfate is seen with following maternal serum concentrations: loss of deep tendon reflexes (9.6-12 mg/dL) (>7 mEq/L), respiratory depression (12-18 mg/dL) (>10 mEq/L), cardiac arrest (24-30mg/dL) (>25mEq/L)

  ✦ Calcium gluconate: the antidote for magnesium toxicity is calcium gluconate 1 g IV over 3 minutes. Repeat doses may be necessary. Calcium chloride can also be used in lieu of calcium gluconate. The suggested dose for calcium chloride for magnesium toxicity is 500 mg of 10% calcium chloride IV given over 5-10 minutes.

  ✦ In the setting of severe preeclampsia, magnesium sulfate should be administered upon diagnosis and continued until 24 hours after birth. However, if the patient shows no improvement in her symptoms of preeclampsia, clinical judgment is advised and magnesium administration may need to be provided for an extended period of time.

  ✦ In the setting of mild preeclampsia the use of magnesium sulfate for seizure prophylaxis can be considered

  ✦ If an eclamptic seizure occurs postpartum and the patient is off of magnesium sulfate, it should be re-administered for at least 24 hours duration from the last seizure

  ✦ If a patient has recurrent seizures despite already being on magnesium sulfate the first therapy, a repeat loading dose of magnesium sulfate is recommended (2-4 g IV over 5-15 minutes). If the patient continues to have seizures despite a repeat loading dose of magnesium sulfate, alternative anti-convulsants should be considered:

    ✦ Lorazepam (Ativan) 4mg IV over 2-5 minutes (can repeat in 5-15 minutes) to maximum of 8 mg in 12 hours

    ✦ Diazepam (Valium) 5-10mg IV slowly (can repeat every 15 minutes up to 30mg)

    ✦ Midazolam (Versed) 1-2mg IV (can repeat in 5 -10 minutes)

    ✦ Phenytoin (Dilantin) 1000 mg IV over 20 minutes

  ✦ Consideration of severe CNS events must be entertained for recurrent or persistent seizures

  ✦ Renal insufficiency: magnesium sulfate should be used with caution in women with renal insufficiency/failure (i.e. serum creatinine greater than 1.2 mg/dL). In these patients, if they are naive to magnesium therapy, a loading dose can be administered. A lower maintenance dose can be considered with serial serum magnesium levels to guide therapy (e.g. 1 g per hour).

  ✦ Myasthenia Gravis: magnesium sulfate is contraindicated in patients with myasthenia gravis

- Assessment:
  - Assess for signs and symptoms of severe and/or worsening preeclampsia:
    - Increasing blood pressure
    - Headache
    - Altered Level of Consciousness – agitation, restless, lethargy, hallucinations, confusion
    - Visual disturbances – blurred vision, floaters, spots, blind spot
    - Upper abdominal pain
    - Urine output <30 ml/hr
    - Shortness of Breath
  - A high index of suspicion for hypertensive disorders of pregnancy and the syndrome of preeclampsia/eclampsia is required when encountering pregnant women with evidence of NEW ONSET hypertension and/or proteinuria.
  - Preeclampsia is typically a disease of the late third trimester but earlier onset of preeclampsia prior to 34 weeks, is often more severe and may have an atypical presentation and should be considered in any patient with new onset symptoms and signs as of hypertension and/or proteinuria and with vague symptoms such as headache, abdominal pain, shortness of breath, or generalized swelling regardless of gestational age. These patients need to be rapidly diagnosed and managed in an appropriate facility.
  - Vague symptoms such as headache, abdominal pain, shortness of breath, "I just don't feel right," or generalized swelling should be evaluated for atypical presentations of preeclampsia.
  - Patients with "gestational hypertension" and "vague symptoms" that meet the criteria of severe preeclampsia should be considered to have atypical preeclampsia or severe preeclampsia.
  - Patients presenting with preeclampsia, severe preeclampsia or eclampsia to centers with limited resources to care for either the infant or mother should be stabilized and transfer to a center that has the capacity to care for expected complications of either the mother or infant.

See California Maternal Quality Care Collaborative (CMQCC) Preeclampsia Toolkit, due to be released May 2013 on www.cmqcc.org.

<div style="writing-mode: vertical">NEONATAL</div>

Neonatal Clinical Considerations

Introduction

This section is provided for emergency personnel with limited background and training in neonatal resuscitation that may need to provide delivery room support and to stabilize newborn infants. Selected information and techniques have been included that would be appropriate for personnel with limited pediatric and neonatal training to be used in an emergency setting. These guidelines are by no means complete, but provide basic and first line information to support newborn infants. The Neonatal Resuscitation Textbook 6[h] Edition and the STABLE Program Learner/Provider Manual 6th Edition served as primary sources for this information and are excellent resources for NICUs to include as more complete resources for emergency personnel.

Fetal Gas Exchange And Circulation

Before birth, the placenta provides gas exchange of oxygen and carbon dioxide for the fetus. Only a small fraction of fetal blood passes through the fetal lungs.

The fetal lungs are fluid-filled in-utero. In addition, the small arteries that perfuse the fetal lungs are very constricted as a result of the low partial pressure of oxygen in the fetus.

Before birth, most of the blood from the right side of the heart does not enter the lungs because of increased resistance to flow in the constricted pulmonary blood vessels in the fetal lungs. Instead, most of this blood takes the lower resistance path through the ductus arteriosus into the aorta (Figure 1).

After birth, the umbilical cord is cut and systemic vascular resistance increases. The baby takes an

initial breath and lung fluid must be absorbed from the alveoli. The lungs must fill with air that contains oxygen and the blood vessels in the lungs must relax to increase blood flow to the alveoli so that oxygen can be absorbed.

Transition From Fetus To Newborn

1. Fluid in the alveoli is absorbed into pulmonary lymphatics and replaced by air. Because air contains 21% oxygen, filling the alveoli with air provides oxygen that can diffuse into the blood vessels that surround the alveoli.

2. The umbilical arteries constrict and then the umbilical arteries and vein are closed when the umbilical cord is clamped. This removes the low resistance placental circuit and results in an increase in systemic blood pressure.

3. As a result of the distention of the alveoli with oxygen-containing gas and subsequent increased oxygen levels in the alveoli, the blood vessels in the lung tissue relax, decreasing resistance to blood flow.

The decreased resistance together with increased systemic blood pressure, leads to an increase in pulmonary blood flow and a decrease in the flow through the ductus arteriosus (Figure 2).

In most circumstances, air provides sufficient oxygen (21%) to initiate relaxation of the pulmonary blood vessels. After completion of normal transition, the baby is breathing air and using his lungs to transport oxygen into his blood. The oxygen and gaseous distention of the lungs are the mains stimuli for the pulmonary blood vessels to relax. As adequate oxygen enters the blood the baby's skin gradually turns from gray/blue to pink.

Although the initial steps in a normal transition occur within a few minutes of birth, the entire

process may not be completed until hours or even several days after delivery.

Problems that may disrupt normal transition:

1. The lungs may not fill with air even when spontaneous respirations are present (inadequate ventilation). The baby's initial breaths may not be strong enough to force fluid from the alveoli, or material such as meconium may block air from entering the alveoli. As a result, oxygen may not reach the blood circulating through the lungs.

2. The expected increase in blood pressure may not occur (systemic hypotension). Excessive blood loss or neonatal hypoxia and ischemia may cause poor cardiac contractility or bradycardia (slow heart rate) and low blood pressure in the newborn.

3. The pulmonary arterioles may remain constricted after birth because of complete or partial failure of gaseous distention of the lungs or lack of oxygen prior to or during delivery (persistent pulmonary hypertension of the newborn). As a result, blood flow to the lungs is decreased, reducing oxygen supply to body tissues.

Newborn Resuscitation

The following guidelines are taken from the Neonatal Resuscitation Textbook 6th edition, 2011. Ideally, any personnel involved in newborn resuscitation should have completed the NRP certification and training. Selected information is included in this syllabus for emergency personnel that may assist in neonatal resuscitation and stabilization, but have limited experience with newborn infants.

Rapid assessment of the neonate's clinical status based on the following questions:

+ Is the infant full-term?

+ Is the infant breathing or crying?

+ Does the infant have good muscle tone?

If the answer to all three questions is yes, the newborn does not need resuscitation, should not be separated from the mother and is managed by routine neonatal care.

The basic steps ("ABCDs") in resuscitation in any age group still apply in the newborn period. However, there are aspects of neonatal resuscitation that are unique and lead to differences in the initial resuscitative steps. (See NRP Resuscitation Flow Diagram; Figure 3)

The 2011 NRP guidelines for neonatal resuscitation recommend the following approach:

+ Initial steps (provide warmth, clear **A**irway if necessary, dry and stimulate the baby to breathe, evaluate respirations, hear rate and oxygenation)

+ **B**reathing (provide positive pressure ventilation with a resuscitation positive-pressure device and apply pulse oximeter, if available)

+ Provide **C**hest compressions as you continue assisted ventilation and insert emergency umbilical venous catheter

+ Administration of **D**rugs, such as epinephrine and/or volume expansion as you continue assisted ventilation and chest compressions

Resuscitation should proceed rapidly. You have approximately 30 seconds to achieve a response from one step before deciding whether you need to go on to the next.

Evaluation and decision-making are based primarily on respirations, heart rate and oxygenation. Decision to progress from one step to the next is determined by the time-dependent response of the infant to the applied resuscitative effort based upon his/her respirations and heart rate.

Monitoring of oxygen saturation by using pulse oximetry should be performed in infants who are gasping, apneic, have labored breathing, persistent cyanosis, or a heart rate less than 100 beats per minute (bpm).

No further resuscitative actions are required if the infant responds with adequate spontaneous respirations and a heart rate above 100 beats per minute.

It is vital that each step be performed optimally because subsequent resuscitative efforts are dependent on the success of previous steps. Thus, more time should be spent if 30 seconds is not sufficient to effectively complete the components of an intervention. Inadequate attention to ensuring completeness and effectiveness of earlier steps will jeopardize the utility of subsequent actions and unnecessarily expose infants to more aggressive intervention when they only required the earlier steps of resuscitation.

Apgar scores are not used to guide resuscitation but are useful as a measure of the newborn's overall status and response to resuscitation. When the five-minute Apgar score is less than seven, additional scores should be assigned every five minutes for up to 20 minutes. Apgar scores are not good predictors of outcome.

Airway — the infant is positioned to open the airway by placing the infant on his/her back on a flat radiant warmer bed with the neck in a neutral to slightly extended position; the neck should not be hyperextended or flexed. The proper position aligns the posterior pharynx, larynx and trachea, and facilitates air entry. If needed, a rolled blanket or towel may be placed under the infant›s shoulder to slightly extend the neck to maintain an open airway.

Suctioning immediately after birth is reserved for babies with obvious obstruction due to secretions or who require positive-pressure ventilation. Once the infant has been correctly positioned, the mouth and nose should be suctioned either with a bulb syringe or mechanical suction device. The mouth is suctioned first and then the nares to decrease the risk for aspiration. Suctioning of either the esophagus or stomach should be avoided if not indicated, as it can produce a vagal response, resulting in apnea and/or bradycardia.

Meconium stained amniotic fluid — In the presence of meconium stained amniotic fluid (MSAF), the 2013 NRP neonatal resuscitation guidelines no longer recommend routine intrapartum suctioning for meconium-stained infants. Although data are insufficient, the guidelines do not recommend changing the current practice of endotracheal suctioning of non-vigorous babies with MSAF and not vigorous infants.

Supplemental oxygen — At Loma Linda University Children's Hospital, we currently utilize room air (21% oxygen) for resuscitation of neonates >30 weeks gestation. For infants ≤ 30 weeks gestation, because of the increased risk of high oxygen-related complications associated with prematurity, we initiate resuscitation with 30 percent oxygen by blender. In all infants, pulse oximetry guides further adjustments of the delivered supplemental oxygen in an effort to achieve and maintain the oxygen saturation based on target SpO_2.

Pulse oximetry — The 2011 NRP guidelines recommend the use of pulse oximetry to determine oxygen saturation (SpO_2) in the following settings because oxyhemoglobin saturation may normally remain in the 70 to 80 percent range for several minutes following birth, which may result in the appearance of cyanosis, and the assessment of skin color is a poor indicator of oxyhemoglobin saturation during the immediate neonatal period:

- When resuscitation is anticipated
- Positive-pressure ventilation is used for more than a few breaths
- Persistent cyanosis
- Use of supplementary oxygen

For these infants, the oximeter probe should be attached to a preductal location on the right upper extremity, usually the wrist or medial surface of the palm as soon as possible.

The targeted SpO$_2$ levels for term infants born at sea level are as follows based on the time after delivery:

+ 1 minute – 60 to 65 percent

+ 2 minutes – 65 to 70 percent

+ 3 minutes – 70 to 75 percent

+ 4 minutes – 75 to 80 percent

+ 5 minutes – 80 to 85 percent

+ 10 minutes – 85 to 95 percent

Data on targeted levels for premature infants and term infants born at other altitudes are lacking, and the above levels are thought to be reasonable for these babies.

Positive-pressure ventilation — Positive-pressure ventilation (PPV) is required after administering the initial steps of resuscitation:

+ If the infant is gasping or apneic.

+ If the heart rate is <100 bpm. The heart rate can be checked either by auscultation or palpation of the pulse in the umbilical cord.

Although PPV is an important therapy in neonatal resuscitation, it is a technique that requires considerable skill and practice to apply it correctly. Several different methods and techniques of delivering PPV to the newborn infant are reviewed here.

Equipment — PPV can be administered to the newborn infant by bag-mask ventilation (BMV) by several different devices:

+ **Self-inflating bag** –Will always refill after being squeezed, even with no compressed gas source. Thus, it is the only method used when compressed gas sources are not available in resource-limited areas. The self-inflating bag has a pressure-release valve, commonly called a pop-off valve that is set by the manufacturer to release at about 30 to 40 cm H$_2$O pressure. However, for the newborn that has not taken its first breath, it may be necessary to occlude this pop-off valve in order to generate sufficient pressure to effectively inflate a newborn's

non-aerated lungs. In such instances, care should be taken not to overinflate the lungs because this may increase the risk of causing pulmonary air leak.

+ There may be significant variation in delivered oxygen concentration depending on the flow rate of oxygen. These findings are significant given the concern for potential oxygen toxicity and episodes of hyperoxia with high concentrations of delivered oxygen. They also demonstrate that pulse oximetry is required when supplemental oxygen and positive pressure ventilation are used.

+ **Flow-inflating bag** – The flow-inflating bag (anesthesia bag) fills only when gas from a compressed source flows into it. It is technically more difficult to master than the self-inflating bag because a tight face-mask seal is needed for the bag to inflate; however, this feature may be considered an advantage because it assures an optimal face-mask seal is obtained, which is necessary for effective positive-pressure ventilation. Because the flow-inflating bag does not have a pressure release valve, a pressure manometer should always be used to minimize the risk of over-inflation resulting in pulmonary air leak.

+ **T-piece resuscitator** – The T-piece resuscitator is similar to the flow-inflating bag, but with the addition of an adjustable flow-control valve, which more precisely controls the peak inflating pressure applied to the infant's lungs, decreasing the risk of pulmonary air leak complications. Like the flow-inflating bag, it requires a compressed gas source.

+ **Laryngeal mask airway (LMA),** which fits over the laryngeal inlet, has been found to be effective in ventilating full-term and preterm infants with birth weights greater than 1500 g newborn infants in instances when BMV or endotracheal intubation is unsuccessful, or endotracheal intubation is not possible. The LMA is a soft mask with an inflatable cuff attached to a silicone rubber airway, which is inserted through the mouth by the clinician using his/her index finger to guide insertion along the hard palate "blindly" without the use of

visualizing instruments. Following insertion and inflation of the cuff, the LMA covers the laryngeal opening and its rim conforms to the contours of the hypopharynx occluding the esophagus with a low-pressure seal. LMA should be considered only if BMV is unsuccessful in providing adequate ventilation, and endotracheal intubation is unsuccessful or not feasible.

Bag Mask Ventilation Procedure — The following steps are required to effectively provide assisted positive pressure bag-mask ventilation (BMV):

- **Position** – The infant should be positioned with the neck in a neutral to slightly extended position to ensure an open airway. The clinician should stand at the head or side of the warmer to view the chest movement of the infant to assess whether ventilation is effectively delivered.

- **Suction** – The nose and mouth should be suctioned as needed to clear any mucous to prevent aspiration prior to delivery of assisted breaths.

- **Seal** – An airtight seal between the rim of the mask and the face is essential to achieve the positive pressure required to inflate the lungs. An appropriately sized mask is selected and positioned to cover the chin, mouth and nose, but not the eyes of the infant. The mask is held on the face by positioning the hand of the clinician so that the little, ring and middle fingers are spread over the mandible in the configuration of the letter «E» and the thumb and index are placed over the mask in the shape of the letter «C». The ring and fifth fingers lift the chin forward to maintain a patent airway. An airtight seal is formed by using light downward pressure on the rim of the mask and gently squeezing the mandible up towards the mask (figure 2).

- **Initial breaths** – The initial administered breaths often require pressures of 30 to 40 cm H_2O to inflate the lungs of the newly born term infant. In most preterm infants, an initial inflation pressure of 20 to 25 cm H_2O is usually adequate. Adequacy of ventilation is demonstrated by improvement in

heart rate. Chest wall movement should be assessed if heart rate does not improve. The infant should be ventilated at a rate of 40 to 60 times per minute to achieve a heart rate >100 bpm.

When initiating ventilation, the care provider should try to avoid excess volume or pressure, which can result in volutrauma resulting in lung injury or pulmonary air leak, especially in the premature infant. To minimize volutrauma, positive pressure should be adjusted to deliver a tidal volume of 4 to 5 mL/kg. In addition, positive end-expiratory pressure of 4 to 5 cm H_2O should be used to prevent atelectasis. The self-inflating bag does not provide PEEP.

Next steps – Further resuscitative efforts are based upon the heart rate response of the infant after the initial 30 seconds of BMV.

- If the heart rate is greater than 100 beats per minute (bpm) and spontaneous effective respiration has begun, BMV can be discontinued and free-flowing oxygen administered as needed, based on the target oxygen saturations for minutes after birth. The infant is observed closely (heart rate and SpO_2) to determine whether his/her spontaneous respiratory effort is adequate without need for further intervention.

- If the heart rate is between 60 to 100 bpm, continue BMV ventilation and re-evaluate after 30 seconds. Reevaluation includes the following sequence of M-Mask readjustment, R-Reposition the airway, S- Suction the mouth and nose and O- Open the mouth slightly. If these maneuvers fail, consider increasing inflation pressure because failure of establishing effective positive pressure ventilation is an extremely common and potentially preventable cause of failed resuscitation.

- If the heart rate is below 60 bpm, immediately begin chest compressions and reassess that adequate positive pressure ventilation is being delivered. (See NRP flow diagram guidelines, appendix).

Chest Compressions

Chest compressions are initiated if the infant's heart rate remains <60 beats per minute despite adequate ventilation for 30 seconds.

Chest compression applies pressure to the lower one-third of the sternum visualized as an imaginary line between the nipples and the xiphoid process. Two methods are used to deliver neonatal chest compressions.

*   **Thumb technique** – In this method, both hands encircle the infant's chest with the thumbs on the sternum and the fingers under the infant. This is the preferred method.

*   **Two-finger technique** – In this method, the tips of the first two fingers, or the middle and ring finger, are placed in a perpendicular position over the sternum.

In both methods, pressure is applied downward perpendicular to the chest wall sufficient to depress the sternum about one-third of the anteroposterior diameter of the chest, and then pressure is released to allow the heart to refill. Care should be taken to avoid applying pressure directly over the xiphoid, as this may cause hepatic injury. The thumb technique is recommended by the 2011 NRP guidelines in neonates because it generates higher systolic and coronary perfusion pressure.

Once heart rate is below 60 bpm, the oximeter may stop working. The FiO2 should be increased to 100% until return of the oximeter reading to guide appropriate adjustment of delivered oxygen.

Chest compressions must always be accompanied by positive-pressure ventilation (PPV). During neonatal resuscitation, the chest compression rate is 90 per minute accompanied by 30 ventilations per minute with one ventilation interposed after every third compression. Thus, the ventilation rate is reduced from the 40 to 60 breaths per minute used in the absence of chest compression to 30 breaths in the presence of chest compression.

After 45-60 seconds of chest compressions and ventilation, check the heart rate. If the heart rate is:

*   Greater than 60 beats per minute, discontinue compressions and continue ventilation at 40 -60 breaths per minute

*   Greater than 100 beats per minute, discontinue compressions and gradually discontinue ventilation if the newborn is breathing spontaneously.

*   Less than 60 beats per minute intubate the newborn (if not already done) and give epinephrine, preferably intravenously. Intubation provides a more reliable method of continuing ventilation.

Drugs — Drugs are rarely required in neonatal resuscitation. Delivering adequate ventilation is the most important resuscitative step because the most common cause of bradycardia is inadequate lung inflation or profound hypoxemia.

*   However, if the heart rate remains <60 beats per minute despite adequate ventilation and chest compressions, administration of epinephrine is indicated. Rarely, volume expansion may be useful.

*   **Epinephrine** — increases the workload and oxygen consumption of the cardiac muscle, and therefore, it is only administered after ventilation has been established to avoid injury to the myocardium.

*   Epinephrine should be given intravenously rather than by endotracheal tube administration.

*   Current guidelines recommend intravenously administered epinephrine at a dose of 0.01 to 0.03 mg/kg (0.1 to 0.3 ml/kg of a 1:10,000 solution [concentration 0.1 mg/mL]). Epinephrine may be repeated every three to five minutes if the heart rate remains <60 beats per min.

*   The ETT route may be used while intravenous access is being obtained, but the safety and efficacy of this practice has not been evaluated. Current guidelines recommend if epinephrine is given through an ETT, a dose of 0.05 to 0.1 mg/kg (0.3 to 1 mL/kg of a 1:10,000 solution) should be used. After ETT administration, another dose of

epinephrine could be administered intravenously when vascular access is obtained.

- If there is no response to the dose of epinephrine, the clinician should reassess the earlier steps in the resuscitation algorithm to ensure that they have been performed correctly. If resuscitative efforts were completed correctly, then another problem such as hypovolemia might be present.

Signs of respiratory distress

- Grunting
- Nasal flaring
- Chest retractions
- Tracheal tugging
- Cyanosis
- Agitation

Strategies for respiratory support

Provide the minimal support necessary to support gas exchange, unless a more aggressive intervention may change the course of the pulmonary disease, such as early intubation for the delivery of surfactant in RDS.

Noninvasive nasal CPAP or ventilation is preferable to intubation and mechanical ventilation

Aggressive weaning of mechanical support in response to the resolution of the underlying disease is crucial

Mechanisms of lung injury

Oxygen toxicity: high oxygen concentration in the blood is a risk factor for bronchopulmonary dysplasia and retinopathy of prematurity and may be reduced by careful monitoring and setting of gestational age appropriate oxygen saturation (SpO2) targets

Inflammation and infection result from intubation. Use of noninvasive ventilation and early extubation are desired.

Barotrauma/volutrauma results from over inflation of the lung or stress from repeated reopening of collapsed lung units or from shear between adjacent lung units.

Maintenance of functional residual capacity (FRC) using appropriate PEEP and the use of small tidal volume (V_T) to prevent over distension help limit injury.

Hypothermia

Normal core (rectal temperature is between 36.5°C and 37.5°C). The World Health Organization defines levels of mild (36.0°C and 36.4°C), moderate (32°C and 35.9°C) and severe hypothermia (< 32°C).

Premature, low birth weight infants, especially those less than 1500 grams and sick infants of any weight are at increased risk for hypothermia

With progressive hypothermia, the infant will exhibit a decreased level of consciousness, decreased respiratory effort (hypoventilation), low heart rate (bradycardia) and low blood pressure (hypotension). Hypothermia leads to pulmonary vasoconstriction with increased R to L shunting and hypoxemia. Increased oxygen consumption and poor tissue oxygenation secondary to prolonged peripheral vasoconstriction can lead to hypoxia.

Goal: Maintain temperature at 37°C. Check temperature every 15 to 30 minutes until it is within a normal range and then at least every hour until the infant is transported.

Maintain a neutral thermal temperature (the body temperature at which minimal energy is expended by the infant in order to maintain a normal body temperature). When minimal energy is expended then oxygen consumption is also lowest.

Prewarm objects before they come in contact with the infant (your hands, stethoscope and blankets).

Clothing and hat serve as good insulators, however, it may not be practical to clothe the critically ill infant. Cover the infant's head with a hat whenever possible.

If the infant is premature, place a chemical thermal mattress underneath the infant. Be sure to place a then cover over the mattress before placing the infant on it.

The following methods of warming infants are also used depending upon the condition of the neonate and the need for further resuscitative efforts:

+ Swaddling the infant after drying

+ "Skin to skin" contact with mother and covering the infant with a blanket

+ Use of polyurethane bags or wraps in infants with birth weights less than 1500 g

+ Raise the environmental (room) temperature to 26°C (78.8°F)

+ Warming pads

Cover the newly born premature infant from chin to feet with a polyethylene covering. This cover will provide extra protection from drafts and will also decrease evaporative heat loss. Do not cover the face or obstruct the airway with the plastic cover.

Quickly dry the infant after delivery or bathing with pre-warmed blankets or towels and immediate remove any wet or damp linens. After thoroughly drying the infant's head, apply a hat.

Do not bathe infants who are hypothermic or show other signs of instability. These infants may be at increased risk for developing persistent pulmonary hypertension (PPHN).

Preventing hypothermia is much easier than overcoming the detrimental effects of hypothermia once they have occurred.

Hypoglycemia

Most infants who require transport are too sick to tolerate oral feedings.

Supporting the energy needs of sick infants with IV fluids containing glucose is an important component of infant stabilization. The infant brain needs a steady supply of glucose to function normally.

If an infant is currently receiving total parenteral nutrition (TPN) but the solution will run out or there is no additional TPN available, then the infant should be switched to IV fluids containing a similar concentration of dextrose. (e.g. baby receiving TPN containing 12.5% dextrose will need IV fluids containing 10-12.5% dextrose in water. Electrolytes may be required for long term fluid administration.)

If having difficulty inserting a peripheral IV (infant is in shock or caregivers have had little opportunity to practice this skill, consider placing an umbilical venous catheter.

Infants at increased risk for hypoglycemia:

+ Premature infants (< 37 weeks)

+ Small for gestational age infants

+ Infants of diabetic mothers

+ Large for gestational age infants

+ Stressed, sick infants, especially those with a history of perinatal stress, respiratory distress, hypoxia, shock, hypothermia, sepsis and cardiac disease

Signs of Hypoglycemia

+ Jitteriness

+ Irritability

+ Hypotonia

+ Lethargy

+ High-pitched or weak cry

+ Hypothermia

+ Poor suck / coordination

+ Tachypnea

+ Cyanosis

+ Apnea

+ Seizures

Glucose monitoring

When an infant is sick or has risk factors for hypoglycemia, screen for whole blood glucose using point of care, bedside evaluation (Sure-Step, One-touch, ACCU-CHEK or by laboratory serum glucose measurement).

Screen every 15-30 minute until greater than 50 mg/dL on at least two consecutive tests.

If low, obtain serum glucose (if possible), but do not delay treatment.

Target glucose level 50 -110 mg/dL

For IV treatment of blood glucose < 50 md/dL by either bedside screen or serum glucose pertains to a sick infant who cannot receive oral or gavage feedings.

- Infants with low blood sugar who are otherwise health can usually tolerate oral feedings as formula or D5W) unless the blood sugar value is very low, in which case the baby may need IV therapy.

- Initial IV fluid and rate: D10W without electrolytes, 80 ml/kg/day delivers 5.5 mg/kg/minute of glucose.

- Infuse via an infusion pump (if infant is older than 24 hours if may be necessary to add electrolytes to the IV solution

- Give 2 mL/kg D10W bolus IV over several minutes

- Screen blood glucose 15-30 minutes after bolus

- Document response to treatment – do symptoms disappear once normoglycemic?

If glucose continues < 50 mg/dL.

- Repeat IV bolus 2 mL/kg D10W

- If not already done, increase infusion to 100 mL/kg/day

- Increase dextrose concentration to D12.5W or D15W

- Do not infuse greater than D12.5 W in peripheral vein, if need higher concentration, central line is indicated

- Follow blood glucose closely, especially in babies that are small for gestational age or hyperinsulinemic (infants of diabetic mothers, large for gestational age)

Premature Infants

Premature infants may require a higher volume of fluid than term infants because of increased water losses through their thinner, less developed skin. Various factors increase water loss, including skin immaturity, providing care under a radiant warmer and use of phototherapy lights

Hyperglycemia – preterm infants, especially those < 32 weeks may become hyperglycemic (blood glucose > 150 mg/dL when they receive an infusion of 80 mL/kg/day of D10W. This occurs because of their immature endocrine system. If blood glucose is persistently elevated, consult with the neonatologist for guidance regarding fluid management. Premature infants may need a lower IV dextrose concentration and an increased fluid rate because of glucose intolerance and increased insensible water loss.

Umbilical venous catheter (UVC) placement

A UVC should be placed if:

- Rapid IV access is required and given the infant's condition, the UVC is the best option for administering emergency fluids and medications

- Based on the infant's health status and condition, there is ongoing difficulty establishing a peripheral IV within a reasonable period of time or attempts

- When more than one intravenous line is required

- Central venous access is necessary to administer glucose concentrations exceeding 12.5% dextrose.

Emergency placement – the catheter should be inserted 2 to 4 cm until there is blood return. This depth usually locates the tip well below the liver. The depth of insertion is related to the infant's size.

In an emergency there may not be time to confirm location of the catheter tip by x-ray before using hypertonic resuscitation medications. If the catheter tip is located in the liver or portal venous circulation, the liver may be injured by hypertonic solutions.

Blood Pressure

The recognition and treatment of hypotension are particularly important to avoid complications such as cerebral ischaemic injury or intraventricular haemorrhage. On the other hand, hypertension in the newborn is increasingly seen as a complication in infants with bronchopulmonary dysplasia and who are receiving steroid treatment.

Arterial blood pressure (BP) is determined by cardiac output and peripheral vascular resistance

In general hypotension indicates inadequate systemic blood flow or left ventricular output and therefore inadequate tissue perfusion, although this is not always the case.

Method of Blood Pressure Measurement

Unless the baby has an in-dwelling arterial line, the only reliable and accurate way of measuring blood pressure indirectly is by using the oscillometric method (e.g. Dynamap). To **minimize** errors of noninvasive BP measurements, the following guidelines are recommended

- cuff width to arm (or calf) circumference ratio as indicated on cuff
- if possible, obtain BP measurement during quiet or sleep state
- obtain average of two or three measurements if making management decisions
- use mean BP to monitor changes as less likely to be erroneous
- noninvasive BP may overestimate BP measurements in VLBW

Normal Neonatal Blood Pressure Values (figure 5)

Blood pressure increases with gestation, birth weight and postnatal age

There is no significant difference between arm and calf blood pressure in normal infants.

It is difficult to define 'normal' BP values in ELBW infants.

In clinical practice, the infant's blood pressure is generally considered to be adequate as long as urine output (> 1ml/kg/hr) and capillary refill (< 3 seconds) are within normal limits and there is no metabolic acidosis. However, these are not reliable indicators of tissue perfusion.

Low birthweight infants

Birthweight (g)	Systolic range (mmHg)	Diastolic range (mmHg)
501-750	50-62	26-36
751-1000	48-59	23-36
1001-1250	49-61	26-35
1251-1500	46-56	23-33
1501-1750	46-58	23-33
1751-2000	48-61	24-35

Preterm infants

Gestation (wk)	Systolic range (mmHg)	Diastolic range (mmHg)
<24</td/>	48-63	24-39
24-28	48-58	22-36
29-32	47-59	24-34
>32	48-60	24-34

Preterm infants

Day	Systolic range (mmHg)	Diastolic range (mmHg)
1	48-63	25-35
2	54-63	30-39
3	53-67	31-43
4	57-71	32-45
5	56-72	33-47
6	57-71	32-47
7	61-74	34-46

Term infants

Age	Systolic (mmHg)	Diastolic (mmHg)	Mean (mmHg)
1 hour	70	44	53
12 hour	66	41	50
Day 1 (Asleep)	70+/-9	42+/-12	55+/-11
Day 1 (Awake)	71+/-9	43+/-10	55+/-9
Day 3 (Asleep)	75+/-11	48+/-10	59+/-9
Day 3 (Awake)	77+/-12	49+/-10	63+/-13
Day 6 (Asleep)	76+/-10	46+/-12	58+/-12
Day 6 (Awake)	76+/-10	49+/-11	62+/-12
Week 2	78+/-10	50+/-9	
Week 3	79+/-8	49+/-8	
Week 4	85+/-10	46+/-9	

Areas of Uncertainty in Clinical Practice

Definitions of 'normal' blood pressure in low birthweight and preterm infants are based on small numbers. Although these are 'healthy' infants, a variety of devices have been used to produce the measurements. There is very good evidence to suggest that blood pressure cannot necessarily be equated with normal systemic flow or a normal circulating blood volume.

Shock

Defined – inadequate vital organ perfusion and oxygen delivery

Failure to promptly recognize and treat shock may lead to multiple organ failure and even death in newborns, therefore treatment must be prompt.

Hypovolemic shock – low circulating blood volume

+ Acute blood loss from fetal-maternal hemorrhage, placental abruption or previa, umbilical cord injury, twin-to-twin transfusion, organ laceration (liver or spleen)

+ Postnatal hemorrhage involving brain, lung, adrenal glands, scalp (subgaleal hemorrhage)

+ Non-hemorrhagic causes – severe capillary leak 2nd to infection, dehydration

+ Functional hypotension – tension pneumothorax or pneumopericardium (impairs cardiac output)

Cardiogenic shock – heart failure results when the heart muscle functions poorly and may occur in infants with intrapartum or postpartum asphyxia, hypoxia and/or metabolic acidosis, bacterial or viral infection, severe respiratory distress (requiring assisted ventilation), severe hypoglycemia, severe metabolic and /or electrolyte disturbances, arrhythmias, congenital heart defects especially those with severe hypoxemia or obstruction of blood flow into the systemic circulation

Septic shock – in the presence of bacterial or viral infection, complicated systemic reactions occur that result in circulatory insufficiency. A hallmark of this type of shock is hypotension that responds poorly to fluid resuscitation. Loss of vascular integrity allows fluid to leak out of the blood vessels and into the tissue spaces. Poor myocardial contractility leads to poor tissue perfusion and oxygenation. These infants often need blood pressure medication to treat the hypotension. The risk for organ injury and death is high.

Blood pressure may be normal or low: hypotension is a late sign of cardiac decompensation.

Blood pressure reading may be within normal range because of vasoconstriction and centralization of blood pressure. The blood is shunted away from non-vital organs to allow for perfusion of vital organs. By the time the blood pressure drops and hypotension becomes apparent, the baby is usually in an advanced state of shock.

Evaluate the pulse pressure by subtracting the diastolic from the systolic blood pressure measurement. A normal pulse pressure in a term infant is between 25 and 30 mmHg and in a preterm infant between 15 and 25 mmHg. A narrow pulse pressure may indicate peripheral vasoconstriction, heart failure, or low cardiac output.

Initial treatment of Shock

If there is no acute blood loss: normal saline or Ringer's lactate, give 10 mL/kg through peripheral IV, UVC or intraosseous, administer over 15 to 30 minutes. For severe shock it may be necessary to provide two, three or more volume boluses. Evaluate the infant's response to treatment (changes in heart rate, perfusion, and blood pressure) following each bolus and decide if more volume is necessary.

If there is acute blood loss: normal saline to begin volume resuscitation while awaiting packed red blood cells or whole blood. Give 10 mL/kg through peripheral IV, UVC or intraosseous and administer over 30 minutes to 2 hours

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Appendix

Figure 1. Fetal Circulation: shunting of blood through the ductus arteriosus and away from the lung
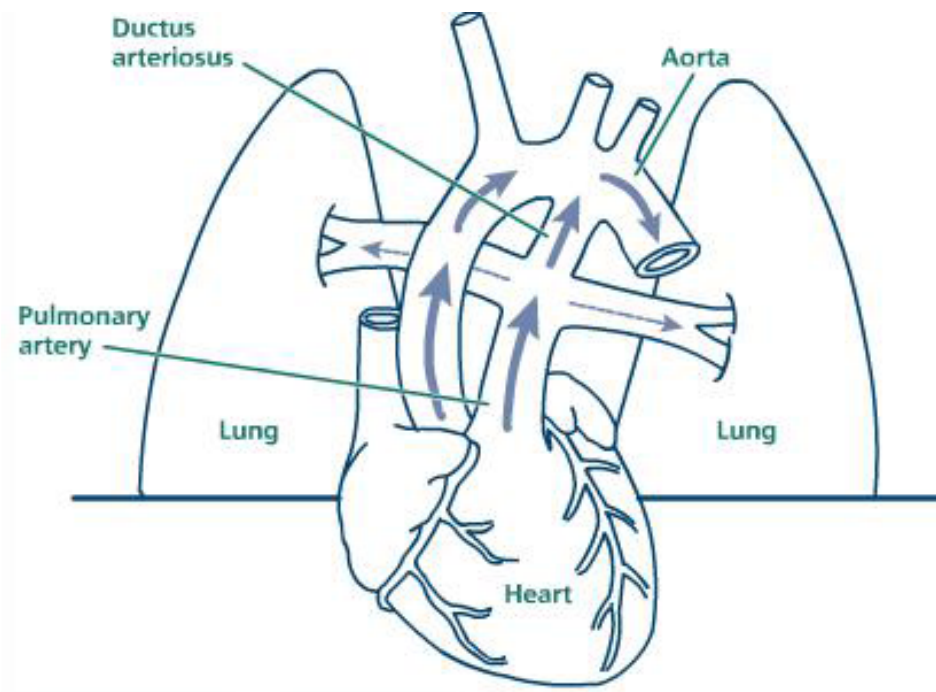
Figure 2. Transitional Circulation: cessation of shunt through the ductus arteriosus after birth, as blood preferentially flows to the lungs
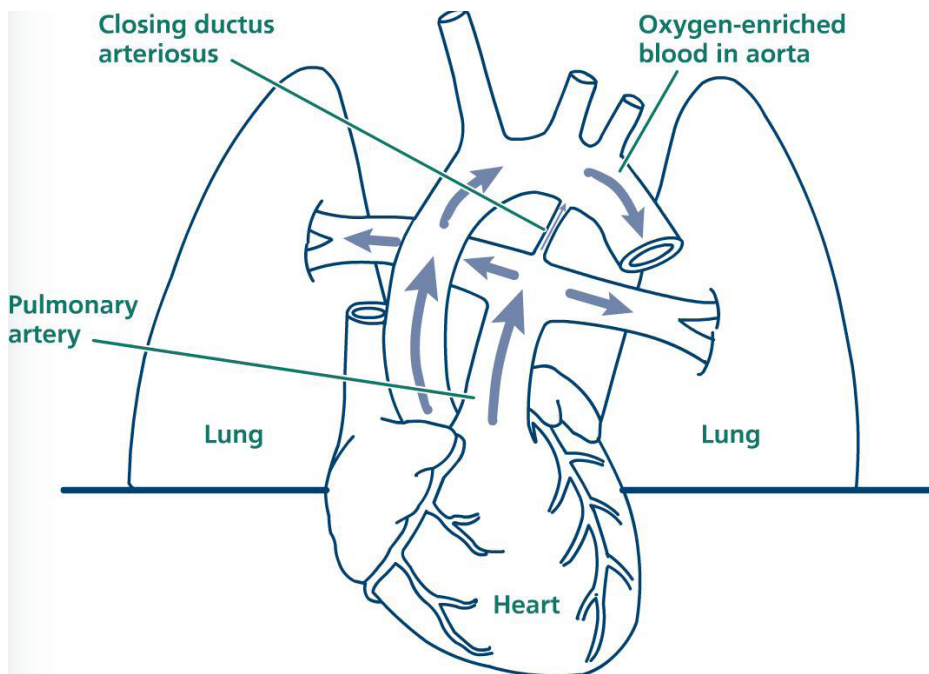
Figure 3. Resuscitation Flow Diagram


```
Birth

                    Term gestation?          Yes—stay         Routine Care
                    Breathing or crying?     with mother      • Provide warmth                    Assessment
                    Good tone?                                • Clear airway if necessary
                                                              • Dry
                          No                                  • Ongoing evaluation

                    Warm, clear airway if necessary,                                  No          (A)
                    dry, stimulate


30 sec              HR below 100 bpm,        No          Labored                                  Evaluation
                    gasping, or apnea?                   breathing
                                                         or persistent
                                                         cyanosis?

                          Yes                                Yes

                    PPV,                                 Clear airway                              (B)
                    SpO₂ monitoring                      SpO₂ monitoring
60 sec                                                   Consider CPAP


                    HR below 100 bpm?        No


                          Yes                                                                      Evaluation

                    Take ventilation                     Post-resuscitation
            No      corrective steps                     care


                    HR below 60 bpm?


                          Yes

                    Consider intubation                                                            (C)
                    Chest compressions
                    Coordinate with PPV


                    HR below 60 bpm?                                                               Evaluation


                          Yes

                    IV epinephrine                                                                 (D)
```

From Neonatal Resuscitation Textbook, 6ᵗʰ edition, 2011. p.12.

Initial Assessment Block. At the time of birth, you should ask yourself 3 questions about the newborn:

+ Was he born at term?

+ Is he breathing or crying?

+ Does he have good tone?

A Block (Airway).

+ Provide warmth, which can be accomplished by covering the baby with a towel and placing him skin-to-skin with mother, or, if the answer to any of the 3 questions is "No", placing him under a radiant owarmer on a resuscitation table, where subsequent resuscitation can take place more easily.

+ Position the head to open the airway. Clear the airway as necessary. Clearing the airway may involve suctioning the trachea toremove meconium.

+ Dry the skin, stimulate the baby to breathe and reposition the head to maintain an open airway.

+ You should simultaneously evaluate respirations and heart rate. If the newborn is not breathing (has apnea or is gasping) or has a heart rate below 100 bpm, proceed immediately to Block B. If the respirations appear labored or the baby is persistently cyanotic, proceed to Block B

Block B(breathing)

+ If the baby has apnea or has a heart rate below 100 bpm, immediately begin to assist the baby's breathing by providing positive pressure ventilation (PPV). If the baby is breathing but has persistent respiratory distress, many clinicians would administer continuous positive airway pressure (CPAP) with a mask, particularly if the baby was born preterm. If you initiate either PPV or CPAP, you should attach an oximeter to determine the need for supplemental oxygen.

+ After 30 seconds of effective PPV, CPAP and /or supplemental oxygen, you evaluate the newborn again to ensure that ventilation is adequate. It is critical to ensure that effective ventilation is being provided before moving to the next steps of resuscitation.

Block C (Circulation)

+ You support circulation by starting chest compressions. Endotracheal intubation is strongly recommended at this point, if not already done, to facilitate and coordinate effective chest compressions and PPV.

+ After administering chest compressions and PPV, you evaluate the newborn again. If the heart rate is still below 60 bpm despite ventilation and chest compressions, you proceed to Block D.

Block D (Drug)

+ You administer epinephrine as you continue PPV and chest compressions.

+ If the heart rate remains below 60 bpm, the actions in Blocks C and D are continued and repeated.

+ When the heart rate improves and rises above 60 bpm, chest compressions are stopped. PPV is continued until the heart rate is above 100 bpm and the baby is breathing. Supplemental oxygen and/or CPAP can be administered, if necessary, based on oxygen saturation as measured by pulse oximetry (SpO2). Care should be taken to avoid allowing the SpO2 to exceed 95%.

Figure 4. Optimal Mask Placement Technique

Optimal mask placement technique: rolling up from the chin. An accurate position can be obtained when the mask is rolled upward onto the face from the chin tip and will reduce the leak at the orbital margin. For a round Laerdal mask, the "two-point top hold" provides the best mask seal. The thumb and index finger apply balanced pressure to the top flat portion of the mask where the silicone is thickest. The stem is not held and the fingers should not encroach onto the skirt of the mask. An even downward pressure onto the mask and an equal upward pressure from the jaw lift is the best way to reduce mask leak.

Figure 5. Average Blood Pressures during the first 12 hours of life in Normal Newborn Infants
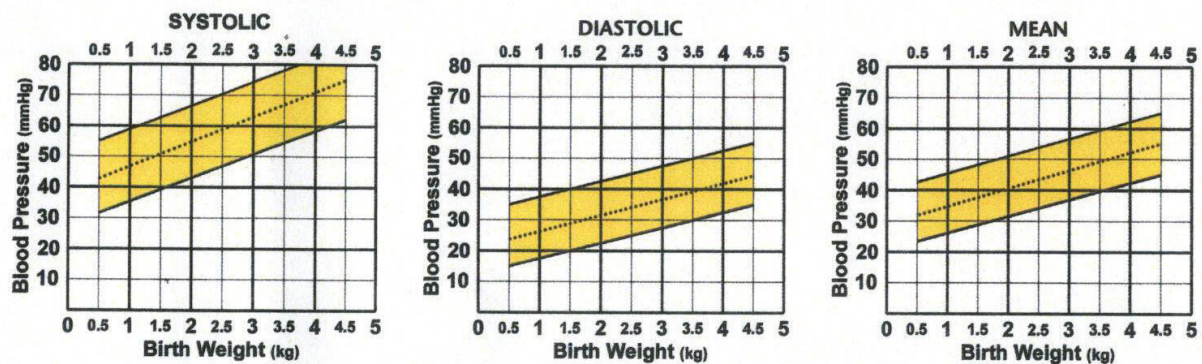
The shaded yellow area is considered normal.

Figure 4.2. Average systolic, diastolic, and mean blood pressures during the first 12 hours of life in normal newborn infants according to birth weight. Evaluation of blood pressure is an important component of patient evaluation, however, the decision to treat shock should be based on history, physical and laboratory exam, and patient condition, not just blood pressure.

Graphs adapted with permission from Versmold, HT, et al. (1981). Aortic blood pressure during the first 12 hours of life in infants with birth weight 610 to 4,220 grams. Pediatrics, 67(5), 607-613.[27,28]

Clinical Considerations of Pediatric Radiation Exposures

Radiation hazard can be due to either external irradiation or contamination.

Contamination:

Contamination results when a radioisotope (as gas, liquid, or solid) is released into the environment and then ingested, inhaled, or deposited on the body surface. Contaminated patient has radioisotopes on or in the body and are **radioactive.**

How to diagnose

- **External contamination**
  Scan with appropriate **radiation survey meter**

- **Internal contamination**
  Swab each nostril separately to help estimate level of internal (lung) contamination collect ≥70 mL spot urine sample for isotope measurement
  Instructions for sample collection, labeling, packaging and shipping (HHS/CDC)

- **Consider total body radiation survey with modified hospital nuclear medicine equipment**

- Proper collection and disposal of wastes (feces urine, wound secretion) from internally contaminated patients avoids further contamination of health care workers.

Exposure:

Radiation exposure occurs when all or part of the body absorbs **penetrating** ionizing radiation from an external radiation source, as shown in the illustration above.

- Exposure from an external source stops when a person leaves the area of the source, the source is shielded completely, or the process causing exposure ceases.

Irradiated patients have no radioisotopes on or in the body and are **not radioactive.**

Radiation exposure also occurs after internal contamination, i.e., when a radionuclide is ingested, inhaled or absorbed into the blood stream.

- This kind of exposure stops only if the radionuclide is totally eliminated from the body, with or without treatment.

An individual exposed only to an **external source** of radiation, as shown above, is **NOT radioactive or contaminated** and may be approached without risk, just like after a chest x-ray or CT scan.

Radiation from external exposure alone is either absorbed without the body becoming radioactive, or it can pass through the body completely.

Therefore, if a person is scanned with a **radiation survey monitor** after external exposure alone, the device will not register radiation above the background level.

Acute Radiation Syndrome (ARS) may result if the dose from whole or partial body exposure is high enough.

How to diagnose ARS

Estimate whole body dose and clinical severity by using:

- **Time to onset of vomiting** (If Vomiting <1hr, 100% mortality)

- **Lymphocyte depletion kinetics** (The faster the decline, the higher the degree of irradiation dose)

- **Physical exam** look for ARS

- **Clinical signs and symptoms associated with ARS and its subsyndromes** As described above, physical exam should focus on particularly four systems; cutaneous, neurovascular, gastrointestinal and hematopoietic complications.

Physical findings suggestive of ARS

Vital signs	Skin	Nervous system	Gastrointestinal tract	Hematologic
• Fever • Hypotension • Tachycardia • Tachypnea	• Erythema • Edema • Blistering* • Desquamation*	• Impaired level of consciousness • Ataxia • Papilledema • Motor/sensory deficits • Presence/absence of reflexes	• Abdominal tenderness • GI bleeding	• Bruising* • Ecchymoses* • Petechiae of skin/ mucous membranes*

Initial decontamination:

Patients with external or internal contamination continue to receive additional ionizing radiation until they are decontaminated. As these patients are moved within the healthcare system they may contaminate healthcare workers and facilities.

+ Patients should be decontaminated prior to their entrance into a healthcare facility

+ Healthcare workers, responder should wear protected gear

+ Water used in decontamination should not be disposed in the municipal sewer system, but stored separately

+ Patient who presents with trauma or burn plus irradiation are increased risk of mortality. Severely injured individuals should be treated first.

+ Traumatic and other life-threatening injuries take precedence over radiation survey and treatment. **We must do a primary survey first and stabilize the patient then proceed with irradiation management.**

+ **Follow the algorithm below provided by US Department of Health and Human Services**

Choose Appropriate Algorithm: Evaluate for Contamination and/or Exposure

Radiological/Nuclear Incident

How do you know a radiation
incident has occurred?

Initial on-site activities

Perform lifesaving tasks before
managing radiation problems

Has your patient
been
contaminated
by radiation?

What is
contamination?
How to diagnose?

Both

Has your patient
been
exposed
to radiation?

What is
exposure?
How to diagnose?

Neither

No Contamination
or Exposure

Contamination Only
Management Algorithm

Exposure + Contamination
Management Algorithm

Exposure Only
Management Algorithm

Exposure + Contamination

Radiological/Nuclear Incident

How do you know a radiation
incident has occurred?

Initial on-site activities

Perform lifesaving tasks before
managing radiation problems

Evaluate for Contamination
and/or Exposure

No Contamination or Exposure

Contamination Only 👥
(What Is Contamination?)

Exposure + Contamination 👥

Exposure Only 👥
(What Is Exposure?)

⚠️ **Management Modifiers**

- Burns
- Trauma
- Mass casualty
- Timing of surgery
- Blood products use
- At-risk/special needs populations

Assess External Contamination
- Contact radiation safety officer
- Assess contamination pattern with radiation survey meter
- Evaluate for radioactive shrapnel
- Document contamination pattern on a body diagram
- Swab each nostril separately to help estimate level of internal (lung) contamination

Decontaminate Whole Body
- Decontaminate either onsite or at other designated area
- Follow decontamination procedures
- Re-scan patient with radiation survey meter
- Repeat decontamination until radiation reading is < 2 times background radiation level
- Do not exceed 3 attempts
- Special issues for infants and children

Evaluate if All Are True:
- Decontamination successful (< 2 times background radiation)
- Absent or minimal physical injury
- Whole/partial body dose from exposure likely to be < 2 Gy

Yes

- Send home with follow-up instructions
- Register in event database

On-site

- **No** - - - - - - -

Medical Facility

Evaluate at Medical Facility
- Treat life- and limb-threatening injuries first
- Obtain serial CBCs with differential to evaluate possibility of exposure and ARS
- Remove any remaining radioactive shrapnel and shield it safely
- Surgical window of about 36-48 hours, depends on rate of dropping blood counts
- Treat non-life-threatening problems

Assess Internal Contamination
- Scan patient with radiation survey meter (caveat)
- Event responders or radiation safety officer will identify the isotope(s)
- Swab each nostril separately to help estimate level of internal (lung) contamination
- Collect ≥70 mL spot urine sample for isotope measurement
  - Instructions for sample collection, labeling, packaging and shipping
- Consider total body radiation survey with modified hospital nuclear medicine equipment

Treat Internal Contamination of Specific Isotope
- Isotopes of Interest Table ▭
- Countermeasures Table ▭
- Decision to treat will depend on
  - Level of internal contamination
  - Size of radiation event
  - Availability of resources/personnel
  - Likelihood that patient will survive

Diagnose/Manage Exposure - Acute Radiation Syndrome
When ARS is severe, it may take priority over decorporation of internal contamination.

Survivors
- Discharge with appropriate follow-up instructions
- Register patient in incident database
- Radiation follow-up considerations
  - Whole body dose
  - Immune status
  - Risk of cancer
  - Risk of specific organ dysfunction

Deceased
- Management of decedents with contamination
- Register decedent in incident database

REMM
RADIATION EMERGENCY MEDICAL MANAGEMENT

No Contamination or Exposure

Radiological/Nuclear Event ☢

↓

How do you know a radiation event has occurred?

↓

Initial Onsite Activities
- Ensure safety of responders
- Establish patient handling flow ⚞
- Perform lifesaving tasks before managing radiation problems

↓

Evaluate for Contamination and/or Exposure ⚞

↓

No Contamination or Exposure	Contamination Only ⚞ (What Is Contamination?)	Exposure + Contamination ⚞	Exposure Only ⚞ (What Is Exposure?)

↓ (from No Contamination or Exposure)

Send home with follow-up instructions
- Provide reassurance
- Register patient in long-term follow-up database
- Provide psychological support as needed

REMM RADIATION EVENT MEDICAL MANAGEMENT
REMM.nlm.gov

Exposure: Diagnose/Manage Acute Radiation Syndrome

Radiological/Nuclear Incident ☢

↓

How do you know a radiation incident has occurred?

↓

Initial on-site activities

↓

Perform lifesaving tasks before managing radiation problems

↓

Evaluate for Contamination and/or Exposure ⚞

↓

No Contamination or Exposure	Contamination Only ⚎ (What Is Contamination?)	Exposure + Contamination ⚎	Exposure Only ⚎ (What Is Exposure?)

⚠ **Management Modifiers**

- Burns
- Trauma
- Mass casualty
- Timing of surgery
- Blood products use
- At-risk/special needs populations

Evaluate for Acute Radiation Syndrome (ARS)
(What Is ARS?)

Look for Signs of ARS

- Perform targeted physical examination

Estimate Dose from Exposure

Use any clinical data available (Interactive Tools)
- Lymphocyte depletion kinetics ▦
- Time to onset of vomiting ▦
- Prodromal symptoms
- Chromosome analysis (dicentrics) ▦

Dose reconstruction by patient location
- Match patient location to exposure map

Begin Assessment & Management

- Assess/manage 4 sub-syndromes of ARS: hematopoietic, gastrointestinal, cutaneous, neurovascular
- Does patient need outpatient or inpatient management? (Response category tool)
- Plan for evolution of ARS over time
- Expect heterogeneity of signs/symptoms
- Consider using template for hospital orders

Special Issues

- Manage ARS with scarce resources (e.g., after nuclear detonation)
- Consider white cell cytokines to mitigate neutropenia if dose > 2 gray
- Consider multi-organ dysfunction and multi-organ failure syndromes of ARS
- Consider hematopoietic stem cell transplant for severe ARS

Survivors

- Discharge with appropriate follow-up instructions
- Register patient in incident database
- Radiation follow-up considerations
  - Whole-body dose
  - Immune status
  - Risk of cancer
  - Risk of specific organ dysfunction

Deceased

- Decedents with exposure only and no contamination require no special radiation precautions
- Register decedent in incident database

REMM
RADIATION EMERGENCY MEDICAL MANAGEMENT
www.REMM.nlm.gov

Contamination: Diagnose/Manage

Radiological/Nuclear Incident ☢

↓

How do you know a radiation incident has occurred?

↓

Initial on-site activities

↓

Perform lifesaving tasks before managing radiation problems

↓

Evaluate for Contamination and/or Exposure

↓

No Contamination or Exposure | **Contamination Only** (What Is Contamination?) | **Exposure +Contamination** | **Exposure Only** (What Is Exposure?)

Assess External Contamination

- Contact radiation safety officer
- Assess contamination pattern with radiation survey meter
- Evaluate for radioactive shrapnel
- Document contamination pattern on a body diagram
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⚠ Management Modifiers

- Burns
- Trauma
- Mass casualty
- Timing of surgery
- Blood products use
- At-risk/special needs populations

Decontaminate Whole Body

- Decontaminate onsite or at other designated area
- Follow decontamination procedures
- Re-scan patient with radiation survey meter
- Repeat decontamination until radiation reading is < 2 times background radiation level
- Do not exceed 3 attempts
- Special issues for infants and children

Evaluate if All Are True:

- Decontamination successful (< 2 times background radiation)
- Absent or minimal physical injury

Yes →
- Send home with follow-up instructions
- Register in event database

Onsite
- -
Medical Facility   **No**

Evaluate at Medical Facility

- Treat life- or limb-threatening injuries first
- Obtain sequential CBCs with differential to rule out whole-body exposure and ARS
- Remove any remaining radioactive shrapnel and shield it safely

Chart continued on next page.

Assess Internal Contamination
- Scan patient with radiation survey meter (caveat)
- Event responders or radiation safety officer will identify the isotope(s)
- Swab each nostril separately to help estimate level of internal (lung) contamination
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  - Instructions for sample collection, labeling, packaging and shipping
- Consider total body radiation survey with modified hospital nuclear medicine equipment

Treat Internal Contamination of Specific Isotope
- Isotopes of Interest Table
- Countermeasures Table
- Decision to treat will depend on
  - Level of internal contamination
  - Size of radiation event
  - Availability of resources/personnel
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Survivors
- Discharge with appropriate follow-up instructions
- Register patient in incident database
- Radiation follow-up considerations
  - Whole body dose
  - Immune status
  - Risk of cancer
  - Risk of specific organ dysfunction

Deceased
- Management of decedents with contamination
- Register decedent in incident database

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RADIATION EMERGENCY MEDICAL MANAGEMENT
www.REMM.nlm.gov
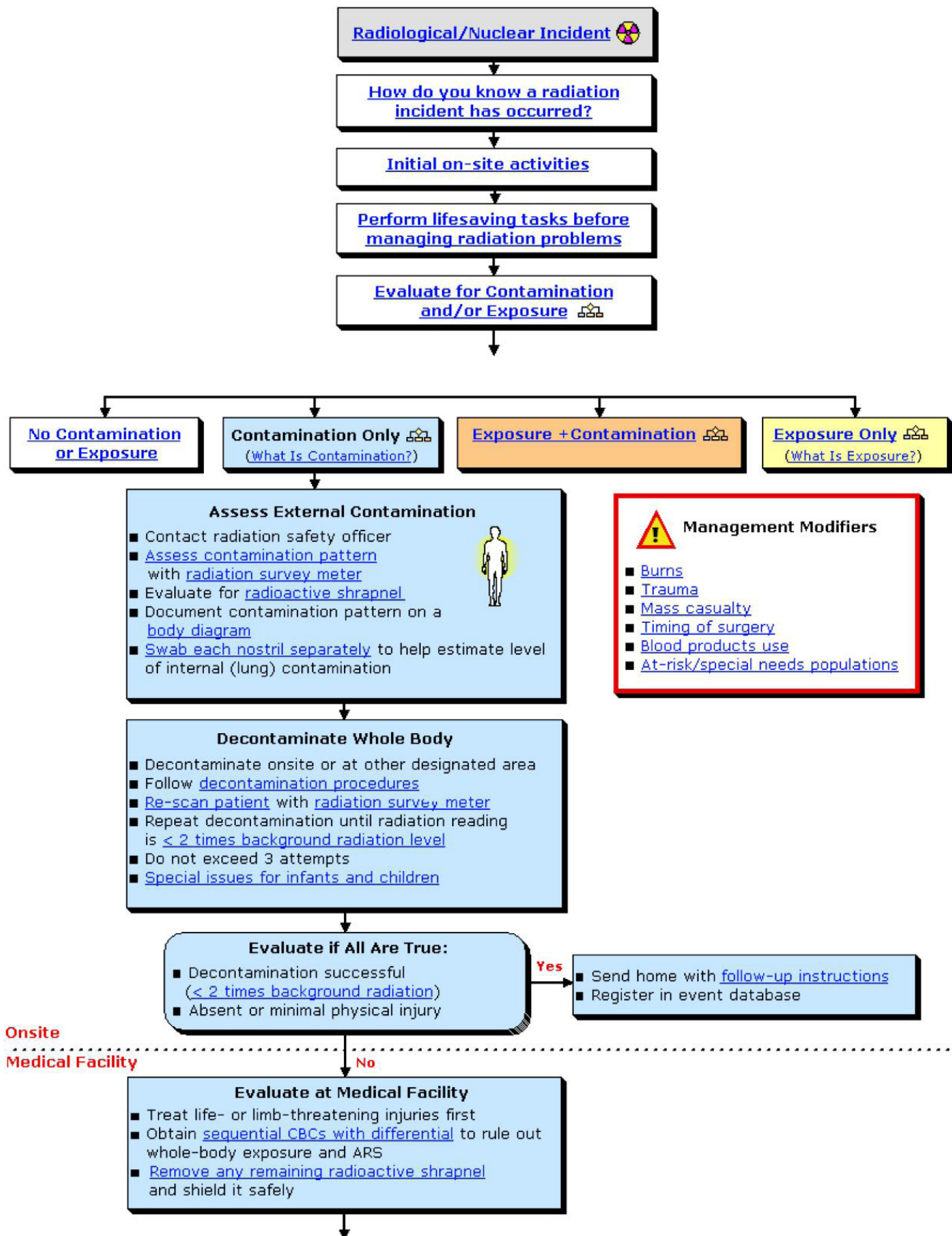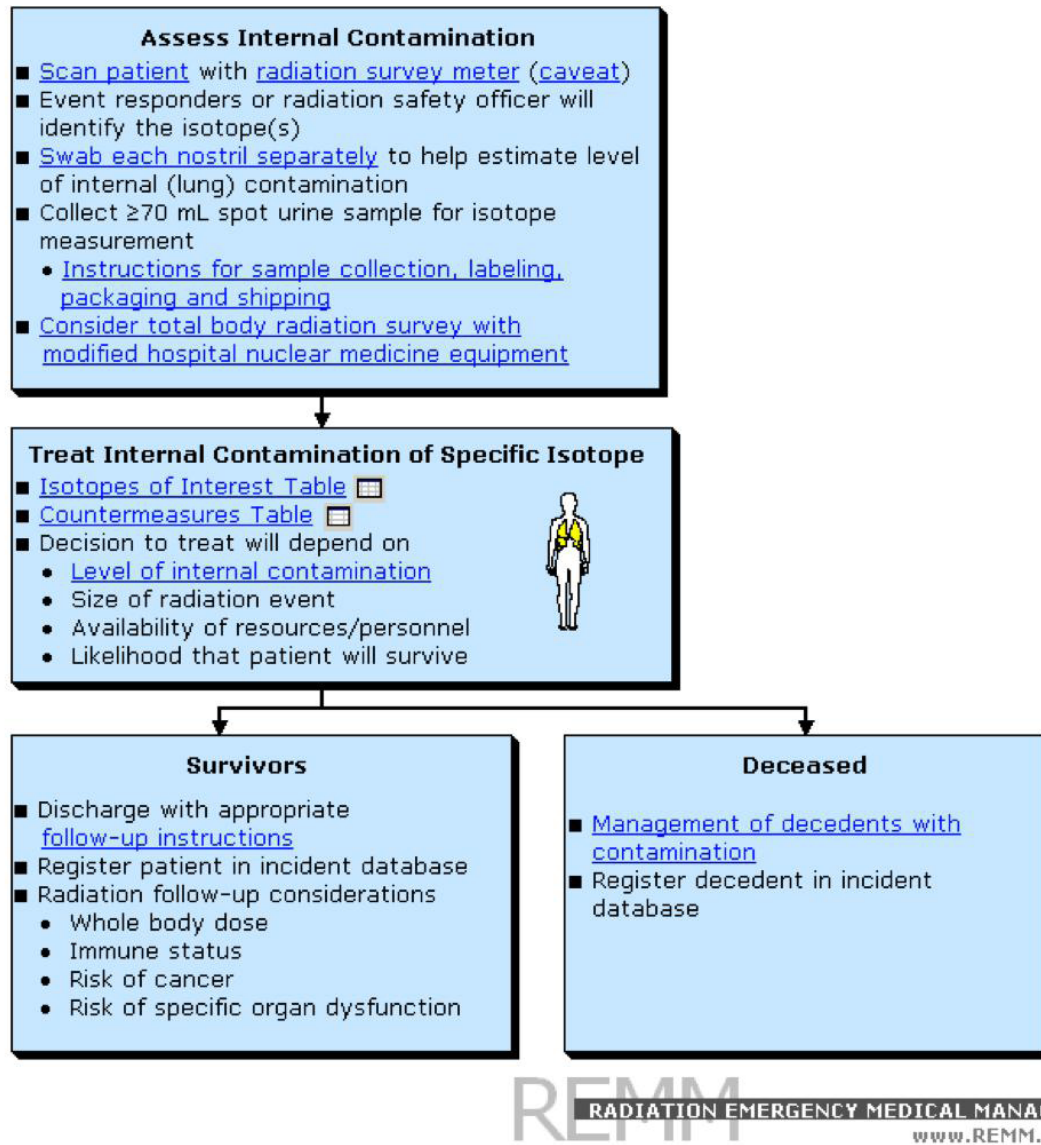
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PICU Radiation Decontamination courtesy of Dr. Kozue Shimabukuro, Loma Linda University Children's Hospital. (2013).

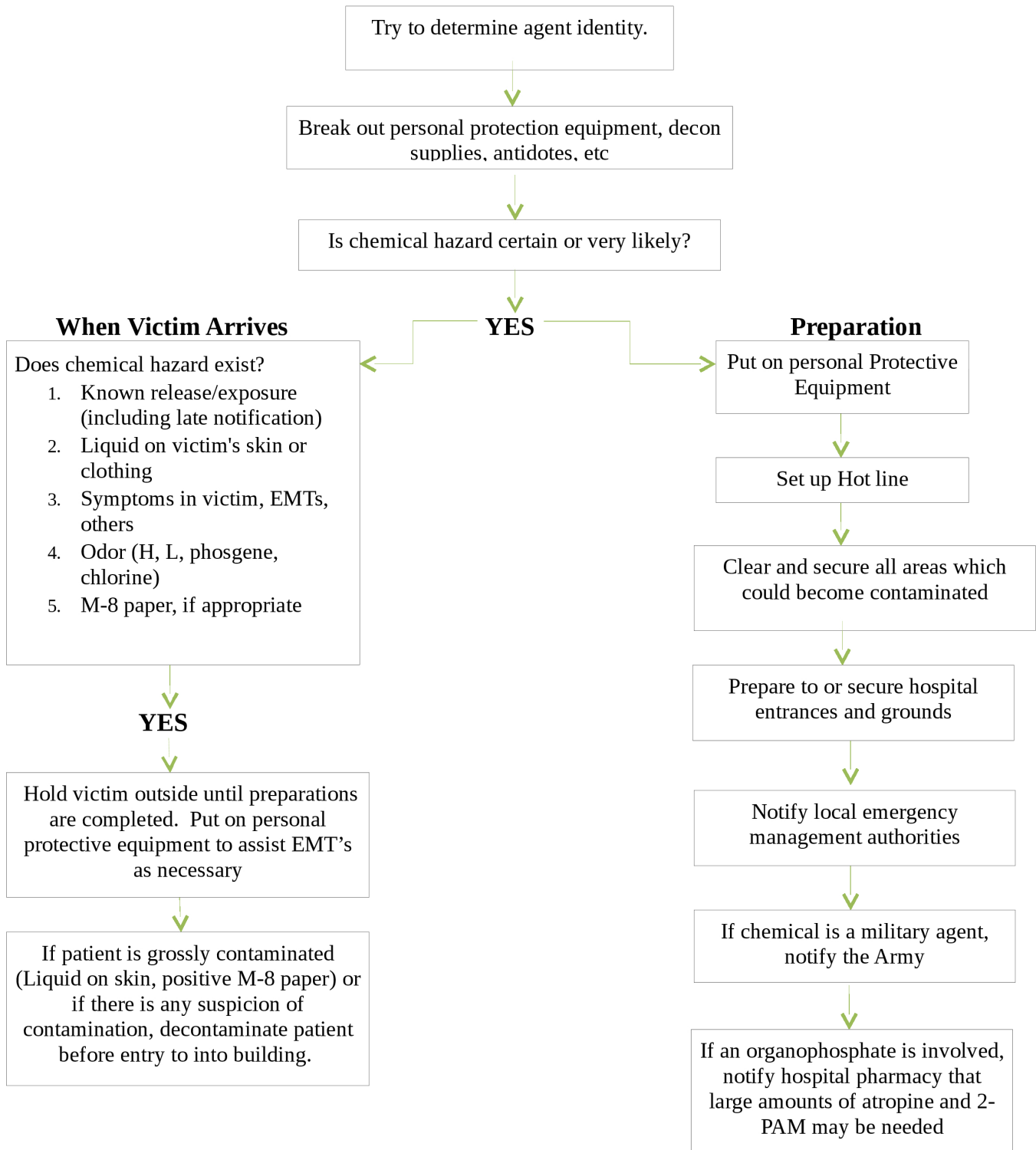# Clinical Considerations of Pediatric Chemical Exposures and Decontamination

A chemical agent is a substance which could kill, seriously injure, or incapacitate human through its toxicological effects. Chemical agents have been used in warfare and in act of terrorism.

Clues signaling a chemical or (biological) attack

1. An unusual increase in the number of patients seeking care for potential chemical-release--related illness

2. Unexplained deaths among young or healthy persons

3. Emission of unexplained odors by patients

4. Clusters of illness in persons who have common characteristics, such as drinking water from the same source

5. Rapid onset of symptoms after an exposure to a potentially contaminated medium (e.g., paresthesias and vomiting within minutes of eating a meal)

6. Unexplained death of plants, fish, or animals (domestic or wild)

7. A syndrome (i.e., a constellation of clinical signs and symptoms in patients) suggesting a disease associated commonly with a known chemical exposure (e.g., neurologic signs or pinpoint pupils in eyes of patients with a gastroenteritis-like syndrome or acidosis in patients with altered mental status).

Chemical decontamination

+ Prevent further injury to the patients

+ Protect hospital staff

+ Protect the hospital environment.

Try to determine agent identity.

Break out personal protection equipment, decon supplies, antidotes, etc

Is chemical hazard certain or very likely?

YES

When Victim Arrives

Does chemical hazard exist?
1. Known release/exposure (including late notification)
2. Liquid on victim's skin or clothing
3. Symptoms in victim, EMTs, others
4. Odor (H, L, phosgene, chlorine)
5. M-8 paper, if appropriate

YES

Hold victim outside until preparations are completed. Put on personal protective equipment to assist EMT's as necessary

If patient is grossly contaminated (Liquid on skin, positive M-8 paper) or if there is any suspicion of contamination, decontaminate patient before entry to into building.

Preparation

Put on personal Protective Equipment

Set up Hot line

Clear and secure all areas which could become contaminated

Prepare to or secure hospital entrances and grounds

Notify local emergency management authorities

If chemical is a military agent, notify the Army

If an organophosphate is involved, notify hospital pharmacy that large amounts of atropine and 2-PAM may be needed

Initial Treatment and Identification of the Chemical Agent

1. Establish airway if necessary.

2. Give artificial respiration if not breathing.

3. Control bleeding if hemorrhaging.

4. Symptoms of cholinesterase poisoning?

   + Pinpoint pupils

   + Difficulty breathing (wheezing, gasping, etc)

   + Local or generalized sweating

   + Fasciculations

   + Copious secretions

   + Nausea, vomiting, diarrhea

   + Convulsions

   + Coma

YES: Go to http://www.cdc.gov/nceh/demil/articles/initialtreat.htm#NERVE%20AGENT%20PROTOCOL

5. History of chlorine poisoning?

YES: Go to http://www.cdc.gov/nceh/demil/articles/initialtreat.htm#CHLORINE%20PROTOCOL

6. Burns that began within minutes of poisoning?

YES: Go to 7.

NO: Go to 8.

7. Thermal burn?

YES: Go to 9.

NO: Go to http://www.cdc.gov/nceh/demil/articles/initialtreat.htm#LEWISITE%20PROTOCOL

8. Burns or eye irritation beginning 2-12 hours after exposure?

YES: Go to http://www.cdc.gov/nceh/demil/articles/initialtreat.htm#MUSTARD%20PROTOCOL

NO: Go to 9.

9. Is phosgene exposure possible?

   + Known exposure to phosgene

   + Known exposure to hot chlorinated hydrocarbons

   + Respiratory discomfort beginning a few hours after exposure

YES: Go to http://www.cdc.gov/nceh/demil/articles/initialtreat.htm#PHOSGENE%20PROTOCOL

10. Check other possible chemical exposures:

   + Known exposure

   + Decreased level of consciousness without head trauma.

   + Odor on clothes or breath

   + Specific signs or symptoms

Phosgene Protocol

1. **Restrict fluids, chest x-ray, blood gases**

   Results consistent with phosgene poisoning?
   YES: Go to # 4

2. **Dyspnea?**

   YES: OXYGEN, positive end-expiratory pressure

3. **Observe closely for at least 6 hours.**

   + IF SEVERE DYSPNEA develops, go to 4.

   + IF MILD DYSPNEA develops after several hours, go to 1.

4. **Severe dyspnea develops or x-ray or blood gases consistent with phosgene poisoning.**

   + Admit

   + Oxygen under positive end-expiratory pressure

   + Restrict fluids

   + Chest x-ray

   + Blood gases

   + Seriously ill list

Mustard Protocol

1. **Airway obstruction?**

   YES: Tracheostomy

2. **If there are large burns:**

   + Establish IV line - do not push fluids as for thermal burns.

   + Drain vesicles - unroof large blisters and irrigate area with tropical antibiotics.

3. **Treat other symptoms appropriately:**

   + Antibiotic eye ointment

   + Sterile precautions prn

   + Morphine prn (generally not needed in emergency treatment; might be appropriate for in-patient treatment.)

Lewisite Protocol

1. **Survey extent of injury.**

2. **Treat affected skin with British Anti-Lewisite (BAL) ointment (if available).**

3. **Treat affected eyes with BAL ophthalmic ointment (if available).**

4. **Treat pulmonary/severe effects**

   - BAL in oil, 0.5 ml/25 lbs body wt. deep IM to max of 4.0 ml. Repeat q 4 h x 3 (at 4, 8 and 12 hours).

   - Morphine prn

5. **Severe poisoning?**

   YES: Shorten interval for BAL injections to q 2 h.

Chlorine Protocol

1. **Dyspnea?**

   - Try bronchodilators

   - Admit

   - Oxygen by mask

   - Chest X-ray

2. **Treat other problems and reevaluate (consider phosgene).**

3. **Respiratory system OK?**

   YES: Go to 5.

4. **Is phosgene poisoning possible?**

   YES: Go to http://www.cdc.gov/nceh/demil/articles/initialtreat.htm#PHOSGENE%20PROTOCOL

5. **Give supportive therapy; treat other problems or discharge.**

Nerve Agent Protocol

1. **Severe respiratory distress?**
    YES:

    +   Intubate and ventilate

    +   ATROPINE
        Adults: 6 mg IM or IV
        Inf/ped: 0.05 mg/kg IV

    +   2-PAM C1
        Adults: 600-1000 mg IM or slow IV
        Inf/ped: 15 mg/kg slow IV

2. **Major secondary symptoms?**
    NO: Go to 6.

    YES:

    +   ATROPINE
        Adults: 4 mg IM or IV
        Inf/ped: 0.02 - 0.05 mg/kg IV

    +   2-PAM C1
        Adults: 600-1000 mg IM or slow IV
        Inf/ped: 15 mg/kg

    +   OPEN IV LINE

3. **Repeat atropine as needed until secretions decrease and breathing easier**

    Adults: 2 mg IV or IM
    Inf/ped: 0.02 - 0.05 mg/kg IV

4. **Repeat 2-PAM C1 as needed**
    Adults: 1.0 gm IV over 20-30 min
    Repeat q lh x 3 prn
    Inf/ped: 15 mg/kg slow IV

5. **Convulsions?**
    NO: Go to 6.
    YES: DIAZEPAM 10 mg slow IV
    Inf/ped: 0.2 mg/kg IV

6. **Reevaluate q 3-5 min.**
    IF SIGNS WORSEN, repeat from 3.

Note: Warn the hospital pharmacy that unusual amounts of atropine and 2-PAM may be needed

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PICU Chemical Exposures courtesy of Dr. Kozue Shimabukuro, Loma Linda University Children's Hospital (2013).

Clinical Considerations of Pediatric Blast Injuries

Disasters due to explosions are increasing in the civilian population and lead to mass casualties due to multisystem trauma. Health care professionals need to understand the spectrum of blast injuries, as well as consider the management and the unique characteristics of blast injuries in pediatric patients.

Physics of blast injury

Explosions produce several effects: blast wave, blast wind and thermal energy

- A *blast wave* is a high-pressure shock wave created by rapidly expanding gases from the explosive detonation. It produces an instantaneous rise in pressure that is several times the atmospheric pressure and then declines to a sub atmospheric degree of pressure. Blast waves travel at supersonic speeds in the air and even faster in water. The resulting stress gradient leads to tissue disruption particularly at tissue interphases.

- *Blast winds* stem from the gas generation and expansion caused during the explosion. It is the displacement of air that can hurl people and objects, as well as collapse structures.

Blast Injuries in Pediatrics

Some unique pediatric characteristics in blast injuries:

- A traumatic brain injury can occur without the patient losing consciousness

- Chest injuries caused by blunt force are a common cause of death in children

- Children are more prone to abdominal injuries because of smaller more pliable ribs, thin abdominal walls that offer them less protection and proportionally larger organs such as the liver and spleen

- Children are more susceptible to heat loss, so temperature regulation is important

- Young children have relatively large heads and immature neck musculature. This makes them more susceptible to cervical spine injuries caused by the fulcrum effect in the C1-C3 area.

- Children under 8 years are susceptible to SCIWORA (Spinal Cord Injury Without Radiologic Abnormalities)

- Traumatic asphyxia occurs almost exclusively in children. It results from the sudden compression of the abdomen/chest against a closed glottis. Symptoms include hyperemic sclera, seizures, disorientation, petechiae in the upper body and respiratory failure.

- A child's body surface area is larger in relation to weight and the layers of skin are thinner leading to increased risk of chemical and thermal burns

- Unheated adult decontamination showers will likely result in significant hypothermia in children. Decontaminate children in the presence of parents if possible to reduce separation anxiety

- Mental health issues are common in children who have experienced a bomb blast

Mechanisms of Blast Injury

Category	Characteristics	Body Part Affected	Types of Injuries
Primary	Unique to high-order explosives, results from the impact of the over-pressurization wave with body surfaces.	Gas filled structures are most susceptible - lungs, GI tract, and middle ear.	Blast lung (pulmonary barotrauma) TM rupture and middle ear damage Abdominal hemorrhage and perforation - Globe (eye) rupture- Concussion (TBI without physical signs of head injury)
Secondary	Results from flying debris and bomb fragments.	Any body part may be affected.	Penetrating ballistic (fragmentation) or blunt injuries Eye penetration (can be occult)
Tertiary	Results from individuals being thrown by the blast wind.	Any body part may be affected.	Fracture and traumatic amputation Closed and open brain injury
Quaternary	All explosion-related injuries, illnesses, or diseases not due to primary, secondary, or tertiary mechanisms. Includes exacerbation or complications of existing conditions.	Any body part may be affected.	Burns (flash, partial, and full thickness) Crush injuries Closed and open brain injury Asthma, COPD, or other breathing problems from dust, smoke, or toxic fumes Angina Hyperglycemia, hypertension

Overview of Explosive-Related Injuries

System	Injury or Condition
Auditory	TM rupture, ossicular disruption, cochlear damage, foreign body
Eye, Orbit, Face	Perforated globe, foreign body, air embolism, fractures
Respiratory	Blast lung, hemothorax, pneumothorax, pulmonary contusion and hemorrhage, A-V fistulas (source of air embolism), airway epithelial damage, aspiration pneumonitis, sepsis
Digestive	Bowel perforation, hemorrhage, ruptured liver or spleen, sepsis, mesenteric ischemia from air embolism
Circulatory	Cardiac contusion, myocardial infarction from air embolism, shock, vasovagal hypotension, peripheral vascular injury, air embolism-induced injury
CNS Injury	Concussion, closed, and open brain injury, stroke, spinal cord injury, air embolism-induced injury
Renal Injury	Renal contusion, laceration, acute renal failure due to rhabdomyolysis, hypotension, and hypovolemia
Extremity Injury	Traumatic amputation, fractures, crush injuries, compartment syndrome, burns, cuts, lacerations, acute arterial occlusion, air embolism-induced injury

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PICU Blast Injuries courtesy of Dr. Sonea Qureshi, Loma Linda University Children's Hospital. (2013).

Clinical Considerations of Pediatric Respiratory Distress/Failure

Respiratory Failure and Airway Management

Children with respiratory distress have increase work of breathing until they experience muscle fatigue and are no longer able to compensate. This leads to respiratory failure and arrest. There are many cause of respiratory distress e.g. pneumonia, asthma, upper airway obstruction or foreign body aspiration.

- In disaster scenario pediatric patients may suffer from blunt trauma, penetrating trauma, and blast injuries leading to pulmonary contusions, hemo/ pneumothorax and pneumomediastinum and other injuries. Children have much more compliant chest walls. rib fractures are much less common and severe thoracic injuries can occur without significant external evidence of injury

- Children have high respiratory rate and lower pulmonary reserve leading to higher dose inhalation during a chemical exposure. They have small airways so there is a greater risk of airway compromise during smoke inhalation. Children have narrower airways and as a result are more prone to bronchospasm and obstruction

For the first responders, it is essential to be able to recognize respiratory distress and failure. They need to provide basic support to maintain airway and breathing in order to prevent cardiopulmonary arrest.

Table 1 describes the clinical assessment of respiratory distress, respiratory failure and respiratory arrest

Table 1. First Impression of Pediatric Respiratory Emergencies

Assessment	Distress	Failure	Arrest
Mental Status	Alert, agitated, or combative	Extreme agitation or reduced responsiveness	Unresponsive
Muscle tone/ body position	Normal; may assume tripod position	Normal tone or hypotonia	Atony
Chest movement	Present	Present	Absent
Work of breathing	Increased	Greatly increased with periods of weakness	Absent
Skin color	Pink or pallid	Pallid, mottled, or cyanotic	Cyanotic

Modified from Paramedic TRIPP

Assessment	Response
Mental Status + Alert, agitated, or combative + Extreme agitation or reduced responsiveness + Unresponsive	+ Provide oxygen (with the help of parent / caregiver) + Consider Bag- mask Ventilation + Bag-mask ventilation / intubation
Airway + Assess patency by chest movement, work of breathing and breath sounds.	Maintain airway patency + Small roll under the shoulder (< 2 yrs) + Suction nose and oropharynx + Jaw-thrust maneuver + Chin –lift maneuver (contraindicated in trauma) Oropharyngeal airway + Used in unconscious patients + Used during Bag mask ventilation Nasopharyngeal Airway + Can be used in awake patients + Helps keeping the tongue from obstructing the airway + Contraindicated in basilar skull fractures, coagulopathy and nasal deformity and infection
Breathing **Respiratory rate** RR > 60 is abnormal Slow rate also indicates respiratory failure **Work of Breathing** Nasal flaring and grunting, Intercostal, sub coastal and suprasternal retractions	+ Children should be allowed to maintain the position of comfort. (maximized airway patency and minimizes respiratory effort) + Oxygen administration is of limited value in the presence of airway obstruction

Breathing

Auscultation
+ Listen over the mouth, neck, chest and axilla
+ Stridor indicates upper airway obstruction
+ Wheezing is caused by expiratory obstruction
+ Respiratory effort with no breath sounds may indicate complete airway obstruction
+ Crackle /rales are heard in pneumonias and pulmonary edema

+ Asymmetrical breath sounds may indicate pneumothorax, pleural effusion, foreign body, atelectasis and ET tube in the opposite main bronchus

In patients with severe distress/respiratory failure
+ Decrease responsiveness, hypotonia, increased work of breathing, skin mottled or cyanotic

+ Monitor Oxygen saturations by pulse oximetry

+ Administer inhaled medication as needed (albuterol, epinephrine)

Oxygen therapy
+ Simple oxygen mask- low-flow device with flow rate of 6-10 L/min (oxygen concentration up to 60%)
+ Partial rebreathing mask- Simple face mask with a reservoir bag. Oxygen flow rate of 10-12 L/min (oxygen concentration 50 - 60 %)
+ Non – rebreathing mask – Face mask with a reservoir and a valve in the exhalation port. Oxygen flow rate of 10 -15 L/min (oxygen concentration up to 95%

+ If signs of tension pneumothorax will need needle thoracostomy and chest tube

+ May need to reposition the ET in some patients

Start Bag-mask Ventilation
+ Maintain an open airway
+ Establish a seal between the patient's face and the mask
+ Deliver optimal tidal volume based on the chest rise
+ In significant obstruction, difficult airway or poor lung compliance use 2- rescuer technique
    + One rescuer uses both hands to open the airway by placing three fingers of each hand on both posterior rami of mandibles and using thumbs and index finger to maintain the seal

	- Second rescuer compresses the ventilation bag - Assess the adequacy of Bag-mask ventilation - Chest rise and B/L breath sounds - Clinical response improved heart rate and good color - Monitor oxygen saturations Tracheal intubation - Consider endotracheal Intubation if the child is unable to maintain effective airway, oxygenation or ventilation despite initial intervention. - Need proper equipment and medication - Should be done by health care providers with training and experience with pediatric intubation - Check ET position with good chest rise, B/L equal air entry and end- tidal CO_2 monitoring
Circulation Assess circulation	- Continuously asses heart rate, blood pressure and perfusion - Establish vascular assess - If active bleeding, hold direct pressure

References:

Centers for Disease Control. (2013). Blast injuries: Pediatrics. Retrieved from http://www.bt.cdc.gov/masscasualties/blastinjury-pediatrics.asp

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PICU Airway Management courtesy of Dr. Sonea Qureshi, Loma Linda University Children's Hospital. (2013).

Clinical Considerations of Pediatric Shock

Shock

Shock is a common physiological state seen in many forms of disasters. Shock is a critical condition that results from an inadequate delivery of oxygen and other essential nutrients to the body. Shock is often but not always characterized by inadequate peripheral and end –organ perfusion. When body is faced with decrease oxygen delivery compensatory mechanism are activated in order to preserve oxygen delivery and systolic blood pressure is maintained with in normal range. This is referred to as compensated shock. When compensatory mechanisms fail then systolic blood pressure drops leading to hypotensive shock.

There are four main categories of shock in pediatrics. Hypovolemic, distributive, cardiogenic and obstructive shock.

+ Hypovolemic shock is most common in children i.e. dehydration, external hemorrhage, internal hemorrhages/fractures, extremity injuries, trauma and burns. Hypovolemic shock occurs when circulating intravascular blood volume decrease's to a point at which adequate tissue perfusion can't be maintained.

+ Cardiogenic shock is caused by a decrease cardiac contractility leading to inadequate oxygen delivery. e.g myocardial contusions in blunt trauma and arrhythmias

+ Distributive shock is a misdistribution of tissue blood flow due to decrease systemic vascular resistance i.e. Head injuries, spinal cord injuries, anaphylaxis and toxic ingestions

+ Obstructive shock is due to obstruction to cardiac output due to extrinsic forces acting on the intrathoracic structures in spite of adequate blood volume and cardiac contractility i.e. tension pneumothorax, hemo/ pneumothorax and cardiac tamponade (penetrating trauma), massive pulmonary embolism and duct-dependent congenital cardiac lesions.

The shock treatment goal is to improve oxygen delivery and help prevent end organ injury. The earlier we can recognize shock, establish priorities and start therapy, better the child's chance of a good outcome.

Initial Assessment and Management of Shock

Assessment	Response
Airway + Asses airway + Partial/complete obstruction + (secretions, blood, altered mental status)	+ Suction nasal and oropharynx + Apply jaw thrust maneuver + Head-tilt chin lift maneuver (contraindicated in trauma) + Consider the need for cervical immobilization in trauma + Consider bag mask ventilation/intubation if complete obstruction/unconscious

Breathing
 	
Respiratory rate
+ Apnea, bradypnea, tachypnea, irregular breathing rate
+ Tachypnea is an early indicator of shock
 	
Work of breathing
+ Look for nasal flaring, assessory muscle use, subcostal and intercostal retractions
 	
Assess breath sounds
+ Absent/decrease breath sounds
+ Wheezing, grunting stridor
+ Asymmetric/absent breath sounds consider
   + Pneumothorax
   + Hemopneumothorax
   + Foreign body aspiration
   + Atelectasis
 	
Pulse oximetry
	Provide high-flow oxygen regardless of saturations
	
	For severe respiratory distress may need Bag-mask ventilation / oral tracheal intubation
	
	For signs of tension pneumothorax consider needle thoracotomy/ Chest tube
	
	Should be used to assess all patients in shock Poor signal may indicate hypoperfused state

Circulation

Heart rate
- Tachycardia
- Bradycardia

Pulse strength
- Compare central versus distal pulses
- Weak Central and absent/weak peripheral pulse

Skin color and temperature
- Pallid, mottled, cyanotic and cool extremities indicate poor perfusion

Cap refill
- > 2-3 seconds indicates poor perfusion

Blood pressure
- Hypotension is a late sign of shock

Urine output
- Aim for 1-2 mL/kg /hr in children

If a source of hemorrhage is identified
Lacerations, extremities injuries

Consider internal hemorrhage in children with blunt trauma e.g pelvic fractures

Obtain Vascular Access
- Percutaneous peripheral
- If unable to get peripheral asses place an Intraosseous needle
- Central venous line placed by physicians with expertise

Fluid resuscitation
- Normal Saline/Ringer lactate 20 ml/kg fluid bolus over 5- 10 minutes. May repeat based on HR, perfusion and BP up to 60 mL/kg
- May need 30-60 mL syringes to rapidly push the fluid though IV
- or use a rapid infusion device or a pressure bag
- After 60mL/kg may consider colloids/blood

Control bleeding
- Applying direct pressure
- Tourniquets should not be used (except in unusual circumstances like traumatic amputation of an extremity)

For ongoing blood losses and coagulopathy blood product should be used
- Cross matched, type –specific or type O (warmed blood)
- PRBC. 10ml/kg as needed
- Keep hemoglobin level 10 g/dl
- Fresh frozen plasma (10 ml/kg)
- Platelets (10 mL/kg)
- With rapid infusion of cold/stored blood, children may experience
- Hypothermia
- Ionized hypocalemia
- Myocardial dysfunction

	Consider vasoactive and inotropic infusions once adequate volume resuscitation has been achieved • Dopamine 2-15 ug/kg/min • Epinephrine 0.05 – 1 ug/kg/min • Norepinephrine 0.05-1 ug/kg/min • Milrinone 0.3-.75 ug/kg/min • Vassopresin 0.3-2 milliunits/kg/min
Hepatomegaly and rales on auscultation is a sign of fluid overload/cardiogenic Shock	Broad spectrum antibiotics intravenously preferably with in an hour
If sepsis is a consideration	May consider stress dose steroids for unresponsive septic shock
Monitor blood glucose	If < 60 mg/dl give IV dextrose • D25% 2-4 mL /kg IV • D10% 5 mL/kg IV
Disability • AVPU • GCS • GCS < 8. Decrease mental status is seen in moderate to severe shock	These patient will need BMV / intubation
Environment	Remove clothing and asses for trauma, bleeding and burns Measure core temp Try to keep children warm after the initial assessment

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PICU Shock courtesy of Dr. Sonea Qureshi, Loma Linda University Children's Hospital. (2013).

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