

PATIENT TRANSFER AND TRANSPORTATION

Purpose

- To provide guidance regarding the movement of injured patients from non-trauma facilities to trauma facilities, from one level of trauma facility to a different level of trauma facility, and to review the availability of transportation for those purposes

Related Policies

- Interfacility Transfer, GPC 5
- EMS Aircraft, 5100
- Trauma Re-Triage, Adult, 4606A
- Trauma Re-Triage, Pediatric, 4604B

Definitions

- *Non-trauma facilities* are acute care facilities not holding a trauma center designation
- *Trauma facilities* are acute care facilities holding a trauma center designation of Level I, Level II, Level III, or EDAT

General Policy

1. All acute care facilities in Marin County, as part of an inclusive trauma system, will provide care to injured patients and participate in the Trauma System Plan
2. Prehospital care personnel will evaluate trauma patients on initial contact and determine the appropriate destination based on the apparent severity of the injury, the location of the patient, the time to transport to definitive care and the availability of transport resources related to the location of the appropriate facility
3. Patient transfer may be accomplished in one of the following ways:
 - Transfer from a non-trauma facility to a trauma facility. To facilitate this type of patient transfer, a rapid re-triage for adults and pediatric patients may be used (see 4604A and B)
 - Transfer from a trauma facility to a trauma facility which a higher level of designation. 4606A and B may be used to identify the types of patients which may benefit from the transfer
 - Transfer after stabilization and initial care (per EMTALA regulations) to a like facility of the patient's choosing
 - Transfer after definitive care (per EMTALA regulations) to a non-trauma facility for on-going care. The transfer of patients from one facility to another must be based upon medical treatment decisions and not in whole or in part on the patient's financial or social status or their ability to pay for care or services. Decisions to transfer the patient at their request or the request of their insurer must, at all times, be made in the manner consistent with good medical practice
4. As the lead agency, the Marin County EMS Agency will initiate and maintain contracts with Level I, Level II, and specialty care facilities on behalf of the Marin County Trauma System Plan
 - All contracts arranging for care of patients injured in Marin County will include provisions for the establishment of transfer guidelines indicating the type of patients or injuries anticipated to be transferred under the terms of the agreement

- Marin County facilities are required to have transfer agreements and to specify the type of patient or injury to be transferred under the terms of the agreement
 - Additional transfer agreements must include provisions assuring that required trauma data is provided to the transferring facility to complete data collection and quality improvement processes
5. In all instances of patient transfer, it is the responsibility of the transferring facility to assure the following:
- That the transfers occur in accordance with all state and federal laws and regulations
 - That all pertinent patient records are transferred with the patient
 - That the receiving facility and receiving physician have accepted the patient
 - That the method of transfer is appropriate to the needs of the patient at the time that the transfer occurs
 - Arranging appropriate transportation for the patient
6. If expected patient care is within Paramedic Scope of Practice and timely transfer is needed, contact 9-1-1 to request *Emergency Interfacility Transfer*. If expected patient care exceeds Paramedic Scope of Practice, contact appropriate transport agencies (CCT Transport) or arrange for nursing staff and/or MD to accompany paramedic or EMT during transport to the receiving facility
- Patients being transferred should receive during the transport a level of care and attention equivalent to the level of care necessary before and following the transfer
 - Level of care refers to the type of equipment and supplies needed and to the level of expertise of caregivers

TRAUMA TRIAGE AND DESTINATION

Purpose

- To provide additional explanation and guidance for the Marin County Trauma Triage Criteria Tool to help identify trauma patients in the field and based upon their injuries, direct their transport to an appropriate level of trauma care facility

Related Policies

- Service Area for Hospitals #4603
- Trauma Re-triage, Adult and Pediatric #4606A/B
- EMS Aircraft #5100
- Ambulance Diversion policy #5400
- Determination of Death, ATG 6
- Destination Guidelines, GPC 4
- Multi-Casualty Incident, GPC 12

Definitions

- **Designated Trauma Center** refers to an acute care facility holding designation as a Level I, Level II, Level III, or EDAT (Emergency Department Approved for Trauma). In Marin County, MarinHealth Medical Center is the designated Level III Trauma Center and Kaiser Permanente San Rafael Medical Center is the designated EDAT.
- **Provide Trauma Notification** means that field personnel will advise the trauma center as soon as possible of their impending arrival by providing a Trauma Notification (see Trauma Triage Tool)
- **Time closest facility** is that facility which can be reached in the shortest amount of time

General Policy

1. It is the overall goal of the Marin County Trauma system to provide treatment of injured patients at Marin County hospitals
2. Whenever physician consultation is indicated within this policy, contact shall be made with MarinHealth Medical Center Level III Trauma Center
3. The following policy statements pertain to use of the Trauma Triage Tool (see 4613a)
 - Patients shall be determined to meet criteria for transport to a designated trauma center if they meet the criteria listed in the Trauma Triage Tool
 - Physician consultation is REQUIRED in the following circumstances:
 - I. The paramedic is unable to transport the patient to the indicated facility in an expedient manner
 - II. The paramedic assesses the patient and scene conditions and believes transport to a different level of care is indicated
 - III. Patient requests a facility not indicated by the Trauma Triage Criteria Tool
 - Physician consultation is RECOMMENDED whenever assistance in resolving treatment decisions or transport destinations is desired
 - Unmanageable airway: Patients with airway compromise unmanageable by BLS or ALS adjuncts will be transported to the closest receiving facility

- Traumatic Arrest: Determination of death can be made prior to, or immediately after, initiating resuscitation if:
 - I. In an MCI incident where START triage principles preclude initiation of CPR
 - Or if ALL of the following are present
 - II. A patient has sustained blunt, penetrating or profound multi-system trauma, or significant blood loss
 - III. Pulseless and/or apnea
 - IV. Absence of potentially reversible cause of arrest
- 4. Destination for adult patients who meet Physiologic or Anatomic Criteria:
 - Transport to time closest trauma center
 - If the estimated ground transport time to the closest trauma center exceeds 30 minutes, consider use of air ambulance
 - I. Estimated ground transport time is evaluated from the time the patient is packaged and ready for transport. Consider traffic conditions, weather, and other relevant factors.
 - II. Estimated air transport time includes: minutes until arrival (if helicopter is not already on the ground); scene and load time of flight crew (typically 10 minutes); flight time to trauma center; and off-load time (typically 7-10 minutes). If helicopter is on the ground at the time the patient is ready for transport, then air transport time is evaluated as time to load, flight time to trauma center and time to off-load to the ED.
- 5. For adult patients meeting mechanism of injury or additional factors criteria, transport to MarinHeath Medical Center
- 6. Destination for pediatric patients who meet physiologic or anatomic criteria:
 - Transport directly to Children's Hospital Oakland (see Trauma Triage Tool)
 - If ETA (transport time) is anticipated to be >30 minutes, physician consultation should be obtained with the Level III trauma center to determine destination
- 7. Incidents involving **three or more patients meeting Physiologic or Anatomic Criteria** will be handled in the following manner:
 - Use of air ambulance should be considered
 - Prehospital providers shall consult with the Level III trauma center regarding destinations
 - Patients that the Level III trauma center cannot accept should be transported to an out-of-county Level I or II trauma center in the most appropriate and expedient manner
 - If an incident is a Multi-Casualty Incident (MCI), prehospital providers will utilize the Multiple Patient Management Plan for destination guidelines. The term "Immediate Trauma Patient" will be used to describe an MCI patient that may need the services of a trauma center. The coordinating hospital should consider the capacity at the local and regional trauma centers when making destination decisions.
- 8. The EDAT will be used for patients meeting mechanism of injury or additional factors trauma criteria that the Level III trauma center is unable to accept.

EMS AIRCRAFT

Purpose

- To provide policy for integrating dispatch and utilization of aircraft into the Marin County EMS system as a specialized resource for prehospital response, transport, and care of patients. Aircraft utilization provides a valuable adjunct to the Marin County EMS System by minimizing the time to definitive care in prescribed circumstances.

Related Policies

- Emergency Medical Dispatch Policy, 4200
- Prehospital/Hospital Contact Policy, 7001
- Trauma Triage and Destination Guideline Policy, 4613

Authority

- California Administrative Code, Title 22, Divisions 2.5 and 9

Applicability

All aircraft providing prehospital patient transport within the Marin County EMS System must be authorized by the EMS agency in their county of origin, or by the EMS Authority, or by a United States Government agency

Policy

1. The patient's condition, available ground resources, incident location in relation to receiving facility and call circumstances will be evaluated by caregivers in the field to determine if air transport is appropriate.
2. The type of aircraft to be requested will be determined by the Incident Commander and/or the County Communications Center based on provider availability, response time criteria and nature of the service needed. See Appendix A.

Procedure for Aircraft Dispatch

1. Aircraft will be dispatched simultaneously with ground units for specific circumstances as follows:
 - Area of the call is inaccessible to ground unit(s) or ground access is compromised;
 - Air assistance may be needed with rescue activities; or
 - Ground transport time to the hospital is > 30 minutes and the applicable Emergency Medical Dispatch Protocol (policy #4200, Appendix A) recommends simultaneous dispatch
 - Reported traumatic injury and Level III Trauma Center is on trauma diversion.
2. Aircraft Dispatch may also occur in the following manner:
 - Upon request of the responding unit while en route to the scene.
 - Upon request of on-scene personnel following patient assessment

Procedure for Aircraft Use

1. Consider use of an EMS aircraft where:
 - A patient meets Trauma Triage Tool anatomic or physiologic criteria and the time closest facility is a Level II Trauma Center
 - Ground transport time is greater than 30 minutes
2. Procedural Considerations
 - EMS aircraft should not transport patients in cardiac arrest. Aircraft crew shall have discretion to transport patients receiving CPR in certain situations (refractory VF, unsafe scene conditions, hypothermia, etc)
 - Marin County Communications Center will notify law enforcement and fire agencies with jurisdiction over the landing zone
3. Medical Control
 - Treatment decisions will be made according to medical control policies and procedures governing the provider agency having responsibility for care

General and Related Procedures

1. Marin County personnel may accompany a patient in an EMS aircraft during transport if all the following conditions are met:
 - Personnel have been providing care for the patient prior to arrival of the aircraft
 - EMS aircraft crew will complete a PCR as required by policy/procedure within their county of origin and forward a copy to Marin County EMS Agency
2. Patient care reports will be kept as follows:
 - Marin County personnel will complete a Marin County PCR as per policy/procedure, and when known, forward it to the receiving hospital
 - EMS aircraft crew will complete a PCR as required by policy/procedure within their county of origin, and forward a copy to Marin County EMS Agency
3. The following times, when available, will be relayed to and reordered by Marin County Communications Center:
 - ETA at time of original dispatch request
 - When airborne, en route to scene
 - Arrival at scene
 - Destination hospital
 - Arrival at receiving hospital
4. As part of the Quality Improvement Program, the EMS Agency will review all aircraft dispatches
5. Aircraft may be utilized by acute care hospitals for interfacility transfers
 1. Hospitals will contact EMS aircraft providers directly
 2. The hospital requesting an EMS aircraft will notify the Marin County Communications Center of aircraft activity so fire and law enforcement agencies can be notified of the probably aircraft landing site
 3. Hospitals shall notify the Marin County EMS Agency of interfacility transfers by EMS aircraft on an annual basis

APPENDIX A

Provider List and Classification Definitions

Provider Name	Classification	Function	Staffing	Location
Stanford University Hospital Helicopter (LIFEFLIGHT)	Air Ambulance	Medical	Pilot Flight Nurses (2)	Palo Alto
California Shock/Trauma Air Rescue (CALSTAR)	Air Ambulance	Medical	Pilot Critical Care Nurses (2)	Concord
Redwood Empire Air Care Helicopter (REACH)	Air Ambulance	Medical	Pilot Critical Care Nurse Paramedic	Santa Rosa Concord
Sonoma County Sheriff's Department Helicopter (Henry 1)	ALS Rescue	Law Long-line Rescue Medical	Pilot Paramedic EMT	Santa Rosa
California Highway Patrol Helicopter (H-30)	ALS Rescue	Law Medical	Pilot Paramedic	Napa
U.S. Coast Guard Helicopter	Auxiliary	Long-line Rescue Water Rescue	Pilot (2) EMT Rescue Swimmer	San Francisco Airport

Classification Definitions

1. "Air Ambulance" means any aircraft specifically constructed, modified, or equipped and used for the primary purpose of responding to emergency calls and transporting critically ill or injured patients whose medical flight crew has at a minimum two attendants certified or licensed in advanced life support
2. "Rescue Craft" means an aircraft whose usual function is not prehospital emergency medical transport but which may be utilized for prehospital emergency patient transport when use of an air or ground ambulance is inappropriate or unavailable
3. "ALS Rescue Aircraft" means a rescue aircraft that is equipped to provide ALS service, staffed with a minimum of one ALS medical flight crew member
4. "Air Rescue Service" means an air service used for emergencies including search and rescue
5. "BLS Rescue Service" means a rescue aircraft whose medical crew has, at a minimum, on attendant certifies as an EMT-1
6. "Auxiliary Aircraft" is a rescue aircraft which does not have a medical flight crew or whose flight crew does not meet the minimum requirements of a BLS Rescue Aircraft

AMBULANCE DIVERSION POLICY

Purpose

- To define the circumstances under which ambulance traffic may be diverted from the intended receiving facility

Related Policies

- Trauma Triage and Destination Guideline Policy, 4613
- Destination Guidelines, GPC 4

Authority

"In the absence of decisive factors to the contrary, ambulance drivers shall transport emergency patients to the most accessible emergency medical facility equipped, staffed, and prepared to administer care appropriate to the needs of the patient." *California Administrative Code, Title 13, Section 1105 (c)*

Definitions

1. **Full diversion** means a rerouting of all ambulance traffic
2. Condition specific diversion may occur when a normally available service, procedure or piece of equipment is temporarily unavailable and results in the rerouting of specific patients, dependent on the reason for diversion. Condition specific diversion may include the following:
 - CT Scanner inoperable
 - Neurosurgeon not available
 - Trauma Center diversion
 - Emergency Department saturation
 - Cath Lab diversion

Policy

1. Each receiving hospital shall establish an internal hospital plan, approved by and on file with the EMS Agency. The plan shall include but not limited to the following:
 - Definitions and standards for activation which are consistent with this policy/procedure
 - Identification of the internal approval process, including persons or positions that must be involved in the decision-making process
 - Mechanisms for notification, on-going monitoring, removal from diversion status; identification and activation of back-up ED and ICU physical space per state licensing guidelines; call-in mechanism for additional staff; identification of patients who can be safely transferred within the facility; internal review of the diversion and reporting to the EMS Agency
2. Full diversion may occur only if the receiving emergency department is incapacitated by a physical plant breakdown (i.e., fire, bomb threat, power outage, etc.) which renders patient care unsafe. In the event of a full diversion, **all patients will be rerouted to other facilities** as appropriate

3. The need to institute a Conditions Specific Diversion is determined per each facility's plan, consistent with the following:
 - A. The following patients may not be rerouted:
 - Obstetrical patients in active labor
 - Patients with respiratory distress and unmanageable airway
 - Patients with uncontrolled external hemorrhage
 - Patients requiring ALS, but having no paramedic in attendance
 - Patients with CPR in progress (unless transporting to the nearest STEMI Receiving Center for patients in refractory VF)
 - Stable patients who insist on transport to a specific hospital. Ambulance personnel will inform the patient of the diversion status and document that the patient refused transport to an alternate facility
 - B. CT Scanner Inoperable:
 - Patients who meet Physiologic and/or Anatomic Trauma Triage Criteria with signs and symptoms of head, neck or spinal cord injury will be transported to Level II Trauma Center; if conditions preclude air transport consult with MarinHealth Medical Center Level III Trauma Center
 - Patients who meet Mechanism of Injury and/or Additional Factors will be transported to Kaiser Permanente San Rafael EDAT
 - Patients with the following get transported to the closest facility with functioning CT scanner:
 - Signs or symptoms of a new CVA
 - Head injury patients not meeting trauma criteria with anticoagulant use and/or bleeding disorders
 - C. Neurosurgeon Not Available:
 - Patients with signs and symptoms of head, neck or spinal cord trauma: transport to Level II Trauma Center; if conditions preclude air transport, consult with MarinHealth Medical Center Level III Trauma Center
 - Patients with signs and symptoms of CVA and/or medical conditions that may require neurosurgical intervention: transport to the closest appropriate facility in Marin County with a functioning CT scanner for initial evaluation and stabilization. Transfer, if indicated, is the responsibility of the hospital, including the maintenance of formal transfer agreements with other facilities
 - D. Trauma Center Diversion:
 - Trauma patients will be diverted from the trauma center when the trauma surgeon and back-up trauma surgeon are encumbered with the care of trauma patients either in the operating room or emergency department
 - Patients who meet Physiologic and/or Anatomic Trauma Triage Criteria shall be transported to the time-closest Level I or Level II Trauma Center by air or ground
 - Patients who meet Mechanism of Injury and/or Additional Factors Trauma Triage Criteria shall be transported to the EDAT

- The following conditions DO NOT constitute acceptable grounds for Trauma Center Diversion:
 - A lack of clinical specialty back-up, inpatient bed space, monitored beds, or inpatient nursing staff
 - ED Saturation Diversion
 - Inoperable CT Scanner (see section 3B)

E. ED Saturation Diversion:

- Ambulance traffic may be diverted due to emergency department saturation when emergency department resources are fully committed and unable to accept incoming ambulance traffic
- Trauma, STEMI, suspected CVA, and OB patients >20 weeks (with a pregnancy related complaint) or OB patients 0-6 weeks postpartum will NOT be rerouted
- Under this policy, ED Saturation Diversion can occur up to four hours a day, two hours maximum at a time, and separated by a minimum of four hours
- At the beginning and end of any diversion period, a hospital must update ReddiNet
- Under no circumstance is lack of in-patient hospital beds, other than in the Emergency Department grounds for diversion. Hospitals are expected to accept ALL ambulance patients and to provide emergency stabilization and appropriate transfer if necessary
- In all cases of diversion, senior management or designee must be notified and must approve activation of the diversion status

F. Cath Lab Diversion

- STEMI ambulance traffic will be diverted when a STEMI Receiving Center Cath Lab is unavailable because of physical plant or mechanical problems
- Cath Lab diversion will not be declared when the Cath Lab is encumbered by routine medical care

4. If more than two receiving hospitals within Marin County meet their internal plan criteria and wish to activate diversion status at the same time, diversion status for all will be discontinued upon direction of the EMS Agency

5. Initiating and termination diversion status

A. Initiating diversion

- The facility shall implement the internal surge plan prior to initiating diversion status. The request to initiate status must be approved by senior management
- The facility shall update ReddiNet immediately to indicate their status as being on diversion
- Dispatch centers (public and private) shall monitor ReddiNet to inform providers of the hospital diversion status

B. Termination of diversion

- Diversion status will be terminated as soon as possible or within two hours of initiation, whichever comes first
- Diversion status is terminated when the hospital updates their status in ReddiNet to indicate that they are no longer on diversion or two hours from initiation has passed

- Dispatch centers (public and private shall monitor ReddiNet to inform providers of the hospital diversion status
- C. The Communications Center shall notify the EMS Agency of changes in diversion status
- D. EMS Agency staff is available to assist with solving system-related problems and can be reached by contacting the Communications Center
- E. The EMS Agency will track the frequency and duration of diversion, making periodic reports to system participants
- F. Any problems associated with patient care, such as delays in transfer of care or patient safety, shall be submitted to the EMS Agency by either prehospital service provider or receiving facility, as applicable, per the Event Reporting Policy #2010

ADULT MEDICATION STANDARD DOSAGES

DRUG	CONCENTRATION	STANDARD DOSE
Acetaminophen (Tylenol/Ofirmev)	1000mg/100ml	IV/IO 1000mg over 15-20 min
Adenosine	6mg/2ml	IV/IO 6mg rapid push followed by 20ml NS flush <i>Repeat:</i> 12mg
Albuterol	2.5mg/3ml NS	Nebulized 5mg/6ml NS
Amiodarone	150mg/3ml	IV/IO VF/Pulseless VTach: 300mg push <i>Repeat:</i> 150mg push in 3-5min Perfusing/Recurrent VTach: 150mg over 10 min (15mg/min) <i>Repeat:</i> q10 min PRN
Aspirin (Chewable)	Variable	PO 324mg
Atropine	1mg/10ml	IV/IO Bradycardia: 1mg <i>Repeat:</i> q3-5 min <i>Max total:</i> 3mg Organophosphate Poisoning: 2mg slowly <i>Repeat:</i> q2-5 min until drying of secretions
Calcium chloride 10%	1gm/10ml	IV/IO Suspected Hyperkalemia in: Asystole/PEA: 1gm Crush Syndrome: 1gm over 5 min Flush with NS before and after
Cyanokit	5gm/vial	IV/IO 5 grams over 15min <i>Repeat:</i> x1 if severe signs <i>Max total dose:</i> 10 grams

DRUG	CONCENTRATION	STANDARD DOSE
Dextrose 10%	25gm/250ml	IV/IO 125ml bolus over 10 min; recheck BG <i>Repeat:</i> as needed
Diphenhydramine (Benadryl)	50mg/ml	IV/IO/IM 50mg
Epinephrine	1mg/ml EpiPen ® 0.3mg	IM Allergic reaction/Anaphylaxis: 0.3mg or EpiPen ® <i>Repeat:</i> x1 in 5 min
Epinephrine	0.1mg/ml	IV/IO 1mg (10ml) followed by 20ml NS flush <i>Repeat:</i> q3-5min
Epinephrine (Push-Dose)	0.1mg/ml	IV/IO ☎ SBP <80: Mix 1ml Epinephrine (0.1mg/ml) with 9ml NS in a 10ml syringe <i>Initial:</i> 1ml <i>Repeat:</i> q3-5 min, titrate to maintain SBP >80
Fentanyl (Sublimaze)	100mcg/2ml	IV/IO 50mcg slowly <i>Repeat:</i> q5 min <i>Max dose:</i> 200mcg IM 50mcg <i>Repeat:</i> in 30 min IN 50mcg; administer 1/2 dose in each nostril <i>Repeat:</i> q5 min <i>Max dose:</i> 200mcg

ADULT MEDICATION STANDARD DOSAGES

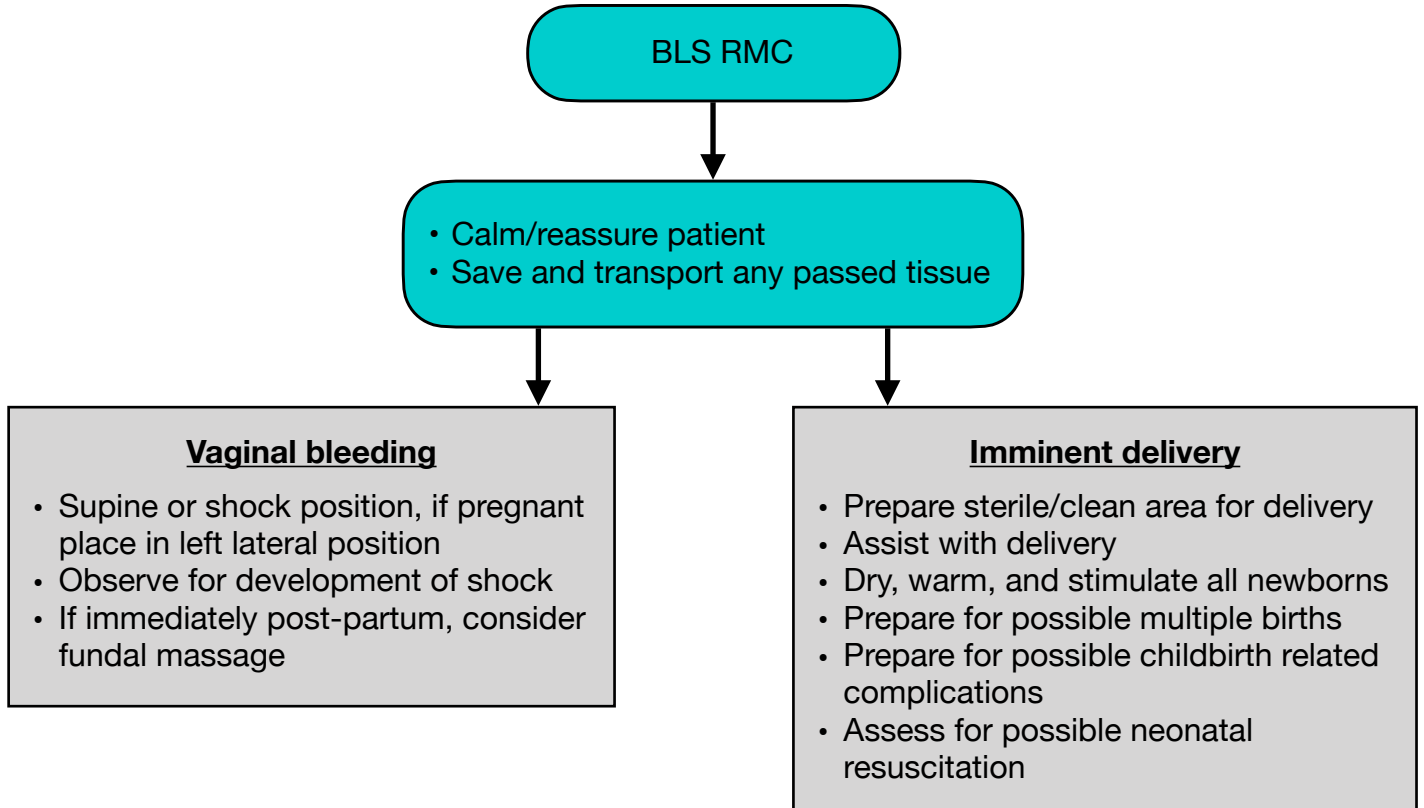
DRUG	CONCENTRATION	STANDARD DOSE
Glucose Paste	15 grams/tube	PO 30 grams
Glucagon	1mg/ml	IM 1mg
Ipratropium (Atrovent)	500mcg/2.5ml Unit dose	Nebulized 500mcg
Lidocaine 2%	20mg/ml	IO 20-40mg over 30-60 seconds <i>Repeat:</i> q15 min
Midazolam (Versed)	2mg/2ml (IV/IO/IM) 5mg/1ml (IN)	IV/IO Cardioversion/Pacing/Seizure (after EMS arrival): 1-2mg slowly <i>Repeat:</i> q3 min Sedation: See specific policy IM Seizure (after EMS arrival): 5mg <i>Repeat:</i> x1 in 2 min if still seizing Cardioversion/Pacing: 2-4mg Sedation: See specific policy IN Cardioversion/Pacing/Seizure (after EMS arrival): 5mg (2.5mg in each nostril) Sedation: See specific policy
Morphine Sulfate	10mg/1ml	IV/IO 5mg slowly <i>Repeat:</i> q5 min if SBP >100 <i>Max dose:</i> 20mg IM 5-10mg <i>Repeat:</i> q20 min <i>Max dose:</i> 20mg

DRUG	CONCENTRATION	STANDARD DOSE
Naloxone (Narcan)	2mg/2ml	IV/IO, IM 0.4-4mg <i>Repeat:</i> q2-3 min until patient responds IN 2mg (1mg in each nostril) <i>Repeat:</i> q2-3 min until patient responds
Nerve Gas Auto-Injector (Atropine, Pralidoxime Chloride [2-PAM])	2mg (0.7ml) 600mg (2ml)	IM Small Exposure to Vapors/Liquids: 1 dose of both medications <i>Repeat:</i> x1 in 10 minutes Larger Exposure to Vapors/Liquids: 3 doses initially of both medications
Nitroglycerine	0.4mg/tablet or spray	SL 1 tablet or spray <i>Repeat:</i> q5 min if SBP >100
Ondansetron (Zofran)	4mg	IV/IO 4mg slowly over 30 seconds <i>Repeat:</i> x1 in 10 min ODT/IM 4mg <i>Repeat:</i> x1 in 10 min
Sodium Bicarbonate	50mEq/50ml	IV/IO 50mEq

OBSTETRICAL EMERGENCIES

Indications

- Patient reports or demonstrates vaginal bleeding and/or imminent delivery (need to bear down, pushing, have urge for bowel movement)



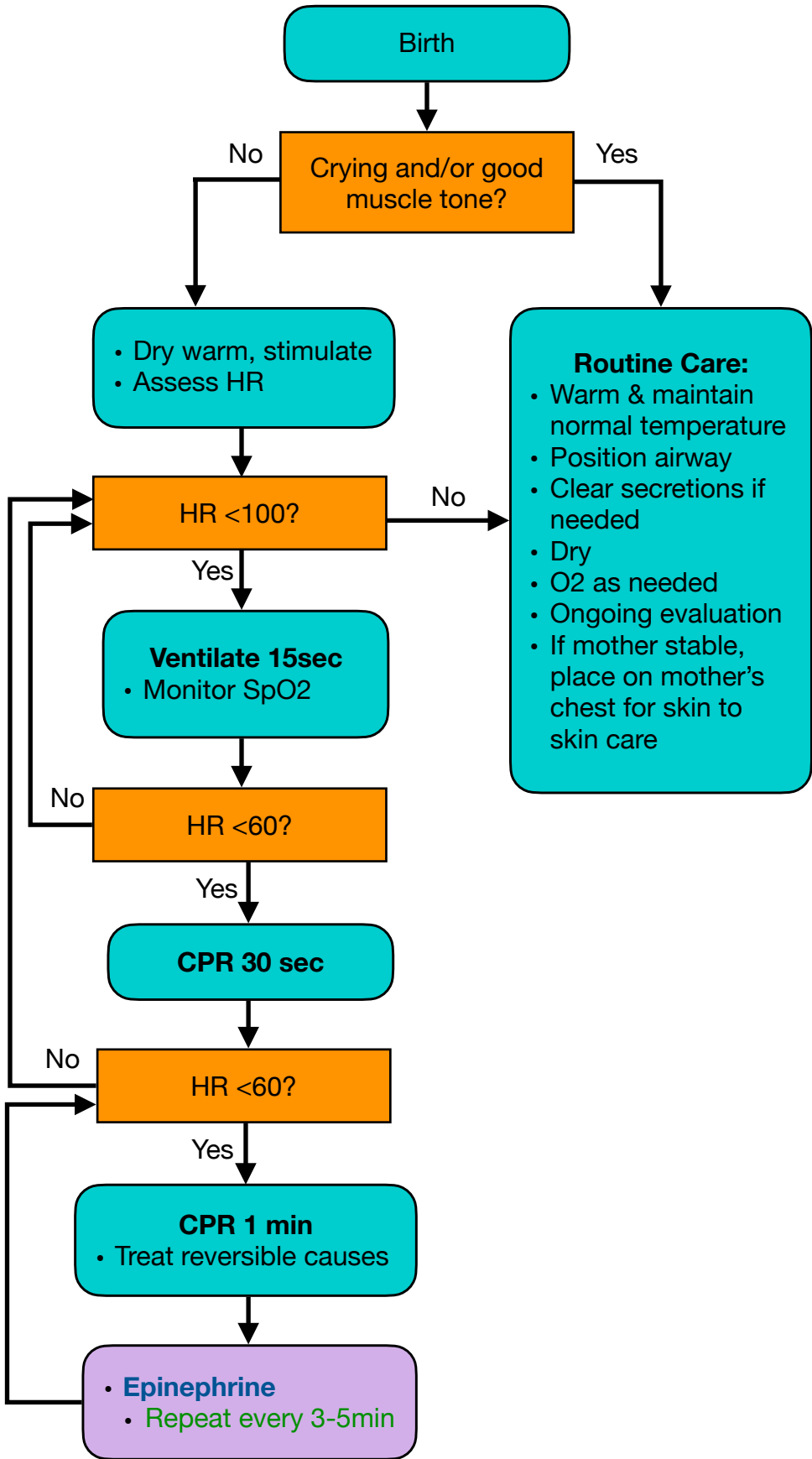
APGAR SCORE

Sign	0	1	2
Heart Rate	Absent	Slow (<100)	≥100
Respirations	Absent	Slow, irregular	Good, crying
Muscle Tone	Limp	Some flexion	Active motion
Reflex Irritability	No response	Grimace	Cough, sneeze, cry
Color	Blue or pale	Pink body with blue extremities	Completely pink

SPECIAL CONSIDERATION

- Prepare for rapid transport in both situations

NEWBORN RESUSCITATION



CRITICAL INFORMATION

- Measure with color-coded resuscitation tape
- Compress at rate of 90bpm. Use metronome or similar device
- 3:1 compression/ventilation ratio with 2 person CPR
- Place pulse ox on right arm (due to ductus arteriosus)
- Peripheral cyanosis is a normal finding
- Delay cord clamping until 30-60 seconds after birth, then clamp 6-8" from baby
- If cord is around neck and can't be slipped over the head, double clamp and cut between clamps

Airway Management

- Suction mouth then nose
- Ventilate with room air at a rate of 60 breaths/min
- Use 2 person BLS airway management whenever possible
- Avoid excessive ventilation
- If HR >100 but SpO2 not in target range or central cyanosis present, administer blow-by O2 at 10LPM

Drug Therapy

- **Epinephrine** 0.01mg/kg (0.1mg/ml) IV/IO
 - Repeat q3-5 min
- **NS** fluid bolus 10ml/kg IV/IO

SpO2 Normal Values After Birth (in Min)

1 min	60-75%
2 min	65-70%
3 min	70-75%
4 min	75-80%
5 min	80-85%
10 min	85-95%

PEDIATRIC DOSING GUIDE

GRAY: 3-5kg/6-11lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
90-160	100-205	30-53	67-104	35-56	45-62

NS Fluid Bolus: 10-20ml/kg	30-100ml	DEFIBRILLATION: 2-4J/kg	1st: 8J	2nd: 16J
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Blade for Foreign Body Removal: 0	CARDIOVERSION: 0.5-1, 2J/kg	1st: 2-4J	2nd: 8J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 0.3-0.5mg 2nd: 0.6-1mg	1st: 0.1-0.16ml 2nd: 0.2-0.33ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	15-25mg	0.3-0.5ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.1mg	1ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	0.15-0.25mg	Preload: 1.5-2.5ml Vial: 0.4-0.6ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	2ml/kg IV/IO		6-10ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	3-5mg	0.03-0.05ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.03-0.05mg	0.3-0.5ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.03-0.05mg	0.3-0.5ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

GRAY: 3-5kg/6-11lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN <i>Max dose: 3mcg/kg</i>	3-5mcg	0.06-0.1ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM <i>Max dose: 1 mg</i>	0.09-0.15mg	0.1-0.15ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO <i>Max dose: 40mg</i>	1st: 1.5-2.5mg 2nd: 0.75-1.25mg	1st: 0.06-0.13ml 2nd: 0.04-0.06ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	0.3-0.5mg	0.06-0.1mg	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> <i>Max dose 5mg</i>	0.6-1mg	0.12-0.2ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> <i>Max per dose: 1mg</i>	0.15-0.25mg	0.15-0.25ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO <i>Max dose: 1mg</i>	0.15-0.25mg	0.15-0.25ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	0.3-0.5mg	0.03-0.05ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN <i>Max dose: 2mg</i>	0.3-0.5mg	0.3-0.5ml	MR q5 min up to 2mg
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	3-5mEq	3-5ml	

PEDIATRIC DOSING GUIDE

PINK: 6-7kg/13-15lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
90-160	100-180	30-53	72-104	37-56	50-62

NS Fluid Bolus: 10-20ml/kg	60-140ml	DEFIBRILLATION: 2-4J/kg	1st: 13J	2nd: 26J
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Blade for Foreign Body Removal: 0	CARDIOVERSION: 0.5-1, 2J/kg	1st: 3-7J	2nd: 13J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 0.7mg 2nd: 1.3mg	1st: 0.2ml 2nd: 0.4ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	32mg	0.6ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.1mg	1ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	0.3mg	Preload: 3ml Vial: 0.8ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	2ml/kg IV/IO		13ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	6.5mg	0.1ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.07mg	0.7ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.1mg	0.1ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

PINK: 6-7kg/13-15lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN <i>Max dose: 3mcg/kg</i>	6.5mcg	0.13ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM <i>Max dose: 1 mg</i>	0.2mg	0.2ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO <i>Max dose: 40mg</i>	<u>1st:</u> 3mg <u>2nd:</u> 2mg	<u>1st:</u> 0.2ml <u>2nd:</u> 0.1ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	0.7mg	0.1ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> <i>Max dose 5mg</i>	1.3mg	0.3ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> <i>Max per dose: 1mg</i>	0.3mg	0.3ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO <i>Max dose: 1mg</i>	0.3mg	0.3ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	0.7mg	0.1ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN <i>Max dose: 2mg</i>	0.7mg	0.7ml	MR q5 min up to 2mg
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	6.5mEq	6.5ml	

PEDIATRIC DOSING GUIDE

RED: 8-9kg/18-20lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
90-160	100-180	30-53	72-104	37-56	50-62

NS Fluid Bolus: 10-20ml/kg	80-180ml	DEFIBRILLATION: 2-4J/kg	1st: 17J	2nd: 34J
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Blade for Foreign Body Removal: 1	CARDIOVERSION: 0.5-1, 2J/kg	1st: 4-9J	2nd: 17J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 0.9mg 2nd: 1.7mg	1st: 0.3ml 2nd: 0.6ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	42mg	0.8ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.2mg	2ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	0.4mg	Preload: 4ml Vial: 1.1ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		42ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	8.5mg	0.2ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.09mg	0.9ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.1mg	0.1ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

RED: 8-9kg/18-20lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	8.5mcg	0.17ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	0.3mg	0.3ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	1st: 4mg 2nd: 2mg	1st: 0.2ml 2nd: 0.1ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	0.9mg	0.2ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	1.7mg	0.3ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	0.4mg	0.4ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	0.4mg	0.4ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	0.9mg	0.1ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	0.9mg	0.9ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	2mg ODT/slow IV	2mg	1ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	8.5mEq	8.5ml	

PEDIATRIC DOSING GUIDE

PURPLE: 10-11kg/22-24lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
90-160	100-180	30-53	72-104	37-56	50-62

NS Fluid Bolus: 10-20ml/kg	100-220ml	DEFIBRILLATION: 2-4J/kg	1st: 21J	2nd: 42J
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Blade for Foreign Body Removal: 1	CARDIOVERSION: 0.5-1, 2J/kg	1st: 5-11J	2nd: 21J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 1mg 2nd: 2.1mg	1st: 0.3ml 2nd: 0.7ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	50mg	1ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.2mg	2ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	0.5mg	Preload: 5ml Vial: 1.3ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		53ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	10.5mg	0.2ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.1mg	1ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.1mg	0.1ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

PURPLE: 10-11kg/22-24lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	10.5mcg	0.21ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	0.3mg	0.3ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	1st: 5mg 2nd: 3mg	1st: 0.3ml 2nd: 0.2ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	1mg	0.2ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	2.1mg	0.4ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	0.5mg	0.5ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	0.5mg	0.5ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	1mg	0.1ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	1mg	1ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	2mg ODT/slow IV	2mg	1ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	10mEq	10ml	

PEDIATRIC DOSING GUIDE

YELLOW: 12-14kg/27-31lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
80-120	98-140	22-37	86-106	42-63	49-62

NS Fluid Bolus: 10-20ml/kg	120-280ml	DEFIBRILLATION: 2-4J/kg	1st: 26J	2nd: 52J
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Blade for Foreign Body Removal: 2	CARDIOVERSION: 0.5-1, 2J/kg	1st: 6-14J	2nd: 26J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 1.3mg 2nd: 2.6mg	1st: 0.4ml 2nd: 0.9ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	65mg	1.3ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.3mg	3ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	0.7mg	Preload: 7ml Vial: 1.6ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		65ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	13mg	0.3ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.1mg	1ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.1mg	0.1ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

YELLOW: 12-14kg/27-31lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	13.5mcg	0.27ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	0.4mg	0.4ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	1st: 6mg 2nd: 3mg	1st: 0.3ml 2nd: 0.2ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	1.3mg	0.3ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	2.6mg	0.5ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	0.7mg	0.7ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	0.7mg	0.7ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	1.3mg	0.1ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	1.3mg	1.3ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	2mg ODT/slow IV	2mg	1ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	13mEq	13ml	

PEDIATRIC DOSING GUIDE

WHITE: 15-18kg/33-40lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
65-100	80-120	20-28	89-112	46-72	58-69

NS Fluid Bolus: 10-20ml/kg	150-360ml
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DEFIBRILLATION: 2-4J/kg	1st: 33J	2nd: 66J
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Blade for Foreign Body Removal: 2
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CARDIOVERSION: 0.5-2J/kg	1st: 8-17J	2nd: 33J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 1.7mg 2nd: 3.4mg	1st: 0.6ml 2nd: 1.1ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	80mg	1.6ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.3mg	3ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	0.8mg	Preload: 8ml Vial: 2.1ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		83ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	16.5mg	0.3ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.2mg	2ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.2mg	0.2ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

WHITE: 15-18kg/33-40lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	16.5mcg	0.33ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	0.5mg	0.5ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	1st: 8mg 2nd: 4mg	1st: 0.4ml 2nd: 0.2ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	1.7mg	0.3ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	3.3mg	0.7ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	0.8mg	0.8ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	0.8mg	0.8ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	1.7mg	0.2ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	1.7mg	1.7ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	2mg ODT/slow IV	2mg	1ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	17mEq	17ml	

PEDIATRIC DOSING GUIDE

BLUE: 19-23kg/42-51lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
65-100	80-120	20-28	89-112	46-72	58-69

NS Fluid Bolus: 10-20ml/kg	190-460ml
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DEFIBRILLATION: 2-4J/kg	1st: 42J	2nd: 84J
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Blade for Foreign Body Removal: 2

CARDIOVERSION: 0.5-2J/kg	1st: 10-21J	2nd: 42J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 2.1mg 2nd: 4.2mg	1st: 0.7ml 2nd: 1.4ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	105mg	2.1ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.4mg	4ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	1mg	Preload: 10ml Vial: 2.6ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		105ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	21mg	0.4ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.2mg	2ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.2mg	0.2ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

BLUE: 19-23kg/42-51lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	21mcg	0.42ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	0.6mg	0.6ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	1st: 10mg 2nd: 5mg	1st: 0.5ml 2nd: 0.3ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	2.1mg	0.4ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	4.2mg	0.8ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	1mg	1ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	1mg	1ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	2.1mg	0.2ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	2mg	2ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	2mg ODT/slow IV	2mg	1ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	21mEq	21ml	

PEDIATRIC DOSING GUIDE

ORANGE: 24-29kg/53-64lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
58-90	75-118	18-25	97-115	57-76	66-72

NS Fluid Bolus: 10-20ml/kg	240-580ml
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DEFIBRILLATION: 2-4J/kg	1st: 53J	2nd: 106J
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Blade for Foreign Body Removal: 2

CARDIOVERSION: 0.5-2J/kg	1st: 13-26J	2nd: 53J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 2.7mg 2nd: 5.4mg	1st: 0.9ml 2nd: 1.8ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	130mg	2.6ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.5mg	5ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	1.3mg	Preload: 13ml Vial: 3.3ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		125ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	26mg	0.5ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.3mg	3ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.3mg	0.3ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

ORANGE: 24-29kg/53-64lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	26.5mcg	0.53ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	0.8mg	0.8ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	1st: 13mg 2nd: 6mg	1st: 0.7ml 2nd: 0.4ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	2.6mg	0.5ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	5mg	1ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	1mg	1ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	1mg	1ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	2.6mg	0.3ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	2mg	2ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	4mg ODT/slow IV	4mg	2ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	26mEq	26ml	

PEDIATRIC DOSING GUIDE

GREEN: 30-36kg/66-80lbs

Normal Vital Signs

HR asleep	HR awake	Respiratory Rate	Systolic BP	Diastolic BP	MAP
58-90	75-118	18-25	97-115	57-76	66-72

NS Fluid Bolus: 10-20ml/kg	300-720ml
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DEFIBRILLATION: 2-4J/kg	1st: 66J	2nd: 132J
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Blade for Foreign Body Removal: 3

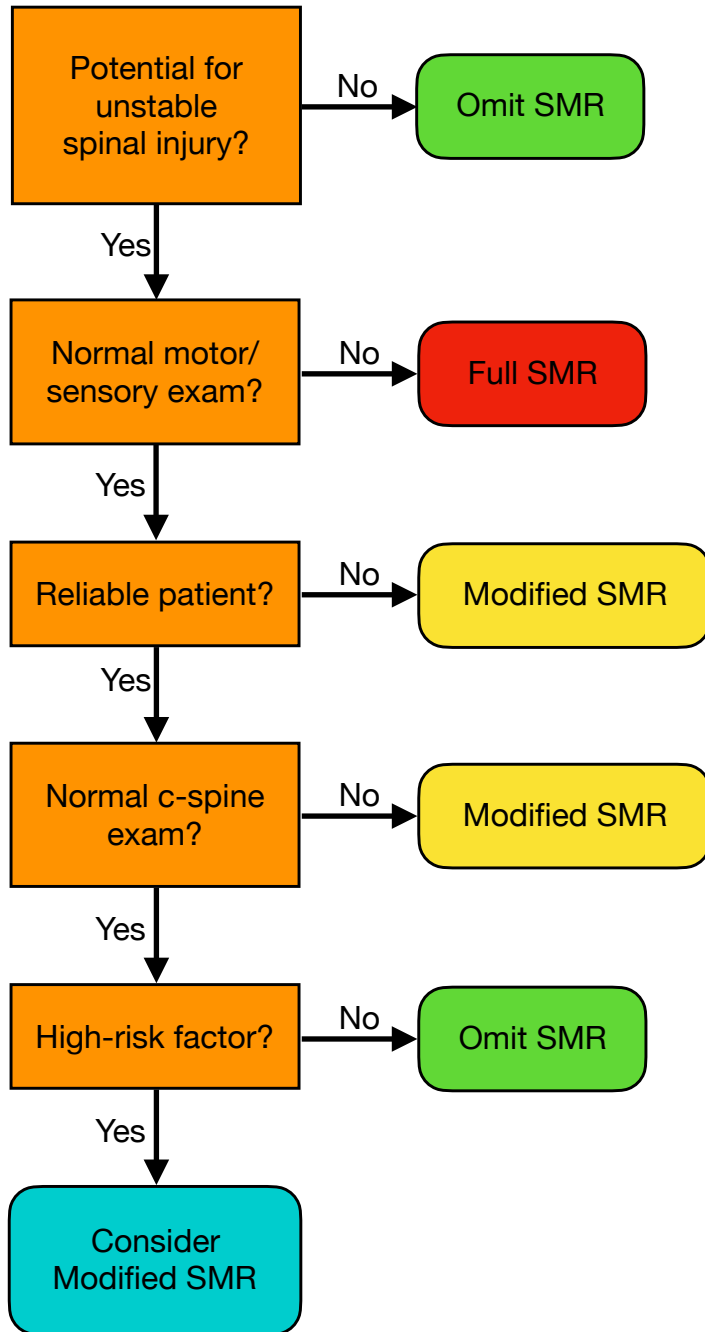
CARDIOVERSION: 0.5-2J/kg	1st: 15-33J	2nd: 66J
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Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
ADENOSINE	6mg/2ml (3mg/ml)	0.1mg/kg RIVP Max 1st dose: 6mg Max 2nd dose: 12mg	1st: 3.3mg 2nd: 6.6mg	1st: 1.1ml 2nd: 2.2ml	RIVP w/ 10ml NS flush MR x1 double the dose
ALBUTEROL	2.5mg/3ml	2.5mg/3ml HHN	2.5mg	3ml	
AMIODARONE (Pulseless arrest)	150mg/3ml (50mg/ml)	5mg/kg IV/IO Max single dose: 300mg	165mg	3.3ml	20ml NS flush MR x2 refractory rhythm
ATROPINE (Bradycardia)	1mg/10ml (0.1mg/ml)	0.02mg/kg IV/IO Min dose: 0.1mg Max single dose: 0.5mg	0.5mg	5ml	MR x1 in 3-5 min
ATROPINE (Organophosphate poisoning)	Preload: 1mg/ 10ml (0.1mg/ml) Vial: 0.4mg/ml	0.05mg/kg IV/IO	1.7mg	Preload: 17ml Vial: 4.1ml	MR q5-10 min until symptoms resolve
DEXTROSE	10%	5ml/kg IV/IO Max dose: 125ml		125ml	Give over 10 min
DIPHENHYDRAMINE <i>Benadryl</i>	50mg/ml	1mg/kg IM/IV/IO IV/IO Max dose: 25mg IM Max dose: 50mg	33mg	0.7ml	
EPINEPHRINE (Cardiac arrest/ Bradycardia)	1mg/10ml (0.1mg/ml)	0.01mg/kg IV/IO	0.3mg	3ml	MR q3-5 min
EPINEPHRINE (Allergic reaction/ Asthma)	1mg/ml	0.01mg/kg IM Total max dose: 0.6mg	0.3mg	0.3ml	MR x1 in 5 min
EPINEPHRINE (Upper airway/Stridor)	1mg/ml	5mg HHN	5mg	5ml	

GREEN: 30-36kg/66-80lbs

Medication	Concentration	Dose	Dose in mg	Dose in ml	Details
FENTANYL (Pain)	50mcg/ml	1mcg/kg IV/IO/IM/IN Max dose: 3mcg/kg	33mcg	0.66ml	MR q5 min For IN: split dose equally in each nostril
GLUCAGON (Hypoglycemia/Beta blocker OD)	1mg/ml	0.03mg/kg IM Max dose: 1mg	1mg	1ml	MR x2 q15 min
IPRATROPIUM <i>Atrovent</i>	500mcg/2.5ml	500mcg/2.5ml HHN	500mcg	2.5ml	
LIDOCAINE 2% (IO insertion)	20mg/ml	0.5mg/kg slow IO Max dose: 40mg	<u>1st:</u> 17mg <u>2nd:</u> 8mg	<u>1st:</u> 0.8ml <u>2nd:</u> 0.4ml	MR x1 at 1/2 initial dose
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.1mg/kg <u>IM</u>	3.3mg	0.7ml	MR x1 in 10 min
MIDAZOLAM <i>Versed</i> (Seizure)	5mg/ml	0.2mg/kg <u>IN</u> Max dose 5mg	5mg	1ml	Split dose equally in each nostril
MIDAZOLAM <i>Versed</i> (Seizure)	2mg/2ml (1mg/ml)	0.05mg/kg slow <u>IV/IO</u> Max per dose: 1mg Total max dose: 5mg	1mg	1ml	MR x2 q15 min
MIDAZOLAM <i>Versed</i> (Cardioversion)	2mg/2ml (1mg/ml)	0.05mg/kg slow IV/IO Max dose: 1mg	1mg	1ml	
MORPHINE (Pain/burns)	10mg/ml	0.1mg/kg IV/IO/IM	3.3mg	0.3ml	MR x2 in 15 min (IV/IO) MR in 30min (IM)
NALOXONE <i>Narcan</i>	2mg/2ml (1mg/ml)	0.1mg/kg IV/IO/IM/IN Max dose: 2mg	2mg	2ml	MR q5 min up to 2mg
ONDANSETRON <i>Zofran</i>	4mg tab 4mg/2ml	4mg ODT/slow IV	4mg	2ml	Slow IV over 30 sec
SODIUM BICARBONATE	1mEq/ml	1mEq/kg IV/IO	33mEq	33ml	

SPINAL INJURY ASSESSMENT



CRITICAL INFORMATION

- See GPC 13, Spinal Motion Immobilization for full and modified SMR procedure, and pediatric/pregnancy considerations
- **Motor exam:**
 - Wrist/finger extension
 - Finger abduction
 - Plantar and dorsiflexion of both feet
- **Sensory exam:**
 - Check for abnormal sensation in all extremities
- **Unreliable patient:**
 - ALOC
 - Alcohol or drug impairment
 - Distracting injury
 - Language barrier
- **Spinal assessment:**
 - Palpate entire spine for pain, step off, and swelling
- **High-risk factors:**
 - Age ≥65 years
 - Meets trauma mechanism of injury
 - Axial load to the head