

HENNEPIN COUNTY EMERGENCY MEDICAL SERVICES SYSTEM
Advanced Life Support Protocols



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By the Hennepin County EMS Advisory Council

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Table of Contents

1. ALS PROTOCOLS FOR ADULT PATIENTS	1-1
PART I. GENERAL GUIDELINES	1-1
Medical Control	1-1
Medical Control Communications Failure	1-2
Physician Presence at the Emergency Scene	1-2
Patient Consent and Refusal	1-3
Equipment	1-3
Airway Management.....	1-4
Sedation of Intubated Patients.....	1-6
IV Therapy	1-6
Pain Management.....	1-7
Limiting Resuscitation	1-8
Patient Disposition	1-8
Infectious Disease Precautions	1-9
Hazardous Materials Response	1-10
Multiple Casualty Incidents	1-11
CISD/Peer Counseling	1-11
PART II. CARDIAC EMERGENCIES	1-12
Standing Orders for All Cardiac Problems	1-12
Specific Cardiac Conditions.....	1-13
Chest Pain - Suggestive of Ischemia	1-13
Suspected Pulmonary Edema	1-15
Cardiogenic Shock/Pump Failure	1-16
Cardiac Arrhythmias	1-16
Premature Ventricular Contractions (PVC's).....	1-16
Bradycardia (Patient Not in Cardiac Arrest).....	1-17
Stable Tachycardias	1-18
Unstable Tachycardias	1-19
Cardiac Arrest States.....	1-20
Ventricular Fibrillation and Pulseless Ventricular Tachycardia	1-20
Asystole.....	1-21
Pulseless Electrical Activity (PEA)	1-22
Special Situations/Considerations in Cardiac Arrest	1-23
PART III. MEDICAL EMERGENCIES	1-24
Shock, Non-Traumatic	1-24
Anaphylaxis	1-25
Asthma Attack.....	1-26
Chronic Obstructive Pulmonary Disease (COPD) Acute Exacerbation	1-28
All Other Respiratory Distress	1-28
Status Seizures	1-29
Unconscious - Unknown Etiology	1-30
Symptomatic Known Diabetic	1-31

Drug Overdose	1-32
Suspected CVA	1-33
Suspected Carbon Monoxide Poisoning	1-34
Symptomatic Renal Patient	1-34
PART IV. TRAUMATIC EMERGENCIES.....	1-35
Standing Orders for All Traumatic Emergencies	1-35
General Trauma/Traumatic Shock	1-36
Isolated Head and Spine Injuries.....	1-37
Amputations	1-37
PART V. OTHER EMERGENCIES	1-38
Hypothermia.....	1-38
Hyperthermia	1-39
Chemical Eye Injuries	1-39
Burns	1-40
Behavioral Emergencies	1-41
Severe Nausea or Vomiting	1-41
PART VI. OBSTETRICS	1-42
Normal Labor and Delivery	1-42
Obstetric Complications.....	1-43
2. ALS PROTOCOLS FOR PEDIATRIC PATIENTS	2-1
PART I. GENERAL GUIDELINES.....	2-1
Airway Management.....	2-1
Cardiac Emergencies.....	2-2
Pediatric IV's	2-3
Pediatric Reference Chart	2-3
Pediatric Pain Management	2-4
PART II. NEWBORN EMERGENCIES.....	2-5
Standing Orders for Newborn Emergencies	2-5
PART III. AIRWAY EMERGENCIES	2-6
Pediatric Asthma Attack	2-6
Foreign Body Airway Obstruction.....	2-8
Croup and Epiglottitis	2-9
PART IV. OTHER PEDIATRIC EMERGENCIES	2-10
Pediatric Status Seizures	2-10
Pediatric Anaphylaxis	2-11
Pediatric Drug Ingestion or Overdose.....	2-12
Pediatric Unconscious - Unknown Etiology	2-13
Pediatric Symptomatic Known Diabetic	2-13
PART V. PEDIATRIC SHOCK.....	2-14
Standing Orders for All Pediatric Shock.....	2-14

PART V. CARDIAC EMERGENCIES.....	2-16
Pediatric Bradycardia	2-16
Pediatric Tachycardia with Adequate Perfusion	2-17
Pediatric Tachycardia with Poor Perfusion (Pulse Present).....	2-18
Pediatric Ventricular Fibrillation and Pulseless Ventricular Tachycardia	2-19
Pediatric Non-VF/VT Arrest (includes Asystole and PEA).....	2-20
3. APPENDICES TO THE ALS PROTOCOLS	3-1
APPENDIX A - ALS PROCEDURES AND MEDICATIONS.....	3-1
ALS Procedures	3-1
ALS Medications	3-2
APPENDIX B - ENDOTRACHEAL INTUBATION	3-3
APPENDIX C - RAPID SEQUENCE INTUBATION	3-5
APPENDIX D - SURGICAL AIRWAYS.....	3-8
Percutaneous Transtracheal Ventilation (PTV) Protocol	3-8
Cricothyrotomy Protocol.....	3-9
APPENDIX E - NITROUS OXIDE (NITRONOX) ADMINISTRATION	3-10
APPENDIX F - "DO NOT RESUSCITATE" (DNR) GUIDELINES	3-12
Background Information	3-12
Authorized Definition - Do Not Resuscitate:.....	3-12
Establishment of a System for Communicating DNR	3-13
Implementation of DNR Orders During Emergency Medical Care.....	3-15
Intent with Regard to DNR Orders	3-15
APPENDIX G - IMPLANTABLE CARDIAC DEFIBRILLATOR (ICD).....	3-19
APPENDIX H - TRANSCUTANEOUS/EXTERNAL CARDIAC PACING.....	3-20
APPENDIX I - INTRAOSSEOUS INFUSION	3-21
APPENDIX J - SYSTEM PLAN FOR MULTIPLE CASUALTY INCIDENTS.....	3-23
Introduction.....	3-23
Purpose of Plan	3-23
General Principals	3-23
Communications During an Incident	3-24
EMS Command and Authority	3-24
Triage and Treatment	3-24
Transportation and Receiving Facilities.....	3-25
Conclusion of an Incident	3-25
Glossary	3-26
Incident Command System	3-27
Use of UHF "MED" Channels	3-31
S.T.A.R.T. Triage.....	3-32
APPENDIX K - NITROGLYCERIN INFUSION	3-33

APPENDIX L - ALS ALGORITHMS.....	3-34
Bradycardia - Patient Not in Cardiac Arrest	3-34
Tachycardias	3-35
Ventricular Fibrillation/Pulseless Ventricular.....	3-36
Asystole.....	3-37
Pulseless Electrical Activity (PEA)	3-38
Pediatric Pulseless Arrest.....	3-39
Pediatric Bradycardia - Patient Not in Cardiac Arrest	3-40
Pediatric Tachycardia - Adequate Perfusion.....	3-41
Pediatric Tachycardia - Poor Perfusion.....	3-42
APPENDIX M - NEEDLE THORACOSTOMY	3-43
APPENDIX N - NERVE AGENT - ORGANOPHOSPHATE EXPOSURE	3-44
APPENDIX O - MEDICATION PROFILES.....	3-45
Adenosine IV	3-45
Albuterol	3-46
Alcaine (eye drops)	3-47
Amiodarone Hydrochloride	3-48
Aspirin (ASA)	3-49
Atropine, IV	3-50
Atrovent	3-51
Benadryl, IV	3-52
Calcium Chloride 10%	3-53
Dextrose, IV	3-54
Dilaudid.....	3-55
Epinephrine	3-56
Etomidate	3-57
Furosemide, IV.....	3-58
Glucagon, IM	3-59
Lidocaine Hydrochloride, IV	3-60
Magnesium Sulfate, IV	3-61
Midazolam Hydrochloride	3-62
Morphine Sulfate, IV	3-63
Narcan, IV	3-64
Nitroglycerin, IV	3-65
Nitroglycerin, Tablets - Metered Dose Spray	3-66
Nitronox	3-67
Sodium Bicarbonate.....	3-68
Succinylcholine	3-69
Terbutaline Sulfate	3-70
Vasopressin	3-71

4. INDEX

1. ALS Protocols for Adult Patients

Adult ALS Protocols apply to adult patients age 18 and over.

PART I. GENERAL GUIDELINES

- A. These Medical Protocols apply to adult patients age 18 and over.
- B. Remember: Courtesy to the patient, the patient's family and other emergency care personnel is of utmost importance.
- C. A Hennepin County EMS System ambulance report form must be completed on all patients and a copy left with the patient at the hospital. Specific prehospital care information must also be recorded on all patient contacts as part of the System data collection program.
- D. The specific conditions listed for treatment in this document, although frequently stated as medical diagnoses, are operational diagnoses to guide the paramedic in initiating appropriate treatment. This document is to be used as consultative material in striving for optimal patient care. It is recognized that specific procedures or treatments may be modified depending on the circumstances of a particular case. Also, a medical control physician, when consulted, will either concur or further evaluate the paramedic's clinical findings and suggest an alternate diagnosis and treatment.
- E. In all circumstances, physicians have latitude in the care they give and may deviate from these Medical Protocols if it is felt such deviation is in the best interest of the patient. Nothing in these protocols shall be interpreted as to limit the range of treatment modalities available to medical control physicians to utilize, other than the modalities and the medications used must be consistent with the paramedic's training.

Medical Control

A medical control physician should be contacted as specified in these protocols. Whenever possible, medical control should be obtained from the hospital of destination requested by the patient. Medical control as required by protocol for cardiac and other non-trauma patients should be established immediately upon completion of necessary ALS procedures. If no request for medical control has been made before three minutes from hospital arrival, patient information only should be communicated (for hospital notification) in lieu of medical control. Except for load-and-go situations with short transport times, any such delay in establishing medical control will be explained in a System Incident Report submitted by paramedics to their medical director and to the Community Health Department. This policy in no way precludes establishment of medical control at any time during the run to obtain physician advice or assistance.

Medical Control Communications Failure

In the occurrence of communication failure, paramedics may perform those orders outlined in the ALS Medical Protocols under "After Obtaining Verbal Orders" for patients with life-threatening or potentially life-threatening conditions. Initiation and performance of these orders must be in accordance with the paramedic's training and must be carried out as written in these Medical Protocols. Any instance of communications failure where procedures are carried out without a physician's verbal order must be reported in a System Incident Report within 48 hours to the paramedic's medical director and to Community Health Department.

Physician Presence at the Emergency Scene

If a physician is present and wishes to assume responsibility for the patient's care:

- A. If the patient's personal physician is present and wishes to assume responsibility for the patient's care:
 1. The paramedic should defer to the orders of the personal physician as long as those orders are appropriate and not in conflict with ALS Medical Protocols. (Paramedics should establish radio medical control any time they are uncomfortable with carrying out orders from a patient's physician.)
 2. Orders given by the personal physician should be written on the EMS report form and signed by the physician.
 3. The paramedic should contact the medical control physician during transport to report treatment given and to obtain further orders if the personal physician does not accompany the patient.
- B. If a System ALS Medical Director or medical control physician is present and wishes to assume responsibility for the patient's care, the same guidelines apply as in 1. above.
- C. If any other intervening physician wishes to assume responsibility for the patient when no radio medical control exists, the paramedics should relinquish responsibility for patient management if the physician:
 1. Can show appropriate identification (or is known to the paramedics); and
 2. Agrees in advance to accompany the patient to the hospital (exception: major multiple casualty incident); and
 3. Signs the EMS report form assuming responsibility and verifying orders.
 - a. If radio medical control exists, the intervening physician should be allowed to communicate with the medical control physician prior to the paramedics accepting orders. If there is any disagreement between the two physicians, the paramedics will follow the orders of the medical control physician and allow the physicians to continue their communication.
 - b. In the case of multiple intervening physicians at the scene, the paramedics should request the physicians designate one physician to direct patient care.

- D. An intervening physician not wishing to assume responsibility for care and accompanying the patient to the hospital may be asked to assist the paramedics and/or act as a medical consultant to them and to the medical control physician.

Patient Consent and Refusal

Whenever an ambulance is requested for a patient, it is the responsibility of the EMS system to treat and transport that patient with his/her consent. Transport by ambulance should always be offered to a patient. If a competent patient or parents of a minor refuse treatment or transportation, they should sign the refusal statement on the ambulance report form. If they refuse to sign, this should be documented, including witnesses' names if possible. In general, a person is mentally competent if he/she:

- A. is capable of understanding the nature and consequences of the proposed treatment; and
- B. has sufficient emotional control, judgment, and discretion to manage their own affairs; and
- C. is not under the influence of drugs or alcohol.

Emergency care for life-threatening conditions should never be delayed or withheld to carry out legal consent procedures. Any time contact with the patient occurs and the patient is not transported, the run is a "left," not a "cancel," and requires full documentation of all sections of the ambulance report form including what the patient (or parent) was told at the scene regarding non-transport and any other follow-up advice or information given at the scene.

Adults: A mentally competent adult has the right to refuse treatment and/or transport; however, the paramedic and/or medical control physician (by phone or radio) should explain thoroughly the alternatives and potential consequences of this action. A medical control physician should always be consulted if in doubt as to the mental competency of a patient, or if the paramedic feels it is detrimental to leave the patient.

Minors: Consent or refusal of treatment/transport of minors (less than 18 years) must be given by the child's parent or legal guardian. Although less desirable, consent or refusal may be given by a responsible adult (over 18) caretaker if the parent has deliberately left the minor in the care of this adult, and the adult is competent and capable. If unsure whether it is appropriate to allow someone to give consent or refuse treatment of a minor, a medical control physician should be consulted.

Equipment

All equipment appropriate to the nature of the call for assessment, treatment and transport should be taken to the site of the patient at the time of initial patient contact.

Airway Management

A. Airway Devices:

Oropharyngeal or nasopharyngeal airway insertion should be attempted on all unconscious patients for airway maintenance.

Esophageal obturator airways and Combitubes are to be inserted only in apneic patients unless ordered verbally by the medical control physician or, if authorized by the ALS medical director. The EOA should be used with caution in trauma patients. Do not insert EOA in apneic patients with bleeding from facial, mouth, or throat trauma.

Endotracheal intubation is not a required procedure but is sanctioned in the Hennepin County EMS System for various categories of patients. Endotracheal intubation is to be performed only by paramedics trained and authorized to intubate and only for those types of patients specified by the ALS Medical Director. Endotracheal intubation shall be performed in accordance with the information and protocol contained in Appendix B (page 3-3) and consistent with other protocols in this document.

Other airway interventions not required but sanctioned by the System are rapid sequence endotracheal intubation and the establishment of surgical airways (i.e., transtracheal needle ventilation and cricothyrotomy) for patients that cannot be ventilated by any other means. These interventions must be authorized by a service's ALS Medical Director and shall be performed in accordance with the information and protocols contained in Appendices C and D (starting page 3-5).

B. Adjunctive Airway Equipment:

1. Endotracheal Tube Locator: ETTL devices utilize anatomical differences between the trachea and the esophagus to verify proper endotracheal tube placement. ETTLs do not rely on chemical reaction to detect the presence or absence of end-tidal carbon dioxide and may be used in conjunction with an end-tidal CO₂ detector device to confirm tube placement.
2. End-tidal CO₂ monitoring: An end-tidal carbon dioxide (CO₂) detector may be used (but is not required) to accomplish confirmation of endotracheal tube placement and is most reliable in patients with spontaneous circulation. This device may not be able to detect CO₂ in cardiac arrest patients due to extremely low blood flow to the lungs.
3. Pulse oximetry: A pulse oximeter may be used (but is not required) for any patient with suspected hypoxemia, in respiratory distress, or whenever sedating medications are administered. Obtaining a normal pulse oximetry reading does not negate the need for oxygen therapy as specified in these protocols.

C. Drug Administration by Inhalation or Via the Airway:

Nitronox, oxygen, Atrovent, epinephrine and albuterol are prehospital drugs administered by inhalation. Of these, Nitronox is not a required drug, but is approved for use in the Hennepin County EMS System. It may be used to treat pain of many varieties including non-traumatic headache, back pain, isolated musculoskeletal trauma, burns not involving the face or respiratory tract and other medical conditions such as kidney stones and third trimester labor. Paramedics trained and authorized by their ALS Medical Director to administer Nitronox shall do so in accordance with the information and protocol contained in Appendix E (page 3-10) of this document.

Oxygen therapy should be administered in accordance with the following guidelines:

1. If patient has no history of COPD, oxygen should be administered by mask at a minimum of 10 liters per minute or by nasal cannula at 4-6 liters per minute. Oxygen flow should be adjusted per SaO₂ if available to achieve 97% or greater oxygen saturation.
2. If patient has a history of COPD, use a nasal cannula at 2-3 liters per minute initially. Oxygen may need to be increased if the patient's respiratory status worsens.
3. Patients with suspected pulmonary burns or CO toxicity should receive oxygen by partial rebreather mask for the highest possible oxygen delivery.

D. Drug Administration By Endotracheal Route:

Narcan, atropine, epinephrine and lidocaine are drugs that may be administered via the tracheobronchial tree by injection into an endotracheal tube. This drug administration route should only be used in cardiac arrest whenever an endotracheal tube has been placed, venous access is significantly delayed, or three attempts at venous access have failed. Medications via the ET route should be administered at twice the IV dose and should be diluted with sterile normal saline or water to a volume of at least 10 ml. A suction catheter should be passed beyond the tip of the endotracheal tube, chest compressions stopped and the drug solution quickly injected into the catheter. This should be followed by several quick ventilations to aerosolize the medication before resuming chest compressions.

E. Sedation of Intubated Patients:

Sedation of Intubated Patients	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If patient is ET intubated and becomes agitated from increased consciousness, consider: Versed titrated 2-5 mg IV/IM, while maintaining a BP of 100 or greater. 2. If BP less than 100 or if additional sedation is necessary, contact a medical control physician. 	<ol style="list-style-type: none"> 3. Consider initial or additional Versed titrated 2-5 mg IV/IM.

IV Therapy

If IV access cannot be established rapidly at the scene (in two attempts) in patients with non-traumatic problems, begin transport to the hospital. Further IV attempts can be made during transport provided all other necessary treatment is being done. There should be no delay at the scene for IV attempts on trauma patients or patients in shock--these IV's should be started during transport.

For most patients, the paramedic has the option of either running fluids through the IV or capping the catheter with a saline lock. However, as specified in these protocols, IV fluids must always be hung in situations:

- A. when the administration of multiple IV medications is anticipated; and
- B. whenever it is likely the patient will require fluid volume replacement.

Pain Management

To provide relief of pain when indicated. This protocol is NOT to be used in cases where the patient:

- has systolic blood pressure less than or equal to 90,
- has pain determined to be cardiac in origin (see chest pain protocol page 1-13),
- is in active labor.

Pain Management	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Assess pain on 0-10 scale. 2. Inform patient that pain is an important diagnostic parameter and the goal of this protocol is to relieve suffering not totally eliminate pain. 3. Administer Morphine Sulfate 2-10 mg IV/IM/SQ (Maximum total dose 10 mg). <ol style="list-style-type: none"> a. Inhaled Nitronox may be used as an alternative if available, see Appendix E (page 3-10). b. If patient is allergic to Morphine Sulfate may use Dilaudid 1-2 mg IV/IM. (Maximum total dose 2 mg) 4. Reassess pain scale and titrate additional doses of pain medication as needed to maximum dosage as above. 5. Monitor vital signs. If respiratory depression or hypotension occurs after administration of MS or Dilaudid ventilate patient as necessary and administer Narcan 0.4 - 2 mg IV. Notify a medical control physician. 6. Contact medical control physician for orders if: <ol style="list-style-type: none"> a. patient has SBP \leq 90, b. if further pain medication is required. 	<ol style="list-style-type: none"> 7. Consider initial or additional pain medication as appropriate.

Limiting Resuscitation

Cardiopulmonary resuscitation will be promptly instituted for all patients found in cardiac arrest unless reliable criteria for the determination of death are present, or a valid DNR or No CPR order exists.

- A. Reliable criteria for the determination of death include:
1. Lividity
 2. Rigor
 3. Obviously fatal trauma
 4. Absence of vital signs in a trauma victim upon arrival of EMS personnel despite a patent airway
- B. Do Not Resuscitate (DNR, No CPR) orders are orders issued by a patient's physician to refrain from initiating resuscitative measures in the event of a cardiopulmonary arrest. Patients with DNR orders may receive vigorous medical support, including all interventions specified in the ALS Medical Treatment Protocols, up to the point of cardiopulmonary arrest.

In the nursing home, a DNR order is valid if it is written in the order section of the patient chart (or on a transfer form) and is signed by a physician. Copies of the order are valid. In a private home, the standard DNR form (see Appendix F, page 3-12) must be signed by the patient or proxy, the physician, and a witness in order to be valid. No validation stamp or notarization is necessary, and a legible copy is acceptable.

If possible, the DNR order or copy should accompany the patient to the hospital. Pertinent documentation should be included on the ambulance report form for the run. In the event of confusion or questions regarding the DNR order, resuscitation should be initiated and a medical control physician should be consulted.

Living wills should not be interpreted at the scene, but conveyed to the physicians in the receiving Emergency Department.

Complete DNR guidelines for ambulance services operating within Hennepin County are found in this document in Appendix F, page 3-12.

Patient Disposition

Patients should be transported to the hospital of their choice (or family's or physician's choice) unless the gravity of the patient's condition warrants transport to the nearest hospital capable of immediately handling the emergency. The decision to transport to the nearest facility or the decision to change destination en route is ultimately the responsibility of the medical control physician or as allowed by the Hennepin County

EMS System Ambulance Diversion Policy. Also, in the case of critical trauma, the paramedic may independently decide to divert to the nearest hospital appropriate for major trauma if the patient meets one or more of the following trauma triage criteria:

- Systolic blood pressure less than 90
- Penetrating trauma to head, neck or trunk
- Less than "A" on the AVPU scale
- Death of occupant in same vehicle
- Glasgow coma score of 13 or less
- Respiratory rate of less than 10 or greater than 30
- Prolonged extrication

Whenever circumstances are such that the paramedic must make a diversion decision independently, the original receiving hospital should be notified by the paramedics or service dispatcher as soon as possible.

Paramedics will consider whether the patient condition warrants direct transport to a Level 1 or 2 Trauma Center or initial stabilization at a closer trauma receiving center.

Infectious Disease Precautions

A. Exposure to blood should be minimized.

When the possibility of exposure to blood or other body fluid exists, gloves are required. During extrication, or when broken glass is present, leather gloves or fire fighter gloves should be used. If hands accidentally become contaminated with blood, they should be washed thoroughly as soon as possible.

When there is risk of eye or mouth contamination (for example, the patient is vomiting bloody material or there is arterial bleeding), protective eye wear and masks are required.

- B. Needles and other sharp objects should be considered as potentially infective and be handled with extraordinary care. Needles should not be recapped. If it is absolutely necessary to recap a needle, use the appropriate technique prescribed by local EMS policies. Needles, syringes and broken glass vials should be immediately placed in puncture-proof containers after use.**
- C. Pocket masks with one-way valves or positive pressure ventilators should be used for artificial respiration whenever possible. Masks should be worn by the paramedic or patient (See D) for those infectious agents known to be transmitted by the airborne route (i.e., tuberculosis, chicken pox, measles, etc.).**
- D. Sufficient information should be obtained to determine if a patient may have active tuberculosis (TB), recent history of TB, HIV infection, fever, recent weight loss or cough. If there is a history suggestive of active TB, paramedics should wear masks compatible with OSHA guidelines and take other specific precautions in accordance with their individual ambulance service Respiratory Protection Plan. Albuterol**

nebulizations should not be administered in the ambulance to patients with a history or symptoms suggestive of active TB; subcutaneous terbutaline or epinephrine should be considered instead. Ventilation should be maximized in the patient compartment during transport of patients known to have active tuberculosis.

- E. Equipment should be thoroughly cleaned per protocol after each use. Disposable equipment should be considered for use whenever appropriate.
- F. In the event of significant exposure to blood or body fluids, supervisory personnel should be promptly informed.
- G. Significant exposure is defined as follows:
 - 1. Any puncture of the skin by a needle or other sharp object that has had contact with patient's blood or body fluids or with fluids infused into the patient.
 - 2. Blood spattered onto mucous membranes (e.g. mouth) or eyes.
 - 3. Contamination of open skin (cuts, abrasions, blisters, open dermatitis) with blood, vomitus, saliva, amniotic fluid or urine. Bite wound to providers would be included in this category.
- H. Local ambulance service policies should define a plan of action in the event of a significant exposure of an emergency responder to blood or body fluids.

Hazardous Materials Response

- A. When working at a Hazardous Materials Incident, Hennepin County EMS System paramedics should station themselves in the Haz Mat cold zone. Paramedics should operate in the cold zone unless they have adequate training and personal protective equipment for operation in the warm zone.
- B. Patients who have been exposed to a hazardous material should be appropriately decontaminated by qualified personnel. Considerations during decontamination should include:
 - 1. Weather and other limiting elements.
 - 2. The patient's level and severity of exposure.
 - 3. Condition of the victim. Transport those patients who cannot wait for a complete decontamination due to life-threatening injuries or condition.
 - 4. No invasive procedures without medical control orders, unless the patient is critical.

5. Contaminated patients being transported for further evaluation or treatment need to be appropriately cocooned to contain any remaining contaminants, and paramedics should limit exposure to themselves using appropriate available protective equipment.
- C. Early hospital notification is important to allow appropriate preparation for the patient.

Multiple Casualty Incidents

In special incidents with potential for multiple casualties, resources of the EMS System may be temporarily overwhelmed or extended to their limits. A System Plan for EMS Response to Multiple Casualty Incidents establishes a framework for coordinating resources during incidents requiring various ambulance providers, hospitals and public safety agencies to work together to optimize patient care and transportation with the given resources of the community. The goals of the system plan are to:

- A. Recognize and maintain operations of ambulance providers, hospitals, and other agencies as close to normal as possible;
- B. Utilize the incident command structure to allow flexibility for effective response to a variety of hazards most likely to occur within the County, including natural disaster, hazardous material exposure, urban fire, air crash, civil unrest or any incident with actual or potential multiple casualties; and
- C. Set system standards to aid individual agencies when developing policies and procedures.

See Appendix J, page 3-23 for details of the System Plan for Multiple Casualty Incidents.

CISD/Peer Counseling

Critical Incident Stress Debriefing (CISD) and Peer Counseling: Paramedics and other EMS personnel are encouraged to familiarize themselves with the causes and contributing factors of critical incident and cumulative stress, and learn to recognize the normal stress reactions that can develop from providing emergency medical services.

A Metro Region CISD/Peer Counseling Program is available to paramedics and other EMS personnel. The program consists of mental health professionals, chaplains and trained peer support personnel who develop stress reduction activities, provide training, conduct debriefings, and assist EMS personnel in locating available resources. The team will provide voluntary and confidential assistance to those wanting to discuss conflicts or feelings concerning their work or how their work affects their personal lives.

PART II. CARDIAC EMERGENCIES

Treatment protocols for cardiac emergencies are based on current American Heart Association Emergency Cardiovascular Care Standards.

Standing Orders for All Cardiac Problems

- A. Talk to patient and reassure to decrease anxiety. Place at rest on stretcher with head elevated 30-40 degrees or in position of comfort.
- B. Elicit patient history*, i.e., chief complaint, history of present illness, pertinent past medical history, medications, allergies, pacemaker or automatic implantable cardiac defibrillator (ICD).

** History-taking to be done concurrently with the following steps:*

- C. Begin oxygen therapy per general guidelines
- D. Perform the following expeditiously:
 - 1. Obtain vital signs and estimate of patient's weight;
 - 2. Perform appropriate physical exam to include lung auscultation and observation for jugular vein distention and dependent edema.
 - 3. Establish IV access using intracath needle connected to either a saline lock or normal saline with minidrip administration set, run to keep vein open (TKO). If IV cannot be started after two attempts, begin transport.
 - 4. Attach ECG chest leads and obtain tracing of initial rhythm.
- E. If indicated, assess patient for proper functioning of pacemaker or ICD (See Appendix G, page 3-19).
- F. Obtain 12-lead EKG if available and transmit to receiving hospital if indicated. Other patient treatments and transport should not be significantly delayed in order to obtain a 12-lead EKG.
- G. When medical control is indicated, establish ASAP.

Specific Cardiac Conditions

Chest Pain - Suggestive of Ischemia	
<p>Patients with any of the following chief complaints or presenting problems should be treated as a suspected MI unless ordered otherwise. If in doubt, contact physician and discuss case:</p> <p>Chest pain or pressure in any patient over age 30</p> <p>Syncopal episode in any patient over age 50 (without suspicion of stroke)</p> <p>Atypical cardiac pain, i.e., shoulder, arm, or jaw pain in absence of chest pain (especially in patient with past cardiac history)</p> <p>Acute onset fatigue, SOB or diaphoresis in patient with past cardiac history (especially elderly)</p> <p>Unexplained respiratory distress</p>	

Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin standing orders for cardiac problems. Do not delay nitro to establish IV access. 2. For cardiac pain, administer nitroglycerin 0.4 mg SL tablet or one metered dose spray if patient's systolic BP \geq 110 (Consult with medical control physician if SBP <110). Check BP immediately prior to and after administration. 3. For any suspected MI, even in absence of chest pain, administer 160 to 325 mg aspirin PO if no history of allergy. 4. Establish IV access. If patient has been loaded in the ambulance without IV access, begin transport promptly, with IV and all other interventions performed en route. 5. If no relief and patient's SBP remains 110 or greater may repeat nitro every five minutes. Recheck BP before and after administration. 6. If pain persists after 3 nitro and SBP remains 110 or greater may give morphine sulfate 2-10 mg IV titrated to obtain pain relief. (Use caution in presence of COPD). <ol style="list-style-type: none"> a. If patient is allergic to Morphine Sulfate may use Dilaudid 1-2 mg IV/IM. 	<p><i>Continued</i></p>

Chest Pain - Suggestive of Ischemia (continued)	
Standing Orders	After Obtaining Verbal Orders
<p>7. Monitor vital signs. If respiratory depression or hypotension occurs after administration of MS or Dilaudid ventilate patient as necessary and administer Narcan 0.4 - 2 mg IV. Notify a medical control physician.</p> <p>8. After administration of at least 3 nitro if authorized and transport time is greater than 10 minutes, consider administration of nitro drip (see Appendix K, page 3-33.)</p> <p>9. If patient potential candidate for reperfusion therapy, assure following info has been communicated to receiving E.D. prior to arrival:</p> <ul style="list-style-type: none"> a. patient age/sex b. vital signs c. pain - time of onset & response to nitro d. dosage and response to MS, if given e. any Hx recent surgery or trauma f. any Hx bleeding problems g. any CNS disease h. Hx of previous lytic therapy i. Pregnancy j. results of 12-lead EKG if available <p>Consider requesting diversion if difference in transport times to requested hospital vs. closest hospital is >30 minutes.</p>	<p>10. If patient potential candidate for reperfusion therapy, consider diversion if difference in transport times to requested hospital vs. closest hospital is > 30 minutes.</p>

Suspected Pulmonary Edema

Condition characterized by tachypnea, labored respirations, anxiety and agitation, fatigue, rales, JVD, possible peripheral edema, frothy sputum and/or cyanosis. Condition attributed to cardiac pump problem versus heart rate problem, volume problem or respiratory disease.

Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin standing orders for cardiac problems. Do not delay nitro to establish IV access. 2. Keep head elevated at all times. Begin oxygen therapy. If respiratory distress severe; consider positive pressure ventilatory assist if patient able to tolerate. Consider ET intubation, if authorized, if patient's ventilations ineffective or Glasgow Coma Score < 8. 3. Monitor ECG closely for dysrhythmias secondary to hypoxia. 4. Give nitroglycerin SL 0.4 mg tablet or 1 metered dose spray if systolic BP 140 or greater. (Consult with medical control physician if SBP <140 and check BP immediately prior to and after each nitro administration.) <ol style="list-style-type: none"> a. 2 minutes after initial dose repeat nitroglycerin 0.4 mg SL or 1 metered dose spray if patient still has signs of pulmonary edema and systolic BP remains 140 or greater. b. 5 minutes after second dose repeat nitroglycerin 0.4 mg SL or 1 metered dose spray if patient still has signs of pulmonary edema and systolic BP 140 or greater. 5. If no relief and patient's SBP remains 140 or greater: <ol style="list-style-type: none"> a. May repeat nitro every five minutes. Recheck BP before and after administration. Or b. After administration of at least 3 nitro if authorized and transport time is greater than 10 minutes, consider administration of nitro drip (Appendix K, page 3-33). 6. Give Aspirin 160 to 325mg PO if no history of allergy. 7. Contact medical control physician for further orders. 	<ol style="list-style-type: none"> 8. Consider morphine 2-4 mg IV. 9. Consider Lasix 40 mg IV.

Cardiogenic Shock/Pump Failure	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Suspect when myocardial ischemia symptoms accompanied by hypotension/shock symptoms in the absence of major dysrhythmias. 2. Begin standing orders for cardiac problems. 3. Contact medical control physician for orders. 	<ol style="list-style-type: none"> 4. Treatment based on patient history and physical exam findings.

Cardiac Arrhythmias

Premature Ventricular Contractions (PVC's)	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Always consider a treatable cause such as bradycardia or hypoxia. 2. If PVC's thought to be secondary to myocardial ischemia, contact a medical control physician. 	<ol style="list-style-type: none"> 3. Consider Lidocaine 1.0-1.5 mg/kg (70 kg = 70 - 100 mg) IV over two minutes (assuming adequate sinus rate). Repeat: 0.5-0.75 mg/kg (70 kg = 35-50 mg) slowly IV every 5-10 min. to a total dose of 3 mg/kg (70 kg = 200 mg). Use 1/2 lidocaine dose (0.5-0.75 mg/kg) if patient's age over 70 or if CHF or hepatic failure present.

Bradycardia (Patient Not in Cardiac Arrest)	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Establish ABC's, oxygen, IV access, vital signs, pulse oximetry and 12-lead ECG if available. 2. Consider treatable causes for bradycardic rhythms (e.g. hypoxia, AMI) 3. Assess for serious signs or symptoms due to bradycardia: <ul style="list-style-type: none"> • Shortness of breath • Chest pain • CHF • Decreased level of consciousness • Hypotension • PVC's in setting of AMI <ol style="list-style-type: none"> a. If serious signs or symptoms present: <ul style="list-style-type: none"> - Give atropine 0.5 mg IV - Begin transcutaneous pacing consider sedation (see Appendix H.) b. If <u>no</u> serious signs or symptoms present and ECG rhythm is Type II second-degree AV block or Third-degree AV block: <ul style="list-style-type: none"> - Prepare transcutaneous pacer - If symptoms develop, begin transcutaneous pacing consider sedation (see Appendix H) c. If <u>no</u> serious signs or symptoms and bradycardic rhythm is <u>NOT</u> Type II second-degree AV block or Third-degree AV block: <ul style="list-style-type: none"> - Monitor patient closely d. Contact a medical control physician for further orders if necessary. 	

See ALS algorithm for Bradycardia page 3-34.

Stable Tachycardias	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. No serious signs or symptoms (shortness of breath, chest pain, dyspnea on exertion, altered mental status, pulmonary edema, rales, rhonchi, hypotension, orthostasis, JVD, peripheral edema, and/or ischemic ECG changes) 2. Initial assessment identifies 1 of 4 types of tachycardias: <ol style="list-style-type: none"> 1) Atrial Fibrillation/Atrial Flutter; 2) Stable Wide Complex; 3) Tachycardia: Unknown Type, Stable Monomorphic and/or Polymorphic VT <ol style="list-style-type: none"> a. Monitor vital signs and ECG closely b. Obtain 12-lead ECG if available c. Treat changes in patient condition as appropriate 4) Narrow Complex Tachycardias <ul style="list-style-type: none"> - 12-lead ECG, if available - Attempt Valsalva maneuver - Adenosine 6 mg rapid IV push (over 1-3 seconds) followed by 20 ml normal saline flush. May repeat additional 12 mg dose in 3-5 minutes if necessary. 3. Contact medical control physician for further orders if necessary 	

See ALS algorithm for Tachycardias page 3-35.

Unstable Tachycardias	
Standing Orders	After Obtaining Verbal Orders
<p>1. Establish rapid heart rate as cause of serious signs and symptoms (shortness of breath, chest pain, dyspnea on exertion, altered mental status, pulmonary edema, rales, rhonchi, hypotension, orthostasis, JVD, peripheral edema, and/or ischemic ECG changes)</p> <p>Rate related signs and symptoms occur at many heart rates but seldom <150 bpm.</p> <p>2. If ventricular rate is > 150 bpm, prepare for immediate cardioversion.</p> <p>3. Have available:</p> <ul style="list-style-type: none"> a. Oxygen saturation monitor b. Suction c. IV line d. Intubation equipment <p>4. Premedicate patient whenever possible, effective regimes include:</p> <p>Sedative:</p> <ul style="list-style-type: none"> a. Midazolam 2mg slow IV (up to total of 5mg) OR b. Etomidate 0.2-0.6 mg/kg IV (typical dose 10 mg) <p><i>with or without an Analgesic:</i></p> <ul style="list-style-type: none"> c. Morphine 2-10 mg IM/IV <p>5. Synchronized cardioversion (energy rates as prescribed by current AHA ACLS guidelines e.g., 100 J, 200 J., 300 J., 360 J. or biphasic equivalent) for:</p> <ul style="list-style-type: none"> a. Ventricular Tachycardia b. PSVT c. Atrial Fibrillation d. Atrial Flutter <p>6. Contact medical control physician for further orders if necessary.</p>	

See ALS algorithm for Tachycardias page 3-35.

Cardiac Arrest States

Ventricular Fibrillation and Pulseless Ventricular Tachycardia	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Institute or continue CPR. 2. Assess and confirm Pulseless VT/VF then defibrillate up to 3 times, if necessary (energy rates as prescribed by current AHA ACLS guidelines; e.g. 200 J, 200 to 300 J, 360 J, or equivalent biphasic). 3. Reassess rhythm, if defibrillation results in a change in rhythm, proceed to the appropriate protocol. If rhythm remains unchanged or recurs continue this protocol. 4. Secure airway; confirm tube placement by exam plus confirmation device (End-Tidal Carbon Dioxide Detection Device or Endotracheal Tube Locator). 5. Obtain IV access 6. Administer Epinephrine 1 mg every 3-5 min. Or Vasopressin 40 U IV, single dose, one time only. 7. Defibrillate up to 3 times, (energy rates as prescribed by current AHA ACLS guidelines; e.g. 200 J, 200 to 300 J, 360 J, or equivalent biphasic). 8. Consider Amiodarone 300 mg IV. Or Lidocaine 100 mg IV may repeat in 3-5 min. (max. total 3 mg/kg). 9. Defibrillate up to 3 times after each drug dose. 10. Consider Sodium Bicarbonate 1 amp (50mEq) IV. 11. Contact medical control physician for further orders. 	<ol style="list-style-type: none"> 12. Consider Amiodarone 150 mg IV 13. Consider magnesium sulfate 1-2 g IV 14. If no response consider termination of resuscitative efforts.

See ALS algorithm for VF/Pulseless VT page 3-36.

Asystole	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Institute or continue CPR. 2. Rapid scene survey: Is there any evidence that resuscitation should not be attempted (e.g., DNR orders, conditions incompatible with life) 3. Secure airway; confirm tube placement, effective ventilation and oxygenation. 4. Assess and confirm asystole (check second lead to verify) 5. May consider transcutaneous pacing If considered, perform immediately (see Appendix H, page 3-20.) 6. Obtain IV access. 7. Administer Epinephrine 1 mg, repeat q 3-5 min. 8. Administer Atropine 1 mg, repeat q 3-5 min (up to total of 3 mg) 9. Contact medical control physician for further orders. 	<ol style="list-style-type: none"> 10. If no response consider termination of resuscitative efforts.

See ALS algorithm for Asystole page 3-37.

Pulseless Electrical Activity (PEA)	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Institute or continue CPR. 2. Secure airway; confirm tube placement, effective ventilation and oxygenation. 3. Assess and confirm rhythm as PEA (rhythm on monitor without detectable pulse) 4. Review the most frequent causes of PEA, treat according to protocols if present: <ul style="list-style-type: none"> • Hypovolemia – fluids, PCT • Hypoxia – ventilation and oxygenation • Hypothermia – re-warming (see Hypothermia protocol) 5. Obtain IV access. 6. Administer Epinephrine 1 mg, repeat every 3-5 min. 7. If PEA rate is <i>slow</i> (<60 bpm) administer Atropine 1 mg, repeat every 3-5 min (up to total of 3 mg) 8. Contact medical control physician for further orders. 	<p><i>Consider for:</i></p> <ul style="list-style-type: none"> • Acidosis – hyperventilation & NaHCO • Hyperkalemia – CaCl & NaHCO • Tension pneumothorax – needle chest decompression • Drug overdose – intubation & specific antidote • Coronary thrombosis - 12-lead ECG <p><i>No specific pre-hospital treatment for:</i></p> <ul style="list-style-type: none"> • Hypokalemia • Cardiac tamponade • Pulmonary embolism <ol style="list-style-type: none"> 9. If no response consider termination of resuscitative efforts.

See ALS algorithm for PEA page 3-38.

Special Situations/Considerations in Cardiac Arrest	
Standing Orders	After Obtaining Verbal Orders
<p>1. For renal patients in cardiac arrest contact a medical control physician for consideration of treatment of hyperkalemia.</p>	<p>2. Consider for treatment of hyperkalemia:</p> <ul style="list-style-type: none"> a. calcium chloride 10 ml (1 gm) IV b. sodium bicarbonate 50 mEq IV <p>3. May consider use of pneumatic compression trousers (PCT) for any cardiac arrest patient.</p>

PART III. MEDICAL EMERGENCIES

Shock, Non-Traumatic	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy and quickly complete patient assessment. 2. Place patient in pneumatic compression trousers (PCT): <ol style="list-style-type: none"> a. For suspected ruptured AAA, inflate irrespective of blood pressure; b. For suspected ruptured ectopic pregnancy, inflate if systolic BP <90; c. For all other hemorrhagic and non-hemorrhagic conditions, do not inflate without verbal orders. 3. Begin transport immediately 4. Start Normal Saline IV en route. 5. Contact a medical control physician for further orders. 	<ol style="list-style-type: none"> 6. Consider volume loading for hypotension.

Anaphylaxis	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy; assist respirations with PPV as needed; ET intubate, if authorized, for severe respiratory distress and/or ineffective ventilation. 2. Consider placing venous tourniquet proximal to sting or injection site, and/or ice pack at sting or injection site. 3. May administer Epinephrine 0.3 mg 1:1000 or one adult EpiPen SC if patient was exposed to commonly recognized allergen and has respiratory distress OR systolic BP <90. 4. Start Normal Saline IV. 5. If patient meets criteria in #3 above, may also administer diphenhydramine HCL (Benadryl) 25 mg IV or, if unable to start IV, 50 mg IM while contacting a medical control physician. 	<ol style="list-style-type: none"> 6. Consider epinephrine 0.05-0.1 mg 1:10,000 solution (0.5-1 ml) IV. If no IV line, 0.3 mg 1:1000 Epinephrine (0.3 ml) or one adult EpiPen may be given subcutaneously or injected into the base of the tongue (unconscious patient only). 7. Consider pneumatic compression trousers (PCT) and/or volume loading for hypotension.

Asthma Attack	
Standing Orders	After Obtaining Verbal Orders
<p>1. If patient breathing:</p> <ul style="list-style-type: none"> a. Begin oxygen therapy. b. For patients in moderate-to-severe respiratory distress, may administer on-site Terbutaline 0.25 mg SC if patient <60 years AND no history of cardiac disease. c. Consider ECG monitoring in older asthmatics receiving parental medications. d. Move patient to ambulance and begin transport. e. En route to hospital, may give nebulized albuterol 2.5 mg with Atrovent 0.5 mg added. May repeat neb of albuterol 2.5 mg with Atrovent 0.5 mg x1. f. Contact a medical control physician for patients with continued moderate-to-severe respiratory distress after two nebs. g. Consider ET intubation. <p>2. If patient in respiratory arrest:</p> <ul style="list-style-type: none"> a. Insert oral airway and begin positive pressure ventilation. Ventilate with short insp:long exp ratio at rate of 8-10/min. 	<ul style="list-style-type: none"> h. Consider medications if not already given: <ul style="list-style-type: none"> - Nebulized albuterol 2.5 mg with Atrovent 0.5 mg added. May repeat immediately if no relief; - Terbutaline 0.25 mg SC. i. Consider 0.3 mg Epinephrine 1:1000 (0.3 ml) or one adult EpiPen SC. j. If unresponsive to other treatments and in impending respiratory failure, may consider magnesium sulfate 1 Gm diluted to 10 ml with Normal Saline or sterile H₂O and given IV push over 1 min. <p style="text-align: right;"><i>Continued</i></p>

Chronic Obstructive Pulmonary Disease (COPD) Acute Exacerbation	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If history of COPD and symptomatic (presence of wheezing alone does not indicate COPD) <ol style="list-style-type: none"> a. En route to hospital, may give nebulized albuterol 2.5 mg with Atrovent 0.5 mg added. May repeat neb of albuterol 2.5 mg with Atrovent 0.5 mg x1. b. Contact a medical control physician for patients with continued moderate-to-severe respiratory distress after two nebs. 	<ol style="list-style-type: none"> c. Treatment based on patient history and physical exam findings.

All Other Respiratory Distress	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin appropriate oxygen therapy. ET intubate, if authorized, for severe distress and/or ineffective ventilation. 2. Consult with a medical control physician immediately if tension pneumothorax suspected. 	<ol style="list-style-type: none"> 3. Consider needle thoracostomy if strong evidence of tension pneumothorax (i.e. increased respiratory distress; weak, rapid pulse; cyanosis; hypotension; uneven chest wall movement; decreased lung sounds on affected side). Perform needle thoracostomy at 2nd intercostal space, midclavicular line of affected side. See Appendix M (page 3-43). 4. Treatment based on patient history and physical exam findings.

Status Seizures	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Position patient to maintain airway. Begin oxygen therapy. 2. Attempt IV access x 1. <ol style="list-style-type: none"> a. If seizure ongoing >5 minutes and IV successful after one attempt, administer midazolam (Versed) IV, titrated 1 mg at a time up to a maximum dose of 10 mg. b. If seizure ongoing >5 minutes and unable to start IV after 1 attempt immediately give midazolam (Versed) 10 mg IM prior to further attempts to establish IV. Be prepared to support respirations. 3. Determine blood glucose and treat hypoglycemia per protocol. 4. Contact medical control physician for further orders if necessary. 	

Unconscious - Unknown Etiology	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. 2. Obtain IV access. 3. Attempt to obtain blood sample for reading by blood glucose determination device. 4. If blood glucose <60, may give 50 ml D₅₀W IV. If IV access difficult or impossible, may give glucagon 1 mg IM. 5. Contact a medical control physician for orders. 	<ol style="list-style-type: none"> 6. If suspected narcotics overdose, consider up to 2 mg Narcan IV. 7. Give or repeat 50 ml D₅₀W IV as appropriate. 8. Consider additional Narcan up to 10 mg IV.
<ol style="list-style-type: none"> 9. Immobilize on backboard prior to transport unless trauma can definitely be ruled out. 	

Symptomatic Known Diabetic	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Determine blood glucose 2. If conscious, give sugar, 50 ml of D₅₀W or 80 Gm of oral glucose 3. If patient unable to take oral fluids due to altered level of consciousness: <ol style="list-style-type: none"> a. Obtain IV access. b. Give 50 ml D₅₀W IV. c. May give glucagon 1 mg IM if IV access difficult or impossible. 4. Contact medical control physician for: <ol style="list-style-type: none"> a. patients with poor response to glucose administration b. patients on oral hypoglycemic agents c. all patients refusing transport following response to treatment with oral glucose or parenteral medications 	<ol style="list-style-type: none"> 5. Consider transport of all patients on oral hypoglycemic agents.

Drug Overdose	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. 2. Tricyclic overdoses requiring ventilatory support should be hyperventilated. 3. For any patient with respiratory rate <8, or history, or physical findings consistent with narcotics overdose assist ventilation and may give up to 2 mg Narcan IV. 4. For all suspected tricyclic overdoses, also monitor ECG. 	<ol style="list-style-type: none"> 5. Consider additional Narcan up to 10 mg. 6. Consider Sodium Bicarbonate 50 mEq IV in tricyclic ingestion. 7. Consider glucagon 1 mg IV for known beta blocker overdose. 8. Consider calcium chloride 1 Gm for known calcium channel blocker overdose with hypotension or bradycardia.

Suspected CVA	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Assess ABCs and vital signs 2. Provide oxygen per nasal cannula and obtain IV access 3. Check blood sugar and treat if indicated 4. Perform neurological tests (Cincinnati Prehospital Stroke Scale, includes difficulty speaking, arm weakness, facial droop) 5. Establish time of onset of symptoms and notify receiving hospital of suspected stroke patient. Expedite transport. 6. If patient is a potential candidate for reperfusion therapy, consider requesting diversion if difference in transport times to requested hospital vs. closest hospital is >30 minutes 	<ol style="list-style-type: none"> 7. If patient is a potential candidate for reperfusion therapy, consider diversion if difference in transport times to requested hospital vs. closest hospital is > 30 minutes.
<ol style="list-style-type: none"> 8. Obtain ECG (12-lead ECG if practical) check for arrhythmias 	

Suspected Carbon Monoxide Poisoning	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. If patient unconscious use partial rebreathing mask or assist respirations with positive pressure oxygen. 2. Monitor ECG. 3. Contact a medical control physician to consider need for transport directly to HCMC for hyperbaric oxygen therapy. 	<ol style="list-style-type: none"> 4. Consider transport directly to HCMC for hyperbaric oxygen therapy.

Symptomatic Renal Patient (SPB <90) With Known or Suspected Hyperkalemia	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. 2. Monitor ECG. 3. Obtain IV access. If fluids hung, keep flow rate minimal. 4. Contact a medical control physician. 	<ol style="list-style-type: none"> 5. Consider calcium chloride 10 ml (1 Gm) IV or more if indicated. 6. Consider sodium bicarbonate 50 mEq IV. 7. Other treatments based on patient history and physical exam findings.

PART IV. TRAUMATIC EMERGENCIES

Standing Orders for All Traumatic Emergencies

- A. Begin oxygen therapy as early as possible in all traumatic emergencies.
- B. Insert oral or nasal airway in all unconscious patients. Do **not** insert EOA in apneic patients with bleeding from facial, mouth, or throat trauma. May ET intubate, if authorized, patients with severe respiratory distress and/or ineffective ventilation or Glasgow Coma Score <8.
- C. Except in unusual circumstances, spine immobilization should be performed if a trauma patient:
 - 1. complains of pain in the spinal area;
 - 2. has experienced head trauma or a mechanism of injury that may be associated with spinal column injury, including penetrating injury to the neck or trunk, and has any of the following findings:
 - a. altered level of consciousness or Hx of loss of consciousness;
 - b. any abnormal neurological findings;
 - c. evidence of alcohol or other drug ingestion;
 - d. multiple facial lacerations or maxillofacial injuries or evidence of scalp hemorrhage or hematoma.
- D. The pneumatic compression trousers (PCT) may be used for the splinting of lower extremity fractures only when it is indicated for other injuries; otherwise, extremity splints (especially traction splints) are more appropriate.
- E. Consider pain management per protocol. See "Pain Management" page 1-7.
- F. All intravenous lines, whether started on standing orders or physician's verbal orders, should be started **in transit** to the hospital. (The only exception is when there is an unavoidable delay moving the patient from the scene, i.e., trapped in auto, etc.) IV fluids should be hung whenever IV access is established for trauma.
- G. Under no circumstances should transport of critical trauma patients be delayed for detailed physical examination and/or treatment of non-life-threatening injuries. Set priorities and expedite transport.
- H. Attempt to notify the receiving hospital as soon as possible when transporting a critical trauma patient. See "Patient Disposition" page 1-8.

General Trauma/Traumatic Shock	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. 2. Spinal immobilization as appropriate. 3. Consult a medical control physician immediately if tension pneumothorax suspected. 5. Apply pneumatic compression trousers (PCT) on any patient with significant trauma: <ol style="list-style-type: none"> a. Do <u>not</u> inflate without verbal orders if patient has chest injury or penetrating injury of neck. b. Inflate if evidence of intra-abdominal and/or pelvic hemorrhage. c. Inflate for external hemorrhage that can be controlled if systolic BP less than 90. d. Inflate if attempting resuscitation of a traumatic arrest. 6. Transport. 7. Start IV Normal Saline while en route on any patient with severe trauma. If SBP <90, run wide open until BP reaches 90, then TKO. 	<ol style="list-style-type: none"> 4. Consider needle thoracostomy if strong evidence of tension pneumothorax (i.e. increased respiratory distress; weak, rapid pulse; cyanosis; hypotension; uneven chest wall movement; decreased lung sounds on affected side). Perform needle thoracostomy at 2nd intercostal space, midclavicular line of affected side. See Appendix M (page 3-43).

Isolated Head and Spine Injuries	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Spinal immobilization as appropriate. 2. Monitor spine injury patients closely for neurogenic shock and/or respiratory problems. 3. If clinical evidence of herniation, consider mild hyperventilation. 4. If patient unconscious, start IV Normal Saline and run TKO if BP > 90. If BP < 90, treat per Traumatic Shock protocol. 5. If time permits, determine blood glucose and treat hypoglycemia per protocol. 	

Amputations	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Patient: <ol style="list-style-type: none"> a. Control hemorrhage and cover stump with sterile dressing saturated with saline; b. Treat as per protocol for General Trauma/Traumatic Shock; c. Do not spend excessive time looking for amputated part if patient unstable. 2. Amputated Part: <ol style="list-style-type: none"> a. Wrap part in sterile gauze; b. Moisten with saline; c. Place in plastic bag; d. Place on ice, if available, or cold packs (do not freeze). 	

PART V. OTHER EMERGENCIES

Hypothermia	
Standing Orders	After Obtaining Verbal Orders
<p>Standing orders for all hypothermic patients:</p> <ul style="list-style-type: none"> • Remove wet garments • Protect against further heat loss and wind chill (use blankets and insulating equipment) • Maintain horizontal position • Avoid rough movement and excess activity • Monitor cardiac rhythm • Assess responsiveness, breathing and pulse • Do pulse check for 30-45 seconds (clinical signs of death may be misleading). <ol style="list-style-type: none"> 1. Pulse and breathing present: <ol style="list-style-type: none"> a. Begin oxygen therapy. b. Begin transport immediately. c. Obtain IV access en route. d. Monitor ECG. e. Rewarming: <ul style="list-style-type: none"> - Mild Hypothermia (temperature $\geq 92^{\circ}$ F or if patient is shivering) – Passive rewarming, active external rewarming. - Moderate hypothermia (temperature $\geq 86^{\circ}$ F to $< 92^{\circ}$ F or if patient is shivering) – Passive rewarming, active external rewarming to truncal areas only (neck, armpits, groin). - Severe hypothermia (temperature $< 86^{\circ}$ F) – transport for active internal rewarming. 2. For pulseless patients, with or without organized ECG rhythm: <ol style="list-style-type: none"> a. Begin CPR. b. For VF/VT, defibrillate up to 3 times (energy rates as prescribed by current AHA ACLS guidelines; e.g. 200 J, 200 to 300 J, 360 J, or equivalent biphasic). Withhold drugs and further shocks and transport immediately. c. Obtain IV access and contact medical control physician en route. d. Warm packs should not be used. 	<ol style="list-style-type: none"> e. May consider cardiac arrest drugs and defibrillation but they are usually not effective until hypothermia is corrected.

Hyperthermia	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. 2. Begin cooling measures. Apply cool packs, if available, to head and truncal areas. Suspend cooling measures if shivering occurs. 3. If patient confused or unconscious, start IV Normal saline. May infuse up to 300 ml without further orders. 4. Transport lights and siren, monitoring ECG en route. 	

Chemical Eye Injuries	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Attempt to remove contact lenses, if present. 2. Immediately and continuously flush the affected eye(s) with normal saline solution for a minimum of 20 minutes, continuing en route to hospital. May insert Morgan lenses for irrigation if authorized. 3. Begin transport. 4. If patient is agitated or unable to hold eyelid open for irrigation, instill Proparacaine HCL, 0.5% solution, 1-2 drops, into the affected eye(s). May be repeated only once. 	

Burns	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. For any significant burn: <ol style="list-style-type: none"> a. Begin oxygen therapy. Use positive pressure ventilatory assist as needed. b. Obtain IV access. 2. If less than 20% of body surface, apply sterile dressings and saturate with cool water (leave Gel-pack in place if applied by first responders). Do not allow any burn patient to become chilled and shiver. 3. More than 20% of body surface: <ol style="list-style-type: none"> a. Remove any non-adherent burned clothing and cover patient with sterile sheet. b. Do not cool down with water (exception: presence of smoldering clothes, articles or material adhering to skin that would continue burning process, i.e., hot tar, etc.). c. Begin rapid transport and contact a medical control physician for further orders and destination decision. d. Consider direct transport to burn center for major burns. e. Consider pain management per protocol. See "Pain Management" page 1-7. <ul style="list-style-type: none"> - Nitronox should <u>not</u> be used for pain relief if burn involves face or respiratory tract or other contraindications are present (see Appendix E, page 3-10) 4. Electrical burns: monitor ECG for any high voltage burn, including lightning strike, or if extensive low voltage injury present. 	

Behavioral Emergencies	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If patient is severely agitated and poses an immediate threat to self or others <ol style="list-style-type: none"> a. Consider Versed 5 mg IM 2. For continued agitation, contact a medical control physician for further orders. 	<ol style="list-style-type: none"> 3. Consider additional Versed 1-5 mg IV/IM.

Severe Nausea or Vomiting	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If patient has severe nausea or vomiting, start IV and consider Benadryl 25 mg IV/IM. 2. Contact a medical control physician for further medication orders if needed. 	

PART VI. OBSTETRICS

Normal Labor and Delivery	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Obtain pertinent history and perform physical exam. 2. If no imminent delivery, transport patient in position of comfort, usually on left side. 3. If authorized, may consider patient self-administration of nitrous oxide for pain relief if no contraindications present (see Appendix E, page 3-10). 4. If question of imminent delivery, observe briefly, then transport unless delivery in progress. Be prepared to stop ambulance if delivery occurs en route. 5. If delivery in progress: <ol style="list-style-type: none"> a. Assist delivery using clean or sterile technique. b. Suction infant and protect from heat loss. See Pediatric Protocols - Newborn Emergencies page 2-5. c. Double clamp and cut cord 8-10 in. from infant. d. Give infant to mother and allow to nurse. e. Transport; do not wait for or attempt delivery of placenta. f. Closely observe infant for distress and mother for excessive postpartum bleeding. g. Contact a medical control physician 	

Obstetric Complications	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy for any complications. 2. Immediate transport for: <ol style="list-style-type: none"> a. prepartum or postpartum hemorrhage (moderate-heavy), b. limb presentation, c. prolapsed umbilical cord, d. known multiple fetuses, e. previous cesarean section. 3. Start IV Normal Saline en route. 4. If hypotensive, position patient on left side. 5. For postpartum hemorrhage: <ol style="list-style-type: none"> a. Oxygen therapy. b. Massage uterus gently. c. Consult med control physician regarding use of pneumatic compression trousers (PCT). 6. For prolapsed umbilical cord: <ol style="list-style-type: none"> a. Oxygen therapy. b. Place mother in knee-chest position or Trendelenburg. c. Insert gloved finger into vagina and hold presenting part off cord. d. Do not touch or attempt to replace cord. 7. For infant distress see Pediatric Protocols - Newborn Emergencies page 2-5. 8. Contact a medical control physician for further orders for any complication. 	

2. ALS Protocols for Pediatric Patients

Age limits for pediatric patients must be flexible. For age less than 13 years, pediatric orders should always apply. Between the ages of 13 and 18, judgement should be used, although the pediatric orders will usually apply. It is recognized that the exact age of a patient is not always known.

PART I. GENERAL GUIDELINES

- A. Age limits for pediatric and adult medical protocols must be flexible. For age less than 13 years, pediatric orders should always apply. Between ages 13 and 18, judgment should be used, although the pediatric orders will usually apply. It is recognized that the exact age of a patient is not always known.
- B. Patient Consent and Refusal: Consent or refusal of treatment/transport of minors (less than 18 years) must be given by the child's parent or legal guardian. Although less desirable, consent or refusal may be given by a responsible adult (over age 18) caretaker if the parent has deliberately left the minor in the care of this adult, and the adult is competent and capable. If unsure whether it is appropriate to allow someone to give consent or refuse treatment of a minor, a medical control physician should be consulted. (Also, see Adult Protocols).
- C. Parents should be allowed to stay with children during evaluation and transport, if appropriate. The parent's lap is usually the best place for the examination of a stable patient.

Airway Management

- A. Airway Devices
 - 1. Do not hyperextend the neck in newborns and infants.
 - 2. Consider oral airway of appropriate size for all unconscious patients.
 - 3. Use liter flow appropriate to the type oxygen mask being used (simple vs. partial rebreathing).
 - 4. For spontaneously breathing patients in shock, high flow oxygen should be given by partial rebreathing mask.
 - 5. Ventilate using oxygen with pediatric mask or pocket mask when ventilation must be assisted.
 - 6. Do not use a positive pressure valve on patients less than 6 years of age.
 - 7. If epiglottitis is a possibility, **do not** attempt to visualize the throat or pharynx. However, if a patient with an airway obstruction has a respiratory or cardiac arrest, the airway may be visualized with a laryngoscope to rule out a foreign body.
 - 8. EOA or Combitube may be used on adolescents of adult size, at least five feet in height. The decision should be based on size, not age. These airways are to be inserted only in apneic patients unless ordered verbally by the medical control physician, and should be used with caution in trauma patients.

9. Endotracheal intubation (ETI) is not a required procedure but is sanctioned by the Hennepin County EMS System for various categories of pediatric patients. ETI is to be performed only by paramedics trained and authorized to intubate and only for those types of patients specified by the ALS Medical Director. Endotracheal intubation shall be performed in accordance with the information and protocol contained in Appendix B (page 3-3) and consistent with other protocols in this document.
10. Other airway interventions not required but sanctioned by the System are rapid sequence endotracheal intubation and transtracheal needle ventilation for patients that cannot be ventilated by any other means. These interventions must be authorized by a service's ALS Medical Director and shall be performed in accordance with the information and protocols contained in Appendices C and D starting page 3-5.

B. Adjunctive Airway Equipment:

1. Endotracheal Tube Locator: ETTL devices utilize anatomical differences between the trachea and the esophagus to verify proper endotracheal tube placement. ETTLs do not rely on chemical reaction to detect the presence or absence of end-tidal carbon dioxide and may be used in conjunction with an end-tidal CO₂ detector device to confirm tube placement.
2. End-tidal CO₂ monitoring: An end-tidal carbon dioxide (CO₂) detector may be used (but is not required) to accomplish confirmation of endotracheal tube placement and is most reliable in patients with spontaneous circulation. This device may not be able to detect CO₂ in cardiac arrest patients due to extremely low blood flow to the lungs.
3. Pulse oximetry: A pulse oximeter may be used (but is not required) for any patient with suspected hypoxemia, in respiratory distress, or whenever sedating medications are administered. Obtaining a normal pulse oximetry reading does not negate the need for oxygen therapy as specified in these protocols.

C. Drug Administration By Inhalation or Via the Airway:

1. The use of the drug Nitronox for pain relief is not required but is allowed by the System. This intervention must be authorized by a service's ALS Medical Director and administered in accordance with the information and protocol contained in Appendix E (page 3-10).
2. Drugs administered via the endotracheal tube should be instilled as deeply as possible into the tracheobronchial tree using a catheter inserted beyond the distal tip of the ET tube. Drugs may be administered full strength or diluted in 1-2 ml of normal saline.

Cardiac Emergencies

- A. Most critical cardiac states in children are not due to primary cardiac problems but are secondary to respiratory, airway, metabolic, or infectious disorders.
- B. Most standing orders for cardiac arrest states follow the adult orders. Refer to pediatric reference e.g., Broselow Tape, if assistance is needed with drug dosage calculations for pediatric patients.

- C. Contact the medical control physician early when there is a question about the nature of a presumed cardiac emergency in children.

Pediatric IV's

- A. For trauma and shock of other etiology, start IV's en route.
- B. Hang IV fluid (versus saline lock) when the administration of multiple IV medications or the need for fluid volume replacement is anticipated.
- C. Use minidrip IV infusion sets for non-traumatic emergencies and macrodrip sets for trauma or hypotensive patients.
- D. If IV access cannot be established at the scene in two attempts for patients with non-traumatic problems, begin transport to the hospital. There should be no delay at the scene for IV attempts on children with trauma or in shock - these IV's should be started during transport.
- E. Intraosseous infusion is a procedure which is not required, but is sanctioned by the Hennepin County EMS System for use in children under the age of seven years in critical condition when IV access is unobtainable. This procedure must be authorized by a service's ALS Medical Director and performed in accordance with the information and protocol contained in Appendix I (page 3-21).

Pediatric Reference Chart

Age	Wt (Kgs.)	Wt. (Lbs.)	HR	RR	SBP	IV Catheter (G)	Laryngoscope Blade Size	Tracheal Tube Size
Newborn	3-5	6-11	80-180	40-60	70	22-24	0-1 straight	Term Infant 3.0-3.5
6 Months	6-9	12-20	80-180	24-36	90 ± 30	22-24	1 straight	3.5 uncuffed
1 Year	10-11	21-24	80-180	22-30	95 ± 30	20-24	1 straight	4.0 uncuffed
2 Years	12-14	25-31	80-180	20-26	100 ± 20	18-22	2 straight	4.5 uncuffed
4 Years	15-18	32-40	75-150	20-26	100 ± 25	18-22	2 straight or curved	5.0 uncuffed
6 Years	19-22	41-48	70-150	20-24	100 ± 15	18-20	2 straight or curved	5.5 uncuffed
8 Years	24-30	49-66	60-125	18-22	105 ± 15	18-20	2-3 straight or curved	6.0 cuffed
10 Years	31-44	67-96	60-125	18-22	110 ± 20	16-20	3 straight or curved	6.5 cuffed
12 Years	45-49	97-109	60-125	16-22	115 ± 20	16-20	3 straight or curved	6.5 cuffed
14 Years	50+	110+	60-125	14-20	115 ± 20	16-20	3 straight or curved	6.5 cuffed

Adapted from AHA ECC Guidelines

Pediatric Pain Management

To provide relief of pain when indicated for pediatric patients. This protocol is NOT to be used in cases where the patient:

- is hypotensive (i.e. clinical signs of poor perfusion, capillary refill >2 seconds),
- complains of abdominal pain,
- has sustained a head injury,
- has pain determined to be cardiac in origin,
- is in active labor.

Pediatric Pain Management	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Assess pain on 0-10 scale if possible. 2. Inform patient and/or guardians that pain is an important diagnostic parameter and the goal of this protocol is to relieve suffering, not totally eliminate pain. 3. Administer Morphine Sulfate x 1 at 0.1 mg/kg IV/IM/SQ (up to maximum dose of 5 mg). <ol style="list-style-type: none"> a. Inhaled Nitronox may be used as an alternative if available, see Appendix E (page 3-10). <p><i>Note: Refer to pediatric reference e.g., Broselow Tape, if assistance is needed with pediatric vital signs or drug dosage calculations.</i></p> <ol style="list-style-type: none"> 4. Monitor vital signs. If respiratory depression or hypotension occurs after administration of MS, ventilate patient as necessary and administer Narcan 0.01 mg/kg IV (up to a maximum dose of 0.4 mg). Notify a medical control physician. 5. Contact a medical control physician for orders if: <ol style="list-style-type: none"> a. patient is hypotensive, b. head injured, c. complains of abdominal pain, d. further pain medication is required. 	<ol style="list-style-type: none"> 6. Consider initial or additional pain medication as appropriate.

PART II. NEWBORN EMERGENCIES

Standing Orders for Newborn Emergencies

- A. In all situations, minimize heat loss:
 - 1. Dry the newborn well.
 - 2. Increase environmental temperature.
 - 3. Fill two sterile gloves with above-body-temperature (100-104°) water and place next to newborn.
 - 4. Use bunting, swaddler or similar device if patient is stable.
- B. Suction infant:
 - 1. During delivery, suction mouth and oropharynx first, then nose on perineum, before delivery of shoulders.
 - 2. If meconium is present at birth, suction the mouth and oropharynx first, then the nose, gently, but as completely as possible, prior to ventilating.
 - 3. Monitor heart rate. Cease suctioning if heart rate <80 (monitor apical pulse with stethoscope).
- C. Provide physical stimulation if respirations are present but depressed. Suction and position for optimal airway. **Do not** hyperextend the neck.
- D. Assist ventilation if respirations are absent, minimal or heart rate <80. Suction and position for optimal airway. **Do not** hyperextend the neck. May use a pediatric mask or pocket mask with supplemental high flow oxygen. **Do not** use positive pressure oxygen valve.
- E. Perform chest compressions if apical heart rate is <80/minute despite assisted/adequate ventilation.
- F. **Transport early.** Contact a medical control physician as soon as possible after birth. Attempt to maintain body temperature and assure optimal ventilation and oxygenation.

PART III. AIRWAY EMERGENCIES

Pediatric Asthma Attack	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If patient breathing <ol style="list-style-type: none"> a. Begin oxygen therapy. b. Move patient to ambulance and begin transport. c. En route to hospital, may give nebulized albuterol 2.5 mg with Atrovent 0.5 mg added. May repeat neb of albuterol 2.5 mg with Atrovent 0.5 mg x1. d. Contact a medical control physician for patients with continued moderate-to-severe respiratory distress after two nebs. e. Consider ET intubation. 2. If patient in respiratory arrest: <ol style="list-style-type: none"> a. Insert oral airway and begin positive pressure ventilation. Ventilate with short insp:long exp ratio at rate of 8-10/min. b. Insert EOA Combitube (if patient meets size requirements) or, if authorized, ET tube as soon as possible. c. May administer Terbutaline 0.01 mg/kg (0.01 cc/kg) SC maximum dose = 0.25 mg while awaiting contact with a medical control physician. 	<ol style="list-style-type: none"> f. Consider terbutaline or epinephrine 0.01mg/kg 1:1000 (0.01 cc/kg) SC. Maximum dose = 0.25 cc terbutaline or 0.3 cc epinephrine (to be used in field only if condition severe). g. If unresponsive to other treatments and in impending respiratory failure, may consider magnesium sulfate 25 mg/kg IV

Continued

Foreign Body Airway Obstruction	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If the patient is making efforts to clear the airway without success, you may assist with careful back blows (infants only), chest or gentle abdominal compressions (per BCLS Protocols) - avoid abdominal compressions in infants less than one year old. Synchronize with patient's cough. 2. If the patient has lost consciousness, attempt to open the airway (use moderate extension and jaw-lift) and ventilate. Reposition and attempt ventilation again if necessary. If unsuccessful, perform standard obstructed airway maneuvers for infant, child or adult, as appropriate. Position an infant with the head dependent during back blows and chest compressions. 3. Consider direct laryngoscopy and foreign body removal with Magill forceps. 4. If unable to remove by any method, attempt to blow obstruction past the trachea with mouth-to-mask ventilation. Attempt endotracheal intubation if authorized. 5. Transport early. Contact a medical control physician promptly for further orders if necessary. 	

Croup and Epiglottitis	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Keep patient upright at all times when conscious. 2. Begin oxygen therapy. Remove mask if not well tolerated. 3. If child is unconscious, position supine and begin ventilation. 4. Place ECG leads. 5. Transport early. 6. Contact a medical control physician as soon as possible if epiglottitis is suspected or distress is marked. 	<ol style="list-style-type: none"> 7. Consider nebulized epinephrine for suspected croup. <ol style="list-style-type: none"> a. Recommend dosage of 5 mg 1:1000 (5cc) or as specified by service medical director. 8. If unable to neb, may give epinephrine 0.01 mg/kg 1:1000 SC.

PART IV. OTHER PEDIATRIC EMERGENCIES

Pediatric Status Seizures	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Assure patent airway. Begin oxygen therapy. 2. Obtain history: Time of onset, history of previous seizures, other risk factors such as previous trauma, illness, or drugs. 3. Determine blood glucose and treat hypoglycemia per protocol. 4. If seizure ongoing >5 minutes and IV access already established, give midazolam HCL (Versed 0.1 mg/kg IV over two minutes. (maximum dose = 5 mg) 5. If seizure ongoing >5 minutes and no IV access, give midazolam HCL (Versed 0.2 mg/kg IM prior to starting IV (maximum dose = 7 mg). 6. Contact a medical control physician for further orders if necessary. 	<ol style="list-style-type: none"> 7. If seizure not terminated within 10 minutes after Versed give additional 0.05 mg/kg Versed over two minutes (maximum dose = 2.5 mg). <p>Be prepared to support respirations.</p>

Pediatric Anaphylaxis	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy; assist respirations with PPV as needed; ET intubate, if authorized, for severe respiratory distress and/or ineffective ventilation. 2. Consider placing venous tourniquet proximal to sting or injection site and/or ice pack at sting or injection site. 3. May administer epinephrine 1:1000, 0.01 mg/kg (0.01 cc/kg) SC or IM up to 0.3 cc (or EpiPen Jr.) if patient was exposed to commonly recognized allergen and has respiratory distress OR hypotension. 4. Start Normal Saline IV 5. If patient meets criteria in #3 above, may administer diphenhydramine HCL (Benadryl) 1 mg/kg IV/IM while contacting a medical control physician (maximum dose = 50 mg). 7. Transport early. 	<ol style="list-style-type: none"> 6. If patient ET intubated and becomes agitated from increased level of consciousness, may give either: <ol style="list-style-type: none"> a. Versed 0.1 mg/kg titrated up to 1mg IV, IM, or SC. May repeat 8. Consider fluid bolus - 20 cc/kg.

Pediatric Drug Ingestion or Overdose	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy if child obtunded. 2. Tricyclic ODs requiring ventilatory support should be hyperventilated. 3. For all significant overdoses, obtain IV access and contact a medical control physician for orders. 4. For all suspected tricyclic overdoses, also monitor ECG. 	<ol style="list-style-type: none"> 5. Consider Narcan 0.1 mg/kg IM or IV up to 2 mg. 6. Consider Sodium Bicarbonate 1 mEq/kg IV for tricyclic ingestions. 7. If child unconscious and blood glucose <60 mg/dl, consider D₅₀W 1 cc/kg IV up to 50 cc for patients four years or older. For patients three years or younger, use D₂₅W, 2 cc/kg.

Pediatric Unconscious - Unknown Etiology	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Begin oxygen therapy. 2. Obtain available history. 3. Immobilize spine if trauma is possible. 4. Obtain IV access - Transport early if no IV site available. 5. Determine blood glucose. 6. Contact a medical control physician. 	<ol style="list-style-type: none"> 7. If blood glucose <60 mg/dl, may give D₅₀W, 1 cc/kg IV up to 50 cc to patients four years or older. For patients three years or younger, use D₂₅W, 2 cc/kg. 8. Consider Narcan 0.1 mg/kg IM or IV up to 2 mg.

Pediatric Symptomatic Known Diabetic	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. If patient is conscious, cooperative, and able to swallow effectively, give oral glucose therapy. 2. If patient unable to take oral fluids due to altered level of consciousness: <ol style="list-style-type: none"> a. Obtain IV access. b. Determine blood glucose. c. Give D₅₀W, 1 cc/kg up to 50 cc to patients four years or older. For patients three years or younger, use D₂₅W, 2 cc/kg IV. d. May give glucagon 1 mg IM if IV access difficult or impossible. 3. Contact a medical control physician for: <ol style="list-style-type: none"> a. patients with poor response to glucose administration; b. all patients refusing transport following response to treatment with oral glucose or parenteral meds. 	

PART V. PEDIATRIC SHOCK

Standing Orders for All Pediatric Shock

Signs/Symptoms: Cool skin, poor capillary refill, tachycardia, weak peripheral pulses, low BP, altered mental status.

1. Perform primary survey. Perform secondary survey while obtaining history.
2. If trauma, immobilize head and spine.
3. Begin oxygen therapy.
4. Place patient in appropriate size pneumatic compression trousers (PCT) (uninflated) whenever symptoms of shock are present, i.e., cool skin, poor capillary refill, tachycardia, etc.
 - a. Do **not** inflate without verbal order if patient has chest injury or penetrating injury to the neck;
 - b. For other patients with traumatic shock, inflate PCT if SBP is less than lower limit for age (see table below);

<u>Age</u>	<u>Systolic BP Lower Limit</u>
6 mos.	70
2 years	80
4 years	80
6 years	80
8 years	85
10 years & older	90

- c. For all other hemorrhagic and non-hemorrhagic conditions, begin transport and contact a medical control physician en route for orders regarding PCT inflation.
5. Begin transport prior to any other ALS intervention. Position in Trendelenburg if hypotensive.
6. Apply ECG leads after quick-look to establish rhythm.
7. Start IV Normal Saline using macrodrip infusion set. If IV not possible, may attempt IO access (if authorized). Contact a medical control physician for infusion rate; recommended initial bolus = 20 cc/kg (10 cc/lb.)

Continued

PCT Guidelines:

Patient Size:

- >100 lbs: use adult pneumatic compression trousers
- 40-100 lbs: use pediatric PCT
- 20-40 lbs: use toddler PCT (optional equipment)

Precautions:

- Use the lowest effective pressure when inflating PCT.
- Do not apply the abdominal compartment above mid-abdomen on any pediatric patient.
- Monitor adequacy of ventilation carefully whenever the abdominal compartment is inflated.
- Prepare to suction vomitus when abdominal compartment is inflated.

PART V. CARDIAC EMERGENCIES

Pediatric Bradycardia	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Assess and support ABCs as needed, provide oxygen and attach monitor defibrillator. 2. If cardiorespiratory compromise (poor perfusion, hypotension, respiratory difficulty, altered level of consciousness): <ol style="list-style-type: none"> a. Begin chest compressions b. Intubate and assure adequate oxygenation and ventilation. c. If despite oxygenation and ventilation heart rate <60 bpm in infant or child <i>and</i> poor systemic perfusion: <ul style="list-style-type: none"> - Give Epinephrine IV/IO: 0.01 mg/kg (1:10,000, 0.1 mL/kg,) ET: 0.1 mg/kg (1:1000, 0.1 mL/kg). May repeat every 3 to 5 minutes at same dose. - Atropine 0.02 mg/kg (minimum dose: 0.1 mg) may repeat once - Contact a medical control physician for orders to consider pacing. d. If pulseless arrest develops see appropriate protocol 3. If no cardiorespiratory compromise: <ol style="list-style-type: none"> a. Support ABCs, observe and transport 	<ul style="list-style-type: none"> - Consider cardiac pacing (see Appendix H, page 3-20)

See ALS algorithm for Pediatric Bradycardia page 3-40.

Pediatric Tachycardia with Adequate Perfusion	
Standing Orders	After Obtaining Verbal Orders
<p>Assess and support ABCs, provide oxygen and ventilation, attach monitor/defibrillator. Evaluate rhythm:</p> <p>1. Probable ventricular tachycardia - QRS duration wide for age (approximately > 0.08 sec)</p> <p>2. Probable supraventricular tachycardia - QRS duration normal for age (approximately ≤ 0.08 sec)</p> <p>3. Probable sinus tachycardia - QRS duration normal for age (approximately ≤ 0.08 sec)</p>	<p>a. Consider medications</p> <ul style="list-style-type: none"> - Amiodarone 5 mg/kg over 20-60 minutes OR - Lidocaine 1 mg/kg IV bolus (wide complex only) <p>b. Consider Cardioversion (energy rates as prescribed by current AHA ACLS guidelines e.g., 0.5 to 1.0 J/kg; may increase to 2 J/kg if initial dose ineffective) Use sedation if possible (midazolam 0.1 mg/kg IV/IM, maximum: 4 mg)</p> <p>a. Obtain 12-lead ECG, if available.</p> <p>b. Consider Valsalva maneuver</p> <p>c. Consider Adenosine 0.1 mg/kg IV (maximum first dose: 6mg). May double and repeat dose once (maximum second dose 12 mg). Use rapid bolus technique.</p> <p>d. Consider Cardioversion (energy rates as prescribed by current AHA ACLS guidelines e.g., 0.5 to 1.0 J/kg; may increase to 2 J/kg if initial dose ineffective) Use sedation if possible (midazolam 0.1 mg/kg IV/IM, maximum: 4 mg)</p> <p>a. Consider Normal Saline bolus 20 mL/kg IV/IO.</p>

See ALS algorithm for Pediatric Tachycardia with Adequate Perfusion page 3-41.

Pediatric Tachycardia with Poor Perfusion (Pulse Present)	
Standing Orders	After Obtaining Verbal Orders
<p>Assess and support ABCs, provide oxygen and ventilation, attach monitor/defibrillator. Evaluate rhythm:</p> <ol style="list-style-type: none"> 1. Probable ventricular tachycardia - QRS duration wide for age (approximately > 0.08 sec) <ol style="list-style-type: none"> a. Immediate cardioversion (energy rates as prescribed by current AHA ACLS guidelines e.g., 0.5 to 1.0 J/kg; may increase to 2 J/kg if initial dose ineffective) Consider sedation (midazolam, 0.1 mg/kg IV/IM, maximum: 4 mg) but do not delay cardioversion 2. Probable supraventricular tachycardia - QRS duration normal for age (approximately \leq 0.08 sec) <ol style="list-style-type: none"> a. Immediate cardioversion (energy rates as prescribed by current AHA ACLS guidelines e.g., 0.5 to 1.0 J/kg; may increase to 2 J/kg if initial dose ineffective) Consider sedation (midazolam, 0.1 mg/kg IV/IM, maximum: 4 mg) but do not delay cardioversion OR b. Adenosine 0.1 mg/kg rapid bolus IV/IO (maximum first dose: 6mg). May double and repeat dose once (maximum second dose 12 mg) 3. Probable sinus tachycardia - QRS duration normal for age (approximately \leq 0.08 sec) <ol style="list-style-type: none"> a. Consider Normal Saline bolus 20 mL/kg IV/IO. b. Continue to assess and support ABCs, monitor, and provide oxygen and ventilation as necessary. 	<ol style="list-style-type: none"> b. Consider alternative medications <ul style="list-style-type: none"> - Amiodarone 5 mg/kg over 20-60 minutes OR - Lidocaine 1 mg/kg IV bolus (wide complex only) c. Consider alternative medications <ul style="list-style-type: none"> - Amiodarone 5 mg/kg over 20-60 minutes OR - Lidocaine 1 mg/kg IV bolus (wide complex only)

See ALS algorithm for Pediatric Tachycardia with Poor Perfusion page 3-42.

Pediatric Ventricular Fibrillation and Pulseless Ventricular Tachycardia	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Institute or continue CPR. 2. Assess and confirm Pulseless VT/VF then defibrillate up to 3 times, if necessary (energy rates as prescribed by current AHA ACLS guidelines; e.g., 2 J/kg, 2 to 4 J/kg, 4 J/kg). 3. Reassess rhythm, if defibrillation results in a change in rhythm proceed to the appropriate protocol. If rhythm remains unchanged or recurs continue this protocol. 4. Secure airway; confirm tube placement, effective ventilation and oxygenation. 5. Obtain IV access. If IV not possible, attempt IO access (if authorized). Transport early if no readily accessible IV/IO access. <p><i>Note: Refer to pediatric reference e.g., Broselow Tape, if assistance is needed with drug dosage calculations for pediatric patients.</i></p> <ol style="list-style-type: none"> 6. Administer Epinephrine IV/IO: 0.01 mg/kg q. 3-5 min. (1:10,000; 0.1 mL/kg). ET: 0.1mg/kg (1:1000; 0.1 mL/kg) 7. Defibrillate (energy rates as prescribed by current AHA ACLS guidelines e.g., 4 J/kg) within 30-60 seconds. - Pattern should be CPR-drug-shock (repeat) 8. Amiodarone 5 mg/kg bolus IV/IO OR Lidocaine 1 mg/kg bolus IV/IO OR Contact medical control physician for further orders. <ol style="list-style-type: none"> 10. Defibrillate (energy rates as prescribed by current AHA ACLS guidelines e.g. 4 J/kg) after each drug dose, within 30-60 seconds. 	<ol style="list-style-type: none"> 9. Consider: Magnesium 25-50 mg/kg IV for torsades de pointes or hypomagnesemia (max. 2 g). 11. If no response, consider termination of resuscitative efforts.

See ALS algorithm for Pediatric Pulseless Arrest page 3-39.

Pediatric Non-VF/VT Arrest (includes Asystole and PEA)	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Institute or continue CPR. 2. Secure airway; confirm tube placement, effective ventilation and oxygenation. 3. Assess and confirm rhythm as Asystole or PEA 4. Obtain IV access. If IV not possible, attempt IO access (if authorized). Transport early if no readily accessible IV/IO access. <p><i>Note: Refer to pediatric reference e.g., Broselow Tape, if assistance is needed with drug dosage calculations for pediatric patients.</i></p> <ol style="list-style-type: none"> 5. Administer Epinephrine IV/IO: 0.01 mg/kg q. 3-5 min. (1:10,000; 0.1 mL/kg). ET: 0.1mg/kg (1:1000; 0.1 mL/kg) <ol style="list-style-type: none"> 7. If PEA, review the most frequent causes and treat according to protocol if present: <ul style="list-style-type: none"> • Hypovolemia – fluids, PCT • Hypoxia – hyperventilate • Hypothermia – re-warming (see Hypothermia protocol) <ol style="list-style-type: none"> 9. Contact medical control physician for further orders. 	<ol style="list-style-type: none"> 6. Consider alternative medications: <ol style="list-style-type: none"> a. Vasopressors b. Antiarrhythmics c. Buffers 8. <i>Consider for:</i> <ul style="list-style-type: none"> • Acidosis - NaHCO • Hyperkalemia - CaCl & NaHCO • Tension pneumothorax - needle chest decompression • Drug overdose - specific antidote • Coronary thrombosis - 12 lead ECG <p><i>No specific pre-hospital treatment for:</i></p> <ul style="list-style-type: none"> • Hypokalemia • Cardiac tamponade • Pulmonary embolism 10. If no response, consider termination of resuscitative efforts.

See ALS algorithm for Pediatric Pulseless Arrest page 3-39.

3. Appendices to the ALS Protocols

Appendices provide additional resources for users of this ALS protocol book.

Appendix A - ALS Procedures and Medications

ALS Procedures

Required ALS Procedures

- All BLS procedures (including oral and nasal airway insertion and MAST application)
- ECG monitoring/interpretation
- Defibrillation
- Synchronized cardioversion
- Deactivation of implantable cardiac defibrillators (ICD)
- EOA or ETC (Combitube) insertion
- Direct laryngoscopy for foreign body removal using Magill forceps
- Endotracheal suctioning
- Peripheral IV insertion (including external jugular)
- Blood drawing
- Administration of specified drugs by:
 - IV push technique
 - IM and SC injection
 - sublingual injection
 - oral and sublingual administration
 - inhalation (includes nebulization)
- Needle thoracostomy for tension pneumothorax
- Direction of patient in Valsalva maneuver
- Blood glucose measurement
- Uterine massage

Permitted ALS Procedures

- Transcutaneous pacing
- Endotracheal intubation
- Administration of specified drugs via endotracheal tube
- Nitronox administration
- Intraosseous infusion of IV fluids and drugs (adult and pediatric)
- Measurement of peak expiratory flow rate
- Cricothyrotomy
- Percutaneous transtracheal ventilation
- Measurement of end tidal CO₂
- Measurement of O₂ saturation by pulse oximetry
- Bilevel Positive Airway Pressure (BiPAP)/Continuous Positive Airway Pressure (CPAP)
- 12-lead EKGs
- Rapid Sequence Intubation
- Administration of Nitroglycerin by IV drip technique
- Nasogastric tube insertion

ALS Medications**Required Medications Generic (Brand)**

- Adenosine (Adenocard)
- Albuterol (Proventil, Ventolin) - premixed for nebulization - 2.5 mg
- Aspirin (ASA)
- Atropine
- Calcium chloride 10%
- Dextrose 50%
- Diphenhydramine HCL (Benadryl)
- Epinephrine 1:1000 and 1:10,000
- Furosemide (Lasix)
- Glucagon
- Ipratropium bromide (Atrovent)
- Lidocaine hydrochloride
- Magnesium sulfate
- Midazolam HCL (Versed)
- Morphine Sulfate
- Naloxone (Narcan)
- Nitroglycerin tablets or spray - 0.4 mg (grains 1/150)
- Oxygen
- Proparacaine HCL (Alcaine)
- Sodium bicarbonate
- Terbutaline sulfate (Brethine)

Permitted Medications

- Amiodarone (Cordarone)
- Dilaudid
- Oral Glucose (Reactose, others)
- Nitrous Oxide (Nitronox)
- Succinylcholine (Anectine)
- Etomidate (Amidate)
- Vasopressin (Pitressin)
- Nitroglycerin (5 mg/ml IV solution)
- Mark 1 kit

Unapproved Medications

- Ammonia ampules
- Plasmanate
- Synthetic blood products

Appendix B - Endotracheal Intubation

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Candidates:

The categories of patients for whom endotracheal intubation is permitted is determined by a service's ALS Medical Director. The following categories of patients, both adult and pediatric, are potential candidates for endotracheal (ET) intubation in the Hennepin County EMS System:

- Cardiac arrest (non-traumatic)
- Traumatic cardiac arrest
- Respiratory arrest
- Patients with decreased level of consciousness (i.e., Glasgow Coma Score < 8) - trauma and non-trauma
- Conscious patients with respiratory distress who are unable to ventilate adequately - trauma and non-trauma

Procedure - Oral Intubation:

1. Maintain airway and ventilation prior to intubation with oral airway or EOA/Combitube (if already placed) and positive pressure ventilation. An EOA or Combitube already in place should not be removed prior to or after ET intubation.
2. Assemble equipment; select appropriate size tube and blade; check operation of key elements. Put on personal protective equipment.
3. Position patient supine with head in "sniffing" position. If cervical spine injury suspected, have second person maintain neutral position with in-line manual stabilization and performs Sellick's maneuver throughout procedure. Remove all potential airway obstructions.
4. Hyperventilate patient for a minimum of 3 minutes before attempting intubation. Hyperventilation should be repeated for a minimum of one minute anytime 30 seconds without ventilation has elapsed for an intubation attempt.
5. May perform rapid sequence intubation if authorized and if indicated. (See Appendix C, page 3-5)
6. May administer lidocaine 1.0-1.5 mg/kg prior to intubating patients with spontaneous respirations and/or suspected head injury.
7. Holding the laryngoscope blade in the left hand, insert it into the right side of the mouth. Advance the blade along the curvature of the tongue, moving the tongue to the left, out of the field of view.
8. Lift the laryngoscope straight up and slightly towards the patient's feet to expose and visualize the epiglottis and vocal cords. Do not pry back on the blade. With a straight blade, the blade is inserted so the tip lifts the bottom edge of the epiglottis. With a curved

blade, the blade tip is inserted into the vallecula just above the epiglottis, indirectly raising the epiglottis when lifted. It may be necessary to slowly withdraw the blade until the epiglottis and vocal cords come into view. Suction as needed for visibility. If unable to view identifiable structures, have assistant place slight downward pressure on the patient's cricoid cartilage (Sellick's maneuver).

9. Stop and ventilate the patient if more than 30 seconds has elapsed for the intubation attempt. Intubation attempts shall be limited to two unless further attempts are ordered by a medical control physician.
10. While directly visualizing the vocal cords, pass the tip of the ET tube between the cords until the proximal end of tube cuff is $\frac{1}{2}$ inch beyond.
11. Manually secure position of the ET tube while removing the laryngoscope, then the stylet.
12. Inflate the cuff with 5-10 ml of air and check the pilot balloon. Suction the tube and oropharynx as needed.
13. Continue to manually stabilize the tube and ventilate the patient with 100% O₂ with a bag-valve device.
14. Immediately assess tube placement by auscultating over the epigastrium, and then auscultating breath sounds bilaterally. A second method to verify tube placement is required and may include use of an end-tidal CO₂ detector, a endotracheal tube detector device, lighted stylet or an aspirator syringe or revisualization of the cords and ET tube. Remove or reposition tube as necessary.
15. If proper tube placement is confirmed, hyperventilate the patient for at least three minutes.
16. Mark tube depth and stabilize the ET tube with tape or other device. Repeat lung auscultation to check position of the tube after taping procedure is completed. The patient should also be reassessed for proper tube position after any significant movement of the patient (onto the stretcher, down stairs, into the ambulance, etc.) This responsibility belongs to the paramedic and may not be delegated to a First Responder.
17. See General Guidelines (page 1-6) for Sedation of Intubated Patients protocol.

Procedure - Nasal Intubation:

1. Steps 1 - 6 as above.
2. Inspect nares for visible obstructions and select the larger or least obstructed. Insert the ET tube and advance through the naris and along the floor of the nasal passage through the nasopharynx. If resistance is encountered, gently retry to advance the ET tube. If resistance persists, abandon the attempt.
3. As the ET tube approaches the glottic opening, pause to listen for exhaled air coming from the proximal end of the ET tube. Pass the ET tube through the glottic opening during inhalation. If no air movement is heard at the end of the tube, withdraw the ET tube until air movement is heard, and reattempt passage into the trachea.
4. Steps 11 - 16 as above.

Appendix C - Rapid Sequence Intubation

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Procedure Definition:

Rapid Sequence Intubation (RSI) is the administration of a neuromuscular blocking agent and a sedative agent to facilitate endotracheal intubation in a controlled manner and improve ventilation by paralyzing the patient.

Candidates:

Adult and pediatric patients whose clinical condition (hypoventilation, increased intracranial pressure) warrants endotracheal intubation but whose combativeness or gag reflex make them difficult to intubate are candidates for rapid sequence induction. RSI is used to quickly induce unconsciousness and muscle relaxation for easier intubation of this type patient and to avoid side effects such as pain and increased intracranial pressure.

Complications:

- Failure to intubate
- Failure to sedate
- Aspiration
- Hyperkalemia
- Bradycardia in children
- Adverse drug reactions

IV Medications Used For RSI:

- **Atropine** - 0.02 mg/kg (min. dose 0.1 mg): A parasympathetic blocker used to prevent vagally stimulated bradycardia and reduce oral secretions.
- **Etomidate** - 0.3 mg/kg: General anesthetic. A hypnotic with no analgesic activity. Produces unconsciousness in approximately 30-60 seconds with recovery in 3-5 minutes.
- **Lidocaine** - 1 mg/kg: Given before succinylcholine to prevent sudden increase in ICP with intubation of head injured patients.
- **Midazolam** - Adult dose 2-4 mg; Peds dose 0.1 mg/kg (max. dose = 5 mg) may be repeated x 1. Midazolam is a benzodiazepine used to induce unconsciousness.

Precautions: Contraindicated in patients with glaucoma. Use with caution in hypovolemic or hypotensive patients.

- **Succinylcholine** - 1.0-2.0 mg/kg: A depolarizing neuromuscular blocking agent used to induce paralysis. Onset 30-60 seconds (peak 2-3 minutes) with recovery in 3-10 minutes.

Precautions: Contraindicated in patients with severe burns, crush injuries, glaucoma, penetrating eye injuries, significant neuromuscular disease, and history or family history of malignant hyperthermia. Not compatible with IV sodium bicarbonate (flush tubing well between drugs).

Side effects:

- Initial muscle fasciculations - may lead to muscle pain, rhabdomyolysis and myoglobinuria;
- Excessive salivation (blocked by atropine);
- Prolonged respiratory depression;
- Hypotension;
- Bradycardia in children;
- Increased intracranial pressure, transient;
- Malignant hyperthermia

Protocol:

1. Following initial patient assessment, restraint and immobilization and IV access, the patient should be assessed for any contraindications to rapid sequence intubation or its agents. A major contraindication is a likelihood that intubation or ventilation might not be possible, as in cases of limited cervical mobility, receding mandible, limited jaw opening, major facial or laryngeal trauma, upper airway obstruction or distorted facial or airway anatomy.
2. Pre-oxygenate with 100 % O₂ while gathering equipment. Attach ECG and, if available, oxygen saturation monitor as time and help permit. (Do not delay intubation to accomplish in critical setting.)
3. Draw up all medications to facilitate rapid administration and have all ET intubation equipment ready, i.e., ET tubes, laryngoscope, McGill forceps and suction.
4. Premedicate children or any patient with heart rate less than 60 with Atropine 0.02 mg/kg IV push up to 0.5 mg (minimum dose - 0.1 mg).
5. For head injured patient or patient with reactive airway disease, consider premedication with lidocaine 1 mg/kg.

6. Midazolam 2-4 mg (peds: 0.1 mg/kg, max dose = 5 mg) or Etomidate 0.3 mg/kg may be administered prior to or after succinylcholine, depending on clinical circumstances.
7. Before proceeding, ascertain that a good mask seal and open airway can be maintained. If the ability to mask ventilate is in doubt, rapid sequence intubation should not proceed until additional assistance can be obtained.
8. Administer Succinylcholine 1.0-2.0 mg/kg.
9. As spontaneous respirations begin to cease, apply posterior cricoid pressure (Sellick's maneuver) to reduce the likelihood of passive gastric regurgitation and aspiration. It should be maintained until tracheal intubation is confirmed. This also reduces the likelihood of gastric distention resulting from mask ventilation and, therefore, may be done before any positive pressure mask ventilation.
10. Orotracheal intubation (with in-line immobilization if appropriate) can take place when full relaxation of airway muscles occurs (apnea and completely supple jaw), in approximately 30-60 seconds.
11. Once intubation is complete, proper ET tube placement should be confirmed according to endotracheal intubation protocol.

Appendix D - Surgical Airways

Permitted in System only if ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Percutaneous Transtracheal Ventilation (PTV) Protocol

Candidates: Adult and pediatric patients who require ventilation but whose airways cannot be maintained using any nonsurgical approach. Examples are patients with:

- upper airway obstruction
- severe facial trauma
- heavy oropharyngeal bleeding

Procedure:

1. Prepare equipment, including a 10-14 gauge catheter-over-needle, suction equipment, oxygen and jet ventilator and put on protective eye wear, mask and sterile gloves;
2. Position patient with neck in neutral, midline position.
3. Hyperventilate patient if any ability to ventilate.
4. Quickly prep anterior neck with antiseptic.
5. Locate the cricothyroid membrane; the notch just below the "Adam's apple" (thyroid cartilage) and just above the next cartilage (cricoid cartilage).
6. Stabilize trachea and insert needle at 45 degree angle towards feet through cricothyroid membrane while aspirating with syringe. Stop advancing the needle as soon as air is aspirated.
7. Advance catheter over needle, angling downward and placing well into trachea. Withdraw the needle, then re-aspirate to confirm placement.
8. Attach the jet ventilator to the catheter and ventilate (must use reduced pressure - 25-30 psi - for small children).
9. Observe chest rise and auscultate breath sounds bilaterally.
10. Stabilize catheter.

Cricothyrotomy Protocol

Candidates: Any adult patient who requires ventilation but whose airway cannot be maintained using any nonsurgical approach. Examples are patients with:

- upper airway obstruction
- severe maxillofacial trauma
- heavy oropharyngeal bleeding

Procedure:

1. Prepare equipment, including scalpel blade and handle, 4.0 mm ET or tracheostomy tube, syringe, hemostat, suction equipment, oxygen and bag-valve device and put on protective eye wear, mask and sterile gloves;
2. Position patient with neck in neutral, midline position.
3. Hyperventilate patient if any ability to ventilate.
4. Quickly prep anterior neck with antiseptic.
5. Locate the cricothyroid membrane; the notch just below the "Adam's apple" (thyroid cartilage) and above the next cartilage (cricoid cartilage).
6. Stabilize trachea with non-operating hand and with other hand, make a ½inch vertical skin incision. Re-identify landmarks, then make horizontal stab incision through membrane. Leave scalpel in place.
7. Insert hemostat next to scalpel. Open jaws to widen tracheal opening and hold firmly open.
8. Remove scalpel and insert ET tube, directing tip down the trachea until cuff completely in trachea.
9. Inflate ET cuff. Remove hemostat.
10. Ventilate patient with bag-valve device and supplemental oxygen or with oxygen-powered demand valve.
11. Observe chest rise and auscultate breath sounds bilaterally.
12. Control any bleeding with direct pressure and dress incision site.
13. Stabilize ET tube.

Appendix E - Nitrous Oxide (Nitronox) Administration

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Pharmacology and Actions:

Nitronox is a mixture of nitrous oxide (NO₂) and oxygen blended at a fixed 50:50 ratio and administered by inhalation. Nitrous oxide has a potent analgesic effect. It is highly diffusible and rapidly enters the blood stream, saturating the central nervous system to afford pain relief within minutes of administration. Likewise, rapid reversal of analgesia occurs only a few minutes after discontinuation.

Indications:

Pain of many varieties including:

- Headache (non-traumatic)
- Back pain
- Isolated musculoskeletal trauma
- Burns not involving face or respiratory tract
- Other medical condition (i.e., kidney stones, third trimester labor)

Contraindication:

- Respiratory distress from any cause;
- COPD (may cause atelectasis and hypoxemia);
- Multiple trauma or suspected multiple trauma;
- Head injury (unless minor with no loss of consciousness);
- Chest injury/possible pneumothorax;
- Abdominal distention or trauma;
- Shock;
- Decreased or impaired level of consciousness from any cause including ETOH;
- Inability to understand or comply with instructions for use (i.e. dementia, mental retardation, young children);
- Patient actively vomiting;
- Early pregnancy.

Side Effects:

- Drowsiness (common)
- Light-headedness, euphoria, headache, confusion, tingling, slurred speech
- Nausea, vomiting (uncommon)
- Bronchospasm (never documented but possible)

Administration:

Nitrous oxide must be self-administered by the patient. It is intermittently inhaled through a demand valve as needed until pain relief occurs or until drowsiness causes the patient to drop the administration mask or mouthpiece. The patient must be coached on how to self-administer and must hold the mask/mouthpiece himself. The patient should be instructed to breathe as normally as possible and to take the

mask away from his face if he starts to feel drowsy, nauseated or extremely light-headed.

Protocol for Nitronox Administration:

1. Complete initial patient assessment and initiate appropriate treatment including oxygen therapy.
2. Determine if patient is candidate for Nitronox based on indications and contraindications. If uncertain whether Nitronox is contraindicated, do not use.
3. Explain the purpose of the drug, the most common side effects and the use of the equipment to the patient.
4. Turn on the ambulance ventilating fan prior to and during administration of Nitronox. Also use the scavenger unit.
5. Give patient the mouthpiece or mask to hold over nose and begin Nitronox administration. The drug must be totally self-administered by the patient, and the paramedic will not under any circumstances hold the mask on the patient's face.
6. Question the patient about pain relief and note changes in outward expressions of pain. Note and document the time administration began and ended, patient acceptance, degree of pain relief, any changes in vital signs and any side effects.
7. Repeat vital signs at least every 3-5 minutes during Nitronox administration.
8. Oxygen therapy must be resumed in appropriate situations, especially for suspected cardiac problems, whenever patient suspends Nitronox administration and after discontinuing Nitronox.
9. If establishing medical control, report Nitronox administration and results as part of patient report.

Appendix F - "Do Not Resuscitate" (DNR) Guidelines

Background Information

The Hennepin County Emergency Medical Services Council recommends the following guidelines to the ambulance services in Hennepin County to allow prehospital personnel to honor directives limiting cardiopulmonary resuscitation (CPR) from individuals who have refused this treatment.

It is customary medical practice to assume that CPR is performed on all persons found to be in cardiac arrest, in the absence of directives from a primary physician to withhold such action. There are individuals who would decline these therapies or for whom the treatments are without benefit. Such persons may legally and ethically decline these treatments. Since in many cases there is prior knowledge that these services are not wanted or not indicated, the Do-Not-Resuscitate (DNR) or "No CPR" order has been used to implement the decision that CPR is not to be performed.

The Hennepin County EMS Council recommends that the decision to withhold CPR rest with the patient and his or her physician. These recommendations are intended to improve communication of the existence of a DNR order between the physician and the emergency medical personnel who may be summoned in the event of an emergency.

Additional discussion about the use of directives to limit life-extending medical care may be found in Deciding to Forgo Life Sustaining Medical Treatment, 1983, U.S. Government Printing Office and authored by the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, Standards for CPR and ECC (JAMA, October 28, 1992, Vol. 268, No. 16), policies of the Minnesota Medical Association (MN Medicine, Vol. 69, February 1986, p. 12-14), The Hastings Center Guidelines; (Guidelines on the Termination of Life-Sustaining Treatment and the Care of the Dying, p. 32., Hastings Center, Briarcliff Manor, NY 1988) and the recent Joint Committee on Accreditation of Health Care Organizations. (JCAHO. MA1.4.11. Accreditation Manual for Hospitals, 1988).

The Hennepin County EMS Council recognizes a patient's right to refuse treatment as stated in the Patient's Bill of Rights (MN Stat. 144.651) and the responsibility of medical personnel to withhold treatments that have no medical benefit.

Authorized Definition - Do Not Resuscitate:

Do-Not-Resuscitate (DNR, No Code, No CPR): In the event of an acute cardiopulmonary arrest, no cardiopulmonary resuscitation will be initiated.

This order means that prehospital personnel will not initiate or continue cardiopulmonary resuscitation on a patient in cardiac arrest once a valid DNR order is identified. DNR does not mean that the medical care of any other medical condition will be changed or limited.

Establishment of a System for Communicating DNR in the Prehospital Setting at the Time of a Medical Emergency

A. Physician Responsibilities

The physician is responsible for obtaining DNR forms from the Community Health Department, hospice program, nursing agency or long term care facility. The physician is responsible for discussing with the patient and/or family the indications for withholding CPR and explaining the meaning of the DNR order to the individuals involved. The physician should document this discussion in the medical record and ensure that the DNR form is properly completed with the necessary signatures.

The physician should keep one copy in the permanent medical record and give the original to the patient. The physician is responsible for obtaining consent or providing informed disclosure for the DNR order in a manner that conforms with the legal, medical and ethical standards of care. The physician must ensure that proxies, signing request forms on the patient's behalf, do so in a manner that conforms to legal and ethical principles applying to proxy decision making.

The physician is responsible for ensuring that the permanent medical record describes the indications, rationale, and involvement of patients (or proxies) in these decisions in a manner that conforms with legal, ethical and medical standards of care.

B. Ambulance Service Responsibilities

Each ambulance service in the Hennepin County EMS System will operate in accordance with this protocol to allow prehospital personnel to honor the DNR orders.

Each ambulance service has the obligation to inform appropriate personnel of the procedural guidelines when presented with a DNR form, or order written in the medical record.

The recommended paramedic protocol is as follows:

Do-Not-Resuscitate (DNR) orders are orders issued by a patient's physician to refrain from initiating cardiopulmonary resuscitative measures in the event of an acute cardiopulmonary arrest. DNR orders are compatible with maximum therapeutic care and the patient may receive vigorous support (IV, drugs, antishock trousers) up until the point of cardiac or respiratory arrest. DNR orders are valid when the DNR form is properly completed. The DNR form must be signed by the patient/proxy, witness and physician and dated. In the nursing home, DNR orders written in the order section of the medical record are valid if signed by the physician (A DNR form may be used, but is not required in the nursing home.). In the event of uncertainty, resuscitative measures should be initiated.

C. Patient Responsibilities and Rights

A patient has the right to refuse cardiopulmonary resuscitation. The patient should be involved to the greatest degree possible in the decision-making process. Patients are encouraged to discuss these decisions with family members, if appropriate.

When the decision to forego resuscitation is reached between the patient and their physician, a DNR form should be completed, signed and dated by the patient/proxy, physician and witness, or the order should be written in the order section of the medical chart (if one is available), signed by the physician.

The patient, family members or supervising health care agency should keep the form in a readily accessible location or make its presence known during the provision of emergency medical services in the home.

The patient may revoke the decision at any time by destroying the form or informing prehospital providers or family members of their wish for cardiopulmonary resuscitation (CPR) in the event of cardiac arrest.

D. Responsibilities of Health Care Providers Involved in Caring for Patients with DNR Orders (Nursing Homes, Home Hospice, Home Health Care).

1. Nursing Homes/Long Term Care Facilities:

The Hennepin County EMS Council recommends that nursing facilities develop policies and guidelines regarding the writing, implementation and transmission of the DNR order during emergency care. Such guidelines should include consideration of the DNR orders being written in the medical record, signed by the physician and dated.

The EMS Council recommends the use of the standard DNR form in the nursing facility; however, a written order in the medical record is sufficient to transmit the DNR order to paramedics responding to a long-term care facility.

2. Procedural Standards for Home DNR Orders:

DNR orders become effective on the day the DNR request form is signed by the patient or acceptable proxy, the physician and the witness.

DNR orders will remain in effect indefinitely. These orders should be reviewed periodically. Home health care providers supervising the care of patients with DNR orders in private homes are strongly urged to develop policies or guidelines to encourage the proper and safe implementation of this order by medical personnel. Such guidelines may include:

- a. Accountability to proper decision-making principles (including the principle of patient involvement in these decisions).
- b. Documentation of the rationale for these orders in the medical record by the patient's physician.
- c. Procedural requirements for these orders, including regular home surveillance, to ensure that these orders are readily accessible to prehospital personnel.

- d. Periodic review of the DNR order. Health care providers should attempt to ensure that patients and families understand the implementation and revision of DNR orders.

Implementation of DNR Orders During Emergency Medical Care

When prehospital emergency medical personnel arrive, the family, patient or staff should immediately present the resuscitation guidelines form. Until properly completed orders are presented, prehospital personnel will assume that no valid DNR orders exist and proceed with standing orders for resuscitation as medically indicated under medical control.

The DNR order may be rejected and overridden if prehospital personnel have substantive reason to believe the order is invalid or in cases of unusual, suspicious or unnatural causes of cardiac arrest. In the event a patient changes his/her mind regarding the DNR order prior to cardiac arrest or family members request resuscitation or disagreement occurs at the time of cardiac arrest, resuscitative measures should be initiated by prehospital personnel and treatment decisions should be made by the physician responsible for care.

Telephone DNR orders will not be accepted by paramedics. Paramedics will not honor DNR orders if they are not legible or properly signed and dated or alternative wording is used to limit medical care, e.g., Living Wills, Supportive Care Plans (Paramedics will not interpret Living Wills during the provision of emergency medical care).

Physicians present at the scene who are willing to take responsibility for the emergency medical care may verbally give orders to prehospital personnel to withhold or discontinue resuscitation. This should be documented on the ambulance report form with the physician's signature, name, address and office telephone number.

DNR orders may be revoked at any time by the patient who, by destroying the request form, will prevent implementation of the DNR order. The patient is responsible for informing his/her physician and the agency supervising care, if any, of this decision.

Patients with DNR orders remain appropriate candidates for emergency evaluation, assistance, treatment and transport. The 911 emergency number may still be used to summon emergency assistance for such patients who are suffering medical emergencies.

The medical urgency of cardiac arrest precludes prehospital emergency medical personnel from evaluating the propriety of the decision-making processes or administrative procedures used to develop the DNR order. These personnel will not assume any responsibility for such an evaluation. This responsibility rests with the attending physician and the licensed health care provider supervising care.

Intent with Regard to DNR Orders

The physicians and ambulance services will make every effort to permit patients accessing emergency medical care and transportation to decline unwanted CPR in a manner consistent with the standard of medical care. The ambulance services will continue under the presumption that patients are eligible for and desire emergency medical services. This system is established to permit patients the right to refuse

unwanted CPR with the realization that this presumption and the urgency of resuscitation may mean that questionable orders may not be honored.

This guideline is intended for patients receiving fully supervised medical care who might be expected to suffer cardiac or respiratory failure in the near future.

It is not the intent of the ambulance service to dictate policy or require services from long-term care or home health agencies or personal physicians. The ambulance services will assume no responsibility for auditing the internal practices of physicians or any agency supervising medical care with regard to the DNR order.

See Minnesota Medical Association DNR Form, next two pages. MMA DNR forms may be obtained directly from the Minnesota Medical Association.

MMA Emergency Resuscitation Guidelines

**MINNESOTA MEDICAL ASSOCIATION
EMERGENCY RESUSCITATION GUIDELINES**

CHECK ONE BOX CATEGORY	RECOMMENDED ACTION	MEDICAL RESPONSE WILL PROVIDE	MEDICAL RESPONSE NOT PROVIDED
<input type="checkbox"/> CPR*	Call 911	Full Treatment As Appropriate	
<input type="checkbox"/> DNR (No CPR*)	No 911 for Cardio- pulmonary Arrest May Call 911 for Urgent Needs May Call Ambulance For Routine Transport Call M.D. or R.N.	Active Treatment up to the Point of Cardiopulmonary Arrest	If in Cardiopulmonary Arrest No Intubation No Ventilatory Assistance No Chest Compression No Defibrillation
<input type="checkbox"/> Hospice or Comfort Care Including DNR*	No 911 for Cardio- pulmonary Arrest Call M.D. or R.N. May Call Ambulance for Routine Transport May Call 911 for Urgent Needs	Comfort Care and Hygiene Care	If in Cardiopulmonary Arrest No Intubation No Ventilatory Assistance No Chest Compression No Defibrillation

*See reverse side for Background Information

Patient/Client Name (Please Print) _____
 Optional Identifying Information: _____ DOB _____ Sex _____ Race _____ Eye Color _____ Hair Color _____ Height _____ Weight _____

I understand this document identifies the level of care to be rendered in situations where death may be imminent. I make this request knowingly and I am aware of the alternatives. I expressly release, on behalf of myself and my family, all person who shall in the future attend to my medical care of any and all liability whatsoever for acting in accordance with this request of mine. Furthermore, I direct these guidelines be enforced even though I may develop a diminished mental capacity at some future time. I am aware that I can revoke these guidelines at any time by simply expressing my request verbally or in writing to my caretaking family, physician, or designated health care provider, or by destroying this form with the intent to revoke it.

 Patient/Client/Proxy/Agent or Other Authorized Signature Printed Name "Relationship" Date

I have witnessed the above signature:

 Witness Signature Printed Name Address Phone Number Date

 Physician's Signature Printed Name Address Phone Number Date

THE ABOVE 3 SIGNATURES AND 3 DATES ARE REQUIRED FOR THIS FORM TO BE
 VALID AND ITS INTENT CARRIED OUT

EMERGENCY CARE GUIDELINES FOR RESUSCITATION

RATIONAL FOR THIS DOCUMENT- The existing standard of emergency care involves aggressive resuscitation including CPR as defined below. The purpose of this document is to allow an individual the option of limiting emergency care when appropriate. Our goal is to provide consistent language and documentation between hospital, long-term care facility, home health care setting, other setting and emergency providers. The document may be used in any setting where emergency care is needed. A legal document, with physician involvement, directs health care providers in responding to emergency calls. If the document is appropriately completed and signed, emergency care can be provided at the level determined by the patient and physician. The patient has the right to revoke these restriction at any time.

A. **DEFINITIONS-** The following terms are used in the chart and defined briefly below:

- **CPR (Cardiopulmonary Resuscitation)-** This is the process of chest compression and artificial breathing in the event of cardiopulmonary arrest as defined by the American Heart Association. Advanced levels of CPR mandate airway management, ventilatory assistance, chest compressions, defibrillation and use of appropriate drugs. The category of CPR implies full resuscitation, using any or all of the above techniques as appropriate.
- **DNR (Do Not Resuscitate) (No CPR)-** This category does involve active and aggressive medical treatment intended to sustain life up to the point of beginning CPR. If a person is found in full cardiopulmonary arrest, no treatment would be provided. If the first person finding the patient has a question about whether or not a pulse or spontaneous breathing exist, 911 should be called and the paramedics summoned to determine the patient's status.
- **HOSPICE OR COMFORT CARE INCLUDING DNR-** This category is appropriate for patients who request death-allowing care, knowing that death is expected and prolongation of life is not a goal. Care is intended to provide comfort and attention to basic human needs, allowing life to continue "as is", without medical intervention to sustain or prolong life beyond the natural course of events. In general, calling 911 is not appropriate for patients in this category. In situations where there are immediate needs for choking, pain relief or comfort, 911 may be called.

B. **SPECIFIC GUIDELINES FOR FORM COMPLETION:** After discussing the treatment options, one of the three categories should be checked. The levels of care are to be explained to the patient and/or family/loved ones by the physician or his/her designee. The definitions are to remain consistent, and are indicated above. Documentation by the physician is important in the patient's permanent record and should include:

1. the rational for DNR or comfort care, including DNR;
2. the basis of determining patient competency; and
3. the significant parties involved in the decision, and their relationship to the patient.

The original form should remain with the patient, with copies to the permanent record and physician's office.

THREE SIGNATURES AND THREE DATES ARE REQUIRED FOR THIS DOCUMENT TO BE VALID AND ITS INTENT CARRIED OUT.

1. **PATIENT/CLIENT or AUTHORIZED SIGNATURE:**

1. The Patient, when of sound mind, may knowingly limit his/her own care.
2. A Proxy pursuant to Minnesota Statutes, Chapter 145 B, an Agent pursuant to Minnesota Chapter 145 C, a Court Appointed Guardian or Conservator (with specific powers to make health care decisions) may sign on behalf of a legally incompetent person.

Appendix G - Implantable Cardiac Defibrillator (ICD)

Emergency Management

General Guidelines:

1. Treat a patient with an implantable cardiac defibrillator (ICD) like any other patient.
2. If ICD discharges while you are touching the patient, you may feel a slight sensation. It will not harm you.
3. Do not wait for the device to fire in the presence of VT or VF. Begin CPR and defibrillate with external paddles as necessary. This will not harm the device.
4. ICD's are implanted under the skin in the left lower abdominal area or left upper chest just below the clavicle.
5. Patients with an ICD will carry a wallet card or Medic-Alert bracelet with important data regarding cutoff rate.
6. ICD's will deliver the first shock within 10-30 seconds after recognizing the arrhythmia.
7. Subsequent shocks will be delivered every 10-30 seconds.
8. An ICD will generally only shock 4-5 times (depending on model), and requires 35 seconds of non-VT/VF rhythm, including asystole, to reset itself.

Deactivating an ICD:

1. Deactivate an ICD only after consultation with a medical control physician.
2. Establish on ECG that the ICD is inappropriately discharging in the presence of a non-VT/VF rhythm.
3. To deactivate the ICD, locate the pulse generator and place a donut magnet over the generator. You may or may not hear a high-pitched tone from the generator, depending on the brand of the ICD.
4. Secure the magnet in place with adhesive tape. The magnet will inhibit further arrhythmia detection and treatment by the ICD.

Appendix H - Transcutaneous/External Cardiac Pacing

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Candidates:

Adult and pediatric patients with bradycardia who are clinically unstable, unconscious or unresponsive to atropine.

Procedure:

1. Place chest leads, if not already done, in Lead II position, attach to pacing machine and obtain hard copy recording of patient's baseline rhythm. Adjust gain to obtain tall QRS complexes.
2. Apply pacing electrodes to chest, to left of sternum and on left posterior chest wall. Connect to pacing machine. In females, place the precordial electrode under the breast but not over the diaphragm. If authorized to pace pediatric patients, use pediatric pacing electrodes for patients < 15 kg.
3. Set pacing mode switch to 1:1.
4. Set pacing rate to 80 or 10-20 higher than the patient's intrinsic heart rate. If patient has no QRS complexes, set rate at 80.
5. Set milliamp setting at zero. Turn pacer power on and observe the pacing artifact on the ECG to assure it is well positioned during diastole. Slowly increase the milliamp setting while observing the ECG and feeling for a pulse to determine if capture is achieved (usually at a setting of between 40 to 80 mA). A pulse oximeter, if available, may be helpful to monitor the patient's pulse. If in doubt about capture, the pacer can be set at a 4:1 mode temporarily. Once capture is obtained, set milliamp setting 10% higher. If capture cannot be obtained, try moving the precordial pacing electrode around to a more effective location.
6. Contact a medical control physician if orders are needed for sedation for the conscious patient. Muscle fasciculations will typically be seen at about 50 mA and the patient will experience pain at levels above about 40-50 mA.
7. Obtain an ECG tracing of the patient's paced rhythm. Closely monitor the patient's ECG, pulse and, if applicable, pulse oximeter during packaging and transport to assure pacing capture if maintained.

Appendix I - Intraosseous Infusion

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

A. Pediatric Intraosseous

Candidates:

Children who are less than 7 years old for whom IV access is unobtainable. The child must be in cardiopulmonary arrest, impending arrest or in critical condition characterized by evidence of clinical shock and unresponsiveness to verbal stimuli. Intraosseous infusion may be instituted after one IV attempt has been unsuccessful or if no peripheral veins are readily apparent or obtainable.

Contraindications:

1. Recently fractured bone at the site;
2. Cellulitis, infection, osteomyelitis, trauma at site;
3. Previous intraosseous attempt in same bone;
4. If history known, bone disorders such as osteogenesis imperfecta and osteopetrosis;

Procedure:

1. Prepare equipment: normal saline IV solution and IV administration set (microdrip unless hypovolemic shock suspected), intraosseous needle or spinal needle with stylet, 10 ml syringe filled with normal saline, skin prep materials, protective eye wear, mask and gloves;
2. Position patient; support the child's leg and externally rotate to expose medial aspect of leg;
3. Select site: Palpate the proximal tibia to find the tibial tuberosity, then locate a point on the flat aspect of the tibia 1-2 finger-breaths (child's) or 2-3 cm below the tuberosity.
4. Alternate site: 1-2 finger-breaths (child's) above lateral condyles of femur in midline;
5. Put on gloves and prep site as for IV start.
6. Using the selected device, angle the needle at approximately 75-80 degrees off surface away from the growth plate of the selected bone (towards feet for tibia, towards head for femur) and insert the needle with firm downward pressure using a twisting or screwing motion to penetrate the skin and subcutaneous tissues, then the periosteum and bone cortex. Expect moderate resistance. Entrance into the medullary cavity will be heralded by a "pop" or a sudden loss of resistance. Only 2-4 mm insertion depth necessary.
7. Manually stabilize needle. Remove the stylet from the needle and aspirate with a 10 ml syringe filled with normal saline. Marrow, which appears as dark old blood, may or may not aspirate into the syringe. Inject entire contents of aspirate and normal saline into the bone marrow. If marrow cannot be aspirated but fluid flushes easily without evidence of swelling, the needle can be considered properly placed.

Continued

8. If initial attempt fails, may make one additional attempt on other tibia or femur, using new needle. Transport immediately if second attempt unsuccessful. Physician verbal orders must be obtained for further attempts.
9. Attach IV tubing and infuse IV solution full flow. Observe for continuous, free flow of IV fluid without significant subcutaneous infiltration (characterized by swelling and redness) around intraosseous site.
10. Secure needle. If appropriate to device, screw down the needle depth guard until it is flush to the skin. Dress site and tape needle securely in place using a gauze dressing for support, as necessary.
11. Set drip rates for fluid as you would for any peripheral IV. Flow rates of up to 1200 ml/hr can be achieved with pressure infusion. All medications designated for IV use can be administered by the intraosseous route.
12. Medical Control contact should be established following initiation of intraosseous infusion.

B. Adult Intraosseous

Candidates:

Adults who are 18 years old or older for whom IV access is unobtainable. The patient must be in cardiopulmonary arrest, impending arrest or in critical condition characterized by evidence of clinical shock and unresponsiveness to verbal stimuli. Intraosseous infusion may be instituted after one IV attempt has been unsuccessful or if no peripheral veins are readily apparent or obtainable.

Contraindications:

1. Weight < 110 lbs. (50 kg);
2. Age <18;
3. Significant tissue damage at injection site,
4. Bone disorders such osteoporosis;
5. Other contraindications as described by equipment manufacturer or service medical director.

Procedure:

The adult intraosseous placement procedure is specific to the type of placement equipment being used. Insertion of the adult intraosseous infusion line must follow the procedure recommended by the equipment manufacturer and approved by the service medical director.

Appendix J - System Plan for Multiple Casualty Incidents

Introduction

In special incidents with potential for multiple casualties, resources of the emergency medical services system may be temporarily overwhelmed or extended to their limits. The plan defines EMS system standards to assure appropriate control, allocation, and utilization of emergency medical resources during a special incident.

Purpose of Plan

The plan establishes a framework for coordinating resources during incidents requiring various ambulance providers, hospitals, and public safety agencies to work together to optimize patient care and transportation with the given resources of the community. The goal of the plan is to:

1. Recognize and maintain operations of ambulance providers, hospitals, and other agencies as close to normal as possible;
2. Allow flexibility for effective response to a variety of hazards most likely to occur within the County, including a natural disaster, hazardous material exposure, urban fire, air crash, civil unrest, or any incident with actual or potential multiple casualties;
3. Set system standards to aid individual agencies when developing policies and procedures.

General Principals

1. The ambulance service in whose primary service area (PSA) the event occurs must request assistance from other ambulance services when it is unable to meet the demands for patient transportation. For any incident with the potential for multiple casualties, the request for additional help from other services should be made early to avoid becoming overburdened.
2. Ambulance providers will maintain written policies for dispatching and responding to incidents with the potential for multiple casualties consistent with this plan and maintain a copy of current policies with Community Health Department (CHD) for system review.
3. Ambulance personnel will understand the common organizational structure, functions, and terminology to effectively operate within an overall incident command structure during major incidents. The EMS Branch Director will coordinate the treatment and transport of patients within the overall incident command structure of the public safety agency in authority.
4. The plan does not speculate before an incident occurs what the given capabilities of any ambulance service, public safety agency, or hospital will be at a given time.
5. The saving of human lives is paramount in any type of incident with multiple casualties. Certain situations may present hazards to emergency personnel, resulting in additional casualties if coordination with other agencies is not maintained. EMS personnel must be certain they do not place themselves in undue danger when trying to carry out their duties.

Communications During an Incident

1. All responding ambulance vehicles will be dispatched to a specific location or staging area by their own dispatcher on their individual radio channel. All communications at the scene must be conducted either face-to-face, communicated through dispatch on individual ambulance service radio channels, or by additional means provided through the ambulance service or public safety command.
2. The Medical Resource Control Center (MRCC) at Hennepin County Medical Center (HCMC) will be notified immediately of an incident with the potential for multiple casualties by the dispatcher within whose PSA the event initially occurs. The dispatcher will relay location, nature and estimate of casualties.
3. If usual dispatch channels malfunction or become overly congested during an incident, a provider may request MRCC to assign a UHF "MED" channel to the individual service(s) to utilize for temporary dispatch consistent with the EMS system policy for reallocating the use of UHF EMS frequencies, in Attachment B (page 3-31).

EMS Command and Authority

1. Depending on the type of incident, the fire and/or police chief in whose jurisdiction an event occurs will normally assume overall incident command of a situation with the potential of having multiple casualties. EMS and other organizations will have command decisions to be made depending on the type or magnitude of an incident.
2. Each service will establish policies to determine who will assume the role of EMS Branch Director for their area. The EMS Branch Director will establish a link with public safety and determine the need for delegating additional command positions consistent with Incident Command Roles and Responsibilities.

Triage and Treatment

The primary function of ambulance personnel during a special incident is the transport of patients to hospitals. The decision to perform triage is made by the EMS Branch Director (or delegate).

1. Ambulance personnel must remain outside the incident "hot zone" unless properly trained, equipped, and authorized. Rescue will primarily be done by police and fire. Ambulance personnel may be requested to assume triage roles and must have training in triage and rapid transportation. See Attachment C (page 3-32).
2. The decision for paramedics to operate entirely on medical protocols during an incident will be made by the ambulance service supervisor. The service medical director or acting system medical director will be notified as soon as possible.
3. The use of triage tags or other means to identify patient acuity is voluntary within the system. If used, identification must adhere to standard definitions of black for dead, red for immediate, yellow for delayed and green for walking wounded.

Transportation and Receiving Facilities

1. The patient's hospital of choice may be overridden by the ambulance supervisor during an incident. The service medical director or acting system medical director will be notified as soon as possible.
2. The medical control hospital closest to the incident will have primary responsibility for receiving critically ill and injured patients. Its emergency department will be contacted by MRCC with estimates of casualties and to determine the number of patients which can be received.
3. Ambulance personnel will contact MRCC to relay number of patients, medical condition and to receive hospital assignment.
4. MRCC will notify the hospital of incoming patients and continue to assess the need for diverting patients to the next closest appropriate hospital. Since victims may find alternative means for transport to hospitals, emergency department personnel should contact MRCC if unable to receive additional patients.
5. The EMS Branch Director (or delegate) will determine the need for additional or alternative transport resources. If transportation vehicles are used which cannot communicate with MRCC, the EMS Branch Director (or delegate) will communicate number of patients to MRCC and receive hospital assignment. It may be necessary to divert large numbers of walking wounded to more distant hospitals.

Conclusion of an Incident

1. The EMS Branch Director (or delegate) will determine need for requesting critical incident stress management (CISM) services either during or at the conclusion of an incident.
2. MRCC will be notified by the EMS Branch Director or ambulance dispatcher when an incident requiring hospital notification is concluded. MRCC will notify all alerted hospitals.
3. MRCC will complete and forward a form supplied by the CHD whenever the following occur:
4. MRCC notifies hospital(s) of potential for multiple casualties;
5. Ambulance crews are instructed to transport patients to nearest hospitals due to a special incident;
6. Ambulance crews are instructed to operate medically entirely on standing orders during an incident.

Glossary

Branch: The organization level having functional/geographic responsibility for major segments of incident operations. This functional level falls between SECTION and DIVISION/GROUP.

Command: Section responsible for overall management of incident activities, specifically responsible for assessing incident priorities; developing goals and objectives; developing and implementing incident action plans; developing appropriate command structure; resource management; incident scene safety; liaison with outside agencies; and release of appropriate information to the media.

Director: Functional title of the individual in command of a Branch. The EMS Branch Director will coordinate the treatment and transport of patients during an incident with multiple casualties.

Incident Commander: The individual assuming and having responsibility for management "command" of all incident activities.

Coordinator: Functional title of any individual in command of a Division or Group.

ATTACHMENT A

Incident Command System

"The Incident Command System (ICS) is a set of personnel policies, procedures, facilities, and equipment integrated into a common organizational structure designed to improve emergency response operations of all types and complexities." Erik Auf der Heide, Disaster Response: Principles of Preparation and Coordination.

The ICS is designed to command and manage available resources at emergency incidents. The intent of an ICS is to:

- Acknowledge that all procedures will not fit perfectly with all departments, the reporting structure may vary, and the system will not need to be fully implemented for all situations the emergency responders will encounter;
- Allow agencies to work toward a common goal in an effective and efficient manner;
- Develop procedures for managing and combining personnel, facilities, equipment, and communications;
- Design a system which can be enacted from the time an incident occurs until the management of the operation is no longer required;
- Allow the system to be established and expanded depending upon the changing conditions of the incident;
- Allow the system to be utilized for any type or size of emergency ranging from minor incident involving a single unit to a major emergency involving several agencies;
- Have qualified personnel from any emergency services staff operate the incident involving personnel from a variety of agencies;
- Allow agencies to communicate using common terminology and operating procedures;

The use of an ICS is effective if the organization, terminology and procedures are commonly implemented. Implementation of the ICS should cause the least possible disruption regarding day-to-day operations.

Addendum to Attachment A includes an expandable organizational chart for EMS functions during an MCI and general outline of the functions when utilized.

EMS BRANCH DIRECTOR/EMS INCIDENT CHIEF

(WEAR APPROPRIATE IDENTIFICATION)

Role is to Command and Control the Activities within the EMS Branch

I. Establish/Maintain Contact with Incident Command

Communicate needs to Incident Command (personnel, equipment, extrication, crowd control, etc.)

II. Coordinate EMS Branch Activities with Incident Command and Other Agencies

A. Assures dispatch and MRCC receive current information regarding situation including:

1. Need for additional resources
2. Approximate number of victims and type of injury

B. Establishes ambulance staging area(s)

C. Considers establishing:

1. Triage/treatment area

D. Assess need for the following:

1. Need for separate radio channel
2. Additional ambulance resources including air medical
3. Traffic/crowd control for Triage/Transportation/Staging areas
4. Additional manpower, equipment, heavy tools, specialty teams
5. Safe helicopter landing zone
6. Buses for multiple minor injury patients
7. Utility units (gas, electricity, water, etc.) to service area
8. Public/media relations to scene
9. Vehicle maintenance to scene
10. County coroner
11. Red Cross
12. County Health Department
13. CISD team for defusing/debriefing

III. Evaluate Need to Separate EMS Branch Functions

- Communications
- Medical Materials (Supplies)
- Triage Teams
- Triage
- Triage Area Treatment
- Transportation
- Air Medical
- Ambulance Staging

IV. Ensure All Medical Group Functions Are Being Accomplished by Appropriate Personnel

Relay Needs to Incident Command, Dispatch or MRCC

COMMUNICATIONS COORDINATOR

- I. Assume Function as Defined by EMS Branch Director or Per Service Specific Protocol**
 - II. Communicate Information as Directed by EMS Branch Director to:**
 - A. Dispatch
 - B. MRCC
 - C. Incident command
 - D. Others as directed
-

TRIAGE COORDINATOR

- I. Complete Rapid Scene Assessment**
 - II. Begin Identification of Patients Using S.T.A.R.T. at Incident Site** (if used, see Attachment C, page 3-32)
 - A. Assign function to Triage Team for major incident
 - B. Update EMS Branch Director with patient triage counts
 - III. Move Patients to Triage/Transportation Area if Operative**
 - A. Arranges for appropriate segregation of patients per service protocol
 - IV. Oversee All Treatment in the Triage/Transportation Area**
 - A. Assign functions to Treatment Coordinator if indicated
 - B. May be assigned to "Triage Area Treatment Leaders" for major incident
-

TREATMENT COORDINATOR

- I. Arrange for Appropriate Scene Treatment by Degree of Injury**
 - II. Assign Treatment Function to Team Leaders as Necessary**
 - III. Re-Triage Patients if Necessary**
 - IV. Request Additional Medical Supplies/Equipment to Triage/Transportation Area**
 - A. Make request through EMS Branch Director or his designee.
-

TRANSPORTATION COORDINATOR

I. Designate a Triage/Transportation Area

II. Assign Patients to Ambulances in Coordination with Triage

- A. Note: Patients should not be kept in triage/transportation area if there are ambulance resources available for transport.

ATTACHMENT B

**Use of UHF "MED" Channels
for Temporary Dispatch Operations During "Special Incidents or Situations"**

When a "special incident or situation" occurs in the Hennepin County EMS system, it is probable that one or more of the usual dispatch channels may become unusable due to malfunction or congestion. During these times, it may become necessary for the MRCC to assign a UHF "MED" channel to the individual service(s) to utilize as their temporary dispatch back-up until congestion eases or repairs are effected. The procedures for requesting and authorizing the use of these channels for this purpose are as follows:

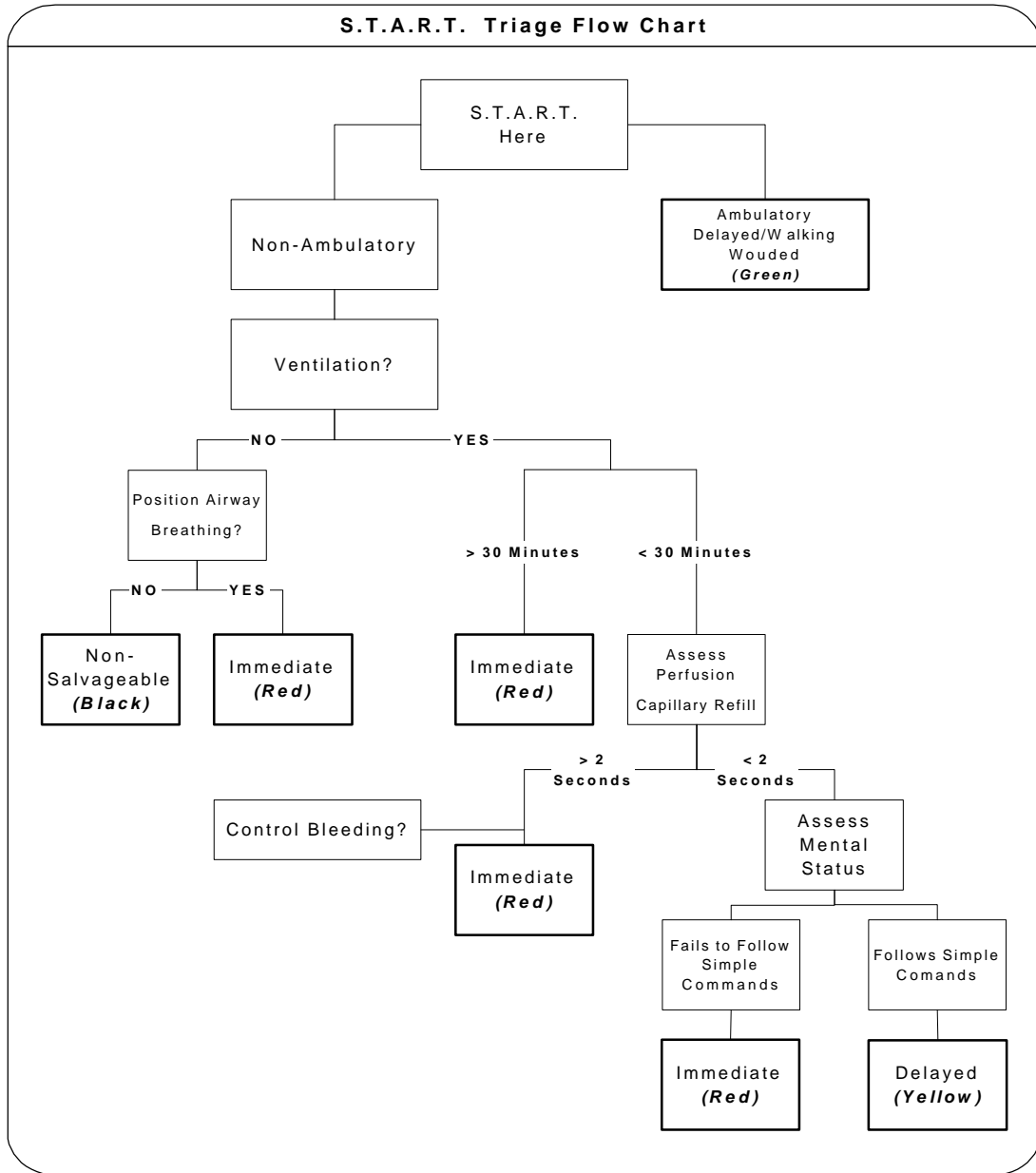
- A. A special incident or situation must exist. For purposes of this section, special incident or situation will be defined as:
 1. Any situation which results in dispatch communication delays over a protracted period (i.e., extremely busy period of activity due to weather conditions such as the Twin Cities metro area ice storm of January 20, 1993).
 2. Any situation which will require protracted on-scene coordination (i.e., motor vehicle accident with three ambulances from the same service responding).
 3. Communication failure on the service's main dispatch channel. (Note: A MED channel will **not** be permanently assigned in place of said dispatch channel.)
- B. The dispatcher of the requesting service will call Hennepin County Medical Resource Control Center (MRCC or Medical Control) at 347-5710 or 347-2123 and request channel authorization and assignment.
- C. The operator will:
 1. Assign the most geographically appropriate channel as soon as the channel becomes available. Ongoing medical control will have priority.
 2. Advise the on-duty Hennepin County Emergency Medical Services (HCEMS) supervisor and/or communications supervisor, and the HCEMS dispatchers immediately of this assignment.
 3. Document the request on an MRCC Incident/Complaint form and forward this to the communications supervisor.
 4. Log the assignment on the white board with time and date and the operator's initials.
- D. When the special incident or situation has stabilized to the point that the MED channel is no longer needed, the requesting service will again notify the MRCC that the channel is available.
- E. HCEMS communications supervisor will forward the documentation of the request to the Community Health Department (CHD), EMS Section, with a copy forwarded to the HCEMS assistant manager. CHD staff will review all requests of this nature for appropriateness.

NOTE: Radio operations during "Special Incidents or Situations" after implementation of the 800 MHz radio system is yet to be determined. Please refer to the 800 MHz system operating procedures as the 800 MHz system becomes operational.

ATTACHMENT C

S.T.A.R.T. Triage
 (Simple Triage And Rapid Treatment)

- A. Separate all ambulatory from non-ambulatory patients. If this is a large incident, utilized P.A. system.
- B. Sort all non-ambulatory patients with the S.T.A.R.T. Flow Chart below.



- C. Recheck Delayed/Walking Wounded (Green)

Appendix K - Nitroglycerin Infusion

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Indications:

For use after initial sublingual doses (3) of nitroglycerin fail to provide the appropriate clinical response in the treatment of Ischemic Chest Pain and Suspected Pulmonary Edema; if time to definitive care will be >10 minutes and authorized by the Service Medical Director.

Dosage:

Initiate Nitroglycerin infusion at 10 mcg per minute. Dependent on patient response and effective dose. Initial dose 10 mcg/min delivered by infusion pump. May be increased by 5-10 mcg/min q 5-10 minutes until desired hemodynamic or clinical response. If no response seen, may increase by 20mcg/min until response achieved. Monitor titration continuously until patient reaches desired level of response. Monitor blood pressure and pulse closely maintaining systolic pressure >100.

Contraindications:

- Patients who are hypersensitive to drug.
- Hypotensive patients
- Severe bradycardia or tachycardia
- RV infarction
- Viagra within 24 hours
- Patients with pericardial tamponade or constrictive pericarditis
- Head trauma with increased intracranial pressure

Adverse Reactions:

- Headache, transient episodes of light-headedness related to
- Blood pressure changes, hypotension, syncope, crescendo
- Angina, rebound hypertension, anaphylactoid reactions.
- Abdominal pain and vomiting, may also be seen.

Precautions:

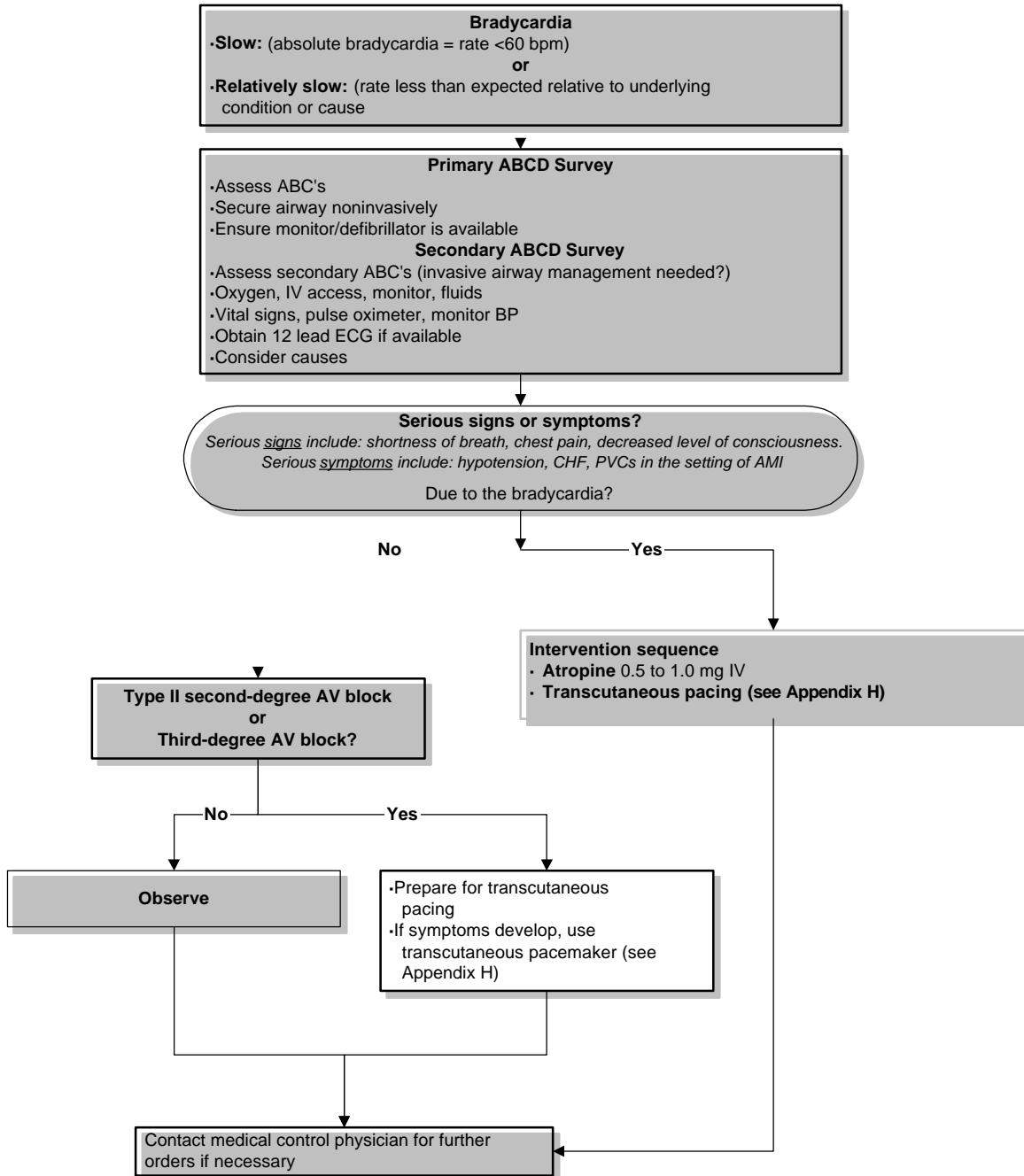
- Do not administer with any other medications in the IV system.
- Use nonabsorbent polyvinyl chloride IV tubing from the manufacturer.
- Use with caution in patients with hepatic or renal disease or with postural hypotension.
- Pregnancy category C: safety for use in pregnancy and in children not established.

Appendix L - ALS Algorithms

Bradycardia - Patient Not in Cardiac Arrest

Hennepin County EMS System ALS Algorithms

Bradycardia (Patient Not In Cardiac Arrest)

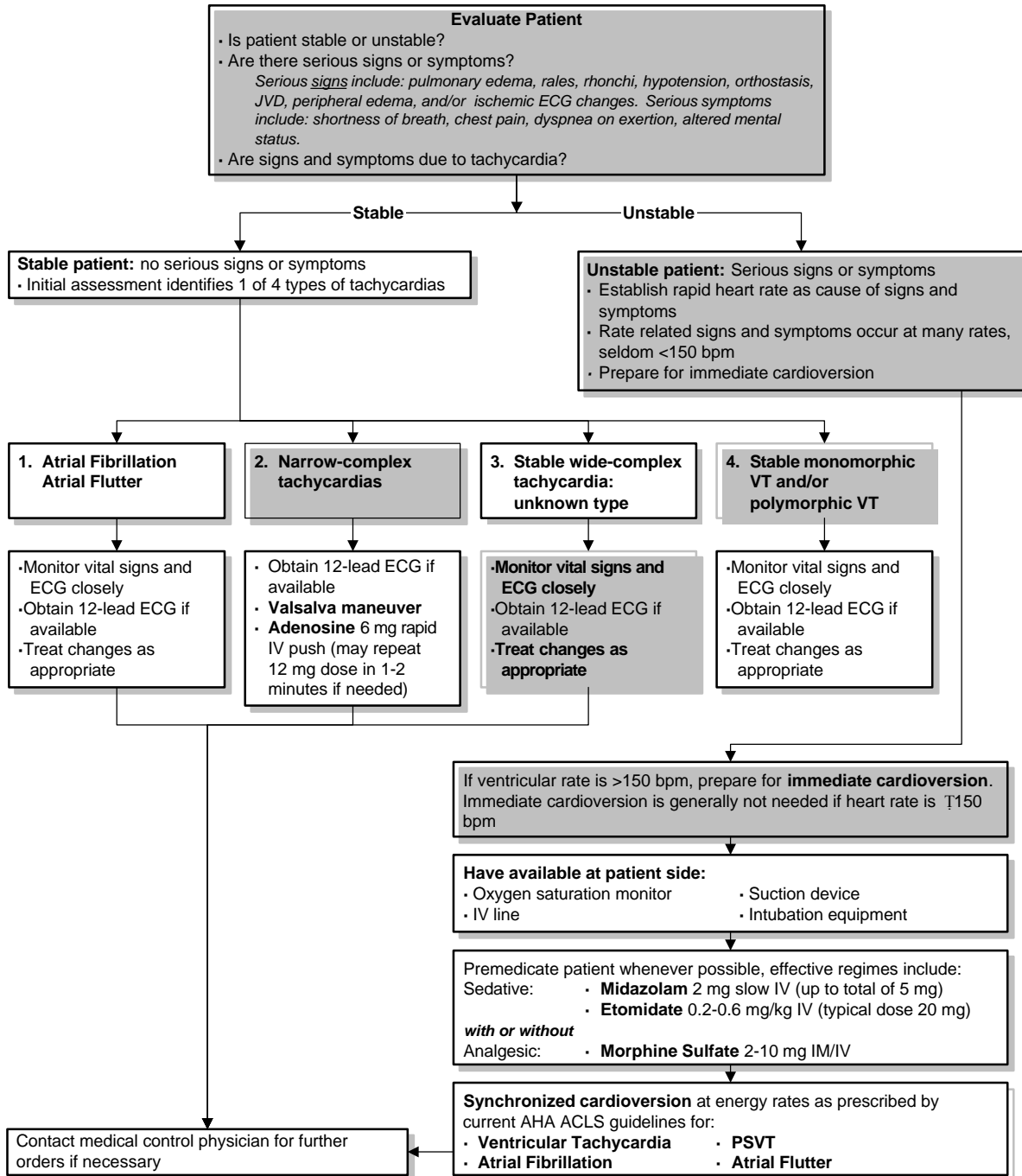


Procedures in black sans serif font are **standing orders**.
 Procedures in gray italic serif font are *after obtaining verbal orders*

1/15/2002

Tachycardias

Hennepin County EMS System ALS Algorithms Tachycardias



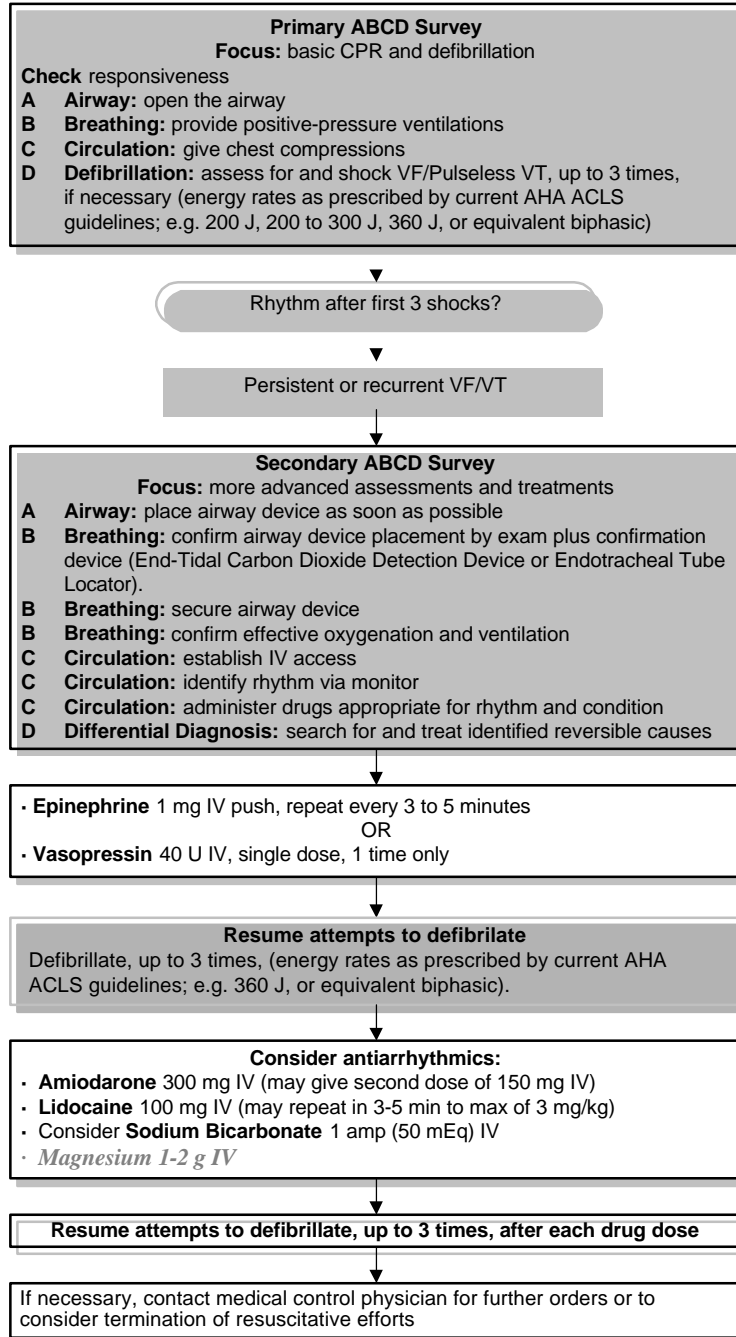
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Procedures in gray italic serif font are after obtaining verbal orders

1/15/2002

Ventricular Fibrillation/Pulseless Ventricular

Hennepin County EMS System ALS Algorithms Ventricular Fibrillation/Pulseless Ventricular Tachycardia

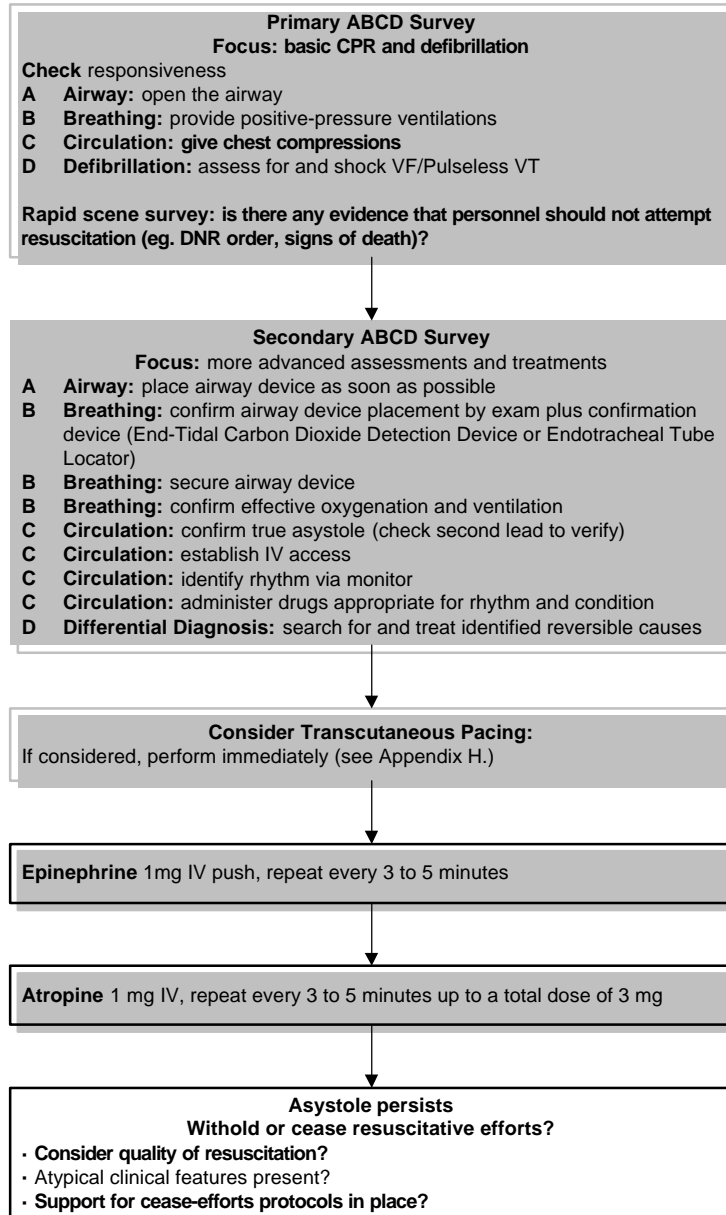


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Procedures in gray italic serif font are *after obtaining verbal orders*

1/15/2002

Asystole

Hennepin County EMS System ALS Algorithms
Asystole



Procedures in black sans serif font are **standing orders**.
Procedures in gray italic serif font are *after obtaining verbal orders*

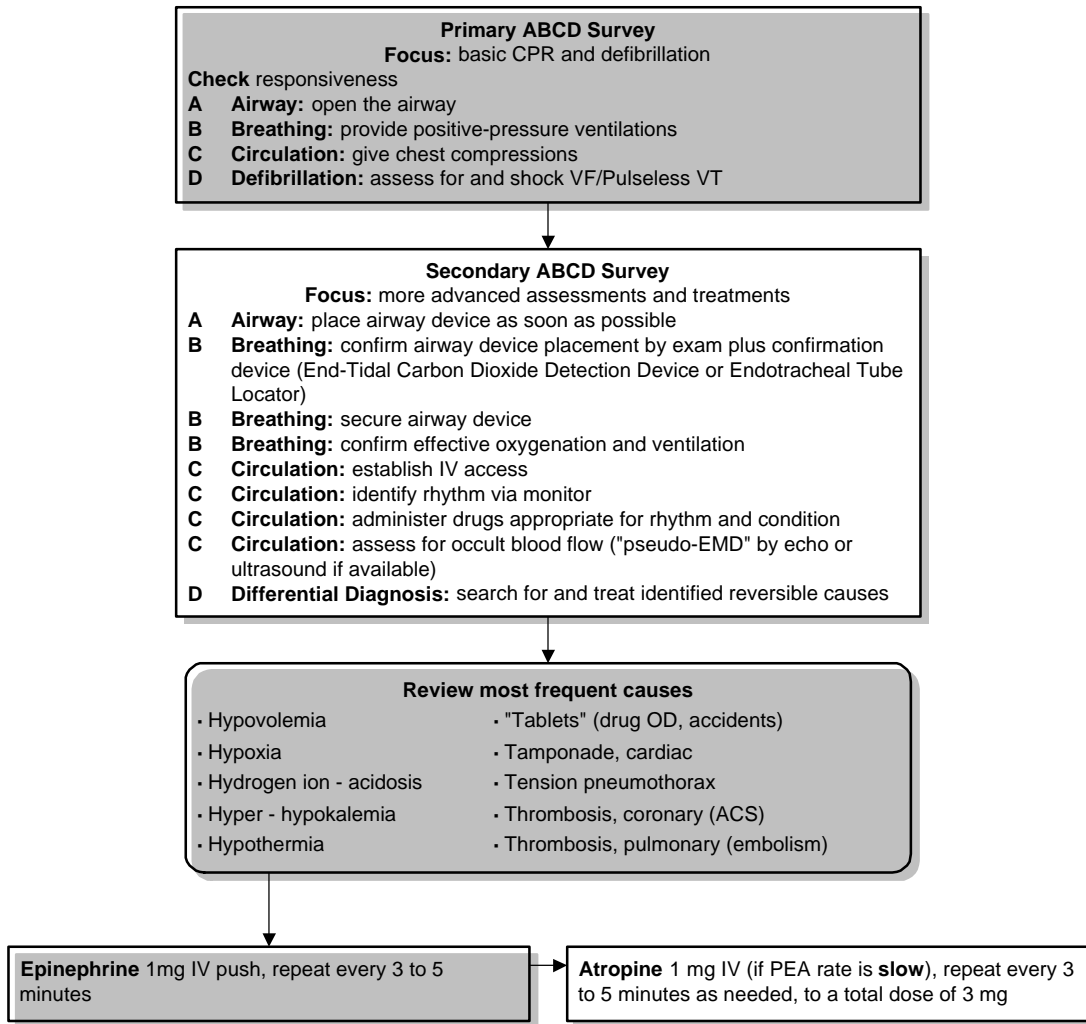
1/15/2002

Pulseless Electrical Activity (PEA)

Hennepin County EMS System ALS Algorithms

Pulseless Electrical Activity

(PEA = rhythm on monitor, without detectable pulse)



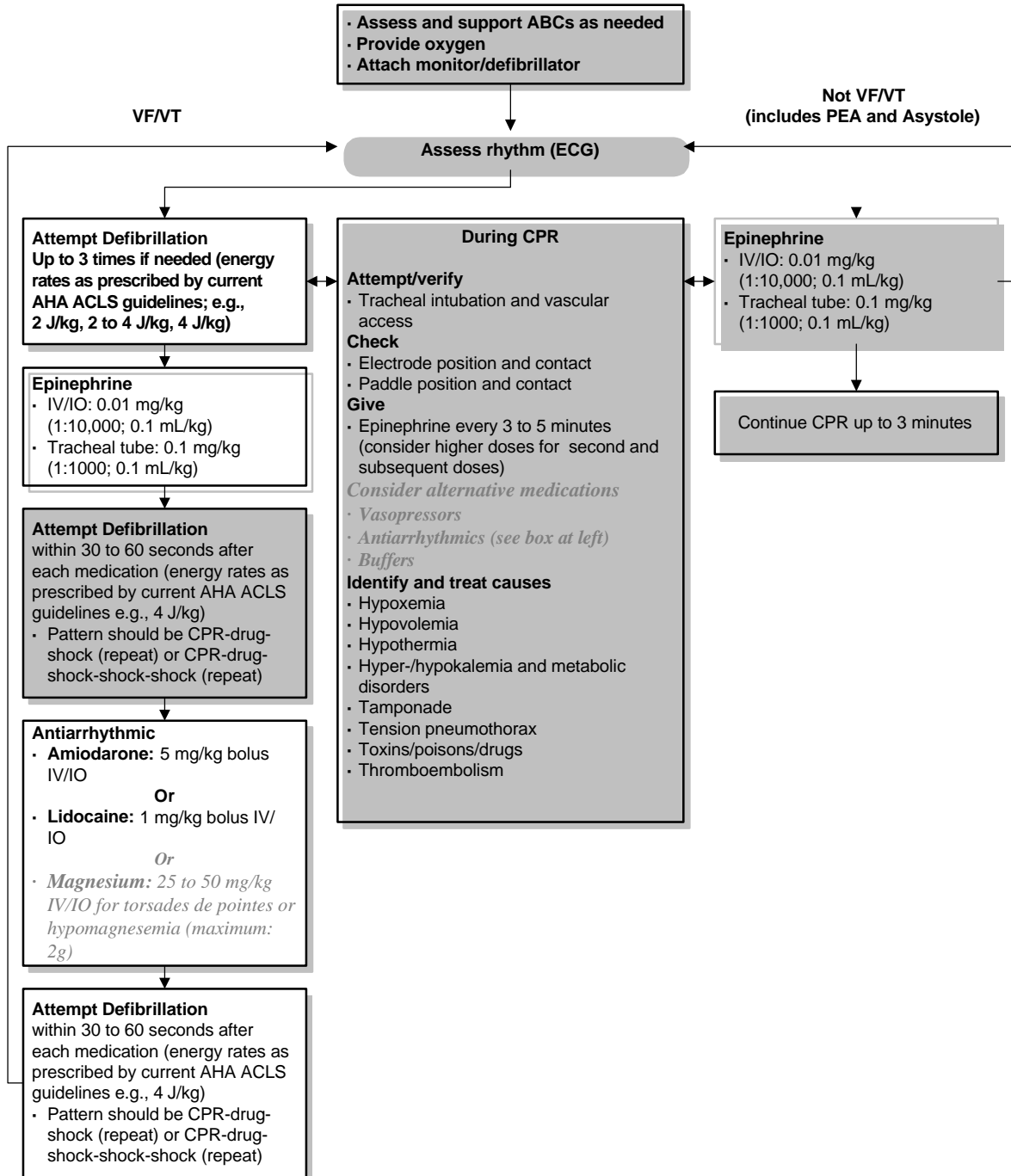
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Procedures in gray italic serif font are after obtaining verbal orders

1/15/2002

Pediatric Pulseless Arrest

**Hennepin County EMS System ALS Algorithms
Pediatric Pulseless Arrest**

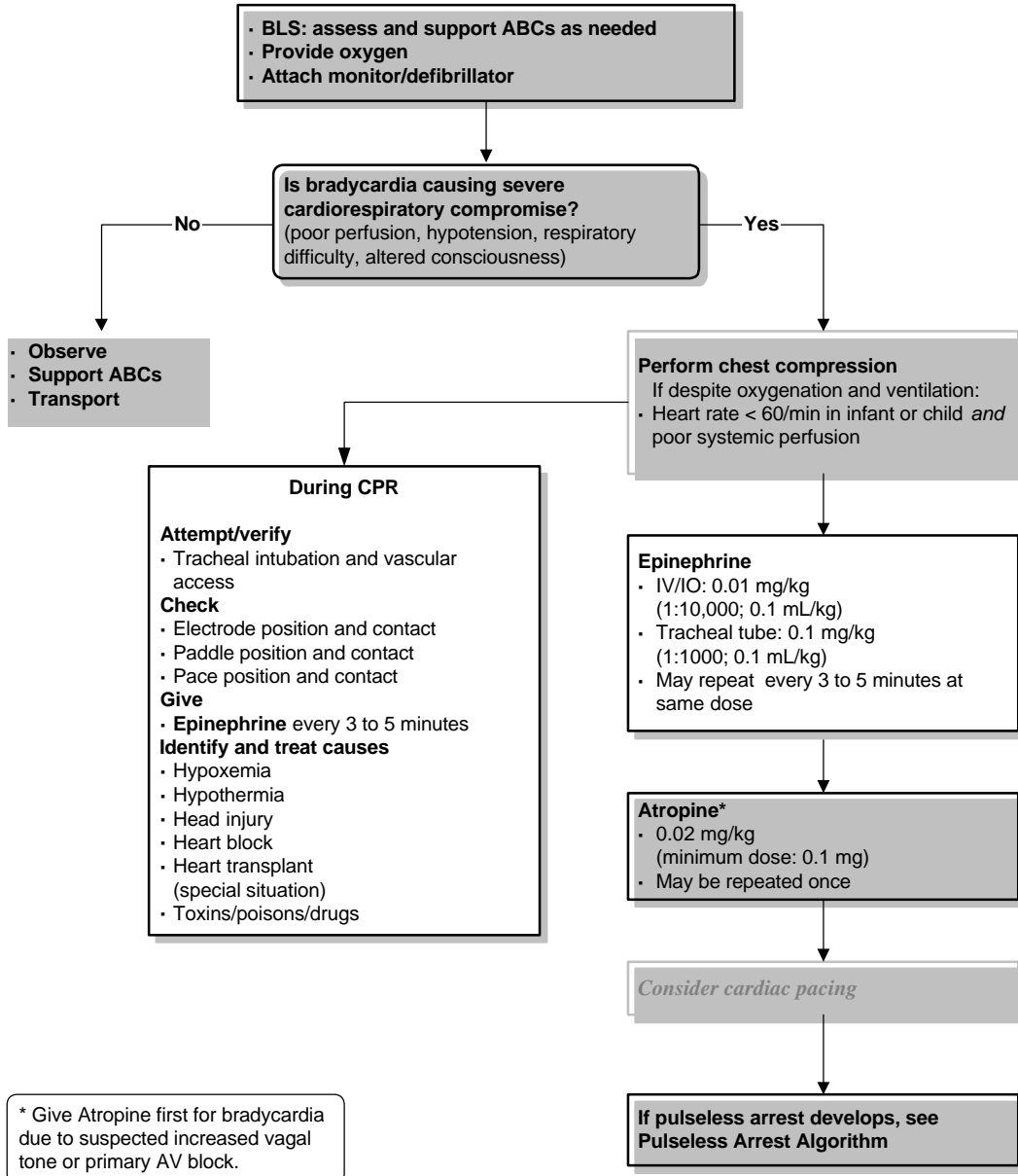


Procedures in black sans serif font are **standing orders**.
 Procedures in gray italic serif font are *after obtaining verbal orders*

1/15/2002

Pediatric Bradycardia - Patient Not in Cardiac Arrest

Hennepin County EMS System ALS Algorithms
Pediatric Bradycardia (Patient Not In Cardiac Arrest)

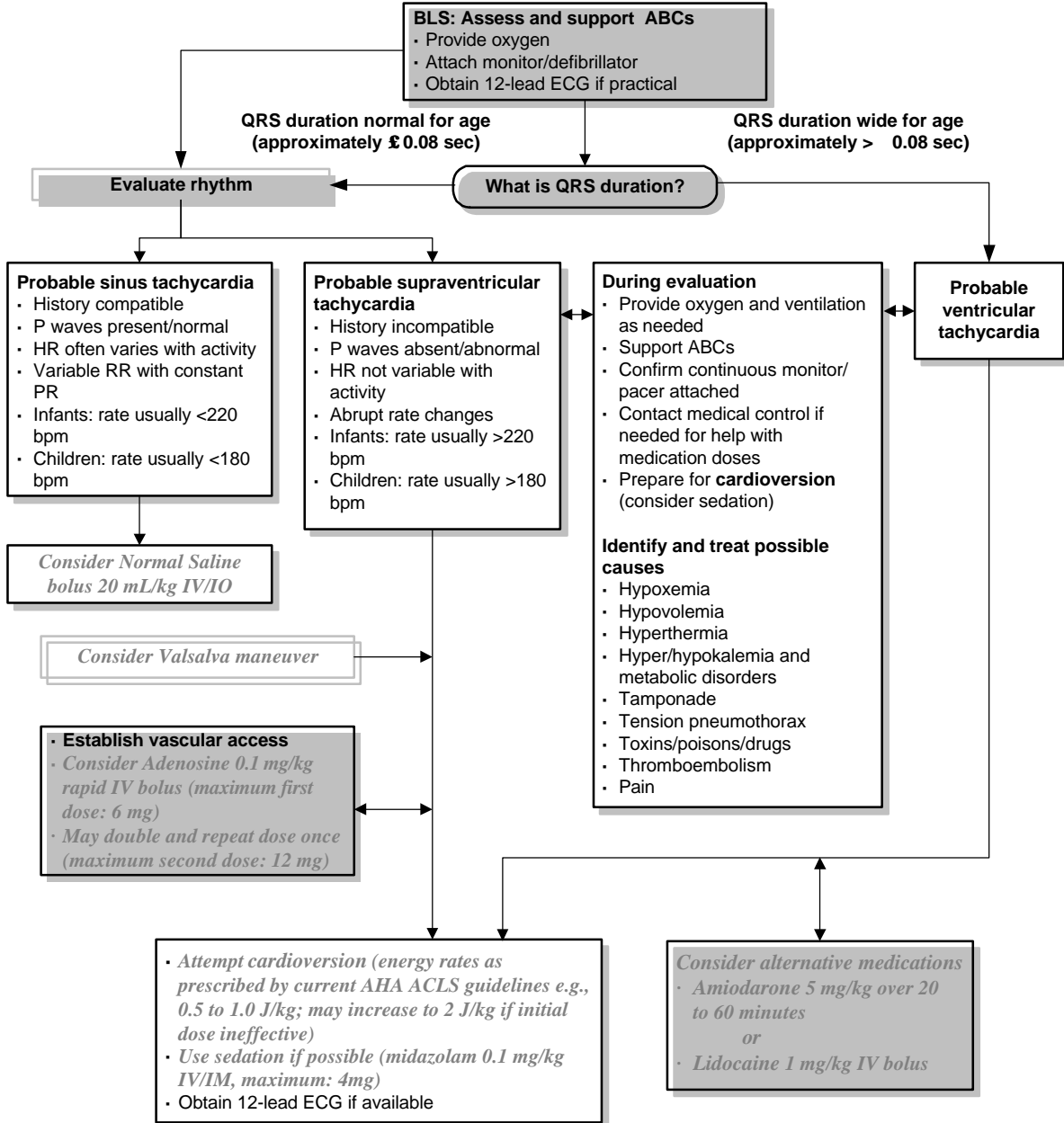


Procedures in black sans serif font are **standing orders**.
 Procedures in gray italic serif font are *after obtaining verbal orders*

1/15/2002

Pediatric Tachycardia - Adequate Perfusion

Hennepin County EMS System ALS Algorithms
Pediatric Tachycardia with Adequate Perfusion

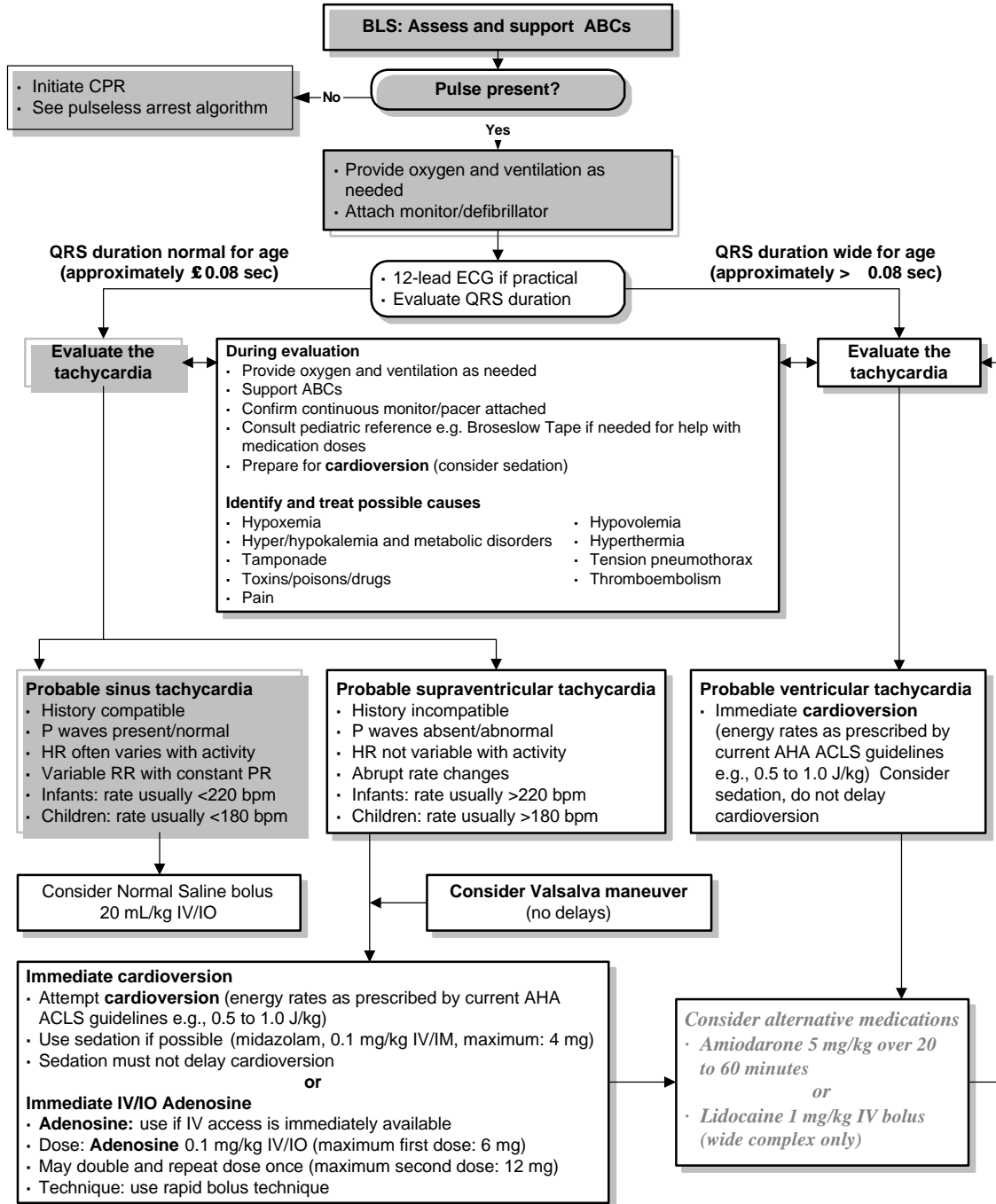


Procedures in black sans serif font are **standing orders**.
 Procedures in gray italic serif font are *after obtaining verbal orders*

1/15/2002

Pediatric Tachycardia - Poor Perfusion

Hennepin County EMS System ALS Algorithms Pediatric Tachycardia with Poor Perfusion



Procedures in black sans serif font are **standing orders**.
Procedures in gray italic serif font are *after obtaining verbal orders*

1/15/2002

Appendix M - Needle Thoracostomy

Permitted in System only if service ALS Medical Director authorizes and provides appropriate education and quality improvement monitoring.

Candidates: Needle thoracostomy may be indicated for patients in PEA or in respiratory distress, either spontaneous or as a result of trauma, where there is **strong evidence** of tension pneumothorax. Evidence of a tension pneumothorax may include the following signs and symptoms:

- progressive respiratory distress
- hyperexpanded chest on affected side
- Indications of developing shock, including: weak, rapid pulse; hypotension, due to ↓ cardiac output; and cyanosis
- neck vein distension (may not be present)
- uneven chest wall movement
- tracheal shift away from affected side (late sign)
- decreased or absent breath sounds on affected side

Procedure:

1. Identify 2nd intercostal space on affected side.
2. Clean area at midclavicular line with alcohol and/or Betadine.
3. Select appropriate needle. Adults: 10-12 g. 3" needle through catheter. Peds: 14-16 g. 1¾ needle through catheter.
4. Position needle at midclavicular line in the middle of the 3rd rib and puncture the skin.
5. Advance needle over 3rd rib into chest at 45° angle to the chest wall and parallel to sternum. A slight give will be felt at the pleural cavity; advance the needle further into chest just until bevel clears pleura.
6. Advance the catheter over the needle and then remove needle.
7. Connect tubing to the Heimlich valve and assure proper direction of flow through the valve.
8. Dress area and secure catheter to chest.
9. Do not clamp tubing. Low suction may be applied intermittently to assist evacuation of pneumothorax.

Appendix N - Nerve Agent - Organophosphate Exposure

Nerve Agent - Organophosphate Exposure	
Standing Orders	After Obtaining Verbal Orders
<ol style="list-style-type: none"> 1. Recognize toxidrome: <ol style="list-style-type: none"> a. Miosis (small pupils) – present in ALL significant exposures, in association with at least two of the following: <ul style="list-style-type: none"> - Fasciculations - Respiratory distress - Increased secretions - Vomiting/Diarrhea/Incontinence - Seizure - Cardiovascular collapse 2. Wear appropriate personal protective equipment; do NOT enter hot zone. 3. Assure appropriate patient decontamination if liquid or vapor exposures (in concert with fire department/HazMat). 4. Assess ABCs and begin oxygen therapy if possible, intubate if needed (may have high airway resistance). 5. Treat seizures per protocol with midazolam. 6. In cases of known organophosphate overdose/exposure or in setting of multiple casualty incident with patients exhibiting this toxidrome. Consider atropine 2 mg IV, repeat as necessary to control bronchial secretions. 7. Mark 1 kit, if available (600 mg pralidoxime, 2 mg atropine) auto-injectors 1M x 2 for patients with seizures, severe shortness of breath, cardiovascular collapse. 8. Consider aggressive management of cardiac arrest if resources allow, as good outcomes documented after prolonged resuscitation. 	

Appendix O - Medication Profiles

Medication profiles given in this section are for guidance and informational purposes only. This section is not intended to provide specific orders for patient care. See protocols for approved system practice.

Adenosine IV

<u>Generic Name:</u>	Adenosine IV
<u>Trade Name:</u>	Adenocard IV
<u>Classification:</u>	Antiarrhythmics
<u>Action/Kinetics:</u>	A naturally occurring nucleoside that acts on the AV node to slow conduction and inhibit reentry pathways. Useful in PSVT. For A fib, atrial or V tach may produce transient AV or retrograde block that may clarify diagnosis. Rapidly metabolized--Half-life is <5 seconds.
<u>Indications:</u>	To convert acute PSVT to normal sinus rhythm. Includes PSVT associated with accessory bypass tracts (Wolff-Parkinson-White syndrome).
<u>Contraindications:</u>	Patients with hypersensitivity to the drug. Those in second or third degree heart block, sick sinus syndrome, or symptomatic bradycardia.
<u>Adverse Effects:</u>	Chest pain, dizziness, dyspnea and or shortness of breath, facial flushing, headache, lightheadedness, blurred vision, nausea, metallic taste, and numbness. More serious symptoms are persistent arrhythmias, and bronchospasm.
<u>How supplied:</u>	6 mg/2 ml with flip top vials that require to be drawn up in a syringe. Also 6mg/2ml and 12mg/2ml in disposable syringes ready to be administered.
<u>Dosage:</u>	The initial dose is 6-mg. rapid bolus over 1-3 seconds. The dose should be followed quickly by a 20-ml saline flush. Then elevate the extremity. Repeat 12mg. in 1-2 minutes if needed. Third dose of 12mg. Maybe given in 1-2 minutes.
<u>Precautions:</u>	Could produce bronchoconstriction in-patients with asthma. Patients who develop high level heart block after a single dose should not receive additional doses. Use with caution in-patients receiving digoxin and verapamil in combination. Therapeutic levels of theophylline and methylxanthines affect the response of adenosine Dipyridamole potentiates its effect.

Albuterol

<u>Generic Name:</u>	Albuterol Sulfate Inhalation Solution, 0.083%
<u>Trade Name:</u>	Ventolin
<u>Classification:</u>	Bronchodilators
<u>Action/Kinetics:</u>	Relaxes bronchial, uterine, and vascular smooth muscle by stimulating beta2-adrenergic receptors.
<u>Indications:</u>	Indicated for the relief of bronchospasm in patients two years of age and older with reversible obstructive airway disease and acute attacks of bronchospasm.
<u>Contraindications:</u>	Hypersensitivity to the drug.
<u>Adverse Effects:</u>	Tachycardia, hypertension, bronchospasm, bronchitis, nasal congestion, tremors, dizziness, nervousness, headache, and sleeplessness.
<u>How Supplied:</u>	Unit dose plastic vial containing albuterol sulfate inhalation solution 0.083%, 2.5mg/3ml. Usual dose for adults and children weighing at least 15 kg is one vial 2.5 mg of albuterol (with atrovent .5mg. added) administered by nebulization. Inhalation solution will be delivered over approximately 5 to 15 minutes.
<u>Precautions:</u>	Used with caution in patients with cardiovascular disorders, especially coronary insufficiency, cardiac arrhythmia's and hypertension. MAO inhibitors, tricyclic antidepressants, may potentiate action on CV system. Propranolol, and other beta blockers inhibit the effect of albuterol

Alcaine (eye drops)

<u>Generic Name:</u>	Proparacaine Hydrochloride (0.5%)
<u>Trade Name:</u>	Alcaine
<u>Classification</u>	Topical anesthetic agent
<u>Actions/Kinetics:</u>	The main site of anesthetic action is the nerve cell membrane where proparacaine interferes with the large transient increase in the membrane permeability to sodium ions. Studies indicate that local anesthetics may limit sodium ion permeability through the lipid layer of the nerve cell membrane. It is rapid acting. The onset begins within 30 seconds and lasts for approximately 15 minutes.
<u>Indications:</u>	Ophthalmic procedures in which it can provide good local anesthesia. (flushing eyes out after chemical injury).
<u>Contraindications:</u>	Hypersensitivity to the drug
<u>Adverse Effects</u>	Hypersensitivity reactions, conjunctival redness, transient eye pain, and lacrimation or increased winking. A hyperallergic corneal reaction may occur which includes an acute diffuse epithelial keratitis.
<u>How Supplied:</u>	15 ml droptainer dispenser (solution is 0.5%)
<u>Dosage:</u>	Instill 1-2 drops, into the affected eye(s). May be repeated only once
<u>Precautions:</u>	Should be used cautiously in patients with cardiac disease, or hyperthyroidism. Prolonged use may produce permanent corneal opacification with loss of vision.

Amiodarone Hydrochloride

<u>Generic Name:</u>	Amiodarone Hydrochloride
<u>Trade Name:</u>	Cordarone
<u>Classification</u>	Antiarrhythmic
<u>Actions/Kinetics:</u>	Blocks sodium channels at rapid pacing frequencies, causing an increase in the duration of the myocardial cell action potential and refractory period, as well as alpha- and beta-adrenergic blockade. The drug decreases sinus rate, increases PR and QT intervals, results in development of U waves, and changes T-wave contour. After IV use, amiodarone relaxes vascular smooth muscle, reduces peripheral vascular resistance (afterload), and increases cardiac index slightly.
<u>Indications:</u>	Used in a wide variety of atrial and ventricular tachyarrhythmias and for rate control of rapid atrial arrhythmias in patients with impaired LV function when digoxin has proven ineffective
<u>Contraindications:</u>	Marked sinus bradycardia due to severe sinus node dysfunction, second- or third-degree AV block, syncope caused by bradycardia (except when used with a pacemaker). Cardiogenic shock. Lactation.
<u>Adverse Effects</u>	Cough and progressive dyspnea. Worsening of arrhythmias, symptomatic bradycardia, sinus arrest, SA node dysfunction, CHF edema, hypotension, cardiac conduction abnormalities, cardiac arrest, abnormal involuntary movements, headache, N&V, abdominal pain, flushing, and shock.
<u>How Supplied:</u>	Injection: 50 mg/mL
<u>Dosage:</u>	Cardiac Arrest: 300mg IV push. Consider repeating 150 mg IV push in 3-5 minutes. Maximum cumulative dose 2.2 g IV/24 hours. Wide complex tachycardia (stable): 150 mg rapid infusion IV (15 mg/min) over first 10 minutes. May repeat 150 mg rapid infusion IV every 10 minutes as needed. Maximum cumulative dose 2.2 g/24 hours.
<u>Precautions:</u>	May produce vasodilation and hypotension. May have negative inotropic effects. May prolong QT interval. Do not routinely use with other drugs that prolong QT interval. Use with caution if renal failure is present.

Aspirin (ASA)

<u>Generic Name:</u>	Acetylsalicylic acid
<u>Trade Name:</u>	Aspirin ASA, Ecotrin,
<u>Classification:</u>	Antiplatelet effect, nonnarcotic analgesic, antipyretic
<u>Action/Kinetics:</u>	To reduce risk of death and/or nonfatal MI in patients with a previous MI or unstable angina pectoris. Impedes clotting by blocking prostaglandin synthesis, which prevents formation of the platelet-aggregating substance thromboxane A ₂ .
<u>Indications:</u>	Dose for cardiac patients fitting criteria, even if absence of chest pains, is a 160-325mg. Aspirin given orally if patient has no history of allergy.
<u>Contraindications:</u>	Hypersensitivity to drug. Patients with active ulcer disease
<u>Adverse Effects:</u>	Bleeding gums, signs of GI bleeding, and petechiae. Aspirin will increase bleeding time.
<u>How Supplied:</u>	160 mg, 325mg tablets. (May also use 4 baby aspirin chewable 81 mg ea., for a total of 324 mg)
<u>Dosage:</u>	Give one aspirin 325mg. or 4 baby aspirin chewable (chewing is preferable to swallowing) give within minutes of arrival.
<u>Precautions:</u>	Use with caution in patients with GI lesions, impaired renal function, hypoprothrombinemia, vitamin K deficiency, thrombocytopenia, or severe hepatic impairment.

Atropine, IV

<u>Generic Name:</u>	Atropine Sulfate IV
<u>Trade Name:</u>	Atropine IV
<u>Classification:</u>	Antiarrhythmic, anticholinergic, antidote
<u>Action/Kinetics:</u>	Anticholinergic that inhibits acetylcholine at the parasympathetic neuroeffector junction, blocking vagal effects on the SA and AV nodes; this enhances conduction through the AV node and speeds heart rate.
<u>Indications:</u>	Treatment of symptomatic sinus bradycardia, atrioventricular block at the nodal level, or ventricular asystole. Usually not effective when infranodal block suspected. Second drug for asystole or PEA.
<u>Contraindications:</u>	Hypersensitivity to the drug, unstable cardiovascular status, myocardial ischemia, glaucoma, and obstructive disease of the GI or GU tracts.
<u>Adverse Effects:</u>	Postural hypotension, Blurred vision, dryness of the mouth, GI reflux, nausea, vomiting, paralytic ileus, tachyarrhythmias, and urinary retention.
<u>How Supplied:</u>	0.1mg/ml total of 10ml to equal 1mg of atropine.
<u>Dosage:</u>	Adult: For bradycardia, 0.5mg to 1mg. IV every three to five minutes as needed, up to a total of 3mg. In asystole give 1mg. IV, repeat every 3 to 5 minutes up to a total of 0.04 mg/kg. Peds: Give 0.02 mg/kg or 0.2 cc/kg IV/IO/ET up to 5cc for child or 10cc for adolescent (minimum dose 0.1mg or 1cc). May be repeated once in 5 minutes.
<u>Precautions:</u>	Use with caution in presence of myocardial ischemia and hypoxia. Avoid in hypothermic bradycardia. Usually not effective in second degree block type II and third degree blocks with wide QRS complexes. Antacids decrease absorption of med.

Atrovent

<u>Generic Name:</u>	Ipratropium bromide
<u>Trade Name:</u>	Atrovent
<u>Classification:</u>	Bronchodilator
<u>Action/Kinetics:</u>	Inhibits vagally mediated reflexes by antagonizing acetylcholine at muscarinic receptors on bronchial smooth muscle.
<u>Indications:</u>	Either alone or with other bronchodilators, especially beta adrenergics, is used for treatment of bronchospasm associated with chronic obstructive pulmonary disease, including asthma chronic bronchitis and emphysema.
<u>Contraindications:</u>	Hypersensitivity to the drug, atropine and its derivatives, and those with a history of hypersensitivity to soy lecithin or related food products such as soybeans and peanuts.
<u>Adverse Effects:</u>	Dizziness, headache, nervousness, palpitations, hypertension, cough, blurred vision, rhinitis, epistaxis, GI distress, Chest pain, flu-like symptoms.
<u>Dosage:</u>	How Supplied: In a unit dose vial containing 2.5 ml (0.5 mg.) One unit dose vial added to the nebulized albuterol May repeat neb of albuterol 2.5 mg. with atrovent 0.5mg. x1.
<u>Precautions:</u>	Used cautiously in patients with angle-closure glaucoma, prostatic hyperplasia, and bladder-neck obstruction. Avoid leakage around the face mask, temporary blurring of vision or eye pain may occur.

Benadryl, IV

<u>Generic Name:</u>	Diphenhydramine hydrochloride
<u>Trade Name:</u>	Benadryl IV
<u>Classification:</u>	Antihistamine,antidyskinetic, antiemetic, antivertigo agent, sedative-hypnotic
<u>Action/Kinetics:</u>	Competes with histamine for H1-receptor sites on effector cells. Prevents, but does not reverse, histamine-mediated responses. It also has anticholinergic (antispasmodic), antiemetic, and sedative effects. It has a rapid onset and is widely distributed throughout the body.
<u>Indications:</u>	Supplemental therapy to epinephrine in anaphylaxis and other uncomplicated allergic reactions requiring prompt treatment.
<u>Contraindications:</u>	Hypersensitivity to the drug, during acute asthmatic attacks, in newborns, premature neonates, or breast feeding women. Avoid use in patients taking MAO inhibitors. Also patients with narrow angle glaucoma, stenosing peptic ulcer, and symptomatic prostatic hypertrophy
<u>Adverse Effects:</u>	Palpitations, hypotension, tachycardia, confusion, insomnia, headache, vertigo, restlessness, tremor, seizures, blurred vision, nausea and vomiting, and anaphylactic shock.
<u>How Supplied:</u>	Vial 50mg/ml for injection IV or IM
<u>Dosage:</u>	25mg. IV or 50mg IM (See protocol)
<u>Precautions:</u>	Use with extreme caution in patients with prostatic hyperplasia, asthma or COPD, increased intraocular pressure, hyperthyroidism, CV disease, hypertension, Avoid SC or perivascular injection. Drug to drug and alcohol use causes increased CNS depression.

Calcium Chloride 10%

<u>Generic Name:</u>	Calcium Chloride
<u>Trade Name:</u>	Calciject
<u>Classification:</u>	Antihyperkalemic, antihypermagnesemic, Cardiotonic, antihypocalcemic
<u>Action/Kinetics:</u>	Calcium is a basic element prevalent in the human body. It affects bones, nerves, muscles, glands, cardiac and vascular tone, and normal coagulation of the blood. It is excreted in the urine and feces.
<u>Indications:</u>	Known or suspected hyperkalemia (e.g., renal failure), Hypocalcemia (e.g., after multiple blood transfusion, and as an antidote for toxic effects (hypotension and arrhythmias) from calcium channel blocker overdose or B-Adrenergic blocker overdose.
<u>Contraindications:</u>	Hypersensitivity to the drug, digitalized patients, hypercalcemia, ventricular fibrillation
<u>Adverse Effects:</u>	May cause bradycardia, cardiac arrest, metallic, calcium or chalky taste, prolonged state of cardiac contraction, sense of oppression, or tingling sensation, especially with a too-rapid rate of administration. (Overdose) nausea and vomiting, coma, and sudden death.
<u>How Supplied:</u>	100mg/ml in 10 ml vial (total =1 GM in a 10% solution)
<u>Dosage:</u>	Usually 10 ml (100mg/ml) (1 Gm) IV
<u>Precautions:</u>	Do not use routinely in cardiac arrest, do not mix with sodium bicarbonate. Three times more potent than calcium gluconate. For IV use only

Dextrose, IV

<u>Generic Name:</u>	D-glucose or glucose
<u>Trade Name:</u>	Dextrose IV
<u>Classification:</u>	Nutritional (carbohydrate)
<u>Action/Kinetics:</u>	A monosaccharide that provides glucose calories for metabolic needs. Oxidation provides water to sustain volume and may help lower excess ketone production and prevent protein loss. Hypertonic solutions (20%-50%) act as diuretics and reduce CNS edema.
<u>Indications:</u>	Diabetics who are unable to take oral fluids due to altered level of consciousness and low blood glucose.
<u>Contraindications:</u>	Delirium tremens with hydration, diabetic coma while blood sugar is excessive, hepatic coma intracranial or intraspinal hemorrhage, glucose-galactose malabsorption syndrome.
<u>Adverse Effects:</u>	Pulmonary edema, exacerbated hypertension, heart failure, (fluid overload-congested states), Hyperglycemia, (during infusion), hyperosmolar syndrome (mental confusion, loss of consciousness), hypokalemia, reactive hypoglycemia (after infusion).
<u>How Supplied:</u>	50 ml prefilled syringe of D ₅₀ W IV
<u>Dosage:</u>	Adult dose: one prefilled syringe of 50ml D50W IV—may repeat as appropriate. Pediatric dose: Give D ₅₀ W, 1cc/kg up to 50 cc to patients four years and older with a blood glucose <60 mg/dl. For patients three years and younger, use D ₂₅ W, 2cc/kg IV.
<u>Precautions:</u>	Use with caution in patients with cardiac or pulmonary disease, hypertension, renal insufficiency, urinary obstruction, or hypovolemia. Avoid extravasation may cause tissue sloughing, necrosis, and phlebitis.

Dilaudid

<u>Generic Name:</u>	Hydromorphone Hydrochloride
<u>Trade Name:</u>	Dilaudid
<u>Classification:</u>	Narcotic analgesic, morphine type
<u>Action/Kinetics:</u>	<p>Binds with opiate receptors in the CNS, altering both perception of and emotional response to pain through an unknown mechanism. Is metabolized in the liver and excreted in urine.</p> <p>Dilaudid is 7-10 times more analgesic than morphine, with a short duration of action. There is less sedation, vomiting and nausea than with morphine, it can induce pronounced respiratory depression. The onset is 10-15 min. with peak effect in 15-20 minutes and duration of 2-5 hours.</p>
<u>Indications:</u>	Analgesia for pain.
<u>Contraindications:</u>	Do not use in pediatric patients, during labor, respiratory depression or when ventilatory function is depressed such as in status asthmatics, COPD, emphysema. Patients who are hypersensitive to drugs, those with intracranial lesions associated with increased intracranial pressure.
<u>Adverse Effects:</u>	
CNS	sedation, somnolence, clouded sensorium, dizziness
Cardiovascular	hypotension, bradycardia
GI	nausea, vomiting
Respiratory	respiratory depression, bronchospasm
<u>How Supplied:</u>	1 ml vial containing 2 mg/1 ml
<u>Dosage:</u>	Adults – 0.5 – 2 mg. IV titrated for pain relief 1-2 mg IM
<u>Precautions:</u>	IV administration should be done over 2-5 min.

Epinephrine

<u>Generic Name:</u>	Epinephrine Hydrochloride
<u>Trade Name:</u>	Adrenalin
<u>Classification:</u>	Cardiac stimulant, bronchodilator, antiallergic, and vasopressor
<u>Action/Kinetics:</u>	Stimulates alpha and beta-adrenergic receptors within the sympathetic nervous system. A potent cardiac stimulant, it strengthens the myocardial contraction (positive inotropic effect) and increases cardiac rate (positive chronotropic effect). Increases myocardial and cerebral blood flow during CPR.
<u>Indications:</u>	Cardiac arrest: VF, pulseless VT, asystole, pulseless electrical activity. Anaphylaxis, severe allergic reactions, and profound bradycardia or hypotension after other drugs tried maybe used as a gtt.
<u>Contraindications:</u>	Patients with angle-closure glaucoma, shock (other than anaphylactic shock), organic brain damage, cardiac dilation, coronary insufficiency, cerebral arteriosclerosis or labor and delivery. Do not use to treat overdose of adrenergic blocking agents.
<u>Adverse Effects</u>	Nervousness, tremor, headache, agitation, dizziness, weakness, cerebral hemorrhage, palpitations, hypertension, tachycardia, anginal pain, nausea and vomiting, and dyspnea.
<u>How Supplied:</u>	Prefilled syringe 0.1mg/ml (1:10,000), total of 10cc = 1 mg.-vial 1 mg/ml (1:1,000) total of 1 cc
<u>Dosage:</u>	Adult-cardiac arrest: 1 mg (10 ml of 1:10,000 solution) administered every 3-5 minutes during resuscitation. Tracheal route: 2 mg. diluted in saline. Anaphylaxis: 0.3 mg (1,1000) SC Peds. Cardiac arrest: (1:10,000) Give 0.1mg/kg or 0.1 cc/kg up to 10cc. Tracheal route: (1:1000) Give 0.1 mg/kg or 0.1 cc/kg up to 10cc. Anaphylaxis: (1:1000) 0.01 mg/kg (0.01 cc/kg) SC or IM up to 0.3 cc if patient was exposed to commonly recognized allergen and has respiratory distress or hypotension. Croup and Epiglottitis: 5 mg. nebulized epinephrine 1:1000. If unable to neb, may give epi 1:1000--- 0.01 mg/kg SC.
<u>Precautions:</u>	High doses do not improve survival or neurologic outcome and may contribute to postresuscitation myocardial dysfunction. Raising blood pressure and increasing heart rate may cause myocardial ischemia, angina and increased myocardial oxygen demand. Higher doses maybe required to treat poison/drug-induced shock. Do not use concurrently with brevipblock. The effects of the drug maybe potentiated by tricyclic antidepressants.

Etomidate

<u>Generic Name:</u>	Etomidate
<u>Trade Name:</u>	Amidate
<u>Classification:</u>	General Anesthetic. Is a hypnotic with no analgesic activity
<u>Mechanism of Action:</u>	Produces general anesthesia by augmenting the inhibitory tone of GABA on the CNS. Specific site of action is believed to be the reticular activating system. ETOMIDATE HAS NO ANALGESIC EFFECTS
<u>Pharmacokinetics:</u>	The onset is 1-2 minutes with a duration of 2-5 minutes. The half life is approximately 75 minutes. Elimination is primarily by the liver by converting to inactive metabolites and excreted in the urine.
<u>Pharmacodynamics</u>	
CNS:	Produces unconsciousness in approximately 30-60 seconds with recovery in 3-5 minutes due to rapid redistribution.
<u>Cardiovascular:</u>	Minimal changes in HR, BP & CO. Preferred agent in hemodynamically compromised patient. Can get tachycardia and HTN with tracheal intubation.
<u>Respiratory:</u>	Dose dependent respiratory depression and apnea.
<u>Adverse Effects:</u>	Myoclonus may occur after administration particularly with stimulation. Pain with injection due to being dissolved in propylene glycol. N/V may occur more frequently after its use. Adrenal suppression is noted but usually only with prolonged use as in an infusion. Frequently see eye movements with injection.
<u>Packing:</u>	Pre-filled syringes and multi-dose vial. Usually 2 mg/ml.
<u>Dosage:</u>	Adults – 20 mg. Peds – 0.3 mg/kg

Furosemide, IV

<u>Generic Name:</u>	Furosemide
<u>Trade Name:</u>	Lasix
<u>Classification:</u>	Diuretic, antihypertensive, and antihypercalcemic
<u>Action/Kinetics:</u>	A sulfonamide-type diuretic, related to the thiazides. Extremely potent and has a rapid onset of action of 5 minutes and may last for 2 hours. Acts on the proximal and distal tubules and ascending loop of Henle. Highly protein bound. Metabolized and excreted in the urine
<u>Indications:</u>	Acute pulmonary edema, in patients with systolic blood pressure >90 (without signs and symptoms of shock), edema associated with congestive heart failure, hypertensive emergencies, and post-cardiac arrest cerebral edema (increased intracranial pressure).
<u>Contraindications:</u>	Anuria, severe progressive renal disease with increasing azotemia and oliguria; hypersensitivity to the drug, rarely used in children, pregnancy, and breast-feeding mothers.
<u>Adverse Effects</u>	Vertigo, headache, dizziness, paresthesia, restlessness, dehydration, orthostatic hypotension, transient deafness (with too-rapid IV infusion), blurred or yellow vision. Abdominal pain, nausea and vomiting, muscle spasm, and electrolyte imbalance.
<u>How Supplied:</u>	Vials of 10 ml (10 mg/ml =total 100 mg. per vial
<u>Dosage:</u>	Dose of 40 mg IV (4cc) for pulmonary edema (per protocol) or amount designated by medical control MD.
<u>Precautions:</u>	Use cautiously in patients with hepatic cirrhosis. If patient is taking antihypertensives, increased risk of hypotension, risk of ototoxicity with higher doses. Use with caution in known sulfonamide sensitivity.

Glucagon, IM

<u>Generic Name:</u>	Glucagon
<u>Trade Name:</u>	GlucaGen
<u>Classification:</u>	Antihypoglycemic, antidote, and diagnostic agent
<u>Action/Kinetics:</u>	Raises blood glucose level by promoting catalytic depolymerization of hepatic glycogen to glucose. Induces liver glycogen breakdown, releasing glucose from the liver. Blood glucose is raised within 10 minutes. Has a half-life of 8 to 18 minutes.
<u>Indications:</u>	Treatment of severe hypoglycemia, Helpful in reversing adverse beta-blockade of beta-adrenergic blocking agents and calcium channel blockers, diagnostic aid in radiologic exam of abdomen
<u>Contraindications:</u>	known hypersensitivity to drug, and in patients with pheochromocytoma or with insulinoma (tumor of pancreas).
<u>Adverse Effects</u>	Hyperglycemia (excessive dosage), nausea and vomiting hypersensitivity reactions (anaphylaxis, dyspnea, hypotension, rash), increased blood pressure, and pulse; this maybe greater in patients taking beta-blockers.
<u>How Supplied:</u>	One vial containing 1 mg. (1 IU) powder and one vial containing 1/ml of sterile water to be reconstituted.
<u>Dosage:</u>	Give 1 mg. IM, after reconstituting powder and sterile water, for symptomatic diabetic patient whose IV access has been difficult. For beta-blocker overdose also give 1 mg. IV.
<u>Precautions:</u>	Give with caution to patients that have low levels of releasable glucose (e.g., adrenal insufficiency, chronic hypoglycemia, and prolonged fasting). Potentiates oral anticoagulants. Depletes glycogen stores especially in children and adolescents.

Lidocaine Hydrochloride, IV

<u>Generic Name:</u>	Lidocaine Hydrochloride IV
<u>Trade Name:</u>	Xylocaine IV
<u>Classification:</u>	Antiarrhythmic
<u>Action/Kinetics:</u>	Decreases ventricular excitability without depressing the force of ventricular contractions by increasing the stimulation threshold of the ventricle during diastole. Onset of action should occur within 2 minutes and last approximately 10 to 20 minutes. Metabolized in the liver and excreted in the urine.
<u>Indications:</u>	Cardiac arrest from VF/VT (class II B) Stable VT, wide-complex tachycardias of uncertain type, wide-complex PSVT (class IIB).
<u>Contraindications:</u>	Hypersensitivity to the drug. Stokes-Adams syndrome, Wolff-Parkinson-White syndrome, severe degrees of SA, AV, or intraventricular block (when no pacemaker is present.).
<u>Adverse Effects</u>	Anaphylaxis, bradycardia, hypotension, cardiovascular collapse, seizures, malignant hyperthermia, respiratory depression, tremors, lightheadedness, confusion, tinnitus, blurred or double vision, and vomiting
<u>How Supplied:</u>	Abboject 5 ml prefilled syringe (100 mg. total)
<u>Dosage:</u>	Adult: V tach Lidocaine 100 mg. (1.0-1.5 mg/kg) IV over two minutes. Use ½dose, i.e., 50 mg. if patient is over age 70 or if CHF or hepatic failure present. Repeat 0,5 to 0.75 mg/kg every 5 to 10 minutes; maximum total dose: 3 mg/kg. Cardiac arrest from VF/VT Lidocaine 100 mg. (1.5 mg/kg) may repeat lidocaine 100mg. IV or 200 mg. ET followed by defib. Peds: Cardiac arrest (1:10,000) Give 0.1 mg/kg or 0.1 cc/kg IV/IO/ET followed by defib.
<u>Precautions:</u>	Prophylactic use in AMI patients is not recommended. Discontinue infusion immediately if signs of toxicity develop. Elderly clients who have hepatic or renal disease or who weigh less than 45.5 kg. Should be watched closely for adverse side effects. Do not add lidocaine to blood transfusion assembly. Potentiates amiodarone, beta-adrenergic blockers (Inderal) and tagamet. Toxicity can occur due to reduced metabolism of lidocaine.

Magnesium Sulfate, IV

<u>Generic Name:</u>	Magnesium Sulfate
<u>Trade Name:</u>	Magnesium Sulfate
<u>Classification:</u>	Antiarrhythmic, electrolyte replenisher, and anticonvulsant
<u>Action/Kinetics:</u>	A CNS depressant and a depressant of smooth, skeletal and cardiac muscle. It possesses a mild diuretic and vasodilating effect Reverses refractory VF caused by hypomagnesemia and aids in replenishment of intracellular potassium. Onset of action is immediate and effective for about 30 minutes. Excreted in the urine.
<u>Indications:</u>	Refractory VF (after lidocaine), torsades de pointes with a pulse, life threatening ventricular arrhythmias due to digitalis toxicity, adjunctive to alleviate bronchospasm in acute asthma, control of seizures in pregnancy, and control of hypertension in acute nephritis in children.
<u>Contraindications:</u>	In the presence of heart block or myocardial damage, hypersensitivity to drug, and within 2 hours preceding delivery of PIH patient.
<u>Adverse Effects</u>	CNS depression, hypotension, circulatory collapse, depression of myocardium. Sweating, hypothermia, muscle paralysis, respiratory paralysis, suppression of knee jerk reflex, and changes in ECG, (increased PR interval, increased QRS complex, and prolonged QT interval).
<u>How Supplied:</u>	50% solution 1 Gm in 2/ml to be diluted to 10 ml with N.S. or sterile water for injection.
<u>Dosage:</u>	50% solution 1 Gm (2 ml) diluted to 10 ml with N.S. or sterile water for injection. Give IV push over one minute.
<u>Precautions:</u>	Should be administered cautiously in the presence of impaired renal failure. Morphine and Valium potentiate respiratory depression when given to patient receiving MgSO ₄ . Calcium gluconate should always be available to treat possible respiratory depression due to MgSO ₄ . Toxic level is >10 mg/dl.

Midazolam Hydrochloride

<u>Generic Name:</u>	Midazolam Hydrochloride
<u>Trade Name:</u>	Versed
<u>Classification:</u>	Sedative-hypnotic, benzodiazepine, amnestic, anesthetic adjunct
<u>Action/Kinetics:</u>	A short acting benzodiazepine, CNS depressant 3 to 4 times as potent as diazepam. Depressant effects are dependent on dose, route of administration and the presence of other medications. Can depress the ventilatory response to CO ₂ stimulation. Mechanics of respiration are not adversely affected with usual doses. Diminishes patient recall. Onset of action within 3 -5 minutes. Half-life ranges from 1.8 to 6.4 hours
<u>Indications:</u>	To produce sedation, relieve anxiety, and impair memory of procedural events. Used with or without narcotic for conscious sedation before short procedures. Also as a component in the induction of anesthesia before administration of other anesthetic agents, and for patients in status seizures.
<u>Contraindications:</u>	Hypersensitivity to the drug, and acute narrow-angle glaucoma. Not recommended in pregnancy, childbirth, breastfeeding, shock, coma, acute alcohol intoxication with depression of vital signs.
<u>Adverse Effects</u>	Serious cardiorespiratory events (airway obstruction, apnea, hypotension, oxygen desaturation, respiratory and or cardiac arrest, paradoxical behavior or excitement. Other common side effects are coughing, headache, hiccups, nausea and vomiting, and nystagmus (especially in children).
<u>How Supplied:</u>	Vial 2ml (total 10 mg) = 5 mg per ml.
<u>Dosage:</u>	Status seizures: Adult , if >5 minutes and IV established, Versed IV titrated 1 mg at a time up to a max dose of 10 mg. Peds: if >5 minutes and IV established Versed IV 0.1 mg/kg over two minutes. (Maximum dose = 5 mg.) If no IV is established adult: Give 10 mg. IM. Peds: Give 0.2 mg/kg IM. Agitation: (intubated patient, behavior emergencies) Versed 1-2 mg IV/IM. Cardioversion: If patient alert and IV access established may give up to 3 mg IV for sedation.
<u>Precautions:</u>	Use cautiously in patients with uncompensated acute illness and in elderly or debilitated patients. Administer slowly over at least 2 minutes. Use with caution in neonates. Versed does not protect against the intracranial pressure or against the pulse and blood pressure rise associated with intubation. Erythromycin may alter the metabolism of versed. Oral contraceptives prolong the half-life. Sedative effects may be antagonized by theophylline.

Morphine Sulfate, IV

<u>Generic Name:</u>	Morphine Sulfate
<u>Trade Name:</u>	Morphine Sulfate (names may vary if preservative free)
<u>Classification</u>	Narcotic analgesic, adjunct, pulmonary edema
<u>Actions/Kinetics:</u>	An opium-derivative, narcotic analgesic, which is a CNS depressant. Induces sleep and inhibits perception of pain by binding to opiate receptors, decreasing sodium permeability, and inhibiting transmission of pain pulses. Relieves pulmonary congestion, and lowers myocardial oxygen need. Detoxified in the liver and excreted in the urine. Onset 2-3 minutes, peak 30 minutes, and duration is 3-6 hours.
<u>Indications:</u>	Analgesic of choice in pain associated with myocardial infarction that is unresponsive to nitrates. Treatment of acute pulmonary edema associated with left ventricular failure, (if blood pressure is adequate). Used for sedation, to decrease anxiety and facilitate induction of anesthesia.
<u>Contraindications:</u>	Hypersensitivity to opiates, acute bronchial asthma, heart failure secondary to lung disease, upper airway obstruction, acute alcoholism, convulsive states, and paralytic ileus.
<u>Adverse Effects</u>	Seizures (with large doses), hypotension, bradycardia, cardiac arrest, or may see tachycardia, and hypertension. Nausea and vomiting, ileus, urine retention, respiratory depression and arrest, hypothermia, and increased intracranial pressure may also been seen.
<u>How Supplied:</u>	Vial 10 mg/ml =1ml
<u>Dosage:</u>	For persistent pain, give morphine sulfate 2-10 mg. IV titrated to obtain pain relief. (Use caution in presence of COPD).
<u>Precautions:</u>	Causes hypotension in volume-depleted patients. Administer slowly and titrate to effect. May cause apnea in asthmatic patients. May also cause increase ventricular response rate in presence of supraventricular tachycardias. Use with caution in the elderly, head injuries with increased intracranial pressure, COPD, severe hepatic or renal disease,

Narcan, IV

<u>Generic Name:</u>	Naloxone Hydrochloride
<u>Trade Name:</u>	Narcan
<u>Classification</u>	Narcotic (opioid) antagonist, Antidote
<u>Actions/Kinetics</u>	Overcomes effects of narcotic overdose including respiratory depression, sedation, and hypotension. It does not have any narcotic effect itself. It exhibits essentially no pharmacologic activity. Onset of action is within 2 minutes. Duration of action is dependent on dose and route of administration
<u>Indications:</u>	Indicated for complete or partial reversal of known or suspected narcotic-induced respiratory depression and overdose. Antidote for natural and synthetic narcotics. Also indicated for the diagnosis of suspected opioid tolerance.
<u>Contraindications:</u>	Hypersensitivity to the drug. The naloxone challenge test should not be performed in patients showing S/S of withdrawal or whose urine contains opioids.
<u>Adverse Effects</u>	May see VF, tachycardia, hypertension, nausea, vomiting, and diaphoresis, in higher doses. Tremors and withdrawal symptoms in narcotic-dependent patients.
<u>How Supplied:</u>	Vial 1.0 mg/ml—10 ml multiple dose vials
<u>Dosage:</u>	If suspected narcotic overdose consider 2 mg Narcan IV. For physical findings consistent with narcotics overdose, may give 2 mg. Narcan IV. Case specific consider additional Narcan up to 10 mg.
<u>Precautions:</u>	May precipitate acute withdrawal symptoms in narcotic addicts. Effects of drug may not outlast effects of narcotics. Use with caution in patients with cardiac disease or those receiving cardiotoxic drugs. It is ineffective against respiratory depression caused by barbiturates, anesthetics, other nonnarcotic agents, or pathologic conditions.

Nitroglycerin, IV

<u>Generic Name:</u>	Nitroglycerin IV
<u>Trade Name:</u>	Tridil or Nitro-Bid IV or Nitrostat IV
<u>Classification:</u>	Antianginal agent, coronary vasodilator, antihypertensive
<u>Action/Kinetics:</u>	Relaxation of the vascular smooth muscle and dilatation of peripheral arteries and veins. Dilatation of the veins promotes peripheral pooling and decreases venous return to the heart (preload). Arteriolar relaxation reduces systemic vascular resistance, systolic arterial pressure, and mean arterial pressure (afterload). Onset: 1-2 minutes Duration: 3-5 minutes (dose-dependent)
<u>Indications:</u>	Initial 24 to 48 hours in patients with AMI and CHF, large anterior wall infarction, persistent or recurrent ischemia, or hypertension. Angina unresponsive to usual doses of organic nitrate or beta-adrenergic blocking agents. Produce controlled hypotension during surgical procedures.
<u>Contraindications:</u>	Patients who are hypersensitive to drug. Hypotensive patients Severe bradycardia or tachycardia RV infarction Viagra within 24 hours Patients with pericardial tamponade or constrictive pericarditis Head trauma with increased intracranial pressure
<u>Adverse Reactions:</u>	Headache, transient episodes of light-headedness related to Blood pressure changes, hypotension, syncope, crescendo Angina, rebound hypertension, anaphylactoid reactions. Abd pain and vomiting, may also be seen.
<u>How Supplied:</u>	Available premixed in 250ml D%W with 50mg.Nitroglycerin. All other preparations must be diluted and administered as an infusion.
<u>Dosage:</u>	Dependent on patient response and effective dose. Initial dose 10 mcg/min delivered by infusion pump. Maybe increased by 5-10 mcg/min q 5-10 minutes until desired hemodynamic or clinical response. If no response seen may increase by 20mcg/min until response achieved. Monitor titration continuously until client reaches desired level of response. Monitor blood pressure and pulse closely maintaining systolic pressure>100.
<u>Precautions:</u>	Pregnancy category C: safety for use in pregnancy and in children not established. Use nonabsorbent polyvinyl chloride IV tubing from the manufacturer. Do not administer with any other medications in the IV system. Use with caution in patients with hepatic or renal disease or with postural hypotension.

Nitroglycerin, Tablets - Metered Dose Spray

<u>Generic Name:</u>	Nitrolingual (spray)---Nitrostat (tabs)
<u>Trade Name:</u>	Nitroglycerin spray---Nitroglycerin tabs
<u>Classification</u>	Antianginal, coronary vasodilator, antihypertensive
<u>Actions/Kinetics</u>	Primary action is relaxation of the vascular smooth muscle and dilatation of peripheral arteries and veins. Although venous effects predominate, nitro produces dilation of both arterial and venous beds. Promotes peripheral pooling of blood and decreases venous return to the heart, reducing left ventricular pressure (preload). Arteriolar relaxation reduces systemic vascular resistance and arterial pressure (afterload). Also increases blood flow through the collateral coronary vessels. Onset: 1-2 minutes Duration: 3-5 minutes.
<u>Indications:</u>	Initial antianginal for suspected ischemic pain. Drug of choice in unstable angina or CHF associated with acute myocardial infarction, and suspected pulmonary edema when systolic blood pressure is greater than 140.
<u>Contraindications:</u>	Hypersensitivity to nitrates, head trauma with increased intracranial pressure, hypotensive patients, severe bradycardia or tachycardia, RV infarction, viagra within 24 hours, and severe anemia.
<u>Adverse Effects</u>	Headache, transient episodes of light-headedness related to blood pressure changes, hypotension, syncope, crescendo angina, rebound hypertension, and anaphylactoid reactions. Abd pain and vomiting may also be seen.
<u>How Supplied:</u>	Pumpspray 400 mcg per spray, (200 metered sprays). Tablets 0.4mg S.L. (1/150).
<u>Dosage:</u>	One tablet S.L. 0.4 mg (gr. 1/150) or one metered spray (400mcg) may repeat same dosage for chest pain patient every 5 minutes x3 if SBP remains 110 or greater. For pulmonary edema patients give one tablet S.L. or one metered spray if SBP is 140 or greater. (Two) minutes after initial dose may repeat tablet or spray if patient continues to have symptoms and SBP remains 140 or greater. (Five) minutes after second dose may repeat tablet or spray if symptoms continue and SBP is 140 or greater.
<u>Precautions:</u>	Do not shake aerosol spray container because this affects metered dose. Patient should sit or lie down when taking this drug. Concomitant use of nitrates and alcohol may cause hypotension. Marked symptomatic orthostatic hypotension may occur when calcium channel blockers and oral controlled-release nitroglycerin are used in combination.

Nitronox

Generic Name:	Nitronox (nitrous oxide and oxygen)
Trade Name:	Nitronox
Classification	(Analgesic inhalant)
Actions/Kinetics	Mixture of nitrous oxide (NO ₂) and oxygen blended at a fixed 50:50 ratio and administered by inhalation. Has a potent analgesic effect. It is highly diffusible and rapidly enters the blood stream, saturating the central nervous system to afford pain relief within minutes of administration. Likewise, rapid reversal of analgesia occurs only a few minutes after discontinuation.
Indications:	Pain of many varieties including: headache, back pain, isolated musculoskeletal trauma, and burns not involving face or respiratory tract. Other medical conditions: (i.e., kidney stones, third trimester labor).
Contraindications:	Respiratory distress from any cause, COPD (may cause atelectasis and hypoxemia), Multiple trauma or suspected multiple trauma, head injury (unless minor with no loss of consciousness), chest injury / possible pneumothorax, abdominal distention or trauma, shock, decreased or impaired level of consciousness from any cause including ETOH, inability to understand or comply with instructions for use (i.e., dementia, mental retardation, young children), patient actively vomiting, and early pregnancy.
Adverse Effects	Drowsiness, (common) Light-headedness, euphoria, headache, confusion, tingling, slurred speech, nausea, vomiting, (uncommon) bronchospasm, (never documented but possible)
How Supplied:	Matrix Medical Nitronox Unit with nitrous oxide (NO ₂) and oxygen blended at a fixed 50:50 ration.
Dosage:	Must be self-administered by the patient. It is intermittently inhaled through a demand valve as needed until pain relief occurs or until drowsiness causes the patient to drop the mask or mouthpiece.
Precautions:	The patient must be coached on how to self-administer and must hold the mask/mouthpiece him/herself. The patient should be instructed to breathe as normally as possible and to take the mask away from his/her face if he/she starts to feel drowsy, nauseated, or extremely lightheaded.

Sodium Bicarbonate

<u>Generic Name:</u>	Sodium bicarbonate
<u>Trade Name:</u>	Sodium bicarbonate
<u>Classification</u>	Electrolyte replenisher, alkalizing agent
<u>Actions/Kinetics</u>	An alkalizing agent and sodium salt. Helps to maintain osmotic pressure and ion balance. It is the buffering agent in blood. Bicarbonate ion elevates blood pH promptly. 99% reabsorbed with normal kidney function. 1% is excreted in the urine.
<u>Indications:</u>	Metabolic acidosis caused by circulatory insufficiency resulting from shock or severe dehydration, severe renal disease, cardiac arrest, primary lactic acidosis, tricyclic overdoses, and hyperkalemia.
<u>Contraindications:</u>	Patients with metabolic or respiratory alkalosis, patients losing chlorides by vomiting or GI suction, patients receiving diuretics known to produce hypochloremic alkalosis, and patients with hypocalcemia in which alkalosis may produce tetany, hypertension, seizures, or heart failure.
<u>Adverse Effects</u>	Gastric distention, belching, flatulence, hypokalemia, metabolic alkalosis, hypernatremia, hyperosmolarity, hyperirritability or tetany. Extravasation of IV sodium bicarbonate may cause chemical cellulitis with tissue necrosis.
<u>How Supplied:</u>	Prefilled syringe 8.4% sodium bicarbonate solution (50-mEq/50 ml)
<u>Dosage:</u>	Adult: Drug overdose Consider Na Bicarb 50 mEq IV in tricyclic ingestions. Symptomatic renal patient Consider Na Bicarb 50 mEq IV. Cardiac arrest-asystole-PEA Consider Na Bicarb 50 mEq (1 amp) or 1 mEq/kg if arrest interval long or return of circulation after prolonged resuscitation. Peds: Cardiac arrest asystole-PEA Consider (1 mEq/cc) if arrest interval long or upon spontaneous circulation. Give 1 mEq/kg or 1cc/kg IV/IO up to 50 cc.
<u>Precautions:</u>	Not recommended for routine use in cardiac arrest patients. Sodium bicarbonate inactivates norepinephrine, and dopamine, and forms a precipitate with calcium. Use with caution in the elderly with renal or cardiovascular insufficiency with or without CHF.

Succinylcholine

<u>Generic Name:</u>	Succinylcholine chloride
<u>Trade Name:</u>	Anectine
<u>Classification</u>	Neuromuscular blocking agent (depolarizing), anesthesia adjunct
<u>Actions/Kinetics</u>	An ultra-short-acting depolarizing skeletal muscle relaxant. Causes paralysis by interfering with neural transmission at the myoneural junction. Depolarization of the drug maybe observed as fasciculations. Onset of action is within 0.5 to 1 minute. Duration of peak effect is 4 to 10 minutes. About 10% of the drug is excreted unchanged in the urine.
<u>Indications:</u>	Provide skeletal muscle relaxation (paralysis) to facilitate endotracheal intubation
<u>Contraindications:</u>	Hypersensitivity to drug, history or family history of malignant hyperthermia, severe burns, crush injuries, glaucoma, penetrating eye injuries, and significant neuromuscular disease.
<u>Adverse Effects</u>	Muscle pain from fasciculations, rhabdomyolysis, myoglobinuria, excessive salivation, (blocked by atropine) prolonged respiratory depression, hypotension, bradycardia, (in children) increased intracranial pressure, (transient) and Malignant hyperthermia.
<u>How Supplied:</u>	Vial of 10 ml--- (20 mg/ml)
<u>Dosage:</u>	Give 1.5 – 2 mg/kg (per protocol)
<u>Precautions:</u>	Use with caution in hypovolemic or hypotensive patients. Not compatible with IV sodium bicarbonate, (flush tubing well between drugs) Incidence of bradycardia with repeat dosing. May cause prolonged blockade with hypocalcemia, hypokalemia, and cardiovascular, hepatic or pulmonary disorders.

Terbutaline Sulfate

<u>Generic Name:</u>	Terbutaline sulfate
<u>Trade Name:</u>	Brethine, Bricanyl
<u>Classification</u>	Sympathomimetic, (bronchodilator), Uterine relaxant
<u>Actions/Kinetics</u>	A beta-adrenergic stimulator. Primary actions are bronchodilation by relaxation of the smooth muscles. and inhibition of uterine smooth muscle contractility. Increases pulse rate and widens pulse pressure moderately. Onset of action is prompt and lasts 2 hours. Metabolized in the liver.
<u>Indications:</u>	Used for prevention and reversal of bronchospasm in patients with bronchial asthma and reversible bronchospasm associated with bronchitis and emphysema.
<u>Contraindications:</u>	Patients with hypersensitivity to drug or sympathomimetic amines, cardiac arrhythmias with tachycardia or digitalis toxicity, uncontrolled hypertension, and any preexisting maternal medical conditions adversely affected by beta-mimetic drugs.
<u>Adverse Effects</u>	Paradoxical bronchospasm with prolonged usage, nervousness, tremor, drowsiness, headache, weakness, palpitations, tachycardia, heartburn, nausea, vomiting, and hypokalemia (with high doses).
<u>How Supplied:</u>	Injection 1 mg/ml (each ampule contains 1 mg. of Terbutaline per 1 ml of solution).
<u>Dosage:</u>	<u>Adult</u> If patient is in respiratory arrest may administer Terbutaline 0.25 mg. SC while awaiting medical control contact. <u>Peds</u> May administer Terbutaline 0.01 mg/kg (0.01 cc/kg) SC—Max dose = 0.25 mg. while awaiting medical control contact.
<u>Precautions:</u>	Use cautiously in patients with CV disorders, hyperthyroidism, diabetes, or seizure disorders. Drug is not recommended for children under 12 years of age because of insufficient clinical data. Protect ampule from light. Do not use if discolored. Significant changes in systolic and diastolic blood pressure may occur in some patients.

Vasopressin

<u>Generic Name:</u>	Vasopressin
<u>Trade Name:</u>	Pitressin
<u>Classification</u>	A natural occurring antidiuretic hormone that becomes a vasoconstrictor when used at higher doses than normally present in the body. (ACLS class IIb)
<u>Actions/Kinetics</u>	Vasopressin acts as a non-adrenergic peripheral vasoconstrictor. This occurs by direct stimulation of smooth muscle V 1 receptors. Interaction of vasopressin with V 1 receptors during CPR causes intense peripheral vasoconstriction of skin, skeletal muscle, intestine, and fat with relatively less constriction of coronary and renal vascular beds.
<u>Indications:</u>	Alternative for the treatment of adult shock-refractory VF. Maybe substituted for epinephrine as an alternative agent. The lower adverse effects profile maybe the major indication for vasopressin. Maybe useful for hemodynamic support in vasodilatory shock. Given intra-arterially, it is an approved treatment for bleeding esophageal varices. May also be used in diabetes insipidus in smaller doses.
<u>Contraindications:</u>	Patients with chronic nephritis accompanied by nitrogen retention. Not recommended for patients with coronary artery disease, because the increased peripheral vascular resistance may provoke angina.
<u>Adverse Effects</u>	Headache, seizure, bronchospasm, anaphylaxis angina, arrhythmias, myocardial ischemia, decreased cardiac output, abdominal cramps, nausea and vomiting.
<u>How Supplied:</u>	For injection: 0.5 ml and 1 ml ampules, 20 units/ml
<u>Dosage:</u>	40 U IV (not repeated) may be substituted for epinephrine as an alternative.
<u>Precautions:</u>	Use cautiously in children, elderly patients, pregnant patients, pre-op and post-op polyuric patients, and in those with seizure disorders.

4. Index

I

12-Lead ECG 1-12, 1-14, 1-17, 1-18, 1-22, 1-33, 2-17, 2-20, 3-1

A

Adenosine 1-18, 2-17, 2-18, 3-2, 3-45

Albuterol 1-5, 1-9, 1-26, 1-27, 1-28, 2-6, 2-7, 3-2, 3-46, 3-51

Amiodarone 1-20, 2-17, 2-18, 2-19, 3-2, 3-48, 3-60

Aspirin 1-13, 1-15, 3-2, 3-49

Atropine 1-5, 1-17, 1-21, 1-22, 1-27, 2-7, 2-16, 3-2, 3-5, 3-6, 3-20, 3-44, 3-50, 3-51, 3-69

Atrovent 1-5, 1-26, 1-27, 1-28, 2-6, 2-7, 3-2, 3-51

B

Benadryl 1-25, 1-41, 2-11, 3-2, 3-52

Blood Draw 3-1

C

Calcium Chloride 1-22, 1-23, 1-32, 1-34, 2-20, 3-2, 3-53

CISD 1-11, 3-28

Combitube 1-27, 2-1, 2-6, 3-1, 3-3

Communications 1-2, 3-24, 3-27, 3-28, 3-31

Cricothyrotomy 1-4, 3-1, 3-9

D

Dextrose 3-2, 3-54

Dilaudid 1-7, 1-13, 1-14, 3-2, 3-55

Diphenhydramine 1-25, 2-11, 3-2, 3-52

Disaster 1-11, 3-23, 3-27

Diversion 1-9, 1-14, 1-33

Divert 1-9, 3-25

Do Not Resuscitate 1-8, 1-21, 3-12, 3-13, 3-14, 3-15, 3-16

E

End Tidal CO₂ 3-1

Endotracheal Intubation 1-4, 2-2, 2-8, 3-3, 3-5, 3-7, 3-69

EOA 1-4, 1-27, 1-35, 2-1, 2-6, 3-1, 3-3

Epinephrine 1-5, 1-10, 1-20, 1-21, 1-22, 1-25, 1-26, 1-27, 2-6, 2-7, 2-9, 2-11, 2-16, 2-19, 2-20, 3-2, 3-52, 3-56, 3-71

Etomidate 1-19, 3-2, 3-5, 3-7, 3-57

F

Furosemide 3-2, 3-58

G

Glucagon 1-30, 1-31, 1-32, 2-13, 3-2, 3-59

Glucose 1-29, 1-30, 1-31, 1-37, 2-10, 2-12, 2-13, 3-1, 3-2, 3-54, 3-59

H

Hyperthermia 1-39, 3-6, 3-60, 3-69

Hypoglycemia 1-29, 1-37, 2-10, 3-54, 3-59

Hypothermia 1-22, 1-38, 2-20, 3-61, 3-63

I

Incident Command 1-11, 3-23, 3-24, 3-26, 3-27, 3-28, 3-29
 Intraosseous Infusion 3-21, 3-22
 Ipratropium 3-2, 3-51

L

Lasix 1-15, 3-2, 3-58
 Lidocaine 1-5, 1-16, 1-20, 2-17, 2-18, 2-19, 3-2, 3-3, 3-5, 3-6, 3-60, 3-61

M

Magnesium Sulfate 1-20, 1-26, 2-6, 2-7, 2-19, 3-2, 3-61
 Mark 1 Kit 3-2, 3-44
 MCI 3-27
 Midazolam 1-19, 1-29, 2-10, 2-17, 2-18, 3-2, 3-5, 3-7, 3-44, 3-62
 Morphine Sulfate 1-7, 1-13, 1-15, 1-19, 2-4, 3-2, 3-55, 3-61, 3-63
 MRCC 3-24, 3-25, 3-28, 3-29, 3-31

N

Naloxone 3-2, 3-64
 Narcan 1-5, 1-7, 1-14, 1-30, 1-32, 2-4, 2-12, 2-13, 3-2, 3-64
 Needle Thoracostomy 1-28, 1-36, 3-1, 3-43
 Neurogenic Shock 1-37
 Nitroglycerin Infusion 1-14, 1-15, 3-33
 Nitroglycerine 1-13, 1-14, 1-15, 3-65, 3-66
 Nitronox 1-5, 1-7, 1-40, 2-2, 2-4, 3-1, 3-2, 3-10, 3-11, 3-67
 Nitrous Oxide 1-42, 3-2, 3-10, 3-67

P

Pneumatic Compression Trousers 1-22, 1-23, 1-24, 1-25, 1-35, 1-36, 1-43, 2-14, 2-15, 2-20, 3-1
 Proparacaine 1-39, 3-2, 3-47
 Pulse Oximeter 1-4, 2-2, 3-20

R

RSI 3-5

S

Sodium Bicarbonate 1-20, 1-23, 1-27, 1-32, 1-34, 2-7, 2-12, 3-6, 3-53, 3-68, 3-69
 Succinylcholine 3-2, 3-5, 3-6, 3-7, 3-69

T

Terbutaline Sulfate 1-10, 1-26, 1-27, 2-6, 2-7, 3-2, 3-70
 Transcutaneous Pacing 1-17, 1-21, 3-1
 Trauma Center 1-9
 Triage 1-9, 3-24, 3-28, 3-29, 3-30, 3-32

V

Valsalva Maneuver 1-18, 2-17, 3-1
 Vasopressin 1-20, 3-2, 3-71
 Versed 1-6, 1-29, 1-41, 2-7, 2-10, 2-11, 3-2, 3-62