

**Illinois ESF-8 Plan: Pediatric and Neonatal
Surge Annex**

Pediatric and Neonatal Care Guidelines

June 2017



Table of Contents

Introduction	1
Burn Care Guideline (includes radiation exposure)	2
Initial Assessment of the Pregnant Patient	26
Inpatient Treatment and Monitoring Intervention Care Guideline	27
Newborn Care Guideline	43
Obstetrical Care Guideline.....	53
Pandemic Care Guideline.....	68
Premature Newborn Care Guideline.....	74
Respiratory Care Guideline.....	79
Shock Care Guideline.....	85
Trauma and Blast Injury Care Guideline.....	95
Sample Admission Orders.....	107
Acronyms	121
References.....	124

Introduction

During a large-scale disaster, normal interfacility transfer patterns may be disrupted. Health care facilities that typically transfer their acutely ill/injured pediatric patients or children with special health care needs (CSHCN)/children with functional access needs (CFAN) to pediatric tertiary care centers/specialty care centers may need to care for these patients for longer periods of time until they are able to transfer these patients to a higher level of care. The *Pediatric and Neonatal Care Guidelines* are available as an adjunct to the Illinois Department of Public Health (IDPH) Emergency Support Function (ESF) 8 Plan: Pediatric and Neonatal Surge Annex which is the state health and medical disaster plan. These care guidelines provide support and guidance to those practitioners caring for children during the initial 96 hours following a disaster. The *Pediatric and Neonatal Care Guidelines* are not meant to be all inclusive, should not replace an existing policy and procedure at a health care facility, nor substitute for clinical judgment. These guidelines may be modified at the discretion of the health care provider.

These guidelines are maintained by the Illinois Emergency Services for Children program and revised as needed.

Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

Disclaimer: This guideline are not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

96 Hour Care Guidelines for Pediatric Burn Patients if Transfer to a Hospital with Burn Capabilities is Not Feasible

Initial Patient Treatment

- Stop the burning process
- Use universal precautions
- Remove all clothing and jewelry
- Prior to initiating care of the patient with wounds, it is critical that health care providers take measures to reduce their own risk of exposure to potentially infectious substances and/or chemical decontamination. Rinse liberally with water, according to protocol, if suspected chemical exposure. Apply clean, dry dressing(s) initially to avoid hypothermia.
- Apply clean DRY sheet or bedding to prevent hypothermia.
- For the care of a burn patient with radiation exposure, see page 21.
- Consult Pediatric Care Medical Specialist (PCMS) and/or the State Burn Coordinating Center (SBCC) for assistance with care of the acutely and critically ill patient, to individualize patient care; if patient does not improve and needs to be transferred; and as needed for further support and consult.
- Palliative care/comfort care patients: During a burn MCI, resources may not be available to treat those with extensive burn injuries. There are sections within the following guidelines that provide guidance to providers in order to address their needs. Consult the SBCC or the Pediatric Care Medical Specialist (PCMS) for additional assistance from palliative care experts.

Primary Assessment, Monitoring, Interventions and Key Points

Assessment and Monitoring	Interventions	Key Points
<p><u>Airway Maintenance with Cervical Spine Motion Restriction</u></p> <ul style="list-style-type: none"> • Assess throat and nares. • Signs of airway injury: <ul style="list-style-type: none"> ○ Hypoxia ○ Facial burns ○ Carbonaceous sputum ○ Stridor ○ Hoarseness ○ Nasal singe 	<p><u>Airway Maintenance with Cervical Spine Motion Restriction</u></p> <ul style="list-style-type: none"> • Chin lift/jaw thrust with C-spine motion restriction as needed. • IMMOBILIZE SPINE as indicated. Position for optimal airway and suction as needed. Position infants and children < 2 yrs supine on a backboard with a recess for the head or use a pad under 	<p><u>Airway Maintenance with Cervical Spine Motion Restriction</u></p> <ul style="list-style-type: none"> • Airway edema increases significantly after IV/IO fluids are started. • Stridor or noisy breath sounds indicate impending upper airway obstruction. • Younger children and those with larger burns are more likely to require intubation due to the smaller diameter of the child’s airway and the need for significant fluid volumes during resuscitation.

Assessment and Monitoring	Interventions	Key Points
<ul style="list-style-type: none"> ○ History of a closed space fire 	<p>the back from the shoulders to the buttocks.</p> <ul style="list-style-type: none"> ● Place an oral pharyngeal airway or cuffed endotracheal tube (ETT) in the unconscious patient ● Intubate early with cuffed ETT. ● Secure ETT with ties passed around the head; do not use tape on facial burns since it will not adhere to burned tissue. ● Insert gastric tube on all intubated patients. ● Palliative care/comfort Care Patients: Patients triaged as expectant or to receive palliative/comfort care only should not be intubated. Administer oxygen to aid comfort and prevent air hunger. Also consider pain management. See pages 16-17 for more guidelines. 	<ul style="list-style-type: none"> ● Prophylactic intubation is preferred because the ensuing edema obliterates landmarks needed for successful intubation. However, during a burn MCI, there is a need to consider resource availability (e.g. number of ventilators, number of trained staff to manage ventilators) ○ It is critical that the ETT is secured well. An ETT that becomes dislodged may be impossible to replace due to the edema of the upper airway.
<p><u>Breathing and Ventilation</u></p> <ul style="list-style-type: none"> ● Assess for appropriate rate and depth of respirations with adequate air exchange. ● Monitor pulse oximetry while checking carbon monoxide (CO) level (as needed). ● If circumferential torso burns, monitor chest expansion closely. ● Obtain Arterial Blood Gas (ABG). ● Obtain Carboxyhemoglobin (COHb) level if suspected inhalation injury. 	<p><u>Breathing and Ventilation</u></p> <ul style="list-style-type: none"> ● 100%, high flow oxygen using a non-rebreather mask or ETT; wean as appropriate. ● Mechanically ventilate as needed. Ventilator settings are not different for burn patients compared to other patients. ● Elevate head of bed (HOB) if not contraindicated to decrease facial edema. ● Consult with SBCC to determine if escharotomy is indicated and to receive guidance on performing an escharotomy. 	<p><u>Breathing and Ventilation</u></p> <ul style="list-style-type: none"> ● CO levels decrease by half (½) every 40 minutes while on 100% FiO₂. CO level goal is <10%. ● An escharotomy is an incision performed longitudinally through burned tissue down to subcutaneous tissue over the entire involved area of full thickness circumferential (or nearly circumferential burn) that is causing constriction and loss of peripheral perfusion or airway constriction. A chest escharotomy may be indicated in circumferential or full thickness chest burns due to location or depth of burn in the trunk area, which may interfere with ventilation.
<p><u>Circulation with Hemorrhage Control</u></p> <ul style="list-style-type: none"> ● Continuous cardiac monitoring as needed. 	<p><u>Circulation with Hemorrhage Control</u></p> <ul style="list-style-type: none"> ● Two large bore peripheral IVs in non-burned extremities (secure well). 	<p><u>Circulation with Hemorrhage Control</u></p> <ul style="list-style-type: none"> ● Cardiac monitoring may be needed if there is an electrical injury, concurrent trauma or cardiac issues

Assessment and Monitoring	Interventions	Key Points
<ul style="list-style-type: none"> Control any signs of hemorrhage. 	<ul style="list-style-type: none"> If unable to secure peripheral IV in non-burned extremity, burned extremity can be used if necessary; suture IV in place. If unable to establish a peripheral IV, place an intraosseus (IO). IO access can be through burned skin. Initial IVF with Lactated Ringers (LR) <ul style="list-style-type: none"> ≤ 5 yrs. 125 mL LR/hour 6-13 yrs. 250 mL LR/hour ≥ 14 yrs. 500 mL LR/hour 	<ul style="list-style-type: none"> Dysrhythmias may be the result of an electrical injury To secure an IV on burned skin (tape will not stick), consider suturing in place or using self-adhesive (e.g. Coban) or other type of wrap. Self-adhesive or other wraps should be applied loosely to prevent skin breakdown. Palliative care/Comfort care patients: IVs should be started for the administration of medications for pain and anxiety. Do not administer large volumes of fluid. Excessive fluid will result in decreased circulation and increased pain due to edema.
<p style="text-align: center;"><u>Disability</u></p> <ul style="list-style-type: none"> Neurologic checks every 4 hours and PRN. <ul style="list-style-type: none"> Determine level of consciousness. Obtain Glasgow Coma Scale Consider using “AVPU.” <ul style="list-style-type: none"> A: Alert V: Responds to verbal stimuli P: Responds to painful stimuli U: Unresponsive Obtain glucose level 	<p style="text-align: center;"><u>Disability</u></p> <ul style="list-style-type: none"> Treat cause of altered mental status as indicated: <ul style="list-style-type: none"> Hypoglycemia: <ul style="list-style-type: none"> Dose: Dextrose 0.5-1 g/kg IV/IO <ul style="list-style-type: none"> Birth- 28 days: D10W: 2 mL/kg IV Infants > 28 days- 1 y/o: D12.5%W: 5-10 mL/kg IV/IO 1 y/o-8 y/o: D25W: 2-4 mL/kg IV/IO > 8 y/o: D50W: 1-2 mL/kg IV/IO 	<p style="text-align: center;"><u>Disability</u></p> <ul style="list-style-type: none"> If altered neurological status, consider the following: <ul style="list-style-type: none"> Associated injuries CO poisoning Substance abuse Hypoxia Hypoglycemia (<60 mg/dL in infants/children; <50 mg/dL in neonates) Pre-existing medical condition
<p style="text-align: center;"><u>Exposure</u></p> <ul style="list-style-type: none"> Monitor temperature 	<p style="text-align: center;"><u>Exposure</u></p> <ul style="list-style-type: none"> Remove all clothing and jewelry. Initially place a clean, dry sheet over the wounds until a thorough cleaning is done. Keep patient and environment warm. <ul style="list-style-type: none"> Keep patient covered Cover the patient’s head 	<p style="text-align: center;"><u>Exposure</u></p> <ul style="list-style-type: none"> Localized hypothermia causes vasoconstriction to damaged area reducing blood flow and tissue oxygenation and may deepen the injury. Systemic hypothermia (core temp less than 95° F / 35° C) induces peripheral vasoconstriction that may increase the depth

Assessment and Monitoring	Interventions	Key Points
	<ul style="list-style-type: none"> ○ Warm the room ○ Warm the IV/IO fluids ○ External patient warming devices 	<ul style="list-style-type: none"> ○ of the burn and interfere with clotting mechanisms and respiration in addition, to causing cardiac arrhythmias. ● Use portable radiant heaters with caution

Secondary Assessment, Monitoring, Interventions and Key Points

Assessment and Monitoring	Interventions and Key Points
<p style="text-align: center;"><u>History</u></p> <ul style="list-style-type: none"> ● Obtain circumstances of injury ● Obtain medical history. Consider using “AMPLET.” <ul style="list-style-type: none"> ○ Allergies, Medications, Previous illness/history, Last meal/fluid intake, Events related to injury, Tetanus and childhood vaccinations 	<p style="text-align: center;"><u>History</u></p> <ul style="list-style-type: none"> ● Obtain history from patient early before intubation if possible. Obtain contact information for family as well.
<p style="text-align: center;"><u>Complete Physical Exam</u></p> <ul style="list-style-type: none"> ● Head to toe exam ● Vital signs: Perform as indicated in health care facility policy. May need to perform more frequently if patient is unstable. <ul style="list-style-type: none"> ○ Heart rate (HR) ○ Blood pressure (BP) ○ Respiratory rate (RR) ○ Temperature ○ Pulse oximetry ○ Capillary refill ○ Skin color of unburned skin ○ Imperative to obtain weight on patient <ul style="list-style-type: none"> ▪ If possible obtain weight before initiating IVF resuscitation ● Determine extent/size of burn by calculating the TBSA using: <ul style="list-style-type: none"> ○ Rule of Nines or Rule of the Palm (See page 19 for printable version) ○ Lund-Browder chart (See page 18 for printable version) ● Determine the depth of the burn (See page 17 for more information) 	<p style="text-align: center;"><u>Complete Physical Exam</u></p> <ul style="list-style-type: none"> ● Due to increased catecholamines and hypermetabolism associated with burn injuries, the HR will be increased. Relative tachycardia is normal for burn patients (will vary based on the age of the patient). Sustained tachycardia may indicate hypovolemia, inadequate oxygenation, unrelieved pain or anxiety. ● May need to use doppler to obtain blood pressure ● Oral rehydration can be used in the following pediatric patients: <ul style="list-style-type: none"> ○ Patients not intubated. ○ Injury not an electrical injury. ○ Awake and alert with < 10% TBSA. ○ Contact the SBCC for assistance with oral rehydration. ○ Monitor quality and quantity of urine output on patient’s receiving oral rehydration. ● IV/IO fluid burn resuscitation-Use Lactated Ringers: <ul style="list-style-type: none"> ○ When supplies of LR are depleted, 0.9 NS and 0.45 NS or colloids can be used for fluid resuscitation. Do not use fluid containing glucose for fluid resuscitation. ○ $3 \text{ mL} \times \text{wt (kg)} \times \% \text{ TBSA} = \text{total for first 24 hours post burn.}$ ○ Administer half of the above amount in first 8 hours post burn.

Assessment and Monitoring	Interventions and Key Points
<ul style="list-style-type: none"> ○ <i>Superficial (1st degree)</i> <ul style="list-style-type: none"> ▪ Involves the epidermis, ▪ Appearance: Red (e.g., sunburn) ▪ Do not include when calculating % TBSA, ○ <i>Partial thickness (2nd degree)</i> <ul style="list-style-type: none"> ▪ Involves the entire epidermis and a variable portion of the dermis ▪ Appearance: red, blistered and edematous. ○ <i>Full thickness (3rd degree)</i> <ul style="list-style-type: none"> ▪ Involves the destruction of the entire epidermis and dermis ▪ Appearance: white, brown, dry, leathery with possible coagulated vessels • If camera is available, take pictures of initial burn injuries to document progression of burn injury. • Labs on admission and every day as indicated by medical condition: <ul style="list-style-type: none"> ○ Electrolyte panel ○ Complete blood count (CBC) ○ ECG for electrical injury or cardiac history ○ ABG with COHb ○ Cardiac panel for electrical injury • CXR if intubated, inhalation injury suspected or underlying pulmonary condition. • Monitor glucose at least every 2 hours x 24 hours. • Monitor for the following signs and symptoms in full thickness, circumferential burn injuries which may indicate a circulation deficit and possible need for escharotomy: (6 P's) <ul style="list-style-type: none"> ○ Pallor or cyanosis of distal unburned skin on a limb ○ Pain ○ Pulselessness ○ Paralysis ○ Paresthesia 	<ul style="list-style-type: none"> ○ Administer remaining amount over next 16 hours post burn. • Pediatrics < 10 kg: Due to limited glycogen stores, in addition to resuscitation IV/IO fluids, administer D5% LR at maintenance rate: <ul style="list-style-type: none"> ○ To calculate maintenance IVF rate for children: <ul style="list-style-type: none"> ▪ 4 mL/kg/hr for 1st 10 kg ▪ + 2 mL/kg/hr for 2nd 10kg ▪ <u>+ 1 mL/kg/hr for each additional kg over 20kg</u> = IV/IO fluid maintenance rate • The above calculation is a starting point for fluid resuscitation. IVF rate should be titrated to maintain urine output. <ul style="list-style-type: none"> ○ Pediatrics <30 kg: 1 mL/kg ○ Pediatrics >30 kg: 0.5 mL/kg • Tetanus prophylaxis, unless received within last 5 years. • Place a soft feeding tube for all intubated patients. Feedings should be initiated within 6 hours of injury. • The goal in the early stages of burn resuscitation should be to maintain the individual's pre-event BP. • If signs of circulation deficit are present, contact the SBCC. • Eyes: <ul style="list-style-type: none"> ○ Remove contact lens prior to eyelid swelling if facial involvement. ○ Fluorescein should be used to identify corneal injury. ○ If eye involvement or facial burns consider, consulting an ophthalmologist. • Consult with SBCC to determine if escharotomy is indicated and to receive guidance on performing an escharotomy. • Finger escharotomies are rarely indicated.

Assessment and Monitoring	Interventions and Key Points
<ul style="list-style-type: none"> ○ Poikilothermia ○ Inability to ventilate in patients with deep circumferential burns of the chest 	
<p style="text-align: center;"><u>Comfort</u></p> <ul style="list-style-type: none"> ● Frequent pain/sedation assessment <ul style="list-style-type: none"> ○ A minimum of every 4 hours ○ Before and after pain/sedation medication given ● Use age appropriate pain scales for pediatric patients (e.g., Wong Baker FACES, FLACC) 	<p style="text-align: center;"><u>Comfort</u></p> <ul style="list-style-type: none"> ● Emotional support and education is essential. ● IV/IO analgesia is preferred route during initial post injury period. ● Large amounts of IV/IO analgesic may be required to attain initial pain control. <ul style="list-style-type: none"> ○ Administer opioids in frequent (every 5 minutes) small to moderate doses until pain is controlled. <ul style="list-style-type: none"> ▪ Morphine 0.1-0.2 mg/kg IV/IO (max 10mg/dose) ▪ Fentanyl 1-2 mcg/kg/dose IV/IO/IN (not to exceed maximum adult dose) ○ Hydrocodone/acetaminophen 0.1-.02 mg/kg PO/NO/OG every 4-6 hours ○ Acetaminophen-codeine (Tylenol #3) 0.5-1mg/kg/dose PO/NG/OG every 4-6 hours (NOTE: Not recommended in children < 2 y/o) ● Consider use of non-pharmacological techniques. <ul style="list-style-type: none"> ○ Examples: <ul style="list-style-type: none"> ▪ < 2 y/o: distraction ▪ 2-6 y/o: distraction, deep breathing ▪ > 6 y/o: deep breathing, distraction, imagery ● Consider anti-anxiety medication in addition to pain medication. <ul style="list-style-type: none"> ○ Lorazepam (Ativan) PO/IV/IO ○ Midazolam (Versed) IV/IO/IN ● Consider sedation for procedures and, if intubated: <ul style="list-style-type: none"> ○ Ketamine ○ Lorazepam (Ativan®) ○ Midazolam (Versed®) ○ Dexmedetomidine (Precedex®)
<p style="text-align: center;"><u>Wound Care</u></p>	<p style="text-align: center;"><u>Wound Care</u></p> <ul style="list-style-type: none"> ● Pre-medicate patients for pain and anxiety before wound care.

Assessment and Monitoring	Interventions and Key Points
<ul style="list-style-type: none"> • Maintain temperature of patient since they are prone to hypothermia • Assess the wound and monitor for: <ul style="list-style-type: none"> ○ Change in wound appearance ○ Change in size of wound ○ Signs or symptoms of infection • Describe what you see: <ul style="list-style-type: none"> ○ Color (e.g. white, leathery, or pink, moist) ○ Sensation (distinguish between pain and sensation) ○ Temperature ○ Swelling ○ Cellulitis (redness around the wound) ○ Odor (foul smelling, sweet smelling, etc.) ○ Drainage (amount, type) • Compartment syndrome <ul style="list-style-type: none"> ○ Can have in non-burned limbs and abdomen • Check of the circulation of an extremity before and after wound care 	<ul style="list-style-type: none"> • In a mass casualty disaster situation wound care for patient with a >20% TBSA burn can be performed once per day. • Contraindications for silver sulfadiazine (Silvadene): <ul style="list-style-type: none"> ○ Patient's with a sulfa allergy ○ During pregnancy Instead use another topical or wound coverage product. • Wash wounds with soap and warm tap water using a wash cloth. <ul style="list-style-type: none"> ○ Remove water by patting dry • Shave daily for burned scalps and faces. • Perform wound care every day if using: <ul style="list-style-type: none"> ○ Silver sulfadiazine (Silvadene) cream ○ Bacitracin • Debride ALL blisters except for: <ul style="list-style-type: none"> ○ Intact blisters on hands and feet unless it is impeding range of motion to the joints, ○ Weeping blister(s). • Ear wound care: <ul style="list-style-type: none"> ○ Ears are poorly vascularized and at risk for chondritis. • How to apply silver sulfadiazine (Silvadene) cream: <ul style="list-style-type: none"> ○ Apply thin layer enough so that the wound cannot be seen through the cream. ○ The layer of silver sulfadiazine (Silvadene) should be thick enough to prevent the wound from drying out prior to the next dressing change. ○ Cover with a dressing; the purpose of a dressing is to keep the cream from rubbing off before the next dressing change. • How to apply silver impregnated antimicrobial dressings (e.g., Acticoat[®], Mepilex): <ul style="list-style-type: none"> ○ Apply a single layer of the dressing moistened with water over burn wounds so that all areas are covered. ○ Water should be used to keep the dressing and overlying gauze moist to maintain the dressing's antimicrobial activity. <i><u>(DO NOT use saline because it deactivates the silver's antimicrobial ability).</u></i>

Assessment and Monitoring	Interventions and Key Points
	<ul style="list-style-type: none"> ○ Should be held in place with water-moistened gauze dressing. ○ Dressing does not need to be changed for 7 days. ○ The overlying gauze can be changed as necessary. ○ If signs of infection appear, remove dressing to assess wound. ○ Record the date of the application. ● Wrap fingers separately if burned. ● Place silver sulfadiazine (Silvadene) coated gauze between the toes. ● For extensive and severe burns to the face: <ul style="list-style-type: none"> ○ Apply a double antibiotic ointment around the eyes and mouth to avoid cream from draining into them. ○ Can use ophthalmic ointment around eyes. ○ Silver sulfadiazine (Silvadene) can be used on the face ● For moderate facial burns, Bacitracin or other antibiotic ointment can be used without a dressing. ● Genital/Perineal Burns <ul style="list-style-type: none"> ○ Urinary catheter may be indicated for genitalia or perineal burns. Evaluate each patient individually to determine if needed. ○ Apply lubricated gauze to labia and in the foreskin to prevent adhesions and decrease risk of infection in this area of high contamination. ● Elevate burned extremities above the level of the heart.

Ongoing Assessment, Monitoring, Interventions and Key Points

Assessment and Monitoring	Interventions
<p style="text-align: center;"><u>Airway and Breathing</u></p> <ul style="list-style-type: none"> ● Obtain chest X-ray if intubated, inhalation injury suspected or underlying pulmonary condition. ● Chest X-ray will usually be clear on admit. If inhalation injury is present, the X-ray will show infiltrates around the second day correlating with a deteriorating oxygen status. ● Frequent suctioning is necessary to prevent occlusion of the airway and endotracheal tube. Anyone with an inhalation 	<p style="text-align: center;"><u>Airway and Breathing</u></p> <ul style="list-style-type: none"> ● Supportive therapy and O₂; wean as appropriate. ● HOB should be elevated 30 degrees to minimize facial and airway edema, unless contraindicated. <ul style="list-style-type: none"> ○ Use reverse Trendelenburg for patients with C-spine motion restriction requirements. ● Suction airway frequently.

Assessment and Monitoring	Interventions
<p>injury is subject to increased respiratory secretions and may have a large amount of carbonaceous debris in the respiratory tract.</p> <ul style="list-style-type: none"> • Airway edema peaks at 36 hours post burn • Weaning from the ventilator and extubation: <ul style="list-style-type: none"> ○ CO level should be normalized (< 10%) for at least 6 hours ○ There is an increased risk of needing to re-intubate inhalation injury patients so maintain intubation equipment at bedside after extubation ○ Don't extubate patient unless there is a leak around the ETT cuff 	<ul style="list-style-type: none"> • Inhalation Injuries: <ul style="list-style-type: none"> ○ Treatment for inhalation injury is supportive care and includes: <ul style="list-style-type: none"> ▪ Intubation as indicated ▪ Provide adequate sedation to prevent dislodgement of ETT ▪ Frequent suctioning ▪ Positive End Expiratory Pressure (PEEP) may improve ventilation ○ Secure ETT with ties instead of tape since tape will not adhere to burned tissue ○ Mark ETT at fixed position (teeth or gums not lips which may have swelling)
<p style="text-align: center;"><u>Circulation/Outputs of Resuscitation</u></p> <ul style="list-style-type: none"> • Monitor mean arterial blood pressure (MAP): <ul style="list-style-type: none"> ○ Goal for MAP is > 60 mmHg • Monitor hourly urine output: <ul style="list-style-type: none"> ○ Goal: 1 mL/kg/hr for children < 30 kg • Monitor for myoglobin/pigment in urine (burgundy color). • Additional resuscitation fluid needs can occur with: <ul style="list-style-type: none"> ○ Very deep burns ○ Inhalation injury ○ Associated injuries ○ Electrical injury ○ Delayed resuscitation ○ Prior dehydration ○ Alcohol or drug dependence ○ Small children • Children and patients with preexisting cardiac disease are particularly sensitive to fluid management. • Diuretics are not indicated in myoglobin in the urine. • Monitor glucose at least every 2 hrs x 24 hours. 	<p style="text-align: center;"><u>Outputs of Resuscitation</u></p> <ul style="list-style-type: none"> • Insert arterial line. • Insert urinary catheter. • If urine output is < goal, ↑ fluids by 1/3. <ul style="list-style-type: none"> ○ Example: u/o for 20 kg pediatric patient = 10 mL/hr, fluid rate at 50 mL/hr, ↑ to 66 mL/hr • If urine output is > goal, ↓ rate of infusion by 1/3. <ul style="list-style-type: none"> ○ Example: u/o for 20 kg pediatric patient = 30 mL/hr fluid rate at 50 mL/hr, ↓ to 33 mL/hr • Upon completion of the resuscitation phase (typically 24 hrs post burn), ↓ hourly fluid volume by 10% per hour to a maintenance fluid with D5 0.45 NS with 20 mEq KCL/L. <ul style="list-style-type: none"> ○ Check serum sodium and potassium on day 2 post burn • Myoglobin in urine: <ul style="list-style-type: none"> ○ Maintain urine output: <ul style="list-style-type: none"> ▪ 2 mL/kg/hr ○ Increase fluid rate (LR). • Oliguria or anuria requires mostly due to inadequate fluid resuscitation and requires more rapid fluid administration. Diuretics are contraindicated!

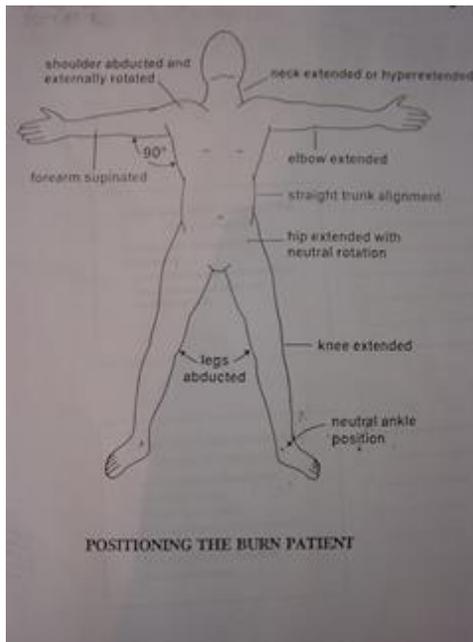
Assessment and Monitoring	Interventions
<ul style="list-style-type: none"> • May take > 24 hours to see signs of adequate resuscitation: <ul style="list-style-type: none"> ○ Normalization of blood pH ○ Improved peripheral circulation ○ Clearing sensorium (more alert) ○ Stable BP • If IVF requirements are still high after 24 hours of crystalloids, contact the SBCC for medical consultation. 	<ul style="list-style-type: none"> • Treatments for hypotension: <ul style="list-style-type: none"> ○ Albumin human 5% injection (consult SBCC before using) ○ Vasopressors initiated when MAP is low despite adequate fluid resuscitation <ul style="list-style-type: none"> ▪ Use institution specific dosing ranges
<p style="text-align: center;"><u>Circulation</u></p> <ul style="list-style-type: none"> • Perform pulse checks (CMS) every 1 hour if there are circumferential burns on extremities. <ul style="list-style-type: none"> ○ Monitor pulses by palpation or doppler exam. <ul style="list-style-type: none"> ▪ Decreased sensation ▪ Severe unrelenting deep tissue pain ▪ Diminished distal pulses ▪ Capillary refill > 5 sec • After 24-48 hrs decrease frequency of pulse checks to every 2 hours if stable. • Assess bowel sounds to monitor for ileus. 	<p style="text-align: center;"><u>Circulation</u></p> <ul style="list-style-type: none"> • Elevate burned extremities on pillows or blankets to improve circulation and minimize edema. • Circumferential chest injuries may become life threatening; an escharotomy may be necessary. • Verify that pulselessness is not due to profound hypotension. • Scrotal swelling, though often significant, does not require specific treatment.
<p style="text-align: center;"><u>Body Temperature</u></p> <p>Perform temperature checks based on health care facility protocol.</p> <ul style="list-style-type: none"> • If unstable or significant burn, hourly vital signs may be indicated. 	<p style="text-align: center;"><u>Body Temperature</u></p> <ul style="list-style-type: none"> • With 2nd and 3rd degree burns, patients may have difficulty regulating their temperature; monitor for hypo and hyperthermia. • Keep patient normo-thermic, especially during wound care. • Keep patient covered. When supplies of blankets are depleted, patients can be wrapped in plastic wrap or aluminum foil for insulation and warmth. • Warm the room. • Warm IV/IO fluid if possible, especially if patient is very hypothermic.
<u>Other Pharmaceutical Considerations</u>	
<ul style="list-style-type: none"> • Stress ulcer prophylaxis <ul style="list-style-type: none"> ○ Begin feedings within 6 hours of injury ○ Start on prophylaxis medications if intubated (based on institutional preference, hospital formulary and availability) • Anti-emetics 	

Assessment and Monitoring	Interventions
<ul style="list-style-type: none"> ○ Use cautiously (enteral feeding intolerance can be a sign of sepsis in burn patients) ○ Ondansetron (Zofran®) ● Itching <ul style="list-style-type: none"> ○ Diphenhydramine (Benadryl®) ○ Hydroxyxine (Atarax®) ● Vitamin Supplements <ul style="list-style-type: none"> ○ Start vitamins after feedings (via tube or PO) are initiated ○ Multivitamins ○ Ascorbic acid ○ Zinc sulfate ○ Glutamine (if available and on formulary) ● Venous thromboembolism prophylaxis <ul style="list-style-type: none"> ○ <u>Consult SBCC/pediatric experts before starting</u> 	
<p style="text-align: center;"><u>Nutrition</u></p> <ul style="list-style-type: none"> ● Obtain dry weight on admission. ● Nutritional plan should start < 6 hours post injury ● Increased need for protein, calories, vitamins and minerals for wound healing ● Adequate intake is more important than route of intake ● TPN is rarely used. Oral feedings (via tube or PO) provides most benefit for burn patients. ● Indications for feeding tube: <ul style="list-style-type: none"> ○ Intubated ○ >20% TBSA ○ Unable to maintain caloric needs via PO ● Indications for post pyloric feeding tube: <ul style="list-style-type: none"> ○ Conscious sedation ○ Twice daily wound care ○ Frequent operative interventions ○ Intolerance of gastric feeding (nausea, vomiting, increased gastric residuals) 	<p style="text-align: center;"><u>Nutrition</u></p> <ul style="list-style-type: none"> ● Consult hospital dietitian to adjust nutritional plan based on lab result trends (CRP, Prealbumin, albumin & transferrin) ● Conduct daily calorie counts ● Daily calorie needs based on % TBSA, weight and age <ul style="list-style-type: none"> ○ Consult SBCC and pediatric experts for calculations ● Increased protein needs. <ul style="list-style-type: none"> ○ 20 % of calories should be from protein (approximately 2.5 - 4.0 grams protein/kg) ● Regular high calorie, high protein diet if able to take PO. <ul style="list-style-type: none"> ○ If unable to maintain adequate caloric requirements, initiate tube feedings. ● No free water drinks (plain water) if taking PO, only high calorie liquids. ● Ensure stool softeners are ordered to prevent constipation due to pain medications. ● Begin enteral nutrition as soon as possible. ● Soft feeding tubes are preferred over hard salem sump nasogastric tube. ● Titrating patient off tube feedings to PO <ul style="list-style-type: none"> ○ Switch to night feedings first ○ If eating during the day and taking in enough calories, can progress to PO feedings only

Assessment and Monitoring	Interventions
<ul style="list-style-type: none"> See Nutritional Algorithm for Pediatric Burn Patients on page 25 for initial infusion rates, titrating feeding rates and residual check 	<ul style="list-style-type: none"> Titrating might be done in acute rehab setting and not in hospital setting
<p><u>Infection Control</u></p> <ul style="list-style-type: none"> Utilize universal precautions. If wounds are exposed: <ul style="list-style-type: none"> Apply gown, mask and gloves to protect patient. No systemic antibiotics are required for the burn injuries. 	
<p style="text-align: center;"><u>Splinting, Positioning and Mobility</u></p> <ul style="list-style-type: none"> In a disaster, physical and occupational therapists may splint patients in functional positions and help with dressings. Rehabilitation (splinting, positioning and mobility) should be initiated early on in care of patient Check circulation status of extremities before and after positioning and splinting Monitor for pressure areas under splints 	<p style="text-align: center;"><u>Splinting, Positioning and Mobility</u></p> <ul style="list-style-type: none"> Obtain physical therapy /occupational therapy consult. Early mobilization of patients HOB elevated at all times. Elevate burned extremities above the level of the heart. Positioning: <ul style="list-style-type: none"> Degree of functioning preserved depends on early intervention and prevention of further tissue damage Designed to: <ul style="list-style-type: none"> Minimize edema formation Prevent tissue destruction Maintain soft tissue in an elongated state to facilitate optimal functional recovery Use whatever tools are available to assist (e.g., pillows, towels, splints, bedside tables, wedges). Neck burns <ul style="list-style-type: none"> Maintain the head in a neutral position. No pillows or blankets under the head flexing the neck forward. Axilla burns <ul style="list-style-type: none"> Keep arms extended to decrease contractures. Ear burns <ul style="list-style-type: none"> No external pressure should be applied. No pillows or blankets under the head. Out of bed (OOB) - If legs are burned, apply ace wraps when OOB.

Assessment and Monitoring	Interventions
	<ul style="list-style-type: none"> • Encourage active range of motion hourly when awake. • Encourage activities of daily living. • Splinting: <ul style="list-style-type: none"> ○ Use either ace/elastic wraps, gauze rolls/wraps, strappings with post-mold material (e.g., thermoplastic-perforated), or whatever is available ○ Wearing schedule: <ul style="list-style-type: none"> ▪ 24 hours/day except for dressing changes and range of motion exercises ▪ At night only for compliant patients who are able to perform exercises independently ▪ Post wearing schedule at patient's bedside

Proper Positioning of a Burn Patient



Area Involved	Contracture Predisposition	Contracture Preventing Position
Anterior neck	Flexion	Extension, no pillows
Anterior axilla	Shoulder adduction	90° abduction, neutral rotation
Posterior axilla	Shoulder extension	Shoulder flexion
Elbow/Forearm	Flexion/pronation	Elbows extended, forearm supinated
Wrists	Flexion	15°–20° extension
Hands:		
MCPs	Hyperextension	70°–90° flexion
IPs	Flexion	full-extension
Palmar Burn	Finger flexion, thumb opposition	All joints full extension, thumb radially abducted
Chest	Lateral/anterior flexion	Straight, no lateral or anterior flexion
Hips	Flexion, adduction, external rotation	Extension, 10° abduction, neutral rotation
Knees	Flexion	Extension
Ankles	Plantar flexion	90° dorsiflexion

Reunification

Assessment and Monitoring	Interventions
<p>During a large scale disaster, family members may become separated. It is crucial that staff attempt to reunify patients with their family. Children are more vulnerable to maltreatment, abuse and abduction, if separated from their care giver. Community partners, such as the American Red Cross and National Center for Missing and Exploited Children, can assist with this process. The reunification process begins with EMS at the scene and, if possible, trying to keep known family members together when making transport decision. The Patient Identification Tracking Form (Attachment 12 in Burn Surge Annex) should be utilized for all patients to assist with the reunification process.</p>	
<p style="text-align: center;"><u>Psychosocial</u></p> <ul style="list-style-type: none"> • Address the psycho-social needs of burn patients <ul style="list-style-type: none"> ○ Immediate needs (pain, fear of unknown, similar to any trauma patient) ○ Long term needs (more ongoing, can need support for years) • Treatment therapies may trigger traumatic response • Explain any procedures. • Involve patient and family. • Consider social worker consultation. • Offer spiritual care. • Consult child life specialists, if available. • Child’s needs and understanding of the injury and care will vary based on their developmental level. <ul style="list-style-type: none"> ○ Infants <ul style="list-style-type: none"> ▪ Learn through sensory stimulation (especially touch) and movement. ▪ Can experience separation anxiety from family/care taker. ○ Toddler/Preschool <ul style="list-style-type: none"> ▪ May see the burn injury as punishment for being “bad” so at risk for ineffective coping. ▪ Routine is important so coordinate procedures around daily routines. ○ School age <ul style="list-style-type: none"> ▪ Anxiety can be decreased by providing child education about processes and involving child in care. ○ Adolescent <ul style="list-style-type: none"> ▪ Body image is significant concern. 	
<p style="text-align: center;"><u>Palliative Care/Comfort Care</u></p> <p>During disasters, patients with extensive burn injuries may be triaged as Expectant based on the Burn Triage Guidelines. Patient’s triaged as Expectant still need palliative care/comfort care provided. See the following page for additional information</p>	

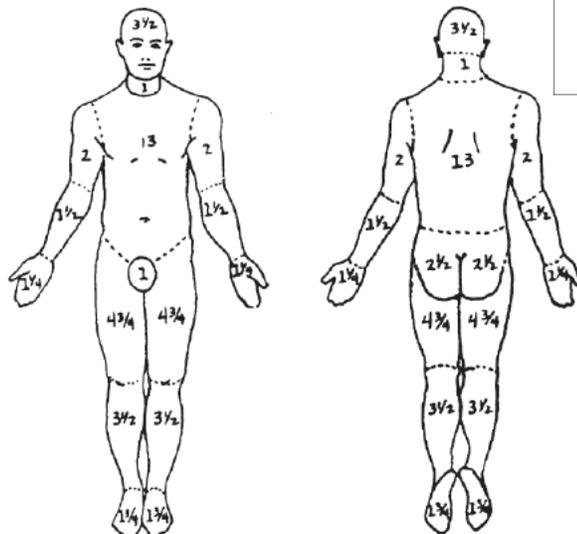
PALLIATIVE CARE COMPONENTS DURING DISASTER MANAGEMENT	
PATHWAY COMPONENT	CONSIDERATIONS
Assess the situation	Health of the patient Family dynamic if present
Identify key players	Patient needs Family and friends needs Physician needs Nurses needs
Consider the big picture of the key players	Staff Concerns and any distress of key players Psychological Symptoms of any key players Distress Physical Symptoms of the patient Pain Dyspnea Existential and Spiritual Symptoms of any key players Examples: <ul style="list-style-type: none"> ○ Last rites from a priest with Catholic backgrounds ○ Imam being available for Islamic backgrounds ○ Hindu and Buddhists have their own beliefs and requests at the end of life. Some request the patient being put on the floor; can be accommodated by lowering the bed all the way to the floor. Legal and Ethical Aspects of Care Any member of the key players uncomfortable with end of life pathways Cultural Aspects of Care Examples: <ul style="list-style-type: none"> ○ Family requests for positioning of patient ○ Turning the bed toward specific directions if requested ○ Having LED candles available if family requests candles around the body End of Life Logistics Find a location that is accessible for family and friends
Communication	Set expectations and maintain communication
Develop and implement plan	Develop Plan/Manage Death: Implement postmortem logistics Pronouncing death Bereavement Staff debriefing/support
Manage pain, dyspnea, and agitation at the end of life	Family and nursing input is essential Don't forget that using opioids with the intent to control symptoms at the end of life is ethically appropriate Assess: <ul style="list-style-type: none"> ● Distress ● Pain: grimace, tachycardia, verbal cues ● Agitation: writhing, sweating ● Dyspnea: retractions, flaring, tachypnea Un-intubated patients: <ul style="list-style-type: none"> ● Pain or dyspnea: Intermittent IV dosing preferred: Morphine and hydromorphone preferred <ul style="list-style-type: none"> ○ Reassess every 10 minute; repeat dose if needed Agitation: Benzodiazepines preferred: Lorazepam and haloperidol preferred Intubated patients: <ul style="list-style-type: none"> ● Pain: Continuous IV infusions preferred: Morphine, fentanyl, and hydromorphone preferred ● Agitation: Continuous IV infusions preferred: Midazolam and lorazepam preferred ● Increase the dosing every ten minutes ● If distress is present, bolus the medication by one hour equivalent and increase infusion by 25 to 100%. Write orders allowing for titration

Assess Degree of Injury

	APPEARANCE	SURFACE	SENSATION	TIME TO HEALING
1st degree/superficial	Pink or red	Dry	Painful	4-5 days
2nd degree/superficial partial thickness	Pink, clear blisters	Moist, weeping	Painful	14–21 days
2nd degree/deep partial thickness	Pink, hemorrhagic blisters, red	Moist	Painful	Weeks, may progress to 3rd degree and require graft, may lead to contractures
3rd degree/full thickness	White, brown, charred	Dry, waxy, leathery	Painless	Requires excision, high risk for infection/fluid loss
4th degree (tendon, nerve, muscle, bone and/or deep fascia involvement)	Brown, charred	Dry	Painless	Requires excision, high risk for infection/fluid loss

Lund & Browder Chart

**BURN DIAGRAM, ESTIMATE
(Lund & Browder)**

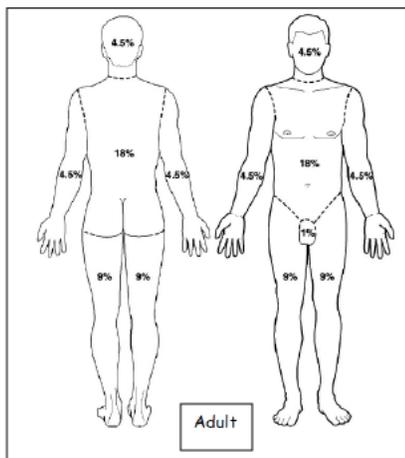
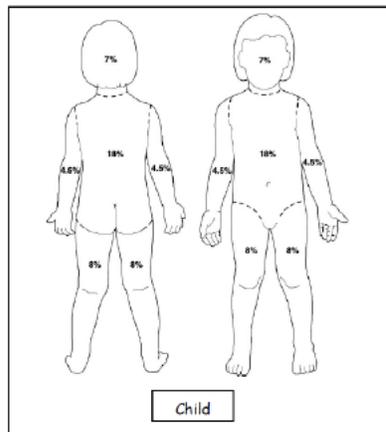
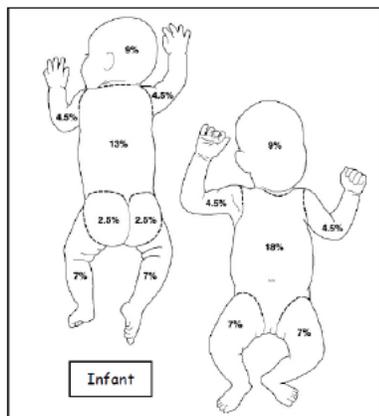


AREA	AGE						BURN ASSESSMENT	
	infant	1-4	5-9	10-14	15	adult	PARTIAL THICKNESS	FULL THICKNESS
head	19	17	13	11	9	7		
neck	2	2	2	2	2	2		
ant. trunk	13	13	13	13	13	13		
post. trunk	13	13	13	13	13	13		
r. buttock	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
l. buttock	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
genitalia	1	1	1	1	1	1		
r. u. arm	4	4	4	4	4	4		
l. u. arm	4	4	4	4	4	4		
r. l. arm	3	3	3	3	3	3		
l. l. arm	3	3	3	3	3	3		
r. hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
l. hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2		
r. thigh	5 1/2	6 1/2	8	8 1/2	9	9 1/2		
l. thigh	5 1/2	6 1/2	8	8 1/2	9	9 1/2		
r. leg	5	5	5 1/2	6	6 1/2	7		
l. leg	5	5	5 1/2	6	6 1/2	7		
r. foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2		
l. foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2		
TOTAL:								

BURN ASSESSMENT: Date _____ Time _____ Signature _____

Rule of 9's Charts:

BURN DIAGRAM ESTIMATE
(Rule of 9's: Estimate of TBSA – Total Burn Surface Area)



Area	Infant	Child	Adult	Burn Assessment	
				Partial thickness	Full thickness
Head	18	14	9		
Chest (Ant. torso)	18	18	18		
Back (Post. Torso) & buttocks	13 (back) 5 (buttocks)	18	18		
Rt. arm & hand	9	9	9		
Lt. arm & hand	9	9	9		
Rt. Leg & foot (anterior)	7	8	9		
Lt. Leg & foot (anterior)	7	8	9		
Rt. Leg & foot (anterior)	7	8	9		
Rt. Leg & foot (anterior)	7	8	9		
Perineum	(include with chest)	(include with chest)	1		

Bolded areas = nine or multiple of nine

Burn Assessment Date _____ Time _____ Signature _____

MANAGEMENT OF BURN PATIENTS WITH RADIATION EXPOSURE

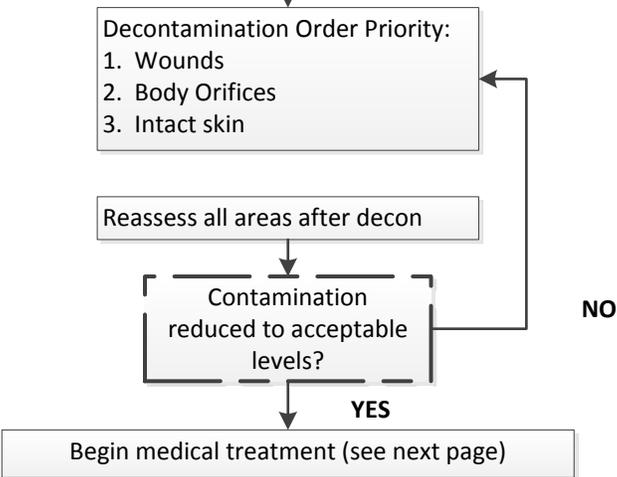
Initial Management of All Pediatric Patients Involved in Radiological Event

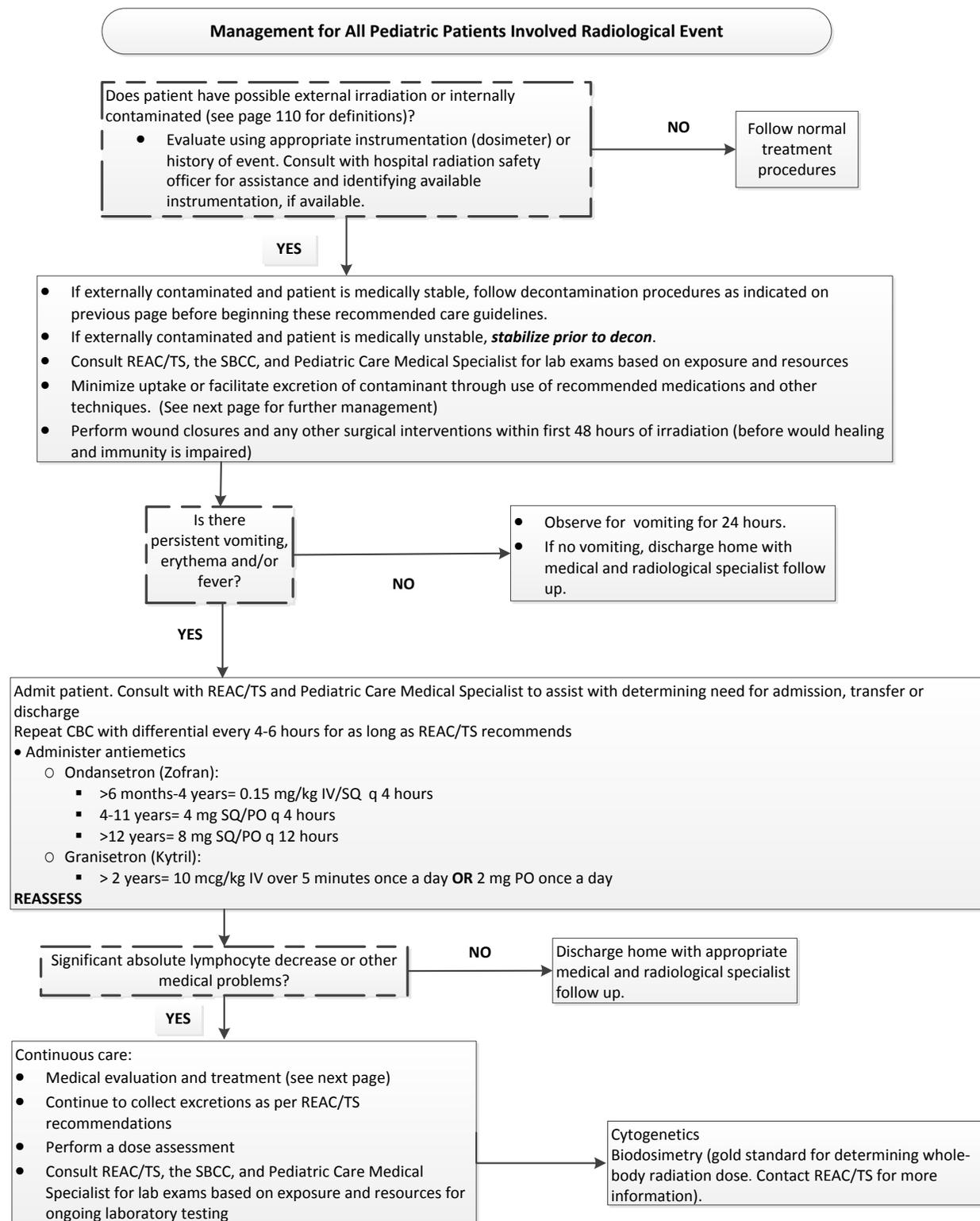
- Determine if decontamination is needed due to external contamination (See below and pages 107 and 110 for information specific to decon)
- Stabilize ABCs (Airway, Breathing, Circulation)
- Immobilize spine as indicated
- Perform history and physical exam
- Look for other injuries (trauma)
- Keep patient NPO (including pacifiers)
- Follow your own hospital radiological response policy, if applicable.
- Consult the SBCC and the Pediatric Care Medical Specialist for assistance with care of the acutely and critically ill patient, to individualize the care of patient, if patient does not improve and needs to be transferred and as needed for further support and consult.
- Contact the IEMA Communication Center (1-217-782-7860 OR 1-800-782-7860) to report that any type of radiologic event has occurred and/or report that patients arriving at the hospital have been involved in any type of radiologic incident.
- It is recommended that hospitals consult REAC/TS (Radiation Emergency Assistance Center/Training Site) for questions regarding additional care management information (24 hour emergency phone number: 865-576-1005)

Steps for Decontaminating Externally Contaminated Pediatric Patients

- Admit to controlled area
- Remove clothing (cut clothing in direction away from patient’s airway and roll it outward away from patient’s skin, trapping any material inside the clothes)
- Place all clothing in plastic bags for testing

- **Assess for and stabilize any emergent medical issues**
- Obtain medical/event history if patient or family able to provide
- Identify/contain contaminate
- Minimize any additional possible intake
- Follow IEMA, REAC/TS, and/or Department of Nuclear Safety recommendations
- See next page for general Information about Radiological Decontamination





Medical Management (Continued)

Medical management is dependent upon the type of specific isotope and the amount of exposure so identifying agent as quickly as possible is important.

Several categories of medical management for internal contamination:

1. Reduction and/or inhibition of absorption of isotope in the GI tract
2. Blocking uptake to the organ of interest
3. Isotope dilution
4. Altering the chemistry of the substance
5. Displacing the isotope from receptors
6. Traditional chelation techniques
7. Early excision of radionuclides from wounds to minimize absorption
8. Bronchoalveolar lavage for severe cases of insoluble inhaled particles

Extensive information for medical management of patients with radiation exposure can be obtain by contacting REAC/TS or in *The Medical Aspects of Radiation Incidents*, which can be found on REAC/TS website at www.orise.orau.gov/reacts

Safety and effectiveness of many of the therapy recommendations have not been established in the pediatric patient. Contact Pediatric Care Medical Specialist and/or REAC/TS representative for treatment recommendations.

The following medications (potassium iodide and Prussian blue) can be obtain through the Strategic National Stockpile (SNS). Hospitals should follow their existing policy to request medications from the SNS. For questions or concerns regarding the policy to request medication from the SNS, hospitals can contact their local health departments, Regional Hospital Coordinating Center (RHCC) or the Pediatric Care Medical Specialist.

Potassium Iodide (KI)

Children are susceptible to thyroid cancer after being exposed to radioactive iodine. The uptake of radioactive iodine needs to be blocked by administering oral potassium iodide (KI) **within 4 hours** of exposure for exposures of ≥ 0.05 Gy (5 rad). See the dosing chart below.

Age of Patient	Dose
<1 month	16 mg PO
1 month-3 years	32 mg PO
4-18 years	65 mg PO
Pregnant or lactating women	130 mg PO

Protective effects of KI lasts approximately 24 hours and is usually given once. If child is unable to be evacuated to a safer area within 24 hours, contact Pediatric Care Medical Specialist for the possible need for repeat doses.

If liquid form is not available, below are the steps for how to convert the KI tabs to KI solution:

1. Place one 130 mg tablet (or two 65 mg tablets) into a bowl and grind into a fine powder.
2. Add 20 mL of water to bowl and dissolve the KI powder.
3. Add 20 mL of milk, juice, soda or syrup to flavor the KI/water mixture
4. Resulting solution has a concentration of 16.26 mg/5 mL
5. Unused iodine mixture may be stored in the refrigerator for up to 7 days.

Other considerations:

- Need to monitor a newborn’s thyroid function 2-3 weeks after receiving KI because KI can cause a transient decrease in thyroxin and increase in the TSH level
- Breastfeeding:
 - The Food and Drug Administration (FDA) and American Academy of Pediatrics (AAP) have each released recommendations for breastfeeding after a mother has been exposed to radiation. The FDA’s recommendation is a mother can breast feed after she has been treated with KI. The AAP recommends that mothers do not breast feed, even if they have been treated with KI unless no other alternative is available. For more information or assistance with determining if breast feeding should continue, consult the Pediatric Care Medical Specialist and/or REAC/TS.

Prussian Blue

Prussian Blue is utilized when the source is cesium, rubidium or thallium. The dosing recommendations are:

- Children 2-12 years old: 1 gm PO TID
- Children >13 years old: 3 gm PO TID

Approximate Thresholds for Acute Radiation Syndromes

Dose		Signs/Symptoms*
0-100 rads (0-1 Gy)	NA	Generally asymptomatic, potential slight drop in lymphocytes later (near 1 Gy)
> 100 rads (> 1 Gy)	Hematopoietic	Anorexia, nausea, vomiting, initial granulocytosis and lymphocytopenia.
> 6-800 rads (> 6-8 Gy)		Early severe nausea, vomiting, watery diarrhea, pancytopenia
> 2000 rads (> 20 Gy)	Cardiovascular/ CNS	Nausea/vomiting within first hour, prostration, ataxia, confusion

* At higher doses the time to onset of signs/symptoms may be compressed.

Psychological Considerations

Radiation emergencies, whether it be from a leak at a nuclear power plant or from a terrorist type incident such as a dirty bomb, leads to significant public anxiety. The anxiety associated with such events can appear out of proportion to the radiation induced health effects and can greatly affect the entire community. Many patients may present with symptoms such as nausea. It is important for providers to determine if nausea is from contamination or from the anxiety of the event. Long term psychological effects can manifest years after an event. General examples of long term effects include: feelings of vulnerability, PTSD, chronic anxiety, feelings of loss of control, fear of safety and health of themselves as well as future generations, and multiple idiopathic physical symptoms (MIPS). Provide educational materials and counseling options to all patients and their families after a radiological emergency.

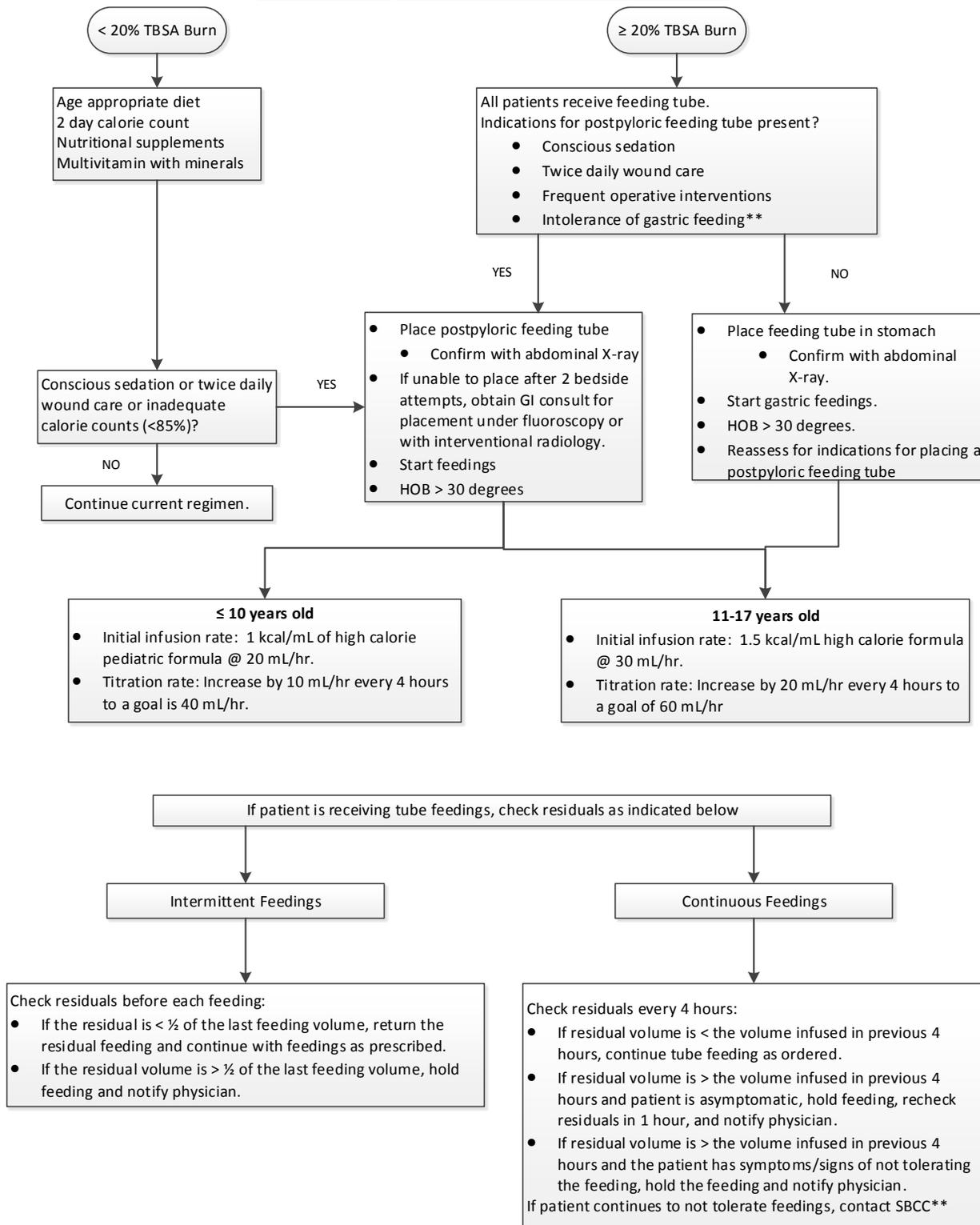
Radioactive Contamination versus Exposure

- **Radioactive contamination:** radioactive material is on or inside a person
 - External contamination-radioactive material is only on outside of a person
 - Internal contamination-radioactive material is ingested, inhaled, or absorbed through the skin or open wound
- **Radiation exposure:** a person is exposed to radioactive materials
- **Difference between contamination and exposure:**
 - Person exposed to radiation may not be contaminated. An radiation exposure means radioactive material penetrated the person's body. For a person to be contaminated with radioactive materials, the materials must be on or inside of the person's body.

General Information about Radiological Decontamination

- Typically is not emergently needed as compared to chemical decon
 - **Can begin treatment for life threatening conditions before initiating decon**
 - Low risk to health care providers if decon is delayed
- Radioactive material cannot be neutralized, only moved from one point to another
- Clean dry sheet or drapes should be applied to the area to prevent spread of contamination to uncontaminated areas
- Standard pediatric considerations for decontamination apply:
 - Use warm water (98°-110°F)
 - Do not carry infants/young children through decon shower
 - Have rewarming measures available after decon is completed
- Clean wound via baby wipes or via irrigation
 - Options: baby wipes, irrigation, OR soft cloth with soap and tepid water
- Irrigation:
 - Irrigate wound/orifice/area with sterile saline or equivalent
 - Prevent splashing
- Run-off should be directed into a receptacle (i.e. lined garbage can)
 - Keep all waste (run-off, absorbent pads, sheets, towels) for later collection and disposal
- Repeat until no further contamination is noted.
- Minor debridement may be needed if wound has foreign bodies in it
- After decon completed, clean wound as per hospital protocol.
- Other considerations:
 - Partial thickness burns:
 - Always irrigate
 - Leave blisters closed
 - Irrigate open blisters
 - Full thickness burns:
 - Radioactive contaminate will slough in eschar
 - Contaminates will remain in layers of dead tissue

Nutritional Algorithm for Pediatric Burn Patients



** Intolerance of feedings can be a sign of sepsis in burn patients

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
Initial Assessment of the Pregnant Patient

INITIAL CONTACT

Unable to obtain information from patient:
(skip to Assessment section)

Reason for admission: _____

Gestation: _____ weeks

Due date: _____

LMP: _____

Number of current gestation:

- Single gestation
 Multiple gestation (number): _____

HISTORY

What number pregnancy is this? _____

Number of:

Previous deliveries: _____

Term: _____ Pre-term: _____

Abortion: _____ Living children: _____

Mode of previous deliveries:

- Vaginal Cesarean Section

Medical history: _____

Surgical history: _____

Previous uterine surgery: _____

Home medications: _____

History of pre-natal care: _____

Known antenatal fetal defect/special conditions of the fetus: _____

Known Group B Strep (GSB) status

- Positive Negative Unknown

Known high risk pregnancy: _____

History of drug use: _____

ASSESSMENT/INTERVENTIONS

Vaginal bleeding

History of bleeding disorders and/or taking medications for bleeding disorders: _____

Time of onset of bleeding: _____

Description of blood loss:

- Watery Bright red Dark red

Estimation of blood loss:

Amount: _____

Clots: Number _____ Size: _____

Pain: Absent Present Constant Intermittent

Abdomen:

- Rigid Soft Relaxation between contractions Scars from previous surgeries Fundal height _____ cm (uppermost border of the symphysis pubis to the upper border of the fundus)

Contractions:

Onset _____ Frequency _____

Pain rating (0-10): _____

Intensity: Mild (abdomen feels like a nose) Moderate (abdomen feels like a chin) Firm (abdomen feels like the forehead)

Membrane status: Intact Ruptured: Time: _____

Fluid: Clear Bloody Meconium

Fetal movement: Normal Decreased Absent

Fetal Heart Tones (Rate): _____

Vital signs:

HR: _____

RR: _____

Temp: _____

SpO₂: _____

BP: _____

If elevated BP:

History of HTN:

- Yes No Pregnancy induced

Swelling:

- Feet and Legs Face None

Complaints of:

- Headache Nausea
 Blurred vision and/or visual disturbances Epigastric pain

Prolapsed cord present?

- Yes No

Are pulsations palpable: Yes No

Doppler for Heart Rate: _____

GSB screening completed? (see OB Care Guideline for details) Yes No

ASSESSMENT/INTERVENTIONS

(continued)

Active Labor:

Bloody show: Yes No

Feeling rectal pressure, grunting or bearing down: Yes No

Separation of labia or bulging of perineum: Yes No

Presenting part: _____

Scalp visible: Yes No

Crowning: Yes No

Time of delivery: _____

After delivery: Mother

Placenta delivered: Yes No

Time of delivery: _____

Placenta intact: Yes No

Uterine status: Firm Soft Midline

Medications received during labor/after delivery:

Oxytocin (Pitocin)

Misoprostol (Cytotec)

Methylergometrine (Methergine)

Hemabate (Carboprost)

Magnesium

Other _____

Bleeding description:

- Dark red Bright red

Bleeding amount:

- Steady trickle Gush Clots

After delivery: Baby

See Newborn Care Guideline for information

DISPOSITION

Form completed by: _____

Date: _____ Time: _____

Patient disposition:

- Discharge Admit

Transfer: _____

For patient's requiring transfer:

Patient Triage Category:

Level III Perinatal Center Criteria

Level II-E Perinatal Center Criteria

Level I or II Perinatal Center Criteria

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

Inpatient Treatment and Monitoring Intervention Care Guideline

Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

Disclaimer: This guideline are not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Common Pediatric Inpatient Treatment and Monitoring Interventions

INTERVENTION	PEDIATRIC CAVEATS/RATIONALE																												
<p>Vital Signs:</p> <ul style="list-style-type: none"> • Vital signs at least every 4 hours (T, HR, RR) • BP every 8 hours, if stable • Pulse oximetry if on O₂ <ul style="list-style-type: none"> ○ Continuous preferred ○ At least every 4 hour checks • HR may be continuously monitored via pulse oximetry 	<p>Vital Signs:</p> <ul style="list-style-type: none"> • Vital signs vary greatly with age: <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 25%;">Age</th> <th style="width: 25%;">Average HR (beats/min)</th> <th style="width: 25%;">Average RR (breaths/min)</th> <th style="width: 25%;">Average Systolic BP (mm/Hg)</th> </tr> </thead> <tbody> <tr> <td>Newborn 0-1 month</td> <td style="text-align: center;">100-180</td> <td style="text-align: center;">30-60</td> <td style="text-align: center;">>60</td> </tr> <tr> <td>Infant 1-12 months</td> <td style="text-align: center;">100-160</td> <td style="text-align: center;">30-60</td> <td style="text-align: center;">>70</td> </tr> <tr> <td>Toddler 1-3 years</td> <td style="text-align: center;">90-150</td> <td style="text-align: center;">24-40</td> <td style="text-align: center;">>70</td> </tr> <tr> <td>Pre-School Age 3-5 years</td> <td style="text-align: center;">80-140</td> <td style="text-align: center;">22-34</td> <td style="text-align: center;">>75</td> </tr> <tr> <td>School Age 5-11 years</td> <td style="text-align: center;">70-120</td> <td style="text-align: center;">18-30</td> <td style="text-align: center;">>80</td> </tr> <tr> <td>Adolescent 13-18 years</td> <td style="text-align: center;">60-100</td> <td style="text-align: center;">12-16</td> <td style="text-align: center;">>90</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Best predictors of shock: <ul style="list-style-type: none"> ○ Tachycardia is first sign of shock ○ Altered mental status ○ Low urine output ○ Capillary refill (not well-validated) • Infants can't increase cardiac stroke volume, thus tachycardia early sign of dehydration 	Age	Average HR (beats/min)	Average RR (breaths/min)	Average Systolic BP (mm/Hg)	Newborn 0-1 month	100-180	30-60	>60	Infant 1-12 months	100-160	30-60	>70	Toddler 1-3 years	90-150	24-40	>70	Pre-School Age 3-5 years	80-140	22-34	>75	School Age 5-11 years	70-120	18-30	>80	Adolescent 13-18 years	60-100	12-16	>90
Age	Average HR (beats/min)	Average RR (breaths/min)	Average Systolic BP (mm/Hg)																										
Newborn 0-1 month	100-180	30-60	>60																										
Infant 1-12 months	100-160	30-60	>70																										
Toddler 1-3 years	90-150	24-40	>70																										
Pre-School Age 3-5 years	80-140	22-34	>75																										
School Age 5-11 years	70-120	18-30	>80																										
Adolescent 13-18 years	60-100	12-16	>90																										

Assessments:

- Obtain head circumference on all children under 2 years of age.
 - Compare to normal for age See: CDC Grow Charts: <http://www.cdc.gov/growthchart>
 - If head injury present, obtain measurements daily
- Assess patient’s fontanels on all children under the age of 12 months.
- Obtain abdominal circumference on all abdominal trauma patients
 - Compare to normal for age
 - Obtain measurements daily
- Obtain daily weight (kilograms only)
- Bedside glucose check on all infants who are cold and tachypneic or children with altered mental status.
- PEWS (Pediatric Early Warning Score)
 - Complete every 4 hours or more often as indicated on card

Assessments:

- Head circumference is an important measurement to determine swelling in the absence of more sophisticated monitoring options.
- Abdominal circumference is an important measurement to determine pathological changes within the abdomen.
- Fontanels:
 - Assess when infant is not crying
 - Anterior fontanel closes at 12-18 months old
 - Posterior fontanel closes within first 3 months
 - Fontanels should be flat, not depressed or bulging
 - Bulging, firm, tense: sign of increased intracranial pressure
 - Sunken, depressed: sign of dehydration
- Hypoglycemia in children:
 - Infants are at high risk of hypoglycemia when cold or stressed
 - Hypoglycemia:
 - < 60 mg/dL in an infant and child (source: PALS)
 - <50 mg/dL in a neonate (source: STABLE)
 - See Treatment: Medication section for dextrose dosing for hypoglycemia
- PEWS Score: (see next page)
 - Can help nurses assess pediatric patients objectively
 - Using vital signs, child's behavior, cardiovascular and respiratory symptoms

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Inpatient Treatment and Monitoring Intervention Care Guideline

PEDIATRIC EARLY WARNING SCORE CARD					
	3	2	1	0	SCORE
Behavior	<ul style="list-style-type: none"> • Lethargic, confused, or • Reduced pain response 	<ul style="list-style-type: none"> • Irritable or agitated and NOT consolable 	<ul style="list-style-type: none"> • Sleeping or • Irritable and consolable 	<ul style="list-style-type: none"> • Playing • Appropriate for patient 	
Cardiovascular	<ul style="list-style-type: none"> • Grey or • Capillary refill ≥ 5 or • Tachycardia 30 above normal or • Bradycardia for age 	<ul style="list-style-type: none"> • Capillary refill 4 seconds or • Tachycardia of 20 above normal parameters 	<ul style="list-style-type: none"> • Pale • Capillary refill 3 seconds 	<ul style="list-style-type: none"> • Pink • Capillary refill 1-2 seconds 	
Respiratory	<ul style="list-style-type: none"> • 5 below normal with retractions and/or • $\geq 50\%$ FiO₂ 	<ul style="list-style-type: none"> • >20 above normal • Using accessory muscles or • 40%-49% FiO₂ or • ≥ 3 LPM 	<ul style="list-style-type: none"> • >10 above normal • Using accessory muscles or • 45-40% FiO₂ or ≥ 2 LPM • Any initiation of O₂ 	<ul style="list-style-type: none"> • Normal for age • No retractions 	
Add 2 points for frequent interventions (suction, positioning, O ₂ changes or multiple IV attempts)					
TOTAL					
** Parental concern should be an automatic call to the Rapid Response Team Score ≥ 7: Assess every 30 minutes Score = 6: Assess every 1 hour Score = 5: Assess every 1-2 hours Score 0-4: Assess every 4 hours					

Pain:

- Need to use age/developmental appropriate pain scales
- Examples:
 - Faces Scale for children > 3 years old
 - FLAAC Scale for children < 3 years old

Comfort measures

- Oral glucose drops effective for neonates
- Distract with favorite media, games

Pain:

Wong-Baker Pain Rating Scale:

0-5 coding	0	1	2	3	4	5
0-10 coding	0	2	4	6	8	10
ENGLISH	No hurt	Hurts little bit	Hurts little more	Hurts even more	Hurts whole lot	Hurts worst
SPANISH	No duele	Duele un poco	Duele un poco más	Duele mucho	Duele mucho más	Duele el máximo

FLACC Pain Scale:

Category	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaws, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans, whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Inpatient Treatment and Monitoring Intervention Care Guideline

	<ul style="list-style-type: none"> • Developmentally delayed children may have exaggerated CNS depression with opiates <ul style="list-style-type: none"> ○ Start with lowest dose and titrate
<p>Intake/Output: Diet/Nutrition</p> <ul style="list-style-type: none"> • Age appropriate diet as tolerated • Allow to breastfeed as tolerated unless contraindication present 	<p>Intake/Output: Diet/Nutrition</p> <ul style="list-style-type: none"> • Check with parents about diet/formula needs. • Contraindications to breastfeeding: <ul style="list-style-type: none"> ○ Mothers who are/have: <ul style="list-style-type: none"> • +HIV • Active untreated TB • Radioactive milk • Using street drugs • Herpes simplex lesions on breasts • Taking anti-metabolites or chemotherapeutic agents, and small number of other medications until they clear from the milk • Age appropriate diet: <ul style="list-style-type: none"> ○ Newborn: <ul style="list-style-type: none"> • Breast or bottle fed, 2-3 ounces/feeding every 2-3 hours ○ Infants: <ul style="list-style-type: none"> • 2-4 months: <ul style="list-style-type: none"> • Breast or bottle fed only, 3-4 ounces/feeding every 3-4 hours • 4-6 months: <ul style="list-style-type: none"> • 4-5 ounces/feeding (breast or bottle) 4 times/day • Begin baby food (i.e. rice cereal) • 6-9 months: <ul style="list-style-type: none"> • 6-8 ounces/feeding (breast or bottle) 4 times/day • Baby food and mashed table food

<ul style="list-style-type: none"> Nasogastric / Orogastric tube placement may be needed to decompress the stomach of air after resuscitation or for feedings <p>Urine Output:</p> <ul style="list-style-type: none"> Assess urine output <ul style="list-style-type: none"> Place indwelling urinary catheter if needed. 	<ul style="list-style-type: none"> 9-12 months: <ul style="list-style-type: none"> 6-8 ounces/feeding (breast or bottle) 4 times /day Soft bite-sized pieces of food Toddlers: <ul style="list-style-type: none"> Table food is appropriate Soft bite-sized pieces: Avoid foods that can cause choking (i.e. hot dogs, grapes, chunks of meat) Preschool: <ul style="list-style-type: none"> Regular table food is appropriate Soft bite-sized pieces: Avoid foods that can cause choking (i.e. hot dogs, grapes, chunks of meat) School age and adolescent: <ul style="list-style-type: none"> Regular table food is appropriate Insertion technique for NG/OG is similar to adults. <ul style="list-style-type: none"> Measure the length needed by placing the tip of the catheter at the nose, hold the tube at the earlobe and measure to the xiphoid process. Place a small piece of tape at that measurement to guide your placement depth. Lubricate the tube well. Abdominal x-ray should be done to confirm placement. <table border="1" data-bbox="747 1036 1161 1149"> <thead> <tr> <th colspan="2">OG/NG Tube Size Selection</th> </tr> </thead> <tbody> <tr> <td>Infant</td> <td>5 F-10 F</td> </tr> <tr> <td>Child</td> <td>8 F-14 F</td> </tr> </tbody> </table> <p>Urine Output:</p> <ul style="list-style-type: none"> Normal urine output is at least 1 mL/kg/hr For catheter placement, use similar technique as with adult placement. See next page for urinary catheter size selection 	OG/NG Tube Size Selection		Infant	5 F-10 F	Child	8 F-14 F
OG/NG Tube Size Selection							
Infant	5 F-10 F						
Child	8 F-14 F						

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Inpatient Treatment and Monitoring Intervention Care Guideline

<ul style="list-style-type: none"> ○ Weigh diapers if strict I/O is required 	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">Urinary Catheter Size Selection</th> </tr> <tr> <td style="width: 50%;">Newborn / Infant</td> <td>5 F-8 F</td> </tr> <tr> <td>Toddler/Preschool</td> <td>8 F-10 F</td> </tr> <tr> <td>School Age</td> <td>8 F-12 F</td> </tr> <tr> <td>Adolescent</td> <td>12 F-14 F</td> </tr> </table> <ul style="list-style-type: none"> • To weigh diapers: <ul style="list-style-type: none"> ○ Subtract total weight from dry diaper weight ○ 1 gm=1 mL urine 	Urinary Catheter Size Selection		Newborn / Infant	5 F-8 F	Toddler/Preschool	8 F-10 F	School Age	8 F-12 F	Adolescent	12 F-14 F
Urinary Catheter Size Selection											
Newborn / Infant	5 F-8 F										
Toddler/Preschool	8 F-10 F										
School Age	8 F-12 F										
Adolescent	12 F-14 F										
<p>IV Fluids:</p> <p><u>IV Site selection:</u></p> <ul style="list-style-type: none"> • Infants (< 12 months): hand, wrist, antecubital, saphenous, feet, scalp • >12 months: hand, wrist, antecubital <p><u>IO Site Selection</u></p> <ul style="list-style-type: none"> • Proximal tibia • Distal tibia • Humerus (if sites palpable) • Distal femur (manual IO only) <p><u>IV/IO Monitoring</u></p> <ul style="list-style-type: none"> • Assess site at least every 2 hours 	<p>IV Fluids:</p> <p><u>IV Site Selection:</u></p> <ul style="list-style-type: none"> • Avoid feet/saphenous for ambulatory children • If available, use a topical anesthetic (e.g., EMLA,LMX). Follow manufacturer’s instructions. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">Suggested IV Catheter Sizes</th> </tr> <tr> <td style="width: 50%;">Newborns/Infants</td> <td>24 G-22 G</td> </tr> <tr> <td>Toddlers/School Age</td> <td>24 G-22 G</td> </tr> <tr> <td>Adolescents</td> <td>22 G-18 G</td> </tr> </table> <p><u>IO Needle Sizes</u></p> <ul style="list-style-type: none"> • Follow manufacture’s recommendations for needle size for pediatric patients. • Needles for the IO drills are not long enough to use in the distal femur. Manual IO should be used. <p><u>IV/IO Monitoring:</u></p> <ul style="list-style-type: none"> • IV/IO can infiltrate quickly because of the child’s activity. Careful assessment will minimize infiltrate damage 	Suggested IV Catheter Sizes		Newborns/Infants	24 G-22 G	Toddlers/School Age	24 G-22 G	Adolescents	22 G-18 G		
Suggested IV Catheter Sizes											
Newborns/Infants	24 G-22 G										
Toddlers/School Age	24 G-22 G										
Adolescents	22 G-18 G										

<ul style="list-style-type: none"> ○ Ensure you are able to palpate & visualize the site when taping the line ● Do not wrap tape circumferentially around an extremity <p><u>IV Fluids: Replacement</u></p> <ul style="list-style-type: none"> ● Birth - 28 days: <ul style="list-style-type: none"> ○ Bolus 0.9% NS at 10 mL/kg ● > 28 days: <ul style="list-style-type: none"> ○ Bolus 0.9% NS at 20 mL/kg ● Suspected cardiogenic shock: <ul style="list-style-type: none"> ○ Bolus 0.9% NS at 5-10 mL/kg <p><u>IV Fluids: Maintenance</u></p> <ul style="list-style-type: none"> ● D5 0.45% NS is standard ● Add 20 mEq KCl/Liter if not hyperkalemic ● Monitor weight, urine output and electrolytes and adjust rate/composition of IV fluids accordingly ● To calculate maintenance rate: <ul style="list-style-type: none"> ○ Birth-28 days: 80-100 mL/kg/24 hrs ○ >28 days: First 10 kg = 4 mL/kg/hr Second 10 kg = 2 mL/kg/hr Each additional kg = 1 mL/kg/hr 	<ul style="list-style-type: none"> ● Wrapping tape circumferentially around an extremity may cause tissue damage if the IV infiltrates <p><u>IV Fluids: Replacement</u></p> <ul style="list-style-type: none"> ● 0.9% NS Bolus used for fluid replacement or for intravascular expansion to treat shock ● May use Lactate Ringers if acidotic ● Administer as rapidly as possible without sacrificing IV/IO ● May repeat x 3 if for severe dehydration or non-cardiogenic shock <p><u>IV Fluids: Maintenance</u></p> <ul style="list-style-type: none"> ● Maintenance fluids usually contain D5 <ul style="list-style-type: none"> ○ Provides 17 calories/100 mL and nearly 20% of the daily caloric needs which will prevent ketone production and helps minimize protein degradation <ul style="list-style-type: none"> ● Will lose weight on this regimen if enteral feedings not given also ○ Need to be started on total parental nutrition after a few days of maintenance fluids if enteral feedings are still not possible. (Nelsons, 2011) ● Potassium should only be added after renal function is proven to be adequate and patient has voided ● Example 23 kg child: 4 mL/hr x 10 kg + 2 mL/hr x 10 kg + 1 mL/hr x 3 kg = 63 mL/hr
--	---

<p>Safety:</p> <ul style="list-style-type: none"> • Ensure crib rails are up at all times when patient is not directly attended to by a caregiver/parent • No extra supplies should be kept in the crib or in reach • Place infant on their back when sleeping • Children under 3 years of age should be placed in a crib 	<p>Safety:</p> <ul style="list-style-type: none"> • Infants can easily roll out of the crib and be injured. • Supplies may be a choking hazard. • Infants sleeping on the back decreases the risk of SIDS • A hospital is not “child proof.” Even if a toddler sleeps in a youth or regular bed at home, consider placing them in a crib for their safety.
<p>Treatments:</p> <p>Medications</p> <p><u>Analgesics/Antipyretics</u></p> <ul style="list-style-type: none"> • Acetaminophen <ul style="list-style-type: none"> ○ 15 mg/kg PO/PR every 4 hrs PRN (max dose in 24 hours=3 gms) • Ibuprofen (infant/child > 6 months) <ul style="list-style-type: none"> ○ 10 mg/kg PO every 6 hr PRN 	<p>Treatments:</p> <p>Medications:</p> <p>Resource: EMSC Pain Management in the Emergency Setting.</p> <p>Acetaminophen:</p> <ul style="list-style-type: none"> • Advantages <ul style="list-style-type: none"> ○ Minimal adverse effects on GI tract or renal function • Disadvantages <ul style="list-style-type: none"> ○ Liver toxicity <p>Ibuprofen</p> <ul style="list-style-type: none"> • Advantages <ul style="list-style-type: none"> ○ Inhibits prostaglandin-induced nociception • Disadvantages <ul style="list-style-type: none"> ○ May have limited effect on the immediate treatment of acute pain as these agents do not directly block nociceptors. Inactive against already released inflammatory mediators. Side effects include nausea, vomiting, ulcers, platelet dysfunction, liver toxicity

<p><u>Analgesics</u></p> <ul style="list-style-type: none"> • Acetaminophen with hydrocodone <ul style="list-style-type: none"> ○ <50 kg: 0.1-0.2 mg/kg/dose of hydrocodone every 4-6 hrs (max 10 mg) ○ >50 kg: 5-10 mg of hydrocodone every 4-6 hrs • Ketorolac (Toradol) <ul style="list-style-type: none"> ○ 0.25-1 mg/kg IM/IV/IO every 6 hr PRN ○ Can be given PO for children >50 kg • Morphine <ul style="list-style-type: none"> ○ 0.1-0.2 mg/kg IM/IV/IO, every 2-4 hrs PRN • Fentanyl <ul style="list-style-type: none"> ○ 1-2 mcg/kg/dose IM/IV/IO, IN* every 30-60 minutes PRN 	<p>Acetaminophen with hydrocodone</p> <ul style="list-style-type: none"> • Elixer: Hycet/Lortab: 7.5 mg hydrocodone and 325 mg acetaminophen per 15 ml • Tablet: Lorcet/Norco • Advantages <ul style="list-style-type: none"> ○ Oral medication ○ Moderately rapid onset • Disadvantages <ul style="list-style-type: none"> ○ Dizziness, sedation, nausea, vomiting, constipation <p>Ketorolac:</p> <ul style="list-style-type: none"> • Advantages <ul style="list-style-type: none"> ○ Effective alternative to opioids for treatment of moderate to severe pain. Can be combined with acetaminophen or low-dose opioids for greater analgesia • Disadvantages <ul style="list-style-type: none"> ○ Bleeding diathesis, hyperkalemia and depression of renal function, hepatotoxicity <p>Morphine:</p> <ul style="list-style-type: none"> • Advantages <ul style="list-style-type: none"> ○ Moderately rapid predictable onset. Significant role for patients who need prolonged pain control (e.g., fracture reduction, multiple trauma, sickle cell disease) • Disadvantages <ul style="list-style-type: none"> ○ Respiratory depression, hypotension, bradycardia, CNS depression, ○ Avoid patients with renal failure • Monitor for respiratory depression <p>Fentanyl:</p> <ul style="list-style-type: none"> • Advantages <ul style="list-style-type: none"> ○ Rapid onset if given IV/IO, short duration, potent analgesic, better safety
--	--

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Inpatient Treatment and Monitoring Intervention Care Guideline

<p>*For IN route, divide dose equally between each nostril</p> <p><u>Antibiotics</u></p> <p>Children > 28 days</p> <ul style="list-style-type: none"> • Ceftriaxone <ul style="list-style-type: none"> ○ 75 mg/kg IV/IO every 24 hrs ○ Not for infants < 1 m/o • Clindamycin <ul style="list-style-type: none"> ○ 10 mg/kg IV/IO every 6 hrs • Vancomycin <ul style="list-style-type: none"> ○ 15 mg/kg IV/IO every 6 hrs • Piperacillin/Tazobactam <ul style="list-style-type: none"> ○ 75 mg/kg IV/IO every 6 hrs • Cefepime <ul style="list-style-type: none"> ○ 50 mg/kg IV/IO every 8 hours (max: 2 g/dose) • Cefuroxime <ul style="list-style-type: none"> ○ Infants and children 28 days and older: 50 mg/kg/dose every 8 hours (max dose: 2000 mg/dose) <p>Neonates (birth - 28 days)</p> <ul style="list-style-type: none"> • Ampicillin 100 mg/kg/day IV/IO divided every 6 hours • Cefotaxime IV/IO 	<ul style="list-style-type: none"> ○ Profile for renal patients, preferred medication for renal patients • Disadvantages <ul style="list-style-type: none"> ○ Respiratory depression, apnea may precede alteration of consciousness chest wall rigidity if given too rapidly. ○ IN route should not be used with facial trauma due to ineffective absorption. <p><u>Antibiotics</u></p> <ul style="list-style-type: none"> • Ceftriaxone <ul style="list-style-type: none"> ○ Effective for: UTI, pneumonia, bacteremia ○ For CNS infections, dose is 100 mg/kg every 24 hrs and Vancomycin should be added • Clindamycin <ul style="list-style-type: none"> ○ Treats most skin/soft tissue infections • Vancomycin <ul style="list-style-type: none"> ○ Reserve for severe infections ○ Good for pneumonia with suspected MRSA or resistant <i>Pneumococcus</i> ○ Severe skin/soft tissue infections ○ Gram-positive bacteremia • Piperacillin/Tazobactam <ul style="list-style-type: none"> ○ Intra-abdominal infections <p>Neonates:</p> <ul style="list-style-type: none"> • Cefotaxime <ul style="list-style-type: none"> ○ Broad spectrum
--	--

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Inpatient Treatment and Monitoring Intervention Care Guideline

<ul style="list-style-type: none"> ○ > 1 yr (Use for treatment and prophylaxis): 3 mg/kg every 12 hours x 5 days ● Acyclovir <ul style="list-style-type: none"> ○ <12 yrs: 20 mg/kg IV/IO every 8 hrs ○ >12yrs: 10 mg/kg IV/IO every 8 hrs <p><u>Dextrose:</u></p> <ul style="list-style-type: none"> ○ Dextrose 0.5-1 g/kg IV/IO ○ D50W: 1-2 mL/kg IV/IO ○ D25W: 2-4 mL/kg IV/IO ○ D10W: 5-10 mL/kg IV/IO (infants >28 days) ○ D10W: 2 mL/kg IV/IO (birth - 28 days) 	<p><u>Dextrose:</u></p> <ul style="list-style-type: none"> ○ Maximum recommended concentration for a bolus administration in children >28 days for hypoglycemia is D25W ○ Maximum recommended concentration for a bolus administration in neonates for hypoglycemia is D10W ○ To convert D50W to D10W <ul style="list-style-type: none"> ● Mix 1 part D50W to 4 parts sterile water or normal saline ○ To convert D50W to D25W <ul style="list-style-type: none"> ● Mix 1 part D50W to 1 part sterile water or normal saline
<p>Other Treatments:</p> <p>Blood Administration:</p> <ul style="list-style-type: none"> ● Replacement with PRBC/ Platelet/Albumin 5%/FFP = 10mL/kg ● Assess the child frequently throughout the infusion for a possible transfusion reaction 	<p>Other Treatments:</p> <p>Blood Administration:</p> <ul style="list-style-type: none"> ● All blood products may be infused through any size IV catheter ● Total blood volume varies by weight <ul style="list-style-type: none"> ○ Approximate volume is 80mL/kg.

Other Considerations:

Children with Special Health Care Needs/Children with Functional Access Needs (CSHCN/CFAN):

- Tracheostomy Care (established tracheostomy)
- G-Tube or J-Tube (established)

Other Considerations:

Children with Special Health Care Needs/Children with Functional Access Needs:

The parent of a child with special needs will be your best reference for how to manage their care. They will be willing to share their treatment plan and techniques. Some parents will have a resource binder or other reference with them.

- Tracheostomy Care: Similar care to adults, wash site gently with warm water as needed. Change tracheostomy ties daily and as needed.
- G-Tube/J-Tube: Similar care to adults, wash site gently with warm water as needed. If tube is accidentally dislodged and a replacement tube is not readily available, you may replace with an indwelling urinary catheter. Slide the catheter in gently. There should be minimal resistance.

Resource: EMSC CSHCN Reference Guide included in the following two pages



Children with Special Health Care Needs

- Listen to the caregivers. They know their child best. Inquire about:
 - *child's baseline abilities*
 - *child's baseline vital signs*
 - *devices & medications*
 - *syndromes/ diseases*
 - *usual vital signs*
 - *what is different today*
 - *symptoms*
- Bring care plans or Emergency Information Forms (EIF) to the hospital with the patient.
- Assess and communicate directly with the child based on developmental age, not chronological age. DO NOT make assumptions about their level of understanding based on their appearance.
- Look for MedicAlert® jewelry or health forms, if usual caregiver is not available.
- Bring necessary **specialized equipment and medications** into the ED with the child if possible (ventilator, tracheostomy tube or gastrostomy tube, etc)
- Ask caregivers for the best way to move the child, particularly if the child is very prone to fractures, such as in *osteogenesis imperfecta* ('brittle bone disease'). If child suffers a fracture & has a brace or splint on the affected area, leave the brace or splint on & immobilize around it.
- *Down Syndrome* patients may have upper cervical instability and may be more prone to spinal cord injury. Immobilization is important in any mechanism of injury in which there has been significant movement of the neck.
- *Cardiac patients* may have absent pulses in limbs, may be chronically hypoxic or have hypoxic spells. Confirm the baseline assessment with caregiver.

TECHNOLOGY-ASSISTED CHILDREN: Among *Children with Special Health Care Needs* is a growing sub-population of children with chronic illnesses who are dependent on medical devices. Several of the most common devices are summarized below with information to assist in the care of children with those devices.

TRACHEOSTOMY: *Breathing tube into trachea through opening in neck*

Uses: Respiratory problems – narrow or obstructed airways, bronchopulmonary dysplasia (chronic lung disease seen in premature babies), etc.
Neurological or Neuromuscular conditions – brain damage, muscular dystrophy, etc.
May be ventilator dependent totally, part of the time or may breathe on own

Types: Uncuffed – infant & young child; Cuffed – older child (usually >age 8yr) & adolescent
Fenestrated – hole in stem allows breathing through vocal cords to permit talking, or weaning off tracheostomy
May be single tube or have inner cannula, which can be removed & cleaned

Assessment Issues: Evaluate for DOPE & Infection (tracheal or pulmonary). Reassess pulse/respiratory rates frequently.

- **Displaced** – total or partial removal of tube
- **Obstructed** – mucus plug, blood, foreign body, or moved against soft tissues
- **Pulmonary problems** – pneumothorax, pneumonia, reactive airway, aspiration
- **Equipment** – ventilator malfunction, oxygen depletion, tubing kinked

Treatment:

BLS: If on ventilator, disconnect and attempt to oxygenate with bag using tracheostomy adaptor (if present) or infant mask over trach opening or stoma (hole in neck). Call ALS if available, especially if respiratory distress present.

If not on ventilator, administer oxygen with bag or infant mask over trach as needed

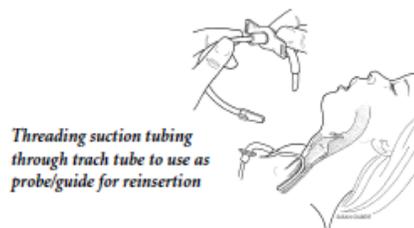
Suction as needed – no more than 10 sec. Insert no more than 3/4 length of neck

If unable to suction because of thick secretions, request caregiver to instill 2-3 ml saline, then suction

If inner cannula present, request that caregiver remove and clean with saline

If unable to ventilate, cover opening with gauze and ventilate with bag and mask over mouth & nose

ALS: If above does not work, may remove tube and either reinsert new tube or use endotracheal tube of same approximate size. If unable to find opening, may thread suction catheter through new tracheostomy tube or endotracheal tube and use catheter tip to probe opening, sliding tube over catheter into opening and then removing catheter. Attempt to ventilate and check breath sounds.



NOTE: This reference card should not replace or supersede regional prehospital medical treatment protocols. Development and printing of this card has been supported in part by a federal grant from the Assistant Secretary for Preparedness & Response (ASPR), U.S. Department of Health & Human Services. This card was adapted from a document developed by New York State EMSC. Drawings are primarily by Susan Gilbert and are adapted from the Teaching Resource for Instructors in Prehospital Pediatrics (TRIPP).

CENTRAL INTRAVENOUS CATHETERS: *Indwelling intravenous access*

Uses: Medication administration, parenteral (IV) hydration/nutrition administration

Types: Totally Implanted (such as Mediport®); multilumen catheters (such as Hickman® or Broviac® catheters); or peripherally inserted central catheter (PICC) lines

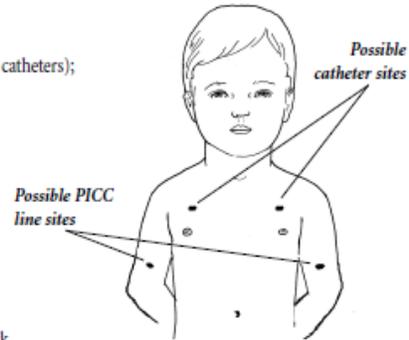
Assessment Issues: Evaluate for DOPE & Infection

- **Displaced** – total or partial dislodgement or movement out of vein into internal tissues
- **Obstructed** – blood clot, protein, crystallized medications / IV nutrition
- **Pericardial Tamponade** – fluid in the pericardial sac due to perforation by catheter
- **Pulmonary problems** – pneumothorax, pulmonary embolism from clot or catheter shear
- **Equipment** – tubing kinked or cracked, infusion pump failure

Treatment:

BLS: Direct pressure if bleeding at site or clamp/tie if tubing leaking. Administer oxygen as needed.

ALS: Aspirate / flush only if permitted by local protocols. Administer IV or IO fluids if signs of shock



CSF SHUNT (*Ventriculoperitoneal or V-P shunt*): Drains excess fluid from brain

Uses: Post meningitis, brain injury/surgery/tumors, hydrocephalus (“water on the brain”)

Types: Polyethylene tubing with reservoir from brain ventricles to abdomen or heart

Assessment Issues: Evaluate for infection and signs of increased intracranial pressure:

Apnea, Headache, Nausea, Vomiting, Lethargy, Drowsiness, Downward Deviation of Eyes

Treatment:

BLS & ALS: Administer oxygen as needed. Perform mild hyperventilation if signs of brain herniation such as unresponsiveness with unequal pupils, fixed dilated or unresponsive pupils, or increased BP and decreased heart rate.

Shunt from ventricle of brain to abdominal cavity



GASTROSTOMY: Feeding tube

Uses: Total or enhanced feeding & / or medication administration
 Abdominal/gastrointestinal problems

Neurological or neuromuscular – brain damage, muscular dystrophy, etc.

Types: Button/catheter type gastrostomy (G) tube – (stomach) or jejeunal (J) tube – (intestine)

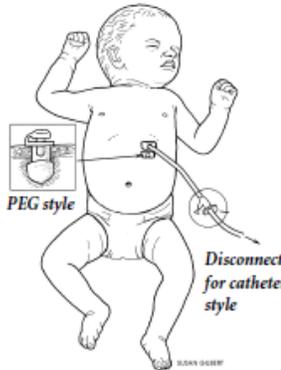
Assessment Issues: Evaluate for DOPE & Infection

- **Displaced** – total or partial removal of tube
- **Obstructed** – blood, crystallized feeding / medications, abdominal tissues
- **Peritonitis or Perforation of stomach/bowel**
- **Equipment** – tubing kinked or cracked, feeding infusion pump failure

Treatment:

BLS: Direct pressure if bleeding at site. Dry sterile dressing over area if tube is dislodged, or tape partially dislodged tube in place. Transport for evaluation of abdominal symptoms or for reinsertion/replacement of tube. (Stoma can close off within hours). If tube blocked, abdominal distension or vomiting – stop feeding. Attach the connector to the tube and leave tube open and draining into a cup. Bring old tube to ED for sizing purposes.

ALS: Administer IV or IO fluids if signs of dehydration or shock. Transport with patient on right side or sitting up to avoid potential aspiration.



COLOSTOMY OR ILEOSTOMY: Drainage of fecal material

Uses: Temporary or permanent malfunction or obstruction of intestine or urinary system

Types: Open stoma draining into plastic pouch

Assessment Issues: Evaluate infection, irritation/trauma, peritonitis

Treatment:

BLS: Direct pressure if bleeding at site. Saline moistened sterile dressing covered by dry dressing if stoma exposed

ALS: Administer IV or IO fluids if signs of dehydration or shock

URETEROSTOMY OR NEPHROSTOMY TUBE OR FOLEY CATHETER: Drainage of urine

Uses: Temporary or permanent malfunction or obstruction of urinary system

Types: Open stoma draining into plastic pouch or through catheter in urethra

Assessment Issues: Evaluate infection, irritation / trauma, peritonitis, blocked urinary drainage.

Treatment:

BLS: Direct pressure if bleeding at site. Saline moistened sterile dressing covered by dry dressing if stoma exposed

ALS: Administer IV or IO fluids if signs of dehydration or shock.



Drawings by Susan Gilbert

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

Newborn Care Guidelines

Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster. This form is to be filled out by the initial hospital and sent with the patient (either when discharged home or to another facility) to communicate what initial management has been completed.

Disclaimer: This guideline are not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

In a disaster scenario, normal routine newborn care may be inadvertently delayed. Therefore, an evaluation of the newborn by a health care provider with expertise in the care of a newborn (e.g., pediatrician, family practice physician, or pediatric nurse practitioner) should occur as soon as possible. The form below and information found in this care guideline is provided to assist those hospitals who typically do not care for newborns to provide necessary care until the above experts can evaluate the patient.

PHYSICAL EXAM	YES	NO	ISSUE	PLAN
Exam WNL				
PHYSICAL FUNCTIONS				
Vital signs WNL See attached for normal values				
Pulse ox screening <input type="checkbox"/> Age of child _____ <input type="checkbox"/> Right hand SpO ₂ % ____ <input type="checkbox"/> Left or Right Foot SpO ₂ % ____				
Any medical problems?				
Anomaly present				
Feeding assessment <input type="checkbox"/> Breastfeeding <input type="checkbox"/> Bottle feeding				
Voiding				
Stooling <input type="checkbox"/> Birth weight _____ <input type="checkbox"/> Current weight _____				
Weight loss >7%				
Jaundice absent				
Signs or concerns for infection				
Normal hearing screening				
LAB RESULTS				
Maternal <input type="checkbox"/> Blood type/Rh _____ <input type="checkbox"/> Group B streptococcus ____ <input type="checkbox"/> Other (i.e. HIV) _____				
Newborn <input type="checkbox"/> Blood type/Rh _____ <input type="checkbox"/> Glucose _____ <input type="checkbox"/> Hematocrit _____ <input type="checkbox"/> Bilirubin _____ <input type="checkbox"/> Phenylketonuria (PKU) _____ <input type="checkbox"/> HIV if mother's status is unknown <input type="checkbox"/> Other _____				
MEDICATIONS				
Hepatitis B				
Vitamin K Dose given: Route:				
Eye prophylaxis Medication used:				

Newborns are one of the most vulnerable population groups.

Hand hygiene is essential.
Breastfeeding is the gold standard.
Keep mother and baby together.

Care of Newborn after Delivery in Transition Period (0-8 hours)

INTERVENTION	CAVEATS/RATIONALE																												
Dry baby immediately with a towel and then gently suction mouth and nose																													
Calculate APGAR Scores: <ul style="list-style-type: none"> • Perform at 1 and 5 minutes. • Repeat APGAR scores every 5 minutes for 20 minutes or until APGAR score \geq 7. • If child is stable with a pink core and a 5-minute APGAR score $>$7, then rewrap the baby in clean, warm, dry blankets and allow parents to hold baby. 	Sample APGAR Score Card <table border="1" data-bbox="621 808 1898 1292"> <thead> <tr> <th data-bbox="621 808 842 948">SIGN</th> <th colspan="3" data-bbox="842 808 1898 948">SCORE</th> </tr> <tr> <td data-bbox="621 948 842 1016"></td> <th data-bbox="842 948 1167 1016">0</th> <th data-bbox="1167 948 1577 1016">1</th> <th data-bbox="1577 948 1898 1016">2</th> </tr> </thead> <tbody> <tr> <td data-bbox="621 1016 842 1084">Appearance</td> <td data-bbox="842 1016 1167 1084">Blue</td> <td data-bbox="1167 1016 1577 1084">Pink body, blue extremities</td> <td data-bbox="1577 1016 1898 1084">All pink</td> </tr> <tr> <td data-bbox="621 1084 842 1153">Pulse</td> <td data-bbox="842 1084 1167 1153">Absent</td> <td data-bbox="1167 1084 1577 1153"><100</td> <td data-bbox="1577 1084 1898 1153">>100</td> </tr> <tr> <td data-bbox="621 1153 842 1221">Grimace</td> <td data-bbox="842 1153 1167 1221">No response</td> <td data-bbox="1167 1153 1577 1221">Weak cry and grimace</td> <td data-bbox="1577 1153 1898 1221">Vigorous cry</td> </tr> <tr> <td data-bbox="621 1221 842 1289">Activity</td> <td data-bbox="842 1221 1167 1289">Flaccid, limp</td> <td data-bbox="1167 1221 1577 1289">Some flexion</td> <td data-bbox="1577 1221 1898 1289">Active motion</td> </tr> <tr> <td data-bbox="621 1289 842 1292">Respirations</td> <td data-bbox="842 1289 1167 1292">Absent</td> <td data-bbox="1167 1289 1577 1292">Slow, irregular</td> <td data-bbox="1577 1289 1898 1292">Good, vigorous cry</td> </tr> </tbody> </table>	SIGN	SCORE				0	1	2	Appearance	Blue	Pink body, blue extremities	All pink	Pulse	Absent	<100	>100	Grimace	No response	Weak cry and grimace	Vigorous cry	Activity	Flaccid, limp	Some flexion	Active motion	Respirations	Absent	Slow, irregular	Good, vigorous cry
SIGN	SCORE																												
	0	1	2																										
Appearance	Blue	Pink body, blue extremities	All pink																										
Pulse	Absent	<100	>100																										
Grimace	No response	Weak cry and grimace	Vigorous cry																										
Activity	Flaccid, limp	Some flexion	Active motion																										
Respirations	Absent	Slow, irregular	Good, vigorous cry																										
At 15 minutes old assess: <ul style="list-style-type: none"> • Overall condition • Respiratory status • Cardiovascular status • Skin color 	<ul style="list-style-type: none"> • <u>Respiratory Status:</u> <ul style="list-style-type: none"> ○ Respiratory rate: 30-60 breaths/minute ○ May have coarse rales until amniotic fluid is cleared from infant's lungs ○ Grunting and retractions may occur until amniotic fluid is cleared from infant's lungs but these should resolve within an hour 																												

<ul style="list-style-type: none"> • Muscle tone • Temperature 	<ul style="list-style-type: none"> ○ <i>Abnormal:</i> <ul style="list-style-type: none"> ▪ Apnea lasting longer than 20 seconds ▪ Persistent central cyanosis ▪ O₂ <85% in room air ▪ Needing supplemental O₂ after 2 hours of age ▪ Excessive oral mucus ▪ Drooling ▪ Periods of cyanosis ▪ Choking or coughing episodes • <u>Cardiovascular Status:</u> <ul style="list-style-type: none"> ○ Heart rate: 120-160 bpm. Heart rate may fall to 80 bpm, but without changes in color or respirations ○ Murmurs can be normal ○ <i>Abnormal:</i> <ul style="list-style-type: none"> ▪ Persistent bradycardia ▪ Capillary refill > 3 seconds and unstable blood pressures may indicate: hypoxia, sepsis, CNS injury, or other cardiovascular problems • <u>Neurological/Muscle Tone:</u> <ul style="list-style-type: none"> ○ <i>Abnormal:</i> <ul style="list-style-type: none"> ▪ Listlessness ▪ Lethargy ▪ Hypotonia ▪ Irritability ▪ Excessive tremors ▪ Jitteriness • <u>Skin color:</u> <ul style="list-style-type: none"> ○ <i>Abnormal:</i> <ul style="list-style-type: none"> ▪ Persistent pallor in the post-partum period may indicate anemia, cardiovascular collapse, or intra-partum asphyxia • <u>Temperature:</u> <ul style="list-style-type: none"> ○ Temperature may fall to 36.5°C (97.7°F) at the mean age of 75 minutes old ○ Do not bathe the baby until the temperature is stable between 36.5°-37.0°C (97.7°-98.0°F)
--	--

<p>Check axillary temperature every 30-60 minutes during transition</p>	<ul style="list-style-type: none"> • Infant skin-to-skin contact with mother keeps the baby warm • If using a radiant warmer then must compare infant's temperature against the radiant warmer
<p>Perform glucose screen if newborn is high risk or symptomatic</p>	<ul style="list-style-type: none"> • Newborns have limited glycogen stores which are rapidly depleted during times of stress. • Hypoglycemia is < 50 mg/dL <ul style="list-style-type: none"> ○ This value is based on the STABLE recommendation and is typically used for high risk newborns. PALS and NRP have other values listed as their definition of hypoglycemia (45 and 40, respectively). • High Risk: <ul style="list-style-type: none"> ○ Premature ○ Small for gestation age ○ Mothers who were diabetic ○ Any newborn looking ill • Symptoms: <ul style="list-style-type: none"> ○ Irritability, tremors, jitteriness, seizures ○ Abnormal high pitch cry ○ Exaggerated Moro reflex <ul style="list-style-type: none"> ▪ Definition of Moro reflex: In response to loss of balance, newborns arch their back, flings their arms outwards, extends the legs, and opens the hands, after which they slowly returns to a flexed position ○ Lethargy, limpness, hypotonia ○ Cyanosis, apnea, irregular respirations ○ Hypothermia, vasomotor instability, temperature instability ○ Poor suck ○ Feeding poorly or refusal to feed when feeding well previously • Treatment for hypoglycemia: <ul style="list-style-type: none"> ○ If possible, allow newborn to feed (breast milk or formula) ○ If unable to feed, consider providing pumped breast milk or formula via NG ○ If unable to take PO, administer Dextrose 10% bolus of 2 mL/kg • If hypoglycemia reoccurs or lasts 48-72 hours post-delivery: <ul style="list-style-type: none"> ○ Could suggest an inborn error of metabolism or some kind of endocrine disorder which necessitates further medical care
<p>Administer eye prophylaxis</p> <ul style="list-style-type: none"> • Erythromycin 0.5% ointment OR • Silver nitrate 1% solution OR • Tetracycline 1% ointment 	<ul style="list-style-type: none"> • Illinois State mandate • Best given within 1st hour of delivery

<p>Administer Vitamin K</p> <ul style="list-style-type: none"> • Infant weight < 1.5 kg: 0.5 mg IM as a single dose • Infant weight > 1.5 kg: 1.0 mg IM as a single dose 	<p>Vitamin K</p> <ul style="list-style-type: none"> • Give within 1 hour of birth • Given to prevent Vitamin K Deficiency Bleeding (aka “Hemorrhagic Disease of the Newborn”)
<p>Newborn Complications:</p> <ul style="list-style-type: none"> • Hyperbilirubinemia: <ul style="list-style-type: none"> ○ Bilirubin should be checked in a newborn that is jaundiced before 24 hours of age • Sepsis: • Other potential interventions depending on presenting symptoms: <ul style="list-style-type: none"> ○ Oxygen administration ○ Suctioning as needed ○ Normothermic environment ○ Bedside glucose ○ Pulse oximetry reading in right arm compared against any other extremity ○ Frequent monitoring ○ Chest X-ray ○ Echocardiogram ○ Exogenous surfactant fluid replacement therapy ○ Mechanical ventilation ○ Antibiotic coverage ○ IV nutrition if respiratory distress interferes with feeding 	<ul style="list-style-type: none"> • Hyperbilirubinemia: <ul style="list-style-type: none"> ○ Common causes: <ul style="list-style-type: none"> ▪ Breast-feeding-associated jaundice ▪ ABO & Rh incompatibility ▪ Polycythemia ▪ Bruising of the newborn (e.g., cephalhematoma) ▪ Bowel obstruction ▪ Inborn errors of metabolism ▪ G6PD deficiency ○ Treatment for breast-feeding-associated jaundice: <ul style="list-style-type: none"> ▪ Promote frequent breastfeeding (minimal 8-10 times/day) ▪ Have mother pump her breasts after feeding ▪ Avoid pacifiers ▪ Avoid supplementation unless medically indicated (excessive weight loss or hypoglycemic). ▪ Expressed breast milk or formula is preferred ○ Other treatment includes phototherapy requiring qualified personnel • Sepsis: <ul style="list-style-type: none"> ○ Symptoms may include: <ul style="list-style-type: none"> ▪ Apnea ▪ Respiratory distress ▪ Poor activity ▪ Poor feeding ▪ Hypothermic ▪ Poor color ○ Risk factors include: <ul style="list-style-type: none"> ▪ Maternal group B streptococcus ▪ Premature rupture of membranes ▪ Mother with intrapartum fever ▪ Chorioamnionitis

<p>Feeding:</p> <ul style="list-style-type: none"> • Promote breastfeeding within 30-60 minutes after delivery <ul style="list-style-type: none"> ○ Feed every 2 -3 hours so at least 8 to 12 feedings occur every 24 hours • Bottle feed when breastfeeding or pumped breast milk not possible <ul style="list-style-type: none"> ○ 2-3 oz. of formula per feeding every 2-3 hours 	<ul style="list-style-type: none"> • Early and exclusive breastfeeding is best for normal term, healthy neonates and prevents hypoglycemia • Contraindications to breastfeeding: <ul style="list-style-type: none"> ○ Mothers who are/have: <ul style="list-style-type: none"> ▪ +HIV ▪ Active untreated TB ▪ Radioactive milk ▪ Using street drugs ▪ Herpes simplex lesions on breasts ▪ Taking anti-metabolites or chemotherapeutic agents, and small number of other medications until they clear from the milk
--	---

Caring for Newborns After Delivery (8-96 hours)

INTERVENTION	CAVEATE/RATIONALE
<p>Vital Signs:</p> <ul style="list-style-type: none"> • Obtain vital signs every 8 hours <ul style="list-style-type: none"> ○ RR: count for full minute ○ HR: auscultate apical pulse for full minute ○ Pulse oximetry screening: perform when at least 24 hours old ○ BP: not recommended if well newborn ○ Temperature 	<p>Vital Signs:</p> <ul style="list-style-type: none"> • <u>RR</u>: <ul style="list-style-type: none"> ○ Normal respirations: 30-60 breaths/minute ○ Respiratory distress includes: <ul style="list-style-type: none"> ▪ Grunting ▪ Nasal flaring ▪ Retractions ▪ Cyanosis ▪ Tachypnea ▪ Apnea ▪ Hypoxemia ○ <i>Abnormal</i>: <ul style="list-style-type: none"> ▪ Apnea > 15 seconds may indicate: <ul style="list-style-type: none"> ○ Sepsis ○ Maternal drugs/medications

- Hypoglycemia
 - Anemia
 - Other metabolic abnormality
 - Tachypnea > 60 breaths/minute may indicate a respiratory, cardiovascular or metabolic problem
- HR:
 - Normal heart rate: 80-160 bpm (slower when sleeping and faster when crying)
 - *Abnormal:*
 - Symptoms of cardiovascular compromise may include:
 - Tachycardia
 - Unequal pulses or blood pressures
 - Poor pulses
 - Respiratory distress
 - Cyanosis of face
 - Central cyanosis
 - Hepatomegaly
 - Abnormal heart rate (80 < bpm > 180) may indicate:
 - Sepsis
 - Asphyxia
 - Hypoxemia
 - Heart block
 - Anemia
 - Hypovolemia
 - Sepsis
- Pulse oximetry screening:
 - Normal is at least $\geq 95\%$ in either extremity with a $\leq 3\%$ absolute difference between upper and lower extremity.
 - Must use right hand (preductal) and on one foot (post-ductal)
 - $SpO_2 < 90\%$ require an expert evaluation to test for infectious and pulmonary causes and for ruling out critical congenital heart disease.
 - High altitudes may result in false positives.
- Temperature:
 - Normal axillary temperature: $36.5^{\circ}\text{-}37^{\circ}\text{C}$ ($97.9^{\circ}\text{-}98.3^{\circ}\text{F}$)
 - If not normothermic must consider causes:

	<ul style="list-style-type: none"> ▪ Environmental ▪ Sepsis ▪ Postasphyxial insult ▪ Low brown fat stores ▪ Prematurity ▪ Small for gestational age (SGA) ○ Must reevaluate temperature minimally every 30 minutes if temperature is abnormal (<36.5° or >37°C (97.9°/98.3°F)). <ul style="list-style-type: none"> ▪ Place baby skin-to-skin contact with mother if infant's temperature <36.5° C (97.9°F) or use a radiant warmer if skin-to-skin contact not feasible. ▪ Remove environmental factors (e.g., over-bundling or hot room) if temperature > 37°C (98.3°F).
<p>Diet/Feeding:</p> <ul style="list-style-type: none"> • Breastfeeding: <ul style="list-style-type: none"> ○ Every 2 -3 hours so at least 8 to 12 feedings occur every 24 hours • Bottle feeding: <ul style="list-style-type: none"> ○ 2-3 oz of formula per feeding every 2-3 hours 	<p>Diet/Feeding:</p> <ul style="list-style-type: none"> • General: <ul style="list-style-type: none"> ○ Early signs of hunger: <ul style="list-style-type: none"> ▪ Increased alertness ▪ Physical activity ▪ Mouthing or rooting ○ Late sign of hunger <ul style="list-style-type: none"> ▪ Crying • Burping: <ul style="list-style-type: none"> ○ Attempted when newborn has ingested 0.5 to 1 ounce of formula and at the end of every feeding ○ Ensure airway is maintained and the head and trunk are supported ○ Gently rub or pat from the lower back in an upwards motion with the newborn sits with support on the caregiver's lap or while being held upright against a caregiver's chest • Breastfeeding: <ul style="list-style-type: none"> ○ Preferred choice even during disasters ○ Feedings should last about 10-15 minutes of active suck on each breast ○ Alternate starting breast at each feeding ○ May need to wake up for feedings especially if it has been four hours since the last feeding ○ Do not interrupt breastfeeding ○ Do not offer any type of supplement feedings unless ordered by a physician ○ Offer pacifier only after breastfeeding has been well established. Otherwise use pacifier only during specific circumstances like pain relief during medical procedures

	<ul style="list-style-type: none"> ● Bottle feeding: <ul style="list-style-type: none"> ○ Iron-fortified infant formula that is commercially-prepared is the recommended ○ Do not prop the bottle <ul style="list-style-type: none"> ▪ Infants must be held in a cuddled position so that the head is slightly above the stomach. ▪ Position the angle of the bottle to prevent air swallowing. ▪ Can rub the nipple softly along the lower lip to help open the infant's mouth ○ All feeding supplies should be washed with clean hot soapy water and then rinsed with clean hot water and allowed to air dry. <ul style="list-style-type: none"> ▪ Sterile technique is recommended when there is a problem with the clean water supply, lack of access to refrigeration, or when the newborn has an immune deficiency problem ○ Prepare formula according to manufacturer's recommendations <ul style="list-style-type: none"> ▪ Only prepare bottles with the amount formula that is expected to be consumed in one feeding. ▪ Discard unused formula within 1 hour. ▪ Bottles can be made in advance and stored in a refrigerator for up to 24 hours. ○ Warming formula: <ul style="list-style-type: none"> ▪ Formula should be warmed to room temperature only ▪ Avoid formula that is either cold or too hot ▪ Do not warm formula in the microwave. ▪ May warm formula by holding the bottle under warm running water. ▪ Test the temperature of warmed formula by shaking the bottle first before applying a few drops to the adult's inner wrist ● Consider placing a nasogastric tube (NG) if newborn is not NPO but is having difficulty feeding or is hypoglycemic and administer either pumped breast milk or formula as indicated above
<p>Elimination:</p> <ul style="list-style-type: none"> ● Urine output: <ul style="list-style-type: none"> ○ First 1-2 days: 2-6 wet diapers/day ○ 3-5 days: 3-5 wet diapers/day ○ 5-7 days: 4-6 wet diapers/day ● Stool: <ul style="list-style-type: none"> ○ First 1-2 days: well newborns pass meconium stool (black, tarry stool). ○ 3-5 days: 3-4 stools/day ○ 5-7 days: 3-6 stools/day 	<p>Elimination:</p> <ul style="list-style-type: none"> ● Staff should notify physician if no urine output for 12 hours ● Routine circumcision not recommended by the AAP ● Do not forcibly retract foreskin

<p>Skin Care/Cord Care:</p> <ul style="list-style-type: none">• Skin care:<ul style="list-style-type: none">○ Bath every 2-3 days as long as the face and diaper area are kept clean regularly• Cord Care:<ul style="list-style-type: none">○ Clean with every diaper change and with sponge baths	<p>Skin Care/Cord Care:</p> <ul style="list-style-type: none">• <u>Skin care:</u><ul style="list-style-type: none">○ Observe face, trunk, and extremities for cyanosis or jaundice○ Do not scrub vernix off○ Scrubbing may damage skin○ Vernix may offer antibacterial properties○ Use a gentle soap without perfumes• <u>Cord care:</u><ul style="list-style-type: none">○ Cord typically falls off in 7-10 days○ Make sure diaper does not cover the cord○ No isopropyl alcohol on cord○ May sponge with warm water on the cord until it falls off○ When the cord has fallen off, may use gentle soap and water○ Do not immerse the baby in bath water until the cord has fallen off○ <i>Abnormal:</i><ul style="list-style-type: none">▪ Drainage that looks serous, purulent, or sanguineous▪ Circumferential redness at base of the cord
---	---

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Obstetrical Care Guidelines

Purpose: To provide guidance to practitioners caring for pregnant women and newborn patients during a disaster
Disclaimer: This guideline are not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Initial Management of All Obstetrical (OB) Patients

- Stabilize ABCs (Airway, Breathing, Circulation)
- For OB trauma patients, stabilize the patient's condition and provide treatment according to trauma guidelines before evaluating the fetus. (See pg. 60 for further care). Be aware of the following caveats:
 - Use rapid sequence induction with cricoid pressure and gastric decompression when oral intubation is required
 - Use closed-tube thoracotomy at a higher intercostal space when treating pneumothorax
 - Place patients who are > 20 weeks gestation in the left lateral position, left lateral tilt, right lateral position or right lateral tilt (while maintain spinal precautions as applicable) to maximize venous return
- Triage:
 - Determine:
 - Number of weeks gestation
 - If the presenting complaint due to the pregnancy
 - If the presenting complaint unrelated to the pregnancy but affects the pregnancy
 - If the presenting complaint affects the pregnancy
 - Triage all pregnant women that are >20 weeks gestation based on the level of severity of patient's complaint related to or that affects the pregnancy to determine level of perinatal services needed:
 - Emergent: (In need of Level III Perinatal Center care) (background read thru for each perinatal center under each section)
 - Cardio-pulmonary failure/arrest
 - Eclampsia
 - Active hemorrhage/heavy bleeding
 - Fetal parts or foreign bodies protruding from vagina
 - Diabetic coma/DKA
 - Altered level of consciousness
 - Multiple gestation (greater than twins) in active labor
 - Active labor in mothers with <30 weeks gestation
 - Laboring mother with known antenatal fetus defect (i.e. cardiac, pediatric surgery)
 - Pre-eclampsia or Hemolysis, Elevated Liver Enzymes, and Low Platelets (HELLP) syndrome
 - Other life threatening conditions to mother or fetus
 - Urgent: (In need of Level II-E Perinatal Center care)
 - Active labor in mothers with >30 and <35 weeks gestation
 - Multiple gestation (no more than twins) in active labor
 - Decreased fetal movement
 - Abdominal pain
 - Preterm rupture of membranes >30 and <35 weeks gestation
 - Obesity

- Non-urgent: (In need of Level I or Level II Perinatal Center care)
 - Active labor in mothers with >35 weeks gestation
 - Preterm rupture of membranes >35 weeks gestation
 - Rule out rupture of membranes (ROM)
 - Stable gestational hypertension
- Perform a complete assessment of pregnant patient at time of presentation (See *Initial Assessment of the Pregnant Patient* for checklist)
- For all OB patients:
 - Establish large bore IV access
 - Obtain lab exams (if available): CBC with differential, Type and RH or Type and Screen, and HIV
 - Obtain prenatal care records (if available)
- Consult Pediatric Care Medical Specialist for assistance with care of the acutely and critically ill patient (mother and child); to individualize the care of patient; if patient needs to be transferred; and as needed for further support and consult.

Management for Common Life Threatening Obstetrical Conditions
Identifying Preeclampsia and/or Eclampsia

ASSESS	NORMAL	MODERATE	SEVERE/ECLAMPSIA
Awareness	Alert/Oriented	Agitated, confused, drowsy, difficulty speaking	Unresponsive, seizure activity
Headache	None	Mild headache, nausea, vomiting	Unrelieved headache
Vision	None	Blurred or impaired	Temporary blindness
Systolic BP (mmHg)	100-139	140-159	≥ 160
Diastolic BP (mmHg)	50-89	90-105	≥ 105
Heart rate	61-110	111-129	≥ 130
Respirations	11-24	25-30	< 10 or > 30
SpO₂ (%)	≥ 95	91-94	≤ 90
Shortness of breath	None	Present	Present
Pain (abdomen or chest)	None	Nausea, vomiting, chest pain, abdominal pain	Nausea, vomiting, chest pain, abdominal pain
Urine output (mL/hr)	≥ 50	30-49	≤ 30 (in 2 hours)
Proteinuria	Trace	+1, +2, ≥ 300/24 hours	> +3; ≥ 5 gm/24 hours
Platelets	> 100	50-100	< 50
AST/ALT	< 70	> 70	> 70
Creatinine	< 0.8	0.9-1.2	> 1.2
Magnesium Sulfate Toxicity	DTR +1; Respirations 16-20	Depression of patellar reflexes	Respirations <12

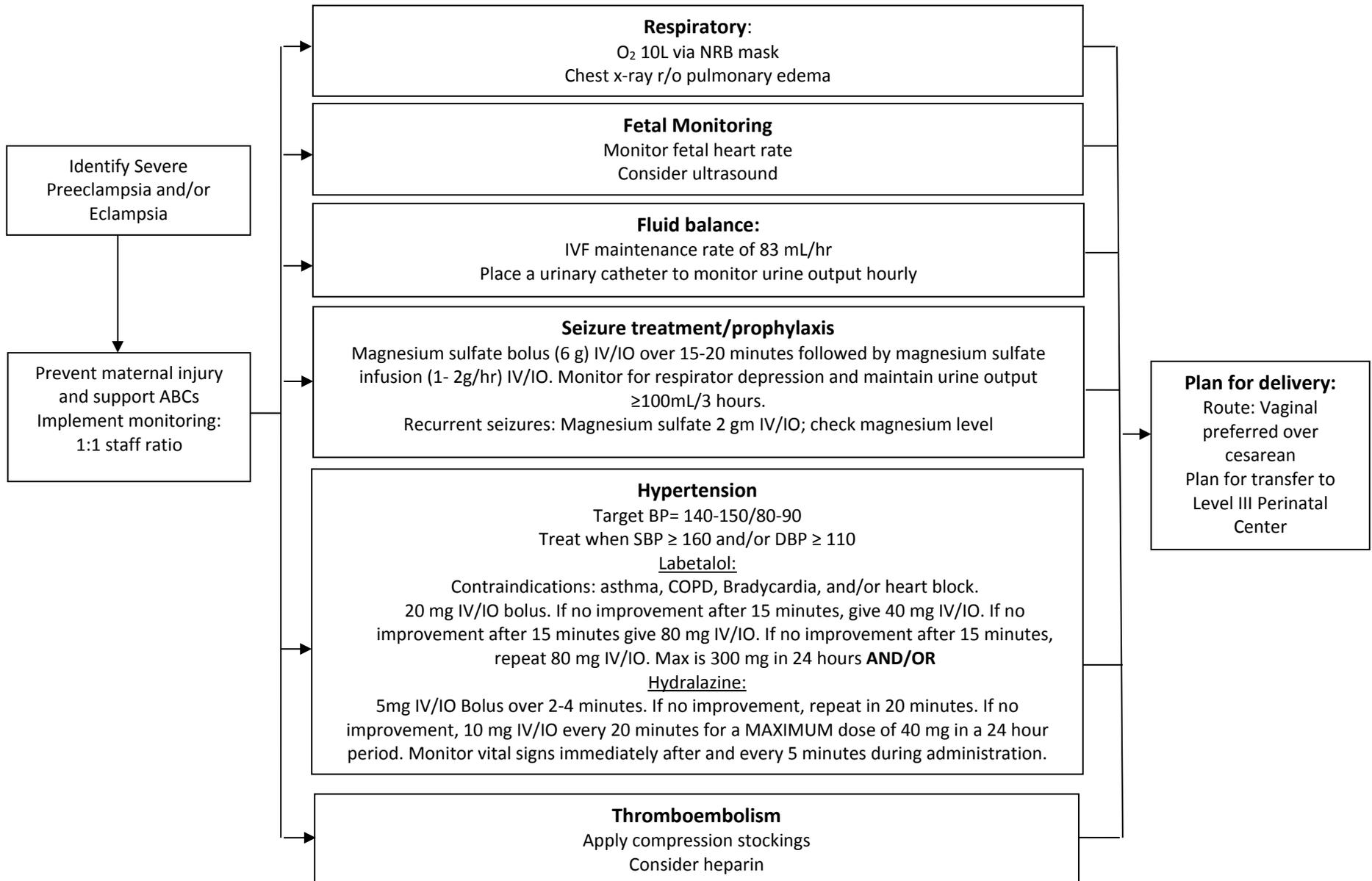
Normal:
 Monitor patient for changes in condition as per hospital protocol

Moderate:
 Consult Pediatric Care Medical Specialist to assist with arranging transfer of patient to higher level perinatal center

Positive Trigger	Treatment
1 of any type	Increase assessment frequency Notify provider
≥ 2 of any type	Order labs/tests Consider Magnesium Sulfate Provide supplemental O ₂

- Severe/Eclampsia:**
- Central imaging is not necessary for the diagnosis and management of most with eclampsia but is indicated in patients with focal neurologic deficits or prolonged coma.
 - Eclampsia can occur during the antepartum, intrapartum and postpartum period.
 - Consult Pediatric Care Medical Specialist to assist with arranging transfer of patient to higher level perinatal center.
 - See next page for Treatment

Treatment of Severe Preeclampsia and/or Eclampsia



IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Obstetrical Care Guidelines

Post-Partum Maternal Hemorrhage: Recognition and Treatment

	Class I	Class II	Class III	Class IV
Est. Blood Loss (EBL)*	~ 900 mL	~ 1200-1500 mL	~ 1800-2100 mL	> ~ 2400 mL
Pulse	<100	> 100	> 120	> 140
Respirations	14-20	20-30	30-40	> 35
Blood Pressure	Normal	Orthostatic changes	Overt hypotension	Overt hypotension
Mental Status	Anxious	Anxious	Anxious and Confused	Confused and Lethargic
Urine Output	≥ 30 mL/hr	20-30 mL/hr	5-15 mL/hr	Anuria
Cap Refill	Normal	>2 seconds	>2 seconds Cold & clammy	>2 seconds Cold & clammy
Fluid Replacement (3:1 Rule)	Crystalloids	Crystalloids	Crystalloids & blood	Crystalloids & blood
Labs	CBC; PT/PTT; Fibrinogen; T&S versus T&C; FDP; Platelets; D-dimer			
Product Replacement	Crystalloids →Transfuse PRBCs →Transfuse other (FFP, Cryo, Plts)			
Bleeding Abatement	Massage →Uterotonics →Surgery →Packing/Tamponade/Embolization			

***Estimating Blood Loss (EBL):**

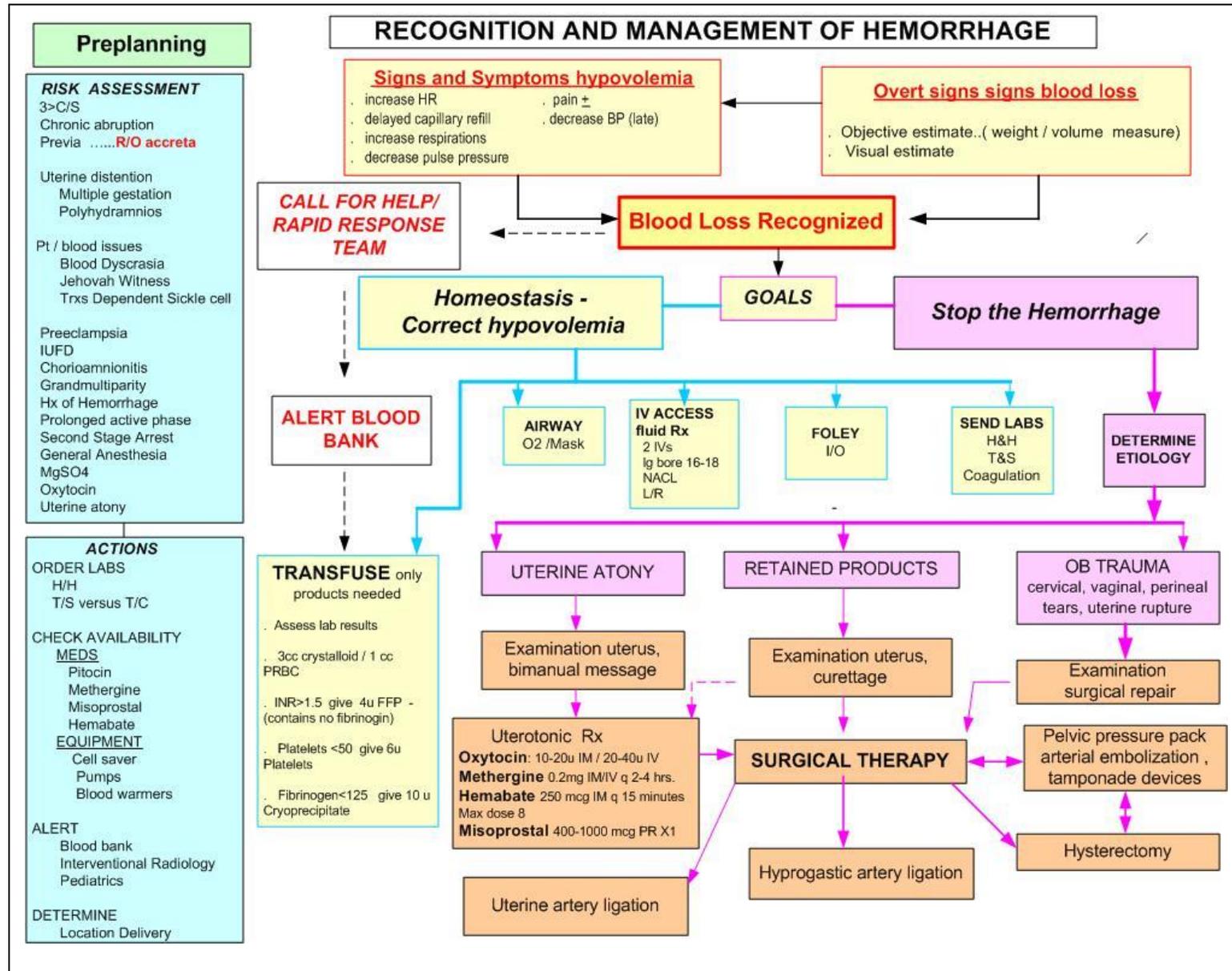
Guide to objective measurement of blood loss

- 1 cup = 250 mL
- = 5 cm clot (orange)
- = 1 unit of PRBCs
- 12 oz soda can=355 mL
- 2 cups = ~500 mL
- = 10 cm clot (softball)
- = 2 units of PRBCs
- Floor spills:
- 20" (50 cm) = 500 mL
- 30" (75 cm) = 1000 mL
- 40" (100 cm) = 1500 mL
- Ideal method is weighing:
- 1g of blood = 1 mL

Blood product replacement consideration:

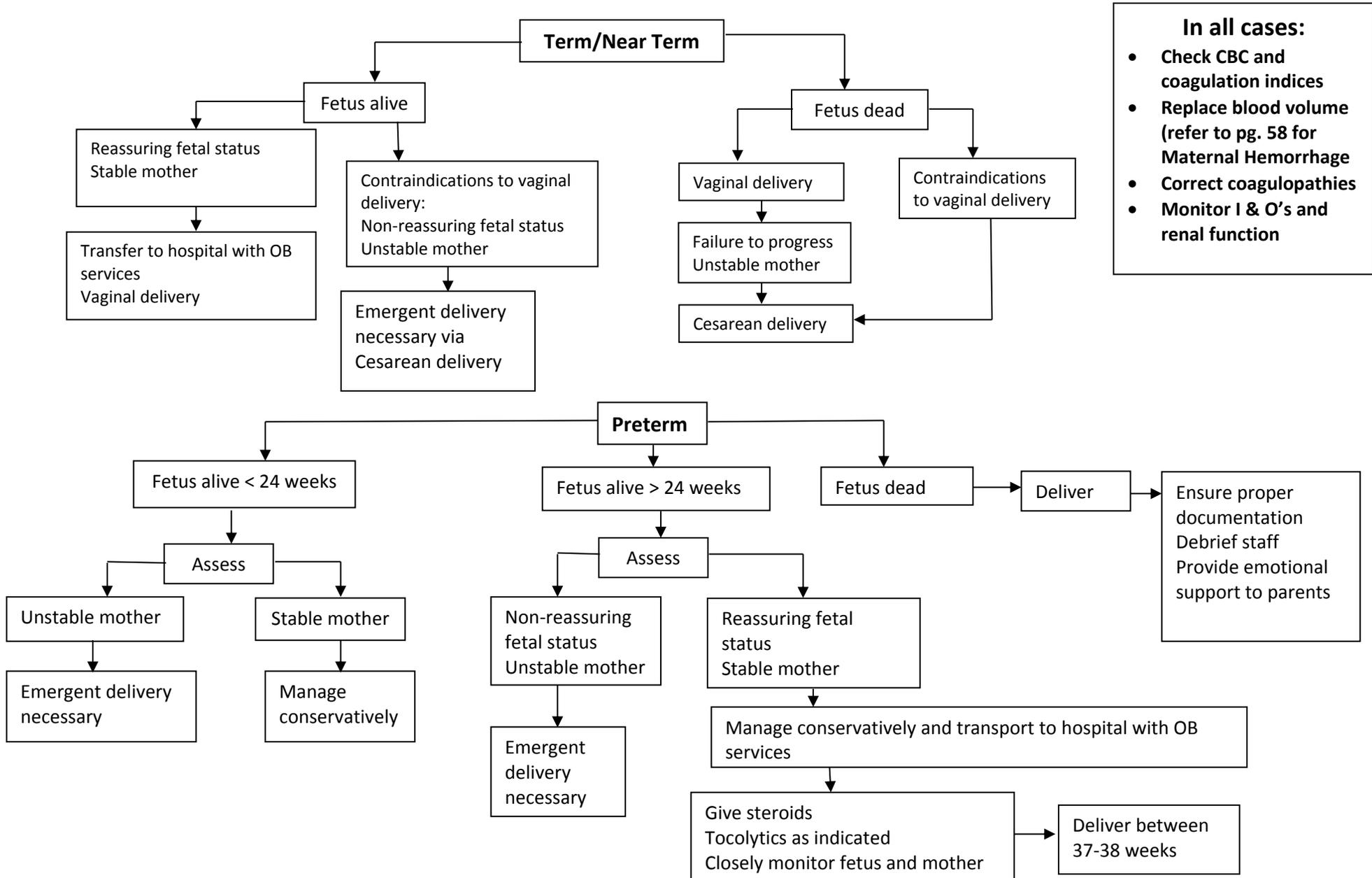
- If the fetus has not been delivered: use O negative or cross matched products

Post-Partum Maternal Hemorrhage: Recognition and Treatment (continued)



IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Obstetrical Care Guidelines

Placenta Abruption



- In all cases:**
- Check CBC and coagulation indices
 - Replace blood volume (refer to pg. 58 for Maternal Hemorrhage)
 - Correct coagulopathies
 - Monitor I & O's and renal function

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**
 Obstetrical Care Guidelines

Trauma

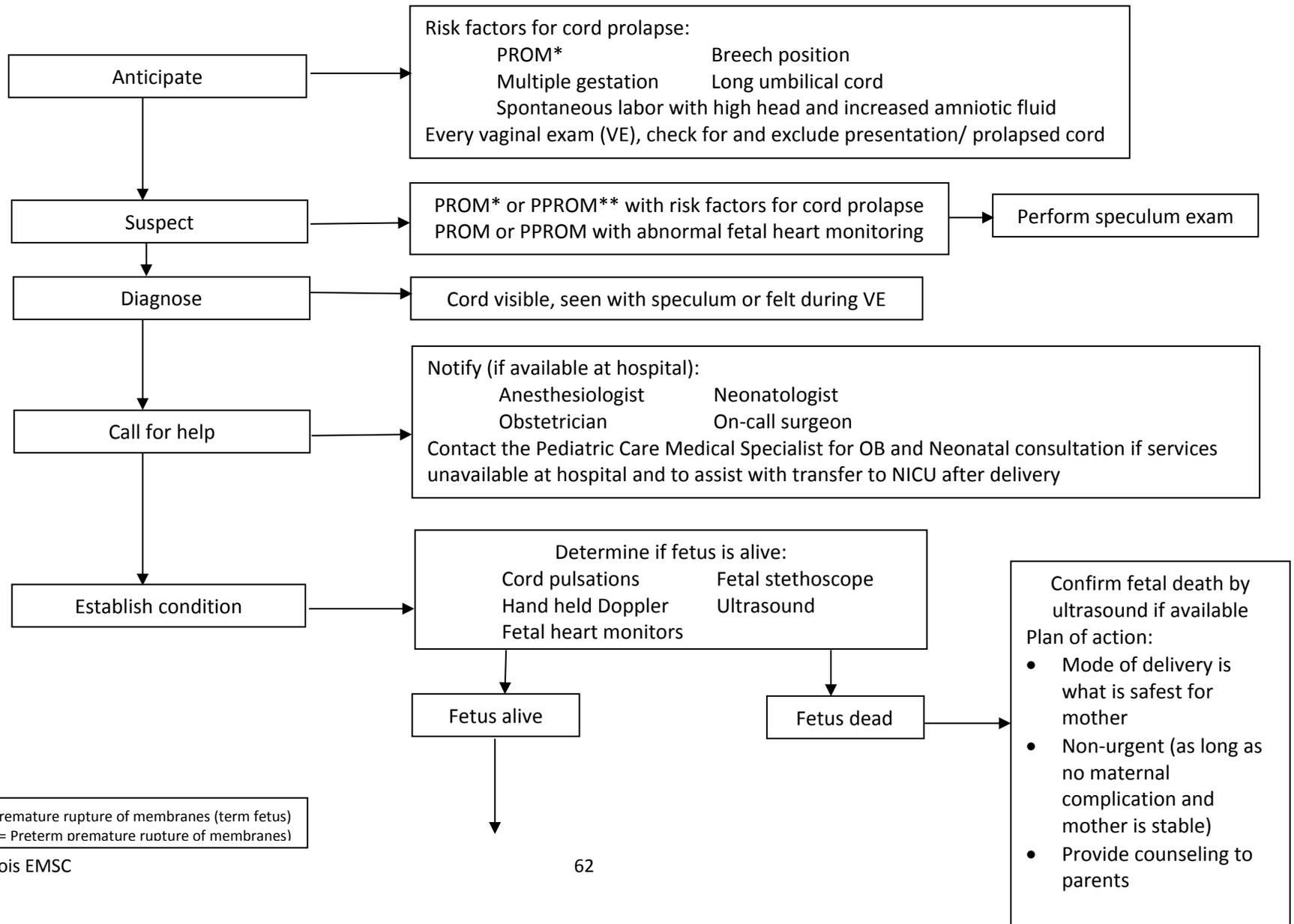
Prenatal Trauma Management (ACEP)	
Consideration	Treatment
General concepts	<ul style="list-style-type: none"> • Medications, tests, treatments and procedures required to stabilize the mother should not be withheld because of pregnancy. • Evaluate for possible pregnancy – related causes for an accident (i.e. seizure secondary to eclampsia) • Maternal physiologic changes may delay signs of shock <ul style="list-style-type: none"> ○ Monitor urine output and fetal heart tracing patterns to provide early warning signs instead of only the mother’s pulse and BP • Consult Pediatric Care Medical Specialist for assistance with care of the acutely and critically ill patient, to individualize the care of patient, if patient needs to be transferred and as needed for further support and consult.
Positioning	<ul style="list-style-type: none"> • Place any pregnant patient > 24 weeks gestation in left lateral decubitus position to avoid hypotension. Right lateral decubitus position is also acceptable. • If patient is on a backboard, tilt it toward the left or place a wedge under right side • If patient’s BP is unstable or concerns exist regarding cervical spine injury, patient should be log-rolled with her neck being stabilized
Hypotension	<ul style="list-style-type: none"> • Administer IV fluids and consider blood transfusion
Hypertension	<ul style="list-style-type: none"> • Criteria for definition: > 140 systolic and > 90 diastolic; • Treat > 160 systolic and > 110 diastolic with labetalol 10-20 mg IV bolus
Fetal/Uterine Monitoring	<ul style="list-style-type: none"> • Initiate fetal monitoring for viable fetus as soon as mother is stabilized (if available and trained personnel available to stay with patient) • If fetal monitoring unavailable, check fetal heart tones via doppler • A viable fetus should be placed on continuous monitoring until under the care of the obstetrician. • Electronic fetal heart and uterine monitoring in pregnant trauma patients > 20 weeks gestation may detect placental abruption • Continuous monitoring can be discontinued after 4 hours if there are no fetal heart rate abnormalities, uterine contractions, bleeding or uterine tenderness
Vaginal Bleeding	<ul style="list-style-type: none"> • Treat heavy vaginal bleeding the same as hypovolemic shock • Massive continual vaginal bleeding may require emergency cesarean delivery • Obtain OB consultation • Administer RhIG to Rh negative patients
Lab tests	<ul style="list-style-type: none"> • CBC (monitor hemoglobin/platelet count) • Type and Screen (monitor for Rh negative) • Kleihauer-Betke • Coagulation panel (INR, PTT, fibrin degradation, fibrinogen, i-COOMBS)

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

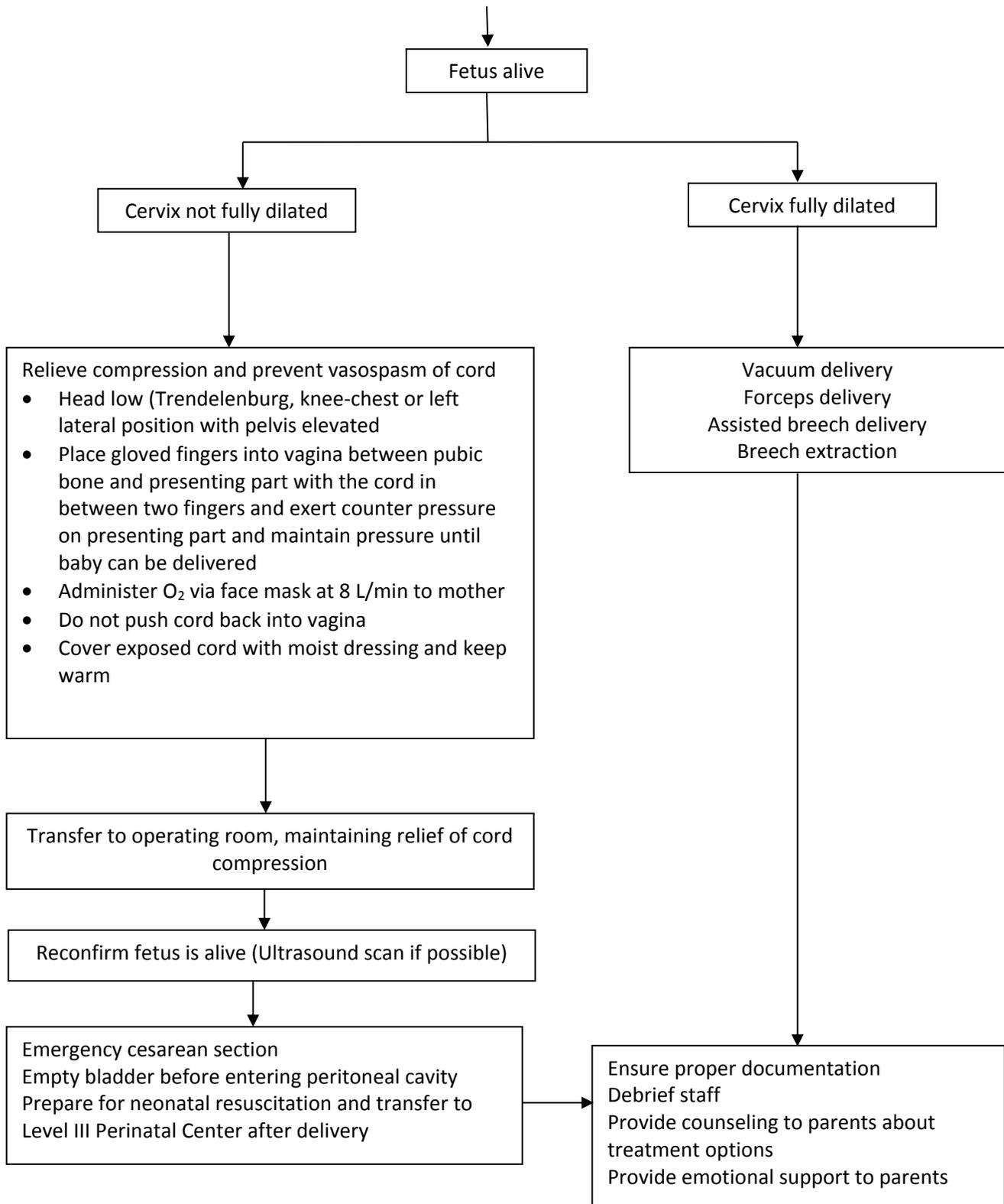
Obstetrical Care Guidelines

Diagnostics	<ul style="list-style-type: none"> • Diagnostic procedures to evaluate potentially serious traumatic injuries should not be withheld for fetal concerns. Order exams for the same indications as non-pregnant trauma patients <ul style="list-style-type: none"> ○ A complete trauma exam with CT scanning will not approach radiation levels that adversely affect the fetus. • Consider ultrasound to replace x-ray when possible • Shield abdomen, pelvis and neck when possible
Treatments: IV Fluids	<ul style="list-style-type: none"> • Larger fluid requirements when hypotensive • Avoid administering large amounts of IVF containing Dextrose which can cause glucose regulation difficulties in neonates if delivery is imminent
Treatments: Intubations and RSI	<ul style="list-style-type: none"> • Same as non-pregnant patients
Treatments: Medications	<p>Analgesia:</p> <ul style="list-style-type: none"> • Acute trauma pain control with narcotics can be given in any trimester as needed • Inform OB of doses and times if fetal delivery is imminent <p>Antibiotics:</p> <ul style="list-style-type: none"> • Ceftriaxone or clindamycin <p>Antiemetics:</p> <ul style="list-style-type: none"> • Metoclopramide or Zofran
Treatments: Oxygen	Provide high concentrated O ₂
Treatments: Rh negative patients	RhIG 1 ampule (300g) IM
Treatments: Seizures	<ul style="list-style-type: none"> • Eclamptic: magnesium sulfate 6 g IV/IO load over 15-20 minutes • Non-eclamptic: lorazepam 1-2 mg/min IV/IO
Treatments: Tetanus	Safe in pregnancy
Treatments: Transfusions	CMV antibody negative; Leukocyte reduced
CPR/ACLS	Left lateral decubitus; no response after 4 minutes of CPR, consider cesarean for viable fetus
Maternal Death	<p>Consider immediate cesarean delivery for a viable fetus in any patient who cannot be resuscitated</p> <p>Consider immediate cesarean delivery in cases of brain death in mother with intact cardiovascular system if fetal compromise is present</p> <p>Consider maintaining life support management until fetus is at an acceptable level of maturity for delivery</p>

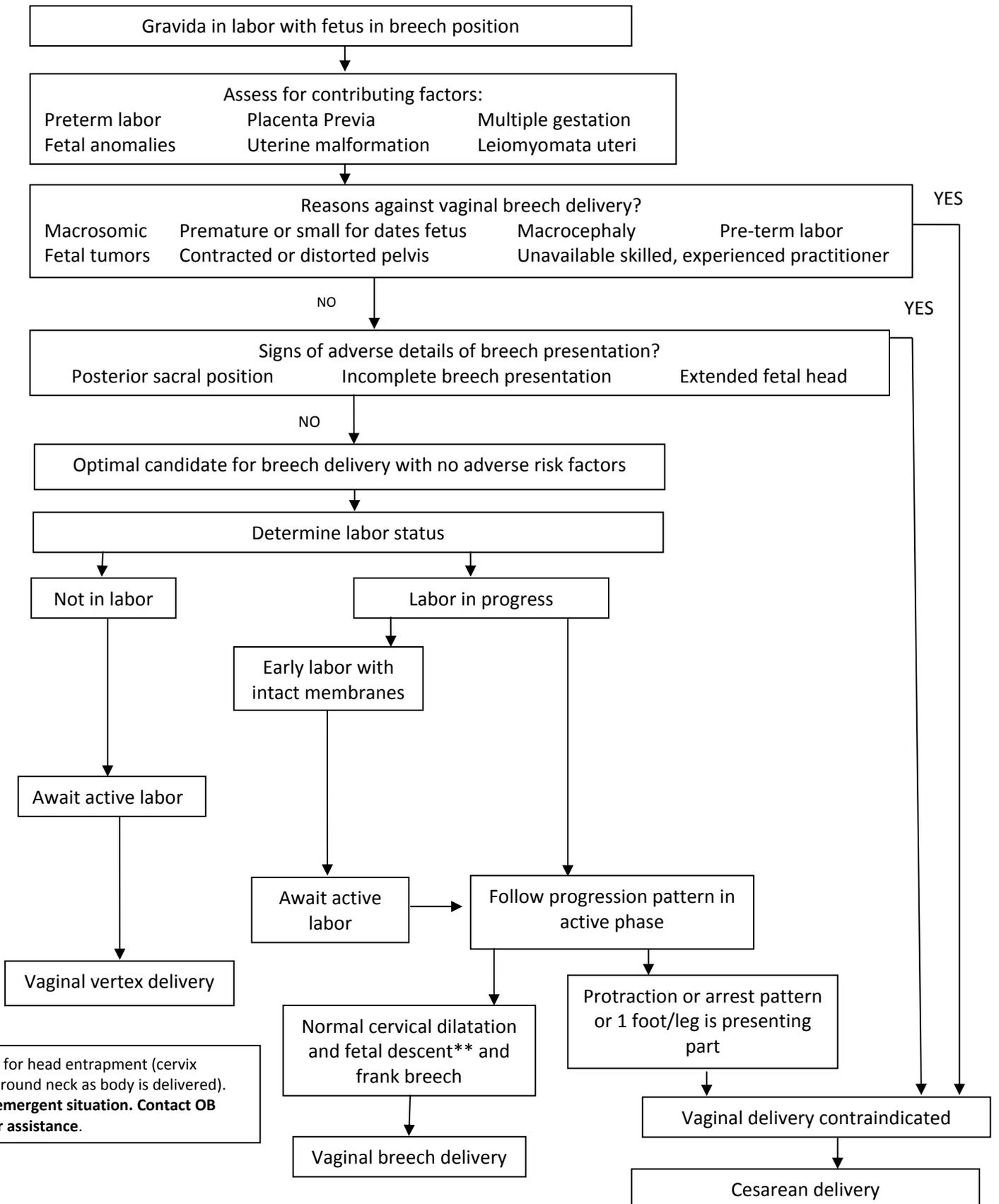
Prolapsed Cord



*PROM=premature rupture of membranes (term fetus)
 **PPROM= Preterm premature rupture of membranes)



Breech Birth



Shoulder Dystocia

Shoulder dystocia:

Anterior shoulder of the baby becomes impacted against the symphysis pubis preventing the shoulders from descending through the pelvis.

Possible Risk Factors:

Antenatal

Previous shoulder dystocia
 Fetal macrosomia
 Maternal diabetes
 Maternal obesity
 Postdate pregnancy
 Short stature

Intrapartum

Prolonged first stage
 Prolonged second stage
 Labor augmentation
 Instrumental delivery
 Precipitate birth
 Uterine hyperstimulation

Maternal

Ruptured uterus
 Postpartum hemorrhage
 Perineal tears
 Emotional trauma

Complications:

Neonatal

Brachial plexus injury
 Fractured clavicle
 Birth asphyxia
 Neonatal death

Identify shoulder dystocia

Turtle sign (chin retracts and depresses the perineum)
 Head when delivered may be tightly applied to vulva
 Anterior shoulder fails to deliver with routine traction

Failure of fetal head to restitute
 Failure of shoulders to descend

Discourage pushing

Notify (if available at hospital):

Anesthesiologist Neonatologist Obstetrician On-call surgeon

Contact the Pediatric Care Medical Specialist for OB and Neonatal consultation if services unavailable at hospital and to assist with transfer to NICU after delivery

McRoberts Maneuver (abduct and hyper flex legs against abdomen)

Suprapubic pressure (apply pressure in a downward, lateral direction just above the maternal symphysis pubis to push the posterior aspect of the shoulder towards fetal chest)

Consider episiotomy if it will make internal maneuvers easier

Try either maneuver first, depending on clinical circumstances and clinician experience

Deliver posterior arm

Internal rotation maneuvers:

If all above maneuvers fail to release the impacted shoulder, consider placing patient in all fours position or repeat the above

Secondary Maneuvers:

Cleidiotomy: deliberate fracture of clavicle
Zavanelli Maneuver: restoring fetus into uterus and performing a cesarean section (contraindicated if a nuchal cord has been previously clamped and cut)
Symphysiotomy: contact Pediatric Care Medical Specialist

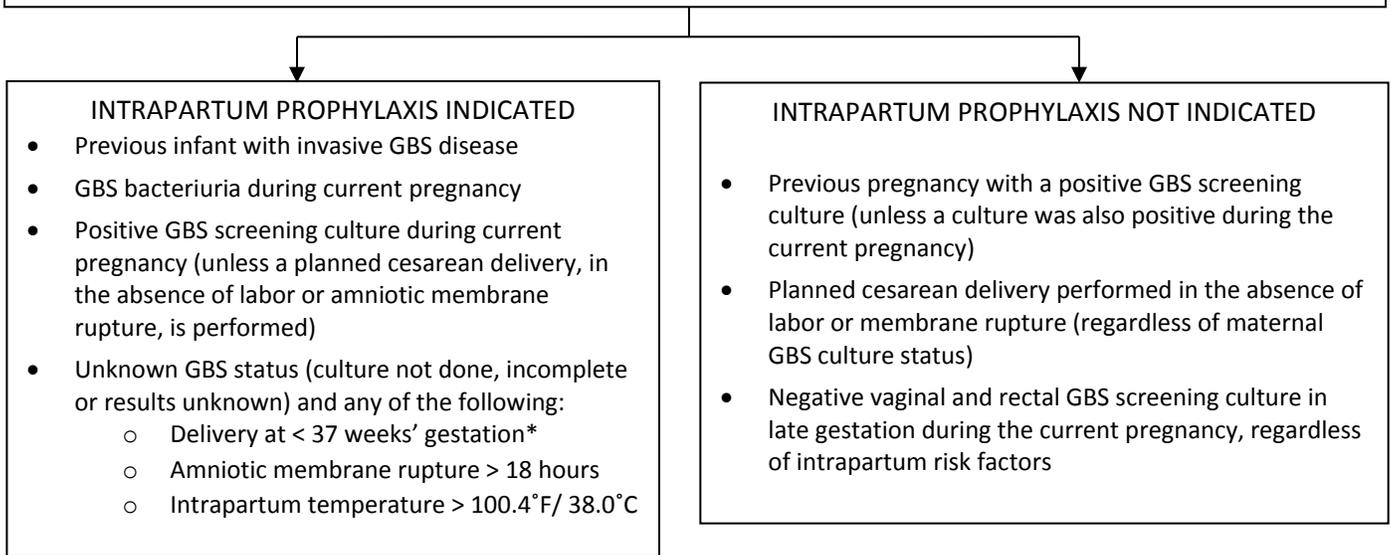
Ensure proper documentation
 Debrief staff
 Provide counseling to parents on treatment options
 Provide emotional support to parents

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017 Obstetrical Care Guidelines

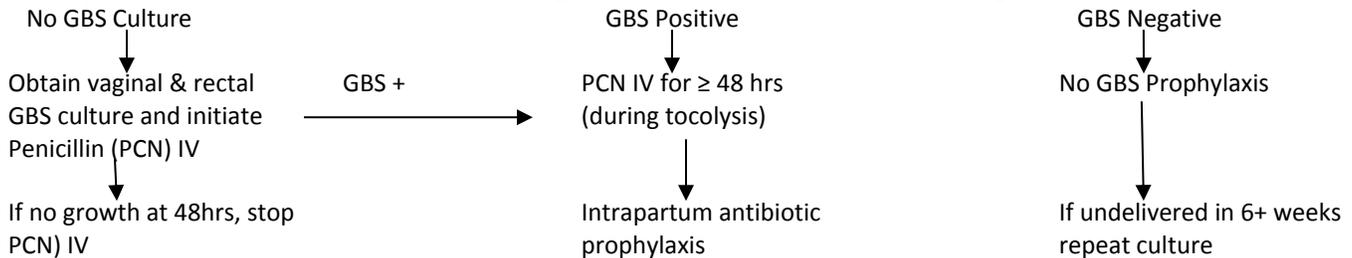
Group B Strep

Group B Streptococcus (GBS): a gram-positive organism, known to colonize the lower GI tract, with the potential for secondary spread to the genitourinary tract and subsequent transmission to the fetus during delivery. GBS is a leading cause of serious neonatal infection with case-fatality rate reported to be as high as 20% in newborns.

Inquire about GBS status during initial assessment of all laboring patients that present to hospital. Complete a vaginal and rectal GBS screening cultures at 35 – 37 weeks' gestation for **ALL** pregnant women [unless patient had GBS bacteriuria during the current pregnancy or a previous infant with invasive GBS disease]



*If onset of labor or rupture of amniotic membranes occurs at <37 weeks' gestation and there is a significant risk for preterm delivery (as assessed by the clinician), follow the algorithm below for GBS prophylaxis management.



RECOMMENDED REGIMENS FOR INTRAPARTAL ANTIMICROBIAL PRPHYLAXIS FOR GBS PREVENTION

Recommended	Penicillin G, 5million units IV initial dose, then 2.5-3.0 million units every 4 hrs until delivery
Alternative	Ampicillin 2 grams IV initial dose, then 1 gram every 4 hrs until delivery
IF PENICILLIN ALLERGIC	
Low Risk for Anaphylaxis	Cefazolin 2 grams IV initial dose, and then 1 gram every 8 hrs until delivery
High Risk for Anaphylaxis	GBS susceptible to clindamycin or erythromycin: Clindamycin 900 milligrams every 8 hrs until delivery
	GBS resistant to clindamycin or erythromycin or susceptibility unknown: Vancomycin** 1 gram every 12 hours until delivery

Maternal Cardiopulmonary Arrest

If the mother suffers from cardiopulmonary arrest, follow Advance Cardiac Life Support guidelines. The following are additional guidelines for care of pregnant women in cardiopulmonary arrest:

- Displace the uterus either manually or by placing a hip roll under the patient's right hip. Left tilt is preferable, however, either side would benefit the patient if left tilt is not possible
- If present, remove fetal monitors before defibrillation or cardioversion. This also includes removing internal monitors.
- For patients with refractory ventricular fibrillation and pulseless ventricular tachycardia, the drug of choice is amiodarone.
- Delivery by post mortem emergent cesarean section should be accomplished within the **first 5 minutes** of the maternal code.

Management of Other Common Delivery Complications

For additional common delivery complications, consult the Pediatric Care Medical Specialist for assistance and guidance with both obstetrical and pediatric care.

Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

Disclaimer: This guideline are not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Initial Management of All Pediatric Patients with Influenza Like Illness (ILI)

- Stabilize ABCs (Airway, Breathing, and Circulation)
- Obtain weight (actual or use of weight/length based tool)
- Monitor
 - Heart Rate (HR), Blood pressure (BP), Oxygen Saturation (SpO₂), mental status, temperature, perfusion, urine output, bedside glucose
- Perform history & physical exam
- Provide oxygen if patient is hypoxic or in acute distress (goal is SpO₂ > 95%).
 - O₂ blow-by or NC if in mild distress
 - O₂ 15L NRB or partial rebreather for moderate to severe distress
 - O₂ 15L BVM for severe distress/arrest
- Consult Pediatric Care Medical Specialist for assistance with care of the acutely and critically ill patient, to individualize the care of patient, if patient does not improve and needs to be transferred and as needed for further support and consult.

Management for All Pediatric Patients with ILI

TREATMENT

See **Pediatric Respiratory Care Guideline** for airway/respiratory management of children

Strategic National Stockpile (SNS):

During a Class 2 or Class 1 Health and Medical Emergency Event (multiple regions or entire state is affected by Pandemic and state disaster declaration has been issued), IDPH may deploy federally supplied medication, medical supplies and medical equipment from the CDC SNS to assist hospitals with the care and treatment of influenza like illness of all patients, including children and newborns. Request for such resources should occur through the Request for Medical Resources process indicated in the Illinois Health and Medical Care Response Plan (ESF-8).

Immunization:

Annual vaccination is the most important method to prevent seasonal influenza infection. All people > 6 months old should receive the vaccination. Children, their caregivers and other members of their household should be screened for the need to receive the vaccination during a pandemic.

Antivirals:

Each pandemic may differ in the recommended medication for treatment and prophylaxis. Consult the Local Health Department, Pediatric Care Medical Specialist and/or the Centers for Disease Control and Prevention (CDC) for medication and pediatric dosing recommendations.

Hydration:

Ensure children maintain adequate hydration when experiencing an influenza like illness.

Monitor urine output:

Normal urine output: at least 1 mL/kg/hr

IV/IO Fluids: replacement

Birth -28 days:

Bolus 0.9%NS at 10 mL/kg

28 days:

Bolus 0.9% NS at 20 mL/kg

Infectious Control Measures

Droplet isolation

- Maintained on hospital patients with suspected or confirmed influenza for 7 days after the onset of symptoms or for 24 hours after resolution of fever and respiratory symptoms, whichever is longer

- Children may have prolonged viral shedding and may need isolation longer

Facemasks and Children:

- Helps provide a physical barrier and blocks large particle droplets when coughing/sneezing
- Should be used on children with:
 1. ILI symptoms
 2. Immuno-suppression or chronic illnesses
 3. ILI symptoms who have to leave hospital/exam room
 4. Asymptomatic children in crowded health care settings (i.e. ED waiting room)
- Considerations:
 1. Masks should not be placed on infants or any pediatric patient who is anxious, restless, vomiting, lethargic or in respiratory distress
 2. Use pediatric sized/child friendly masks if available. Adult sized masks can be folded in half to fit children's smaller faces.

See EMSC's *Children and Facemask...To Mask or Not to Mask....* for more information on page 72.

Triaging upon entry to hospital

All patients and visitors should be screened upon entry to building for ILI and the need for PPE

Promptly separate out unexposed and exposed asymptomatic children from symptomatic children and adults (see cohorting)

For the wellbeing of the child (asymptomatic or symptomatic), it is best to keep caregiver (asymptomatic or symptomatic) with child

Provide facemasks to all who have signs/symptoms of respiratory infection/ILI

Visitor restrictions

Primary caregivers should not be restricted to visit their child regardless if they are potentially infectious.

Mask and other appropriate barrier methods should be implemented.

Testing

Surveillance and testing: frequency of reporting and testing will be determined by state and federal recommendations and reflect the pandemic severity index level

- Need to have in place ways to monitor community acquired and health care-associated transmissions

Special considerations

Psychosocial needs of Children: experience from isolation/disease containment may be traumatic for children and families and have similar effects as natural disasters. It is important to implement strategies during a pandemic to help build the resiliency of children and parents.

Resource Allocation

For information on resource allocation, see: EMSC's *Resource Allocation Strategies for the Pediatric Population and within the IDPH ESF-8 Plan: Catastrophic Incident Response Annex*

Cohorting

Consider cohorting children by age group as well as the groups listed below. If separating those who are suspected/exposed/symptomatic from those who are non-ILI/exposed and asymptomatic into separate areas is not possible, cohorting in same area can be accomplished by maintaining a distance of 6 feet between these two groups.

Consider the following opportunities to separate/cohort groups:

1. Upon entry to hospital (ED)
 - a. ILI Assessment/Triage Area and waiting room
 - b. Non-ILI Assessment/Triage Area and waiting room
2. In ED
 - a. Suspected/Exposed and Symptomatic Treatment Areas
 - b. Non-ILI/Exposed and Asymptomatic Treatment Areas
3. Inpatient units/rooms
 - a. Confirmed Influenza
 - b. Suspected/Exposed to ILI (may be merged with Confirmed Influenza as pandemic progresses and resources are limited)
 - c. Not exposed/Immune and Asymptomatic

Perinatal and Newborn Considerations:

1. Whenever possible, keep health mothers and newborns together. Consider alternate sites of care for mothers and newborns who are Not exposed/Asymptomatic.
2. Hospitalized pregnant labor with either suspected or confirmed influenza should be placed on droplet precautions and adhere to respiratory hygiene, cough etiquette, hand hygiene and PPE
3. During delivery, droplet precautions should be maintained
4. After delivery:
 - a. CDC recommends hospitals consider temporarily separating newborns from the mother in cases of suspected or confirmed influenza during hospital stay
 - i. Length of separation has not been established but recommendations based on H1N1 virus:
 1. Mother received antivirals for > 48 hours
 2. Mother afebrile without antipyretics for > 48 hours
 3. Mother able to control her cough and respiratory secretions
 - b. If separation not possible/accepted, allow newborn to room –in with mother but create physical barriers (i.e. curtains between mother and newborn), keeping newborn > 6 feet away from ill mother and ensure a health adult is present to care for newborn. If/when mother has direct contact with newborn, mother should wear a facemask and practice hand hygiene.
 - c. Newborns of mothers with suspected or confirmed influenza can be cared for in the newborn nursery as long as no symptoms are present and should be cared for by non-ill staff. If the newborn develops symptoms, they should be placed on droplet precautions
5. Discharge home:
 - a. Encourage immediate family who will have contact with newborn to receive influenza vaccination
 - b. Encourage a vaccinated, non-ill family member to provide care to newborn at home until mother’s symptoms resolve

General Influenza Concepts for All Patients

Infectivity of the Influenza Virus:

- Incubation period= 1-3 days
- Period of Communicability= Infectious 1 day before onset of symptoms and may be longer than 7 days after onset of symptoms

Influenza virus is inactivated by hospital germicides, household cleaning products, soap, hand wash or hand hygiene products

It is critical that infection prevention and control policies/procedures are maintained to decrease the transmission of influenza in the hospital setting.

- Hand Hygiene for staff, patients and visitors
- Hygiene measures to minimize influenza transmission
- PPE (mask use, gloves)
- Cleaning, disinfecting and sterilizing patient care equipment
- Environmental control (i.e. housekeeping)

Pandemic Severity Index: CDC uses fatality ratio as the critical driver for forecasting a pandemic's severity. This can help forecast the impact of a pandemic and enable recommendations to be made for mitigation strategies.



CHILDREN AND FACEMASKSTO MASK OR NOT TO MASK....



Why should children wear facemasks?

- 🐾 Provide a physical barrier between the mouth/nose and the immediate environment
- 🐾 Block large particle droplets from coughs and sneezes

Who should wear facemasks?

- 🐾 Children presenting with Influenza Like Illness (ILI)
- 🐾 Children presenting with immuno suppression or chronic illness
- 🐾 Children with ILI who leave the hospital/exam room to go to the bathroom or diagnostic procedures
- 🐾 Healthy children in a crowded healthcare setting (i.e. emergency room waiting area)

Who is at higher risk for infection?

- 🐾 Children under 5 years of age
- 🐾 Children who have asthma, chronic pulmonary, cardiovascular, hepatic, hematological, neurologic, neuromuscular or metabolic disorders such as diabetes
- 🐾 Children who are immunosuppressed (caused by medications or by HIV)
- 🐾 Children and adolescents who are receiving long term aspirin therapy and who might be at risk for experiencing Reyes Syndrome after influenza virus infection

How to keep facemasks on children?

- 🐾 If available, ideally use a pediatric sized/child friendly mask
- 🐾 Educate children and families on the need to keep the mask on, even when talking, coughing or sneezing

Make it fun for children:

- 👉 Create a game for putting/keeping the mask on (i.e. superhero type mask)
- 👉 Use of positive reinforcement measures (i.e. stickers)
- 👉 Use older children as role models for keeping them on (i.e. older siblings)
- 👉 Praise child for a job well done

Assessing pediatric patients wearing facemasks

- 🐾 Good assessment of the pediatric patient is important, especially those under 6 months who cannot receive the influenza vaccine. Be alert to subtle changes.
- 🐾 Do not use facemasks on pediatric patients who are anxious, restless, vomiting, lethargic, or in respiratory distress
- 🐾 Routinely assess children wearing a mask, especially if quiet, to assure that their condition is not deteriorating
- 🐾 Be aware of the risk of misidentifying children when multiple siblings are wearing masks and undergoing treatment

What to do when supplies of pediatric facemasks are limited

- 🐾 Promote and educate on cough and sneeze etiquette
 - 👏 If available, review learning materials (e.g. CDC brochures, Sesame Street cough etiquette video)
 - 👏 Provide sufficient hand sanitizer, tissues or wipes and disposal containers
- 🐾 Fold adult sized masks in half and fit them across their small faces
 - 👏 Ask children to decorate their “special” mask (non-toxic markers, stickers, crayons)
- 🐾 Cohort symptomatic (influenza like illness) children
 - 👏 If separating siblings (families), be sure to have enough staff members to assist. If this is not possible, consider separating families with flu symptoms from other well families and children
- 🐾 Avoid close contact - keep healthy children at least 6 ft apart from ILI patients
- 🐾 Adopt visitor policies, restricting children during a pandemic outbreak



Remember to:

Properly dispose of used pediatric facemasks and wash your hands

References:

- 1) Hohenhaus, Susan M., Responding to the Threat of Pandemic Flu in Pediatric Patients. ENA Connection. 2009 Nov; 3.3 (10): 8
- 2) Interim Recommendations for Facemask and Respirator Use to Reduce 2009 Influenza A (H1N1) Virus Transmission. <http://www.cdc.gov/h1n1flu/masks.htm>
- 3) School Nurse Emergency Care Course, Fifth Edition. Maywood, IL: Illinois Emergency Medical Services for Children; 2016.
- 4) Esther Munoz, RN, BSN, CIC, When and How to Wear A Facemask. Phoenix Children’s Hospital. 2009

Printing and distribution of this document is supported through federal funding from the Assistant Secretary for Preparedness and Response (ASPR).



Revised March 2017



IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Premature Newborn Care Guideline

Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

Disclaimer: This guideline is not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Initial Management of a Premature Neonate

Initial management immediately following delivery should adhere to Neonatal Resuscitation Program (NRP) guidelines. This care guideline reviews the additional special care considerations for premature newborns.

Please see the **Newborn Care Guideline** for standard care of all newborns.

Contact the Pediatric Care Medical Specialist for guidelines on withholding and discontinuing resuscitation of a premature newborn.

General Concepts for Caring for a Premature Neonate

Premature neonates are at a much higher risk of developing complications than the term infant. The anatomy/physiology of a premature neonate increases their vulnerability to morbidity/ mortality factors. Constant monitoring is necessary to determine when increased management and support are needed. Therefore, it is recommended that premature neonates be stabilized and then transferred to a center that is capable of providing neonatal intensive care as soon as safely possible given the circumstances of the disaster incident.

AIRWAY

Preterm Neonates that require oxygen:

- Neonates with spontaneous respirations may be given supplemental oxygen per:
 - Neonatal nasal cannula at 1-2 LPM flow
 - Oxygen mask
 - Flow-inflating bag and mask
 - Oxygen hood or blow-by O₂ with O₂ tubing held close to neonate's face
 - CPAP (if available) with a PEEP of 4 or 5

Consult Pediatric Care Medical Specialist for assistance with care if respiratory support needs go beyond the above methods

Preterm neonates that require assisted ventilation:

- Preterm newborns <35 weeks: resuscitation should be initiated with low oxygen (21-30%) and titrated to achieve appropriate oxygen saturation
- Follow Neonatal Resuscitation Program (NRP) guidelines for initiating positive pressure ventilation (PPV):
 - Heart rate < 100 bpm
 - Gaping respirations
 - Apnea
- Use the appropriate sized bag for PPV-maximum volume of 750 mL, and appropriate sized neonatal mask
- Monitor inflation pressures carefully.
 - Initial inspiratory pressure of 15-20 cm H₂O
 - Deliver subsequent breaths with approximately 15 cm H₂O of pressure, or just enough pressure to see the chest rise
- Best indication that PPV is effective is:
 - Increasing heart rate
 - Auscultation of equal breath sounds bilaterally
 - Color improvement
 - Increased oxygen saturation per pulse oximetry

Avoid hypoxia/hyperoxia

- All neonates receiving O₂ should have oxygen saturations closely monitored with pulse oximetry
- Neonates ≤ 1250 grams at birth maintain SpO₂ between 85-92% with supplemental oxygen
- Use an oxygen blender in the delivery of supplemental O₂ so that the FiO₂ may be titrated according to pulse oximetry

Preterm neonates that require prolonged assisted ventilation:

- Consider intubation. See endotracheal intubation below more information.
- The potential risk for serious complications with intubation and ventilator management is high. It is recommended to consult the Pediatric Care Medical Specialist for assistance with care.

Consider surfactant therapy for preterm neonates who have clinical signs of respiratory distress syndrome:

- Signs of impairment in oxygenation:
 - PaO₂ < 50 mmHg in room air, central cyanosis in room air
 - O₂ required to maintain PaO₂ > 50mmHg, or required supplemental oxygen to maintain pulse oximeter saturation over 85% in the first 24 hours of life
 - Newborn is often tachypneic with grunting, nasal flaring and chest retractions. Lung sounds may be decreased with rales present.
- **AND**, chest radiograph is consistent with Respiratory Distress Syndrome (reticulogranular appearance of lung fields with or without low lung volumes and air bronchograms within the first 24 hours of life)
- Should only be considered and administered by care providers with expertise in surfactant administration. The potential for complications with surfactant administration is high. Consult Pediatric Care Medical Specialist for assistance with care.

Endotracheal Intubation		
Endotracheal tube size is determined based on the neonate's weight or gestation.		
Weight (in grams)	Gestational Age (in weeks)	Endotracheal Tube Size
<1000 grams	<28 weeks gestation	2.5 uncuffed*
1000-2000 grams	28-34 weeks gestation	3.0 uncuffed*
2000-3000 grams	34-38 weeks gestations	3.5 uncuffed*
<p>*Cuffed endotracheal tubes are not recommended for the neonatal population. Determine the initial depth of endotracheal tube insertion using the 'Tip-to-lip' rule: Add 6 to the neonate's weight in kg to determine the centimeter marking on the Endotracheal tube at the lip. For example a neonate that weighs 2,030 grams: 6 + 2 (kg)= 8cm marking at the lip. Correct Endotracheal tube placement is confirmed with chest x-ray, and should be at the level of T1- T3 (Below the clavicles and above the carina).</p>		

THERMOREGULATION
<p>Premature neonates are at an increased risk of developing hypothermia and are more vulnerable to cold stress than the term neonate. The axillary temperature should be monitored within the first 30 minutes of life, and then every 1 hour, and should be maintained between 97.7° F and 99.5° F (36.5° C and 37.5° C). Continue to monitor temperature every 1-3 hours once stabilized.</p>
<p>Measures that may prevent hypothermia include:</p> <ol style="list-style-type: none"> 1. Increase the room/delivery room temperature >25° C (77° F) 2. Use of radiant warmer for resuscitation if available 3. Use of chemical warming mattress <ol style="list-style-type: none"> a. Caution: Place receiving blanket on chemical warming mattress to avoid direct skin contact with warming device 4. Use of occlusive/polyethylene wrap or large plastic bag (i.e. gallon size food grade storage bag) for neonates <28-30 weeks gestation. <ol style="list-style-type: none"> a. Wrap neonate in occlusive wrap up to the neck, or insert entire body of neonate up to the neck in plastic bag b. Caution: <i>Do not allow plastic to cover any part of the face</i> 5. Use of knit hat 6. Neonates > 32 weeks gestation may be placed skin-to-skin with mother if stable. Place unwrapped, undressed neonate directly onto mother's chest/abdomen and cover both with warm blankets. 7. <i>To avoid burns, Never use hot water bottles or gloves filled with hot water to warm the neonate.</i>

HYPOGLYCEMIA	
<p>There is no consensus as to what specific plasma glucose concentration defines a normal glucose value. Because premature neonates are at an increased risk of hypoglycemia, it is recommended that the blood glucose levels be maintained between >50 and <200mg/dL. Monitor blood glucose within the first hour of birth, and then every 1-3 hours if stable.</p>	
IV FLUIDS	<ul style="list-style-type: none"> • Establish IV access • Preferred IV fluids for infusion during first 24 hours of life is D₁₀W <ul style="list-style-type: none"> ○ After 24 hours, consider need to add electrolytes • Initial maintenance rate: 80 mL/kg/day <ul style="list-style-type: none"> ○ Calculation example: 1.8kg X 80mL divided by 24 = rate of 6 mL per hour • Always administer IV fluids via infusion pump
GLUCOSE BOLUS	<ul style="list-style-type: none"> • For blood glucose < 50 mg/dL, administer a glucose bolus: <ul style="list-style-type: none"> ○ D₁₀W, 2 mL/kg at a rate of 1mL/min ○ Calculation example: 1.8kg X 2 = 3.6mL to be administered over 4 minutes • Recheck blood glucose (use heel for site) within 15 min. post bolus infusion • Repeat glucose bolus if blood glucose remains < 50 mg/dL • Premature neonates with persistent low blood glucose may need to consider increasing IV glucose maintenance fluid rate or IV fluid glucose concentration. Consult Pediatric Care Medical Specialist for assistance with care

ADDITIONAL SPECIAL CONSIDERATIONS FOR PREMATURE NEONATES	
METHODS TO DECREASE RISK OF INTRAVENTRICULAR HEMORRHAGE	<ul style="list-style-type: none"> • Handle the neonate gently • Closely monitor pressures delivered if positive-pressure ventilation is needed <ul style="list-style-type: none"> ○ Avoid big changes in pulmonary pressures ○ Avoid delivering high pressures if possible • Avoid rapid infusion of IV boluses and fluids • Avoid hypertonic solutions • Make any changes in care/management, (i.e. ventilation or O₂ requirements), gradually and according to assessment of response
ADDRESSING THE INCREASED RISK OF INFECTION	<ul style="list-style-type: none"> • Obtain blood lab work to include blood cultures and CBC <ul style="list-style-type: none"> ○ <u>IF UNABLE TO OBTAIN BLOOD WORK OR LUMBAR PUNCTURE, AND NEONATE AT RISK FOR INFECTION, ADMINISTER ANTIBIOTICS AS SOON AS POSSIBLE</u> • Initiate antibiotic therapy promptly: <ul style="list-style-type: none"> ○ Ampicillin: 100mg/kg IV every 12 hours. Infuse over 30 min. ○ Gentamycin: Consult Pediatric Care Medical Specialist for assistance with dosing.

Other Premature Neonate Considerations

RISK FACTORS	
MATERNAL RISK FACTORS	NEONATAL RISK FACTORS
<ul style="list-style-type: none"> • Chronic Hypertension • Pregnancy-induced hypertension • Illicit and certain prescription drugs use • Tobacco, alcohol use • Diabetes Mellitus • Premature or prolonged rupture of membranes • Maternal infection • Oligohydramnios/Polyhydramnios 	<ul style="list-style-type: none"> • Prematurity (<37 weeks) • Small for gestational age (<10th percentile for gestational age) • Large for gestational age (>90th percentile for gestational age) • Intrauterine growth retardation (IUGR) • Infection • Birth trauma • Meconium stained amniotic fluid

**UNIQUE ANATOMY/PHYSIOLOGY CONSIDERATIONS
RELATED TO MEDICAL MANAGEMENT OF THE
PREMATURE NEONATE**

MANAGEMENT	ANATOMICAL/PHYSIOLOGICAL CONSIDERATION
Airway	<ul style="list-style-type: none"> • Weak chest muscle anatomy → may cause ineffective breathing • Immature nervous system → decreased or absent respiratory drive • Deficient surfactant production • Vulnerable to hyperoxia • Lung anatomy more fragile and less compliant than term neonates
Thermoregulation	<ul style="list-style-type: none"> • High risk of rapid heat loss → hypothermia • Thin skin • Large surface area to body mass ratio • Decreased or no fat stores • Risk of ↑ evaporative water loss → promoting heat loss
Hypoglycemia	<ul style="list-style-type: none"> • Diminished glycogen stores: most hepatic glycogen stores are gained in the third trimester of pregnancy • Decreased fat stores • Potential increased glucose utilization due to respiratory distress, hypoxia, hypothermia
Intraventricular hemorrhage	<ul style="list-style-type: none"> • Fragile germinal matrix → increased risk in preemies <32 weeks gestation
Increased risk of infection	<ul style="list-style-type: none"> • Immature immune system • Association of preterm labor with maternal infection (i.e. chorioamnionitis) • Preterm premature rupture of membranes, and/or rupture of membranes > 18 hours

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Respiratory Care Guideline

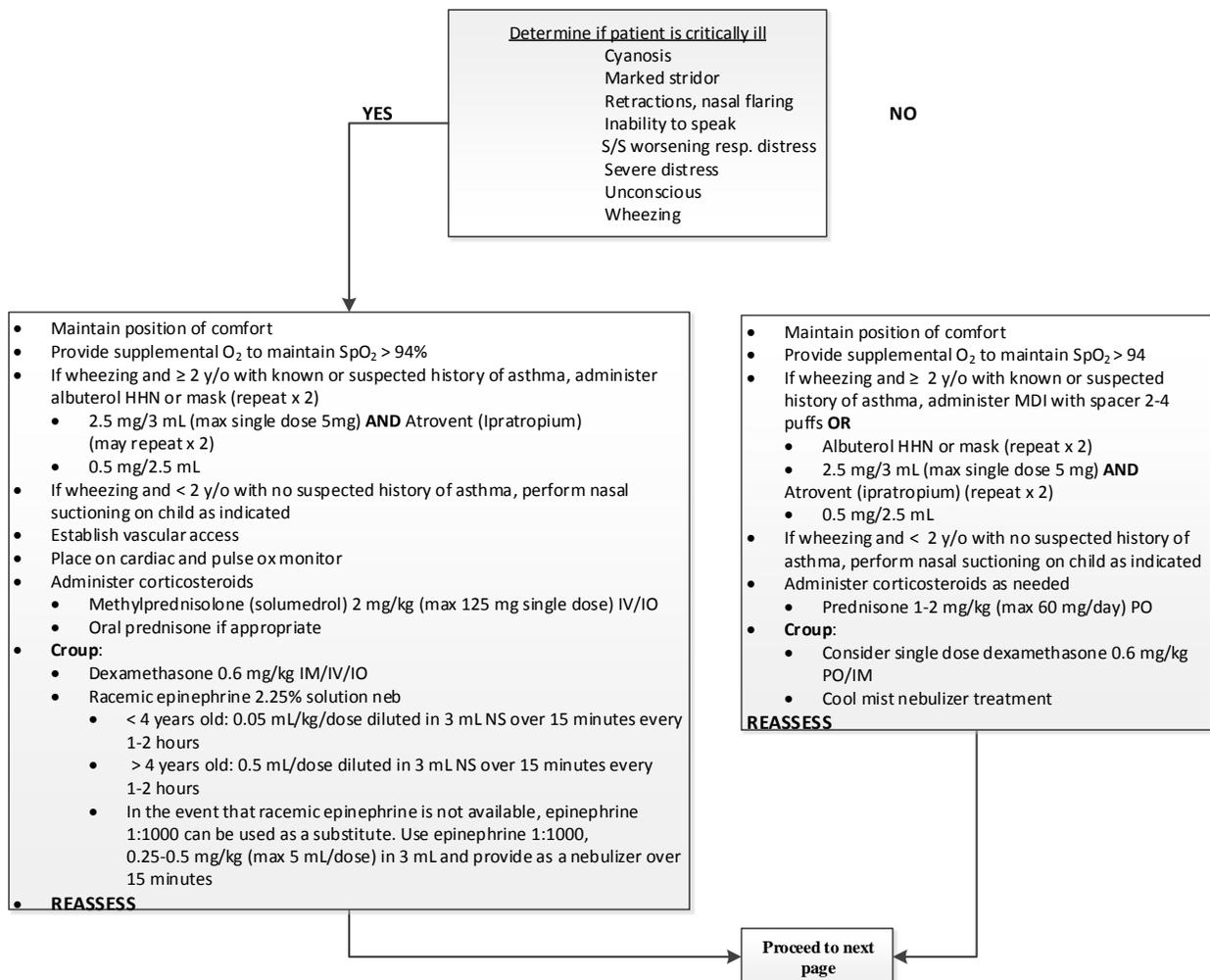
Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

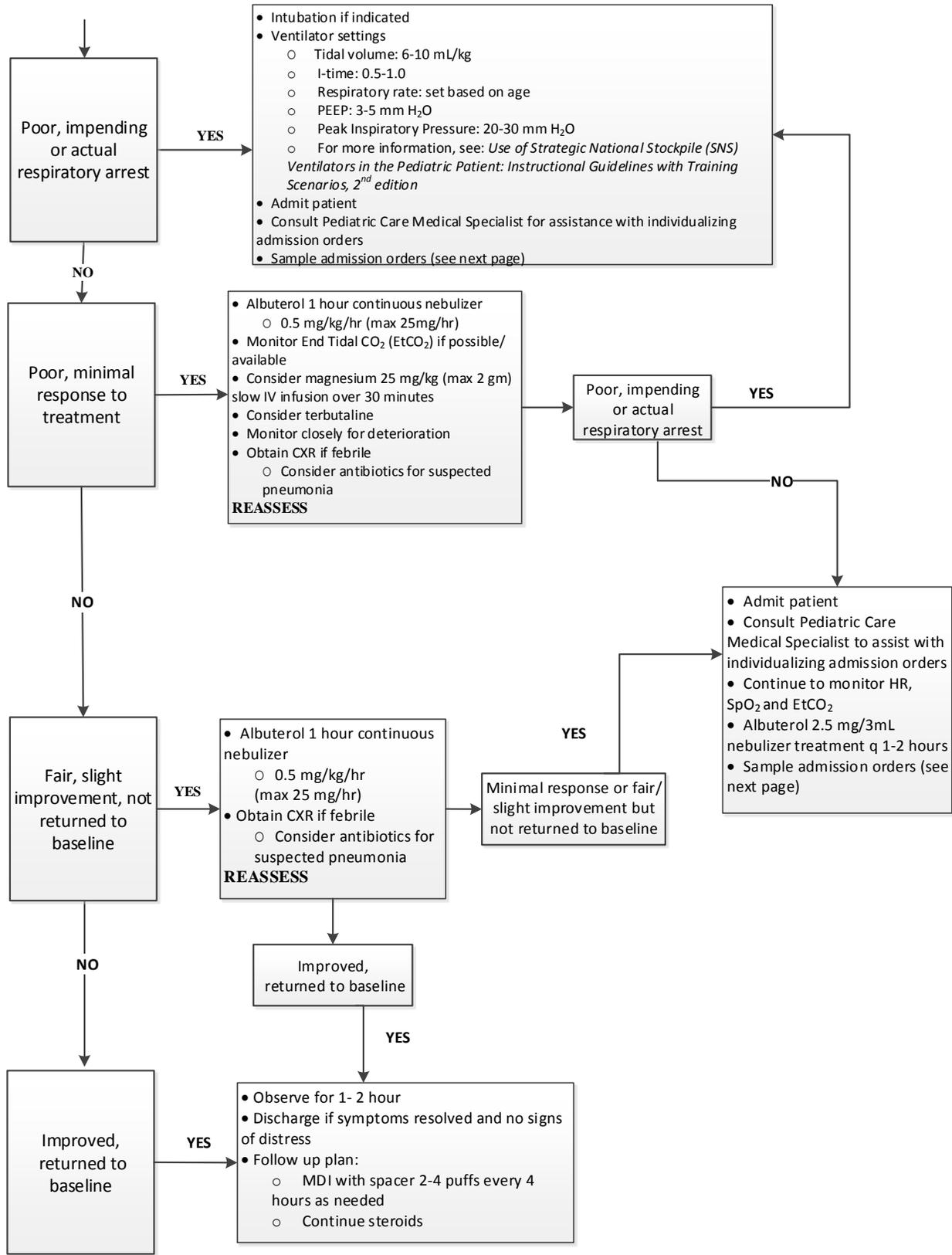
Disclaimer: This guideline are not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Initial Management of All Pediatric Respiratory Patients

- Stabilize ABCs and c-spine (Airway, Breathing, and Circulation)
- If exam consistent with tension pneumothorax, consider emergent needle decompression then placement of chest tube (if experienced/skilled practitioner available)
- Obtain weight (actual or use of weight/length based tool)
- Monitor:
Heart Rate (HR), Blood pressure (BP), Oxygen Saturation (SpO₂), mental status, temperature, perfusion, urine output, bedside glucose
- Perform history & physical exam
- Provide oxygen if patient is hypoxic or in acute distress (goal is SpO₂ > 95%).
 - O₂ blow by if in mild distress
 - O₂ 15L NRB or partial rebreather for moderate to severe distress
 - O₂ 15L BVM for severe distress/arrest
- Consult pediatric expert for assistance with care of the acutely and critically ill patient, to individualize the care of patient, if patient does not improve and needs to be transferred and as needed for further support and consult.

Management for Respiratory Distress for All Pediatric Patients





Sample Pediatric Respiratory Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Weight (kg): _____ **Height(cm):** _____

Allergies: _____

Pulse Oximetry:

- Obtain pulse oximetry on admission to unit
- If SpO₂ > 90%, obtain spot check pulse oximetry readings with each treatment, with vital signs or if patient exhibits decline in respiratory status
- If SpO₂ < 90%, provide oxygen and begin continuous pulse oximetry monitoring

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
- Titrate oxygen to maintain pulse oximetry >90%
- Wean oxygen if oxygen saturation maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes

Ventilator settings: _____

- For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*

Peak Expiratory Flow Rate (PEFR)

- Peak Flow will be done on admission for patients > 5 years of age to determine patient’s compliance/ability to effectively perform
- Check Peak Flow before and after breathing treatments.

AVERAGE PREDICTED PEAK EXPIRATORY FLOW RATES FOR NORMAL CHILDREN

Height		PEFR (L/min)	70% PEFR	Height		PEFR (L/min)	70% PEFR	Height		PEFR (L/min)	70% PEFR
In	Cm			In	Cm			In	Cm		
43	109	147	103	52	132	267	187	60	152	373	261
44	112	160	112	53	135	280	196	61	155	387	271
45	114	173	121	54	137	293	205	62	157	400	280
46	117	187	131	55	140	307	215	63	160	413	289
47	119	200	140	56	142	320	224	64	163	427	299
48	122	214	150	57	145	334	234	65	165	440	308
49	124	227	159	58	147	347	243	66	168	454	318
50	127	240	168	59	150	360	252	67	170	467	327
51	130	254	178	Data from Voter. <i>Pediatr Rev</i> 1996; 17(2): 53-63							

Medications:

- Albuterol
 - MDI via spacer device
 - 2 puffs every 3 hours (6-11 months old)
 - 4 puffs every 3 hours (>12 months old)
 - Nebulizer _____mg every ____ hrs (0.5mg/kg/hr, max dose 30mg/hr)
 - Continuous
 - If patient requires treatment prior to two hour interval, administer Albuterol continuous nebulizer for two hours and begin continuous pulse oximetry monitoring
 - Albuterol 0.5mg/kg/hr (max dose 10mg/hr)
- Ipratropium bromide (Atrovent):
 - 0.5mg to be given with 2nd and 3rd doses of Albuterol
- Corticosteroids:
 - Prednisolone Sodium Phosphate (Orapred): _____mg PO STAT (2mg/kg loading dose-max 60mg/dose) then _____mg PO every 12 hours (1mg/kg maintenance dose-max 30mg/dose) x 5 days
 - Methylprednisone (Solumedrol): _____mg IV STAT (2mg/kg loading dose-max 60mg/dose) then _____mg IV every 6 hours (1mg/kg maintenance dose-max 30mg/dose) x 4 doses
- Topical anesthetic for IV start and lab draws:
 - Apply topically once 30-90 minutes prior to painful procedures (maximum 1gm, 10 centimeter area squared, or application time of 2 hours)
- Antibiotics:
 - _____
 - _____
 - _____
 - _____
- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15mg/kg/dose) _____mg PO/GT every 4 hrs PRN for temperature \geq 38.6°C/101.5°F or discomfort (max dose 3000mg/day)
 - Acetaminophen (Tylenol) (20mg/kg/dose) _____mg PR every 4 hrs PRN for temperature \geq 38.6°C/101.5°F or discomfort (max dose 3000mg/day)
 - Ibuprofen (Motrin) (10mg/kg/dose) _____mg PO/GT every 6 hours PRN for temperature \geq 38.6°C/101.5°F or discomfort
- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc.
- Asthma Score (see next page)

General Information

Unlike adults, cardiac arrest in children most often occurs secondary to respiratory insufficiency. Once the child proceeds to a cardiac event, the likelihood of resuscitating that child is dismal. Rapid airway assessment and intervention is imperative. Several conditions manifest as respiratory distress in children including: airway obstruction, upper airway disease (croup, epiglottitis), and lower airway disease (asthma, bronchiolitis, and pneumonia). Signs and symptoms of impending respiratory collapse include:

- Cyanosis
- Tachycardia
- Bradycardia
- Shallow respiration
- Decreasing LOC/restlessness
- Hypotension

Pediatric asthma may present differently from the adult form. Children may not wheeze, but continuously cough for 20-30 minutes after excitement or exercise, or may abruptly vomit.

Due to the small diameter of their airways, even incremental edema/bronchoconstriction may cause severe air exchange problems. The inability of pediatric patients to increase their tidal-volumes often results in markedly increased respiratory rate which dehydrates airways and accelerates the development of mucous plugs. Hypoxemia & hypercarbia lead to acidosis and bradycardia. Treat aggressively.

Asthma Score

- Intended for use with patients > 2 years old who are being treated for asthma or an asthma exacerbation
- Not intended for patients who:
 - Are being treated for bronchiolitis, pneumonia, croup, reactive airway disease
 - Have chronic lung disease, cystic fibrosis, airway anomalies, cardiac disease, foreign body or neurologic disorders
- Calculate the asthma score upon admission, prior to each aerosol treatment, and during the weaning process
- Wean if score of 0-1 and/or peak expiratory flow rate (PEFR) greater than 70% predicted → see Asthma Weaning Guidelines on next page.
- Treatment should be given for a score of 2 or higher and/or PEFR less than 70% predicted.

ASTHMA SCORE	0	1	2
Respiratory Rate (Count for a full minute)	0-12 mos: < 40 1-5 y/o: < 30 6-9 y/o: < 25 10-15 y/o: < 23 >15 y/o: < 20	0-12 mos: 40-50 1-5 y/o: 30-40 6-9 y/o: 25-30 10-15 y/o: 23-27 > 15 y/o: 20-24	0-12 mos: > 50 1-5 y/o: > 40 6-9 y/o: > 30 10-15 y/o: > 27 >15 y/o: > 24
Retractions	None	Suprasternal/Subcostal/ Intercostal	Using neck or abdominal muscles (belly breathing) if atypical for child
Breath Sounds	Normal, equal, Mild expiratory wheeze	Wheeze throughout expiration Localized decreased breath sounds	Wheeze throughout inspiration & expiration Multiple areas with decreased breath sounds
Oxygen Saturation (SpO₂)	≥ to 92%	≥ 90-92%	≤ 90%

Adapted from: Cincinnati Children’s Hospital Medical Center Respiratory Assessment/Care Record, 2002; Kelly et al, Improved Outcomes for Hospitalized Asthmatic Children Using a Clinical Pathway, 2000.

Asthma Weaning Phases
<p>NOTE: <i>Initial asthma phase should be chosen on the patient’s clinical presentation (e.g., the frequency of initial treatments needed to show improvement), with some assistance with asthma score. For example, a patient with asthma score of 2-3 would likely start in phase II or III. If patient has an asthma score of 4 or more, consider starting patient in phase I or II.</i></p>
<p>PHASE I: Continuous Albuterol treatment</p> <ul style="list-style-type: none"> • Assess Asthma Score every 1-2 hours • If score less than 2 for two consecutive assessments, wean to Phase II • If worsening score or has not met weaning criteria after 6 hours, RT to call physician
<p>PHASE II: Every 2 hour Albuterol treatment</p> <ul style="list-style-type: none"> • Assess Asthma Score before and after every treatment • If score less than 2, wean to Phase III • If worsening score (score increased by 2 or more) or has not met weaning criteria after 8 hours, RT to call physician
<p>PHASE III: Every 3 hour Albuterol treatment</p> <ul style="list-style-type: none"> • Assess Asthma Score before and after every treatment • Transition to MDI with spacer +/- mask or mouthpiece if able to comply <ul style="list-style-type: none"> ○ ALL MDI ALBUTEROL IS 4-6 PUFFS PER TREATMENT (in 30 second intervals) • If score less than 2, wean to Phase IV • If worsening score (score increased by 2 or more) or has not met weaning criteria after 12 hours, RT to call physician
<p>PHASE IV: Every 4 hour Albuterol treatment</p> <ul style="list-style-type: none"> • Assess Asthma Score before and after every treatment • If worsening score (score increased by 2 or more) or has not met discharge criteria after 12 hours, RT to call physician • If patient has met discharge criteria after 2 beta-agonist treatments at q 4 hours, RT to call physician
<p>Discharge Criteria: Must meet all 5 discharge criteria</p> <ol style="list-style-type: none"> 1. SpO2 > 92% (goal = 91-94%) 2. Off of supplemental oxygen for at least 6 hours (must include one sleep period—this may be a nap*) 3. Normal respiratory rate 4. End expiratory wheeze only 5. Minimal → no retractions <p>*A nap is at least 30 continuous minutes of sleep</p>

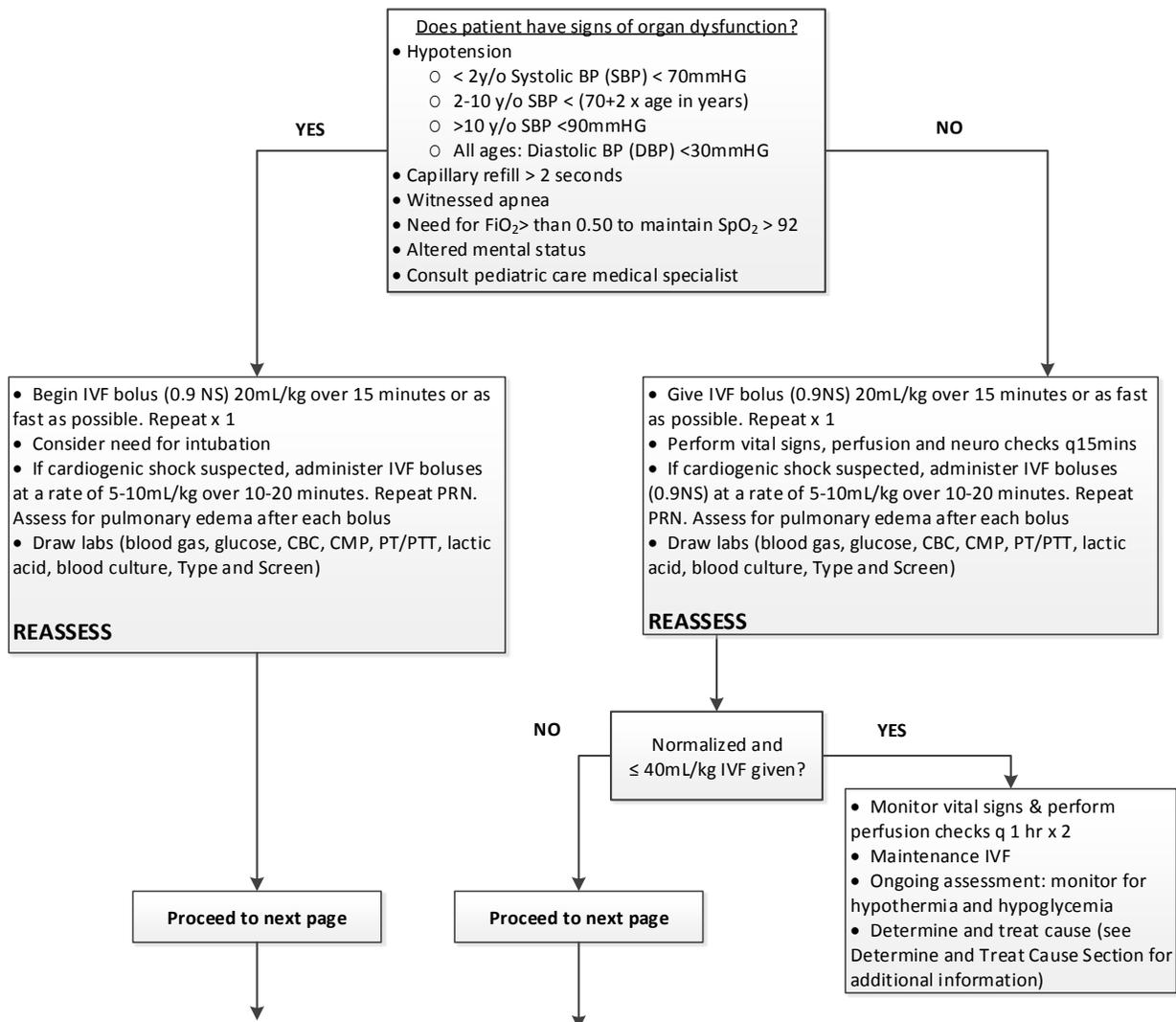
Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

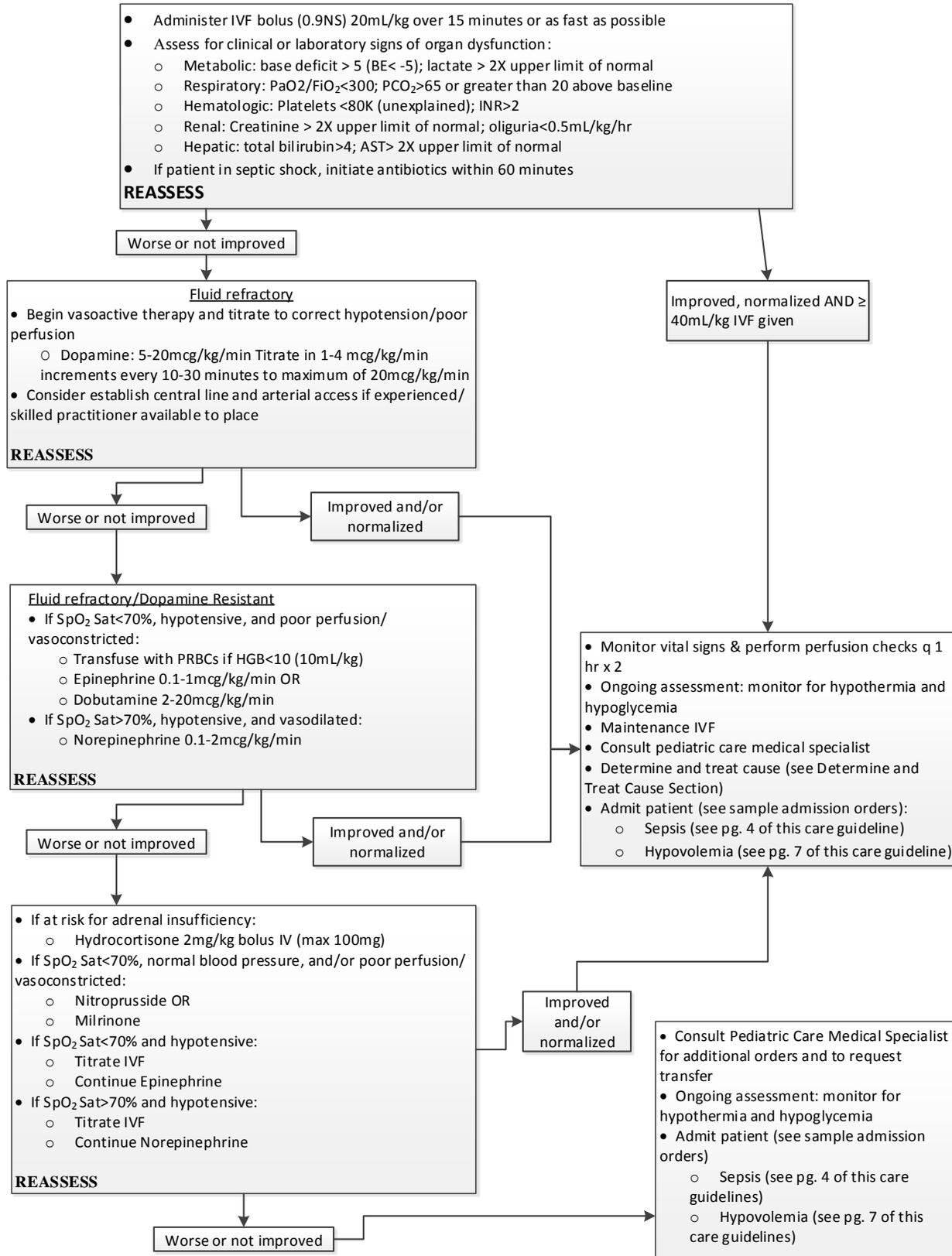
Disclaimer: This guideline is not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Initial Management of All Pediatric Shock Patients

- Stabilize ABCs and c-spine (Airway, Breathing, and Circulation)
- Obtain weight (actual or use of weight/length based tool)
- Establish 2 peripheral IVs (consider large bore if possible) or if unable, establish intraosseous (IO) access
- Control any external bleeding
- Monitor
 - Heart Rate (HR), Blood pressure (BP), Oxygen Saturation (SpO₂), mental status, temperature, perfusion, urine output, bedside glucose
- Perform history & physical exam
- Consult Pediatric Care Medical Specialist for assistance with care of the acutely and critically ill patient, to individualize the care of patient, if patient does not improve and needs to be admitted/transferred and as needed for further support and consult.

Management of all Pediatric Shock Patients





Determine and treat cause
<p>Anaphylaxis:</p> <ul style="list-style-type: none"> ○ Epinephrine 1:1000 0.1 mL/kg (not to exceed 0.3 mg/dose) IM, every 15 minutes x 2 then every 4 hours OR ○ Epinephrine Autoinjector 0.3 mg IM (for patients >30kg) OR Junior Autoinjector 0.15 mg (for patients 10-30 kg) OR ○ If hypotension continues after IVF bolus, Epinephrine 0.01 mg/kg (1:10000) IV/IO every 3-5 minutes (max dose 1 mg) ○ Benadryl 1.25-1.5 mg/kg IV/IO/IM every 4-6 hours (max dose 50 mg) <ul style="list-style-type: none"> ▪ Monitor for respiratory depression ○ Methylprednisone 2 mg/kg IV initially (max 60 mg) then 0.5 mg/kg every 6 hours or 1 mg/kg every 12 hours (max 125 mg/day). ○ Pepcid 0.5 mg/kg IV every 12 hours
<p>Cardiogenic shock:</p> <ul style="list-style-type: none"> ○ Administer IVF boluses at a rate of 5-10 mL/kg over 10-20 minutes. Repeat PRN. Assess for pulmonary edema after each bolus ○ Consider Diuretics ○ Consider Milrinone ○ Consider need to increase cardiac output <ul style="list-style-type: none"> ▪ Vasodilators ▪ Inotropes ○ Reduce metabolic demands: <ul style="list-style-type: none"> ▪ Antipyretics PRN
<p>Hemorrhage:</p> <ul style="list-style-type: none"> ○ If signs/symptoms of shock and at risk for hemorrhage, consider administering PRBCs 10 mL/kg <ul style="list-style-type: none"> ▪ Administering 10 mL/kg of PRBCs will increase hemoglobin by 2 g/dL or hematocrit 4-6%
<p>Hypocalcemia</p> <ul style="list-style-type: none"> ○ Calcium chloride: 10-20 mg/kg (0.1-0.2 mL/kg calcium chloride 10%) infused at a rate that does not exceed 100 mg/min OR Calcium gluconate: 15 mg/kg
<p>Hypoglycemia</p> <ul style="list-style-type: none"> ○ Birth-28 days: D10W 2 mL/kg IV ○ >28 days-1 year: D12.5% 4-8 mL/kg IV ○ >1 year: D25% 2-4 mL/kg IV ○ D50% 1-2 mL/kg IV
<p>Obstructive shock:</p> <p>Treat underline cause:</p> <ul style="list-style-type: none"> ○ Cardiac Tamponade (perform pericardiocentesis if experienced/skilled practioner available) ○ Tension Pneumothorax (perform needle decompression and place chest tube if experienced/skilled practitioner available) ○ Closed ductus arteriosus <ul style="list-style-type: none"> ▪ Prostaglandin E1 0.05-0.1 mcg/kg/min continuous IV ○ Pulmonary embolism
<p>Spinal cord injury:</p> <p>If hypotensive/bradycardic after IVF boluses:</p> <ul style="list-style-type: none"> ○ Atropine 0.02 mg/kg IV/IO (min single dose 0.1 mg/max single dose 1 mg). May repeat every 3 minutes to max 2 mg. <p>If continue to be hypotensive and bradycardic:</p> <ul style="list-style-type: none"> ○ Dopamine to maintain SBP >90 ○ Phenylephrine or vasopressin ○ Consult neuro surgeon for further medical management
<p>Sepsis:</p> <ul style="list-style-type: none"> ● Antibiotics: broad spectrum antimicrobial agent <u>initiated within 60 minutes</u> <ul style="list-style-type: none"> ● Neonates: Ampicillin, Cefotaxime, Cefuroxime, Gentamicin ● Children > 1 month: Ceftriaxone, Vancomycin, Cefepime, Gentamicin, Piperacillin/Tazobactam, Clindamycin ● Antipyretics: Acetaminophen 15 mg/kg or ibuprofen 10 mg/kg.

Sample Pediatric Septic Shock Admission Orders

Admitting physician: _____
Diagnosis: _____
Condition: Critical Serious Stable
Weight (kg): _____ **Height(cm):** _____
Allergies: _____
Isolation: _____

Assessment:

- Continuous cardiac monitoring
- Continuous pulse oximetry
- Blood pressure with all vital signs
- Routine I&O
- Strict I&O
- Daily weight
- Seizure precautions
- Neuro checks ever _____ hours
- All non-rectal temperatures > 38°C/100.4°F should be confirmed rectally on infants ≤60 days of age

Tests:

- CBC with differential
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- CMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- BMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- Blood culture (order if not performed prior to admission)
- Viral blood culture
- Catheterized urinalysis (order if not performed prior to admission)
- Catheterized urine culture (order if not performed prior to admission)
- Stool culture
- Stool for Rotavirus
- Stool gram stain
- RSV
- Influenza
- Viral culture
- Chest x-ray (PA and lateral) (order if not performed prior to admission)

For infants ≤60 days of age with fever:

- CSF for (laboratory should perform these in ranking order as listed below)
 - Cell count
 - Glucose

- Protein
- Gram stain
- Aerobic culture
- Viral culture
- Enterovirus PCR
- Herpes PCR
- Meningitis antigen profile
- Conjunctiva viral culture
- Viral culture of skin lesion on _____
- Rectal viral culture
- _____
- _____
- _____

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15mg/kg/dose) _____ mg PO/GT every 4 hrs PRN for temperature 38.6°C/101.5°F or discomfort (max dose 3000mg/day)
 - Acetaminophen (Tylenol) (20mg/kg/dose) _____ mg PR every 4 hrs PRN for temperature ≥ 38.6°C/101.5°F or discomfort (max dose 3000mg/day)
 - Ibuprofen (Motrin) (10mg/kg/dose) _____ mg PO/GT every 6 hours PRN for temperature ≥ 38.6°C/101.5°F or discomfort (for infants >5 months)
- Antibiotics:
 - Ceftriaxone _____ mg IV every _____ hours (max 4gm/day)
 - Vancomycin _____ mg IV every _____ hours (max 1gm/dose)
 - _____
 - _____
 - _____
 - For infants ≤ 30 days of age with fever:
 - Ampicillin _____ mg IV every ____ hours (200 mg/kg/day)
 - Cefuroxime _____ mg IV every ____ hours (200 mg/kg/day)
 - Cefotaxime _____ mg IV every ____ hours
 - Acyclovir _____ mg IV every _____ hours
 - (If greater than or equal to 35 weeks post-conceptual age, give 60 mg/kg/day divided every 8 hours. If less than 35 weeks post conceptual age, give 40 mg/kg/day divided every 12 hours)
 - Gentamycin _____ mg IV every _____ hours
- Topical anesthetic for IV start and lab draws:
 - Apply topically once 30-90 minutes prior to procedure (maximum 1gm, 10 centimeter area squared, or application time of 2 hours)

IV Therapy:

- Saline lock
- D5 ½ NS with 20 mEq KCl/L running at _____ mL/hr (ensure patient is voiding)
- _____ running at _____ mL/hr
- _____ running at _____ mL/hr

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
 - Titrate oxygen to maintain SpO₂ > 90%
 - Wean oxygen if oxygen saturation maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator Settings: _____
- For more information, see: Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition
-
- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc

Sample Pediatric Hypovolemic Shock Admission Orders

Admitting physician: _____
Diagnosis: _____
Condition: Critical Serious Stable
Weight (kg): _____ **Height(cm):** _____
Allergies: _____
Isolation: _____

Assessment:

- Continuous cardiac monitoring
- Continuous pulse oximetry
- Blood pressure with all vital signs
- Routine I&O
- Strict I&O
- Daily weight

Tests:

- CBC with differential
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- CMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- BMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15mg/kg/dose) _____ mg PO/GT every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000mg/day)
 - Acetaminophen (Tylenol) (20mg/kg/dose) _____ mg PR every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000mg/day)
 - Ibuprofen (Motrin) (10mg/kg/dose) _____ mg PO/GT every 6 hours PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (for infants >5 months)
- Antiemetic:
 - _____
 - _____
- Antibiotics:
 - _____
 - _____
 - _____

- Topical anesthetic for IV start and lab draws:
 - Apply topically once 30-90 minutes prior to procedure (maximum 1gm, 10 centimeter area squared, or application time of 2 hours)

IV Therapy:

- _____
- D5 ½ NS with 20 mEq KCl/L running at _____ mL/hr (ensure patient is voiding)
- _____ running at _____ mL/hr
- _____ running at _____ mL/hr

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
- Titrate oxygen to maintain SpO₂ > 90%
- Wean oxygen if oxygen saturation maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator Settings: _____
 - For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*
- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc

Definitions and Other Pediatric Shock Information	
TYPES	
<p>Distributive Shock <i>Definition:</i> Excessive vasodilation and impaired distribution of blood flow <i>Common types:</i> Sepsis, anaphylaxis, spinal cord injuries (neurogenic)</p> <p>Hypovolemic Shock <i>Definition:</i> Deficiency of intravascular blood volume <i>Common causes:</i></p> <ol style="list-style-type: none"> 1. Intravascular volume loss: gastroenteritis, burns, diabetes insipidus, heat stroke 2. Hemorrhage: trauma, surgery 3. Interstitial loss: burns, sepsis, nephrotic syndrome, intestinal obstruction, ascites <p>Obstructive Shock <i>Definition:</i> Circulatory failure caused by a physical obstruction <i>Common causes:</i> Physical causes of shock should be considered (e.g. cardiac Tamponade or pulmonary embolism), especially in neonates who may have been born with obstructive congenital health disease (i.e. coarctation of the aorta, severe aortic valvular stenosis) <i>Presentation:</i> Neonates who present with signs of shock associated with enlarged liver, enlarged cardiac silhouette and/or heart murmur</p> <p>Cardiogenic Shock <i>Definition:</i> Impaired cardiac contractility <i>Common causes:</i></p> <ol style="list-style-type: none"> 1. Congestive heart failure 2. Cardiomyopathy 3. Cardiac Tamponade 4. Drugs 5. Tension Pneumothorax 	
Key Points	
<p>Stages of shock: Compensated, Decompensated & Irreversible</p> <ul style="list-style-type: none"> • Tachycardia=Compensated • Progression to next stage can be abrupt • Adolescents compensate like kids, not adults • Hypotension=Decompensated <p>Early indicators of shock Hyperthermia/hypothermia, leukocytosis/neutropenia, unexplained tachycardia, tachypnea, poor distal perfusion</p>	

SYSTEM	DISORDERS	GOALS	THERAPIES
Respiratory	Acute respiratory distress syndrome	Prevent/treat: hypoxia and respiratory acidosis	Oxygen
	Respiratory muscle fatigue	Prevent barotrauma	Early endotracheal intubation and mechanical ventilation
	Central apnea	Decrease work of breathing	Positive end-expiratory pressure (PEEP) Permissive hypercapnia High-frequency ventilation Extracorporeal membrane oxygenation (ECMO)
Renal	Pre-renal failure Renal failure	Prevent/treat: hypovolemia, hypervolemia, hyperkalemia, metabolic acidosis, hypernatremia/ hyponatremia, and hypertension Monitor serum electrolytes	Judicious fluid resuscitation Low-dose dopamine Establishment of normal urine output and blood pressure for age Furosemide (Lasix) Dialysis, ultrafiltration, hemofiltration
Hematologic	Coagulopathy (disseminated intravascular coagulation)	Prevent/treat: bleeding	Vitamin K Fresh frozen plasma Platelets
	Thrombosis	Prevent/treat: abnormal clotting	Heparinization Activated protein C
Gastrointestinal	Stress ulcers	Prevent/treat: gastric bleeding Avoid aspiration, abdominal distention	Histamine H2 receptor–blocking agents or proton pump inhibitors Nasogastric tube
	Ileus Bacterial translocation	Avoid mucosal atrophy	Early enteral feedings
Endocrine	Adrenal insufficiency, primary or secondary to chronic steroid therapy	Prevent/treat: adrenal crisis	Stress-dose steroids in patients previously given steroids Physiologic dose for presumed primary insufficiency in sepsis
Metabolic	Metabolic acidosis	Correct etiology Normalize pH	Treatment of hypovolemia (fluids), poor cardiac function (fluids, inotropic agents) Improvement of renal acid excretion Low-dose (0.5-2 mEq/kg) sodium bicarbonate if the patient is not showing response, pH < 7.1, and ventilation (CO2 elimination) is adequate

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Trauma and Blast Injury Care Guideline

Purpose: To provide guidance to practitioners caring for pediatric patients during a disaster.

Disclaimer: This guideline is not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

Initial Management of All Pediatric Trauma Patients

- Stabilize ABCs and c-spine (Airway, Breathing, and Circulation)
 - Initiate spinal motion restriction as indicated. Position for optimal airway and suction as needed. Position infants and children < 2 y/o supine on a backboard with a recess for the head or use a pad under the back from the shoulders to the buttocks.
 - Consider needle decompression for signs of pneumothorax, hemothorax or tension pneumothorax
- Obtain weight (actual or use of weight/length based tool)
- Establish 2 peripheral IVs (consider large bore if possible) or if unable, establish intraosseous (IO) access
- Control any external bleeding
- Avoid removal of penetrating objects in the emergency department (should be performed in operating room due to risk of hemorrhage)
- Monitor
 - Heart Rate (HR), Blood pressure (BP), Oxygen Saturation (SpO₂), mental status, temperature, perfusion, urine output, bedside glucose
- Perform detailed primary and secondary history & physical exam including mechanism of injury, Pediatric Trauma Score (PTS) and Pediatric Glasgow Coma Scale (PGCS)
- Consult pediatric care medical specialist for assistance with care of the acutely and critically injured patient (see below for Level I Trauma Criteria), to individualize the care of patient, if patient does not improve and needs to be admitted/transferred and as needed for further support and consult.
- Category 1 Trauma Criteria (minimum):
 - All penetrating injuries to head, neck, torso, and/or groin
 - Two or more body regions with potential threat to life or limb
 - Combination trauma with ≥20% TBSA burn
 - Limb paralysis and/or sensory deficit above the wrist and ankle
 - Flail chest
 - Amputation proximal to wrist or ankle
 - Blunt or penetrating trauma with unstable vital signs AND/OR:
 - Hemodynamic compromise (Pediatric SBP≤80)
 - Respiratory compromised (Respiratory rate <10 or >29)
 - Altered mentation (PGCS≤10)
- **Additional Blast Injury Considerations:**
 - Classification of Blast Injuries (see page 102 for more detailed information on pediatric clinical presentations for common blast injuries and management of specific blast injuries)
 - Primary
 - Results from impact of the over-pressurized blast wave
 - Gas filled/ hollow structures most susceptible
 - Examples: blast lung, tympanic membrane rupture, abdominal hemorrhage and perforation, eye globe rupture, traumatic brain injury (TBI) without physical signs of head injury

- Secondary
 - Results from flying debris and bomb fragments
 - Entire body may be affected
 - Examples: penetrating and blunt trauma injuries, eye penetration
- Tertiary
 - Results from victims being thrown by blast wind
 - Entire body may be affected
 - Examples: fractures, amputations, closed and open brain injury
- Quaternary
 - All injuries, illnesses not due to Primary, Secondary or Tertiary mechanisms
 - Entire body may be affected
 - Example: crush injuries, burns, asphyxia, toxic exposures, exacerbation or complications from existing or chronic conditions

Management for Pediatric Trauma & Blast Injury Patients

Determine if patient is critically ill/injured

- Capillary refill >2 seconds
- Slow or fast breathing rate
- Penetrating wound to head/chest/abdomen
- Significant blunt trauma to chest/abdomen
- Pelvic/femoral fracture
- Open chest wound
- Spinal injury with paresthesia
- Unconscious/history of LOC
- Amputation/crush injury
- Respiratory distress/failure
- Signs/symptoms of intra-abdominal injury:
 - Hematuria, Grey Turner sign (discoloration of flank/periumbilical area), abdominal asymmetry/ distention, tender/guarding/pain on palpation
- Signs of Shock
- Prolonged extrication

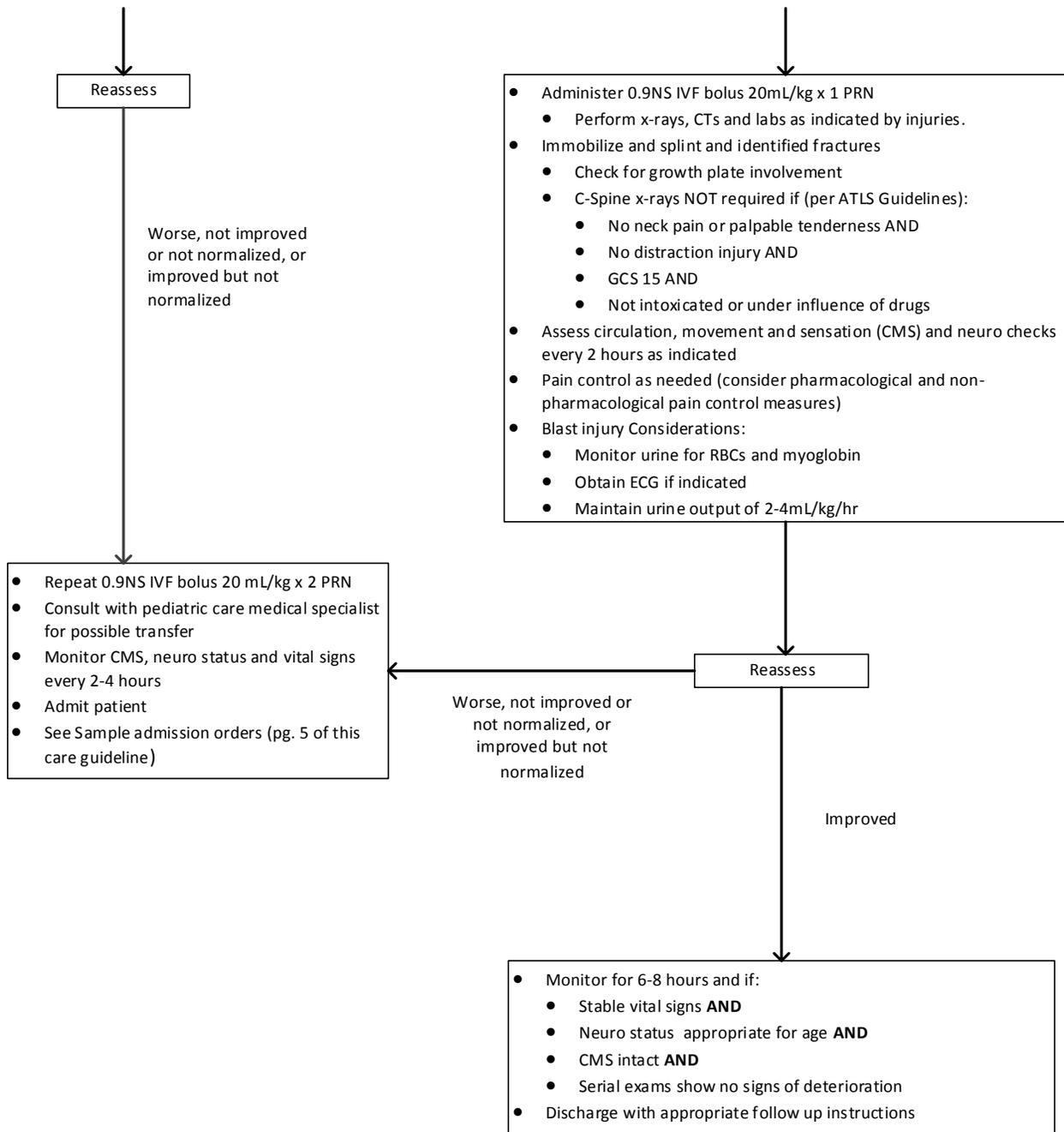
YES

NO

- Treat all life threatening injuries:
 - Protect airway:
 - Apply supplemental oxygen to maintain SpO₂ ≥ 94%
 - Use NPA/OPA as needed if not contraindicated
 - Intubated as needed to protect airway
 - Tidal volume: 6-10mL/kg
 - I-time: 0.5-1.0
 - Respiratory rate: set based on age
 - PEEP: 3-5 mm H₂O
 - Peak Inspiratory Pressure: 20-30 mm H₂O
 - For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*
 - Control any bleeding
 - Administer 0.9NS IVF bolus 20mL/kg if signs of hypoperfusion exist. Repeat x 2 PRN
 - Consider PRBCs if patient does not respond to IVF boluses (10mL/kg)
- Perform x-rays, CTs as indicated:
 - Immobilize/splint/stabilize any fractures
- Draw labs as indicated (CBC, CMP, PT/PTT, urine analysis, Type and Screen)
- Initiate pain control
- Administer antibiotics and tetanus as indicated
- Perform detailed head to toe assessment (see pg. 7 for details)
- **Additional Blast Injury Considerations:**
 - See page 8 of this care guidelines for detailed assessment and management for blast injuries
 - Maintain urine output of 2-4mL/kg/hr
- Prolonged extrication requires high fluid volume and possible alkalinization of the urine
 - For potential potential rhabdomyolysis (0.45% NS with 50mEq/liter of sodium bicarbonate).
 - Monitor urine for RBCs and myoglobin
 - Obtain CKMB, ECG and maintain cardiac monitor
 - Consider compartment syndrome if pain disproportionate to injury
 - Consider performing a fasciotomy (if experienced/ skilled practitioner available or after

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Trauma and Blast Injury Care Guideline



IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017** Trauma and Blast Injury Care Guideline

Sample Pediatric Trauma/Blast Injury Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Weight (kg): _____ **Height (cm):** _____

Allergies: _____

Assessment:

- Continuous cardiac monitoring
- Continuous pulse oximetry
- Blood pressure with all vital signs
- Routine I&O
- Strict I&O q 1 hour (maintain urine output at 2-4mL/kg/hr)
- Daily weight
- Seizure precautions
- Neuro checks ever _____ hours
- Perform CMS checks on extremities every _____ hours to monitor for compartment syndrome/crush syndrome

Tests:

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15mg/kg/dose) _____ mg PO/GT every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000mg/day)
 - Acetaminophen (Tylenol) (20mg/kg/dose) _____ mg PR every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000mg/day)
 - Ibuprofen (Motrin) (10mg/kg/dose) _____ mg PO/GT every 6 hours PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (for infants >5 months). Ensure adequate renal function before utilizing.
- Analgesics
 - Acetaminophen with hydrocodone (Hycet/Lortab/Lorcet/Norco) _____ mg/kg PO every 4-6 hours PRN for pain
 - Morphine (0.1-0.2 mg/kg) _____ mg IV every 2-4 hours as needed (max 10mg/dose)
 - Fentanyl _____ mg IV every _____ hours as needed.
- Antibiotics:
 - _____
 - _____
 - _____
- Topical anesthetic for IV start and lab draws
 - Apply topically once 30-90 minutes prior to procedure (maximum 1gm, 10 centimeter area squared, or application time of 2 hours)

IV Therapy:

- Saline Lock
- NS bolus _____ mL IV to run over 1 – 2 hours

- LR bolus _____mL IV to run over 1-2 hours
- D5 0.45 NS with 20 mEq KCl/L to run at _____mL/hr (Ensure adequate renal function before utilizing potassium)
- D5 0.2 NS with 20 mEq KCl/L to run at _____mL/hr (Ensure adequate renal function before utilizing potassium)
- Other _____

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
 - Titrate oxygen to maintain SpO₂ > 90%
 - Wean oxygen if SpO₂ maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator Settings: _____
- For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*
- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc.
- If hypovolemic, refer to **Pediatric Shock Care Guidelines: Sample Hypovolemic Shock Admission Orders**

Detailed Assessment of Pediatric Trauma Patients

- Inspect/palpate each body area for DCAP-BLS, TIC, PMS (Deformity, contusions, abrasions, punctures, burns, lacerations, swelling, tenderness, instability, crepitus; + pulses, motor, and sensory ability) as appropriate plus:
- MENTAL STATUS: Assess mentation using the Pediatric Glasgow Coma Score (PGCS), Neuro exam, motor/sensory, nuchal rigidity, appearance, tone, acting appropriate for age, consolability, look/gaze, and speech/cry.
- HEAD, FACE, EYES, EARS, NOSE, MOUTH: Note any drainage; re-inspect pupils for size, shape, equality, fixed deviation and reactivity; conjugate movements; note gross visual acuity
- NECK: Carotid pulses, neck veins, subcutaneous (Sub-Q) emphysema, location of trachea, and cervical spines
May need to temporarily remove anterior aspect of c-collar to re-assess neck
- CHEST: Expose chest as needed. Auscultate breath/heart sounds.
- RESPIRATION/VENTILLATION: rate, rhythm, pattern and work of breathing
- ABDOMEN: Signs of injury/peritonitis. Note contour, visible pulsations, wounds/ bruising patterns, pain referral sites, localized tenderness, guarding, rigidity
- PELVIS/GU: Inspect perineum and apply PASG/mast trousers if suspected pelvic fracture.
- EXTREMITIES: Inspect for position, false motion, skin color, and signs of injury
- BACK: Note any muscle spasms
- SKIN/SOFT TISSUE: Inspect/palpate for color, temperature, moisture, signs of SQ emphysema, pulses in all extremities, capillary refill

Pediatric Trauma Score (age 12 and under)			
Component	+2	+1	-1
Size	> 20kg > 5 years old	11-20kg 1-5 years old	≤ 10kg < 1 year old
Airway	Normal	Maintainable	Unmaintained or intubated
Systolic BP	>90mmHg	50-90mmHg	< 50 mmHg
CNS	Awake	Obtunded/lost consciousness	Coma/unresponsive
Skeletal Injury	None	Closed fracture	Open/multiple fractures
Open Wounds	None	Minor	Major/penetrating
Score of < 8 usually indicates the need for evaluation at a Trauma Center.			

Pediatric Glasgow Coma Scale		
Category	For Patients <2 Years Old	For Patients >2 Years Old
Eye Opening (E)	(4) Spontaneous (3) To speech (2) To pain (1) None	(4) Spontaneous (3) To speech (2) To pain (1) None
Verbal Response (V)	(5) Coos, babbles, appropriate words (4) Irritable, cries (3) Cries to pain (2) Moans to pain (1) None	(5) Oriented (4) Confused (3) Inappropriate words (2) Incomprehensible (1) None
Motor Response (M)	(6) Normal spontaneous movements (5) Withdraws from touch (4) Withdraws from pain (3) Abnormal flexion (decorticate) (2) Abnormal extension (decerebrate) (1) None	(6) Obeys commands (5) Localizes to pain (4) Withdrawal to pain (3) Flexion to pain (2) Extension to pain (1) None

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

Trauma and Blast Injury Care Guideline

Detailed Assessment and Management of Blast Injury

Information below obtained from Center for Disease Control and Prevention (CDC). (2012). Blast Injuries: Fact Sheets for Professionals. Retrieved from http://emergency.cdc.gov/masscasualties/pdf/blast_fact_sheet_professionals-a.pdf

Type of Injury	Presentation	Diagnosis	Management
Abdominal injury	<ul style="list-style-type: none"> • Injury presentation may be subtle and variable • Signs/symptoms: abdominal pain, rebound tenderness, absent bowel sounds, nausea, vomiting, fever and signs of hypovolemia or hemorrhage • Injuries following underwater blasts have increased severity <p><i>Pediatric Considerations:</i></p> <ul style="list-style-type: none"> ○ Smaller and more pliable ribs and thinner abdominal walls leaves abdominal organs unprotected so children are more prone to abdominal injuries ○ Proportionally, children have larger organs so they are more prone to injury ○ Spleen and liver are especially more vulnerable to injury from blunt and penetrating force trauma. ○ Traumatic asphyxia results from sudden compression of the abdomen or chest against a closed glottis. Symptoms include: hyperemic sclera, seizures, disorientation, petechiae on upper body, respiratory failure. Treatment is supportive. 	<ul style="list-style-type: none"> • Similar to standard abdominal trauma • Serial abdominal exams • Laboratory tests • Radiology tests: free air, unexplained ileus, intra-abdominal hematoma/hemorrhage, solid organ contusion/laceration, intra-abdominal abscess 	<ul style="list-style-type: none"> • NPO • Avoid removal of penetrating objects in the emergency department (perform in OR) • Antibiotics, tetanus vaccination • Serial exams and laboratory monitoring • Women in 2nd and 3rd trimester should have fetal monitoring • All pregnant women should have a Kleihauer-Betke test: <ul style="list-style-type: none"> ○ Positive requires mandatory pelvic ultrasound, fetal non-stress test monitoring and OB/GYNE consult • Radiology exams: plain abdominal films, CT scan, Focused Abdominal Sonography for Trauma (FAST) • Appropriate referral to trauma center as applicable • Strict discharge and return instructions if signs/symptoms of abdominal injury occur after discharge
Brain/ Neurological/ Cervical Injury	<ul style="list-style-type: none"> • Head injury is most common cause of death in bombings 	<ul style="list-style-type: none"> • Glasgow Coma Scale (GCS)/ Pediatric Glasgow Coma Scale (PGCS) 	<ul style="list-style-type: none"> • Record initial GCS/PGCS and reassess per protocols • Re-evaluate patient every 24 hours or sooner if symptoms worsen

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

Trauma and Blast Injury Care Guideline

<ul style="list-style-type: none"> • Diffuse axonal injury, skull fractures, coup-counter-coup injury, subarachnoid and subdural hemorrhage common • Mild Traumatic Brain Injury (mTBI) may go undiagnosed or misdiagnosed as PTSD • May or may not have history of loss of consciousness (LOC) • Headache, seizures, dizziness, memory problems • Gait/balance problems, nausea, vomiting, difficulty concentrating • Visual Disturbances, tinnitus, slurred speech • Disoriented, irritable, confused • Extremity weakness or numbness <p><i>Pediatric considerations:</i></p> <ul style="list-style-type: none"> ○ Traumatic brain injury (TBI) can occur in patients who have not had a loss in consciousness. Children may appear alert and awake initially but should be evaluated if they have any of the following symptoms: <ul style="list-style-type: none"> ▪ Abnormal behavior (i.e. irritability, excessive sleepiness) ▪ Persistent vomiting ▪ Seizures ▪ Loss of consciousness ▪ Evidence of CSF leak ○ Young children have immature neck musculature and relatively large heads which makes them more prone to cervical spine injuries in C1-C3. ○ Children less than 8 years old are susceptible to SCIWORA (spinal cord injury without radiographic abnormality) 	<ul style="list-style-type: none"> ○ Mild TBI: At least 1 of the following inclusion criteria present: <ul style="list-style-type: none"> ▪ Any period of LOC and GCS/PGCS of 13-15 after the LOC ▪ Any loss of memory of the event immediately before or after the incident with posttraumatic amnesia of < 24hrs ▪ Any alteration in mental status at the time of incident ○ Moderate to Severe TBI: GCS/PGCS < 12 • CT scan for hemorrhage, cerebral contusion, fracture, foreign bodies • Cervical spine imaging for all patients with head injury • MRI is more sensitive to diagnosis diffuse axonal injury 	<ul style="list-style-type: none"> • Maintain: <ul style="list-style-type: none"> ○ Cerebral perfusion pressure ○ Body temperature ○ Neuromuscular blockage and sedation (for intubated patients) ○ Cervical spine control ○ Glucose control ○ Seizure control ○ DVT prophylaxis • Complete rest until asymptomatic • Symptoms that persist beyond 7-10 days suggests post-concussion syndrome and warrants additional follow up.
--	--	--

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017 Trauma and Blast Injury Care Guideline

	<ul style="list-style-type: none"> Consider cervical spine injury in children with head injury 		
Crush Injury and Crush Syndrome	<ul style="list-style-type: none"> Reperfusion syndrome: <ul style="list-style-type: none"> Hypotension Renal failure d/t rhabdomyolysis, myoglobinuria and metabolic abnormalities Metabolic abnormalities (hypocalcemia, hyperkalemia, metabolic acidosis) Cardiac arrhythmias Compartment syndrome 	<ul style="list-style-type: none"> History of events/ injury Laboratory tests 	<ul style="list-style-type: none"> If possible, administer IVF before releasing crushed body part Administer IV hydration <ul style="list-style-type: none"> Maintain urine output of 2-4mL/kg/hr Monitor for cardiac arrhythmias Treat hyperkalemia and hypocalcemia Alkalize the urine Monitor for renal failure-consider hemodialysis as needed Monitor for compartment syndrome Monitor urine for red blood cells Treat open wounds with antibiotics and tetanus vaccination Observe all crush injuries and monitor for the pain, pallor, paresthesia, pain with passive movement and pulselessness
Ear Injury	<ul style="list-style-type: none"> External Ear: <ul style="list-style-type: none"> May have degloving of cartilage which is considered a serious injury Pinna hematoma from blunt trauma Tympanic Membrane (TM): <ul style="list-style-type: none"> Can be stretched and displaced medially Range of injuries includes intra-tympanic hemorrhage to TM perforation Injuries can be unilateral or bilateral, small or complete, single or double Laceration can be smooth and linear, punched out or ragged with inverted or everted edges Middle Ear: <ul style="list-style-type: none"> Conductive and sensorineural hearing loss, vestibular disturbances, cranial 	<ul style="list-style-type: none"> Otoscopic evaluation 	<ul style="list-style-type: none"> External Ear: <ul style="list-style-type: none"> Manage injuries with foreign body removal, clean and close wounds Consider consultation on closure requirements if cartilage of pinna is degloved Drain pinna hematomas and apply pressure dressing Tympanic Membrane: <ul style="list-style-type: none"> Rupture: Keep ear clean and dry. Refer patient to specialist Perforation: Antibiotic eardrops to irrigate and clear ear of debris Middle and Inner Ear: <ul style="list-style-type: none"> Can defer until patient can see specialist Will need audiometry exams

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

Trauma and Blast Injury Care Guideline

	<ul style="list-style-type: none"> nerve palsy, CNS complications (brain abscess & meningitis) • Inner Ear: <ul style="list-style-type: none"> ○ Damage to auditory and vestibular components ○ Temporary hearing changes 		
Extremity Injuries	<ul style="list-style-type: none"> • Traumatic amputations: primarily occur through bony shaft rather than joint disarticulations • Fragments imbedded into extremity • Blunt force injuries • Crush injuries (see above for more information) 	<ul style="list-style-type: none"> • Document systemic musculoskeletal, neurological, and vascular states of each extremity • Document each open wound • Photograph if possible • Radiological exams as indicated 	<ul style="list-style-type: none"> • Perform thorough debridement • Antibiotics for all open fractures • Obviously contaminated wounds: <ul style="list-style-type: none"> ○ Irrigate with sterile saline; dress with Betadine soaked sponges • Tetanus prophylaxis if indicated • Splint fractured extremities • Surgical management: <ul style="list-style-type: none"> ○ Initial debridement and bony stabilization should be done in OR
Eye Injuries	<ul style="list-style-type: none"> • Presents with wide range of symptoms • Significant eye damage may be present with normal vision and minimal symptoms (irritation, foreign body sensation, altered vision, bleeding, periorbital swelling or bruising) • Minor injuries include: Corneal abrasions, conjunctivitis, superficial foreign bodies • Open globe (360° conjunctival hemorrhage, misshapen pupil, brown/pigmented tissue outside of globe, clear gel like tissue outside of globe, abnormally deep or shallow anterior chamber) • Eyelid lacerations are common • Serious non-penetrating injuries: hyphema, traumatic cataract, vitreous hemorrhage, retinal detachment, choroidal rupture and optic nerve injuries 	<ul style="list-style-type: none"> • Obtain visual acuity • Test for light perception, hand motion and count fingers • Thin cut CT scan of orbits may help identify foreign bodies • MRI is contraindicated until proven that no metal foreign bodies are present 	<ul style="list-style-type: none"> • Do not force eyelid open-defer exam if massive swelling is present • Assume all eye injuries may also be ruptured globe • Do not patch or bandage the eye • Use convex plastic or metal shield or the bottom of a clean paper cup taped in place • Do not remove impaled FBs • Tetanus if indicated • Administer anti-emetics for nausea and vomiting • Administer IV broad spectrum antibiotics if rupture globe is suspected • Consult an ophthalmologist as soon as possible • Rapid transport to facility with ophthalmic OR capabilities is primary goal

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017 Trauma and Blast Injury Care Guideline

Lung/Chest Injury	<ul style="list-style-type: none"> • May present with no external injuries to chest • Symptoms: dyspnea, hemoptysis, cough, chest pain • Signs: tachypnea, hypoxia, cyanosis, apnea, wheezing, decreased breath sounds, hemodynamic instability • Associated pathology: bronchopleural fistula, air emboli, hemothorax, pneumothorax <p><i>Pediatric Considerations:</i></p> <ul style="list-style-type: none"> ○ Chest injuries are a common cause of death in children after an explosive event. Below are some anatomical features found in children that affect their injury pattern: ○ Chest wall is more compliant so rib fractures are less common. Severe thoracic injuries can occur without significant external evidence of injury ○ Mediastinal structures are more mobile. Tension pneumothorax can shift mediastinum and cause respiratory and cardiovascular compromise. Suspect tension pneumothorax in children who are hypotensive and hypoxic ○ Traumatic asphyxia results from sudden compression of the abdomen or chest against a closed glottis. Symptoms include: hyperemic sclera, seizures, disorientation, petechiae on upper body, respiratory failure. Treatment is supportive. 	<ul style="list-style-type: none"> • Chest radiography: characteristic “butterfly” pattern • Arterial blood gases (ABG) • CT Chest • Doppler 	<ul style="list-style-type: none"> • Care is similar to a pulmonary contusion <ul style="list-style-type: none"> ○ Cautious IVF use ensuring tissue perfusion without volume overload • High flow oxygen to prevent hypoxemia • Secure airway for: impending airway compromise, secondary edema, injury or massive hemoptysis • Prompt decompression for hemo- or pneumothorax • Use caution with decision to intubate patient-mechanical ventilation and positive end pressure may increase risk of alveolar rupture and air embolism • Air embolism: high flow oxygen; place patient in prone, semi-left lateral or left lateral position and transfer to hyperbaric chamber • Patients with normal chest xray and ABG and no complaints can be discharged after observing for 4-6 hours
Mental health	<ul style="list-style-type: none"> • Will vary based on age and developmental level 		<ul style="list-style-type: none"> • Provide psychological first aid (PFA) • Refer to behavioral health specialist as indicated

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Sample Pediatric Admission Orders

Purpose: To provide guidance to practitioners caring for pediatric patients who need inpatient hospital care during a disaster.

Disclaimer: This guideline is not meant to be all inclusive, replace an existing policy and procedure at a hospital or substitute for clinical judgment. These guidelines may be modified at the discretion of the healthcare provider.

- Sample Pediatric Standard Admission Orders
- Sample Pediatric Respiratory Admission Orders
- Sample Pediatric Septic Shock Admission Orders
- Sample Pediatric Hypovolemic Shock Admission Orders
- Sample Pediatric Trauma/Blast Injury Admission Orders

Sample Pediatric Standard Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Patient Admission Status: Full inpatient Observation

Weight (kg): _____ **Height (cm):** _____

Allergies: _____

Activity:

- As tolerated
- Strict bed rest
- Bed rest with bathroom privileges

Isolation: _____

Vital signs/assessment:

- Per nursing protocol (if applicable)
- Continuous cardiac monitoring
- Continuous pulse-ox
- Spot check pulse-ox with vitals and if exhibiting respiratory difficulty
- Continuous pulse-ox if patient receiving supplemental O2
- Routine I & O
- Strict I & O
- Daily weights
- BP with vitals
- Seizure precautions
- Neuro checks every _____
- Notify physician if temperature is greater than _____ or less than _____
- Notify physician if pulse oximetry is less than _____
- Other _____

Diet:

- General PO ad lib
- Soft diet PO ad lib
- Full liquid diet PO ad lib
- Clear liquid diet PO ad lib
- Breastfeeding PO ad lib
- _____ formula PO ad lib
- NPO
- Other _____

IVS:

- Saline Lock
- NS bolus _____ mL IV to run over 1 – 2 hours
- D5 ½ NS with 20 mEq KCl/L to run at _____ mL/hr
- D5 ¼ NS with 20 mEq KCl/L to run at _____ mL/hr
- Other _____

Supplemental Oxygen:

Oxygen to maintain saturation \geq _____ % via:

- Nasal cannula _____
- High-humidity nasal cannula _____
- High flow high humidity nasal cannula _____ L
- Trach collar _____
- Other: _____

Respiratory Treatments:

- _____
- _____
- _____

Labs:

- CBC with Differential
- CBC (Hemogram)
- CMP
- BMP
- CBG
- VBG
- ESR
- CRP
- UA: Clean catch Bagged Cath HCG Urine culture
- Blood culture
- Stool for: Culture Rotavirus C. diff O&P Gram stain
- Heme
- NP wash for: RSV Influenza Viral culture
- _____
- _____
- _____
- _____
- _____
- _____

Radiology:

- CXR (AP) Reason: _____
- CXR (PA and lateral): Reason: _____
- Abdominal series: Reason: _____
- KUBL: Reason: _____
- Other _____
- Other _____
- Other _____

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex | **2017**
Sample Pediatric Admission Orders

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15 mg/kg/dose) _____ mg PO/GT every 4 hours PRN temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ and/or discomfort (not to exceed 4000 mg a day)
 - Acetaminophen (Tylenol) (20 mg/kg/dose) _____ mg PR every 4 hours PRN temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ and/or discomfort (not to exceed 4000 mg a day)
 - Ibuprofen (Motrin) (10 mg/kg/dose) _____ mg PO/GT every 6 hours PRN temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ and/or discomfort
- Analgesics
 - Acetaminophen with hydrocodone (Hycet/Lortab/Lorcet/Norco) _____ mg/kg PO every 4-6 hours PRN for pain
 - Morphine (0.1-0.2 mg/kg) _____ mg IV every 2-4 hours as needed (max 10 mg/dose)
 - Fentanyl _____ mcg IV every _____ hours as needed.
- Topical Anesthetic to be applied prior to routine blood draws and IV starts
- Other:
 - _____
 - _____
 - _____
 - _____
 - _____
 - _____

Consults:

- _____
- _____
- _____

Additional Orders:

- _____
- _____
- _____
- _____
- _____
- _____

Sample Pediatric Respiratory Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Weight (kg): _____ **Height (cm):** _____

Allergies: _____

Pulse Oximetry:

- Obtain pulse oximetry on admission to unit
- If SpO₂ > 90%, obtain spot check pulse oximetry readings with each treatment, with vital signs or if patient exhibits decline in respiratory status
- If SpO₂ < 90%, provide oxygen and begin continuous pulse oximetry monitoring

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
 - Titrate oxygen to maintain pulse oximetry > 90%
 - Wean oxygen if oxygen saturation maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator settings: _____
- For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*

Peak Expiratory Flow Rate (PEFR)

- Peak Flow will be done on admission for patients > 5 years of age to determine patient’s compliance/ability to effectively perform
- Check Peak Flow before and after breathing treatments.

AVERAGE PREDICTED PEAK EXPIRATORY FLOW RATES FOR NORMAL CHILDREN

Height		PEFR (L/min)	70% PEFR	Height		PEFR (L/min)	70% PEFR	Height		PEFR (L/min)	70% PEFR
In	Cm			In	Cm			In	Cm		
43	109	147	103	52	132	267	187	60	152	373	261
44	112	160	112	53	135	280	196	61	155	387	271
45	114	173	121	54	137	293	205	62	157	400	280
46	117	187	131	55	140	307	215	63	160	413	289
47	119	200	140	56	142	320	224	64	163	427	299
48	122	214	150	57	145	334	234	65	165	440	308
49	124	227	159	58	147	347	243	66	168	454	318
50	127	240	168	59	150	360	252	67	170	467	327
51	130	254	178	Data from Voter. <i>Pediatr Rev</i> 1996; 17(2): 53-63							

Medications:

- Albuterol
 - MDI via spacer device
 - 2 puffs every 3 hours (6-11 months old)
 - 4 puffs every 3 hours (> 12 months old)
 - Nebulizer _____mg every ____ hrs (0.5 mg/kg/hr, max dose 30 mg/hr)
 - Continuous
 - If patient requires treatment prior to two hour interval, administer Albuterol continuous nebulizer for two hours and begin continuous pulse oximetry monitoring
 - Albuterol 0.5mg/kg/hr (max dose 10mg/hr)
- Ipratropium bromide (Atrovent):
 - 0.5 mg to be given with 2nd and 3rd doses of Albuterol
- Corticosteroids:
 - Prednisolone Sodium Phosphate (Orapred): _____mg PO STAT (2 mg/kg loading dose-max 60 mg/dose) then ____mg PO every 12 hours (1 mg/kg maintenance dose-max 30 mg/dose) x 5 days
 - Methylprednisone (Solumedrol): _____mg IV STAT (2 mg/kg loading dose-max 60 mg/dose) then _____mg IV every 6 hours (1 mg/kg maintenance dose-max 30 mg/dose) x 4 doses
- Topical anesthetic for IV start and lab draws:
 - Apply topically once 30-90 minutes prior to painful procedures (maximum 1 gm, 10 centimeter area squared, or application time of 2 hours)
- Antibiotics:
 - _____
 - _____
 - _____
 - _____
- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15 mg/kg/dose) _____mg PO/GT every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000mg/day)
 - Acetaminophen (Tylenol) (20 mg/kg/dose) _____mg PR every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000mg/day)
 - Ibuprofen (Motrin) (10mg/kg/dose) _____mg PO/GT every 6 hours PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort
- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc.
- Asthma Score (see next page)

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex 2017

Sample Pediatric Admission Orders

Asthma Score			
<ul style="list-style-type: none"> • Intended for use with patients > 2 years old who are being treated for asthma or an asthma exacerbation • Not intended for patients who: • Are being treated for bronchiolitis, pneumonia, croup, reactive airway disease • Have chronic lung disease, cystic fibrosis, airway anomalies, cardiac disease, foreign body or neurologic disorders • Calculate the asthma score upon admission, prior to each aerosol treatment, and during the weaning process • Wean if score of 0-1 and/or peak expiratory flow rate (PEFR) greater than 70% predicted → see Asthma Weaning Guidelines on next page. • Treatment should be given for a score of 2 or higher and/or PEFR less than 70% predicted. 			
ASTHMA SCORE	0	1	2
Respiratory Rate (Count for a full minute)	0-12 mos: < 40 1-5 y/o: < 30 6-9 y/o: < 25 10-15 y/o: < 23 >15 y/o: < 20	0-12 mos: 40-50 1-5 y/o: 30-40 6-9 y/o: 25-30 10-15 y/o: 23-27 > 15 y/o: 20-24	0-12 mos: > 50 1-5 y/o: > 40 6-9 y/o: > 30 10-15 y/o: > 27 >15 y/o: > 24
Retractions	None	Suprasternal/Subcostal/ Intercostal	Using neck or abdominal muscles (belly breathing) if atypical for child
Breath Sounds	Normal, equal, Mild expiratory wheeze	Wheeze throughout expiration Localized decreased breath sounds	Wheeze throughout inspiration & expiration Multiple areas with decreased breath sounds
Oxygen Saturation (SpO₂)	≥ to 92%	≥ 90-92%	≤ 90%
<small>Adapted from: Cincinnati Children's Hospital Medical Center Respiratory Assessment/Care Record, 2002; Kelly et al, Improved Outcomes for Hospitalized Asthmatic Children Using a Clinical Pathway, 2000.</small>			

Sample Pediatric Septic Shock Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Weight (kg): _____ **Height(cm):** _____

Allergies: _____

Isolation: _____

Assessment:

- Continuous cardiac monitoring
- Continuous pulse oximetry
- Blood pressure with all vital signs
- Routine I&O
- Strict I&O
- Daily weight
- Seizure precautions
- Neuro checks ever _____ hours
- All non-rectal temperatures > 38°C/100.4°F should be confirmed rectally on infants ≤60 days of age

Tests:

- CBC with differential
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- CMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- BMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- Blood culture (order if not performed prior to admission)
- Viral blood culture
- Catheterized urinalysis (order if not performed prior to admission)
- Catheterized urine culture (order if not performed prior to admission)
- Stool culture
- Stool for Rotavirus
- Stool gram stain
- RSV
- Influenza
- Viral culture
- Chest x-ray (PA and lateral) (order if not performed prior to admission)

For infants ≤ 60 days of age with fever:

- CSF for (laboratory should perform these in ranking order as listed below)

- Cell count
 - Glucose
 - Protein
 - Gram stain
 - Aerobic culture
 - Viral culture
 - Enterovirus PCR
 - Herpes PCR
 - Meningitis antigen profile
- Conjunctiva viral culture
- Viral culture of skin lesion on _____
- Rectal viral culture
- _____
- _____
- _____

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15 mg/kg/dose) _____mg PO/GT every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000 mg/day)
 - Acetaminophen (Tylenol) (20 mg/kg/dose) _____mg PR every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000 mg/day)
 - Ibuprofen (Motrin) (10 mg/kg/dose) _____mg PO/GT every 6 hours PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (for infants > 5 months)
- Antibiotics:
 - Ceftriaxone _____ mg IV every _____ hours (max 4 gm/day)
 - Vancomycin _____mg IV every _____ hours (max 1 gm/dose)
 - _____
 - _____
 - _____
 - For infants ≤ 30 days of age with fever:
 - Ampicillin _____ mg IV every 6 hours (200 mg/kg/day)
 - Cefuroxime _____mg IV every 6 hours (200 mg/kg/day)
 - Cefotaxime _____ mg IV every _____ hours
 - Acyclovir _____mg IV every _____ hours
 - (If greater than or equal to 35 weeks post-conceptual age, give 60 mg/kg/day divided every 8 hours. If less than 35 weeks post conceptual age, give 40 mg/kg/day divided every 12 hours)
 - Gentamycin _____mg IV every _____hours
- Topical anesthetic for IV start and lab draws:
 - Apply topically once 30-90 minutes prior to procedure (maximum 1 gm, 10 centimeter area squared, or application time of 2 hours)

IV Therapy:

- Saline lock
- D5 ½ NS with 20 mEq KCl/L running at _____ mL/hr (ensure patient is voiding)

- _____ running at _____ mL/hr
- _____ running at _____ mL/hr

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
- Titrate oxygen to maintain SpO₂ > 90%
- Wean oxygen if oxygen saturation maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator Settings: _____
 - For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*

- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc.

Sample Pediatric Hypovolemic Shock Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Weight (kg): _____ **Height (cm):** _____

Allergies: _____

Isolation: _____

Assessment:

- Continuous cardiac monitoring
- Continuous pulse oximetry
- Blood pressure with all vital signs
- Routine I&O
- Strict I&O
- Daily weight

Tests:

- CBC with differential
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- CMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours
- BMP
 - now (order if not performed prior to admission)
 - at _____
 - every _____ hours

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15 mg/kg/dose) _____ mg PO/GT every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000 mg/day)
 - Acetaminophen (Tylenol) (20mg/kg/dose) _____ mg PR every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000 mg/day)
 - Ibuprofen (Motrin) (10mg/kg/dose) _____ mg PO/GT every 6 hours PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (for infants > 5 months)
- Antiemetic:
 - _____
 - _____
- Antibiotics:
 - _____
 - _____
 - _____

- Topical anesthetic for IV start and lab draws:
 - Apply topically once 30-90 minutes prior to procedure (maximum 1gm, 10 centimeter area squared, or application time of 2 hours)

IV Therapy:

- _____
- D5 ½ NS with 20 mEq KCl/L running at _____ mL/hr (ensure patient is voiding)
- _____ running at _____ mL/hr
- _____ running at _____ mL/hr

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
- Titrate oxygen to maintain SpO₂ > 90%
- Wean oxygen if oxygen saturation maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator Settings: _____
 - For more information, see: Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition
- See **Sample Pediatric Standard Admission Orders** for additional examples for diet, IV, labs etc

Sample Pediatric Trauma/Blast Injury Admission Orders

Admitting physician: _____

Diagnosis: _____

Condition: Critical Serious Stable

Weight (kg): _____ **Height (cm):** _____

Allergies: _____

Assessment:

- Continuous cardiac monitoring
- Continuous pulse oximetry
- Blood pressure with all vital signs
- Routine I&O
- Strict I&O q 1 hour (maintain urine output at 2-4 mL/kg/hr)
- Daily weight
- Seizure precautions
- Neuro checks ever _____ hours
- Perform CMS checks on extremities every _____ hours to monitor for compartment syndrome/crush syndrome

Tests:

- _____
- _____
- _____

Medications:

- Analgesics/Antipyretics:
 - Acetaminophen (Tylenol) (15 mg/kg/dose) _____ mg PO/GT every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000 mg/day)
 - Acetaminophen (Tylenol) (20 mg/kg/dose) _____ mg PR every 4 hrs PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (max dose 3000 mg/day)
 - Ibuprofen (Motrin) (10 mg/kg/dose) _____ mg PO/GT every 6 hours PRN for temperature $\geq 38.6^{\circ}\text{C}/101.5^{\circ}\text{F}$ or discomfort (for infants > 5 months). Ensure adequate renal function before utilizing.
- Analgesics
 - Acetaminophen with hydrocodone (Hycet/Lortab/Lorcet/Norco) _____ mg/kg PO every 4-6 hours PRN for pain
 - Morphine (0.1-0.2 mg/kg) _____ mg IV every 2-4 hours as needed (max 10 mg/dose)
 - Fentanyl _____ mcg IV every _____ hours as needed.
- Antibiotics:
 - _____
 - _____
 - _____

- Topical anesthetic for IV start and lab draws
 - Apply topically once 30-90 minutes prior to procedure (maximum 1gm, 10 centimeter area squared, or application time of 2 hours)

IV Therapy:

- Saline Lock
- NS bolus _____ mL IV to run over 1 – 2 hours
- LR bolus _____ mL IV to run over 1-2 hours
- D5 ½ NS with 20 mEq KCl/L to run at _____ mL/hr (Ensure adequate renal function before utilizing potassium)
- D5 ¼ NS with 20 mEq KCl/L to run at _____ mL/hr (Ensure adequate renal function before utilizing potassium)
- Other _____

Supplemental Oxygen Orders:

- If SpO₂ < 90% on room air, apply oxygen to maintain SpO₂ 91-94%
 - Nasal Cannula
 - Aerosol Mask
- Titrate oxygen to maintain SpO₂ > 90%
- Wean oxygen if SpO₂ maintains 94%.
 - Decrease oxygen by ½ liter per minute (LPM) and reassess patient 5-10 minutes after change in oxygen
 - Do not decrease oxygen more frequently than every 60 minutes
- Ventilator Settings: _____
 - For more information, see: *Use of Strategic National Stockpile (SNS) Ventilators in the Pediatric Patient: Instructional Guidelines with Training Scenarios, 2nd edition*
- See **Sample Pediatric Standard Admission Orders** for additional orders for diet, IV, labs etc
- If hypovolemic, refer to **Pediatric Shock Care Guidelines: Sample Hypovolemic Shock Admission Orders**

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Pediatric Care Guideline Acronym List

AAP	American Academy of Pediatrics	EMSC	Emergency Medical Services for Children
ABC	Airway, breathing, circulation	ESF-8	Emergency Support Function # 8
ABG	Arterial blood gas	EtCO ₂	End title CO ₂
ABO & Rh	Blood group antigens (ABO) and the Rh antigen	FAST	Focused Abdominal Sonography for Trauma exam
APGAR	Appearance, Pulse, Reflex (Grimace), Activity, Respirations	FDA	Food and Drug Administration
ATLS	Advance Trauma Life Support course	FiO ₂	Fracture of inspired oxygen
BE	Base excess	G6PD	Glucose-6-phosphate dehydrogenase deficiency
BP	Blood pressure	GCS	Glasgow Coma Scale
BPM	Beats per minute	GI	Gastrointestinal
BVM	Bag valve mask	gm	Gram
CBC	Complete blood count	GT	Gastric tube
CDC	Center for Disease Control and Prevention	Gy	Unit of absorbed dose, specific energy (imparted) and of kerma
CK-MB	Creatine kinase MB	H ₂ O`	Water
CMP	Complete metabolic panel	Hgb	Hemoglobin
C-Spine	Cervical spine	HIV	Human Immunodeficiency Virus
CPAP	Continuous Positive Airway Pressure	HOB	Head of bed
cm	centimeter	HR	Heart Rate
CMS	Circulation/color, movement, sensation	hr	Hour
CNS	Central nervous system	I-time	Inspiratory time
CO	Carbon monoxide	I & O	Intake and output
CT	Cat scan	IDPH	Illinois Department of Public Health
CXR	Chest x-ray	IEMA	Illinois Emergency Management Agency
DBP	Diastolic blood pressure	ILI	Influenza like illness
dL	Deciliter	IM	Intramuscular
d/t	Due to	IN	Intranasal
DVT	Deep vein thrombosis	IO	Intraosseous
ECG	Electrocardiogram	IV	Intravenous
ED	Emergency department	IVF	Intravenous fluids

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Pediatric Care Guideline Acronym List

K	Potassium	PASG	Pneumatic antishock garment
k-cal	kilocalorie	PCO ₂	Partial pressure of carbon dioxide in blood
KCl	Potassium Chloride	PEEP	Positive End Expiratory Pressure
KI	Potassium Iodide	PFA	Psychological first aid
kg	Kilogram	pg	page
L	liter	PGCS	Pediatric Glasgow Coma Scale
LOC	Loss of consciousness	PO	By mouth
LPM	Liter per minute	PPE	Personal protective equipment
LR	Lactated Ringers	PPV	Positive Pressure Ventilation
mcg	microgram	PR	Per rectum
MDI	meter dose inhaler	PRN	As needed
mEq	milliequivalent	PT/PTT	Prothrombin time/ Partial Thromboplastic time
mg	Milligram	PTS	Pediatric Trauma Score
min	Minute	PTSD	Post Traumatic Stress Disorder
mL	Milliliter	RAD	Radiation absorbed dose
mmHG	millimeter of mercury	REAC/TS	Radiation Emergency Assistance Center/Training Site
mos	month	RBC	Red blood cells
MRI	Magnetic resonance imaging	RR	Respiration rate
NC	Nasal cannula	RT	Respiratory Therapy
NG	Nasogastric	SBP	Systolic blood pressure
NPO	Nothing by mouth	SCIWORA	Spinal cord injury without radiographic abnormality
NRB	Non-rebreather mask	SGA	Small for gestational age
NRP	Neonatal Resuscitation Provider Course	SNS	Strategic National Stockpile
NS	Normal saline	SpO ₂	Blood oxygen saturation
O ₂	Oxygen	SQ	Subcutaneous
OOB	Out of bed	STABLE	Sugar & Safe Care, Temperature, Airway, Blood Pressure, Lab Work, Emotional Support Course
OR	Operating room	T1-T3	Thoracic spine 1-Thoracic spine 3
PALS	Pediatric Advanced Life Support Course		
PaO ₂	Partial pressure of oxygen in blood		

IDPH ESF-8 Plan: Pediatric and Neonatal Surge Annex **2017**

Pediatric Care Guideline Acronym List

TBI	Traumatic Brain Injury
TBSA	Total body surface area
TID	Three times per day
TM	Tympanic membrane
TSH	Thyroid stimulating hormone
y/o	year old
°C	Degree Celsius
°F	Degree Fahrenheit

Burn Care Guideline:

- American Burn Association (ABA). Burn center referral criteria. Retrieved from <http://www.ameriburn.org/>
- Cuccurullo, S., editor. (2004). Proper positioning of a pediatric burn patient. Physical Medicine and Rehabilitation Board Review. New York: Demos Medical Publishing. Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK27240/table/A12887/?report=objectonly>
- Green, T. E. (2010). Pediatric burns: Initial response, lasting effects. *Nursing2010*, August, 42-49
- Guillamondegui, O.D., Gunter, O.L. Jr, Bonadies, J.A., Coates, J.E., Kurek, S.J., De Moya, M.A., Sing, R.F., Sori, A.J. (2008). Practice management guidelines for stress ulcer prophylaxis. *Eastern Association for the Surgery of Trauma (EAST)*; 24. Retrieved from <http://guideline.gov/content.aspx?id=12635>
- Illinois Department of Public Health (IDPH). (2015). IDPH ESF-8 Plan: Burn Surge Annex
- Illinois EMS for Children (EMSC). (2010). Use of strategic national stockpile (SNS) ventilators in the pediatric patient: Instructional guidelines with training scenarios. 2nd edition
- Illinois EMS for Children (EMSC). (2016). Pediatric prehospital protocols.
- Marx: Rosen's Emergency Medicine, 7th ed. (2010). Local burn wound care.
- Peoples, J. (n.d.). Pediatric burn care. Stanford School of Medicine. Retrieved from http://peds.stanford.edu/Tools/pdfs/pediatric_burn_care_peoples.pdf
- State of Michigan. (2013). Multi-casualty burn incident plan, version 19. Retrieved from <http://michiganburn.org/images/content/MiBurnVer19.pdf>
- State of Michigan: State Burn Coordinating Center. (n.d.). Burn MCI: Guidelines for pediatric burn resuscitation. Retrieved from http://michiganburn.org/images/content/PediatricFluidResuscitation11_01_12.pdf
- State of Michigan: State Burn Coordinating Center. (n.d.). Burn MCI: Fluid resuscitation. Retrieved from http://michiganburn.org/images/content/MCI-Fluid_resus_protocol.pdf
- Wisconsin State Expert Panel on Burn Surge. (2011). Guidelines for the stabilization of burn patients for 72 hours until transfer to a burn center. *Wisconsin Hospital Emergency Preparedness Program*.

Inpatient Treatment and Monitoring Interventions

- Agency for Healthcare Research & Quality (AHRQ).
- American Academy of Pediatrics. (2006). Pediatric education for prehospital professionals (PEPP), 2nd edition. Massachusetts: Jones & Bartlett Publishers.
- American Association of Critical Care Nurses (AACN). (2010). AACN procedure manual for critical care, 6th edition. Neonatal thermoregulation. 1390-1398.
- American Association of Critical Care Nurses (AACN). (2010). AACN procedure manual for critical care, 6th edition. Orogastric/nasogastric tube: Insertion and removal. 1328-1334.
- American Heart Association (AHA). (2011). Pediatric advanced life support.
- Centers for Disease Control and Prevention (CDC). (2000). Grow charts. Retrieved from <http://www.cdc.gov/growthcharts>

- Centers for Disease Control and Prevention (CDC). (2012). Influenza antiviral medications: Summary for clinicians. Retrieved from <http://www.cdc.gov/flu/professionals/antivirals/summary-clinicians.htm>
- Children’s Hospital of Atlanta. (n.d.). Pediatric early warning score card (PEWS). Retrieved from <http://www.choa.org/Menus/Documents/PhysicianPortal/scorecard.pdf>
- Hockenberry, M.J. & Wilson. D. (2008). Wong’s essentials of pediatric nursing, ed. 8. St. Louis, MO: Mosby.
- Illinois EMS for Children (EMSC). (2007). Children with special health care needs.
- Illinois EMS for Children (EMSC). (2015). Creating liquid Tamiflu for children during a pandemic flu.
- Illinois EMS for Children (EMSC). (2013). Pain management in the emergency setting.
- Karlsen, K. (2013). The s.t.a.b.l.e.® program: post-resuscitation/pre-transport stabilization. Care of sick infants guidelines for neonatal healthcare providers. 6th ed. Park City, Utah: The S.T.A.B.L.E.® Program.
- Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski M., Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S876 –S908.
- Merkel, S., et al. (1997). The FLACC: A behavioral scale for scoring postoperative pain in young children. *Pediatric Nurse*, 23(3), 293-297.
- Rockford Health System. (2012). Pediatric unit admission orders. Used with permission

Newborn Care

- American Academy of Pediatrics, Committee on Fetus and Newborn, American College of Obstetricians and Gynecologists and Committee on Obstetric Practice. (2006). The apgar score. *Pediatrics*, 117, 1444-1447.
- American Academy of Pediatrics, Section on Breastfeeding. (2005). Breastfeeding and the use of human milk. *Pediatrics*, 115.
- American Academy of Pediatrics, Section on Breastfeeding. (2012). Breastfeeding and the use of human milk. *Pediatrics*, 129.
- American Academy of Pediatrics, Section on Cardiology and Cardiac Surgery Executive Committee. (2011). Report on the endorsement of health and human services recommendations for pulse oximetry screening for critical congenital heart disease. *Pediatrics*, 129, 190-192.
- American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2011). Policy statement: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128, 1030-1039.
- American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2005). The changing concept of sudden infant death syndrome: Diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics*, 116, 1245-1255.

- American Academy of Pediatrics (2011). Technical Report: SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. *Pediatrics*, 128, e1341
- American Heart Association (AHA). (2011). Pediatric advanced life support.
- Barber, C., Karimi, P., & Anderson, J. M. (2006). Changes in the neonatal resuscitation program. *NeoReviews*, 7(9), e449-e454.
- Bartick, M., Stuebe, A., Shealy, K.R., Walker, M., & Grummer-Strawn, L.M. (2009). Closing the quality gap: Promoting evidenced-based breastfeeding care in the hospital. *Pediatrics*, 124(4), e793-e802. Berryman, R.E., & Glass, S.M. (2005). Routine care. In P.J. Thureen, J. Deacon, J.A. Hernandez, D.M. Hall (Eds.). *Assessment and care of the well newborn* (pp.198-205). St. Louis, MO: Elsevier Saunders.
- Deacon, J. (2005). Discharge assessment. In P.J. Thureen, Author, J.A. Hernandez, D.M. Hall (Eds.). *Assessment and care of the well newborn* (pp.358-367). St. Louis, MO: Elsevier Saunders.
- Deacon, J. (2005). Parental preparation. In P.J. Thureen, Author, J.A. Hernandez, D.M. Hall (Eds.). *Assessment and care of the well newborn* (pp.349-357). St. Louis, MO: Elsevier Saunders.
- Gill, S.L. (2009). Breastfeeding by hispanic women. *JOGNN*, 38, 244-252.
- Glass, S.M. (2005). Feeding the newborn. In P.J. Thureen, J. Deacon, J.A. Hernandez, D.M. Hall (Eds.). *Assessment and care of the well newborn* (pp.175-197). St. Louis, MO: Elsevier Saunders.
- Hall, D.M., Thureen, P. J., Abzug, M.J. (2005). Bacterial infections. In Author, Author, J. Deacon, J.A. Hernandez (Eds.). *Assessment and care of the well newborn* (pp.295-315). St. Louis, MO: Elsevier Saunders.
- Haninger, N.C., & Farley, C.L. (2001). Screening for hypoglycemia in healthy term neonates: Effects on breastfeeding. *The American College of Nurse-Midwives*, 46(5), 292-301.
- Hernandez, J.A., Fashaw, L., & Evans, R. (2005). Adaptation to extrauterine life and management during normal and abnormal transition. In P.J. Thureen, J. Deacon, Author, D.M. Hall (Eds.). *Assessment and care of the well newborn* (pp.83-109), St. Louis, MO: Elsevier Saunders.
- Karlsen, K. (2013). The s.t.a.b.l.e.® program: post-resuscitation/pre-transport stabilization. *Care of sick infants guidelines for neonatal healthcare providers*. 6th ed. Park City, Utah: The S.T.A.B.L.E.® Program.
- Morrison, G., Ludington-Hoe, S. & Cranston Anderson, G. (2006). Interruptions to breastfeeding dyads on postpartum day 1 in a university hospital. *JOGNN*, 25, 709-716.
- Shaefer, S.J., Herman, S.E., Frank, S.J., Adkins, M., & Terhaar, M. (2010). Translating infant safe sleep evidence into nursing practice. *Association of Women's Health, Obstetric and Neonatal Nurses*, 39, 618-626.

Pandemic

- Centers for Disease Control and Prevention (CDC). (2007). Hospital pandemic influenza planning checklist. Retrieved from <http://www.flu.gov/planning-preparedness/hospital/hospitalchecklist.pdf>
- Illinois EMS for Children (EMSC). (2010). *Children and Facemask....To Mask or Not to Mask*.
- Illinois EMS for Children (EMSC). (2013). *Resource Allocation Strategies for the Pediatric Population draft document*

- Los Angeles County Department of Health Services. (2006). Hospital pandemic influenza guidelines: Acute care hospital settings.
- U.S. Department of Health and Human Services. (2005). HHS pandemic influenza plan: Supplement 3-healthcare planning. Retrieved from <http://www.hhs.gov/pandemicflu/plan/pdf/S03.pdf>

Premature Newborn

- Consultation of this document provided by personal communication with Dr. Frank Hernandez, Neonatologist, Rockford Memorial Hospital, Rockford, IL
- Gardner, S.L., Carter, B.S., Enzman-Hines, M., & Hernandez, J.A. (2011). *Merenstein & gardner's handbook of neonatal intensive care*. 7th ed. St. Louis, MO: Mosby/Elsevier.
- Hansmann, G. (2009). *Neonatal Emergencies*. Cambridge, New York: Cambridge University Press.
- Hypothermia Task Force. Led by Dr Patricia Ittmann, Neonatologist. Rockford Memorial Hospital. Rockford, IL
- Karlsen, K. (2013). *The s.t.a.b.l.e.® program: post-resuscitation/pre-transport stabilization. Care of sick infants guidelines for neonatal healthcare providers*. 6th ed. Park City, Utah: The S.T.A.B.L.E.® Program.
- Kattwinkel, J. (2011). Use of Resuscitation Devices for positive-Pressure Ventilation. In: Kattwinkel, J., McGowen, J.E., Zaichkin, J., (Eds.). *Textbook of neonatal resuscitation*. 6th ed. Elk Grove Village: American Academy of Pediatrics, 71-132.
- Kattwinkel, J. (2011). Endotracheal Intubation and Laryngeal Mask Airway Insertion. In: Kattwinkel, J., McGowen, J.E., Zaichkin, J., (Eds.). *Textbook of neonatal resuscitation*. 6th ed. Elk Grove Village: American Academy of Pediatrics, 159-210.
- Kattwinkel, J. (2011). Resuscitation of Babies Born Preterm. In: Kattwinkel, J., McGowen, J.E., Zaichkin, J., (Eds.). *Textbook of neonatal resuscitation*. 6th ed. Elk Grove Village: American Academy of Pediatrics, 268-282.
- NICU Clinical Nurse Specialist. (2011). *NICU: oxygen saturation parameters for infants with birth weight equal to or less than 1250 grams (AKA: owl protocol)*. (Policy # 118). Policy Manual: Rockford Memorial Hospital.
- Vermont Oxford Network. (2009). *Vermont oxford network database manual of operations for infants born in 2010*. Retrieved from <http://www.vtoxford.org/tools/ManualofOperationsPart2.pdf>.

Radiation

- American Academy of Pediatrics. (2003). Policy statement: Radiation disasters and children. *Pediatrics*, 111, 1455.
- American Medical Association. (2005). Section 8: Radiation Emergencies. Retrieved from http://www.ama-assn.org/resources/doc/cphpdr/08_radiation.pdf
- Centers for Disease Control and Prevention (CDC). (2005). Acute radiation syndrome: A fact sheet for physicians. Retrieved from <http://www.bt.cdc.gov/radiation/arsphysicianfactsheet.asp>
- Homeland Security Council Interagency Policy Coordination Subcommittee for Preparedness & Response to Radiological and Nuclear Threats. (2009). Planning guidance for response to a nuclear detonation. First edition.

- Murray, J. S. (2011). Caring for children following radiation disaster. *Journal for Specialists in Pediatric Nursing*, 16, 313-319.
- The Radiation Emergency Assistance Center/Training Site (REAC/TS). (2011). The medical aspects of radiation incidents. Retrieved from www.orise.orau.gov/reacts
- U.S. Department of Health and Human Services. (2011). Patient management algorithms. Radiation Emergency Medical Management (REMM). Retrieved from <http://www.remm.nlm.gov/>
- U.S. Department of Health and Human Services (2013). Potassium iodide. Radiation Emergency Medical Management (REMM). Retrieved from <http://www.remm.nlm.gov/potassiumiodide.htm>
- U.S. Department of Health and Human Services. (2005). Field administration of radiation exposure antidotes & field administration of acute radiation syndrome treatments: Pediatric dosing guidelines. Retrieved from <http://www.phe.gov/Preparedness/responders/ndms/teams/Documents/rad.pdf>

Respiratory

- American Association of Critical Care Nurses (AACN). (2010). AACN procedure manual for critical care, 6th edition. Aerosolized medication: Nebulized medication. 1165-1169.
- American Heart Association (AHA). (2011). Pediatric advanced life support
- Children's Hospital of Illinois. (2009). Pediatric Asthma/reactive airway disease admission preprinted orders. Used with permission.
- Cincinnati Children's Hospital Medical Center. (2002). Asthma score/respiratory assessment/care record.
- Kelly, C. S., Andersen, C. L., Pestian, J. P., Wenger, A. D., Finch, A. B., Strobe, G. L., & Luckstead, D. F. (2000). Improved outcomes for hospitalized asthmatic children using a clinical pathway. *Annals of Allergy, Asthma & Immunology*, 84(5), 509-516.
- Illinois EMS for Children (EMSC). (2010). Use of strategic national stockpile (SNS) ventilators in the pediatric patient: Instructional guidelines with training scenarios. 2nd edition
- Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski M., Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S876 –S908.
- Rockford Health System. (2012). Pediatric unit reactive airway protocol orders. Used with permission.
- Voter, K. Z., McBride, J. T. (1996). Diagnostic tests of lung function. *Pediatrics in Review*, 17(2): 53-63.

Shock Care Guideline

- American Association of Critical Care Nurses (AACN). (2010). AACN procedure manual for critical care, 6th edition. Fluid calculations: Hydration and rehydration. 1013-1017.
- American Heart Association (AHA). (2011). Pediatric advanced life support

- Illinois EMS for Children (EMSC). (2010). Use of strategic national stockpile (SNS) ventilators in the pediatric patient: Instructional guidelines with training scenarios. 2nd edition
- Kliegman, R.M., Bonita, S. F., St. Geme, J. W., Schor, N. F., & Behrman, R. E. (2011). Nelson textbook of pediatrics, 19th ed. Chapter 64: Shock.
- Kliegman, R.M., Bonita, S. F., St. Geme, J. W., Schor, N. F., & Behrman, R. E. (2011). Nelson textbook of pediatrics, 19th ed. Table 64.8: Goal directed therapy of organ system dysfunction in shock.
- Kleinman ME, Chameides L, Schexnayder SM, Samson RA, Hazinski M., Atkins DL, Berg MD, de Caen AR, Fink EL, Freid EB, Hickey RW, Marino BS, Nadkarni VM, Proctor LT, Qureshi FA, Sartorelli K, Topjian A, van der Jagt EW, Zaritsky AL. Part 14: pediatric advanced life support: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2010;122(suppl 3):S876 –S908.
- Rockford Health System. (2011). Pediatrics-infants 60 days or less with fever. Used with permission.

Trauma & Blast Injury Care Guideline

- American Academy of Pediatrics. (2016). Pediatric education for prehospital professionals (PEPP), 2nd edition. Massachusetts: Jones & Bartlett Publishers.
- American College of Surgeons. (2008). Advanced trauma life support for doctors (ATLS). 8th edition.
- Centers for Disease Control and Prevention (CDC). (2012). Blast injuries: Fact sheets for professionals. Retrieved from http://emergency.cdc.gov/masscasualties/pdf/blast_fact_sheet_professionals-a.pdf
- Illinois Department of Public Health (IDPH). (2001). Section 515.2030: Level I Trauma Center Designation Criteria. Joint Committee on Administrative Rules: Administrative Code.
- Illinois EMS for Children (EMSC). (2010). Use of strategic national stockpile (SNS) ventilators in the pediatric patient: Instructional guidelines with training scenarios. 2nd edition.