

Introduction and Foundations of Practice

Introduction

This document describes the methods by which Aurora Regional EMS will provide the highest quality pre-hospital patient care available. We have incorporated evidenced-based guidelines, when available, with historically proven practices to produce this document. While it is impossible to address every possible variation of disease or traumatic injury, these policies, protocols and procedures do provide a foundation for treating the vast majority of patients encountered. Certainly, our education, experience and clinical judgement will assist us as we provide the highest quality patient care available. Additionally, on-line medical control is available for those patient presentations that do not fall within the scope of the document.

Guidelines for the Use of Protocols

You will notice the medical protocols are divided into essentially three sections. The upper sections include history, signs and symptoms and differential assessment. The information in these boxed areas is meant as a guide to assist in obtaining pertinent information and to remind each of us to consider multiple potential causes for a patient complaint. From this, you should choose those elements which are pertinent to the particular patient you have encountered. It is not expected that every historical element or sign/symptom be recorded for every patient; it is expected that those elements pertinent to your patient will be included in the patient evaluation.

The center section describes the essentials of patient care which are presented in flow chart style. These represent the proven practices which are the foundation of the care we provide. It is suggested EMS providers follow the protocol flow chart from top to bottom, completing skills that are indicated at their given level. Certainly, exceptions will exist based on your clinical judgement and patient condition; the rationale for any deviation from the recommended course should be clearly explained in the patient care record. It is anticipated that such exceptions will be rare and providers are strongly encouraged to contact the on-line medical control or medical director prior to any deviations (so long as patient's condition is stable). Skills or procedures that occur after the "Notify destination or Contact Medical Control" box, require online orders from medical control before initiating.

When reading the protocols, you should utilize the following legend when determining the appropriate scope of practice.

EMR		EMR	→	Emergency Medical Responder
EMT		EMT	→	Emergency Medical Technician
AEMT		AEMT	→	Advanced Emergency Medical Technician
P		P	→	Paramedic
M		M	→	Medical Control

Finally, the Pearls section/page is located at the bottom of single page protocols or on the last page of each protocol. provides suggestions for patient care based on experience and common medical knowledge. As with the first section, not every patient will require every element under the Pearls section/page. It is anticipated this section will be used as a practical guide for the implementation of the essentials of the patient care section.

In summary, these protocols describe the proven practices that are the foundations of our care. The additional information, coupled with your experience and education, will allow us to provide pre-hospital patient care that is second-to-none.

Thank you for continuing to provide prompt, compassionate and clinically excellent care.

Sincerely,

Steven W. Zils, MD, FACEP, FAEMS, FAAEM
Out-of-Hospital Medical Director
Aurora Regional EMS

Erin McGlynn, MD, MPH
EMS Medical Director
Aurora Regional EMS

Jacob Cihla, MD
Out of Hospital Medical Director
Aurora Regional EMS

Cassandra Hardy, MD
EMS Medical Director
Aurora Regional EMS

Key to Protocol Utilization

History

- Important history items
- Circumstances of event
- SAMPLE
- Time of onset
- Duration

Signs/Symptoms

- Important Signs and Symptoms specific to each protocol

Differential

- A list of other disease or injury which should be considered

Black Box

Highlights Important Information



Universal Patient Care Protocol

Assumed all protocols utilize and will not appear on individual protocols

Red Box

Highlights Critical Information

May direct to another protocol



Signals protocol within a protocol

Information Box

Indicates Entry/Exit from/to another protocol(s)



Decision Point
Darker outline to highlight

Red text indicates items that would be key metrics for QA/CQI purposes

Indicates medication only

Algorithm Legend

EMR	Emergency Medical Responder
B	Emergency Medical Technician
A	Advanced Emergency Medical Technician
P	Paramedic
M	Notify Destination or Contact Medical Control

Pearls

- Important information specific to each protocol will appear here.
- Will usually appear on page 2.
- Important exam items listed here specific to protocol.

EMS Medical Guidelines

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Aurora Regional EMS

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- 
- AC 1 – Adult Asystole, PEA
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 - AC 3 – Cardiac Arrest
 - AC 4 – Chest Pain; Cardiac and STEMI
 - AC 5 – CHF – Pulmonary Edema
 - AC 6 – Adult Tachycardia, Narrow Complex
 - AC 7 – Adult Monomorphic Tachycardia, Wide Complex
 - AC 8 – Adult Polymorphic Tachycardia
 - AC 9 – VF, Pulseless VT
 - AC 10 – Post Resuscitation
 - AC 11 – LVAD Emergency
 - AC 12 – Wearable Cardioverter Defibrillator Vest

Adult Medical

- 
- AM 1 – Allergic Reaction Anaphylaxis
 - AM 2 – Diabetic - Adult
 - AM 3 – Dialysis Renal Failure
 - AM 4 - Hypertension
 - AM 5 – Hypotension, Shock
 - AM 6 – LVO Interfacility Transport
 - AM 7- Hemorrhagic Shock
 - AM 8 - Blood Transfusion Reaction

Adult Obstetrical

- 
- AO 1 – Childbirth Labor
 - AO 2 – Newly Born
 - AO 3 – OB-GYN Emergency

Airway Respiratory

- 
- AR 1 – Adult Airway
 - AR 2 – Adult Failed Airway
 - AR 3 – COPD Asthma



AR 4 – Pediatric Airway
AR 5 – Pediatric Failed Airway
AR 6 – Pediatric Respiratory Distress
AR 7 – Post Intubation BIAD Management
AR 8 – Ventilator Emergencies
AR 9 – Tracheostomy Tube Emergencies
AR 10 – Mechanical Ventilation

Pediatric Cardiac



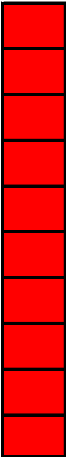
PC 1 – Pediatric Asystole, PEA
PC 2 – Pediatric Bradycardia
PC 3 – Pediatric CHF – Pulmonary Edema
PC 4 – Pediatric Cardiac Arrest
PC 5 – Pediatric Tachycardia, Narrow Complex
PC 6 – Pediatric Tachycardia, Wide Complex
PC 7 – Pediatric VF, Pulseless VT
PC 8 – Pediatric Post Resuscitation

Pediatric Medical



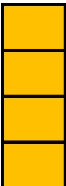
PM 1 – Pediatric Allergic Reaction
PM 2 – Pediatric Diabetic
PM 3 – Pediatric Hypotension, Shock

Trauma and Burns



TB 1 – Blast Injury
TB 2 – Chemical and Electrical Burn
TB 3 – Crush Syndrome
TB 4 – Extremity Trauma
TB 5 – Head Trauma
TB 6 – Multiple Trauma
TB 7 – Radiation Incident
TB 8 – Selective Spinal Immobilization
TB 9 – Thermal Burn
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Toxic- Environmental



TE 1 – Bites and Envenomations
TE 2 – Carbon Monoxide Cyanide
TE 3 – Drowning/Submersion Injury
TE 4 – Hyperthermia



TE 5 – Hypothermia

TE 6 – Overdose Toxic Ingestion

TE 7 – WMD Nerve Agent

Universal Protocols



UP 1 – Universal Patient Care

UP 2 – Triage

UP 3 – Abdominal Pain, Vomiting, Diarrhea

UP 4 – Altered Mental Status

UP 5 – Back Pain

UP 6 – IV or IO Access

UP 7 – Dental Problems

UP 8 – Indwelling Central Line Emergencies

UP 9 – Epistaxis

UP 10 – Fever/Infection Control

UP 11 – Pain Control

UP 12 – Police Custody

UP 13 – Seizure

UP 14 – Suspected Stroke

UP 15 – Suspected Sepsis

UP 16 – Syncope

UP 17 – Behavioral Health Crisis

UP 18 – Behavioral Agitation Sedation Guide

UP 19 – Behavioral Severe Agitation

Enclosures:

Medication References

Policy/Procedure Guidelines

Adult Asystole / Pulseless Electrical Activity

History

- SAMPLE
- Estimated downtime
- See Reversible Causes below
- DNR, or Living Will

Signs and Symptoms

- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- See Reversible Causes below



Cardiac Arrest Protocol AC 3

Criteria for Death / No Resuscitation
Review DNR Form

YES

NO

1. Rigor mortis and/or dependent lividity
2. Decapitation
3. Traumatic cardiac arrest with injury obviously incompatible with life
4. Traumatic arrest with apnea and either asystole or wide complex PEA at a rate < 40 (paramedic only).

Do not begin resuscitation

Follow
Criteria for Death/
Withholding Resuscitation
Policy/Procedure

AT ANY TIME

Return of
Spontaneous
Circulation



Go to
Post Resuscitation
Protocol AC 10

EMR	Follow CPR Procedure Monitor EtCO2 if available
	AED Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6
P	Epinephrine (1:10,000) 1 mg IV / IO Repeat every 3-5 minutes
A	Normal Saline Bolus 500 mL IV / IO May repeat as needed Maximum 2 L
Search for Reversible Causes	
EMR	Blood glucose analysis
B	Glucagon: Adult: 1mg IM/IN
A	Dextrose 10% Adult: 250 mL IV, max 250 mL.
P	Hyperkalemia: Calcium gluconate Adult 3000 mg IV push. May repeat x1. (Max 2 Doses). Sodium bicarbonate: 1mEq/kg IV, max 50 mEq/dose. May repeat in 5 min x1. (Max 2 Doses).
	TCA overdose: Sodium bicarbonate: 1 mEq/kg IV, max 50 mEq/dose. May repeat in 5 min x1. (Max 2 doses)
	Consider needle decompression

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

M

Notify Destination or
Contact Medical Control

M

Adult Asystole / Pulseless Electrical Activity

Pearls

- Efforts should be directed at high quality compressions with limited interruptions and early defibrillation when indicated.
- **DO NOT HYPERVENTILATE:** If no advanced airway (BIAD, ETT), compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation.
- IV access is preferred route. Follow IV or IO Access Protocol UP 6.
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
 - Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 - Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 - Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
 - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Bradycardia

History

- Past medical history
- Medications
 - Beta-Blockers
 - Calcium channel blockers
 - Clonidine
 - Digoxin
- Pacemaker

Signs and Symptoms

- HR < 60/min with hypotension, acute altered mental status, chest pain, acute CHF, seizures, syncope, or shock secondary to bradycardia
- Chest pain
- Respiratory distress
- Hypotension or Shock
- Altered mental status
- Syncope

Differential

- Acute myocardial infarction
- Hypoxia / Hypothermia
- Pacemaker failure
- Sinus bradycardia
- Head injury (elevated ICP) or Stroke
- Spinal cord lesion
- Sick sinus syndrome
- AV blocks (1°, 2°, or 3°)
- Overdose

Exit to
Appropriate
Protocol(s)



Heart Rate < 60 / min and Symptomatic:

Hypotension, Acute AMS, Ischemic Chest Pain,
Acute CHF, Seizures, Syncope, or Shock
secondary to bradycardia
Typically HR < 50 / min

YES

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary
(PE)
Thrombosis; coronary (MI)

Airway Protocol(s) AR 1, 2
if indicated

Respiratory Distress
Protocol AR 3
if indicated

Chest Pain: Cardiac and STEMI
Protocol AC 4
if indicated

Search for Reversible Causes

EMR 12 Lead ECG Procedure

IV / IO Protocol UP 6

P Cardiac Monitor

A Normal Saline Fluid Bolus
500 mL – 2 L NS IV / IO
(Unless Acute CHF)
Maximum 2 L

Atropine 1 mg IV / IO
May repeat every 3 – 5 minutes
Maximum 3 mg

If No Improvement
Transcutaneous Pacing Procedure
(Consider earlier in 2nd or 3rd AVB)

A. Consider Norepinephrine if patient still
hypotensive 2-10 mcg/min IV/IO, titrate to SBP ≥
90 mmHg or MAP ≥ 65. May consider push dose
epinephrine 5-20mcg (0.5-2ml) every 1-5
minutes until Norepinephrine drip started.

B. Consider Glucagon Adult: 1mg IM/IN, if
patient still bradycardic and on beta blockers.

C. Consider Calcium gluconate Adult: 3000 mg
IV/IO push. May repeat x1 (Max 2 doses), if
patient still bradycardic and on calcium channel
blockers

M Notify Destination or
Contact Medical Control M

Consider Pain Control

Ketamine 0.3 mg/kg IV / IO
Infuse or IV push over 10
minutes May repeat in 20
minutes x2 (Max 3 Doses)
Maximum 30 mg/single
dose

Ketamine 1 mg/kg IN
Maximum 100mg (1mL) in
each nare. May repeat in 5-
10 minutes, Max 5mg/kg

OR

Fentanyl 25 – 100 mcg IV /
IO / IM / IN
Repeat every 5 minutes
Maximum 3 mcg/kg

OR

Consider Sedation

Ketamine
IV/IO: 1-2 mg/kg once

IN: 3-5mg/kg; max 100mg/
1ml/nare; may repeat in 5-
10 mins; max 5mg/kg

IM: 5mg/kg once; Max
500mg/kg

OR

Midazolam
2 – 2.5 mg
IV / IO / IM / IN
May repeat after 5 minutes
Maximum 10mg

Suspected Beta-
Blocker or Calcium
Channel Blocker



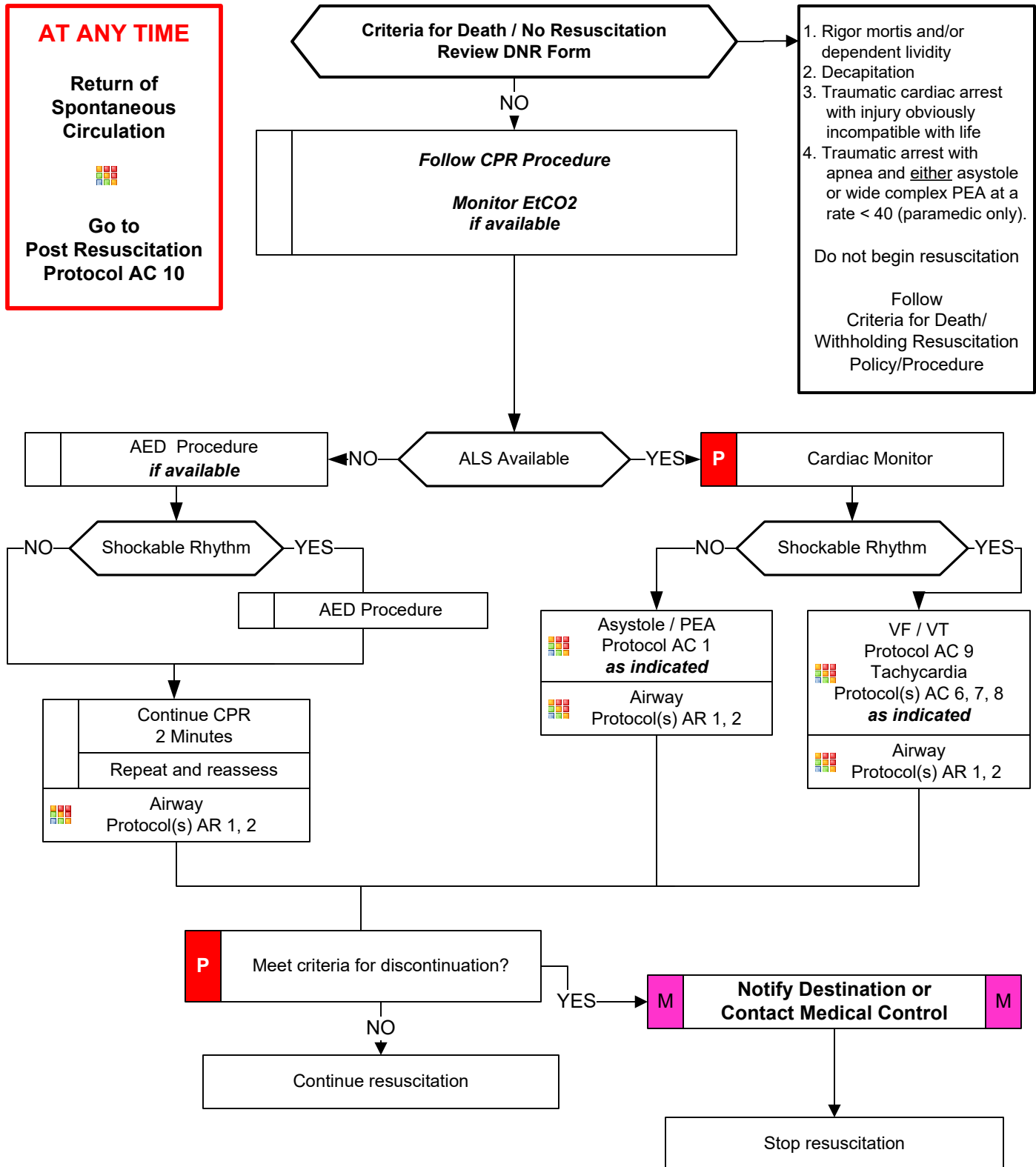
Follow Overdose/
Toxic Ingestion
Protocol TE 7

Bradycardia; Pulse Present

Pearls

- **Recommended Exam:** Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.
- Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.
- Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia. Give Calcium Gluconate in addition to Sodium Bicarbonate if hyperkalemia suspected.
- **12-Lead ECG:**
 - 12 Lead ECG not necessary to diagnose and treat
 - Obtain when patient is stable and/or following rhythm conversion.
- **Unstable condition**
 - Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
 - If at any point patient becomes unstable move to unstable arm in algorithm.
- Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.
- **Atropine:**
 - Atropine is considered a first line agent in symptomatic bradycardia.
 - Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
 - If no IV or IO access immediately available start Transcutaneous Pacing, establish IV / IO access, and then administer atropine and/or norepinephrine.
- **Symptomatic condition**
 - Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
 - Symptomatic bradycardia usually occurs at rates < 50 beats per minute.
 - Search for underlying causes such as hypoxia or impending respiratory failure.
- **Serious Signs / Symptoms:**
 - Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.
- **Transcutaneous Pacing Procedure (TCP)**
 - Indicated with unstable bradycardia unresponsive to medical therapy.
 - If time allows transport to a STEMI-receiving center because transcutaneous pacing is a temporizing measure.
 - Transvenous / permanent pacemaker will probably be needed.
 - Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- **IM injection**
 - Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

Cardiac Arrest; Adult



Cardiac Arrest; Adult

Pearls

- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.
- **DO NOT HYPERVENTILATE:** If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.
- Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.
- The effectiveness of chest compressions decreases when moving patients.
 - a. Patients should therefore be resuscitated as close to the point at which they are first encountered and should only be moved if the conditions on scene are unsafe or do not operationally allow for resuscitation.
 - b. Chest compressions are also less effective in a moving vehicle.
 - c. It is also dangerous to EMS clinicians, patients, pedestrians, and other motorists to perform chest compressions in a moving ambulance.
 - d. For these reasons and because in most cases the care provided by EMS clinicians is equivalent to that provided in emergency departments, resuscitation should occur on-scene.
- Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.
- IV access is preferred route. Follow IV or IO Access Protocol UP 6.
- **Defibrillation:**
 - Follow manufacturer's recommendations concerning defibrillation / cardioversion energy when specified.
 - Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
 - Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
 - Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
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 - Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
 - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Chest Pain: Cardiac and STEMI

History

- Age
- Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies
- Recent physical exertion
- Onset / Palliation / Provocation
- Quality (crampy, constant, sharp, dull, etc.)
- Region / Radiation / Referred
- Severity (1-10)
- Time (onset /duration / repetition)

Signs and Symptoms

- CP (pain, pressure, aching, vice-like tightness)
- Location (substernal, epigastric, arm, jaw, neck, shoulder)
- Radiation of pain
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness
- **Time of Onset**
- Women:
 - More likely to have dyspnea, N/V, weakness, back or jaw pain

Differential

- Trauma vs. Medical
- Angina vs. Myocardial infarction
- Pericarditis
- Pulmonary embolism
- Asthma / COPD
- Pneumothorax
- Aortic dissection or aneurysm
- GE reflux or Hiatal hernia
- Esophageal spasm
- Chest wall injury or pain
- Pleural pain
- Overdose: Cocaine or Methamphetamine

12 Lead ECG Procedure	
EMR	Aspirin 81 mg x 4 PO (chewed) Or 325 mg PO (confirm no allergies and not pregnant)
M	EMT: Notify Destination or Contact Medical Control
B	Nitroglycerin 0.4 mg Sublingual Repeat every 5 minutes x 2 (Max 3 doses) <i>if prescribed to patient and (BP ≥ 100)</i>
A	Nitroglycerin 0.4 mg Sublingual Repeat every 5 minutes x 2 (Max 3 Doses) <i>if (BP ≥ 100)</i>
P	Cardiac Monitor

No STEMI

IV / IO Protocol UP 6	
A	Nitroglycerin 0.4 mg SL Repeat every 5 minutes as needed
P	Fentanyl 25-100 mcg IV IO/IM/IN Repeat every 3-5 as needed Maximum 3mcg/kg
A	Ondansetron: Adult: 4 mg IV/IO/IM/ PO
Treat hypotension, pulmonary edema or dysrhythmias per protocols <i>If indicated</i>	

Transport based on: <u>Transport Policy</u>	
Immediate Notification of Facility Immediate Transmission of ECG <i>if capable</i> Keep Scene Time to ≤ 15 Minutes	
P	Brilinta: Adult: 180mg PO

Acute MI / STEMI

STEMI Definition:

- ≥ 1 mm ST Segment elevation in ≥ 2 contiguous leads
- ≥ 2 mm ST/J point elevation in V2-V3 for men
- ≥ 1.5 mm ST/J point elevation in V2-V3 for women
- ECG software diagnoses Acute MI (symptomatic)

M	Notify Destination or Contact Medical Control	M
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Chest Pain: Cardiac and STEMI

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are the key performance indicators for the EMS Acute Cardiac (STEMI) Care Toolkit**
- **Nitroglycerin:**
 - Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.
 - Nitroglycerin may cause hypotension during any type myocardial infarction. It is NOT more likely to cause hypotension in an inferior MI and should NOT be avoided unless already hypotensive.
- **STEMI (ST-Elevation Myocardial Infarction)**
 - STEMI patients should be taken to a STEMI receiving center per the Transport policy.
 - Consider placing 2 IV sites in the left arm: Many PCI centers use the right radial artery for intervention.
 - Strongly Consider placing defibrillator pads on patient as a precaution.
 - Consider Normal Saline bolus of 250 – 500 mL as pre-cath hydration.
 - Scene time goal is < 15 minutes.
 - Document and time-stamp facility STEMI notification and make notification as soon as possible.
 - Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).
- **Cardiac related symptoms in men and women:**
 - Pressure, squeezing, fullness, or pain in the chest.
 - Pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
 - Shortness of breath with or without chest pain.
 - Sweating, nausea, weakness, and/or lightheadedness.
 - Women, diabetic patients, and the elderly often experience only weakness, shortness of breath, nausea/vomiting, and back or jaw pain.**

CHF / Pulmonary Edema

History

- Congestive heart failure
- Past medical history
- Medications (digoxin, Lasix, Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Cardiac history --past myocardial infarction

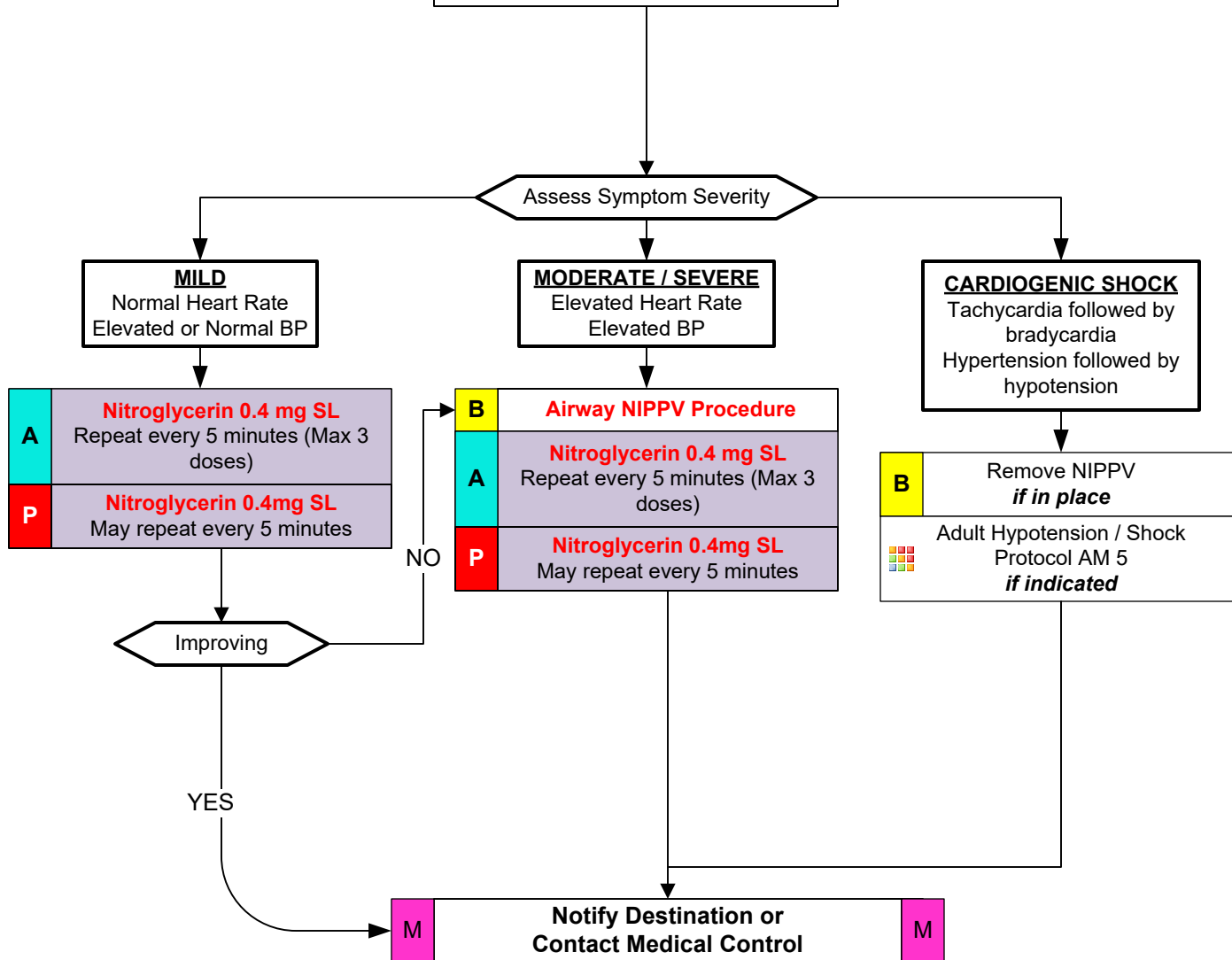
Signs and Symptoms

- Respiratory distress, bilateral rales
- Apprehension, orthopnea
- Jugular vein distention
- Pink, frothy sputum
- Peripheral edema, diaphoresis
- Hypotension, shock
- Chest pain

Differential

- Myocardial infarction
- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- COPD
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pericardial tamponade
- Toxic Exposure

Airway Protocol(s) AR 1, 2 <i>as indicated</i>	
Chest Pain and STEMI Protocol AC 4 <i>if indicated</i>	
EMR	12 Lead ECG Procedure
P	Cardiac Monitor
IV / IO Protocol UP 6	



CHF / Pulmonary Edema

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Diuretics (furosemide) and opioids have NOT been shown to improve the outcomes of EMS patients with pulmonary edema. Even though this historically has been a mainstay of EMS treatment, it is no longer routinely recommended.**
- **Nitroglycerin:**
 - Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.**
 - Nitroglycerin may cause hypotension during any type myocardial infarction. It is NOT more likely to cause hypotension in an inferior MI and should NOT be avoided unless already hypotensive.**
- **Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).**
- **Consider myocardial infarction in all these patients. Diabetics, geriatric and female patients often have atypical pain, or only generalized complaints.**
- **Cardiac related symptoms in men and women:**
 - Pressure, squeezing, fullness, or pain in the chest.**
 - Pain or discomfort in one or both arms, the back, neck, jaw, or stomach.**
 - Shortness of breath with or without chest pain.**
 - Sweating, nausea, weakness, and/or lightheadedness.**
 - Women, diabetic patients, and the elderly often experience only weakness, shortness of breath, nausea/ vomiting, and back or jaw pain.**
- **If patient has taken nitroglycerin without relief, consider potency of the medication.**
- **Contraindications to opioids include severe COPD and respiratory distress. Monitor the patient closely.**
- **Monitor for hypotension after administration of nitroglycerin and opioids.**
- **Allow the patient to be in their position of comfort to maximize their breathing effort.**

Adult Tachycardia

NARROW (≤ 0.11 sec) Includes SVT & Atrial Fibrillation

History

- Age
- Past medical history (MI, Angina, WPW, Diabetes, post menopausal)
- Recent physical exertion
- Palpitations, irregular heart beat
- Time (onset /duration / repetition)

Signs and Symptoms

- Chest pain, heart failure, dyspnea
- AMS
- Shock, poor perfusion, hypotension
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness

Differential

- Trauma vs. Medical
- Sinus Tachycardia vs. dysrhythmia
- Fever, sepsis, infection
- Pericarditis, pulmonary embolism
- Aortic dissection or aneurysm
- Overdose: Stimulants

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable / Serious Signs and Symptoms

HR Typically ≥ 150

Hypotension, Acute AMS, Ischemic Chest Pain,
Acute CHF, Seizures, Syncope, or Shock
secondary to tachycardia

NO

Yes

EMR	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Rate
Controlled?

No

Regular
Rhythm?

YES

No

diltiazem 0.25 mg/kg IV / IO
Over 2 minutes
Maximum 20 mg

If No Improvement in 15 minutes
diltiazem 0.35 mg/kg IV / IO
Over 2 minutes
Maximum 25 mg

Attempt Vagal Maneuvers

Adenosine 12 mg IV / IO
Rapid push with flush

May repeat 12 mg IV / IO x 1
(Max 2 Doses)

Improvement?

Yes

Monitor and Reassess

Notify Destination or
Contact Medical Control

Cardioversion Procedure

Consider Pain Control

Ketamine 0.3 mg/kg IV / IO
Infuse or IV push over 10 minutes May
repeat in 20 minutes x2 (Max 3 Doses)
Maximum 30 mg/single dose

Ketamine 1 mg/kg IN
Maximum 100mg (1mL) in each nare. May
repeat in 5-10 minutes, Max 5mg/kg

OR

Fentanyl 25 – 100 mcg IV / IO / IM / IN
Repeat every 5 minutes
Maximum 3 mcg/kg

OR

Consider Sedation

Ketamine
IV/IO: 1-2 mg/kg once

IN: 3-5mg/kg; max 100mg/1ml/nare; may
repeat in 5-10 mins; max 5mg/kg

IM: 5mg/kg once; Max 500mg/kg

OR

Midazolam
2 – 2.5 mg
IV / IO / IM / IN
May repeat after 5 minutes
Maximum 10mg

Synchronized
Narrow and Regular: 50 – 100J
Narrow and Irregular: 200J
May repeat and increase dose
with subsequent cardioversion attempts

Adult Tachycardia

NARROW (≤ 0.11 sec)

Pearls

- **Recommended Exam:** Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **12-Lead ECG:**
 - 12 Lead ECG not necessary to diagnose and treat
 - Obtain when patient is stable and/or following rhythm conversion.
- **Unstable condition**
 - Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
 - If at any point patient becomes unstable move to unstable arm in algorithm.
- Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
- Typical sinus tachycardia is in the range of 100 to (220 - patient's age) beats per minute.
- **Symptomatic condition**
 - Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
 - Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute.
 - Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
- **Serious Signs / Symptoms:**
 - Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.
- If patient has history or 12 Lead ECG reveals Wolff Parkinson White (WPW):
 - DO NOT administer a Calcium Channel Blocker (e.g. Diltiazem) or Beta Blockers.
 - Use caution with Adenosine and give only with defibrillator available.
 - Atrial arrhythmias with WPW should be treated with Amiodarone.
- **Regular Narrow-Complex Tachycardia:**
 - Vagal maneuvers and adenosine are preferred. Vagal maneuvers may convert 19% to 54 % of SVT.
 - Using passive leg raise with Valsalva is more effective.
 - Adenosine should be pushed rapidly via proximal IV site followed by 20 mL Normal Saline rapid flush.
 - Adenosine should not be used in the post-cardiac transplant patient without **Contact of Medical Control**.
- **Irregular Narrow-Complex Tachycardia:**
 - Rate control is more important in pre-hospital setting rather than focus on rhythm conversion.
- **Synchronized Cardioversion:**
 - Recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and SVT.
- Monitor for hypotension after administration of Calcium Channel Blockers.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **IM injection**
 - Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

Adult Monomorphic Tachycardia

Wide Complex (≥ 0.12 sec)

History

- Age
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Recent physical exertion
- Palpitations, irregular heart beat
- Time (onset /duration / repetition)

Signs and Symptoms

- Chest pain, heart failure, dyspnea
- AMS
- Shock, poor perfusion, hypotension
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness

Differential

- Trauma vs. Medical
- Sinus Tachycardia vs. dysrhythmia
- Fever, sepsis, infection
- Pericarditis, pulmonary embolism
- Aortic dissection or aneurysm
- Overdose: Stimulants

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

 If no pulse, proceed to appropriate protocol

Unstable/ Serious Signs and Symptoms
HR Typically > 150
Hypotension, Acute AMS, Ischemic Chest Pain,
Acute CHF, Seizures, Syncope, or Shock
secondary to tachycardia

YES

NO

EMR	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6
P	Consider consultation with medical control

P	Amiodarone 150 mg in 100 mL of D5W IV / IO Infuse over 10 minutes May repeat if wide complex tachycardia recurs OR Lidocaine 1 – 1.5 mg/kg IV / IO May repeat if refractory Lidocaine 0.75 mg/kg IV / IO Maximum 3 mg/kg
	Monitor and Reassess
M	Notify Destination or Contact Medical Control

Cardioversion Procedure

Consider Pain Control

Ketamine 0.3 mg/kg IV / IO
Infuse or IV push over 10 minutes May repeat in 20 minutes x2 (**Max 3 Doses**)
Maximum 30 mg/single dose

Ketamine 1 mg/kg IN
Maximum 100mg (1mL) in each nare. May repeat in 5-10 minutes, **Max 5mg/kg**

OR

Fentanyl 25 – 100 mcg IV / IO / IM / IN
Repeat every 5 minutes
Maximum 3 mcg/kg

OR

Consider Sedation

Ketamine
IV/IO: 1-2 mg/kg once

IN: 3-5mg/kg; max 100mg/1ml/nare; may repeat in 5-10 mins; max 5mg/kg

IM: 5mg/kg once; Max 500mg/kg

OR

Midazolam
2 – 2.5 mg
IV / IO / IM / IN
May repeat after 5 minutes
Maximum 10mg

Wide: Regular and Irregular: 200 – 360J
• **Monomorphic QRS (Synchronized)**
• **Polymorphic QRS (Not-Synchronized)**

May repeat and increase dose with subsequent cardioversion attempts

Monomorphic QRS:

- All QRS complexes in a single lead are similar in shape.

Adult Monomorphic Tachycardia

Wide Complex (≥ 0.12 sec)

Pearls

- **Recommended Exam:** Mental Status, Skin, Neck, Lung, Heart, Abdomen, Extremities, Neuro
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and if SYMPTOMATIC.**
- **12-Lead ECG:**
12-Lead ECG is not necessary to diagnose and treat arrhythmia. A single lead ECG is often all that is needed. Obtain 12-Lead when patient is stable and/ or following a rhythm conversion.
- **Monomorphic QRS:**
All QRS complexes in a single lead are similar in shape.
- **Polymorphic QRS:**
QRS complexes in a single lead will change shape from complex to complex.
- **Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.**
- **Unstable condition**
Condition which acutely impairs vital organ function and cardiac arrest may be impending.
If at any point patient becomes unstable move to unstable arm in algorithm.
- **Symptomatic condition**
Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea but cardiac arrest is not impending.
Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
- **Serious Signs/ Symptoms:**
Hypotension. Acutely altered mental status. Signs of shock/ poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.
- Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
- Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.
- If patient has history or 12-Lead ECG reveals Wolff Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g., Diltiazem). Use caution with Adenosine and give only with defibrillator available. Atrial arrhythmias with WPW should be treated with Amiodarone.
- **Regular Wide-Complex Tachycardia:**
Unstable condition: Immediate defibrillation if pulseless and begin CPR.
- **Irregular Tachycardia:**
Wide-complex, irregular tachycardia: Do not administer calcium channel, beta blockers, or adenosine as this may cause paradoxical increase in ventricular rate. This will usually require cardioversion. Contact Medical Control.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **IM injection**
Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

Adult Polymorphic Tachycardia

WIDE (≥ 0.12 sec) Torsades de pointes

History

- Age
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Recent physical exertion
- Palpitations, irregular heart beat
- Time (onset /duration / repetition)

Signs and Symptoms

- Chest pain, heart failure, dyspnea
- AMS
- Shock, poor perfusion, hypotension
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness

Differential

- Cardiac arrest
- Sinus Tachycardia vs. dysrhythmia
- Fever, sepsis, infection
- Pericarditis, pulmonary embolism
- Aortic dissection or aneurysm
- Overdose

**Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia**

Exit to
Cardiac Arrest
Protocol AC 3

Pulse Present?

Yes

Unstable / Serious Signs and Symptoms
HR Typically ≥ 150
Hypotension, Acute AMS, Ischemic Chest Pain,
Acute CHF, Seizures, Syncope, or Shock
secondary to tachycardia

No

EMR	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6
P	Consider consultation with medical control

QT Interval ≥ 500 msec

No

Yes

**Amiodarone 150 mg in
100 mL of D5W IV / IO**
Infuse over 10 minutes
May repeat if tachycardia recurs or
persists

OR

**Lidocaine
1 – 1.5 mg/kg IV / IO**

May repeat if refractory
**Lidocaine
0.75 mg/kg IV / IO**

Maximum 3 mg/kg

Monitor and Reassess

**Consider
Magnesium 2 g
IV / IO**
Given over 5 min
May repeat

Maximum 4 g

Monitor and
Reassess

**Notify Destination or
Contact Medical Control**

Defibrillation Procedure

Wide and Irregular: 200 – 360J

Polymorphic QRS (Not-Synchronized)

*May repeat and increase dose with subsequent
cardioversion attempts*

Consider Pain Control

Ketamine 0.3 mg/kg IV / IO
Infuse or IV push over 10 minutes May repeat in
20 minutes x2 (Max 3 Doses)
Maximum 30 mg/single dose

Ketamine 1 mg/kg IN
Maximum 100mg (1mL) in each nare. May repeat
in 5-10 minutes, **Max 5mg/kg**

OR

Fentanyl 25 – 100 mcg IV / IO / IM /IN
Repeat every 5 minutes
Maximum 3 mcg/kg

OR

Consider Sedation

**Ketamine
IV/IO: 1-2 mg/kg once**

**IN: 3-5mg/kg; max 100mg/1ml/nare; may repeat
in 5-10 mins; max 5mg/kg**

IM: 5mg/kg once; Max 500mg/kg

OR

**Midazolam
2 – 2.5 mg
IV / IO / IM / IN**
May repeat after 5 minutes
Maximum 10mg

Polymorphic QRS:

- QRS complexes in a single lead will change shape from complex to complex.

Adult Polymorphic Tachycardia

WIDE (≥ 0.12 sec) Torsades de pointes

Pearls

- **Recommended Exam:** Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro
 - **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
 - **12-Lead ECG:**
 - 12 Lead ECG not necessary to diagnose and treat
 - Obtain when patient is stable and/or following rhythm conversion.
 - **Monomorphic QRS:**
 - All QRS complexes in a single lead are similar in shape.
 - **Polymorphic QRS:**
 - QRS complexes in a single lead will change shape from complex to complex.
 - **Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.**
 - **Unstable condition**
 - Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
 - If at any point patient becomes unstable move to unstable arm in algorithm.
 - **Symptomatic condition**
 - Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
 - Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
 - **Serious Signs / Symptoms:**
 - Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.
 - Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
 - Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.
 - If patient has history or 12 Lead ECG reveals Wolff Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g., Diltiazem) or Beta Blockers. Use caution with Adenosine and give only with defibrillator available.
 - **Polymorphic / Irregular Tachycardia:**
 - This situation is usually unstable and immediate defibrillation is warranted.
 - If QT length is known, use for decision-making. Prolonged QT length defined as > 500 msec.
 - QT length < 500 msec:
 - Arrhythmia more likely related to ischemia or infarction and Magnesium not likely helpful.
 - May quickly deteriorate into Ventricular Fibrillation.
 - Even when terminated by defibrillation, may recur, so follow with medication therapy.
 - QT prolongation > 500 msec:
 - Magnesium more likely to be helpful.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **IM injection**
 - Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

Ventricular Fibrillation Pulseless Ventricular Tachycardia

 Cardiac Arrest Protocol AC 3

	Follow CPR Procedure
	AED Procedure
P	Defibrillation Procedure
	IV / IO Access Protocol UP 6
P	Epinephrine (1:10,000) 1 mg IV / IO Repeat every 3 to 5 minutes <i>If VF / VT refractory to defibrillation, delay Epinephrine administration until after 2nd defibrillation</i>
	Search for Reversible Causes
	Follow CPR Procedure <u>If Rhythm Refractory</u> Continue CPR and give Anti-arrhythmics and Epinephrine Continue CPR up to point where you are ready to defibrillate with device charged. Repeat pattern during resuscitation.
	Monitor EtCO2 If available
P	Amiodarone 300 mg IV/IO May repeat if refractory Amiodarone 150 mg IV/IO Or <i>(not both unless directed by medical control)</i> Lidocaine 1.0 – 1.5 mg/kg IV/IO May repeat if refractory Lidocaine 0.75 mg/kg IV/IO Maximum 3 mg/kg
	After 3 shocks with unchanged rhythm Magnesium 2 gm IV/IO
	Defibrillation Procedure <i>If VF / VT refractory after 3 shocks consider changing vector of defibrillation pads</i>
M	Notify Destination or Contact Medical Control

AT ANY TIME

**Return of
Spontaneous
Circulation**



**Go to
Post Resuscitation
Protocol AC 10**

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Ventricular Fibrillation

Pulseless Ventricular Tachycardia

Pearls

- Efforts should be directed at high quality CPR with limited interruptions and early defibrillation when indicated.
- **DO NOT HYPERVENTILATE:** If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.
- Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.
- Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.
- IV access is preferred route. Follow IV or IO Access Protocol UP 6.
- **Defibrillation:**
 - Follow manufacturer's recommendations concerning defibrillation / cardioversion energy when specified.
 - Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
 - Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
 - Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 - Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 - Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Magnesium Sulfate is not routinely recommended during cardiac arrest, but may help with Torsades de points, prolonged QT, low Magnesium States (malnourished / alcoholic), and suspected digitalis toxicity**
- Return of spontaneous circulation: Heart rate should be > 60 when initiating anti-arrhythmic infusions.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Adult Post Resuscitation

Return of Spontaneous Circulation

Repeat Primary Assessment

Transport Destination Decision

Post-resuscitation patient is medically complex.

Refer to Transport Policy

Optimize Ventilation and Oxygenation

- Respiratory Rate 10 / minute
- Maintain SpO2 92 – 98%
- **DO NOT HYPERVENTILATE**

B

- ETCO2 ideally 35 – 45 mm Hg



Airway
Protocol(s) AR 1, 2
as indicated

EMR

12 Lead ECG Procedure



IV or IO Access Protocol UP 6

P

Cardiac Monitor

Monitor Vital Signs / Reassess

Search for reversible causes

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Chest Pain and STEMI
Protocol AC 4
if indicated



Hypotension / Shock
Protocol AM 5
as indicated

A

Optimize Systolic BP and Mean Arterial BP

- Systolic BP > 90 mmHg
- Mean Arterial BP ≥ 65 mmHg



Appropriate Arrhythmia
Protocol(s) AC 2, 6, 7, 8
as indicated



Seizure Protocol UP 13
as indicated



Post Intubation/BIAD Management
Protocol AR 7

Arrhythmias are common and usually self limiting after ROSC



If Arrhythmia Persists follow Rhythm Appropriate Protocol

M Notify Destination or Contact Medical Control **M**

Adult Post Resuscitation

Pearls

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Continue to search for potential cause of cardiac arrest during post-resuscitation care.**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided. Titrate FiO_2 to maintain SpO_2 of 92 - 98%.**
- **Pain/sedation:**
 - Patients requiring advanced airways and ventilation commonly experience pain and anxiety. Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.
 - Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.
 - Vital signs such as tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.
 - Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.
- **Ventilator / Ventilation strategies:**
 - Tailored to individual patient presentations. Medical Control can indicate different strategies above.
 - In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH₂O.
 - Continuous pulse oximetry and capnography should be maintained during transport for monitoring.
 - Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.
- **EtCO₂ Monitoring:**
 - Initial End tidal CO₂ may be elevated immediately post-resuscitation, but will usually normalize.
 - Goal is 35 – 45 mmHg but avoid hyperventilation to achieve.
- **Titrate fluid resuscitation and vasopressor administration to maintain SBP of 90 – 100 mmHg or Mean Arterial Pressure (MAP) of 65 – 80 mmHg.**
- **Common causes of post-resuscitation hypotension are hyperventilation, hypovolemia, pneumothorax and side effects of ACLS drugs.**
- **STEMI (ST-Elevation Myocardial Infarction)**
 - Consider placing 2 IV sites in the left arm: Many PCI centers use the right radial artery for intervention.
 - Consider placing defibrillator pads on patient as a precaution.
 - Document and time-stamp facility STEMI notification and make notification as soon as possible.
 - Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).
- **Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiology / cardiac catheterization, intensive care service, and neurology services.**
- **The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post-resuscitation management may best be planned in consultation with Medical Control.**

Mechanical Circulatory Support LVAD, RVAD, and Bi-VAD

History

- SAMPLE
- Bridge to transplant
- Destination therapy
- Estimated downtime
- LVAD, RVAD, Bi-Vad, TAH
- DNR, MOST, or Living Will
- Contact with LVAD coordinator

Signs and Symptoms

- Unconsciousness
- Pulseless
- Apneic
- Poor capillary refill / skin color
- AMS or decreased mental status
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- See Reversible Causes below
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage

Contact VAD coordinator:

- As quickly as possible for troubleshooting and treatment advice, but do not delay emergency treatment
- Follow patient specific emergency plan if present

Rapid assessment
Check for signs of life
Assess for adequate perfusion

**Criteria for Death /
No Resuscitation**
Review DNR

1. Rigor mortis and/or dependent lividity
2. Decapitation
3. Traumatic cardiac arrest with injury obviously incompatible with life
4. Traumatic arrest with apnea and either asystole or wide complex PEA at a rate < 40 (paramedic only).

Do not begin resuscitation

Follow Criteria for Death/
Withholding Resuscitation
Policy/Procedure

NO

**Unresponsive and
Not breathing normally**

**Responsive or Unresponsive and
Breathing normally**

Assess LVAD function
Look and listen for alarms
LVAD Alarming?

Go to Page 2

NO

Place stethoscope over heart

Humming sound present?

Go to Page 3

NO

**Airway Protocol(s) AR 1, 2
if indicated**

**Respiratory Distress Protocol AR 3
if indicated**

Assume VAD failure
Initiate age appropriate ventilation rate

Go to Page 2

**Airway Protocol(s) AR 1, 2
if indicated**

**Respiratory Distress Protocol AR 3
if indicated**

Assess LVAD function
Look and listen for alarms
LVAD Alarming?

NO

Place stethoscope over heart

Humming sound present?

NO

Assume VAD failure
Initiate age appropriate ventilation rate

Go to Page 2

Mechanical Circulatory Support LVAD, RVAD, and Bi-VAD

History

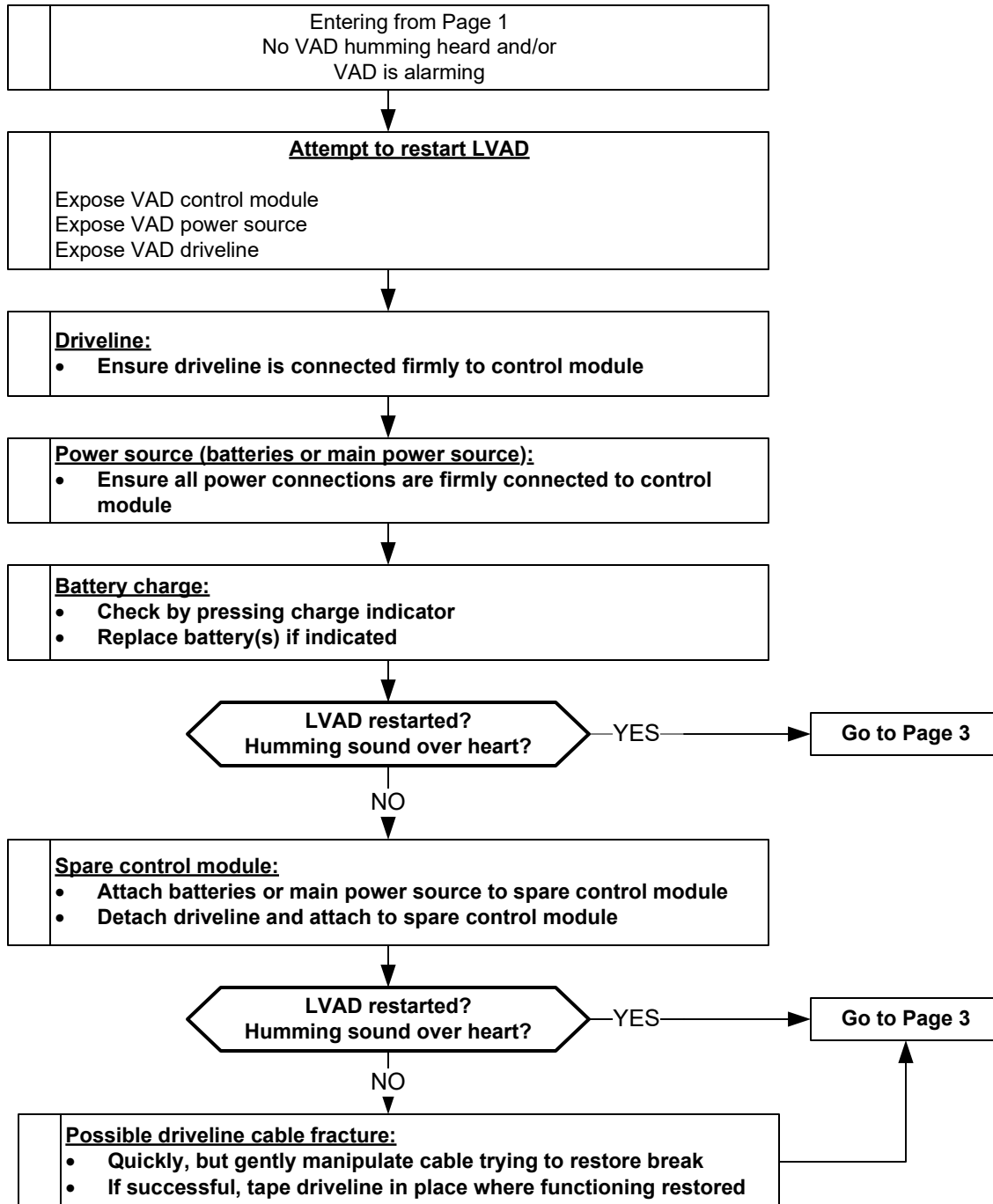
- SAMPLE
- Bridge to transplant
- Destination therapy
- Estimated downtime
- LVAD, RVAD, Bi-Vad, TAH
- DNR or Living Will
- Contact with LVAD coordinator

Signs and Symptoms

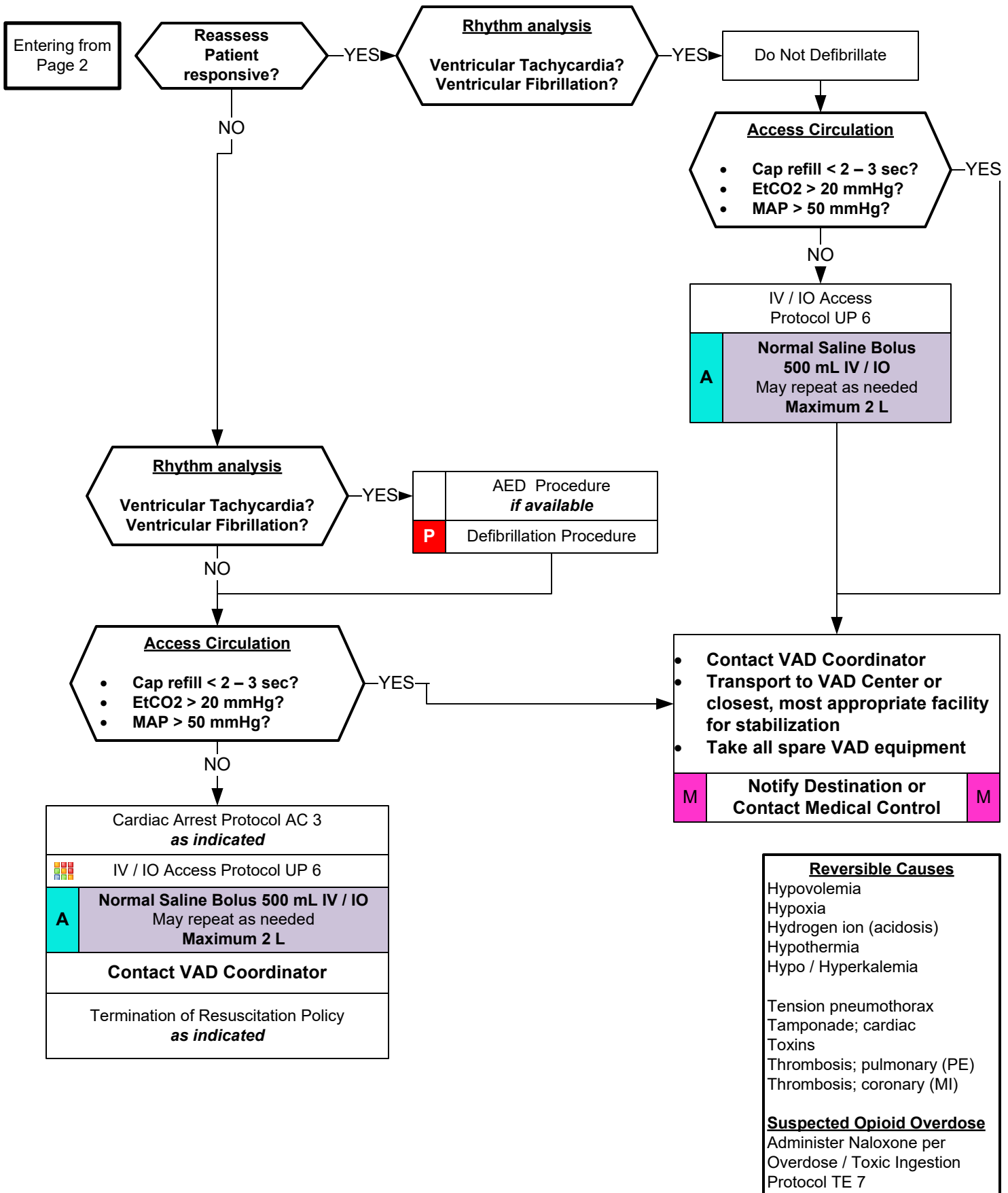
- Unconsciousness
- Pulseless
- Apneic
- Poor capillary refill / skin color
- AMS or decreased mental status
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- See Reversible Causes below
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage



Mechanical Circulatory Support LVAD, RVAD, and Bi-VAD



Left Ventricular Assist Device LVAD Unresponsive or AMS

Pearls

- **Recommended exam:** Mental status, skin color, capillary refill, peripheral pulses, blood pressure.
- **Assessment of blood flow and perfusion status:**
 - Optimal BP attained by manual BP and Doppler.
 - Automated BP devices can measure a BP in about 50% of attempts and is not reliable to assess perfusion
 - A MAP of ≥ 60 mmHg is adequate for most LVAD patients.
 - Skin color, skin temperature, capillary refill
- **Mechanical Circulatory Support devices:**
 - LVAD – Left Ventricular Assist Device
 - RVAD – Right Ventricular Assist Device
 - BiVAD – Biventricular Ventricular Assist Device
 - TAH – Total Artificial Heart
- **Reasons for use:**
 - Bridge therapy – patients awaiting transplant or anticipated recovery.
 - Destination therapy – advanced heart failure, not candidate for transplant, and will live rest of life with device.
- **Pump type and assessing pulses:**
 - Pulsatile flow pumps – older units, not commonly in use now, but generate blood flow with a pulsatile flow and patient will have a palpable pulse.
 - Continuous flow pumps – majority of pumps now used and create blood flow in a continuous stream, no pulsatile flow, so patient will not have a palpable pulse.
 - Most devices are implanted inside the chest and have an internal pump, a driveline connected from the pump to the controller unit, and a power source consisting of batteries and electrical cord for receptacles.
- **Common complications:**
 - Disconnection of power supply, either battery disconnect, or electrical cord to receptacle disconnection.
 - Driveline failure or disconnection from controller unit.
 - Controller failure
 - Blood clot formation, acute stroke, and bleeding (mucosal and gastrointestinal most common sites)
 - Infection
- **Abnormal heart rhythm:**
 - Pseudo-PEA: Normal cardiac electrical activity in a patient who is alert and well perfused with no palpable pulse.
 - Tachyarrhythmias are usually well tolerated.
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Transcutaneous Pacing:**
 - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival

If a patient has a Total Artificial Heart (TAH), contact medical control for next steps. Patients with a TAH, which is not a ventricular assist device, will not have a ventricular rhythm, and are not responsive to cardiac medications. CPR and defibrillation are not helpful in resuscitating these patients.

Wearable Cardioverter Defibrillator Vest

History

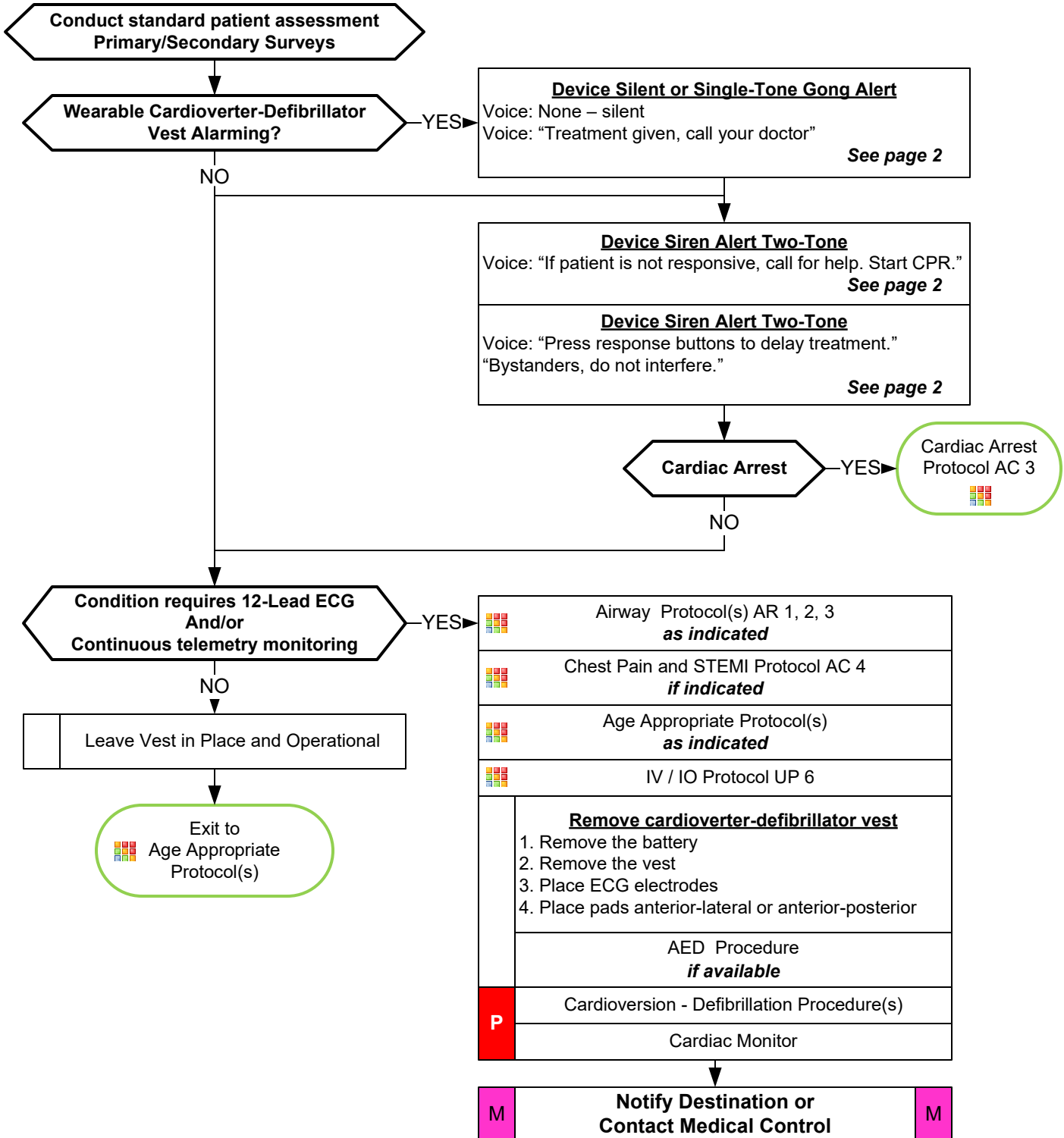
- SAMPLE
- Known risk for Sudden Cardiac Death
- Risk for life-threatening arrhythmia
- No implanted defibrillator
- Heart failure – cardiomyopathy
- Decreased ejection fraction

Signs and Symptoms

- Chest pain, dyspnea
- Palpitations
- Received shock from vest
- Poor capillary refill / skin color
- AMS or decreased mental status

Differential

- See Reversible Causes below
- Arrhythmia
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage



Wearable Cardioverter Defibrillator Vest

1. Garment

- Worn under your normal clothing, directly against skin
- Includes the electrode belt



2. Electrode Belt

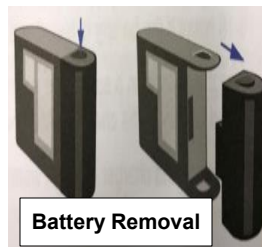
- Designed to detect dangerous heart rhythms and deliver a treatment shock

3. Monitor

- Worn around waist or with shoulder strap
- Continuously records heart rate



Response button



Battery Removal

Pearls

- Recommended exam:** Mental status, skin color, capillary refill, peripheral pulses, blood pressure.
- Wearable Cardioverter-Defibrillator Vest:**
 - Device is preparing to deliver a shock to the patient:** Before device delivers a shock, it tests to see if patient is conscious – voice prompt instructs patient to press the “response” button (see diagram above). Only the patient should press the “response” button. Once a treatable arrhythmia is detected it takes between 25 and 60 seconds to deliver the shock.
- Audible and tactile warning system:**
 - The device will provide a vibration, a siren tone, and voice prompts to check if the patient is conscious and give them an opportunity to press the “response” button to abort a shock. See audible warning system above.
- Reasons for use:**
 - Currently only device on the market is the Zoll LifeVest.
 - Worn by patients at risk of sudden cardiac arrest or risk of abnormal and/or lethal arrhythmia.
- Blue gel on the patient's skin from the device:**
 - Electrode pads release a blue gel prior to treatment to improve shock conduction and reduce burning. Do not remove the gel if the vest is left in place during treatment. Remove gel if vest is removed for prehospital care.
- Shock to providers:**
 - Do not touch the patient when the device is instructing you that a shock will be delivered. Providers can be shocked by the device during energy delivery if provider is touching the patient.
- Removing the device for prehospital care:**
 - The device should only be removed when ECG monitor and defibrillator is available. Continuous ECG monitoring and electrode pads should be in place when vest is removed.
- Defibrillation/cardioversion with vest in place:**
 - Disconnect the device from the vest before you deliver a cardioversion or defibrillation
- Transcutaneous Pacing:**
 - May be utilized with vest in place – disconnect the device from the vest before you perform transcutaneous pacing.

Allergic Reaction/ Anaphylaxis

History

- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

Signs and Symptoms

- Itching or hives
- Coughing / wheezing or respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema
- N/V

Differential

- Urticaria (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration / Airway obstruction
- Vasovagal event
- Asthma or COPD
- CHF

Assess Symptom Severity / Suspected Exposure to Allergen

MILD
Skin Only

IV or IO Access Protocol UP 6
if indicated

P **Diphenhydramine**
25 - 50 mg
PO / IV / IM / IO

B Monitor and Reassess
Monitor for Worsening
Signs and Symptoms

SEVERE
Angioedema, bronchospasm or
hypotension

EMR **Epinephrine 1:1000 IM**
0.3 mg
Repeat every 5 minutes if no
improvement x 2 (Max 3 Doses)

No improvement after 3 epi
doses, contact med control **M**

Albuterol 2.5 – 5 mg
Nebulizer
Repeat as needed x 3
if indicated

P **Diphenhydramine**
25 - 50 mg IV / IM / IO
if not given PO (See Pearls)

Airway Protocol(s) AR 1, 2
if indicated

Hypotension/ Shock
Protocol AM 5
if indicated

IV or IO Access Protocol UP 6

A **Normal Saline Bolus**
500 mL IV / IO
Repeat as needed
Maximum 2 Liters

M **Notify Destination or**
Contact Medical Control **M**

No improvement with IM Epinephrine
Contact medical control & discuss

P **Epinephrine 1:10,000 0.1mg (1mL)**
IV/IO diluted in 10mL over 5
minutes

Allergic Reaction/ Anaphylaxis

Pearls

- **Recommended Exam:** Mental Status, Skin, Heart, Lungs, Abdominal
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **IM injection**
Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)
- **Epinephrine and administration:**
Drug of choice and the **FIRST** drug that should be administered in acute anaphylaxis (Severe Symptoms.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.
- **Diphenhydramine administration:**
Diphenhydramine has no proven benefit in Moderate/ Severe anaphylaxis.
Diphenhydramine should **NOT** delay initial or repeat Epinephrine administration.
In Moderate and Severe anaphylaxis, Diphenhydramine may decrease mental status.
Diphenhydramine should **NOT** be given to a patient with decreased mental status and/ or a hypotensive patient as this may cause nausea, vomiting, and/ or worsening mental status.
- **Anaphylaxis unresponsive to repeat doses of IM epinephrine may require IV epinephrine administration by IV push or epinephrine infusion.**
- **Symptom Severity Classification:**
Mild symptoms:
Flushing, hives, itching, erythema with normal blood pressure and perfusion.
Severe symptoms:
Angioedema, bronchospasm, hypotension.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash/ skin involvement.**
- **Angioedema** is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in **-il**.
- **Hereditary Angioedema** involves swelling of the face, lips, airway structures, extremities, and may cause moderate to severe abdominal pain. Some patients are prescribed specific medications to aid in reversal of swelling.
Paramedic may assist or administer this medication per patient/ package instructions.
- **Patients with moderate and severe reactions should receive a 12 lead ECG and should be continually monitored, but this should NOT delay administration of epinephrine.**

Diabetic; Adult

History

- Past medical history
- Medications
- Recent blood glucose check
- Last meal

Signs and Symptoms

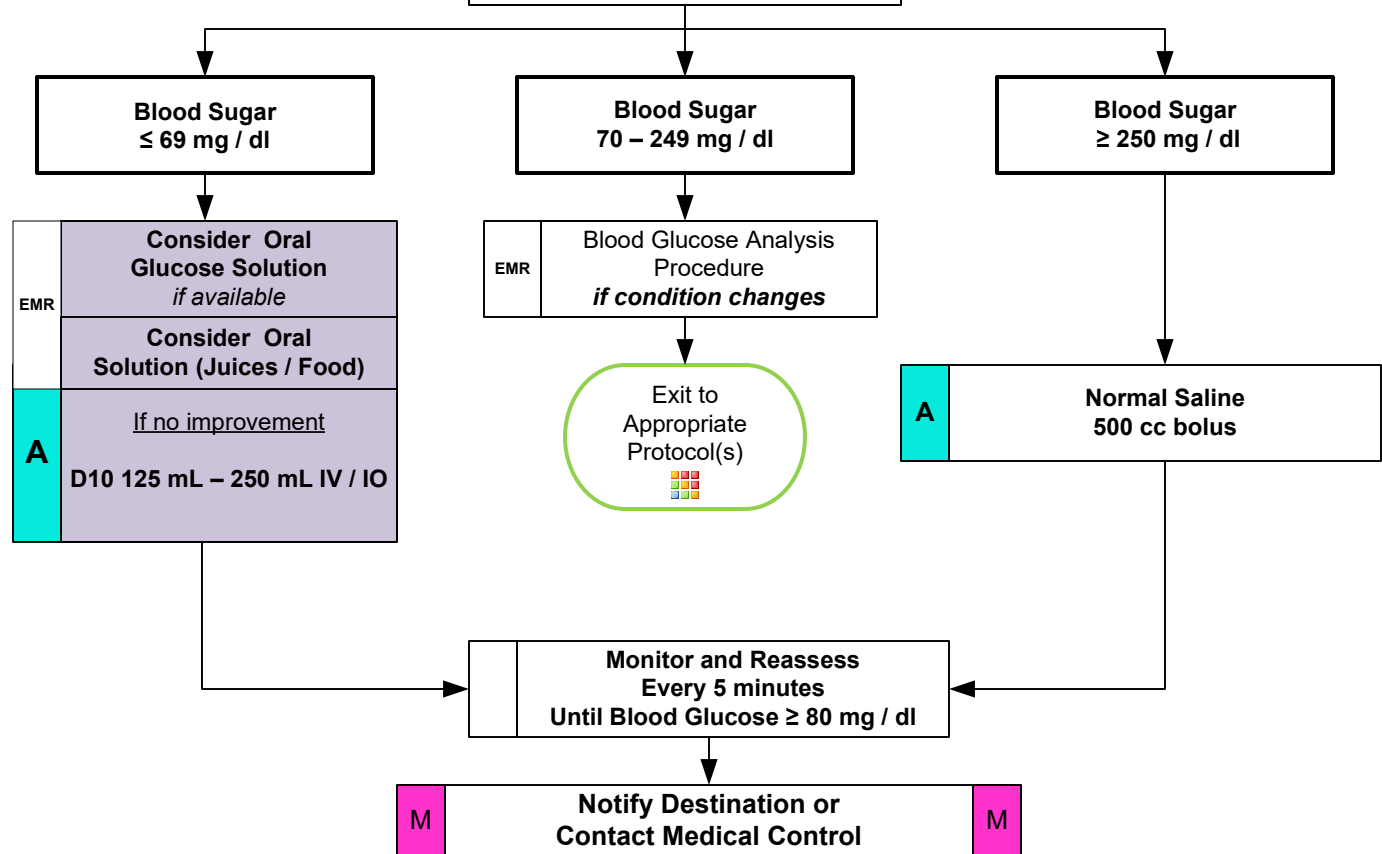
- Altered mental status
- Combative / irritable
- Diaphoresis
- Seizures
- Abdominal pain
- Nausea / vomiting
- Weakness
- Dehydration
- Deep / rapid breathing

Differential

- Alcohol / drug use
- Toxic ingestion
- Trauma; head injury
- Seizure
- CVA
- Altered baseline mental status

EMR	Blood Glucose Analysis Procedure
	12 Lead ECG Procedure <i>if indicated</i>
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Hypotension/ Shock Protocol AM 5 <i>if indicated</i>
	Suspected Stroke Protocol UP 14 <i>if indicated</i>
	Seizure Protocol UP 13 <i>if indicated</i>

B	Blood Glucose ≤ 69 mg / dl and symptomatic No venous access Glucagon 1 mg IM Repeat in 15 minutes if needed x 1 (Max 2 doses)
---	---



Diabetic; Adult

Pearls

- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- **Patients with prolonged hypoglycemia or those who are malnourished may not respond to glucagon.**
- **Do not administer oral glucose to patients who are not able to swallow or protect their airway.**
- **Quality control checks should be maintained per manufacturers recommendation for all glucometers.**
- **IM injection**

Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**

Blood sugar must be ≥ 80 , patient has ability to eat and availability of food with responders on scene.

Patient must have known history of diabetes and not taking any sulfonylureas. Sulfonylureas:

Tolbutamide (Orinase)- Glimeperide (Amaryl)- Glipizide (Glucotrol)- Glyburide (Microns, DiaBeta, Glynase PresTab)- Repaglinide (Prandin)- Nateglinide (Starlix)- Exenatide (Byetta)- Liraglutide (Victoza)

Patient returns to normal mental status and has a normal neurological exam with no new neurological deficits.

See Universal Patient Care Protocol UP-1. Must demonstrate capacity to make informed health care decisions, otherwise contact medical control.

Confirm that a reliable adult will be staying with the patient.

- **Hypoglycemia with Oral Agents:**

Patient's taking sulfonylureas should be encouraged to allow transportation to a medical facility.

They are at risk of recurrent hypoglycemia that can be delayed for hours and require close monitoring even after normal blood glucose is established.

Not all oral agents have prolonged action so Contact Medical Control for advice.

Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.

- **Hypoglycemia with Insulin Agents:**

Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established.

Not all insulins have prolonged action so Contact Medical Control if in doubt.

Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.

- **Congestive Heart Failure patients who have Blood Glucose > 250 :**

Limit fluid boluses unless patient has signs of volume depletion such as, dehydration, poor perfusion, hypotension, and/ or shock.

Dialysis/ Renal Failure

History

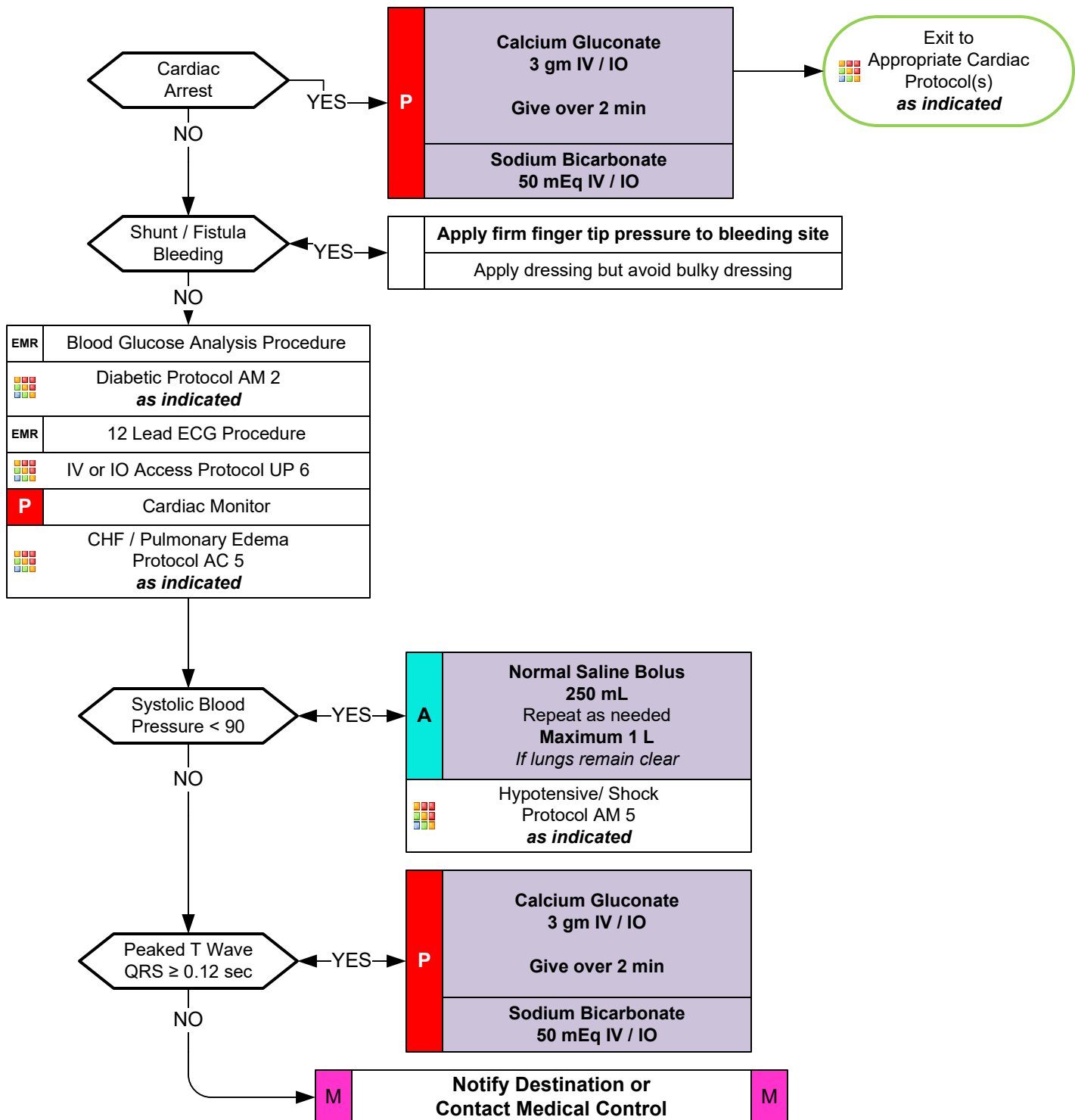
- Peritoneal or Hemodialysis
- Anemia
- Catheter access noted
- Shunt access noted
- Hyperkalemia

Signs and Symptoms

- Hypotension
- Bleeding
- Fever
- Electrolyte imbalance
- Nausea and / or vomiting
- Altered Mental Status
- Seizure
- Arrhythmia

Differential

- Congestive heart failure
- Pericarditis
- Diabetic emergency
- Sepsis
- Cardiac tamponade



Dialysis/ Renal Failure

Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart. Skin.**
- **Preferably transport to a medical facility capable of providing dialysis treatment.**
- **Do not take Blood Pressure or start IV / IO in extremity which has a shunt/ fistula in place.**
- **If hemorrhage cannot be controlled with firm, point, uninterrupted pressure, application of tourniquet with uncontrolled dialysis fistula bleeding is indicated.**
- **Hemodialysis:**
Process which removes waste from the blood stream and occurs about three times each week.
Some patients do perform hemodialysis at home.
- **Peritoneal dialysis:**
If patient complains of fever, abdominal pain, and/ or back pain, bring the Peritoneal Dialysis fluid bag, which has drained from the abdomen, to the hospital.

Complications of Dialysis Treatment:

Hypotension:

Typically responds to small fluid bolus of 250 mL Normal Saline.

May result in angina, AMS, seizure or arrhythmia.

Filtration and decreased blood levels of some medications like some seizure medications:

Disequilibrium syndrome:

Shift of metabolic waste and electrolytes causing weakness, dizziness, nausea and/ or vomiting and seizures.

Equipment malfunction:

Air embolism.

Bleeding.

Electrolyte imbalance.

Fever.

- **Fever:**
Consider sepsis in a dialysis patient with any catheter extending outside the body.
- Always consider Hyperkalemia in all dialysis or renal failure patients.
- Sodium Bicarbonate and Calcium Gluconate should not be mixed. Flush 10 mL saline between medications or administer in separate lines. ***prioritize calcium in patients with EKG changes or cardiac arrest***
- Renal dialysis patients have numerous medical problems typically. Hypertension and cardiac disease are prevalent.

Hypertension

History

- Documented Hypertension
- Related diseases: Diabetes; CVA; Renal Failure; Cardiac Problems
- Medications for Hypertension
- Compliance with Hypertensive Medications
- Erectile Dysfunction medications
- Pregnancy

Signs and Symptoms

One of these

- Systolic BP 220 or greater
- Diastolic BP 120 or greater

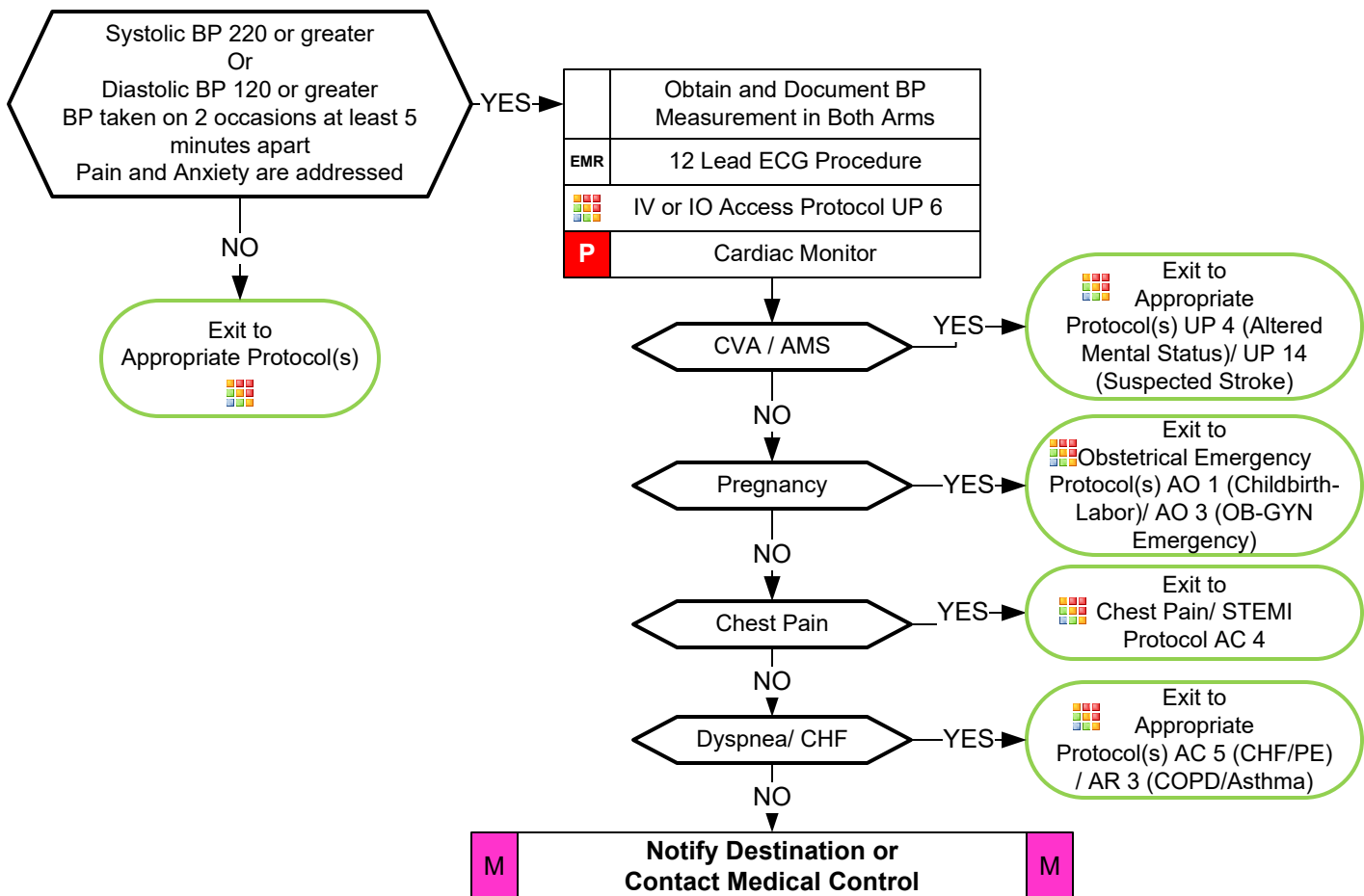
AND at least one of these

- Headache
- Chest Pain
- Dyspnea
- Altered Mental Status
- Seizure

Differential

- Hypertensive encephalopathy
- Primary CNS Injury
 - Cushing's Response with Bradycardia and Hypertension
- Myocardial Infarction
- Aortic Dissection / Aneurysm
- Pre-eclampsia / Eclampsia

Hypertension is not uncommon especially in an emergency setting. Hypertension is usually transient and in response to stress and/ or pain. A hypertensive emergency is based on blood pressure along with symptoms which suggest an organ is suffering damage such as MI, CVA or renal failure. This is very difficult to determine in the pre-hospital setting in most cases. Aggressive treatment of hypertension can result in harm. Most patients, even with significant elevation in blood pressure, need only supportive care. Specific complaints such as chest pain, dyspnea, pulmonary edema or altered mental status should be treated based on specific protocols and consultation with Medical Control.



Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- Elevated blood pressure is based on two to three sets of vital signs.
- Symptomatic hypertension is typically revealed through end organ dysfunction to the cardiac, CNS, or renal systems.
- All symptomatic patients with hypertension should be transported with their head elevated at 30 degrees.
- Ensure appropriate size blood pressure cuff utilized for body habitus.

Hypotension/ Shock

History

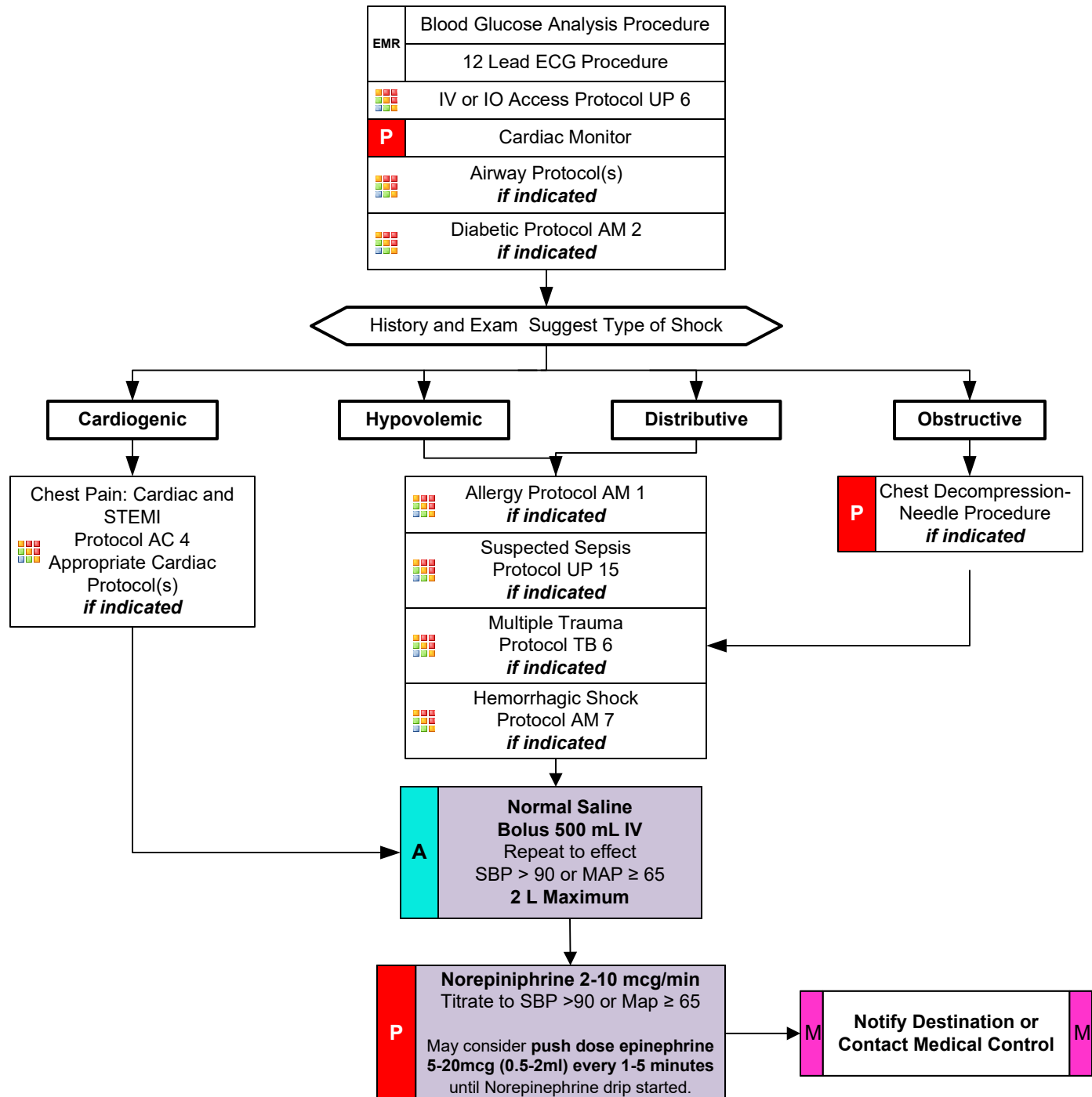
- Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic
- Fluid loss - vomiting, diarrhea, fever
- Infection
- Cardiac ischemia (MI, CHF)
- Medications
- Allergic reaction
- Pregnancy
- History of poor oral intake

Signs and Symptoms

- Restlessness, confusion
- Weakness, dizziness
- Weak, rapid pulse
- Pale, cool, clammy skin
- Delayed capillary refill
- Hypotension
- Coffee-ground emesis
- Tarry stools

Differential

- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolus
- Tension pneumothorax
- Medication effect / overdose
- Vasovagal
- Physiologic (pregnancy)
- Sepsis



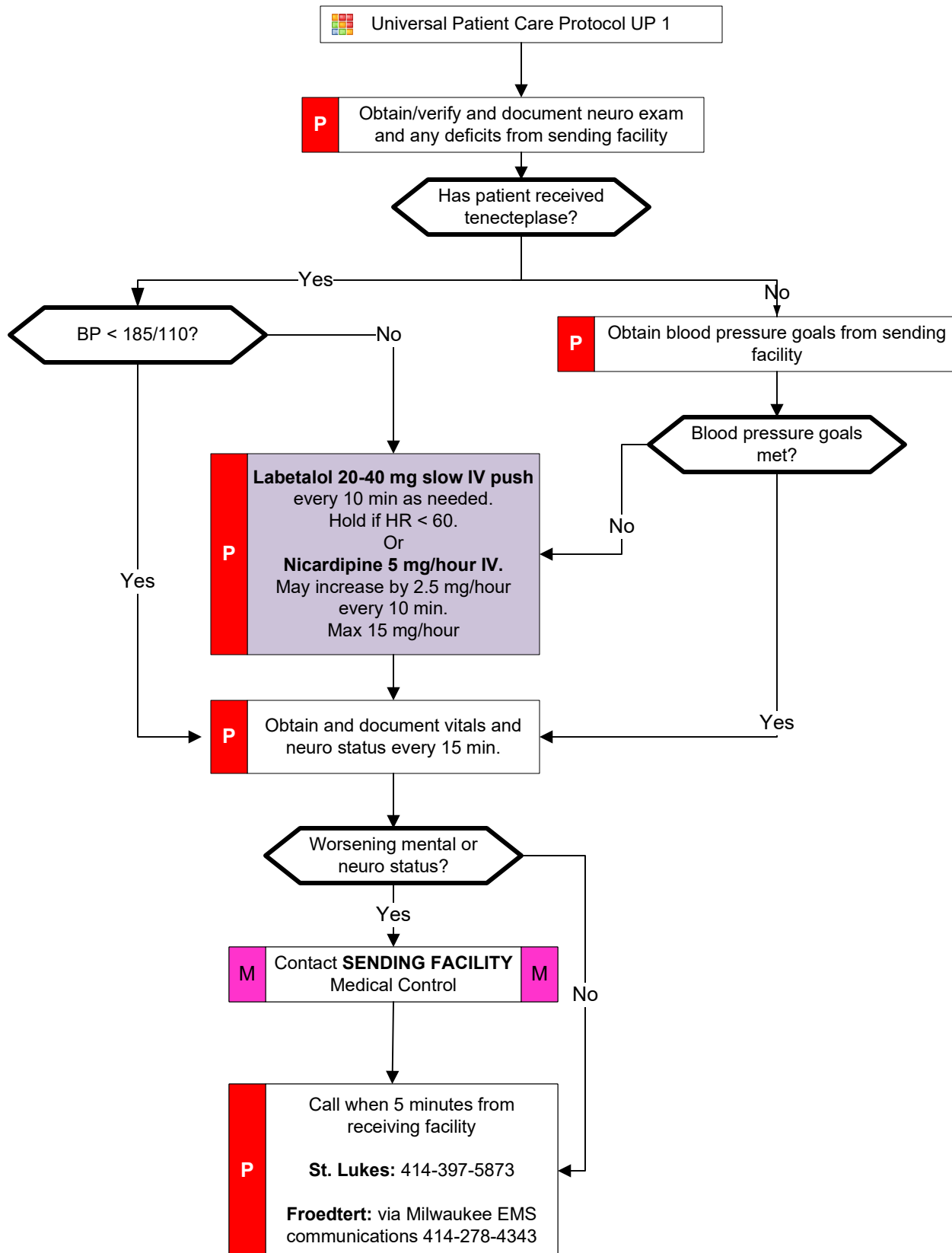
Hypotension/ Shock

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Hypotension is defined as a systolic blood pressure less than 90. This is not always reliable and should be interpreted in context and consider patient's typical BP if known.
- Shock may be present with a normal blood pressure initially or even elevated blood pressure.
- Shock is often present with normal vital signs and may develop insidiously. Tachycardia may be the first and only sign.
- Consider all possible causes of shock and treat per appropriate protocol.
- **Hypovolemic Shock:**
Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy-related bleeding
- **Cardiogenic Shock:**
Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventricle / septum / valve / toxins.
- **Distributive Shock:**
Sepsis/ Anaphylactic/ Neurogenic/ Toxins
Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.
- **Obstructive Shock:**
Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.
- **Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:**
Body cannot produce enough steroids (glucocorticoids/ mineralocorticoids.)
May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate.
Usually hypotensive with nausea, vomiting, dehydration and/ or abdominal pain.
May administer prescribed steroid carried by patient IM / IV / IO as long as administration route is within EMS providers scope of practice and with medical control approval.

Patient may have Hydrocortisone (Cortef or Solu-Cortef).
Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by patient's physician.

Stroke – Large Vessel Occlusion Interfacility Transport



Stroke – Large Vessel Occlusion Interfacility Transport

Pearls

- Recommended Exam: Mental Status, Neuro
- Transport of LVO patient can only be completed at the paramedic level
- Maximum of two medication drips may be running for acceptance of transfer
- Goal of 10 minutes from patient contact to leaving sending facility. Document reason for any delay.
- Patients may receive tenecteplase if they presented within 4.5 hours of symptom onset and may be eligible for intervention up to 24 hours after symptom onset.
- Transport should be emergent.
- For any worsening mental status, consult with SENDING FACILITY Medical Control.

Hemorrhagic Shock

History

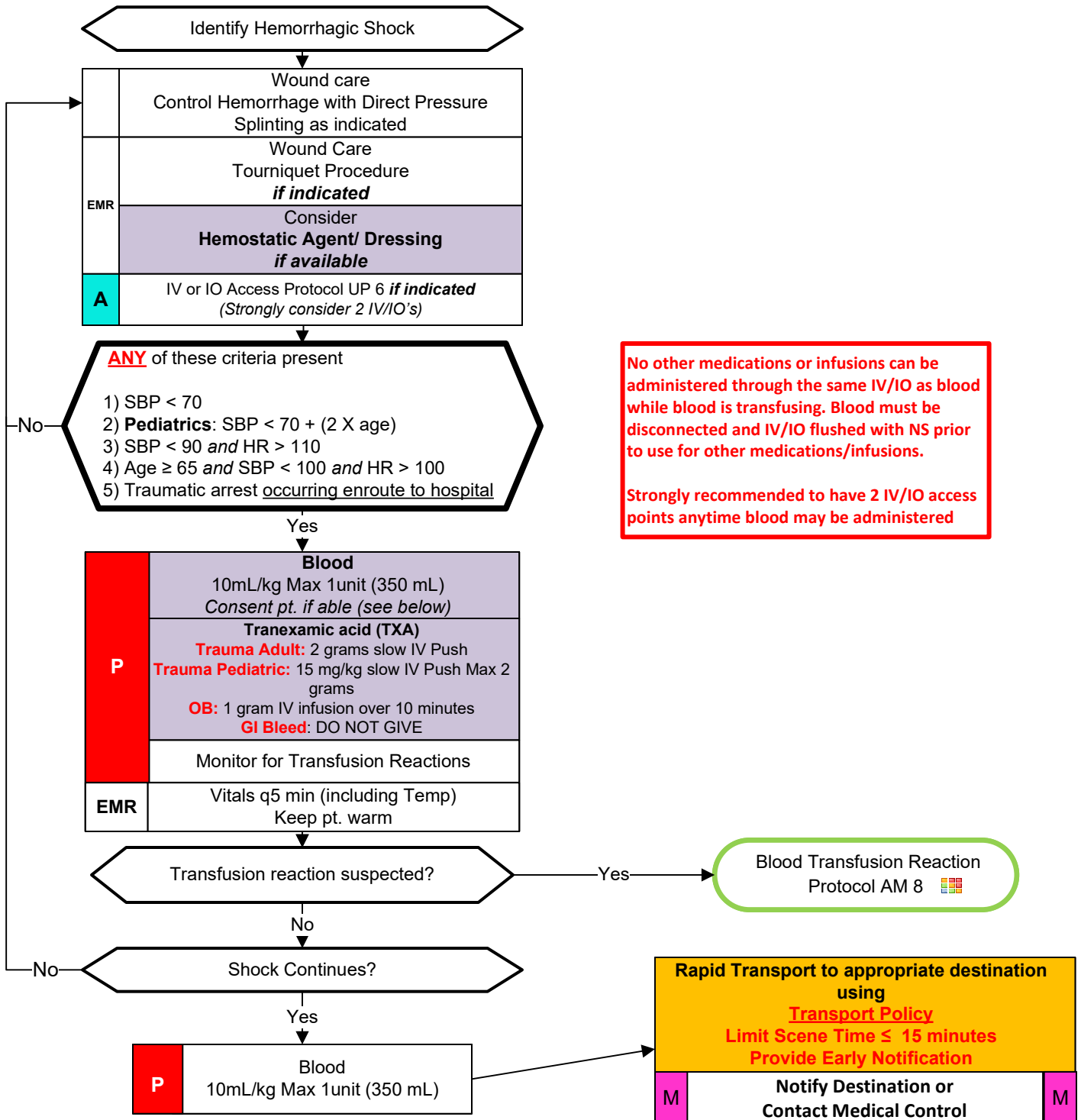
- Acute Blood Loss
- Trauma
- Postpartum hemorrhage
- Large Volume GI Bleed

Signs/Symptoms

- Hypotension, shock
- Diaphoresis, Cold, pale skin
- Conjunctival pallor
- Weak or absent distal pulses
- External or Internal source of blood loss
- Lightheadedness
- Traumatic Injury
- Chest Pain
- Shortness of Breath

Differential

- Hemorrhagic shock
- Hypovolemic shock from non blood fluid loss (diarrhea, vomiting, etc)
- Obstructive shock (tension pneumothorax, cardiac tamponade)
- Neurogenic shock (spinal cord injury)



No other medications or infusions can be administered through the same IV/IO as blood while blood is transfusing. Blood must be disconnected and IV/IO flushed with NS prior to use for other medications/infusions.

Strongly recommended to have 2 IV/IO access points anytime blood may be administered

Hemorrhagic Shock

Pearls

- If possible, obtain verbal consent (see below for suggested language). If unable, implied consent applies.
- Blood product is the preferred method to treat hemorrhagic shock. IV fluids can cause hypothermia, worsen coagulopathy, increase acidosis and are associated with worse outcomes compared to blood product administration. Patients in hemorrhagic shock in the prehospital setting benefit most from hemorrhage control (if possible) and blood administration.
- In multisystem trauma patients who are hypotensive it is extremely likely that blood loss is a major factor driving the low blood pressure. Consider isolated neurogenic shock in patients with a mechanism not likely to cause blood loss (dive into shallow water, mechanical fall without evidence of long bone fracture). Consider isolated obstructive shock from tension pneumo or tamponade in isolated stab wounds to the chest. Gunshot wounds to the chest can cause multiple causes of shock.
- If ongoing hemorrhage is suspected, target fluid resuscitation to a lower systolic blood pressure (~90) to minimize further blood loss.
- Signs of potential blood transfusion reaction include Fever, Shortness of Breath, Hypoxia, Chills, Rash, Hives, and Chest pain.
- Please document all patient care related to blood administration in the PCR and notify Aurora Regional EMS office of blood administration per the blood administration policy and procedures.

Suggested Blood Consent Language

"Sir/Ma'am, you meet criteria for blood product administration because we believe you are having severe bleeding, the treatment includes giving you blood products through your vein per our physician-developed guideline. The benefits of blood products are to mitigate the bleeding and potentially prevent death before we get to the hospital. The risks of transfusion include irritation or infection at the needle site or in your body, fevers or skin rash, and other more rare complications with your heart or lungs. There is the risk of transmission of infections but it is extremely rare. Alternative options to blood products include IV fluids or no treatment at all; however, you are critically ill and deciding on IV fluids or no treatment could result in severe complications or your death. Our physicians believe that the benefits of blood products outweigh the risks, and we would like your verbal consent to proceed."

Blood Transfusion Reaction

History

- Prehospital blood initiated

Signs/Symptoms

- Fever
- Chills
- Difficulty Breathing
- Body Aches
- Rash/Hives

Differential

- Hemorrhagic shock (the reason you are giving blood can cause dizziness & vague symptoms)
- Chest trauma w/ hypoxia (Pneumothorax, Hemothorax, Cardiac Tamponade, Rib Fractures)
- Fever (Consider Sepsis, was fever present prior to blood administration in medical pt. with non traumatic hemorrhagic shock)

Unexpected change in condition during/after blood administration



Enter from Hemorrhagic Shock Protocol AM 7

Is clinical decompensation due to underlying cause of shock?

Continue to manage underlying cause of shock

Hypotension/Shock Protocol AM 5



No

Isolated Fever?

Yes

Febrile Non-Hemolytic Rxn

No other medications or infusions can be administered through the same IV/IO as blood while blood is transfusing. Blood must be disconnected and IV/IO flushed with NS prior to use for other medications/infusions.

Strongly recommended to have 2 IV/IO access points anytime blood may be administered

No

Consider Alternative Reactions

P	Slow Blood Bolus Rate
E	Acetaminophen 15 mg/kg PO Max 1,000 mg
P	<u>Adult Only</u> Acetaminophen 15 mg/kg IV/IO infuse over 15 minutes Maximum 1000 mg Do not give if already administered in last 4 hours via any route

Shortness of Breath, Hypoxia, Crackles

Transfusion Related Acute Lung Injury (TRALI)

Fever + Worsening Hypotension

Hemolytic Reaction

Rash/Hives + Angioedema

Anaphylactic Reaction

Unclear Diagnosis

P	Stop Blood
A	Normal Saline 20 mL/kg IV/IO Titrate to SBP ≥ 90 or MAP ≥ 65
E	Acetaminophen 15 mg/kg PO Max 1,000 mg PRN for Fever
P	<u>Adult Only</u> Acetaminophen 15 mg/kg IV/IO PRN for fever infuse over 15 minutes Maximum 1000 mg Do not give if already administered in last 4 hours via any route
	Allergic Reaction Anaphylaxis Protocol AM 1 If indicated

Notify Destination or Contact Medical Control

Blood Transfusion Reaction

Pearls

Transfusion reactions are rare!

- Any concern for transfusion reaction needs to be documented in the patient care report.
- Reactions to blood product are rare events, occurring in <1% of all blood transfusions.
- Febrile non-hemolytic reactions are the most common and easily managed.
- Many transfusion reactions (such as volume overload, sepsis) are exceedingly unlikely to occur in the EMS setting given
 - 1) Shorter duration of time with patients (usually)
 - 2) Amount of blood product administered
 - 3) Clinical situations in which we are administering blood
- **Acetaminophen IV /IO:**

Preference would be to infuse with use of IV pump. If IV pump not available may infuse without pump but should still be infused over minimum of 15 minutes.
If not using an IV pump and dose is <1000mg remove extra medication using syringe before infusing to prevent accidental overdose

Special Considerations

- Please document all patient care related to suspected blood transfusion reactions in the PCR and notify Aurora Regional EMS office of suspected blood transfusion reactions per the blood administration policy and procedures.

Childbirth/ Labor

History

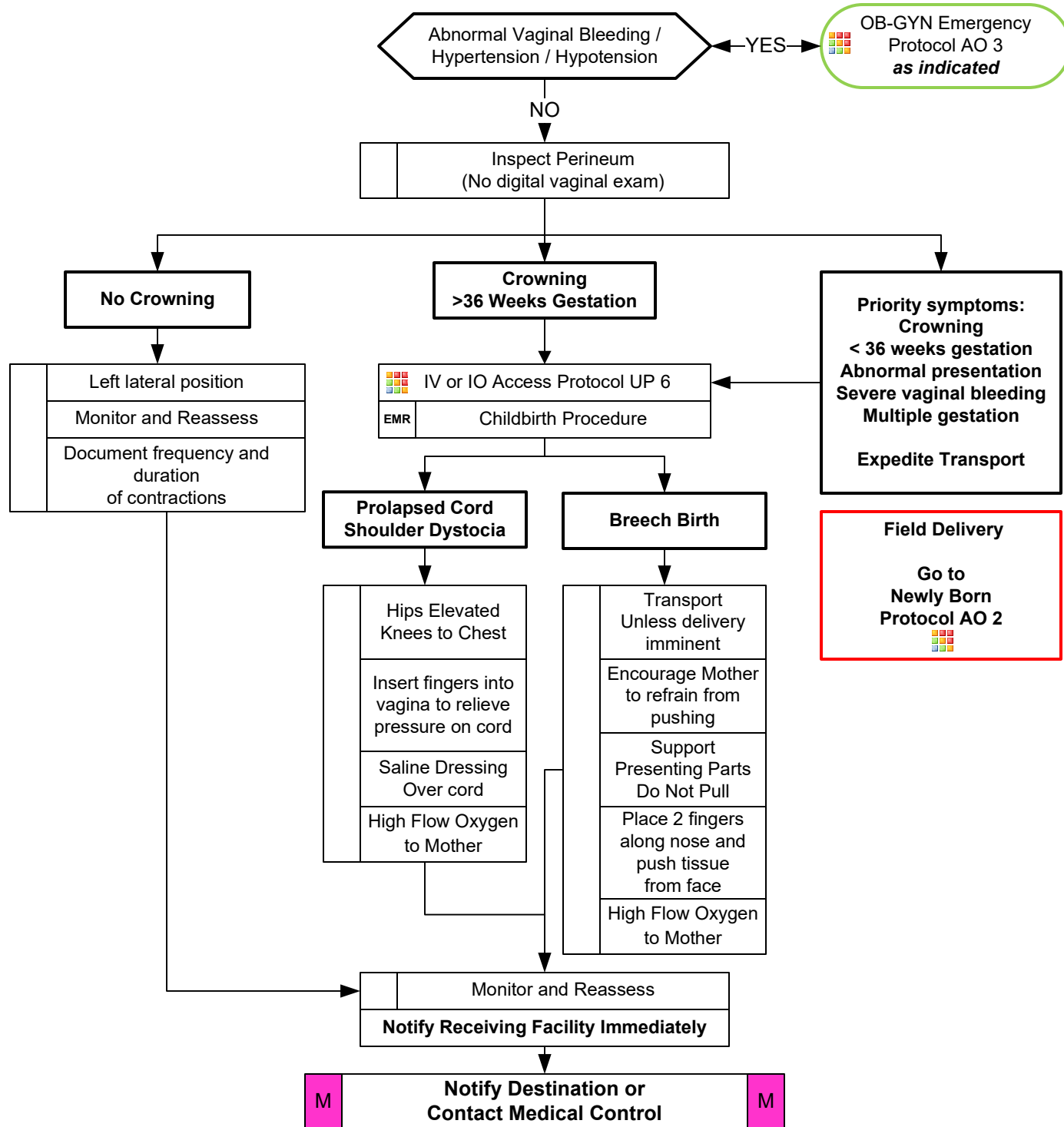
- Due date
- Time contractions started / how often
- Rupture of membranes
- Time / amount of any vaginal bleeding
- Sensation of fetal activity
- Past medical and delivery history
- Medications
- Gravida / Para Status
- High Risk pregnancy

Signs and Symptoms

- Spasmodic pain
- Vaginal discharge or bleeding
- Crowning or urge to push
- Meconium

Differential

- Abnormal presentation
 - Buttock
 - Foot
 - Hand
- Prolapsed cord
- Placenta previa
- Abruptio placenta



Childbirth/ Labor

Apgar score

	Score 2	Score 1	Score 0
A pppearance	 Pink	 Extremities blue	 Pale or blue
P ulse	> 100 bpm	< 100 bpm	No pulse
G rimace	Cries and pulls away	Grimaces or weak cry	No response to stimulation
A ctivity	 Active movement	 Arms, legs flexed	 No movement
R espiration	Strong cry	Slow, irregular	No breathing

- **Expected Pulse Oximetry readings following birth:**
(Accurate only in infant NOT requiring resuscitation)

1 minute	60 – 65%
2 minutes	65 – 70%
3 minutes	70 – 75%
4 minutes	75 – 80%
5 minutes	80 – 85%
10 minutes	85 – 95%
- Pulse oximetry should be applied to the right upper arm, wrist, or palm.

Pearls

- **Recommended Exam (of Mother): Mental Status, Heart, Lungs, Abdomen, Neuro**
- **Record APGAR at 1 minute and 5 minutes after birth. Do not delay resuscitation to obtain APGAR.**
- **If neonate requiring resuscitation, move quickly to AO 2 Newly Born Protocol**
- **After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding (apply uterine massage only after placenta delivery).**
- **Transport or Delivery?**
Decision to transport versus remain and deliver is multifactorial and difficult. Generally it is preferable to transport.
Factors that will impact decision include: number of previous deliveries; length of previous labors; frequency of contractions; urge to push; and presence of crowning.
- **Maternal positioning for labor:**
Supine with head flat or elevated per mother's choice. Maintain flexion of both knees and hips. Elevated buttocks slightly with towel. If delivery not imminent, place mother in the left, lateral recumbent position with right side up about 10 – 20°.
- **Umbilical cord clamping and cutting:**
Place first clamp about 10 cm from infant's abdomen and second clamp about 5 cm away from first clamp.
- **Multiple Births:**
Twins occur about 1/90 births. Typically manage the same as single gestation. If imminent delivery call for additional resources, if needed. Most twins deliver at about 34 weeks so lower birth weight and hypothermia are common. Twins may share a placenta so clamp and cut umbilical cord after first delivery. Notify receiving facility immediately.
- Document all times (Contraction onset, contraction duration and frequency, delivery, APGAR 1 and 5 minutes, and placenta delivery).
- If maternal seizures occur, refer to the Obstetrical Emergencies Protocol.
- Some perineal bleeding is normal with any childbirth. Large quantities of blood or free bleeding are abnormal.

Newly Born

History

- Due date and gestational age
- Multiple gestation (twins etc.)
- Meconium / Delivery difficulties
- Congenital disease
- Medications (maternal)
- Maternal risk factors such as substance abuse or smoking

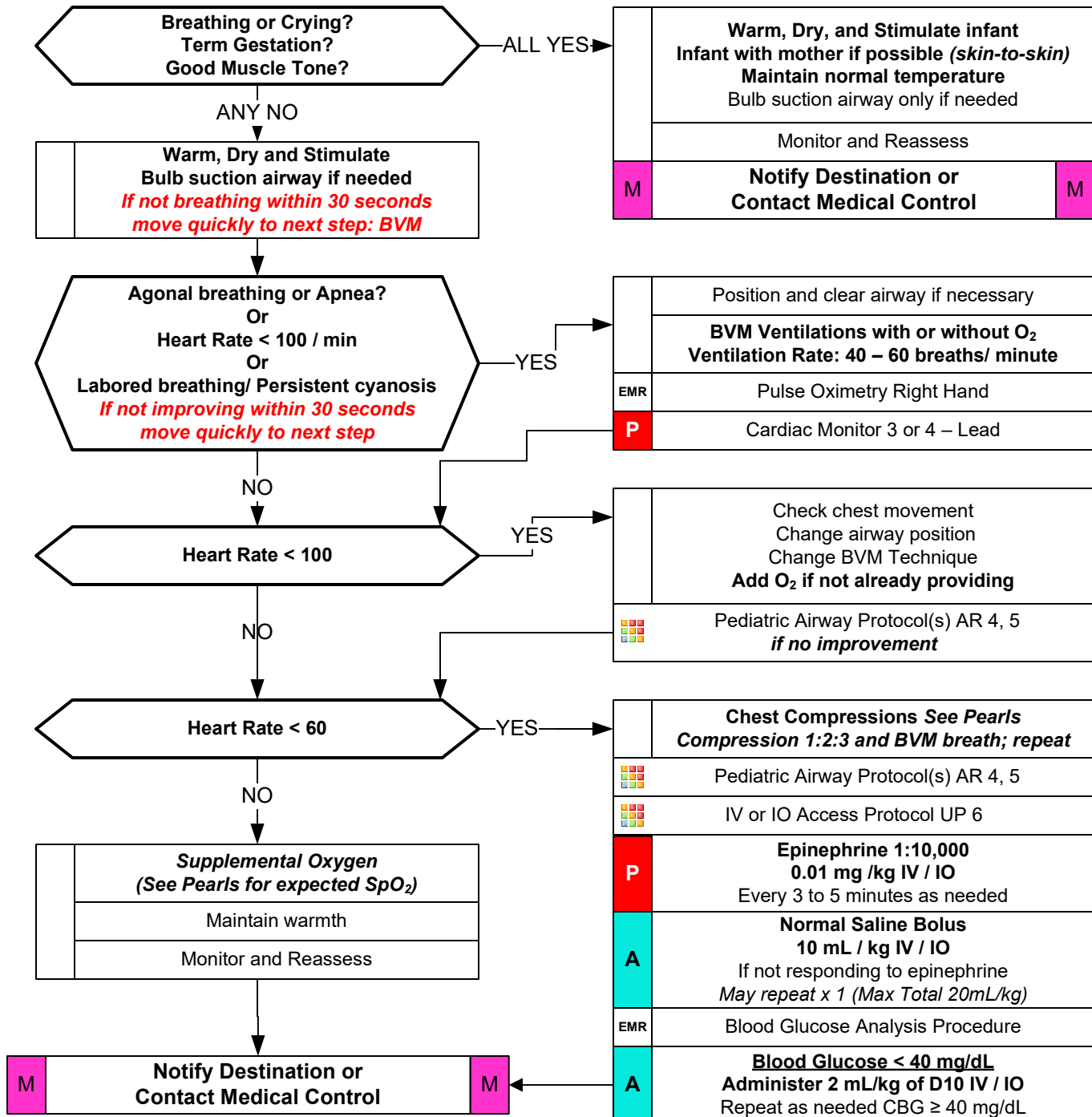
Signs and Symptoms

- Respiratory distress
- Peripheral cyanosis or mottling (normal)
- Central cyanosis (abnormal)
- Altered level of responsiveness
- Bradycardia

Differential

- Airway failure, Secretions, or Respiratory drive
- Infection
- Maternal medication effect
- Hypovolemia, Hypoglycemia, Hypothermia
- Congenital heart disease

In a non-vigorous infant whose respirations are not improving after warming, drying, and stimulating within 30 seconds, move quickly to Positive Pressure Ventilation with BVM



Newly Born

Pearls

- **Recommended Exam: Quality of Cry, Muscle tone, Respirations, Heart Rate, Pulse Oximetry, and Gestational Age**
- **Majority of newborns do not require resuscitation, only warming, drying, stimulating, and cord clamping.**
With term gestation, strong cry/ breathing, and good muscle tone, generally will not need resuscitation.
If no resuscitation needed, skin-to-skin contact with the mother is best way to maintain warmth of infant.
Maintain warmth of infant following delivery adjuncts; cap/ hat, plastic wrap, thermal mattress, radiant heat.
Most important vital signs in the newly born are heart rate, respirations, and respiratory effort.
About 10% of newborns need assistance to help them start breathing after birth.
About 1% of newborns require intensive resuscitation to restore/ support cardiorespiratory functions.
- **Airway:**
Positive Pressure Ventilations with BVM is the most important treatment in a newborn with poor respirations and/ or persistent bradycardia (HR < 100 BPM).
When BVM is needed, ventilation rate is 40 – 60 breaths per minute.
Adequacy of ventilation/ is measured mainly by increase in heart rate as well as chest rise.
Routine suctioning is no longer recommended, bulb suction only if needed.
- **Breathing:**
Oxygen is not necessary initially, but if infant is not responding with increased heart rate or adequate breathing, add oxygen to the BVM.
- **Circulation/ Compressions:**
Heart rate is critical during first few moments of life and is best monitored by 3 or 4 lead ECG, as pulse assessment is difficult in the neonate. Heart Rate is best tool for gauging resuscitation success.
If heart rate remains < 60 BPM after 30 to 60 seconds of BVM/ resuscitation, begin compressions.
2-thumbs encircling chest and supporting the back is recommended. Limit interruptions of chest compressions.
- **If infant not responding to BVM, compressions, and/ or epinephrine, consider hypovolemia, pneumothorax, and/ or hypoglycemia (< 40 mg/dL).**
- **Document 1 and 5 minute APGAR in PCR or ePCR. DO NOT delay or interrupt resuscitation to obtain an APGAR score.**
- **Meconium staining:**
Infant born through meconium staining who is NOT vigorous:
Bulb suction mouth and nose and provide positive pressure ventilation.
Direct endotracheal suctioning is no longer recommended.
- **Expected Pulse Oximetry readings following birth:**
(Accurate only in infant NOT requiring resuscitation)

1 minute	60 – 65%
2 minutes	65 – 70%
3 minutes	70 – 75%
4 minutes	75 – 80%
5 minutes	80 – 85%
10 minutes	85 – 95%
- Pulse oximetry should be applied to the right upper arm, wrist, or palm.
- **Cord clamping:**
Recommended to delay for 1 minute, unless infant requires resuscitation.
- Maternal sedation or narcotics will sedate infant (Naloxone NO LONGER recommended, use supportive care only).
- **In the NEONATE, D10 is administered at 2 mL/kg.**

Apgar score

	Score 2	Score 1	Score 0
A ppearance	 Pink	 Extremities blue	 Pale or blue
P ulse	> 100 bpm	< 100 bpm	No pulse
G rimace	Cries and pulls away	Grimaces or weak cry	No response to stimulation
A ctivity	 Active movement	 Arms, legs flexed	 No movement
R espiration	Strong cry	Slow, irregular	No breathing

OB-GYN Emergency

History

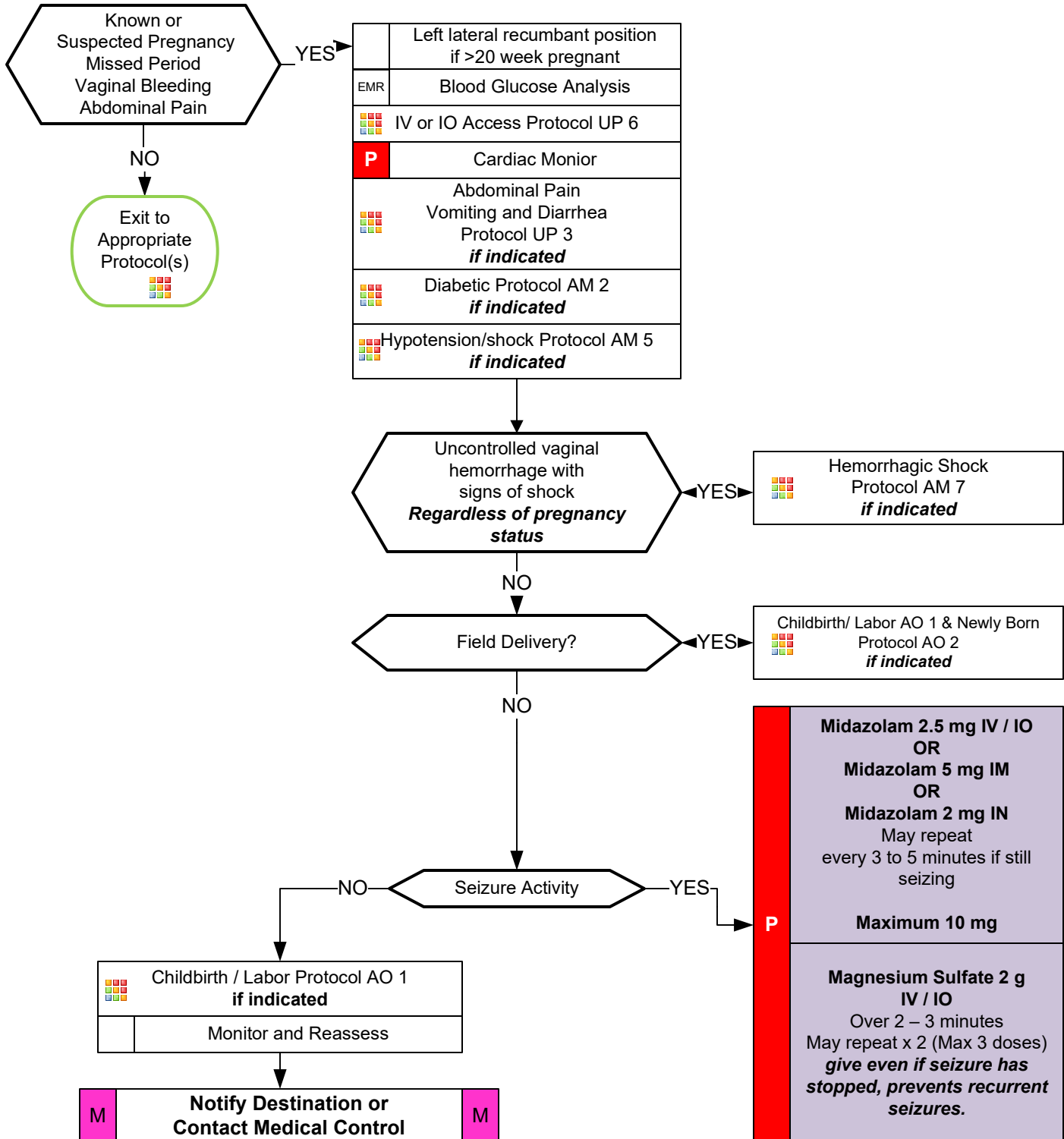
- Past medical history
- Hypertension meds
- Prenatal care
- Prior pregnancies / births
- Gravida / Para

Signs and Symptoms

- Vaginal bleeding
- Abdominal pain
- Seizures
- Hypertension
- Severe headache
- Visual changes
- Edema of hands and face

Differential

- Pre-eclampsia / Eclampsia
- Placenta previa
- Placenta abruptio
- Spontaneous abortion

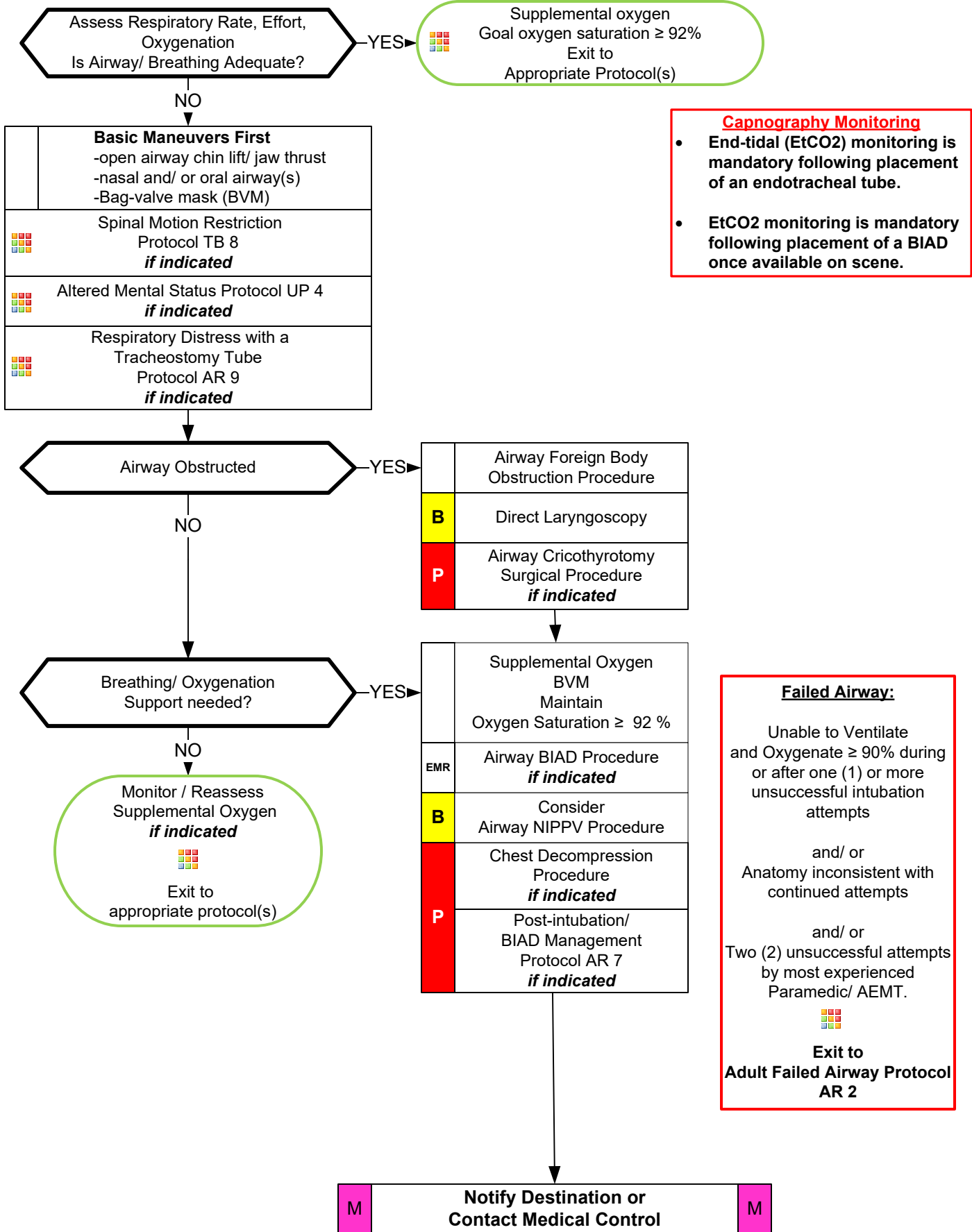


OB-GYN Emergency

Pearls

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- **With active seizure activity, benzodiazepine is a priority over magnesium sulfate.**
- **Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult or no IV or IO access.**
- **Magnesium Sulfate should be administered as quickly as possible. May cause hypotension and decreased respiratory drive, but more likely in doses higher than 6 gm.**
- **Any pregnant patient involved in a MVC should be seen immediately by a physician for evaluation. Greater than 20 weeks generally require 4 to 6 hours of fetal monitoring. DO NOT suggest the patient needs an ultrasound but emphasize patient needs 4 to 6 hours of fetal monitoring.**
- **After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding (apply uterine massage only after placenta delivery).**
- **Ectopic pregnancy:**
Implantation of fertilized egg outside the uterus, commonly in or on the fallopian tube. As fetus grows, rupture may occur. Vaginal bleeding may or may not be present. Many women with ectopic pregnancy do not know they are pregnant. Usually occurs within 5 to 10 weeks of implantation. Maintain high index of suspicion with women of childbearing age experiencing abdominal pain.
- **Preeclampsia:**
Occurs in about 6% of pregnancies. Defined by hypertension and protein in the urine. RUQ pain, epigastric pain, N/V, visual disturbances, headache, and hyperreflexia are common symptoms.
In the setting of pregnancy, hypertension is defined as a BP > 140 systolic or > 90 diastolic mmHg, or a relative increase of 30 systolic and 20 diastolic from the patient's normal (pre-pregnancy) blood pressure.
Risk factors: < 20 years of age, first pregnancy, multi-gestational pregnancy, gestational diabetes, obesity, personal or family history of gestational hypertension.
- **Eclampsia:**
Seizures occurring in the context of preeclampsia. Remember, women may not have been diagnosed with preeclampsia.
- Maintain patient in a left lateral position, right side up 10 - 20° to minimize risk of supine hypotensive syndrome.
- Ask patient to quantify bleeding - number of pads used per hour.

Adult Airway



Adult Airway

Pearls

- See Pearls section of protocols AR 2 and 3.
- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- Video laryngoscopy with bougie should be the preferred intubation method of placing an ETT. If video laryngoscopy is not available, paramedic should strongly consider BIAD as first-line device for securing airway.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.
- Ventilation rate should be 10 - 12 per minute to maintain a EtCO₂ of 35 – 45 and avoid hyperventilation.
- **Anticipating the Difficult Airway and Airway Assessment**
 - Difficult BVM Ventilation (ROMAN):** Radiation treatment/ Restriction; Obese/ Obstruction/ OB – 2d and 3d trimesters/ Obstructive sleep apnea; Mask seal difficulty (hair, secretions, trauma); Age ≥ 55 ; No teeth.
 - Difficult Laryngoscopy (LEON):** Look externally for anatomical problems; Evaluate 3-3-2 (Mouth opening should equal 3 of patient's finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patient's finger's width); Obese, obstruction, OB – 2d and 3d trimesters; Neck mobility limited.
 - Difficulty BIAD (RODS):** Radiation treatment/ Restriction; Obese/ Obstruction/ OB – 2d and 3d trimesters/ Obstructive sleep apnea; Distorted or disrupted airway; Short thyromental distance/ Small mandible.
 - Difficulty Cricothyrotomy / Surgical Airway (SMART):** Surgery scars; Mass or hematoma, Access or anatomical problems; Radiation treatment to face, neck, or chest; Tumor.
- Complete an Airway Evaluation Form with any BIAD or Intubation procedure.
- Intubation attempt defined as laryngoscope blade passing the teeth
- If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment).
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube or BIAD well to better maintain placement. When moving a patient, disconnect ventilator/BVM to aid in minimizing risk of airway displacement. Document end tidal CO₂ before and after every patient movement.
- **DOPES:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax, Equipment failure, and Stacked breaths, air-trapping.

Adult, Failed Airway

Definition of Failed Airway:

Unable to Ventilate and Oxygenate $\geq 90\%$ during
or after one (1) or more unsuccessful intubation/BIAD attempts

and/ or

Anatomy inconsistent with continued attempts

and/ or

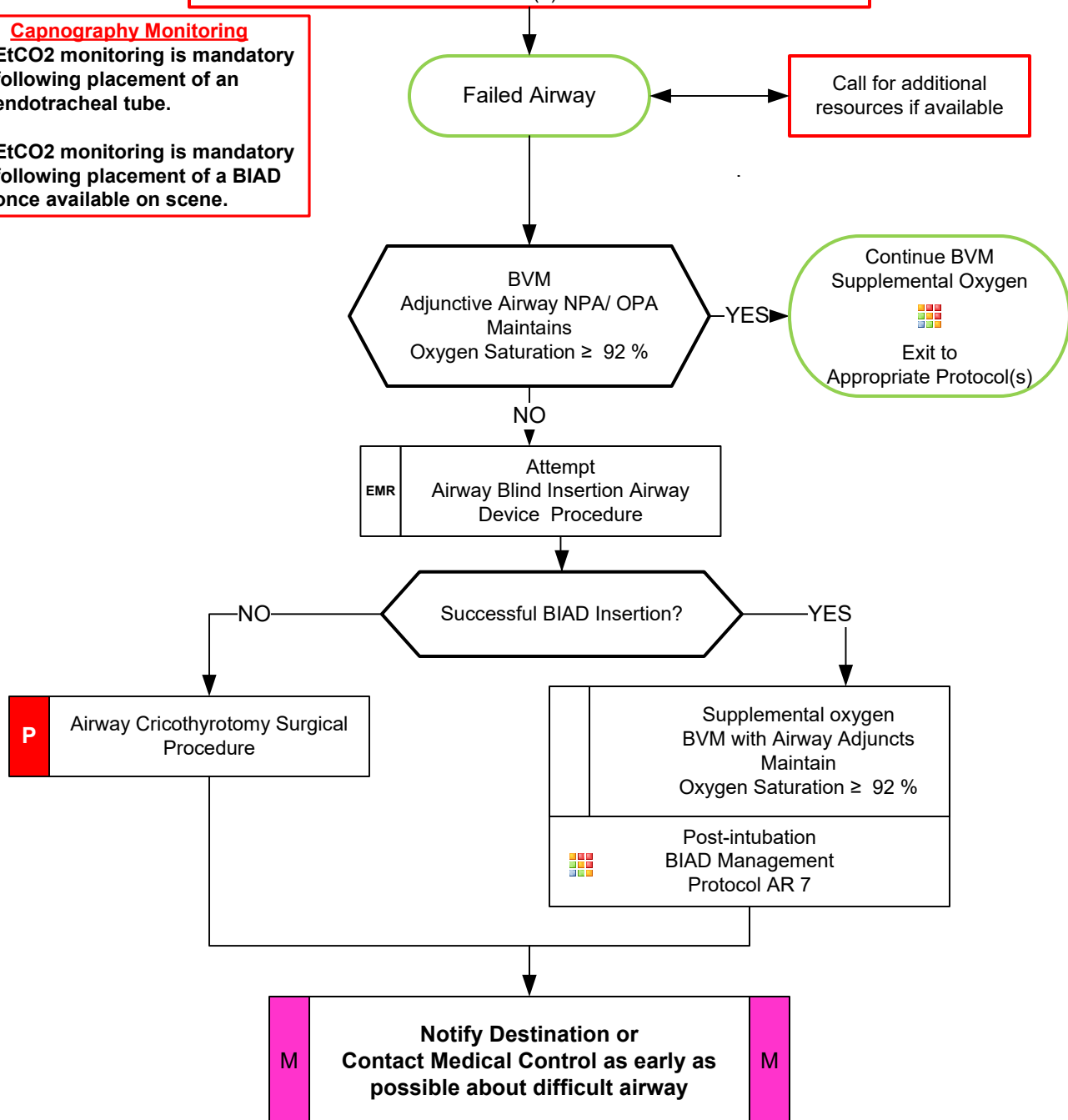
Two (2) unsuccessful intubation/BIAD attempts by most experienced
provider.

*Each attempt should include change in approach
or equipment*

NO MORE THAN TWO (2) ATTEMPTS TOTAL

Capnography Monitoring

- EtCO₂ monitoring is mandatory following placement of an endotracheal tube.
- EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.



Adult, Failed Airway

Pearls

- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.
- Ventilation rate should be 10 - 12 per minute to maintain a EtCO₂ of 35-45 and avoid hyperventilation.
- **Anticipating the Difficult Airway and Airway Assessment**
 - Difficult BVM Ventilation (ROMAN):** Radiation treatment/ Restriction; Obese/ Obstruction/ OB – 2d and 3d trimesters/ Obstructive sleep apnea; Mask seal difficulty (hair, secretions, trauma); Age ≥ 55 ; No teeth.
 - Difficult Laryngoscopy (LEON):** Look externally for anatomical problems; Evaluate 3-3-2 (Mouth opening should equal 3 of patient's finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patient's finger's width); Obese, obstruction, OB – 2d and 3d trimesters; Neck mobility limited.
 - Difficulty BIAD (RODS):** Radiation treatment/ Restriction; Obese/ Obstruction/ OB – 2d and 3d trimesters/ Obstructive sleep apnea; Distorted or disrupted airway; Short thyromental distance/ Small mandible.
 - Difficulty Cricothyrotomy / Surgical Airway (SMART):** Surgery scars; Mass or hematoma, Access or anatomical problems; Radiation treatment to face, neck, or chest; Tumor
- Complete an Airway Evaluation Form with any BIAD or Intubation procedure.
- Intubation attempt defined as laryngoscope blade or BIAD tip passing the teeth.
- If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated and BIAD patients if time allows.
- It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves/ transfers.
- **DOPES:** Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax, Equipment failure, and Stacked breaths, air-trapping.

Adult COPD/ Asthma Respiratory Distress

History

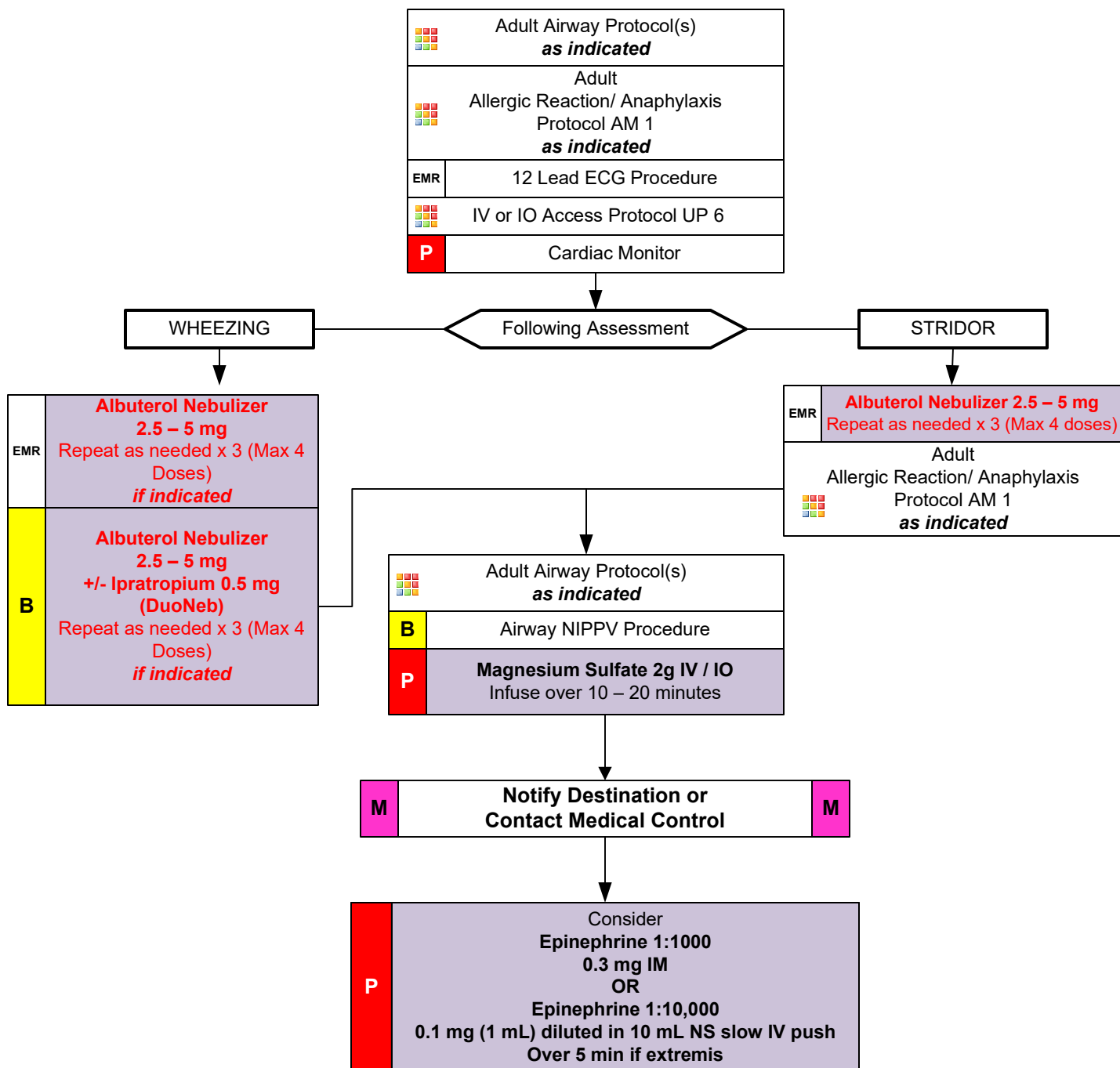
- Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers)
- Toxic exposure, smoke inhalation

Signs and Symptoms

- Shortness of breath
- Pursed lip breathing
- Decreased ability to speak
- Increased respiratory rate and effort
- Wheezing, rhonchi
- Use of accessory muscles
- Fever, cough
- Tachycardia

Differential

- Asthma
- Anaphylaxis
- Aspiration
- COPD (Emphysema, Bronchitis)
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin (Carbon monoxide, etc.)

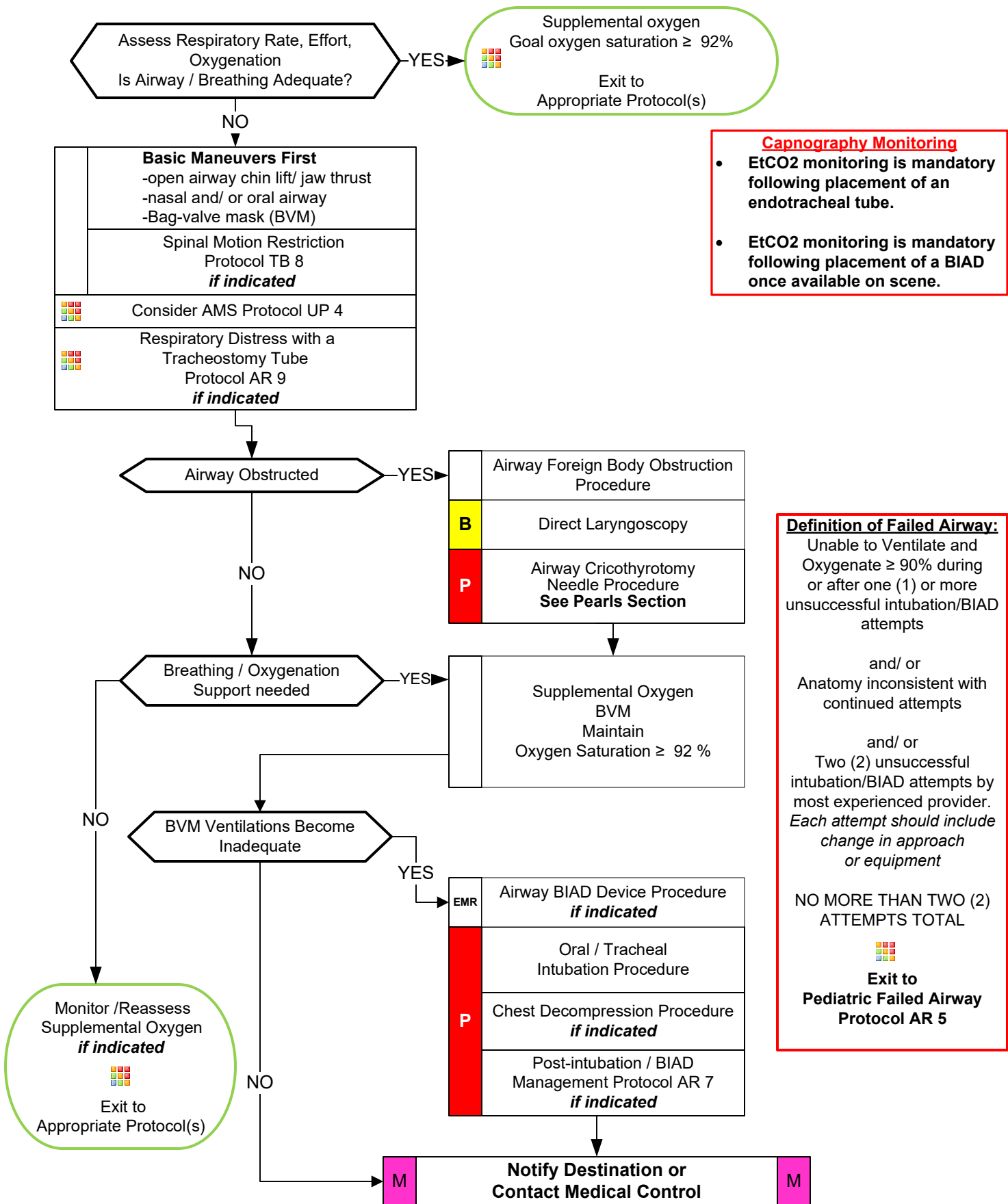


Adult COPD/ Asthma Respiratory Distress

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **This protocol includes all patients with respiratory distress, COPD, Asthma, Reactive Airway Disease, or bronchospasm.**
- **Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.**
- **Pulse oximetry should be monitored continuously and consider End-tidal CO₂ monitoring if available.**
- **Combination nebulizers containing albuterol and ipratropium (DuoNeb):**
Patients may require more than 3 nebulizer treatments, treatments should continue until improvement.
Following 3 combination nebulizers (DuoNeb), it is preferable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
If allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement per Allergic Reaction protocol.
If allergic reaction is not suspected, paramedic may administer with failure to improve and/ or impending respiratory failure.
- **Consider Magnesium Sulfate with no improvement and/ or impending respiratory failure. Likely more effective with asthmatic exacerbation and less so with COPD exacerbation.**
- **Non-Invasive Positive Pressure Ventilation (NIPPV: CPAP, Bilevel/BiPAP):**
May be used with COPD, Asthma, Allergic reactions, and/ or CHF.
Consider early in treatment course.
Consider removal if SBP remains < 100 mmHg and not responding to other treatments.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.

Pediatric Airway



Pediatric Airway

Pearls

- For the purposes of this protocol, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is preferable to continue with basic airway measures.
- Ventilation rate:
30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 - 12 per minute.
Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.
- Intubation:
Attempt defined as laryngoscope blade passing the teeth.
Use of a stylet is recommended in all pediatric intubations.
Endotracheal tube: Depth = 3 x the diameter of the ETT. Estimated Size = Age/4 ÷ 3 with Age in years
Full Term newborn = 3.5 mm.
If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- Aurora Regional EMS Airway Evaluation Form:
Fully complete and have receiving healthcare provider sign confirming BIAD or endotracheal tube placement.
Complete online using the link in Vector Solutions or the link provided by your EMS leadership.
- It is important to secure the endotracheal tube or BIAD well to better maintain placement. When moving a patient, disconnect ventilator/BVM to aid in minimizing risk of airway displacement. Document end tidal CO₂ before and after every patient movement.
- Airway Cricothyrotomy Percutaneous Needle Procedure:
Indicated as a lifesaving / last resort procedure in pediatric patients < 12 years of age.
A variety of alternative pediatric airway devices now available make the use of this procedure rare.
 ≥ 12 years: Surgical cricothyrotomy or commercial kits based on agency preference recommended.
- **DOPES:** Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax, Equipment failure and Staked breaths, air-trapping.

Pediatric Failed Airway

Definition of Failed Airway:

Unable to Ventilate and Oxygenate $\geq 90\%$ during
or after one (1) or more unsuccessful intubation/BIAD attempts

and/ or

Anatomy inconsistent with continued attempts

and/ or

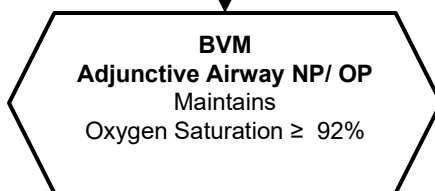
Two (2) unsuccessful intubation/BIAD attempts by most experienced
provider.

*Each attempt should include change in approach
or equipment*

NO MORE THAN TWO (2) ATTEMPTS TOTAL

Call for additional
resources if available

Failed Airway



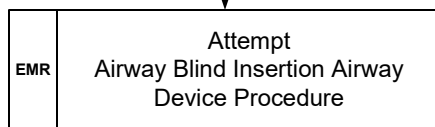
YES

Continue BVM
Supplemental Oxygen



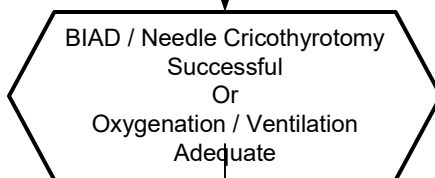
Exit to
Appropriate
Protocol(s)

NO



P

Airway Cricothyrotomy
Needle Procedure
See Pearls Section

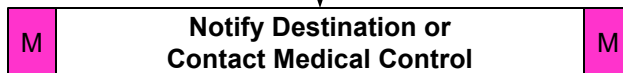
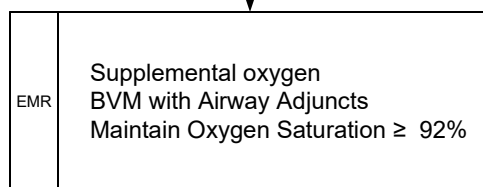


YES

Exit to
Post-intubation/
BIAD Management
Protocol AR 7



NO



Capnography Monitoring

- EtCO₂ monitoring is mandatory following placement of an endotracheal tube.
- EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.

Pediatric Failed Airway

Pearls

This protocol is for use in patients who FIT within a Pediatric Medication/ Skill Resuscitation System Product.

- For the purposes of this protocol, a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.
- Ventilation rate:
30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 – 12 per minute. Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.
- Intubation:
Attempt defined as laryngoscope blade or BIAD tip passing the teeth.
Use of a stylet is recommended in all pediatric intubations.
Endotracheal tube: Depth = $3 \times$ the diameter of the ETT. Estimated Size = $\text{Age}/4 \div 3$ with Age in years
Full Term newborn = 3.5 mm.
If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- Aurora Regional EMS Airway Evaluation Form:
Fully complete and have receiving healthcare provider sign confirming BIAD or endotracheal tube placement.
Complete online using the link in Vector Solutions or the link provided by your EMS leadership.
- Paramedics should consider using a BIAD if endotracheal intubation is unsuccessful.
- Secure the endotracheal tube well.
- Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- Airway Needle Cricothyrotomy Percutaneous Needle Procedure:
Indicated as a lifesaving / last resort procedure in pediatric patients < 12 years of age.
 ≥ 12 years: Surgical cricothyrotomy or commercial kits based on agency preference recommended.
- **DOPES:** Displaced tracheostomy tube/ ETT, **O**bststructed tracheostomy tube/ ETT, **P**neumothorax, **E**quipment failure and **S**tacked breaths.

Pediatric Asthma Respiratory Distress

History

- Time of onset
- Possibility of foreign body
- Past Medical History
- Medications
- Fever / Illness
- Sick Contacts
- History of trauma
- History / possibility of choking
- Ingestion / OD
- Congenital heart disease

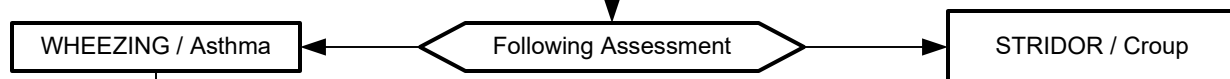
Signs and Symptoms

- Wheezing / Stridor / Crackles / Rales
- Nasal Flaring / Retractions / Grunting
- Increased Heart Rate
- AMS
- Anxiety
- Attentiveness / Distractability
- Cyanosis
- Poor feeding
- JVD / Frothy Sputum
- Hypotension

Differential

- Asthma / Reactive Airway Disease
- Aspiration
- Foreign body
- Upper or lower airway infection
- Congenital heart disease
- OD / Toxic ingestion / CHF
- Anaphylaxis
- Trauma

Pediatric Airway Protocol(s) AR 3, 5 - 7 as indicated	
Pediatric Allergic Reaction/ Anaphylaxis Protocol PM 1 as indicated	
EMR	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6 if indicated
P	Cardiac Monitor



EMR	Albuterol Nebulizer 1.25 - 2.5 mg Repeat as needed x 3 (Max 4 doses) if indicated
B	Albuterol Nebulizer 1.25 - 2.5 mg +/- Ipratropium 0.5 mg (DuoNeb) Repeat as needed x 3 (Max 4 Doses) if indicated
P	Magnesium Sulfate 40 mg/kg IV / IO Infuse over 10 – 20 minutes Maximum 2 gm

B	Racemic Epinephrine Nebulizer 1 mg (1:1000) in 2 mL NS May repeat x 1 (Max 2 doses)
---	---

Pediatric Airway Protocol(s) AR 3, 5 - 7 as indicated	
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M	Notify Destination or Contact Medical Control	M
---	--	---

P	Consider Epinephrine 1:1000 0.01 mg / kg IM (Maximum 0.3 mg) OR Epinephrine 1:10,000 0.01 mg/kg diluted in 10 mL NS Slow IV/IO push over 5 min (Maximum 0.1 mg)
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Pediatric Asthma Respiratory Distress

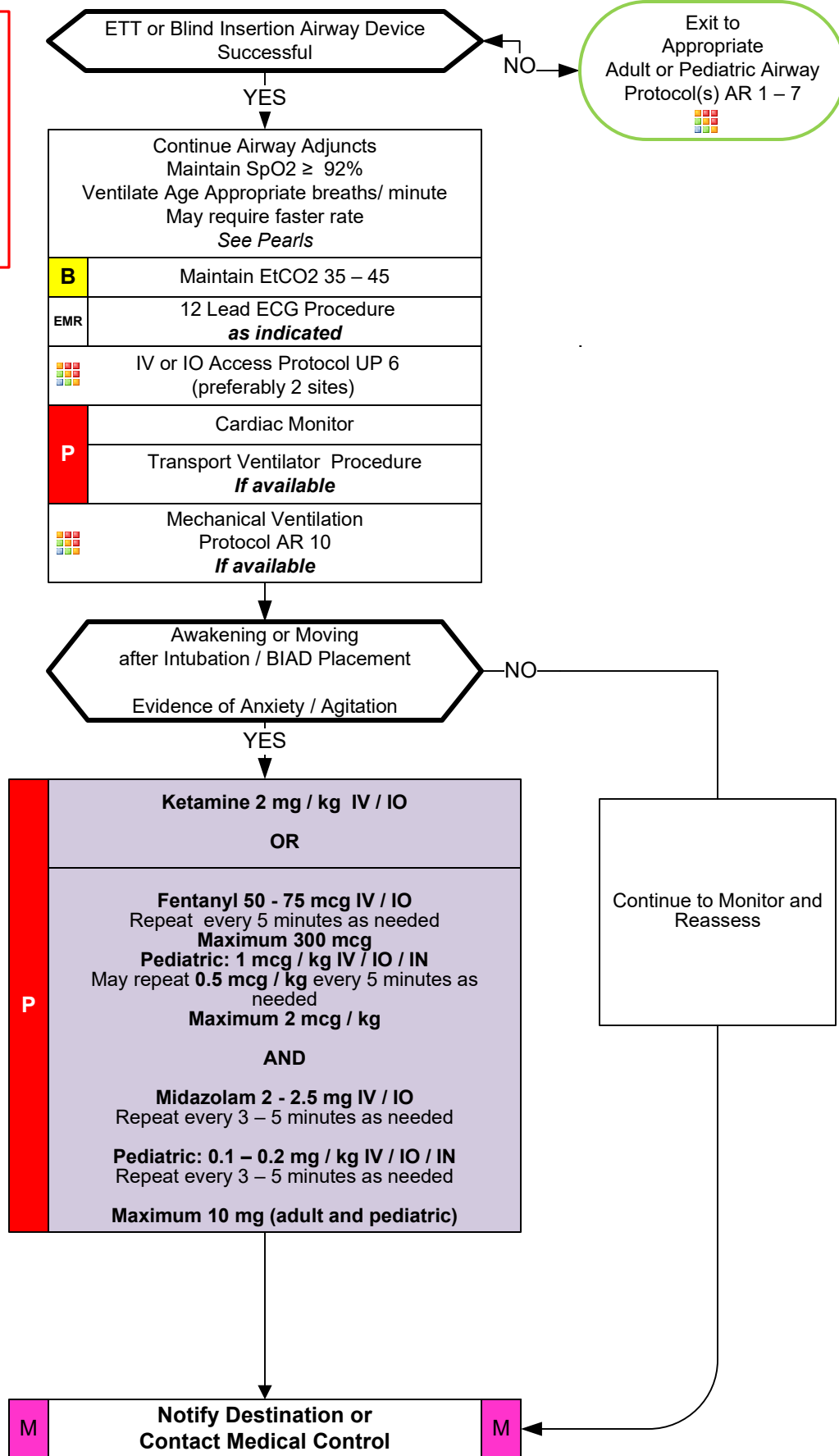
Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **This protocol includes all patients with respiratory distress, Asthma, Reactive Airway Disease, croup, or bronchospasm.**
- **Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.**
- **Pulse oximetry should be monitored continuously and consider End-tidal CO2 monitoring if available.**
- **Combination nebulizers containing albuterol and ipratropium (DuoNeb):**
 - Patients may require more than 3 nebulizer treatments, treatments should continue until improvement.
 - Following 3 combination nebulizers (DuoNeb), it is preferable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
 - If allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement per Allergic Reaction Protocol.
 - If allergic reaction is not suspected, administer with no improvement and/ or impending respiratory failure.
- **Consider Magnesium Sulfate with impending respiratory failure and/ or no improvement.**
- **Consider IV access when Pulse oximetry remains $\leq 92\%$ after first beta-agonist nebulizer treatment.**
- **Do not force a child into a position, allow them to assume position of comfort, typically the tripod position.**
- Bronchiolitis is a viral infection typically affecting infants which results in wheezing which may not respond to beta-agonists.
- Croup typically affects children < 2 years of age. It is viral, possible fever, gradual onset, no drooling is noted.
- Epiglottitis typically affects children > 2 years of age. It is bacterial, with fever, rapid onset, possible stridor, patient wants to sit up to keep airway open, drooling is common. Airway manipulation may worsen the condition.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.

Post-intubation/ BIAD Management

Capnography Monitoring

- EtCO₂ monitoring is mandatory following placement of an endotracheal tube.
- EtCO₂ monitoring is mandatory following placement of a BIAD once available on scene.



Post-intubation/ BIAD Management

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
- **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
- **Ventilated patients cannot communicate pain/ anxiety and providers are poor at recognizing pain/ anxiety.**
- **Vital signs such as tachycardia and/ or hypertension can provide clues to inadequate sedation, however they are not always reliable indicators of a patient's lack of adequate sedation.**
- **Ventilation rate:**
 - Guidelines: 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 10 – 12 per minute.**
 - Maintain EtCO₂ between 35 - 45 and avoid hyperventilation.**
- In general, ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 - 8 mL/kg and peak pressures should be < 30 cmH₂O. Plateau Pressures should be < 30 cmH₂O.
- Head of bed should be maintained at least 10 – 20 degrees of elevation when possible, to decrease aspiration risk.
- With abrupt clinical deterioration, if mechanically ventilated, disconnect from ventilator to assess lung compliance.
- **DOPES: Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax, Equipment failure and Stacked breaths.**

Ventilator Emergencies

History

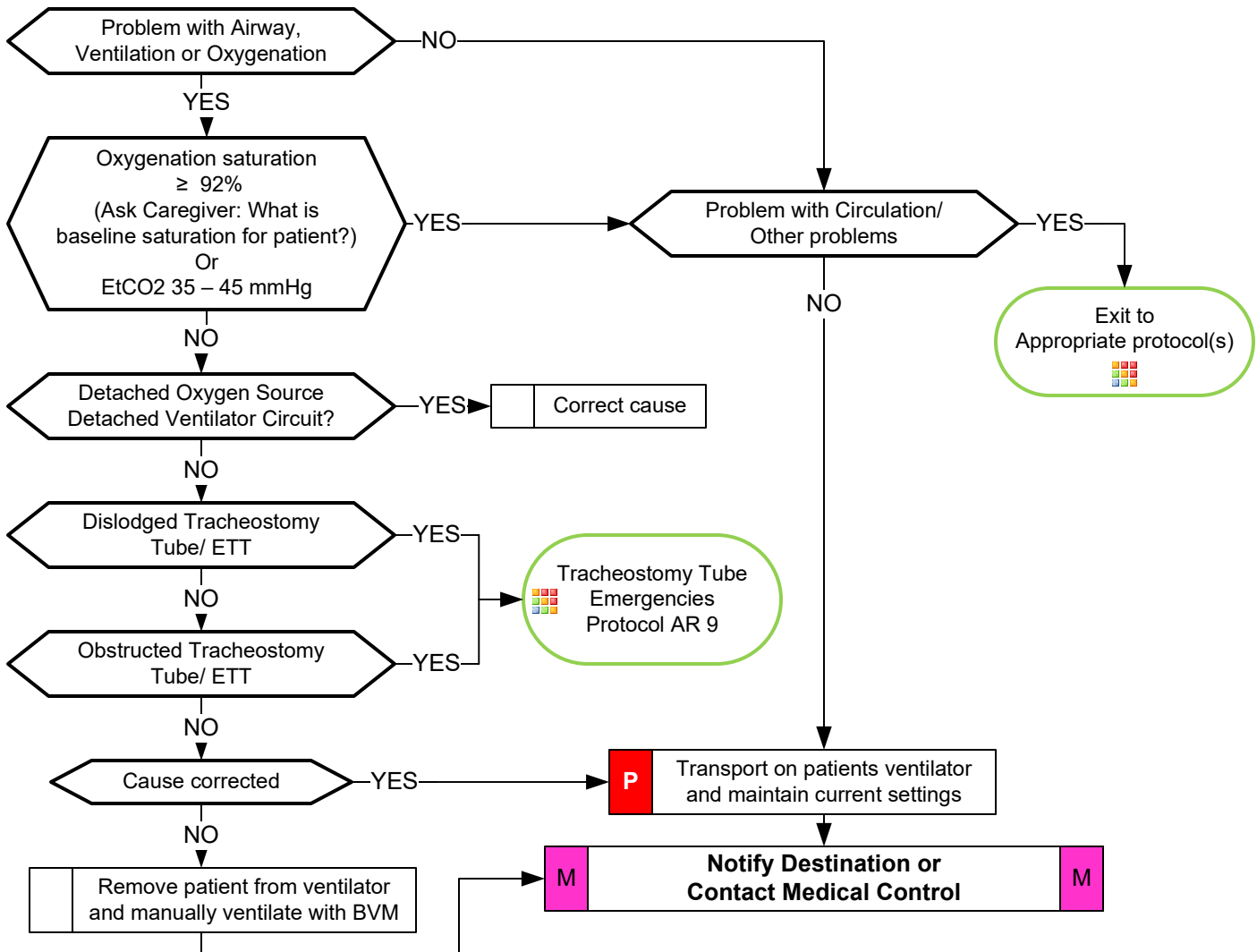
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchopulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

- Transport requiring maintenance of a mechanical ventilator
- Power or equipment failure at residence

Differential

- Disruption of oxygen source
- Dislodged or obstructed tracheostomy tube
- Detached or disrupted ventilator circuit
- Cardiac arrest
- Increased oxygen requirement / demand
- Ventilator failure



Pearls

- **Always talk to family/ caregivers as they have specific knowledge and skills.**
- **Always use patient's equipment if available and functioning properly. All license levels may provide care/transport using the patient's home vent if the complaint is not respiratory in nature. If using the patient's ventilator bring caregiver knowledgeable in ventilator operation during transport.**
- **Take patient's ventilator to hospital even if not functioning properly.**
- Continuous pulse oximetry and End Tidal CO₂ monitoring must be utilized during assessment and transport.
- Unable to correct ventilator problem: Remove patient from ventilator and manually ventilate using BVM.
- Typical alarms:
 - Low Pressure/ Apnea: Loose or disconnected circuit, leak in circuit or around tracheostomy site.
 - Low Power: Internal battery depleted.
 - High Pressure: Plugged/ obstructed airway or circuit.
- **DOPES:** Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax, Equipment failure, and Stacked breaths.

Tracheostomy Tube Emergencies

History

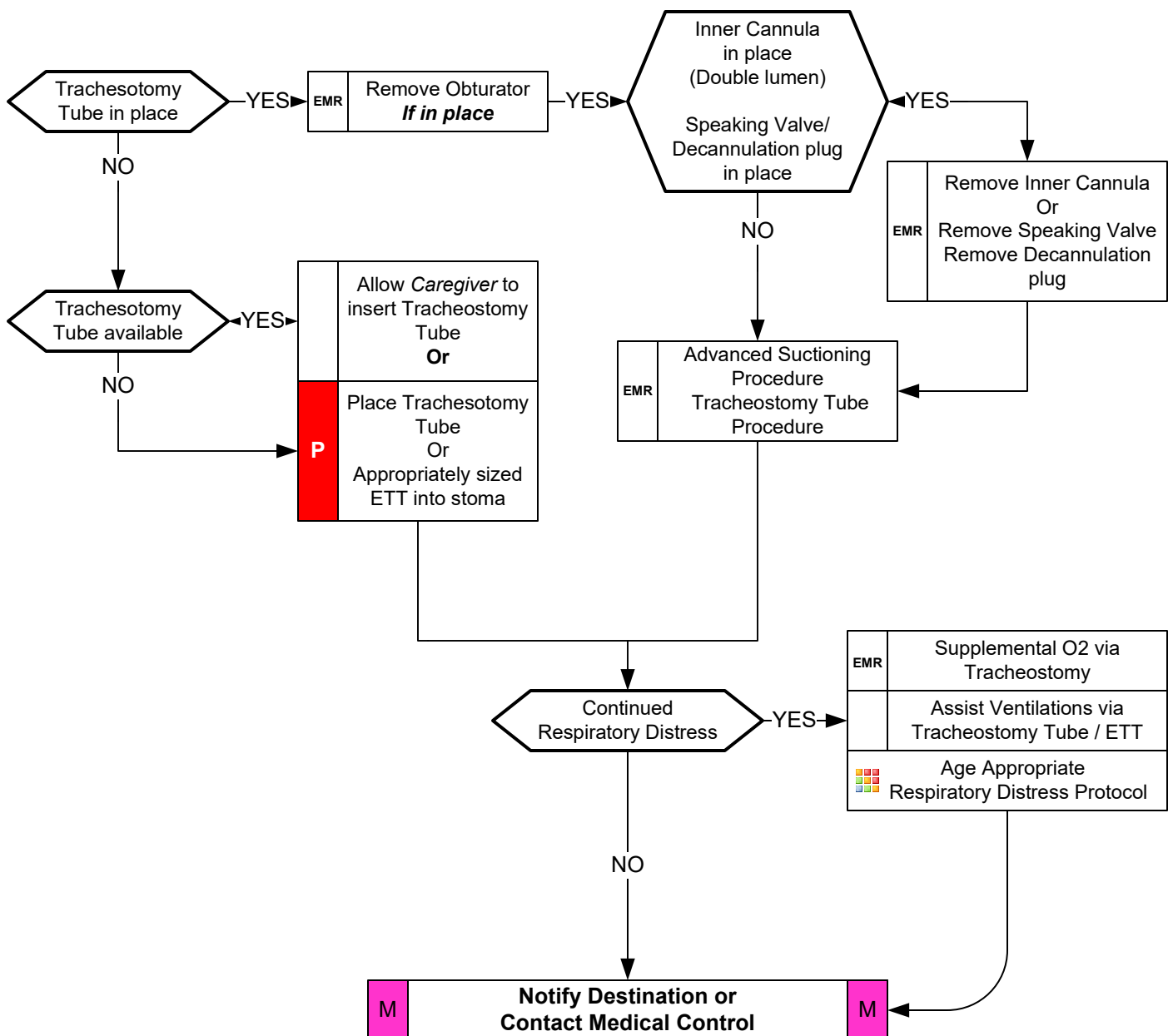
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (accidental damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchial or pulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

- Nasal flaring
- Chest wall retractions (with or without abnormal breath sounds)
- Attempts to cough
- Copious secretions noted coming out of the tube
- Faint breath sounds on both sides of chest despite significant respiratory effort
- AMS
- Cyanosis

Differential

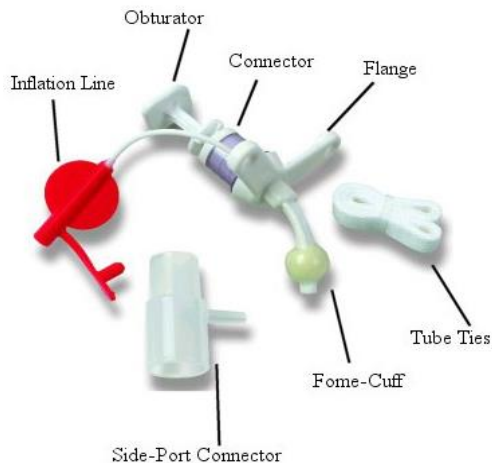
- Allergic reaction
- Asthma
- Aspiration
- Septicemia
- Foreign body
- Infection
- Congenital heart disease
- Medication or toxin
- Trauma



Tracheostomy Tube Emergencies

Pearls

- Always talk to family/ caregivers as they have specific knowledge and skills.
- Important to ask if patient has undergone laryngectomy. This does not allow mouth/ nasal ventilation by covering stoma.
- Use patients equipment if available and functioning properly.
- Estimate suction catheter size by doubling the inner tracheostomy tube diameter and rounding down.
- Suction depth: Ask family/ caregiver. No more than 3 to 6 cm typically. Instill 2 – 3 mL of NS before suctioning.
- Do not suction more than 10 seconds each attempt and pre-oxygenate before and between attempts.
- DO NOT force suction catheter. If unable to pass, then tracheostomy tube should be changed.
- Always deflate tracheal tube cuff before removal. Continual pulse oximetry and EtCO₂ monitoring if available.
- **DOPES:** Displaced tracheostomy tube/ ETT, Obstructed tracheostomy tube/ ETT, Pneumothorax, Equipment failure and Stacked breaths.



Mechanical Ventilation

History

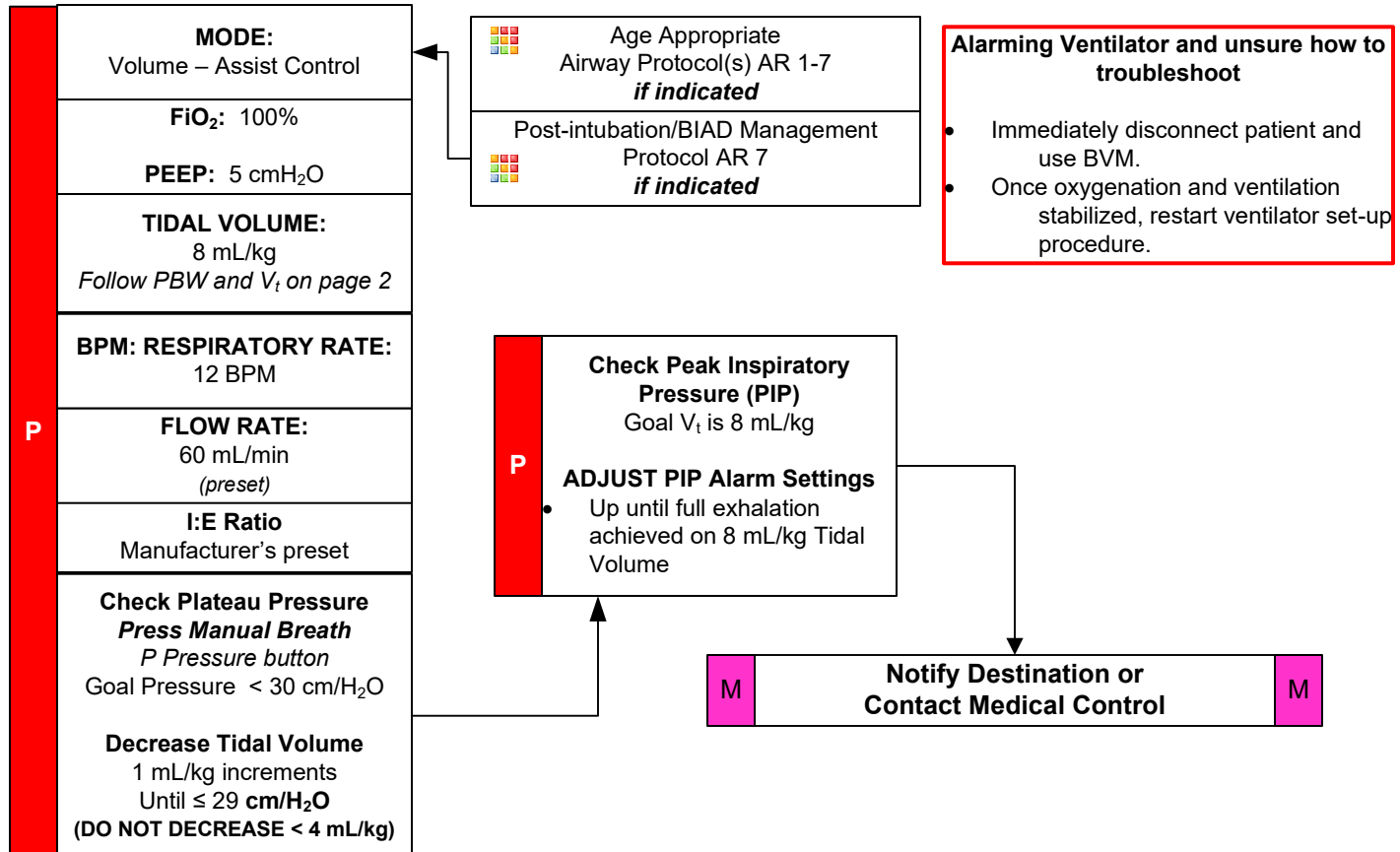
- Multiple etiologies leading to need for advanced airway control
- Requires ventilation support
- Height and underlying lung conditions

Signs and Symptoms

- Loss of consciousness or AMS with inability to protect airway
- Difficult oxygenation and/or ventilation

Differential

- ROSC
- Trauma
- Stroke
- Seizure
- Shock (see Shock Protocol)
- Toxicological



Pearls

- **Recommended Exam:** Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- **Mechanical ventilation may be used in any patient ≥ 1 year old.**
- **MODE:** In all adult patients use Volume – Assist Control. This mode requires adequate sedation as it can be uncomfortable in a patient who is awakening.
- **TIDAL VOLUME:** Tidal volume is very important in preventing lung injury and calculated by height and predicted body weight, or ideal body weight, and NOT actual body weight.
 - Follow Tidal Volume by Height Table on page 2.
 - Follow Tidal Volume by Height Table on page 2 when adjusting Peak Inspiratory Pressure alarms to allow full exhalation.
 - High Tidal Volumes are well known to cause alveolar damage and lung injury.
- **EtCO₂:** EtCO₂ and arterial CO₂ do not always correlate well in patients with lung disease or during serious illness or injury.
 - Use caution in adjusting respiratory rate to reach a goal of 35 – 45 mmHg. Most intubated patients do not need tight control in this range.
 - Patients with suspected head injury do need EtCO₂ with a target of 35 – 45 mmHg.
 - Allowing patients with COPD and asthma exacerbations to have higher EtCO₂ outside the 35 – 45 mmHg range is acceptable. Lower ventilation rates allow more time for exhalation and prevents auto-PEEP and/ or air trapping.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.

Mechanical Ventilation

TIDAL VOLUME INITIAL SETTINGS By HEIGHT

FEMALE

Height / Predicted body weight / Vt

HEIGHT	PBW	4 ml	5 ml	6 ml	7 ml	8 ml
4' 0" (48)	17.9	72	90	107	125	143
4' 1" (49)	20.2	81	101	121	141	162
4' 2" (50)	22.5	90	113	135	158	180
4' 3" (51)	24.8	99	124	149	174	198
4' 4" (52)	27.1	108	136	163	190	217
4' 5" (53)	29.4	118	147	176	206	235
4' 6" (54)	31.7	127	159	190	222	254
4' 7" (55)	34	136	170	204	238	272
4' 8" (56)	36.3	145	182	218	254	290
4' 9" (57)	38.6	154	193	232	270	309
4' 10" (58)	40.9	164	205	245	286	327
4' 11" (59)	43.2	173	216	259	302	346
5' 0" (60)	45.5	182	228	273	319	364
5' 1" (61)	47.8	191	239	287	335	382
5' 2" (62)	50.1	200	251	301	351	401
5' 3" (63)	52.4	210	262	314	367	419
5' 4" (64)	54.7	219	274	328	383	438
5' 5" (65)	57	228	285	342	399	456
5' 6" (66)	59.3	237	297	356	415	474
5' 7" (67)	61.6	246	308	370	431	493
5' 8" (68)	63.9	256	320	383	447	511
5' 9" (69)	66.2	265	331	397	463	530
5' 10" (70)	68.5	274	343	411	480	548
5' 11" (71)	70.8	283	354	425	496	566
6' 0" (72)	73.1	292	366	439	512	585
6' 1" (73)	75.4	302	377	452	528	603
6' 2" (74)	77.7	311	389	466	544	622
6' 3" (75)	80	320	400	480	560	640
6' 4" (76)	82.3	329	412	494	576	658
6' 5" (77)	84.6	338	423	508	592	677
6' 6" (78)	86.9	348	435	521	608	695
6' 7" (79)	89.2	357	446	535	624	714
6' 8" (80)	91.5	366	458	549	641	732
6' 9" (81)	93.8	375	469	563	657	750
6' 10" (82)	96.1	384	481	577	673	769
6' 11" (83)	98.4	394	492	590	689	787
7' 0" (84)	100.7	403	504	604	705	806

MALE

Height / Predicted body weight / Vt

HEIGHT	PBW	4 ml	5 ml	6 ml	7 ml	8 ml
4' 0" (48)	22.4	90	112	134	157	179
4' 1" (49)	24.7	99	124	148	173	198
4' 2" (50)	27	108	135	162	189	216
4' 3" (51)	29.3	117	147	176	205	234
4' 4" (52)	31.6	126	158	190	221	253
4' 5" (53)	33.9	136	170	203	237	271
4' 6" (54)	36.2	145	181	217	253	290
4' 7" (55)	38.5	154	193	231	270	308
4' 8" (56)	40.8	163	204	245	286	326
4' 9" (57)	43.1	172	216	259	302	345
4' 10" (58)	45.4	182	227	272	318	363
4' 11" (59)	47.7	191	239	286	334	382
5' 0" (60)	50	200	250	300	350	400
5' 1" (61)	52.3	209	262	314	366	418
5' 2" (62)	54.6	218	273	328	382	437
5' 3" (63)	56.9	228	285	341	398	455
5' 4" (64)	59.2	237	296	355	414	474
5' 5" (65)	61.5	246	308	369	431	492
5' 6" (66)	63.8	255	319	383	447	510
5' 7" (67)	66.1	264	331	397	463	529
5' 8" (68)	68.4	274	342	410	479	547
5' 9" (69)	70.7	283	354	424	495	566
5' 10" (70)	73	292	365	438	511	584
5' 11" (71)	75.3	301	377	452	527	602
6' 0" (72)	77.6	310	388	466	543	621
6' 1" (73)	79.9	320	400	479	559	639
6' 2" (74)	82.2	329	411	493	575	658
6' 3" (75)	84.5	338	423	507	592	676
6' 4" (76)	86.8	347	434	521	608	694
6' 5" (77)	89.1	356	446	535	624	713
6' 6" (78)	91.4	366	457	548	640	731
6' 7" (79)	93.7	375	469	562	656	750
6' 8" (80)	96	384	480	576	672	768
6' 9" (81)	98.3	393	492	590	688	786
6' 10" (82)	100.6	402	503	604	704	805
6' 11" (83)	102.9	412	515	617	720	823
7' 0" (84)	105.2	421	526	631	736	842

TROUBLESHOOTING Hypoxia or Deterioration DOPEs

D	Dislodged ETT or cuff leak
O	Obstruction of ETT or circuit
P	Pneumothorax, Pneumonia, Pulmonary embolism or edema, Plug (mucous)
E	Equipment problem
S	Stacked breaths, air trapping, or auto-PEEP

RESPONSE to Hypoxia or Deterioration DOTT

D	Disconnect ventilator, squeeze chest if auto-PEEP, Decompress if pneumothorax
O	Oxygen 100% FiO2, BVM and check compliance
T	Tube position and function, check EtCO2
T	Tweak ventilator settings or equipment

Pressure Alarm Troubleshooting

Problem Location

Consider

High PIP	+	High Plateau > 30	Alveoli	Compliance problem: Pneumothorax, Pneumonia Pulmonary Edema or Embolism, CHF
High PIP	+	Normal Plateau < 30	Airway problem	Airway, ventilator, or circuit problem: DOPE, Right Main stem intubation, Air trapping or auto-PEEP, Mucous plug, Patient out of synchrony with ventilator

Pediatric Asystole / PEA

History

- Events leading to arrest
- Estimated downtime
- SAMPLE
- Existence of terminal illness
- Airway obstruction
- Hypothermia
- Suspected abuse

Signs and Symptoms

- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- Respiratory failure
- Foreign body
- Infection (croup, epiglottitis)
- Congenital heart disease
- See Reversible Causes below

 Pediatric Cardiac Arrest Protocol PC 4

Criteria for Death / No Resuscitation Review DNR

YES

NO

1. Rigor mortis and/or dependent lividity
2. Decapitation
3. Traumatic cardiac arrest with injury obviously incompatible with life
4. Traumatic arrest with apnea and either asystole or wide complex PEA at a rate < 40 (paramedic only).

Do not begin resuscitation

Follow Criteria for Death/Withholding Resuscitation Policy/Procedure

AT ANY TIME

Return of Spontaneous Circulation



Go to Post Resuscitation Protocol

EMR	Refer to CPR Procedure
	AED Procedure <i>if available</i>
P	Cardiac Monitor
	IV or IO Access Protocol UP 6
P	Epinephrine 1:10,000 0.01 mg/kg IV / IO Maximum Single Dose 1mg
A	Normal Saline Bolus 20 mL/kg IV / IO May repeat as needed Maximum 60 mL/kg
	Search for Reversible Causes
EMR	Blood Glucose Analysis Procedure <i>if applicable</i>

Notify Destination or Contact Medical Control

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Pediatric Asystole / PEA

Pearls

- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress $\geq 1/3$ anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches.
- Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.
- When advanced airway not in place perform 15 compressions with 2 ventilations.
- Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.
- **DO NOT HYPERVENTILATE:**
If advanced airway in place ventilate:
 Age < 1 year: 1 breath every 2 seconds with continuous, uninterrupted compressions.
 Age ≥ 1 year: 1 breath every 3 seconds with continuous, uninterrupted compressions.
- Airway is a more important intervention in pediatric arrests.
- Patient survival is often dependent on proper ventilation and oxygenation / airway Interventions.
- BVM is the first line in pediatric patients. Advanced airway should only be considered if unable to successfully ventilate/oxygenate with BVM. BIAD is preferred over ETI if unable to continue BVM.
- **High-Quality CPR:**
 Make sure chest compressions are being delivered at 100 – 120 / min.
 Make sure chest compressions are adequate depth for age and body habitus.
 Make sure you allow full chest recoil with each compression to provide maximum perfusion.
 Minimize all interruptions in chest compressions to < 10 seconds.
 Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:** Follow manufacturer's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO₂ (EtCO₂)**
 If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
 If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation.**
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
 Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

Pediatric Bradycardia

History

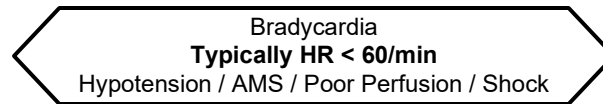
- Past medical history
- Foreign body exposure
- Respiratory distress or arrest
- Apnea
- Possible toxic or poison exposure
- Congenital disease
- Medication (maternal or infant)

Signs and Symptoms

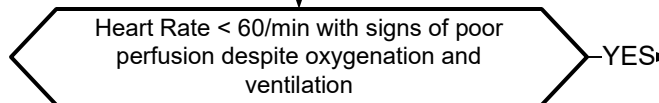
- Decreased heart rate
- Delayed capillary refill or cyanosis
- Mottled, cool skin
- Hypotension or arrest
- Altered level of consciousness

Differential

- Respiratory failure, Foreign body, Secretions, Infection(croup, epiglottitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax
- Hypothermia
- Toxin or medication
- Hypoglycemia
- Acidosis



	Pediatric Airway Protocol(s) AR 4, 5 as indicated
	Identify underlying cause Search for reversible causes
P	Cardiac Monitor
	IV or IO Protocol UP 6



Exit to
Pediatric Cardiac Arrest
Protocol(s) PC 1, 4, 7


NO

	Identify underlying cause Search for reversible causes
EMR	Blood Glucose Analysis Procedure
	IV or IO Protocol UP 6
A	Normal Saline Bolus 20 ml / kg IV / IO Repeat as needed x 3 Maximum 60 mL / kg
P	Epinephrine 1:10,000 0.01 mg/kg IV / IO Maximum Single Dose 1mg
	Atropine 0.02 mg / kg IV / IO May repeat x 1 (Max 2 doses) Minimum single dose 0.1 mg Maximum single dose 0.5 mg
	If no improvement Consider Transcutaneous Pacing Procedure

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia
Hypoglycemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Suspected Beta-Blocker or Calcium Channel Blocker


Follow Pediatric Toxicology Protocol

M	Notify Destination or Contact Medical Control	M
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Pediatric Bradycardia

Pearls

- **Recommended Exam:** Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- Bradycardia is often associated with hypoxia so ensure patent airway, breathing, and circulation as needed.
- Begin CPR immediately with persistent bradycardia and poor perfusion despite adequate oxygenation and ventilation.
- Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric pads should be used in children < 10 kg.
- Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.
- Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia.
- **12-Lead ECG:**
 - 12 Lead ECG not necessary to diagnose and treat
 - Obtain when patient is stable and/or following rhythm conversion.
- **Unstable condition**
 - Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
 - If at any point patient becomes unstable move to unstable arm in algorithm
- Epinephrine is first drug choice for persistent, symptomatic bradycardia.
- **Atropine:**
 - Second choice, unless there is evidence of increased vagal tone or a primary AV conduction block, then give atropine first.
 - Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
 - If no IV or IO access immediately available, start Transcutaneous Pacing, establish IV / IO access, and then administer epinephrine.
 - Epinephrine should be administered following Atropine if no response.
- **Symptomatic condition**
 - Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
 - Symptomatic bradycardia usually occurs at rates < 50 beats per minute.
 - Search for underlying causes such as hypoxia or impending respiratory failure.
- **Serious Signs / Symptoms:**
 - Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.
- **Transcutaneous Pacing Procedure (TCP)**
 - Indicated with unstable bradycardia unresponsive to medical therapy.
 - If time allows transport to specialty center because transcutaneous pacing is a temporizing measure.
 - Transvenous / permanent pacemaker will probably be needed.
 - Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.
- Most maternal medications pass through breast milk to the infant so maintain high-index of suspicion for OD-toxins.
- Hypoglycemia, severe dehydration and narcotic effects may produce bradycardia. Many other agents a child ingests can cause bradycardia, often in a single dose.

Pediatric Pulmonary Edema / CHF

History

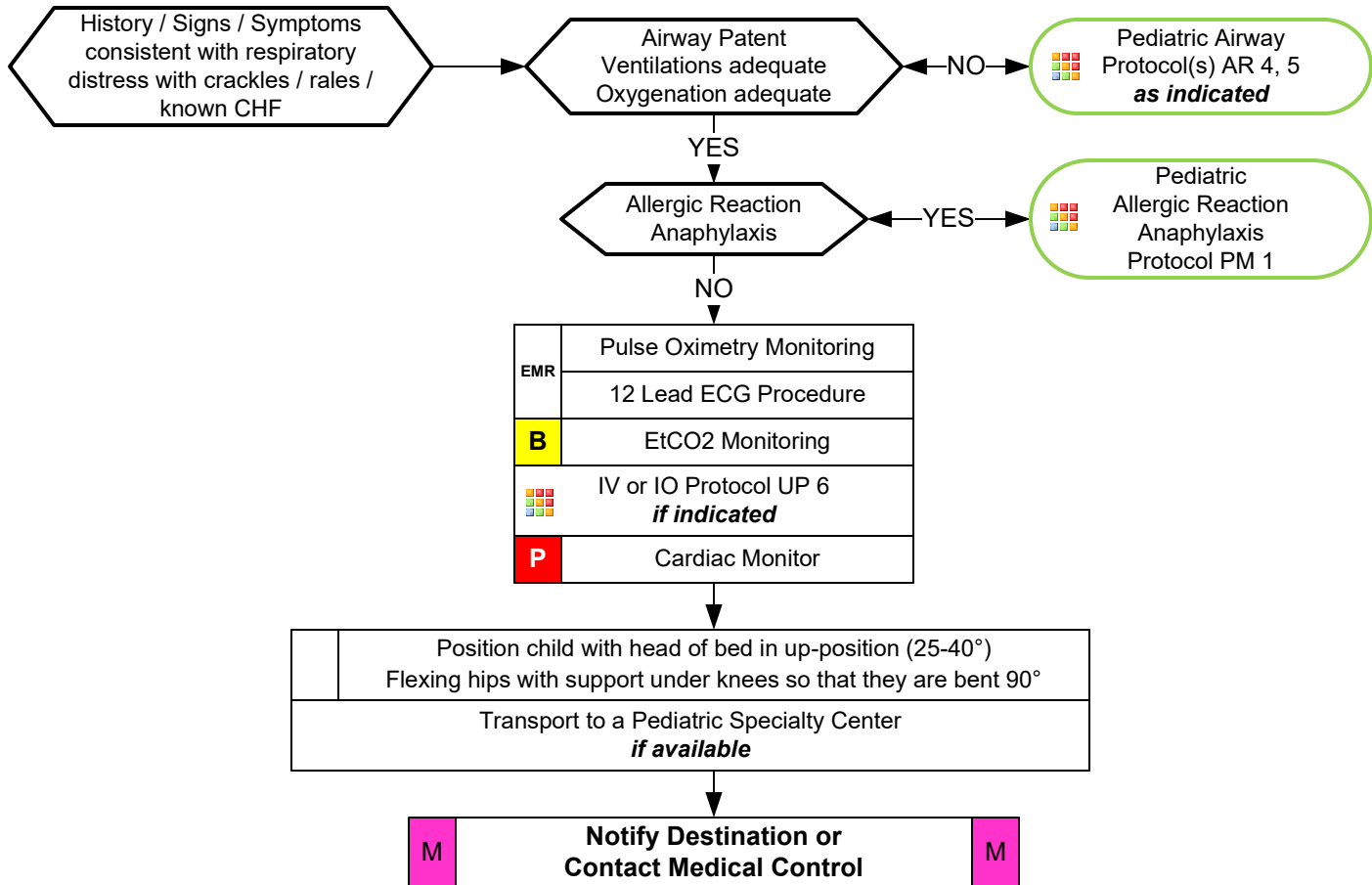
- Congenital Heart Disease
- Chronic Lung Disease
- Congestive heart failure
- Past medical history

Signs/Symptoms

- Infant: Respiratory distress, poor feeding, lethargy, weight gain, +/- cyanosis
- Child/Adolescent: Respiratory distress, bilateral rales, apprehension, orthopnea, jugular vein distention (rare), pink, frothy sputum, peripheral edema, diaphoresis, chest pain
- Hypotension, shock

Differential

- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pericardial tamponade
- Toxic Exposure



Pearls

- **Recommended exam: Mental status, Respiratory, Cardiac, Skin, Neuro**
- **Contact Medical Control early in the care of the pediatric cardiac patient.**
- **Most children with CHF have a congenital heart defect, obtain a precise past medical history.**
- **Congenital heart disease varies by age:**
 - < 1 month: Tetralogy of Fallot, Transposition of the great arteries, Coarctation of the aorta.
 - 2 – 6 months: Ventricular septal defects (VSD), Atrioseptal defects (ASD).
 - Any age: Myocarditis, Pericarditis, SVT, heart blocks.
- **Treatment of Congestive Heart Failure / Pulmonary edema may vary depending on the underlying cause and may include the following with consultation by Medical Control:**
 - Fentanyl:** 1 mcg/kg IV / IO. Max single dose 50 mcg.
 - Nitroglycerin:** Dose determined after consultation of Medical Control.
 - Norepinephrine:** 0.05-0.1 mcg/kg/min. Max 2 mcg/kg/min.
- Do not assume all wheezing is pulmonary, especially in a cardiac child: avoid albuterol unless strong history of recurrent wheezing secondary to pulmonary etiology (discuss with Medical Control)

Pediatric Cardiac Arrest

History

- Time of arrest
- Medical history
- Medications
- Possibility of foreign body
- Hypothermia

Signs and Symptoms

- Unresponsive
- Cardiac arrest

Differential

- Respiratory failure: Foreign body, Secretions, Infection (croup, epiglottitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax, cardiac tamponade, pulmonary embolism
- Hypothermia
- Toxin or medication
- Electrolyte abnormalities (Glucose, K)
- Acidosis

Protocol Age Guidance:

Newborn – 3 days:
AO2 Newly Born

3- days to 15 years:
PC4 Pediatric Cardiac Arrest

≥ 16 years:
AC3 Cardiac Arrest;
Adult

Criteria for Death / No Resuscitation Review DNR

NO

Refer to CPR Procedure

EMR

YES

1. Rigor mortis and/or dependent lividity
2. Decapitation
3. Traumatic cardiac arrest with injury obviously incompatible with life
4. Traumatic arrest with apnea and either asystole or wide complex PEA at a rate < 40 (paramedic only).

Do not begin resuscitation

Follow
Criteria for Death/
Withholding Resuscitation
Policy/Procedure

ALS Available

YES

Cardiac Monitor

P

AED Procedure
if available

EMR

Shockable Rhythm

YES

Defibrillation Automated

NO

Continue CPR
2 Minutes

Repeat and reassess

Pediatric Airway
Protocol(s) AR 4, 5

Treat reversible
causes

Notify Destination or
Contact Medical Control

M

M

Shockable Rhythm

YES

Pediatric Asystole /
PEA
Protocol PC 1

Pediatric Airway
Protocol(s) AR 4, 5

Pediatric VF / VT
Protocol PC 7
Pediatric
Tachycardia
Protocol PC 5, 6

Pediatric Airway
Protocol(s) AR 4, 5

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypothermia
- Hypo / Hyperkalemia
- Tension pneumothorax
- Tamponade; cardiac
- Toxins
- Thrombosis; pulmonary (PE)
- Thrombosis; coronary (MI)

Pediatric Cardiac Arrest

Pearls

- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress $\geq 1/3$ anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches.
- Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.
- When advanced airway not in place perform 15 compressions with 2 ventilations.
- Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric pads should be used in children < 10 kg.
- **DO NOT HYPERVENTILATE:**
If advanced airway in place ventilate:
 Age < 1 year: 1 breath every 2 seconds with continuous, uninterrupted compressions.
 Age ≥ 1 year: 1 breath every 3 seconds with continuous, uninterrupted compressions.
- Patient survival is often dependent on proper ventilation and oxygenation / airway interventions.
- BVM is first line in pediatric patients. Advanced airway should only be considered if unable to successfully ventilate/oxygenate with BVM. BIAD is preferred over ETI if unable to continue BVM.
- **High-Quality CPR:**
 Make sure chest compressions are being delivered at 100 – 120 / min.
 Make sure chest compressions are adequate depth for age and body habitus.
 Make sure you allow full chest recoil with each compression to provide maximum perfusion.
 Minimize all interruptions in chest compressions to < 10 seconds.
 Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:**
 Follow manufacturer's recommendations concerning defibrillation / cardioversion energy when specified.
 Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
 Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO₂ (EtCO₂)**
 If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
 If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation.**
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
 Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

Pediatric Tachycardia

Narrow Complex (≤ 0.09 sec)

History

- Past medical history
- Medications or Toxic Ingestion (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

Signs and Symptoms

- Heart Rate: Child $> 180/\text{bpm}$
Infant $> 220/\text{bpm}$
- Pale or Cyanosis
- Diaphoresis
- Tachypnea
- Vomiting
- Hypotension
- Altered Level of Consciousness
- Pulmonary Congestion
- Syncope

Differential

- Heart disease (Congenital)
- Hypo / Hyperthermia
- Hypovolemia or Anemia
- Electrolyte imbalance
- Anxiety / Pain / Emotional stress
- Fever / Infection / Sepsis
- Hypoxia, Hypoglycemia
- Medication / Toxin / Drugs (see HX)
- Pulmonary embolus
- Trauma, Tension Pneumothorax

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable / Serious Signs and Symptoms
AMS, shock, hypotension
HR Typically > 180 Child
HR Typically > 220 Infant

NO

YES

EMR	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Regular Rhythm?

NO

YES

Probable Sinus Tachycardia

Probable SVT

Identify and Treat Underlying Cause

Exit to
Age Appropriate
Protocol(s)

Vagal Maneuvers

Adenosine $0.1 \text{ mg / kg IV / IO}$
Maximum 6 mg

May repeat
Adenosine $0.2 \text{ mg / kg IV / IO}$
Maximum 12 mg

Notify Destination or
Contact Medical Control

Cardioversion Procedure

$0.5 - 1 \text{ J / kg}$
Repeat and increase to 2 J / Kg
Max 2 J/Kg

Consider Pain Control

Ketamine $0.3 \text{ mg/kg IV / IO}$
Infuse or IV push over 10 minutes May repeat in 20 minutes x2 (Max 3 Doses)
Maximum $30 \text{ mg/single dose}$

Ketamine 1 mg/kg IN
Maximum 100mg (1mL) in each nare. May repeat in 5-10 minutes, Max 5mg/kg

OR

Fentanyl $1 \text{ mcg/kg IV / IO / IM / IN}$
May repeat 0.5 mcg/kg every 5 minutes
Maximum 2 mcg/kg

OR

Consider Sedation

Ketamine
 $\text{IV/IO: } 1-2 \text{ mg/kg once}$
 $\text{IN: } 3-5\text{mg/kg; max } 100\text{mg/1ml/nare; may repeat in } 5-10 \text{ mins; max } 5\text{mg/kg}$

$\text{IM: } 5\text{mg/kg once; Max } 500\text{mg/kg}$

OR

Midazolam
 $0.1 - 0.2 \text{ mg/kg}$
 IV / IO / IM / IN
May repeat after 5 minutes
Maximum 10mg

Single lead ECG able to
diagnose and treat arrhythmia
12 Lead ECG not necessary to
diagnose and treat, but
preferred when patient is stable.

AT ANY TIME

Pulseless

Go to
Pediatric Cardiac Arrest
Protocol PC 4

Pediatric Tachycardia

Narrow Complex (≤ 0.09 sec)

Pearls

- **Recommended Exam:** Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro
- **Monomorphic QRS:**
All QRS complexes in a single lead are similar in shape.
- **Polymorphic QRS:**
QRS complexes in a single lead will change from complex to complex.
- Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric pads should be used in children < 10 kg.
- Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.
- **12-Lead ECG:**
12-Lead ECG not necessary to diagnose and treat.
Obtain when patient is stable and/or following rhythm conversion.
When administering adenosine, obtaining a continuous 12-Lead can be helpful to physicians.
- **Unstable condition:**
Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
If at any point patient becomes unstable move to unstable arm in algorithm
If IV or IO access is in place, may administer adenosine and repeat, prior to synchronized cardioversion.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **Serious Signs and Symptoms:**
Respiratory distress / failure.
Signs of shock / poor perfusion with or without hypotension.
AMS
Sudden collapse with rapid, weak pulse
- **Narrow Complex Tachycardia (≤ 0.09 seconds):**
- Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 beats / minute. Children usually < 180 beats / minute.
- SVT: $> 90\%$ of children with SVT will have a narrow QRS (≤ 0.09 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 beats / minute. Children usually > 180 beats / minute.
- Atrial Flutter / Fibrillation
- **Vagal Maneuvers:**
Breath holding. Blowing a glove into a balloon. Have child blow out "birthday candles" or through an obstructed straw. Infants: May put a bag of ice water over the upper half of the face careful not to occlude the airway.
- Separating the child from the caregiver may worsen the child's clinical condition.
- Monitor for respiratory depression and hypotension associated if Midazolam is used.
- Continuous pulse oximetry is required for all SVT Patients if available.
- **IM injection**
Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

Pediatric Tachycardia

Wide Complex (> 0.09 sec)

History

- Past medical history
- Medications or Toxic Ingestion (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

Signs and Symptoms

- Heart Rate: Child > 180/bpm
Infant > 220/bpm
- Pale or Cyanosis
- Diaphoresis
- Tachypnea
- Vomiting
- Hypotension
- Altered Level of Consciousness
- Pulmonary Congestion
- Syncope

Differential

- Heart disease (Congenital)
- Hypothermia/ Hyperthermia
- Hypovolemia or Anemia
- Electrolyte imbalance
- Anxiety/ Pain/ Emotional stress
- Fever/ Infection/ Sepsis
- Hypoxia, Hypoglycemia
- Medication/ Toxin/ Drugs (see HX)
- Pulmonary embolus
- Trauma, Tension Pneumothorax

**Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia**

Unstable / Serious Signs and Symptoms
AMS, shock, hypotension

HR Typically > 180 Child
HR Typically > 220 Infant

NO

YES

EMR	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Regular Rhythm?

NO

YES

Probable Ventricular Tachycardia

If QRS Regular and Monomorphic
Adenosine 0.1 mg / kg IV / IO
Maximum 6 mg

May repeat
Adenosine 0.2 mg / kg IV / IO
Maximum 12 mg

**Expert consultation recommended
for further medication management
and/ or cardioversion procedure**

**Notify Destination or
Contact Medical Control**

Cardioversion Procedure

0.5 – 1 J / kg
Repeat and increase to **2 J / Kg**
Max 2 J/Kg

Consider Pain Control

Ketamine 0.3 mg/kg IV / IO
Infuse or IV push over 10 minutes May repeat in 20 minutes x2 (Max 3 Doses)
Maximum 30 mg/single dose

Ketamine 1 mg/kg IN
Maximum 100mg (1mL) in each nare. May repeat in 5-10 minutes, **Max 5mg/kg**

OR

Fentanyl 1 mcg/kg IV / IO / IM / IN
May repeat 0.5 mcg/kg every 5 minutes
Maximum 2 mcg/kg

OR

Consider Sedation

Ketamine
IV/IO: 1-2 mg/kg once
IN: 3-5mg/kg; max 100mg/1ml/nare; may repeat in 5-10 mins; max 5mg/kg

IM: 5mg/kg once; Max 500mg/kg

OR

Midazolam
0.1– 0.2 mg/kg
IV / IO / IM / IN
May repeat after 5 minutes
Maximum 10mg

**Single lead ECG able to
diagnose and treat arrhythmia**

12 Lead ECG not necessary to
diagnose and treat, but preferred
when patient is stable.

AT ANY TIME

Pulseless

**Go to
Pediatric Cardiac
Arrest Protocol PC 4**

Pediatric Tachycardia

Wide Complex (> 0.09 sec)

Pearls

- **Recommended Exam:** Mental Status, Skin, Neck, Lung, Heart, Abdomen, Neuro
- **Monomorphic QRS:**
All QRS complexes in a single lead are similar in shape.
- **Polymorphic QRS:**
QRS complexes in a single lead will change from complex to complex.
- Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric pads should be used in children < 10 kg.
- Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.
- **12-Lead ECG:**
12-Lead ECG is not necessary to diagnose and treat arrhythmia. A single lead ECG is often all that is needed.
Obtain 12-Lead when patient is stable and/ or following a rhythm conversion.
When administering adenosine, obtaining a continuous 12-Lead can be helpful later to physicians.
- **Unstable condition:**
Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
If at any point patient becomes unstable move to unstable arm in algorithm
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **Serious Signs and Symptoms:**
Respiratory distress/ failure.
Signs of shock/ poor perfusion with or without hypotension.
AMS
Sudden collapse with rapid, weak pulse
- **Wide Complex Tachycardia (≥ 0.09 seconds):**
SVT with aberrancy.
VT: Uncommon in children. Rates may vary from near normal to > 200/ minute.
Most children with VT have underlying heart disease / cardiac surgery/ long QT syndrome/ cardiomyopathy.
Amiodarone 5 mg / kg over 20 – 60 minutes, maximum of 150 mg. Consultation with Medical Control is advised when this agent is considered.
- **Torsade's de Pointes/ Polymorphic (multiple shaped) Tachycardia:**
Rate is typically 150 to 250 beats/ minute.
Associated with long QT syndrome, hypomagnesaemia, hypokalemia, many cardiac drugs.
May quickly deteriorate to VF.
Separating the child from the caregiver may worsen the child's clinical condition.
- Monitor for respiratory depression and hypotension associated if Midazolam is used.
- Continuous pulse oximetry is required for all SVT patients if available.
- **IM injection**
Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

Pediatric Ventricular Fibrillation Pulseless Ventricular Tachycardia

History

- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Airway obstruction
- Hypothermia

Signs and Symptoms

- Unresponsive
- Cardiac Arrest

Differential

- Respiratory failure / Airway obstruction
- Hyper / hypokalemia, Hypovolemia
- Hypothermia, Hypoglycemia, Acidosis
- Tension pneumothorax, Tamponade
- Toxin or medication
- Thrombosis: Coronary / Pulmonary Embolism
- Congenital heart disease

 Pediatric Cardiac Arrest Protocol PC 4

EMR	Refer to CPR Procedure
	Automated Defibrillation Procedure
P	Defibrillation Manual Procedure • First shock: 2 J / Kg • Second shock: 4 J / Kg • Subsequent shocks ≥ 4 J / kg - Maximum 10 J / kg or adult dose
	IV / IO Protocol UP 6
P	Epinephrine 1:10,000 0.01 mg/kg IV / IO Maximum 1mg Repeat every 3 – 5 minutes
	If Rhythm Refractory to defibrillation Continue CPR up to point where you are ready to defibrillate with device charged.
P	Amiodarone 5 mg/kg IV/IO. Max 300 mg OR Lidocaine 1mg/kg IV/IO
P	For Torsades Magnesium sulfate 25 mg/kg/dose IV/IO Max 2g/dose
P	For dialysis or known hyperkalemic patient Sodium bicarbonate 1 meq/kg Slow IV/IO push Maximum 50 meq AND Calcium gluconate 80 mg/kg Slow IV/IO push Maximum 3000 mg (3 grams) **flush IV/IO well between bicarb and calcium**
	Repeat pattern during resuscitation.
M	Notify Destination or Contact Medical Control

AT ANY TIME

Return of
Spontaneous
Circulation



Go to
Post Resuscitation
Protocol

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia
Hypoglycemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Pediatric Ventricular Fibrillation Pulseless Ventricular Tachycardia

Pearls

- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress $\geq 1/3$ anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches.
- Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.
- When advanced airway not in place perform 15 compressions with 2 ventilations.
- Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric pads should be used in children < 10 kg.
- **DO NOT HYPERVENTILATE:**
If advanced airway in place ventilate:
Age < 1 year: 1 breath every 2 seconds with continuous, uninterrupted compressions.
Age ≥ 1 year: 1 breath every 3 seconds with continuous, uninterrupted compressions.
- Patient survival is often dependent on proper ventilation and oxygenation / airway interventions.
- BVM is first line in pediatric patients. Advanced airway should only be considered if unable to successfully ventilate/oxygenate with BVM. BIAD is preferred over ETI if unable to continue BVM.
- **High-Quality CPR:**
Make sure chest compressions are being delivered at 100 – 120 / min.
Make sure chest compressions are adequate depth for age and body habitus.
Make sure you allow full chest recoil with each compression to provide maximum perfusion.
Minimize all interruptions in chest compressions to < 10 seconds.
Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:**
Follow manufacturer's recommendations concerning defibrillation / cardioversion energy when specified.
Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO₂ (EtCO₂)**
If EtCO₂ is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation.**
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

Pediatric Post Resuscitation

History

- Respiratory arrest
- Cardiac arrest

Signs/Symptoms

- Return of pulse

Differential

- Continue to address specific differentials associated with the original dysrhythmia

	Pediatric Airway Protocol(s) AR 4, 5 as needed
	Monitor Vital Signs / Reassess
EMR	Blood Glucose Analysis Procedure
	Optimize Ventilation and Oxygenation • Maintain SpO2 92 – 98% • Advanced airway if indicated • Age Appropriate Respiratory Rate DO NOT HYPERVENTILATE
	ETCO2 ideally 35 – 45 mm Hg
EMR	12 Lead ECG Procedure
	IV or IO Protocol UP 6
P	Cardiac Monitor
	Pediatric Diabetic Protocol PM 2 if indicated
	Pediatric Hypotension / Shock Protocol PM 3 if indicated
	Pediatric Bradycardia Protocol PC 2 if indicated
	Pediatric Tachycardia Protocol PC 5, 6 as indicated

Hypotension Age Based

0 – 31 Days
< 60 mmHg

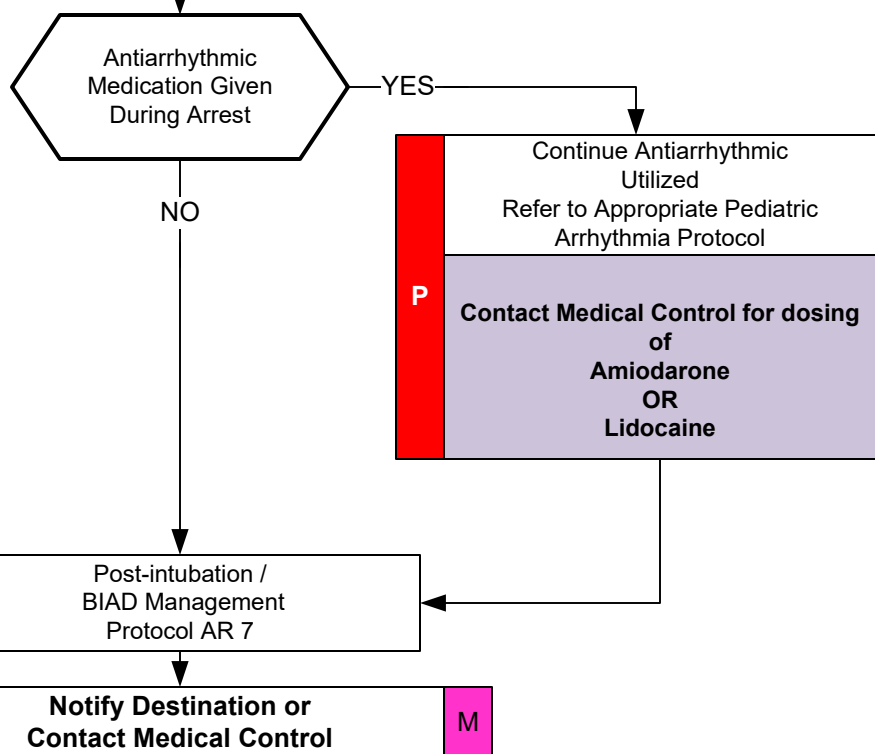
1 Month to 1 Year
< 70 mmHg

> than 1 Year
< 70 + (2 x age) mmHg

Arrhythmias are common and usually self limiting after ROSC



If Arrhythmia Persists follow Rhythm Appropriate Protocol



Pediatric Post Resuscitation

Pearls

- **Recommended Exam:** Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro
- **Goals of care** are to preserve neurologic function, prevent secondary organ damage, treat the underlying cause of illness, and optimize prehospital care. Frequent reassessment is necessary.
- **Hyperventilation** is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided. Titrate FiO_2 to maintain SpO_2 of 92 - 98%.
- **Use length-based or weight-based pediatric resuscitation system** for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.
- **Pain/sedation:**
 - Patients requiring advanced airways and ventilation commonly experience pain and anxiety. Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.
 - Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.
 - Vital signs such as tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.
 - Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.
- **Ventilator / Ventilation strategies:**
 - Tailored to individual patient presentations. Medical Control can indicate different strategies above.
 - In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH₂O.
 - Continuous pulse oximetry and capnography should be maintained during transport for monitoring.
 - Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.
- **EtCO₂ Monitoring:**
 - Initial End tidal CO₂ may be elevated immediately post-resuscitation, but will usually normalize.
 - Goal is 35 – 45 mmHg but DO NOT hyperventilate to achieve.
 - EtCO₂ should be continually monitored with advanced airway in place.
- **Administer resuscitation fluids and vasopressor agents** to maintain SBP at targets listed on page 1. This table represents minimal SBP targets.
- **Refer to transport policy** for appropriate destination.
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post-resuscitation management may best be planned in consultation with Medical Control.

Pediatric Allergic Reaction

History

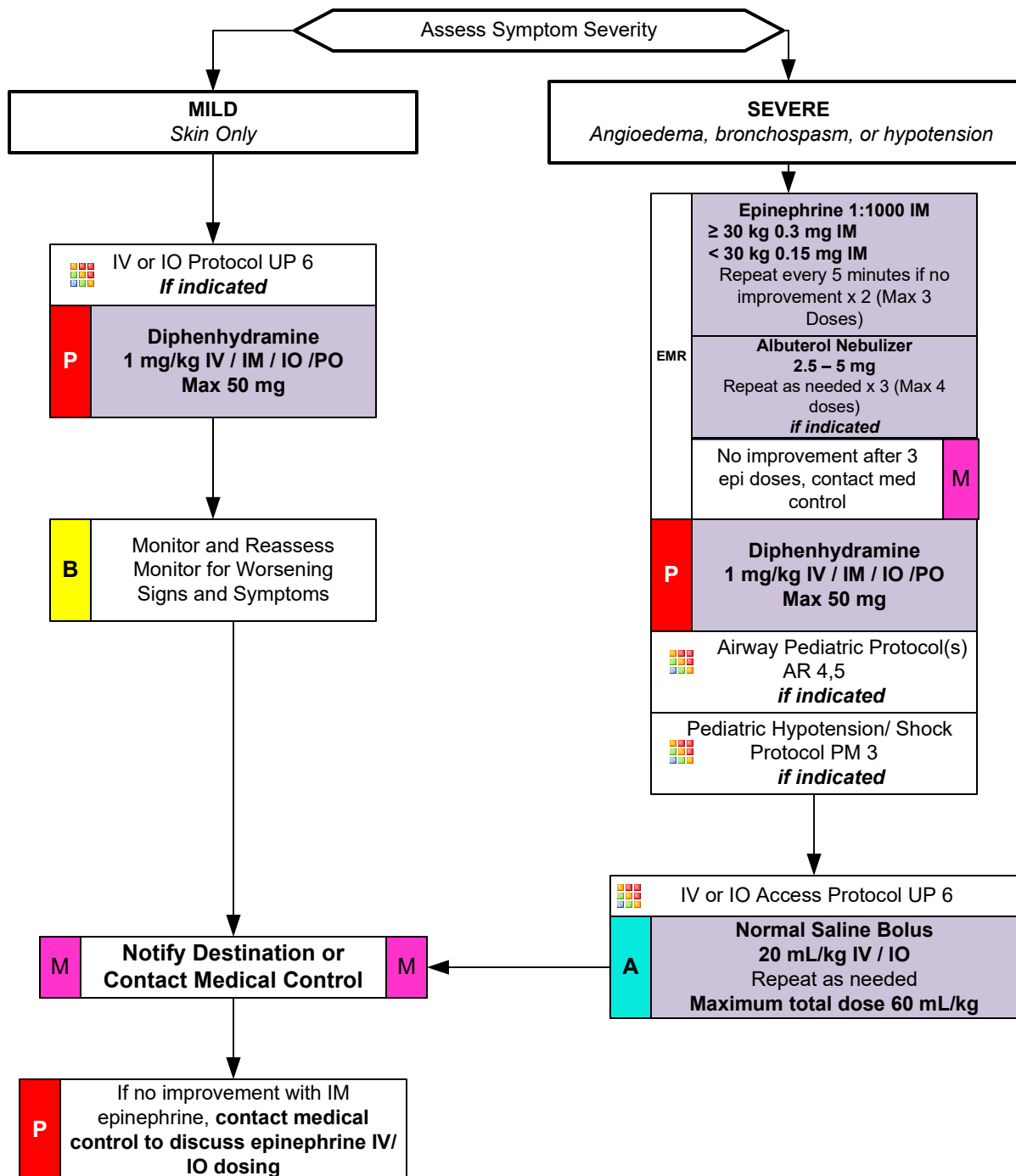
- Onset and location
- Insect sting or bite
- Food allergy/ exposure
- Medication allergy/ exposure
- New clothing, soap, detergent
- Past medical history/ reactions
- Medication history

Signs and Symptoms

- Itching or hives
- Coughing/ wheezing/ respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema
- Nausea/Vomiting

Differential

- Urticaria (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration/ Airway obstruction
- Vasovagal event
- Asthma/ COPD /CHF



Pediatric Allergic Reaction

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine administration:**
Drug of choice and the **FIRST** drug that should be administered in acute anaphylaxis (Moderate/ Severe Symptoms.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.
- **IM injection**
Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)
- **Diphenhydramine administration:**
Diphenhydramine have no proven benefit in Moderate/ Severe anaphylaxis.
Diphenhydramine should **NOT** delay initial or repeat Epinephrine administration.
In Moderate and Severe anaphylaxis, Diphenhydramine may decrease mental status.
Diphenhydramine should **NOT** be given to a patient with decreased mental status and/ or a hypotensive patient as this may cause nausea, vomiting, and/ or worsening mental status.
- **Anaphylaxis unresponsive to repeat doses of IM epinephrine may require IV epinephrine administration by IV push or epinephrine infusion. Contact Medical Control for appropriate dosing.**
- **Symptom Severity Classification:**
Mild symptoms:
Flushing, hives, itching, erythema with normal blood pressure and perfusion.
Severe symptoms:
Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash/ skin involvement.**
- **Angioedema** is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in -il.
- **Hereditary Angioedema** involves swelling of the face, lips, airway structures, extremities, and may cause moderate to severe abdominal pain. Some patients are prescribed specific medications to aid in reversal of swelling. **Paramedic may assist or administer this medication per patient/ package instructions.**
- **Fluids and Medication titrated to maintain a SBP $>70 + (\text{age in years} \times 2)$ mmHg.**
- **Patients with moderate and severe reactions should receive a 12-Lead ECG and should be continually monitored, but this should NOT delay administration of epinephrine.**
- **The shorter the onset from exposure to symptoms the more severe the reaction.**

Pediatric Diabetic

History

- Past medical history
- Medications
- Recent blood glucose check
- Last meal

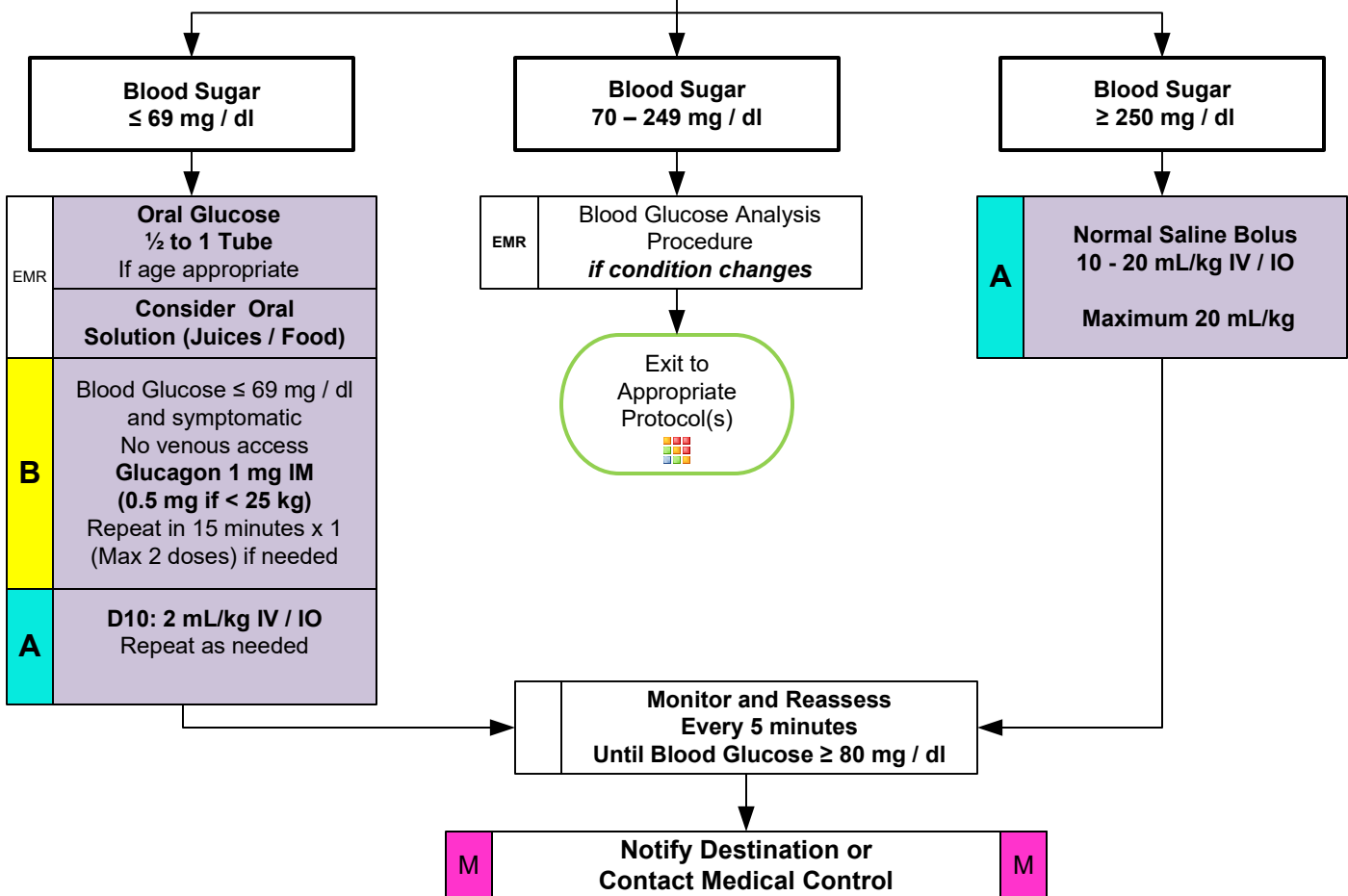
Signs and Symptoms

- Altered mental status
- Combative/ irritable
- Diaphoresis
- Seizures
- Abdominal pain
- Nausea/ vomiting
- Weakness
- Dehydration
- Deep/ rapid breathing

Differential

- Alcohol/ drug use
- Toxic ingestion
- Trauma; head injury
- Seizure
- CVA
- Altered baseline mental status.

EMR	Blood Glucose Analysis Procedure
	12 Lead ECG Procedure <i>if indicated</i>
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Hypotension/ Shock Protocol PM 3 <i>if indicated</i>
	Seizure Protocol UP 13 <i>if indicated</i>



Pediatric Diabetic

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Respirations and effort, Abdomen, Neuro.**
- **Patients with prolonged hypoglycemia or those who are malnourished may not respond to glucagon.**
- **Do not administer oral glucose to patients that are not able to swallow or protect their airway.**
- **Quality control checks should be maintained per manufacturers recommendation for all glucometers.**
- **IM injection**

Preferred location is lateral thigh (maximum 5 ml/dose) with alternate site deltoid (maximum 2 ml/dose)

- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**

Blood sugar must be ≥ 80 , patient has ability to eat and availability of food with responders on scene.

Patient must have known history of diabetes and not taking any sulfonylureas. Sulfonylureas:
Tolbutamide (Orinase)- Glimeperide (Amaryl)- Glipizide (Glucotrol)- Glyburide (Microns, DiaBeta, Glynase PresTab)- Repaglinide (Prandin)- Nateglinide (Starlix)- Exenatide (Byetta)- Liraglutide (Victoza)

Patient returns to normal mental status and has a normal neurological exam with no new neurological deficits. See Universal Patient Care Protocol UP-1.

Patient must be left in the presence/care of a responsible adult- especially if telephone sign off acquired and parent/guardian is not present on scene.

- **Hypoglycemia with Oral Agents:**

Patients taking sulfonylureas should be strongly encouraged to allow transportation to a medical facility.

They are at risk of recurrent hypoglycemia that can be delayed for hours and require close monitoring even after normal blood glucose is established.

Not all oral agents have prolonged action so Contact Medical Control for advice.

Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.

- **Hypoglycemia with Insulin Agents:**

Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established.

Not all insulins have prolonged action so Contact Medical Control if in doubt. Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.

Pediatric Hypotension/ Shock

History

- Blood loss
- Fluid loss
- Vomiting
- Diarrhea
- Fever
- Infection

Signs and Symptoms

- Restlessness, confusion, weakness
- Dizziness
- Tachycardia
- Hypotension (Late sign)
- Pale, cool, clammy skin
- Delayed capillary refill
- Dark-tarry stools

Differential

- Shock
 - Hypovolemic
 - Cardiogenic
 - Septic
 - Neurogenic
 - Anaphylactic
- Trauma
- Infection
- Dehydration
- Congenital heart disease
- Medication or Toxin

EMR	Blood Glucose Analysis Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Pediatric Airway Protocol(s) AR 4, 5 <i>if indicated</i>
	Diabetic Protocol PM 2 <i>if indicated</i>

Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60
 Ages ≥ 1 month: SBP < 70
 Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90
 Ages ≥ 65: SBP < 110

All ages Shock Index:
 HR > SBP

History and Exam Suggest Type of Shock

Cardiogenic

Chest Pain: Cardiac and STEMI
 Protocol AC 4
 Appropriate Pediatric Arrhythmia Protocol(s) PC 1, 2, 5-7
if indicated

A Normal Saline Bolus
 5 – 10 mL / kg IV / IO
 Titrate to age appropriate
 SBP ≥ 70 + (2 x Age)
 Maximum 10 mL / kg

Hypovolemic

Pediatric Allergy Protocol PM 1
if indicated

Suspected Sepsis Protocol UP 15
if indicated

Multiple Trauma Protocol TB 6
if indicated

Hemorrhagic Shock Protocol AM 7
if indicated

A Normal Saline Bolus
 20 mL / kg IV / IO
 Titrate to age appropriate
 SBP ≥ 70 + (2 x Age)
 Maximum 60 mL / kg

P Norepinephrine
 0.05-0.1mcg/kg/min
 Max 2mcg/kg/min
 Titrate to SBP > 70 + (2 x age)

M Notify Destination or Contact Medical Control **M**

Distributive

Obstructive

P Chest Decompression-Needle Procedure
if indicated

Hypotension/ Shock

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Consider all possible causes of shock and treat per appropriate protocol. Majority of decompensation in pediatrics is airway or respiratory related.
- Decreasing heart rate and hypotension occur late in children and are signs of impending cardiac arrest.
- Shock may be present with a normal blood pressure initially or even elevated.
- Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the first and only sign.
- Consider all possible causes of shock and treat per appropriate protocol.
- **Hypovolemic Shock:**
Hemorrhage, trauma, GI bleeding, or pregnancy-related bleeding.
- **Cardiogenic Shock:**
Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventricle/ septum/ valve/ toxins.
- **Distributive Shock:**
Septic/ Anaphylactic/ Neurogenic/ Toxic
Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.
- **Obstructive Shock:**
Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.
- **Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:**
Body cannot produce enough steroids (glucocorticoids/ mineralocorticoids.)
May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate.
May administer prescribed steroid carried by patient IM / IV / IO as long as administration route is within EMS providers scope of practice and with medical control approval.

Patient may have Hydrocortisone (Cortef or Solu-Cortef).
Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by patient's physician.

Blast Injury/ Incident

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history/ Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

Signs and Symptoms

- Hearing loss (TM rupture)
- Ocular burns/vision changes
- Multiple trauma/ penetrating trauma
- Hypotension/ shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing
- Pneumothorax/ hemothorax
- Traumatic amputation (tourniquet)

Differential

- Thermal / Chemical / Electrical Burn Injury
 - Superficial (1st Degree) red – painful (Don't include in TBSA)
 - Partial Thickness (2nd Degree) blistering
 - Full Thickness (3rd Degree) painless/charred or leathery skin
- Radiation injury

Nature of Device: Agent/ Amount. Industrial Explosion. Terrorist Incident. Improvised Explosive Device.

Method of Delivery: Incendiary/ Explosive

Nature of Environment: Open / Closed.

Distance from Device: Intervening protective barrier. Other environmental hazards,

Evaluate for: Blunt Trauma/ Crush Injury/ Compartment Syndrome/ Traumatic Brain Injury/ Concussion/ Tympanic Membrane Rupture/ Abdominal hemorrhage or Evisceration, Blast Lung Injury and Penetrating Trauma.

Scene Safety/ Quantify number and Triage Patients/ Load and Go with Assessment/ Treatment Enroute

Call for help/ additional resources
Stage until scene safe

Accidental/ Intentional Explosions
(See Pearls)

	Triage Protocol UP 2 as indicated
	Age Appropriate Airway Protocol(s) AR 1 - 7 as indicated
	Multiple Trauma Protocol TB 6 if indicated
	IV and IO Access Protocol UP 6 if indicated
P	Cardiac Monitor if indicated
	Thermal Burn Protocol TB 9 Chemical and Electrical Burn Protocol TB 2 if indicated
	Crush Injury Protocol TB 3 if indicated
	Radiation Incident Protocol TB 7 if indicated
	Decontamination Procedure if indicated
	Pain Control Protocol UP 11 if indicated

Blast Lung Injury

YES

Age Appropriate
Airway Protocol(s) AR 3, 6
as indicated

NO

Rapid Transport to appropriate destination using
Transport Policy

**Notify Destination or
Contact Medical Control**

Blast Injury/ Incident

Pearls

- **Types of Blast Injury:**

Primary Blast Injury: From the blast pressure (air) wave.
Secondary Blast Injury: Impaled objects. Debris which becomes missiles/ shrapnel.
Tertiary Blast Injury: Patient falling or being thrown/ pinned by debris.
Most Common Cause of Death: Secondary Blast Injuries.

- **Triage of Blast Injury patients:**

Blast Injury patients with burn injuries should be triaged using the Thermal Burn/ Chemical and Electrical Burn Protocol Guidelines for Critical/ Serious/ Minor Trauma and Burns and the Transport Policy.
Patients may be hard of hearing due to tympanic membrane rupture.

- **Care of Blast Injury Patients:**

Patients may suffer multi-system injuries including blunt and penetrating trauma, shrapnel, barotrauma, burns, and toxic chemical exposure.
Consider airway burns, which should prompt early and aggressive airway management as indicated.
Cover open chest wounds with semi-occlusive dressing or commercial chest seal product.
Minimize IV fluids resuscitation in patients with no signs of shock or poor perfusion.

- **Blast Lung Injury:**

Blast Lung Injury is characterized by respiratory difficulty and hypoxia. Can occur (rarely) in patients without external thoracic trauma. More likely to occur in an enclosed space or in close proximity to explosion.
Symptoms: Dyspnea, hemoptysis, cough, chest pain, wheezing, and hemodynamic instability.
Signs: Apnea, tachypnea, hypopnea, hypoxia, cyanosis, and diminished breath sounds.
Air embolism should be considered and patient transported in left-lateral decubitus position.
Blast Lung Injury patients may require early intubation but positive pressure ventilation may worsen the injury, avoid hyperventilation, which can cause further injury.
Air transport may worsen lung injury, monitor oxygenation and ventilation closely. Tension pneumothorax may occur requiring chest decompression. Be judicious with fluids as volume overload may worsen lung injury.

- **Accidental Explosions or Intentional Explosions:**

All explosions or blasts should be considered intentional until determined otherwise.

Greatest concern is potential threat for a secondary device.

Attempt to determine the source of the blast to include any potential threat for aerosolization of hazardous materials.
Evaluate scene safety including the source of the blast, which may continue to spill explosive liquids or gases.
Consider structural collapse, environmental hazard, and fire.

Conditions that led to the initial explosion may reoccur and lead to a second explosion.

Patients who are physically able, typically move away from the explosive source.

Evaluate surroundings for suspicious items; unattended backpacks or packages, or unattended vehicles.

If patient(s) is unconscious or there is fatalities and you are evaluating patient(s) for signs of life:

Before moving, note if there are wires coming from the patient(s), or if it appears the patient(s) is lying on a package/ pack, or bulky item. If so, do not move the patient(s), quickly back away and immediately notify a law enforcement officer.

If there are no indications the patient is connected to a triggering mechanism for a secondary device, expeditiously remove the patient(s) from the scene and begin transport to the hospital.

Protect the airway and cervical spine, however beyond the primary survey, care and a more detailed assessment should be deferred until rapid transport begins.

If there are signs the patient was carrying the source of the blast, notify law enforcement immediately, and most likely a law enforcement officer will accompany your patient to the hospital.

Chemical and Electrical Burn

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history/ Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

Signs and Symptoms

- Burns, pain, swelling
- Ocular burns/ vision changes
- Loss of consciousness
- Hypotension/ shock
- Compartment syndrome
- Airway compromise/ distress could be indicated by hoarseness/ wheezing
- Electrical burn may be misleading with small contact/ external burn and major internal injury – burn/ trauma center transport is recommended

Differential

- Thermal / Chemical / Electrical Burn Injury
 - Superficial (1st Degree) red – painful (Don't include in TBSA)
 - Partial Thickness (2nd Degree) blistering
 - Full Thickness (3rd Degree) painless/charred or leathery skin
- Radiation injury
- Blast injury

Assure Chemical Source is NOT Hazardous to Responders.
Assure Electrical Source is NO longer in contact with patient before touching patient.

Assess Burn/ Concomitant Injury Severity

< 5% TBSA partial/full thickness (2nd/3rd Degree) Burn
 No inhalation injury, Not Intubated,
 Normotensive
 GCS 14 or Greater
 Minor Burn

5-15% TBSA partial/full thickness (2nd/3rd Degree) Burn
 When reasonably accessible, transport to a Burn Center
 Serious Burn

>15% TBSA partial/full thickness (2nd/3rd Degree) Burn
 When reasonably accessible, transport to a Burn Center
 Critical Burn

	Age Appropriate Airway Protocol(s) AR 1 - 7 <i>if indicated</i>	
	IV or IO Access Protocol UP 6 Consider 2 IV sites if $\geq 15\%$ TBSA	
	Thermal Burn Protocol TB 9	
	Pain Control Protocol UP 11 <i>if indicated</i>	
	Identify Contact Points	
	<u>Eye Involvement</u> Irrigate Involved Eye(s) with Normal Saline for 30 minutes Continue irrigation during transport	
	<u>Chemical Exposure/ Burn</u> Flush Contact Area with Normal Saline for 15 minutes Continue irrigation during transport	
	Decontamination Procedure <i>if indicated</i>	
	Rapid Transport to appropriate destination using <u>Transport Policy</u>	
M	Notify Destination or Contact Medical Control	M

Chemical and Electrical Burn

Pearls

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Green, Yellow, and Red in burn severity do not apply to the Triage System.**
- **Refer to Rule of Nines.**

- **Transport and Destination:**

In general, chemical and electrical burns should be transported to a burn center.

When EMS transport to burn center is limited, transport to and stabilization at local facility is appropriate.

Burns with inhalation injury should be transported to the closest most appropriate facility.

Burns with multiple trauma should be transported to a trauma center per Transport Policy.

- **Chemical Burns:**

Refer to Decontamination Procedure.

With dry powders/ substances, gently brush or wipe off prior to irrigation. Do not aerosolize by brushing too vigorously. Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation and use tap water. Other water sources may be used based on availability.

Flush the area as soon as possible with the cleanest, most readily available water or saline solution and use copious amounts of fluids.

Flush contact area for a minimum of 15 minutes and continue until arrival at receiving facility.

Hydrofluoric acid burns:

Monitor ECG for prolonged QT intervals which can be sign of hypocalcemia.

Eye involvement:

Irrigation is recommended for a minimum of 30 minutes and continue until arrival at receiving facility.

- **Electrical Burns:**

Remember the extent of the obvious external burn from an electrical source does not always reflect more extensive internal damage. Small external injury may have large internal injury.

Do not refer to wounds as an entry and exit wound.

DO NOT contact patient until you are certain the source of the electrical shock is disconnected.

Attempt to locate contact points (generally there will be two or more.) A point where the patient contacted the source and a point(s) where the patient is grounded.

Sites will generally be full thickness (3rd degree).

Cardiac Monitor: Anticipate ventricular or atrial irregularity including VT, VF, atrial fibrillation, and/ or heart blocks.

Attempt to identify the nature of the electrical source (AC or DC), the amount of voltage, and the amperage the patient may have been exposed to during the electrical shock.

Lightning strike:

Lightning strike victims are amenable to airway, breathing, cardiac compressions, as well as early defibrillation.

Use concept of reverse triage with multiple casualties. Resuscitate lightning strikes as the priority.

Lightning strike victims found alive do not often deteriorate quickly.

Crush Syndrome Trauma

History

- Entrapped and crushed under heavy load > 30 minutes
- Extremity / body crushed
- Building collapse, trench collapse, industrial accident, pinned under heavy equipment

Signs and Symptoms

- Hypotension
- Hypothermia
- Abnormal ECG findings
- Pain
- Anxiety

Differential

- Entrapment without crush syndrome
- Vascular injury with perfusion deficit
- Compartment syndrome
- Altered mental status

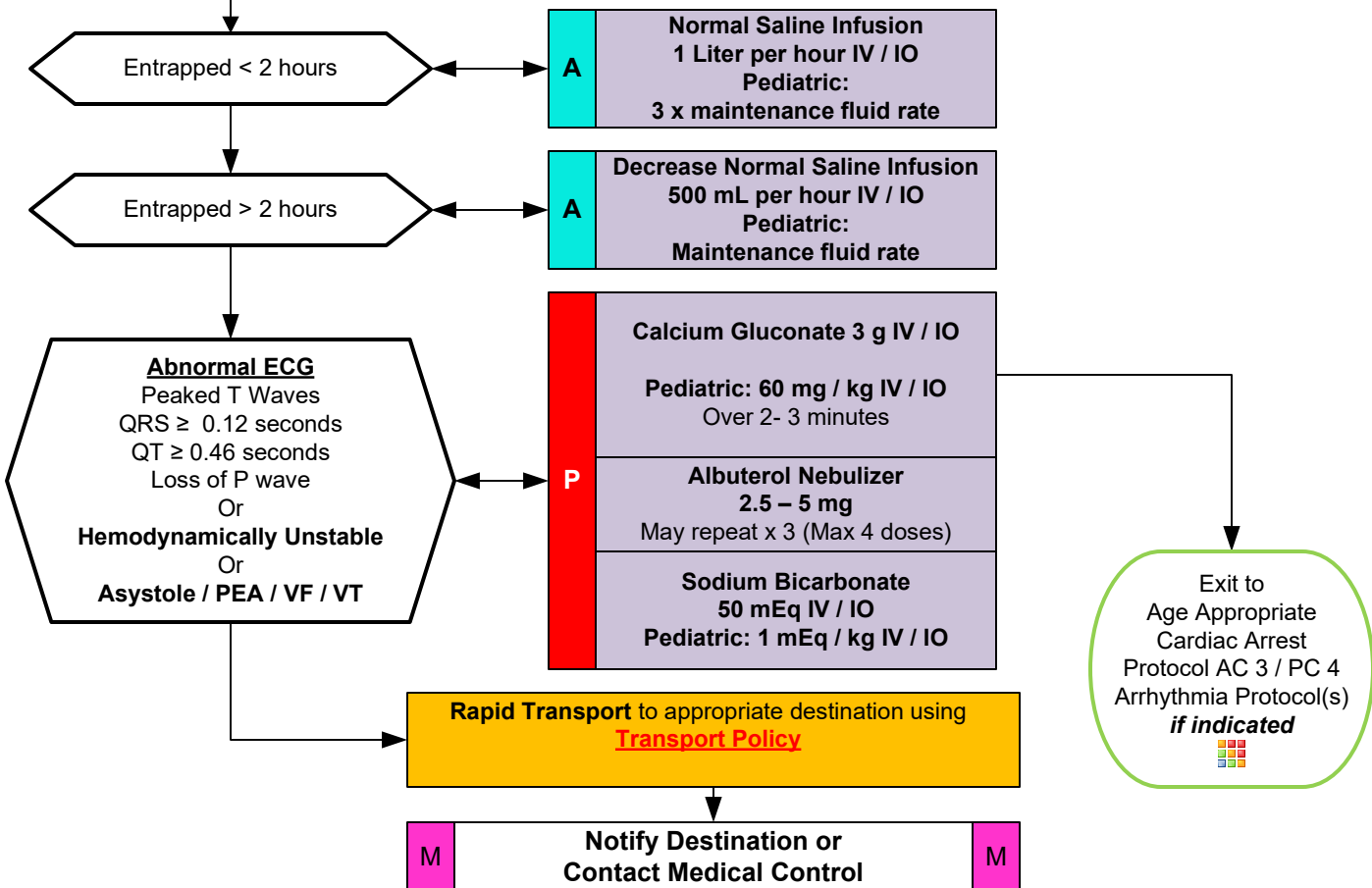
	Age Appropriate Airway Protocol(s) AR 1 - 7 as indicated
EMR	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Multiple Trauma Protocol TB 6 if indicated
	Thermal Burn Protocol TB 9 Chemical and Electrical Burn Protocol TB 2 if indicated
	Pain Control Protocol UP 11 as indicated
	Hemorrhagic Shock Protocol AM 7 if indicated

Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60
Ages ≥ 1 month: SBP < 70
Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90
Ages ≥ 65: SBP < 100

All ages:
Shock Index HR > SBP



Crush Syndrome Trauma

Pearls

- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
 - **Scene safety is of paramount importance as typical scenes may pose hazards to rescuers. Call for appropriate resources.**
 - **Crush Injury is a localized crush injury with systemic signs and symptoms causing muscle breakdown and release of potentially toxic muscle cell components and electrolytes into the circulation.**
 - **Crush syndrome typically manifests after 1 – 4 hours of crush injury.**
 - **Fluid resuscitation strategy:**
 - If possible, administer IV / IO fluids prior to release of crushed body part, especially with crush > 1 hour.
 - If access to patient and initiation of IV / IO fluids occurs after 2 hours, give 2 liters of IV fluids in adults and 20 mL/kg of IV fluids in pediatrics, and then begin > 2 hour dosing regimen.
 - **If not able to perform IV / IO fluid resuscitation immediately, place tourniquet on crushed limb until IV / IO fluids can be initiated (even if tourniquet is not being used for hemorrhage control).**
 - **Pediatric IV Fluid maintenance rate:**
 - 4 mL for the first 10 kg of weight +
 - 2 mL for the second 10 kg of weight +
 - 1 mL for every additional kg in weight after 20 kg
- Example: 28 kg pediatric**

First 10 kg:	4 mL/kg/hr = 40 mL/hr
Second 10 kg:	2 mL/kg/hr = 20 mL/hr
Final 8 Kg:	1 mL/kg/hr = 8 mL/hr
Total: 68 mL/hr rate	
- **Consider all possible causes of shock and treat per appropriate protocol.**
 - **Majority of decompensation in pediatrics is airway or respiratory related.**
 - **Decreasing heart rate and hypotension occur late in children and are signs of impending cardiac arrest.**
 - **Shock may be present with a normal blood pressure initially or even elevated.**
 - **Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only sign.**
 - **Patients may become hypothermic even in warm environments. Maintain warmth.**
 - **Hyperkalemia from crush syndrome can produce ECG changes described in protocol, but may also be a bizarre, wide complex rhythm. Wide complex rhythms should also be treated using the VF/ Pulseless VT Protocol if indicated (AC 9 VF Pulseless VT Protocol and/ or PC 7 Pediatric VF Pulseless VT Protocol).**

Extremity Trauma

History

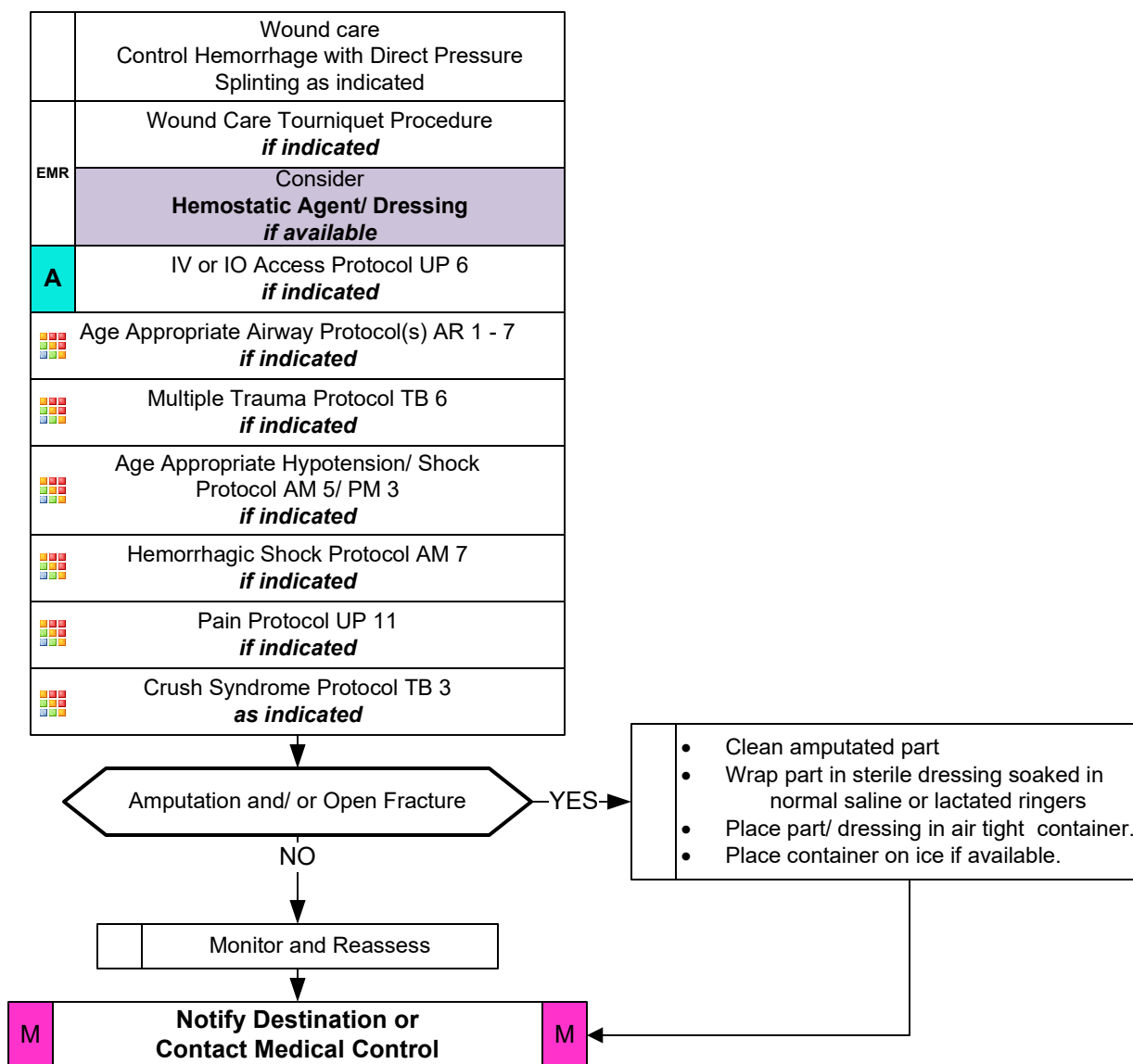
- Type of injury
- Mechanism: crush/ penetrating/ amputation
- Time of injury
- Open vs. closed wound / fracture
- Wound contamination
- Medical history
- Medications

Signs and Symptoms

- Pain and/ or swelling
- Deformity
- Altered sensation/ motor function
- Diminished pulse/ capillary refill
- Decreased extremity temperature

Differential

- Abrasion
- Contusion
- Laceration
- Sprain
- Dislocation
- Fracture
- Amputation



Pearls

- **Recommended Exam: Mental Status, Extremity, Neuro, Perfusion**
- Peripheral neurovascular status is important to assess and document, as well as time of assessment.
- In amputations, time is critical. Transport and notify medical control immediately, so that the appropriate destination can be determined.
- Hip dislocations as well as knee and elbow fracture/ dislocations have a high incidence of vascular compromise.
- Urgently transport any injury with neurological or vascular compromise.
- Blood loss may be concealed or not apparent with extremity injuries.
- Lacerations optimally should be evaluated for repair within 6 hours from the time of injury.
- **Multiple casualty incident: Tourniquet Procedure may be considered first instead of direct pressure.**

Head Trauma

History

- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications
- Evidence for multi-trauma

Signs and Symptoms

- Pain, swelling, bleeding
- Altered mental status
- Unconscious
- Respiratory distress/ failure
- Vomiting
- Major traumatic mechanism of injury
- Seizure

Differential

- Skull fracture
- Brain injury (Concussion, Contusion, Hemorrhage or Laceration)
- Epidural hematoma
- Subdural hematoma
- Subarachnoid hemorrhage
- Spinal injury
- Abuse

	Age Appropriate Airway Protocol(s) AR 1 - 7 <i>if indicated</i>
	Obtain and Record GCS
EMR	Supplemental oxygen Airway adjuncts as needed Preferably $\geq 92 - 98\%$
	Prevent Oxygen desaturation events $< 90\%$
B	Blood Glucose Analysis Procedure
	Maintain EtCO ₂ 35 – 45 mmHg
A	IV or IO Access Protocol UP 6 <i>if indicated</i>
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Multiple Trauma Protocol TB 6 <i>if indicated</i>
	Age Appropriate Hypotension/ Shock Protocol AM 5/ PM 3 <i>if indicated</i>
	Seizure Protocol UP 13 <i>if indicated</i>
	Spinal Motion Restriction Protocol TB 8 <i>if indicated</i>
	Pain Control Protocol UP 11 <i>if indicated</i>
	Monitor and Reassess

Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60
 Ages ≥ 1 month: SBP < 70
 Age 1 – 9: SBP $< 70 + (2x \text{ Age})$

Ages 10 – 64: SBP < 90
 Ages ≥ 65 : SBP < 110

All ages Shock Index:
 HR $>$ SBP

Hyperventilation:

Hyperventilation is NOT recommended in patients who require BVM, BIAD, or ETT.

Maintain ventilation rate to target
 EtCO₂ of 35 – 45 mmHg
See Pearls

Maintain oxygenation to target SpO₂
 of 92 – 98%
 (Near 100% if possible)

Rapid Transport to appropriate destination
 using
Transport Policy

Notify Destination or
 Contact Medical Control

Head Trauma

Pearls

- **Recommended Exam:** Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro
- **Hypoxia:**
Single episode of hypoxia can worsen head injury and double mortality.
Maintain SpO₂ preferable between 92 – 98%, but 100% if possible.
- **Hyperventilation in head injury requiring advanced airway:**
Hyperventilation lowers CO₂ and causes vasoconstriction leading to increased intracranial pressure (ICP).
Hyperventilation is not recommended and can worsen the brain injury.
In patients requiring BVM, BIAD, or endotracheal tube, titrate ventilation rate to EtCO₂ between 35 - 45 mmHg.
Recommended ventilation rates with advanced airways:
Infant/ Toddler: 25 breaths / minute
Children: 20 Breaths / minute
Adolescents/ Adults: 10 – 12 Breaths / minute
- **Hypotension:**
Episodes of hypotension can worsen head injury and increase mortality:
In adults, target SBP is at least 90 - 100 mmHg.
In pediatrics, target SBP is at least > 70 + (2 x the age in years).
Usually indicates shock unrelated to the head injury and should be aggressively treated, otherwise limit fluid administration.
- **GCS**
Key performance measure used in the EMS for trauma care (See chart below)
Serial assessments of GCS with ongoing assessments should be performed.
- **Sedation Considerations**
Sedation of patients with head injuries should not be routinely performed.
If patient is significantly agitated where evaluation and treatment cannot be safely performed, consider performing BARS scale and assessing need for sedation utilizing Universal protocols UP 17-19.
- **Do not place in Trendelenburg position as this may increase ICP and worsen blood pressure.**
- **Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).**
- **Consider Restraints if necessary for patient's and/ or personnel's protection per the Restraints: Physical/Chemical procedure.**
- **Concussions:**
Traumatic brain injuries involving any of a number of symptoms including confusion, loss of consciousness, vomiting, or headache.
Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.
EMS Providers should not make return-to-play decisions when evaluating an athlete with suspected concussion. This is outside the scope of practice.

Eye Opening Response	Verbal Response	Motor Response
4 = Spontaneous	5 = Oriented	6 = Obeys commands
3 = To verbal stimuli	4 = Confused	5 = Localizes pain
2 = To pain	3 = Inappropriate words	4 = Withdraws from pain
1 = None	2 = Incoherent	3 = Flexion to pain or decorticate
	1 = None	2 = Extension to pain or decerebrate
		1 = None

Multiple Trauma

History

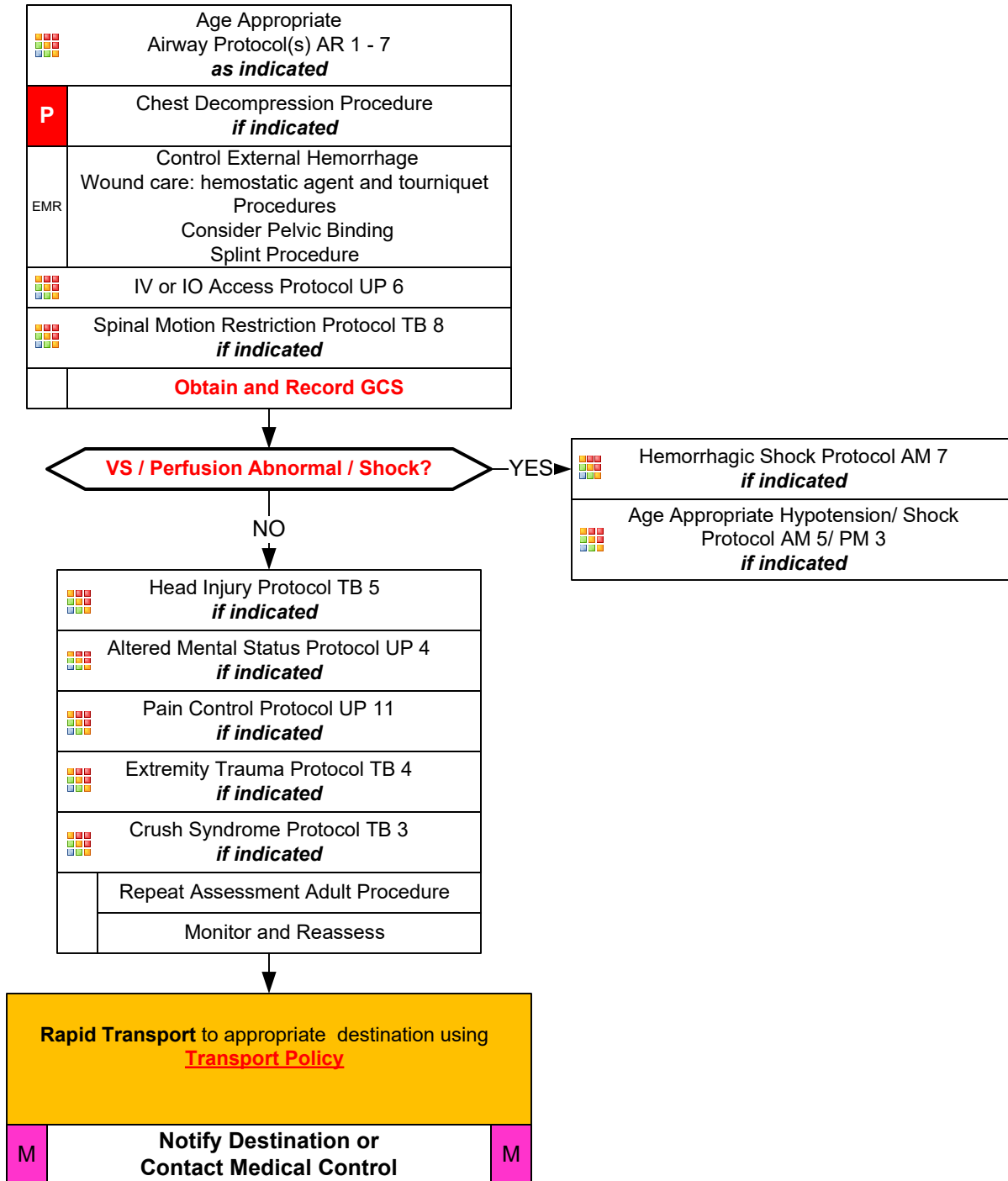
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints/ protective equipment
- Past medical history
- Medications

Signs and Symptoms

- Pain, swelling
- Deformity, lesions, bleeding
- Altered mental status or unconscious
- Hypotension or shock
- Arrest

Differential (Life threatening)

- Uncontrolled hemorrhage
- Airway obstruction/ deformity
- Chest:
 - Tension pneumothorax
 - Flail chest/ Open chest wound
 - Pericardial tamponade/ Hemothorax
- Head Trauma Protocol TB 5
- Intra-abdominal bleeding
- Pelvis/ Femur/ Extremity fracture
- Spine fracture/ Cord injury
- Hypothermia



Multiple Trauma

Pearls

- **Recommended Exam:** Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro
- **Items in Red Text** are key performance measures used in trauma care.
- **Scene time** should not be delayed for procedures and all should be performed during rapid transport of unstable patients.
- **Ask all patients** if they are taking any anticoagulants and report during facility transition of care.
- **Airway:**
 - BVM and BIAD are acceptable for airway management to maintain SpO₂ of 92 – 98%.
 - Endotracheal intubation, if performed, should be completed during transport and should not delay scene time.
- **Breathing:**
 - Consider bilateral Chest Decompression with signs of shock and/ or injury to torso with evidence of tension pneumothorax.
- **Circulation:**
 - Control external hemorrhage and prevent hypothermia by keeping patient warm.
 - IV or IO access should be established during rapid transport of unstable patients.
- **Head Injury with multiple trauma (Refer to Head Trauma Protocol TB 5):**
 - Higher SBP targets are needed to maintain cerebral perfusion pressure.
 - Single episodes of Hypotension and/ or hypoxia are associated with worse outcomes in head injured patients.
 - Adult SBP target is ≥ 100 mmHg and MAP ≥ 65 .
 - Pediatric SPB target is $\geq 70 + 2(\text{Age})$ mmHg and MAP ≥ 65
- **Trauma Triad of Death:**
 - Metabolic acidosis/ Coagulopathy/ Hypothermia
 - Address by appropriate resuscitation measures and keeping patient warm, regardless of ambient temperature, which helps to treat metabolic acidosis, coagulopathy, and hypothermia.
- **Trauma in Pregnancy:**
 - Providing optimal care for the mother = optimal care for the fetus.
 - After 20 weeks gestation (fundus at or above umbilicus) transport patient on left side with 10 – 20° of elevation.
- **Geriatric Trauma:**
 - **Age ≥ 65 : SBP < 110 mmHg or HR $> \text{SBP}$ may indicate shock.**
 - Evaluate with a high index of suspicion, occult injuries difficult to recognize and with unexpected patient decompensation.
 - Risk of death with trauma increases after age 55.
 - Low impact mechanisms, such as ground level falls might result in severe injury especially in age over 65.
- Maintain high-index of suspicion for domestic violence or abuse, pediatric non-accidental trauma, or geriatric abuse.
- Severe bleeding from an extremity, not rapidly controlled with direct pressure, needs application of a tourniquet.

Radiation Incident

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history/ Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

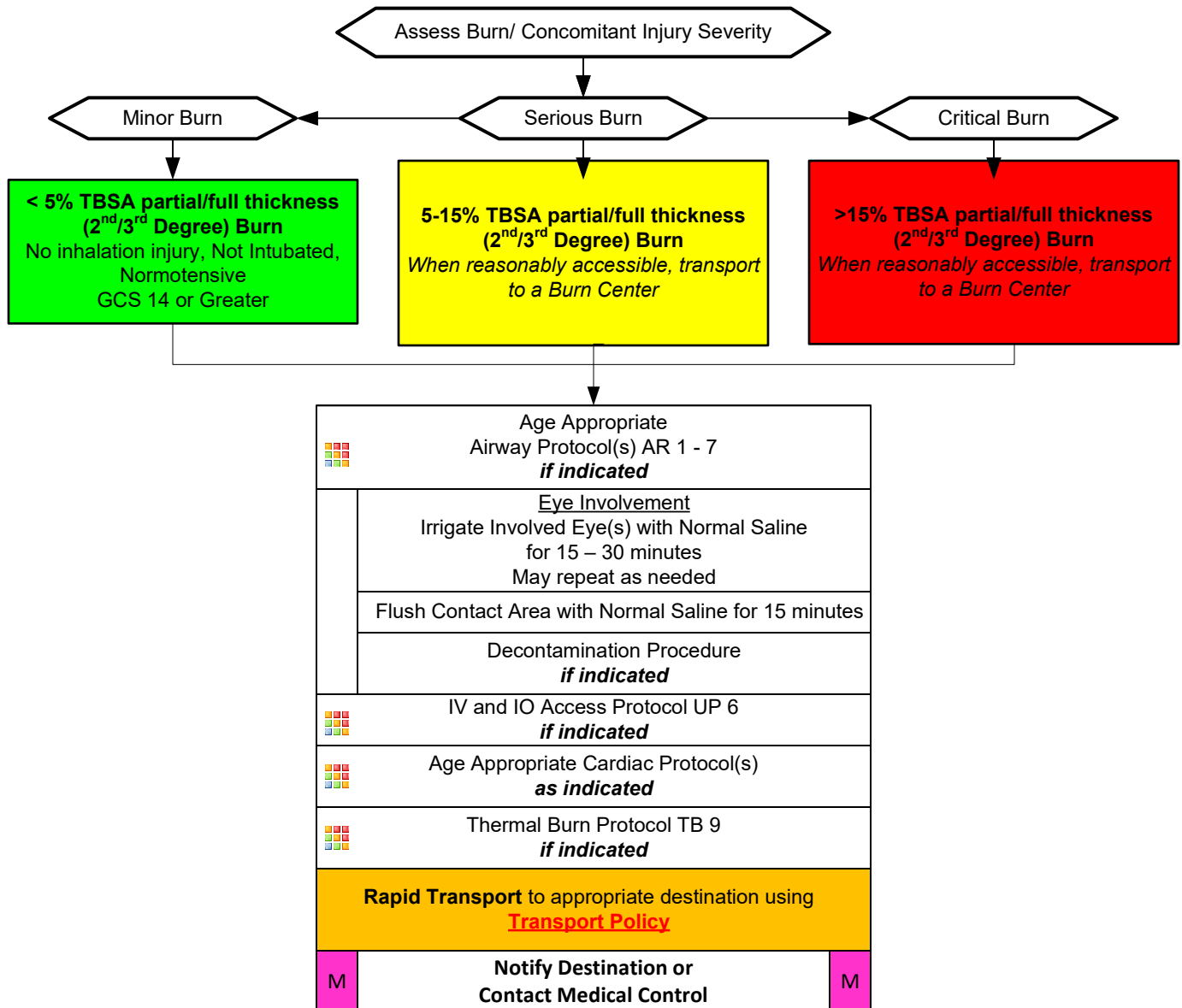
Signs and Symptoms

- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/ distress could be indicated by hoarseness/ wheezing
- Hypotension
- Thermal or Chemical Injury

Differential

- Thermal / Chemical / Electrical Burn Injury
 - Superficial (1st Degree) red – painful (Don't include in TBSA)
 - Partial Thickness (2nd Degree) blistering
 - Full Thickness (3rd Degree) painless/charred or leathery skin

Scene Safety / Quantify number and Triage Patients/ Load and Go with Assessment/ Treatment Enroute



Collateral Injury: Most all injuries immediately seen will be a result of collateral injury, such as heat from the blast, trauma from concussion, treat collateral injury based on typical care for the type of injury displayed.

Qualify: Determine exposure type; external irradiation, external contamination with radioactive material, internal contamination with radioactive material.

Quantify: Determine exposure (generally measured in Grays/Gy). Information may be available from those on site who have monitoring equipment, do not delay transport to acquire this information.

Radiation Incident

Time Phases of Radiation Injury
(Exposure Dose vs Clinical Outcome)

Exposure Dose (Gy)	Prodrome Severity	Manifest Illness - Symptom Severity			Prognosis
		Hematologic	Gastrointestinal	Neurologic	
0.5 to 1.0	+	+	0	0	Survival almost certain
1.0 to 2.0	+/++	+	0	0	Survival >90 percent
2.0 to 3.5	++	++	0	0	Probable survival
3.5 to 5.5	+++	+++	+	0	Death in 50% at 3.5 to 6 wks
5.5 to 7.5	+++	+++	++	0	Death probable in 2-3 wks
7.5 to 10	+++	+++	+++	0*	Death probable in 1-2.5 wks
10 to 20	+++	+++	+++	+++	Death certain in 5-12 days
> 20	+++	+++	+++	+++**	Death certain in 2-5 days

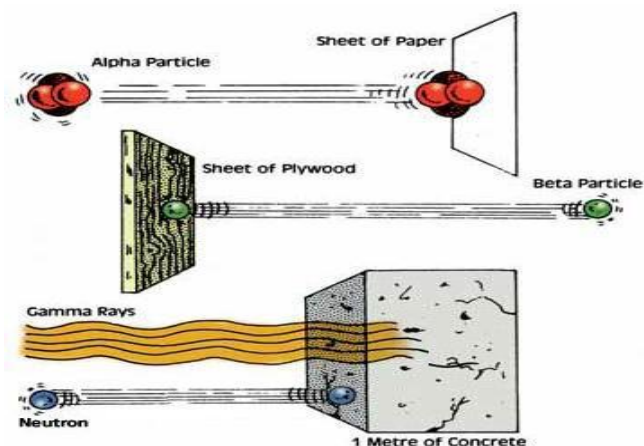
Abbreviations: Gy: dose in Grey;

0: no effects; +: mild; ++: moderate; +++: severe or marked

* Hypotension

** Also cardiovascular collapse, fever, shock

Modified from: Waselenko, JK, MacVittie, TJ, Blakely, WF, et al. Medical management of the acute radiation syndrome: Recommendations of the strategic national stockpile radiation working group. Ann Int Med 2004; 140:1039.



Pearls

The three primary methods of protection from radiation sources:

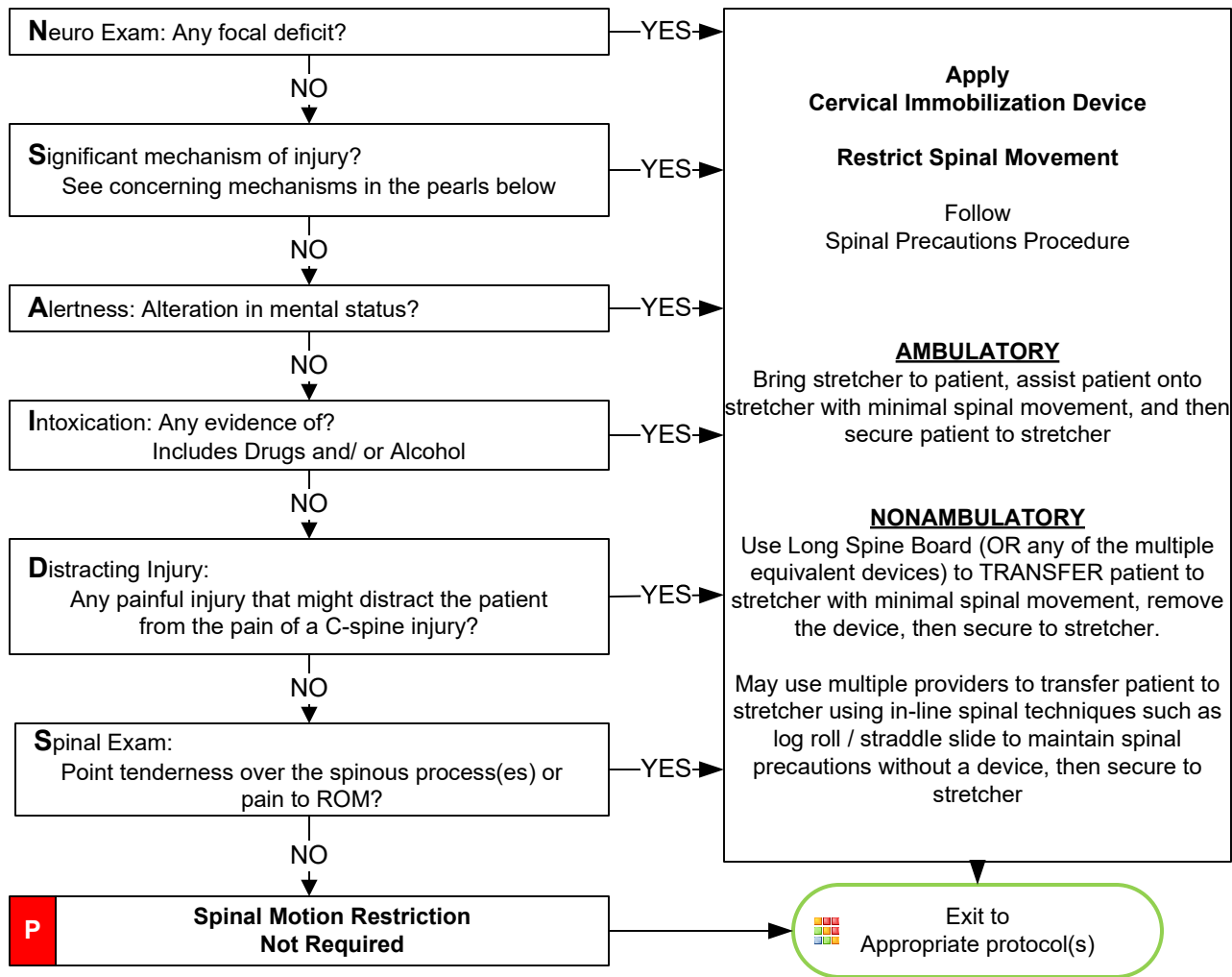
Limiting time of exposure

Distance from

Shielding from the source

- Dealing with a patient with a radiation exposure can be a frightening experience. Do not ignore the ABC's, a dead but decontaminated patient is not a good outcome. Refer to the Decontamination Procedure for more information.
- Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation and use tap water. Other water sources may be used based on availability. Flush the area as soon as possible with the cleanest, most readily available water or saline solution using copious amounts of fluids.
- Three methods of exposure:**
 - External irradiation
 - External contamination
 - Internal contamination
- Two classes of radiation:**
 - Ionizing radiation (greater energy) is the most dangerous and is generally in one of three states:
 - Alpha Particles, Beta Particles and Gamma Rays.
 - Non-ionizing (lower energy) examples include microwaves, radios, lasers and visible light.
- Radiation burns with early presentation are unlikely, it is more likely this is a combination event with either thermal or chemical burn being presented as well as a radiation exposure. When the burn is from a radiation source, it indicates the patient has been exposed to a significant source, (> 250 rem).
- Patients experiencing radiation poisoning are not contagious. Cross contamination is only a threat with external and internal contamination.
- Typical ionizing radiation sources in the civilian setting include soil density probes used with roadway builders and medical uses such as x-ray sources as well as radiation therapy. Sources used in the production of nuclear energy and spent fuel are rarely exposure threats as is military sources used in weaponry. Nevertheless, these sources are generally highly radioactive and in the unlikely event they are the source, consequences could be significant and the patient's outcome could be grave.
- If there is a time lag between the time of exposure and the encounter with EMS, key clinical symptom evaluation includes:
 - nausea/vomiting, hypothermia/hyperthermia, diarrhea, neurologic or cognitive deficits, headache and hypotension.
- Transport and Destination:**
 - In general, chemical and electrical burns should be transported to a burn center.
 - When EMS transport to burn center is limited, transport to and stabilization at local center is appropriate.
 - Burns with inhalation injury should be transported to the closest most appropriate facility.
 - Burns with multiple trauma should be transported to a trauma center per Transport policy.

Selective Spinal Motion Restriction



Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Patients meeting all the above criteria do not require spinal motion restriction. However, patients who fail one or more criteria above require spinal motion restriction, but does NOT require use of the long spine board for immobilization.**
- **Long spine boards are NOT considered standard of care in most cases of potential spinal injury. Spinal motion restriction with cervical collar, and securing patient to cot, while padding all void areas is appropriate.**
- **True spinal immobilization is not possible. Spine protection and spinal motion restriction do not equal long spine board.**
- **Spinal motion restriction is always utilized in at-risk patients. This includes cervical collar, securing to stretcher, minimizing movement/ transfers. and maintenance of in-line spine stabilization during any necessary movement/ transfers. This includes the elderly, or others with body or spine habitus preventing them from lying flat.**
- **Consider spinal motion restriction in patients with arthritis, cancer, dialysis, and underlying spine or bone disease.**
- **Range of motion (ROM) is tested by touching chin to chest (look down), extending neck (look up), and turning head from side to side (chin to each shoulder) only in patients without posterior cervical mid-line pain. ROM should NOT be assessed if patient has midline spinal tenderness. Patient's range of motion should not be assisted, they must be able to complete alone.**
- **C-collar application is not necessary where:**
Penetrating trauma to the head, neck or torso with no signs and/ or symptoms of spinal injury.
- **Concerning mechanisms that may result in spinal column injury:**
Fall from ≥ 3 feet and/ or ≥ 5 stairs or steps. Ground level falls in patients ≥ 65 years of age.
MVC ≥ 30 mph, rollover, and/or ejection
Motorcycle, bicycle, other mobile device, or pedestrian-vehicle crash
Diving or axial load to spine
Electric shock

Thermal Burn

History

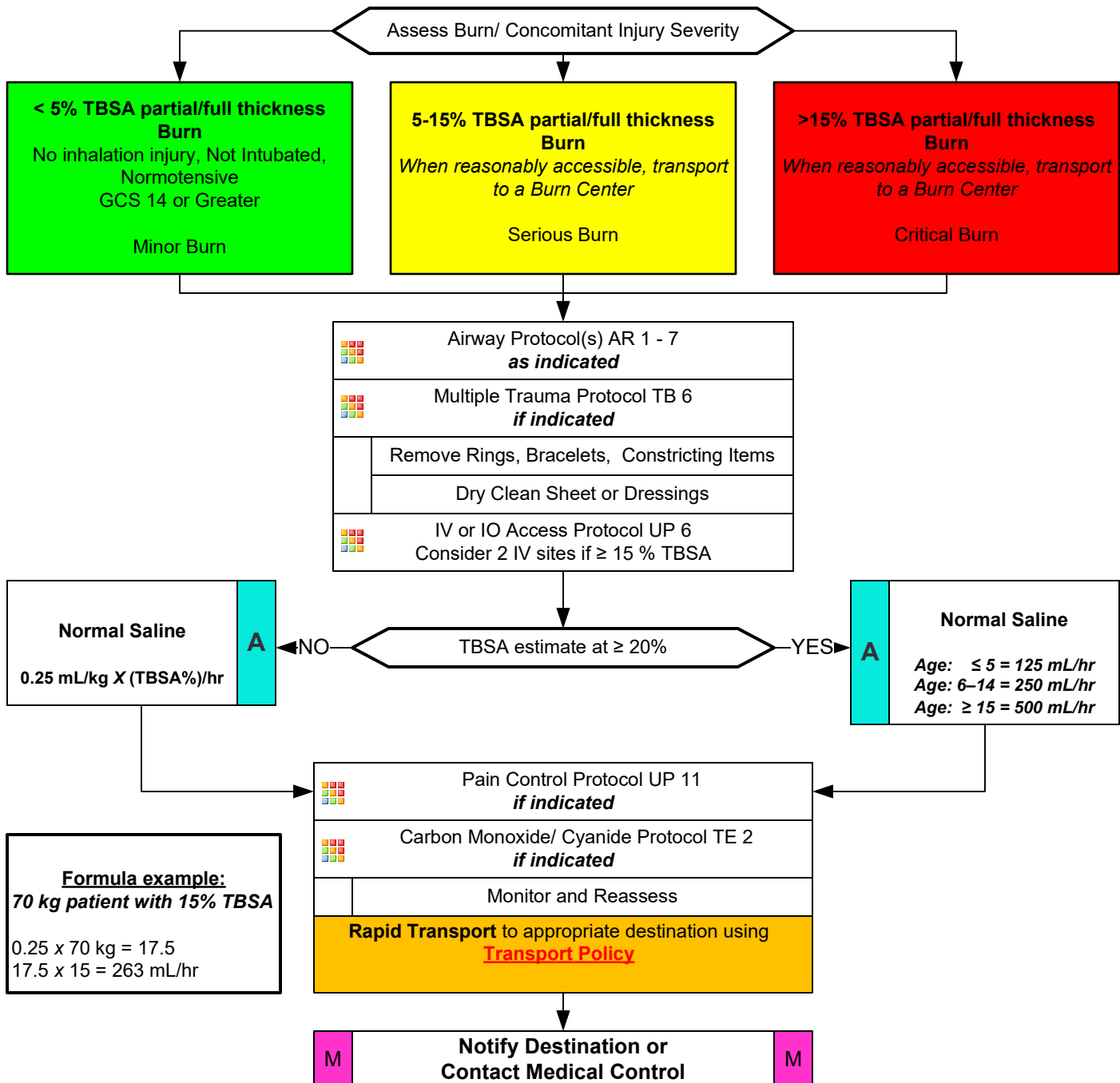
- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history/ Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

Signs and Symptoms

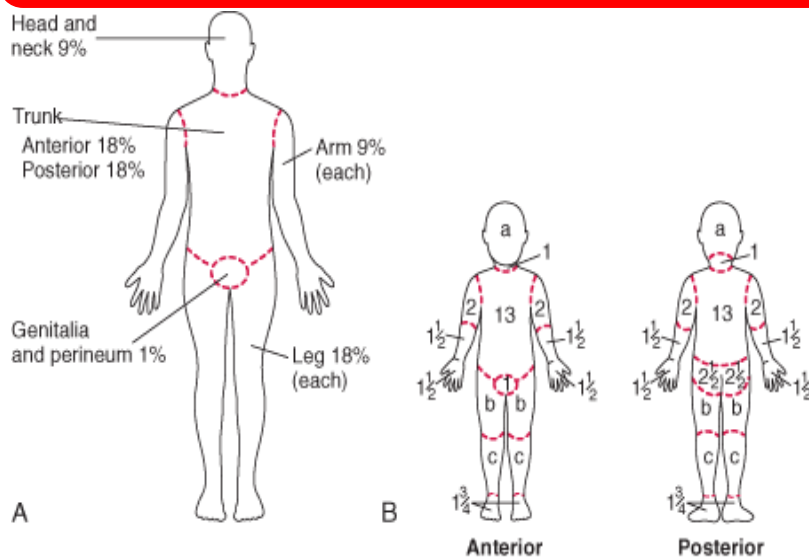
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/ distress could be indicated by hoarseness/ wheezing

Differential

- Thermal / Chemical / Electrical Burn Injury
 - Superficial (1st Degree) red – painful (Don't include in TBSA)
 - Partial Thickness (2nd Degree) blistering
 - Full Thickness (3rd Degree) painless/charred or leathery skin
- Radiation injury
- Blast injury



Thermal Burn



Relative percentage of body surface area (% BSA) affected by growth

Body Part	Age				
	0 yr	1 yr	5 yr	10 yr	15 yr
a = 1/2 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2
b = 1/2 of 1 thigh	2 3/4	3 1/4	4	4 1/4	4 1/2
c = 1/2 of 1 lower leg	2 1/2	2 1/2	2 3/4	3	3 1/4

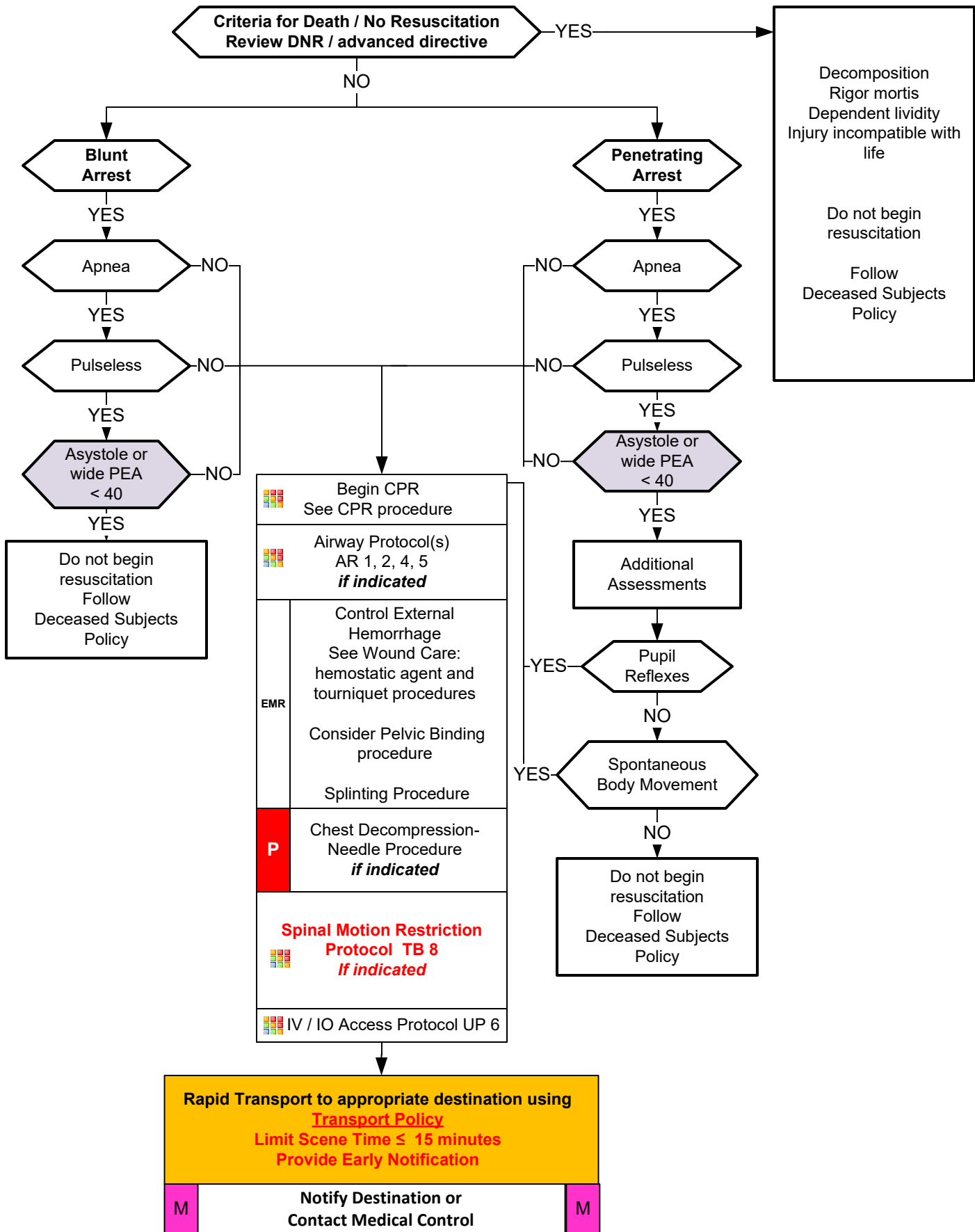
Rule of Nines

- Rarely find a complete isolated body part that is injured as described in the Rule of Nines.
- More likely, it will be portions of one area, portions of another, and an approximation will be needed.
- For the purpose of determining the extent of serious injury, differentiate the area with minimal or superficial (1st degree) burn from those of partial (2nd degree) or full (3rd degree) thickness burns.
- For the purpose of determining Total Body Surface Area (TBSA) of burn, include only Partial (2nd degree) and Full Thickness (3rd degree) burns.** Report the observation of other superficial (1st degree) burns but do not include those burns in your TBSA estimate.
- Some texts will refer to 4th, 5th and 6th degree burns. There is significant debate regarding the actual value of identifying a burn injury beyond that of the superficial, partial and full thickness burn at least at the level of emergent and primary care. For our work, all are included in Full Thickness burns.

Estimate spotty areas of burn by using the size of the patient's palm as 1 %

- Pearls**
- Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- Green, Yellow, and Red In burn severity do not apply to the Triage System.**
- Airway considerations:**
 - Singed nasal hairs, facial burns, and/ or carbonaceous sputum are NOT absolute indications for intubation in a burn patient.
 - Utilizing non-rebreather face mask as well as NIPPV procedure are acceptable as tolerated.
- Critical or Serious Burns:**
 - > 5-15% total body surface area (TBSA) partial and full thickness (2nd or 3rd degree) burns
 - Full thickness (3rd degree) burns > 5% TBSA for any age group
 - Circumferential burns of extremities
 - Electrical or lightning injuries
 - Suspicion of abuse or neglect
 - Inhalation injury
 - Chemical burns
 - Burns of face, hands, perineum, or feet
- Transport and Destination:**
 - Burns with inhalation injury should be transported to the closest most appropriate facility.
 - Burns with multiple trauma should be transported to a trauma center per Transport policy
- Burn patients are trauma patients, evaluate for multisystem trauma.
- Assure whatever has caused the burn is no longer contacting the injury. (Stop the burning process!)
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Burn patients are prone to hypothermia - never apply ice or cool the burn, must maintain normal body temperature.
- Evaluate the possibility of geriatric abuse with burn injuries in the elderly.
- Do not administer IM pain injections to a burn patient. IM dosing is variable in burn patients and may result in over or under dose.

Traumatic Arrest



Traumatic Arrest

Pearls.

- Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro
- Items in Red Text are key performance measures.
- Scene time should not be delayed for procedures and all should be performed during rapid transport.
- First arriving EMS personnel should make the assessment concerning agonal respirations, pulselessness, asystole or PEA < 40, pupillary reflexes, and spontaneous body movements.
- Withholding resuscitative efforts with blunt and penetrating trauma victims who meet criteria, is appropriate.
- Airway:
 - Airway is a priority in traumatic arrest.
 - BVM and BIAD are acceptable for airway management.
 - Endotracheal intubation, if performed, should be completed during transport and should not delay scene time.
- Breathing:
 - Consider bilateral Chest Decompression in both blunt and penetrating trauma.
- Circulation:
 - Control external hemorrhage, including use of tourniquets, and prevent hypothermia by keeping patient warm.
 - IV/IO access should be established during rapid transport of unstable patients.
 - Rhythm determination is more helpful in rural settings, or where transport to nearest facility is > 15 minutes.
- Trauma Triad of Death:
 - Metabolic acidosis/ Coagulopathy/ Hypothermia
 - Performance of appropriate resuscitation measures and keeping patient warm, regardless of ambient temperature, helps to treat metabolic acidosis, coagulopathy, and hypothermia.
- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.
- DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compressions to ventilations are 30:2. If advanced airway in place ventilate 10 – 12 breaths per minute.
- ALS procedures should optimally be performed during rapid transport.
- Time considerations:
 - From the time cardiac arrest is identified, if CPR is performed ≥ 15 minutes with no ROSC, consider termination of resuscitation on scene.
 - From the time cardiac arrest is identified, if transport time to closest Trauma Center is > 15 minutes consider termination of resuscitation on scene.
- Lightning strike, drowning or in situations causing hypothermia, resuscitation should be initiated.
 - Where multiple lightening strike victims are found, use Reverse Triage: Begin CPR in apneic/pulseless victims.

Bites and Envenomations

History

- Type of bite/ sting
- Description/ photo for identification
- Time, location, size of bite/ sting
- Previous reaction to bite/ sting
- Domestic vs. Wild
- Tetanus and Rabies risk
- Immunocompromised patient

Signs and Symptoms

- Rash, skin break, wound
- Pain, soft tissue swelling, redness
- Blood oozing from the bite wound
- Evidence of infection
- Shortness of breath, wheezing
- Allergic reaction, hives, itching
- Hypotension or shock

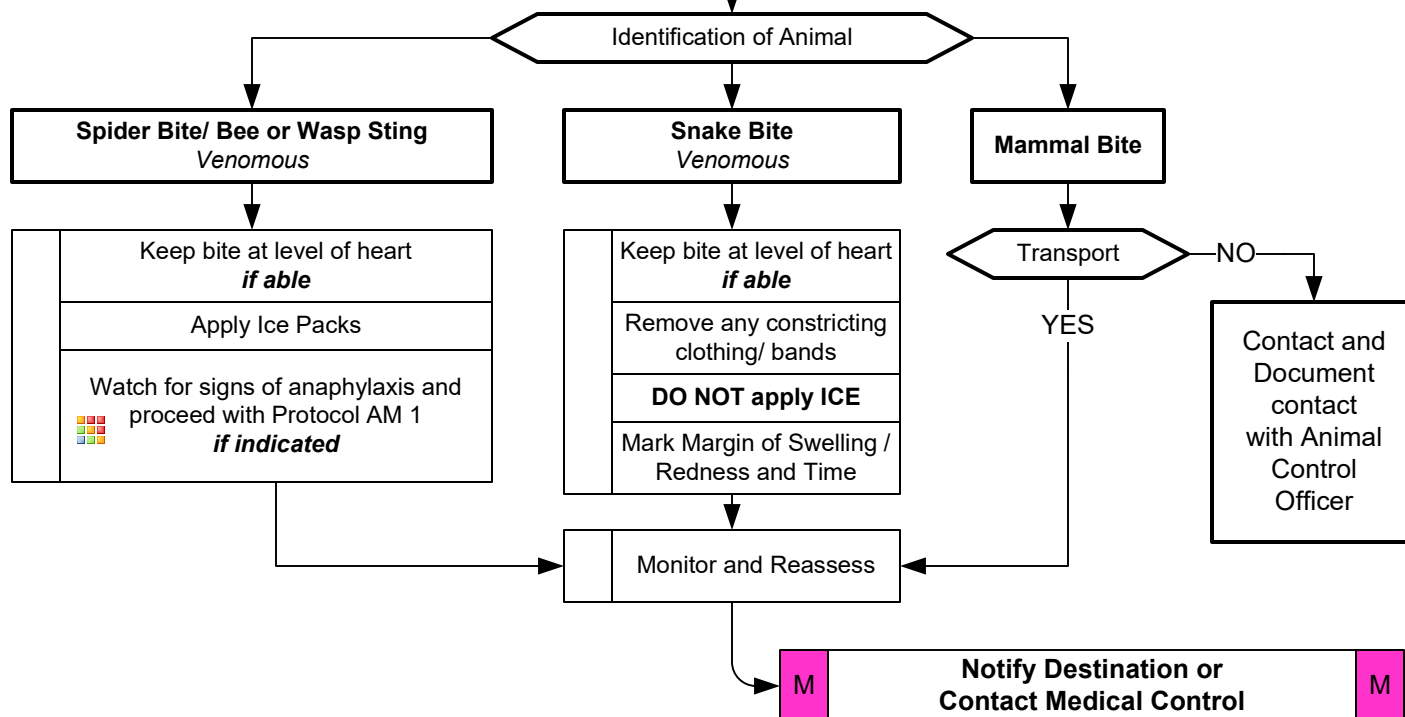
Differential

- Animal bite
- Human bite
- Snake bite (poisonous)
- Spider bite (poisonous)
- Insect sting / bite (bee, wasp, ant, tick)
- Infection risk
- Rabies risk
- Tetanus risk

Call for help/ additional resources
Stage until scene safe

	General Wound Care
	Immobilize Injury
	Remove any constricting clothing/ bands/ jewelry
	IV or IO Access Protocol UP 6 if indicated
	Age Appropriate Trauma Protocol(s) TB 4, 5, 6 if indicated
	Age Appropriate Allergic Reaction/ Anaphylaxis Protocol AM 1/ PM 1 if indicated
	Age Appropriate Hypotension/ Shock Protocol AM 5 / PM 3 if indicated
	Pain Control Protocol UP 11 if indicated

Contact
Wisconsin Poison Control
1-800-222-1222



Bites and Envenomations

Pearls

- **Recommended Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neuro exam if systemic effects are noted**
- **Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplant patients.**
- **Consider contacting the Wisconsin Poison Control Center for guidance (1-800-222-1222).**
- **Do not put responders in danger attempting to capture an animal or insect for identification purposes.**
- **Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound.**
- **Human bites:**
Human bites have higher infection rates than animal bites due to normal mouth bacteria.
Hand and foot bites have highest rates of infection.
- **Dog/ Cat/ Carnivore bites:**
Carnivore bites are much more likely to become infected and all have risk of Rabies exposure.
Cat bites may progress to infection rapidly due to a specific bacteria (*Pasteurella multocida*).
- **Snake bites:**
Poisonous snakes in this area are generally rare, more likely to be of the pit viper family: Timber rattlesnake and Eastern Massasauga rattlesnake.
Coral snake bites are rare: Very little pain but very toxic. "Red on yellow - kill a fellow, red on black – venom lack."
Amount of envenomation is variable, generally worse with larger snakes and early in spring.
Snake bites are treated based on signs and symptoms and progression.
It is not important to attempt to identify the type of snake and attempts may endanger providers.
Do not bring a snake to the facility for identification as accidental bites to providers may occur.
- **Spider bites:**
Black Widow spider bites tend to be minimally painful, but over a few hours, muscular pain and severe abdominal pain may develop (spider is black with red hourglass on belly).
Brown Recluse spider bites are minimally painful to painless. Little reaction is noted initially but tissue necrosis at the site of the bite develops over the next few days (brown spider with fiddle shape on back).
- **Animal bite(s) in subjects declining transport to a medical facility for evaluation:**
Document contact with animal control officer or police. Per Wisconsin State Statute 95.21, police or animal control may require a cat or dog to undergo a quarantine period after biting a human.

Carbon Monoxide/ Cyanide

History

- Smoke inhalation
- Ingestion of cyanide
- Eating large quantity of fruit pits
- Industrial exposure
- Trauma
- Reason: Suicide, criminal, accidental
- Past Medical History
- Time/ Duration of exposure

Signs and Symptoms

- AMS
- Malaise, weakness, flu like illness
- Dyspnea
- GI Symptoms; N/V; cramping
- Dizziness
- Seizures
- Syncope
- Reddened skin
- Chest pain

Differential

- Diabetic related
- Infection
- MI
- Anaphylaxis
- Renal failure/ dialysis problem
- Head injury/ trauma
- Co-ingestant or exposures

	Immediately Remove from Exposure
	Appropriate Airway Protocol(s) 1 - 7 as indicated
EMR	High Flow Oxygen
	Blood Glucose Analysis Procedure
	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6
EMR	CO Monitor (if available)
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 if indicated
	Age Appropriate Diabetic Protocol AM 2/ PM 2 if indicated
	Age Appropriate Multiple Trauma Protocol TB 6 Head Injury TB 5 if indicated
	Age Appropriate Hypotension/ Shock Protocol AM 5/ PM 3 if indicated

**Contact
Wisconsin Poison
Control
1-800-222-1222**

	Continue Care Continue High Flow Oxygen
	Monitor and Reassess

M	Notify Destination or Contact Medical Control	M
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Pearls

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
- **Scene safety is priority.**
- Consider CO and Cyanide with any product of combustion.
- Normal environmental CO level does not exclude CO poisoning.
- Symptoms present with lower CO levels in pregnancy, children, and the elderly.
- Continue high flow oxygen regardless of pulse ox readings.

Drowning/Submersion Injury

History

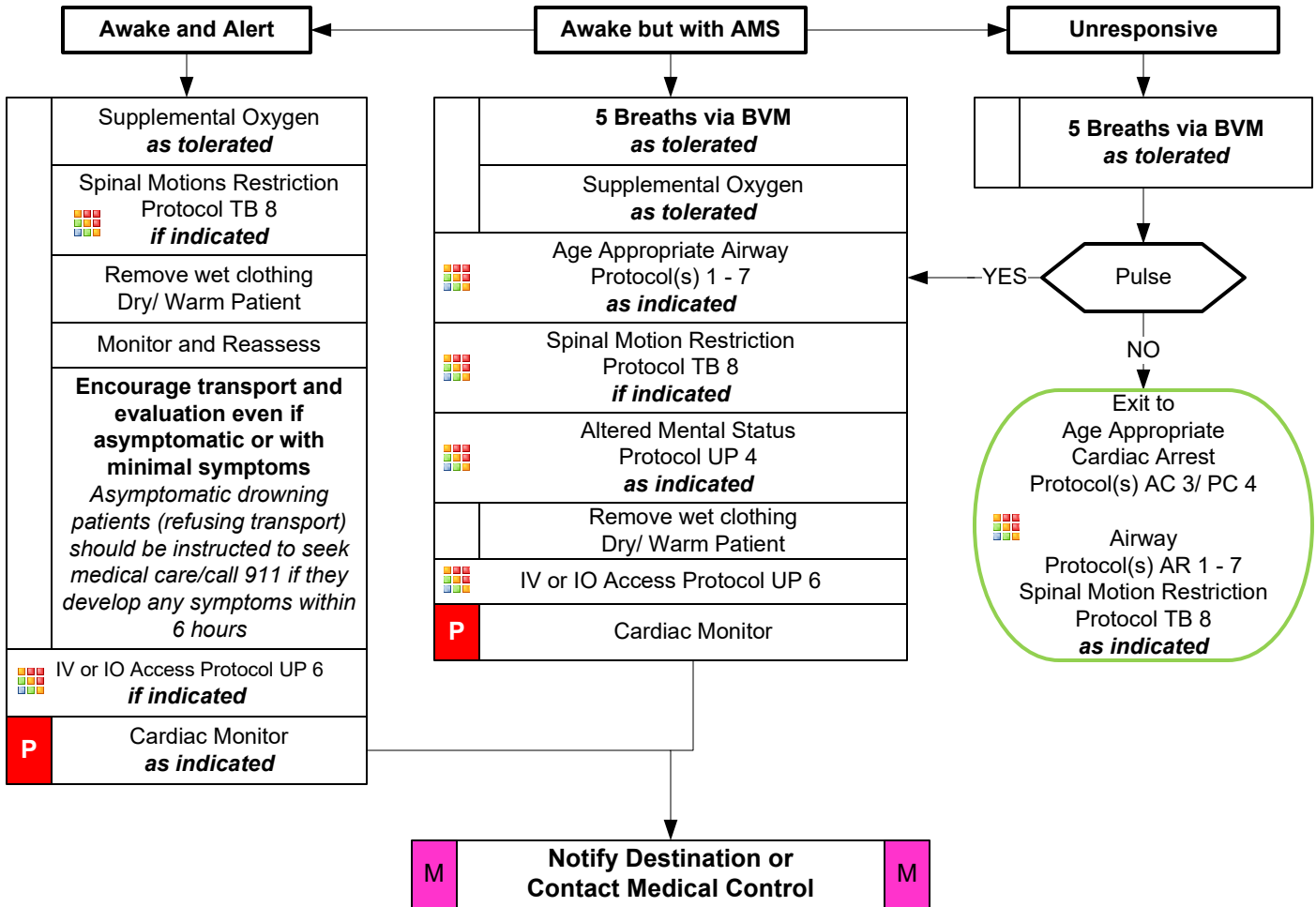
- Submersion in water regardless of depth
- Possible history of trauma
- Slammed into shore wave break
- Duration of submersion/ immersion
- Temperature of water or possibility of hypothermia

Signs and Symptoms

- Unresponsive
- Mental status changes
- Decreased or absent vital signs
- Foaming/ Vomiting
- Coughing, Wheezing, Rales, Rhonchi, Stridor
- Apnea

Differential

- Trauma
- Pre-existing medical problem
 - Hypoglycemia
 - Cardiac Dysrhythmia
- Pressure injury (SCUBA diving)
 - Barotrauma
 - Decompression sickness
- Post-immersion syndrome



Toxic-Environmental Protocol Section

Pearls

- **Recommended Exam: Respiratory, Mental status, Trauma Survey, Skin, Neuro**
- **Drowning is the process of experiencing respiratory impairment (any respiratory symptom) from submersion/ immersion in a liquid.**
- **Begin with BVM ventilations, if patient does not tolerate, then apply appropriate mode of supplemental oxygen (Consider NPPV if mental status appropriate).**
- **Ensure scene safety. Drowning is a leading cause of death among would-be rescuers.**
- **When feasible, only appropriately trained and certified rescuers should remove patients from areas of danger.**
- **Regardless of water temperature – resuscitate all patients with known submersion time of ≤ 25 minutes.**
- **Foam is usually present in airway and may be copious, DO NOT waste time attempting to suction. Ventilate with BVM through foam (suction water and vomit only when present.)**
- **Cardiac arrest in drowning is caused by hypoxia, airway and ventilation are equally important to high-quality CPR.**
- **Encourage transport of all symptomatic patients (cough, foam, dyspnea, abnormal lung sounds, hypoxia) due to potential worsening over the next 6 hours.**
- Predicting prognosis in prehospital setting is difficult and does not correlate with mental status. Unless obvious death, transport.
- Hypothermia is often associated with drowning and submersion injuries even with warm ambient conditions.
- Drowning patient typically has <1 – 3 mL/kg of water in lungs (does not require suction) Primary treatment is reversal of hypoxia.
- Spinal motion restriction is usually unnecessary. When indicated it should not interrupt ventilation, oxygenation and/ or CPR.

Hyperthermia

History

- Age, very young and old
- Exposure to increased temperatures and / or humidity
- Past medical history / Medications
- Time and duration of exposure
- Poor PO intake, extreme exertion
- Fatigue and / or muscle cramping

Signs and Symptoms

- Altered mental status / coma
- Hot, dry or sweaty skin
- Hypotension or shock
- Seizures
- Nausea

Differential

- Fever (Infection)
- Dehydration
- Medications
- Hyperthyroidism (Thyroid Storm)
- Delirium tremens (DT's)
- Heat cramps, exhaustion, stroke
- CNS lesions or tumors

	Remove from heat source to cool environment
	Cooling measures
	Remove tight clothing
EMR	Blood Glucose Analysis Procedure
	Age Appropriate Diabetic Protocol AM 2/ PM 2 as indicated

Heat Stroke

Classic Heat Stroke

- Not common type
- Hot and Dry
- Altered Mental Status

Exertional Heat Stroke

- **Most common type**
- Wet with prior sweating
- Altered Mental Status

Assess Symptom Severity

HEAT CRAMPS

Normal to elevated body temperature
Warm, moist skin
Weakness, Muscle cramping

PO Fluids as tolerated

Monitor and Reassess

HEAT EXHAUSTION

Elevated body temperature
Cool, moist skin
Weakness, Tachypnea

HEAT STROKE

Fever, usually > 104°F (40°C)
Hot, dry skin
Hypotension, AMS / Coma

	Age Appropriate Airway Protocol(s) AR 1 - 7 as indicated
	Altered Mental Status Protocol UP 4 as indicated
	Active cooling measures Target Temp < 102.5° F (39°C)
EMR	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
A	Normal Saline Bolus 500 mL IV / IO Repeat to effect SBP > 90 or MAP ≥ 65 Maximum 2 L PED: Bolus 20 mL/kg IV / IO Repeat to effect Age appropriate SBP ≥ 70 + 2 x Age Maximum 60 mL/kg
	Age Appropriate Hypotension/ Shock Protocol AM 5/ PM 3 as indicated
	Monitor and Reassess

Notify Destination or
Contact Medical Control

Hyperthermia

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Neuro**
- **Extremes of age are more prone to heat emergencies (i.e. very young and very old).**
- **Temperature measurement:**
 - Obtain and document patient temperature if able.
 - Many thermometers and routes of measurement are available.
 - Order of preference for route of measurement: Rectal > oral > temporal > axillary.
- Heat illness is predisposed by use of: tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Cocaine, Amphetamines, and Salicylates may elevate body temperatures.
- Intense shivering may occur as patient is cooled.
- **Heat Cramps:**
 - Consists of benign muscle cramping secondary to dehydration and is not associated with an elevated temperature.
- **Heat Exhaustion:**
 - Consists of dehydration, salt depletion, dizziness, fever, mental status changes, headache, cramping, nausea and vomiting. Vital signs usually consist of tachycardia, hypotension, and an elevated temperature.
- **Heat Stroke:**
 - Consists of dehydration, tachycardia, hypotension, temperature $\geq 104^{\circ}\text{F}$ (40°C), and an altered mental status.
 - Sweating generally disappears as body temperature rises above 104°F (40°C).
 - The young and elderly are more prone to be dry with no sweating.
 - Exertional Heat Stroke:**
 - In exertional heat stroke (athletes, hard labor), the patient may have sweated profusely and be wet on exam.
 - Rapid cooling takes precedence over transport as early cooling decreases morbidity and mortality.**
 - If available, immerse in an ice water bath for 5 – 10 minutes. Monitor rectal temperature and remove patient when temperature reaches 102.5°F (39°C). Your goal is to decrease rectal temperature below 104°F (40°C) with target of 102.5°F (39°C) within 15 minutes. Stirring the water aids in cooling.
 - Nearly 66% of all exertional heat strokes occur in high school athletes during the month of August.
 - Other methods include cold wet towels below and above the body or spraying cold water over body continuously.
- **Neuroleptic Malignant Syndrome (NMS):**
 - Neuroleptic Malignant Syndrome is a hyperthermic emergency which is not related to heat exposure.
 - It occurs after taking neuroleptic antipsychotic medications.
 - This is a rare but often lethal syndrome characterized by muscular rigidity, AMS, tachycardia and hyperthermia.
 - Drugs Associated with Neuroleptic Malignant Syndrome:**
 - Prochlorperazine (Compazine), promethazine (Phenergan), clozapine (Clozaril), and risperidone (Risperdal)
 - metoclopramide (Reglan), amoxapine (Ascendin), and lithium.
 - Management of NMS:**
 - Supportive care with attention to hypotension and volume depletion.
 - Use benzodiazepines such as midazolam for seizures and/ or muscular rigidity.

Hypothermia/ Frostbite

History

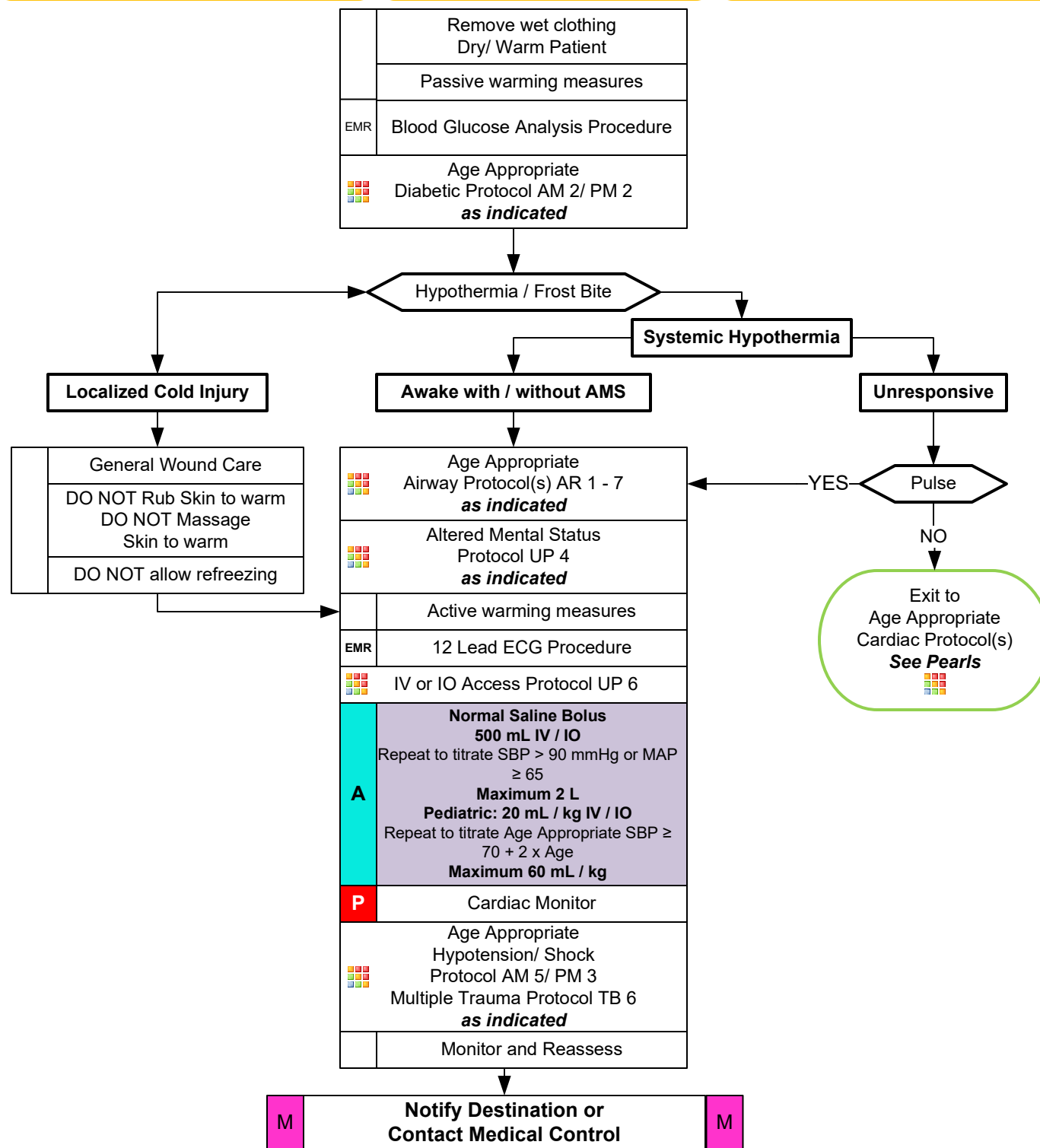
- Age, very young and old
- Exposure to decreased temperatures but may occur in normal temperatures
- Past medical history / Medications
- Drug use: Alcohol, barbituates
- Infections/ Sepsis
- Length of exposure/ Wetness/ Wind chill

Signs and Symptoms

- Altered mental status/ coma
- Cold, clammy
- Shivering
- Extremity pain or sensory abnormality
- Bradycardia
- Hypotension or shock

Differential

- Sepsis
- Environmental exposure
- Hypothyroidism
- Hypoglycemia
- CNS dysfunction
 - Stroke
 - Head injury
 - Spinal cord injury



Hypothermia/ Frostbite

Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Patients in cardiac arrest suspected to be from hypothermia should be resuscitated until body temperature $\geq 93.2^{\circ}$ F, 32° C. Consider earlier termination or withholding resuscitation if other extenuating circumstances are present such as suspected trauma, significantly prolonged exposure, or other evident signs of death. Contact medical control if needed.**
- **Temperature measurement:**
 - Obtain and document patient temperature if able.**
 - Many thermometers and routes of measurement are available.**
 - Order of preference for route of measurement: Rectal > oral > temporal > axillary.**
 - Many thermometers do not register temperature below 93.2° F.**
- **Hypothermia categories:**
 - Mild $90 - 95^{\circ}$ F ($32 - 35^{\circ}$ C)
 - Moderate $82 - 90^{\circ}$ F ($28 - 32^{\circ}$ C)
 - Severe $< 82^{\circ}$ F ($< 28^{\circ}$ C)
- **Mechanisms of hypothermia:**
 - Radiation: Heat loss to surrounding objects via infrared energy (60% of most heat loss.)
 - Convection: Direct transfer of heat to the surrounding air.
 - Conduction: Direct transfer of heat to direct contact with cooler objects (important in submersion.)
 - Evaporation: Vaporization of water from sweat or other body water losses.
- **Contributing factors of hypothermia: Extremes of age, malnutrition, alcohol or other drug use.**
- **If the temperature is unable to be measured, treat the patient based on the suspected temperature.**
- **CPR:**
 - Severe hypothermia may cause cardiac instability and rough handling of the patient theoretically can cause ventricular fibrillation. This has not been demonstrated or confirmed by current evidence. However, intubation and CPR techniques should not be withheld due to this concern.**
 - Intubation should be done gently by the most experienced provider(s).**
 - Below 86° F (30° C) antiarrhythmics may not work and if given, should be given at increased time intervals.**
 - Contact medical control for direction. Epinephrine can be administered.**
 - Below 86° F (30° C) pacing should not be utilized.**
 - Consider withholding CPR if patient has organized rhythm or has other signs of life. Contact Medical Control.**
 - If the patient is below 86° F (30° C) then defibrillate 1 time if defibrillation is required. Consider deferring further attempts until more warming occurs. Contact medical control for direction.**
 - Hypothermia may produce severe bradycardia so take at least 60 seconds to palpate a pulse.**
- **Active Warming:**
 - Remove from cold environment and into warm environment protected from wind and wet conditions.**
 - Remove wet clothing and provide warm blankets/ warming blankets.**
 - Hot packs can be activated and placed in the armpit and groin area if available. Care should be taken not to place the packs directly against the patient's skin.**

Overdose/ Toxic Ingestion

History

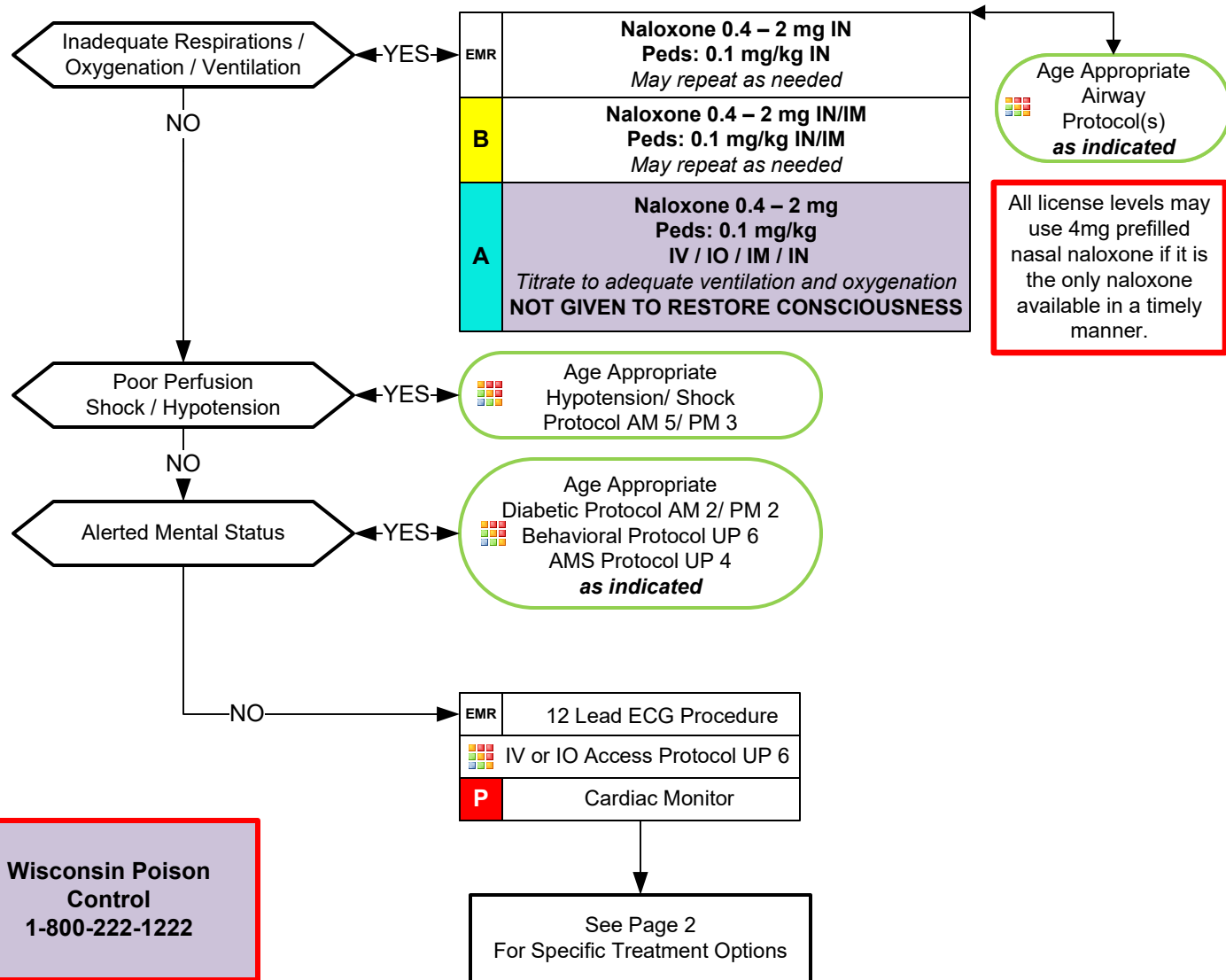
- Ingestion or suspected ingestion of a potentially toxic substance
- Substance ingested, route, quantity
- Time of ingestion
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications

Signs and Symptoms

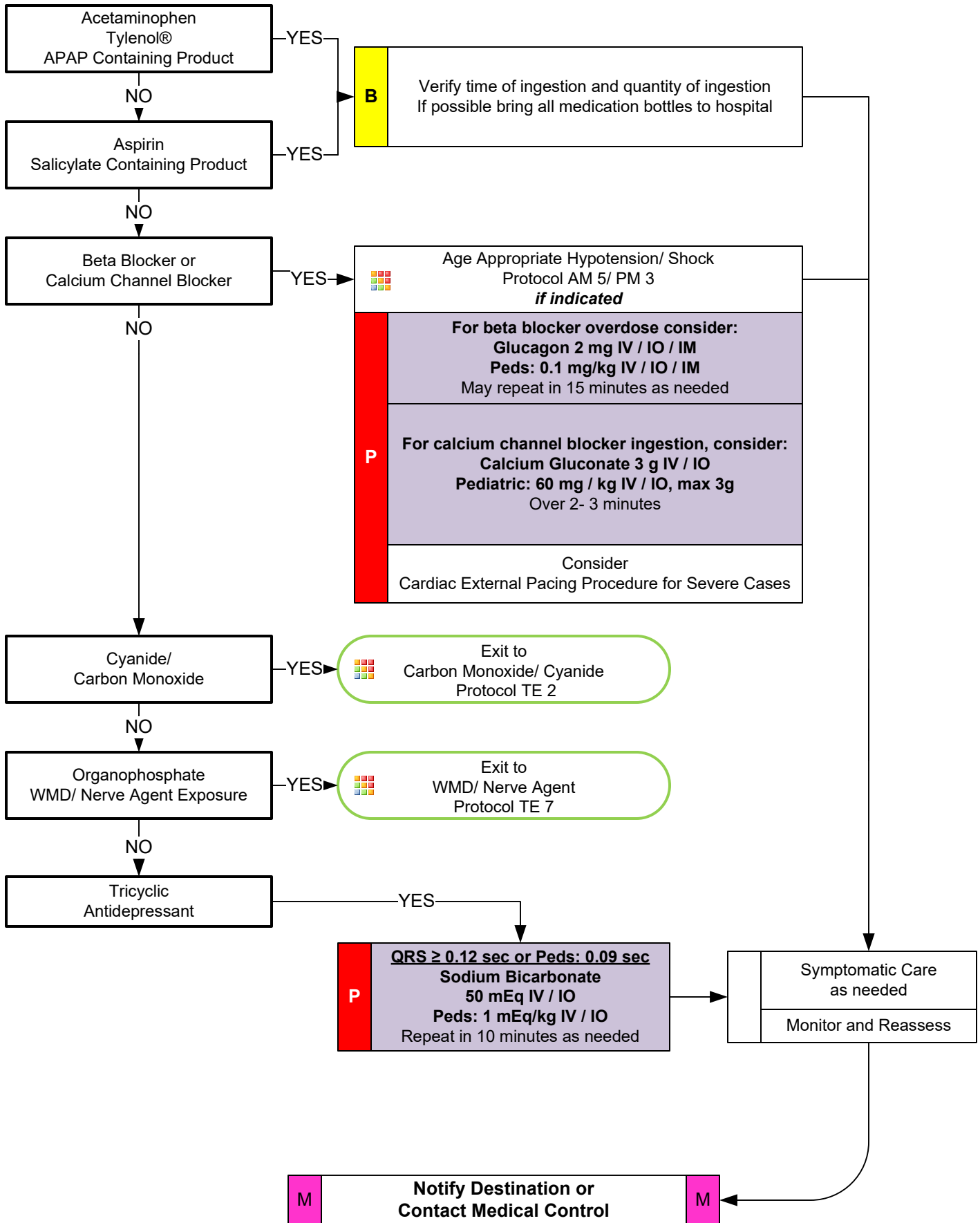
- Mental status changes
- Hypotension / hypertension
- Decreased respiratory rate
- Tachycardia, dysrhythmias
- Seizures
- S.L.U.D.G.E.
- D.U.M.B.B.E.L.S

Differential

- Tricyclic antidepressants (TCAs)
- Acetaminophen (Tylenol)
- Aspirin
- Depressants
- Stimulants
- Anticholinergic
- Cardiac medications
- Solvents, Alcohols, Cleaning agents
- Insecticides (organophosphates)



Overdose/ Toxic Ingestion



Overdose/ Toxic Ingestion

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Opioids and opiates may require higher doses of Naloxone to improve respiration, in certain circumstances up to 10 mg.**
- **Time of Ingestion:**
 1. **Most important aspect is the TIME OF INGESTION, the substance(s), amount ingested, and any co-ingestants.**
 2. **Every effort should be made to elicit this information before leaving the scene.**
- **Do not rely on patient history of ingestion, especially in suicide attempts. Make sure patient is still not carrying hiding other medications or has any weapons.**
- **Pediatric:**

Age specific blood pressure 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 10 years > 70 + (2 x age)mmHg and > 10 years > 90 mmHg.

Pediatric IV Fluid maintenance rate:

4 mL for the first 10 kg of weight +
2 mL for the second 10 kg of weight +
1 mL for every additional kg in weight after 20 kg

Example: 34 kg pediatric	
First 10 kg:	4 mL/kg/hr = 40 mL/hr
Second 10 kg:	2 mL/kg/hr = 20 mL/hr
Final 14 Kg:	1 mL/kg/hr = 14 mL/hr
Total: 74 mL/hr rate	
- **Bring bottles, contents, emesis to ED.**
- **S.L.U.D.G.E: Salivation, Lacrimation, Urination, Defecation, GI distress, Emesis.**
- **D.U.M.B.B.E.L.S: Diarrhea, Urination, Miosis, Bradycardia, Bronchorrhea, Emesis, Lacrimation, Salivation.**
- **Tricyclic:** 4 major areas of toxicity: seizures, dysrhythmias, hypotension, decreased mental status or coma; rapid progression from alert mental status to death.
- **Acetaminophen:** initially normal or nausea/ vomiting. If not detected and treated, causes irreversible liver failure.
- **Aspirin:** Early signs consist of abdominal pain and vomiting. Tachypnea and altered mental status may occur later. Renal dysfunction, liver failure, and or cerebral edema among other things can take place later.
- **Depressants:** decreased HR, decreased BP, decreased temperature, decreased respirations, non-specific pupils.
- **Stimulants:** increased HR, increased BP, increased temperature, dilated pupils, seizures.
- **Anticholinergic:** increased HR, increased temperature, dilated pupils, mental status changes.
- **Cardiac Medications:** dysrhythmias and mental status changes.
- **Solvents:** nausea, coughing, vomiting, and mental status changes.
- **Insecticides:** increased or decreased HR, increased secretions, nausea, vomiting, diarrhea, pinpoint pupils.
- **Nerve Agent Antidote kits** contain 2 mg of Atropine and 600 mg of pralidoxime in an autoinjector for self administration or patient care.
- **When appropriate contact the Poison Control Center for guidance.**
- **Consider restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.**

WMD-Nerve Agent Protocol

History

- Exposure to chemical, biologic, radiologic, or nuclear hazard
- Potential exposure to unknown substance/hazard

Signs and Symptoms

- **S**alivation
- **L**acrimation
- **U**rination; increased, loss of control
- **D**efecation / Diarrhea
- **G**I Upset; Abdominal pain / cramping
- **E**mesis
- **M**uscle Twitching
- Seizure Activity
- Respiratory Arrest

Differential

- Nerve agent exposure (e.g., VX, Sarin, Soman, etc.)
- Organophosphate exposure (pesticide)
- Vesicant exposure (e.g., Mustard Gas, etc.)
- Respiratory Irritant Exposure (e.g., Hydrogen Sulfide, Ammonia, Chlorine, etc.)

Call for help/ additional resources
Stage until scene safe

Obtain history of exposure
Observe for specific toxidromes
Initiate triage and/or decontamination as indicated.

Contact
Wisconsin Poison Control
1-800-222-1222

Symptom Severity

Asymptomatic

Monitor and Reassess
Every 15 minutes for
symptoms
Initiate Treatment per
Appropriate Arm

Minor Symptoms:
Respiratory Distress + SLUDGEM

IV or IO Access Protocol UP 6

EMR
Nerve Agent Kit IM
2 Doses Rapidly
if available
See pearls for adult/pediatric dosing

Major Symptoms:
Altered Mental Status, Seizures,
Respiratory Distress, Respiratory
Arrest

IV or IO Access Protocol UP 6

EMR
Nerve Agent Kit IM
3 Doses Rapidly
if available
See pearls for adult/pediatric dosing

P
Atropine 2 mg IV / IO / IM
Pediatric: See Pearls
IV / IO / IM
Repeat every 3 to 5 minutes until
symptoms resolve
Pralidoxime (2PAM)
600 mg IV / IO / IM
Pediatric: 15 – 25 mg / kg
IV / IO / IM
Over 30 minutes

Seizure Protocol UP 13

Notify Destination or
Contact Medical Control

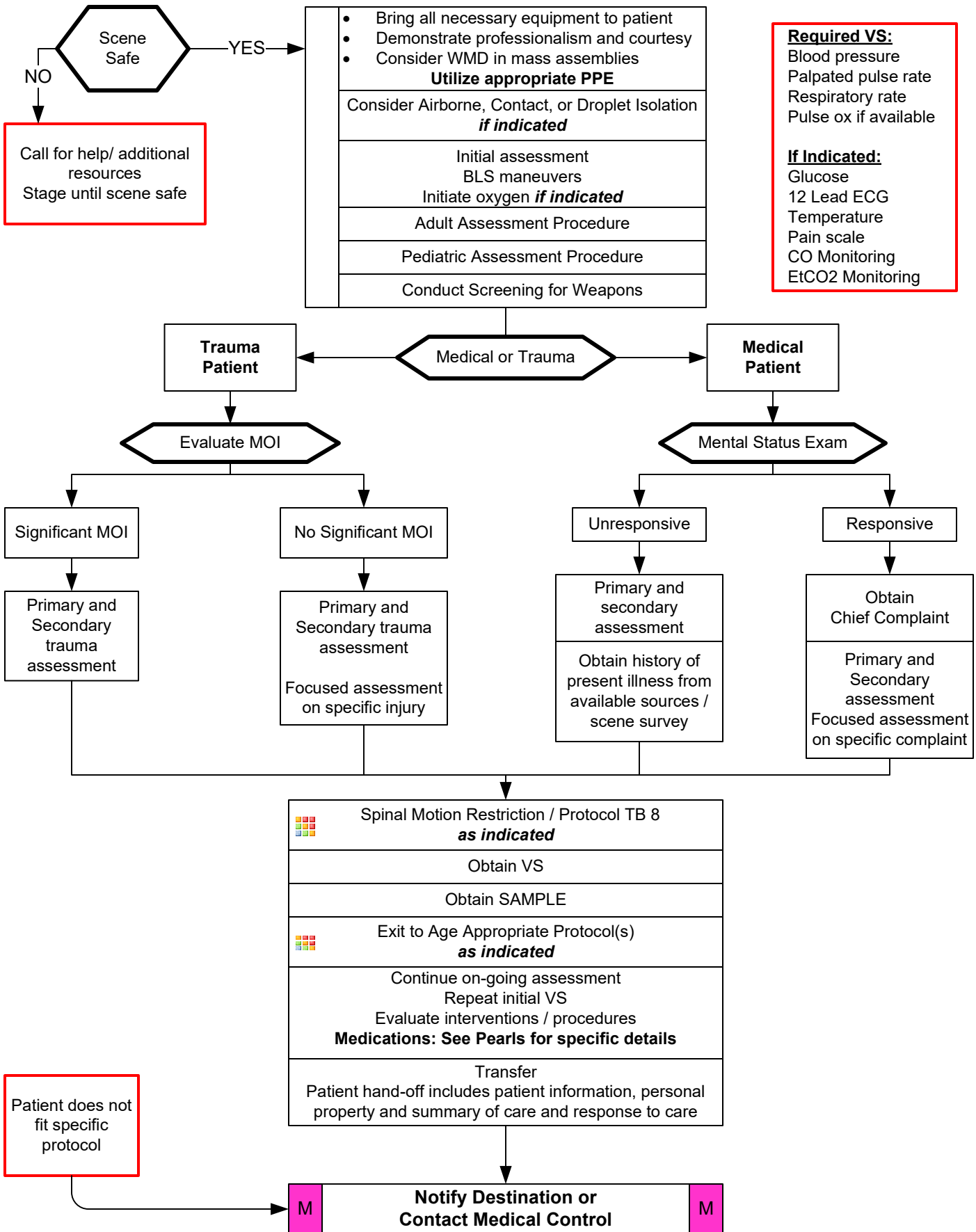
Toxic-Environmental Protocol Section

WMD-Nerve Agent Protocol

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Gastrointestinal, Neuro**
- **Follow local HAZMAT protocols for decontamination and use of personal protective equipment.**
- **Adult/ Pediatric Atropine Dosing Guides:**
 - Confirmed attack: Begin with 1 Nerve Agent Kit for patients less than 7 years of age, 2 Nerve Agent Kits from 8 to 14 years of age, and 3 Nerve Agent Kits for patients 15 years of age and over.
 - If Triage/ MCI issues exhaust supply of Nerve Agent Kits, use atropine (if available).
 - Usual pediatric doses: 0.5 mg ≤ 40 pounds (18 kg), 1 mg dose if patient weighs between 40 to 90 pounds (18 to 40 kg), and 2 mg dose ≥ 90 pounds (≥ 40 kg).
- Each Nerve Agent Kit contains 600 mg of Pralidoxime (2-PAM) and 2 mg of Atropine.
- **Seizure Activity: Midazolam by any route is acceptable.**
- For patients with major symptoms, there is no limit for atropine dosing.
- Carefully evaluate patients to ensure they do not have exposure to other agent(s) (e.g., narcotics, vesicants, etc.)
- The main symptom that the atropine addresses is excessive secretions, so atropine should be given until secretions improve/ dry.

Universal Patient Care

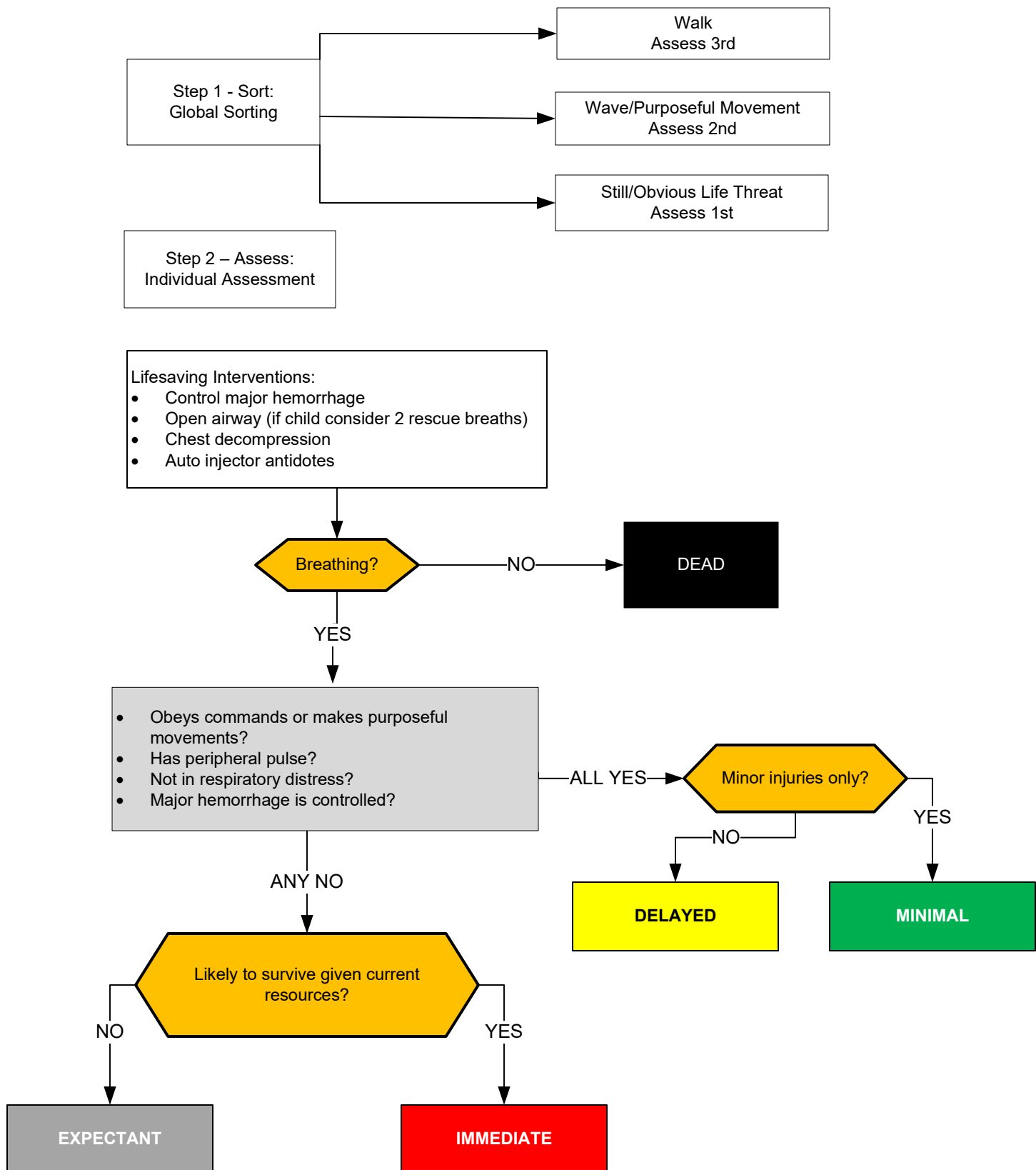


Universal Patient Care

Pearls

- **Recommended Exam:** Minimal exam if not noted on the specific protocol is vital signs, mental status, and location of injury or complaint.
- Any patient contact, which does not result in an EMS transport, must have a completed Patient Care Report.
- Vital signs should be obtained before, 10 minutes after, and at patient hand off with all pain medications.
- Two complete vital sign acquisitions should occur at a minimum with any patient encounter.
- **Medication Administration:**
Any medication that is drawn up or mixed by EMS should follow the medication cross check procedure for safety prior to patient administration.
- **Patient assisted medications optional skill (All License Levels)**
 1. May administer any patient prescribed medication that is approved within the Wisconsin EMS scope of practice and within these approved protocols.
 2. May administer any patient prescribed medication after discussing with medical control and only if the administration route is within your license level Wisconsin EMS scope of practice
- **Transport with special equipment**
- EMS providers should transport (all license levels) a patient with their own special medical equipment such as Ventilators, medication infusion pumps, wound vacs, etc. as long as there is not an issue/concern related to the special equipment. If the patient is unable to assist in use of the equipment consider transporting with a family member/caregiver who is familiar with the equipment.
- **Patient Refusal (Declining Treatment and/ or Transport):**
Patient refusal is a high risk situation. Encourage patient to accept transport to medical facility.
Encourage patient to allow an assessment, including vital signs. Documentation of the event is very important including a mental status assessment describing the patient's capacity to refuse care.
Guide to Assessing capacity:
C: Patient should be able to communicate a clear choice: This should remain stable over time. Inability to communicate a choice or an inability to express the choice consistently demonstrates incapacity.
R: Relevant information is understood: Patient should be able to voice a factual understanding of the illness/ injury, the options, and the risks and benefits of recommended treatment or transport.
A: Appreciation of the situation: Ability to communicate an understanding of the facts of the situation. The patient should be able to recognize the significance of the outcome potentially from their decision.
M: Manipulation of information in a rational manner: Demonstrate a rational process to come to a decision. Should be able to describe the logic they are using to come to the decision, though you may not agree with decision.
- **Pediatric Patient General Considerations:**
A pediatric patient is defined by fitting with a Pediatric Medication/ Skill Resuscitation System, Age ≤ 15, weight ≤ 49 kg.
Special needs children may require continued use of Pediatric based protocols regardless of age and weight.
Initial assessment should utilize the **Pediatric Assessment Triangle** which encompasses Appearance, Work of Breathing and Circulation to skin.
The order of assessment may require alteration dependent on the developmental state of the pediatric patient.
Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.
- Timing of transport should be based on patient's clinical condition and the agency transport policy.
- Consider consultation with Medical Control for patient(s) refusing treatment/ transport.
- Blood Pressure is defined as a Systolic/ Diastolic reading. A palpated Systolic reading may be necessary at times.
- SAMPLE: Signs/ Symptoms; Allergies; Medications; PMH; Last oral intake; Events leading to illness/ injury

Triage



Triage

Pearls

- **When approaching a multiple casualty incident where resources are limited:**
Triage decisions must be made rapidly with less time to gather information
Emphasis shifts from ensuring the best possible outcome for an individual patient to ensuring the best possible outcome for the greatest number of patients.
- **Scene Size Up:**
 1. **Conduct a scene size up.** Assure well being of responders. Determine or ensure scene safety before entering. If there are several patients with the same complaints consider HazMat, WMC or CO poisoning.
 2. **Take Triage system kit.**
 3. **Determine number of patients.** Communicate the number of patients and nature of the incident and establish incident command.
 4. **Direct incoming resources.** Identify ingress and egress path. Establish a staging area. Assign a medical officer, triage officer, transportation officer, and staging officer as personnel become available.
- **Triage is a continual process and is a continuous process in each section as resources allow.**
- **Step 1: Global sorting:**
Call out to those involved in the incident to walk to a designated area and assess group last.
For those who cannot walk, have them wave/ indicate a purposeful movement and assess them second.
Those involved who are not moving, or have an obvious life threat, assess first.
- **Step 2: Individual assessments:**
Control major hemorrhage.
Open airway and if child, give 2 rescue breaths.
Perform Needle Chest Decompression Procedure if indicated.
Administer injector antidotes if indicated.
- **Assess the first patient you encounter using the three objective criteria which can be remembered by RPM.**
R: Respiratory (*Respiratory rates are difficult to measure quickly, use work of breathing and respiratory distress*)
P: Perfusion (*Capillary refill can be altered by many factors including skin temperature – use age appropriate heart rates*)
M: Mental Status (*Motor component of GCS score is important indicator – ability to follow commands*)
- If your patient falls into the RED TAG category, stop, place RED TAG and move on to next patient. Attempt only to correct airway problems, treat uncontrolled bleeding, or administer an antidote before moving to next patient.
- **Treatment:**
Once casualties are triaged, a focus on treatment can begin. You may need to move patients to treatment areas.
RED TAGs are moved/ treated first followed by YELLOW TAGs. GREEN TAGs are moved and treated last.
When resources allow, re-triage GREY TAGs.
BLACK TAGs should remain in place.
You may also indicate deceased patients by pulling their shirt/ clothing over their head.
As more help arrives, then the triage/ treatment process may proceed simultaneously.
- **Lightning strike (Reverse Triage):**
Lightning strike victims are amenable to airway, breathing, cardiac compressions as well as early defibrillation.
Use concept of reverse triage with multiple casualties. Resuscitate lightning strikes as the priority.
Lightning strike victims found alive do not often deteriorate quickly.

Abdominal Pain Vomiting and Diarrhea

History

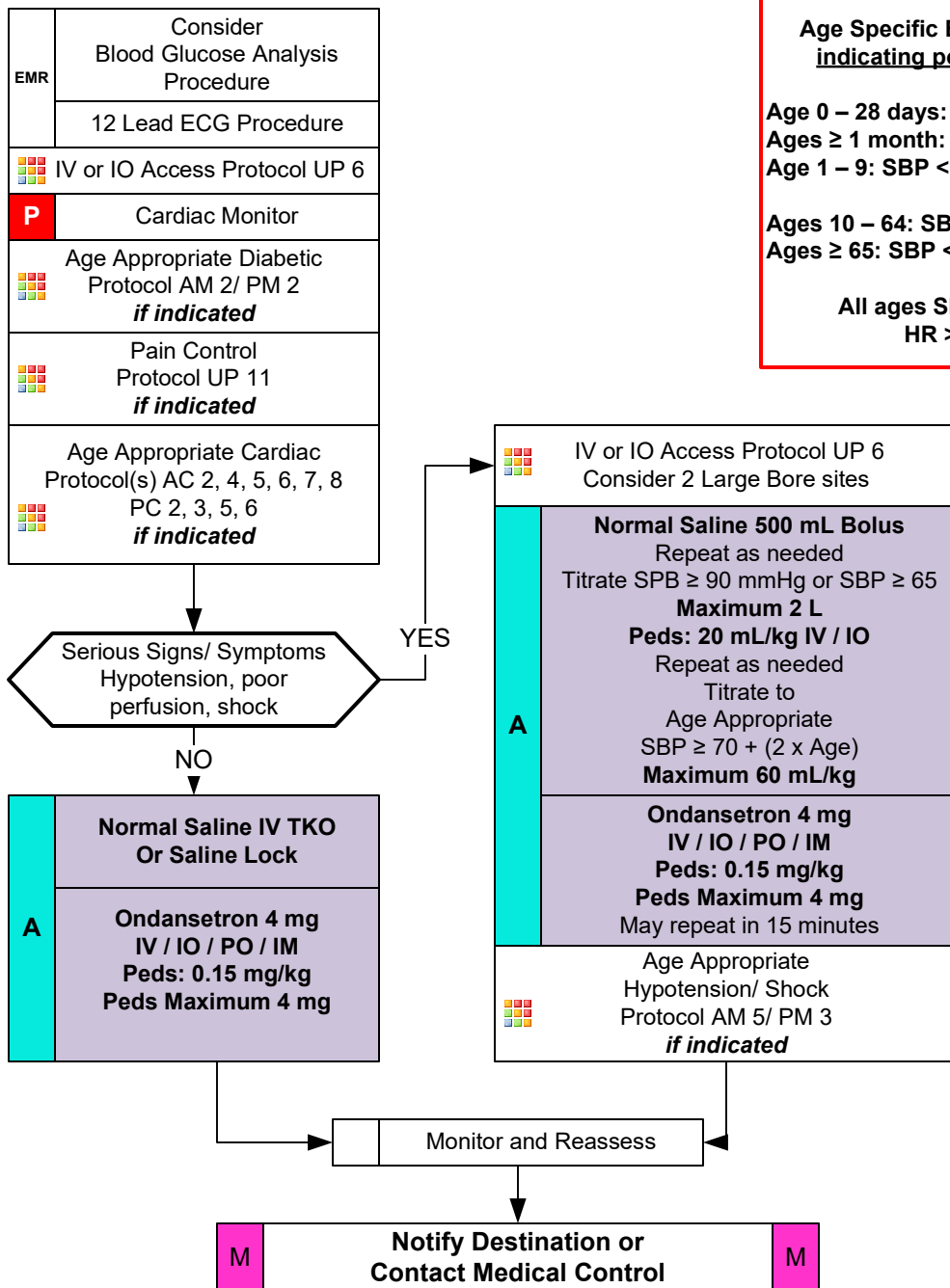
- Age
- Time of last meal
- Last bowel movement/emesis
- Improvement or worsening with food or activity
- Duration of problem
- Other sick contacts
- Past medical history
- Past surgical history
- Medications
- Menstrual history (pregnancy)
- Travel history
- Bloody emesis / diarrhea

Signs and Symptoms

- Pain
 - Character of pain (constant, intermittent, sharp, dull, etc.)
 - Distention
 - Constipation
 - Diarrhea
 - Anorexia
 - Radiation
- Associated symptoms:**
Fever, headache, blurred vision, weakness, malaise, myalgias, cough, headache, dysuria, mental status changes, rash

Differential

- CNS (increased pressure, headache, stroke, CNS lesions, trauma or hemorrhage, vestibular)
- Myocardial infarction
- Drugs (NSAID's, antibiotics, narcotics, chemotherapy)
- GI or Renal disorders
- Diabetic ketoacidosis
- OB-Gyn disease (ovarian cyst, PID, Pregnancy)
- Infections (pneumonia, influenza)
- Electrolyte abnormalities
- Food or toxin induced
- Medication or Substance abuse
- Psychological



Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60

Ages ≥ 1 month: SBP < 70

Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90

Ages ≥ 65: SBP < 110

All ages Shock Index:
HR > SBP

Abdominal Pain Vomiting and Diarrhea

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Abdominal/ back pain in women of childbearing age should be treated as pregnancy related until proven otherwise.**
- **The diagnosis of abdominal aneurysm should be considered with abdominal pain, with or without back and/ or lower extremity pain or diminished pulses, especially in patients over 50 and/ or patients with shock/ poor perfusion. Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 35, diabetics and/ or women, especially with upper abdominal complaints.**
- **Heart Rate: Tachycardia is one of the first clinical signs of dehydration and volume depletion and typically increases as dehydration becomes more severe.**
- **Nausea without vomiting should be treated like vomiting. Patient will benefit from symptom control with antiemetic even if not actively vomiting.**
- Isolated vomiting in children is common but can be a sign of more serious pathology. Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, CO poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), and organophosphate poisoning. Maintain a high index of suspicion for serious pathology.

Altered Mental Status

History

- Known diabetic, medic alert tag
- Drugs, drug paraphernalia
- Report of illicit drug use or toxic ingestion
- Past medical history
- Medications
- History of trauma
- Change in condition
- Changes in feeding or sleep habits

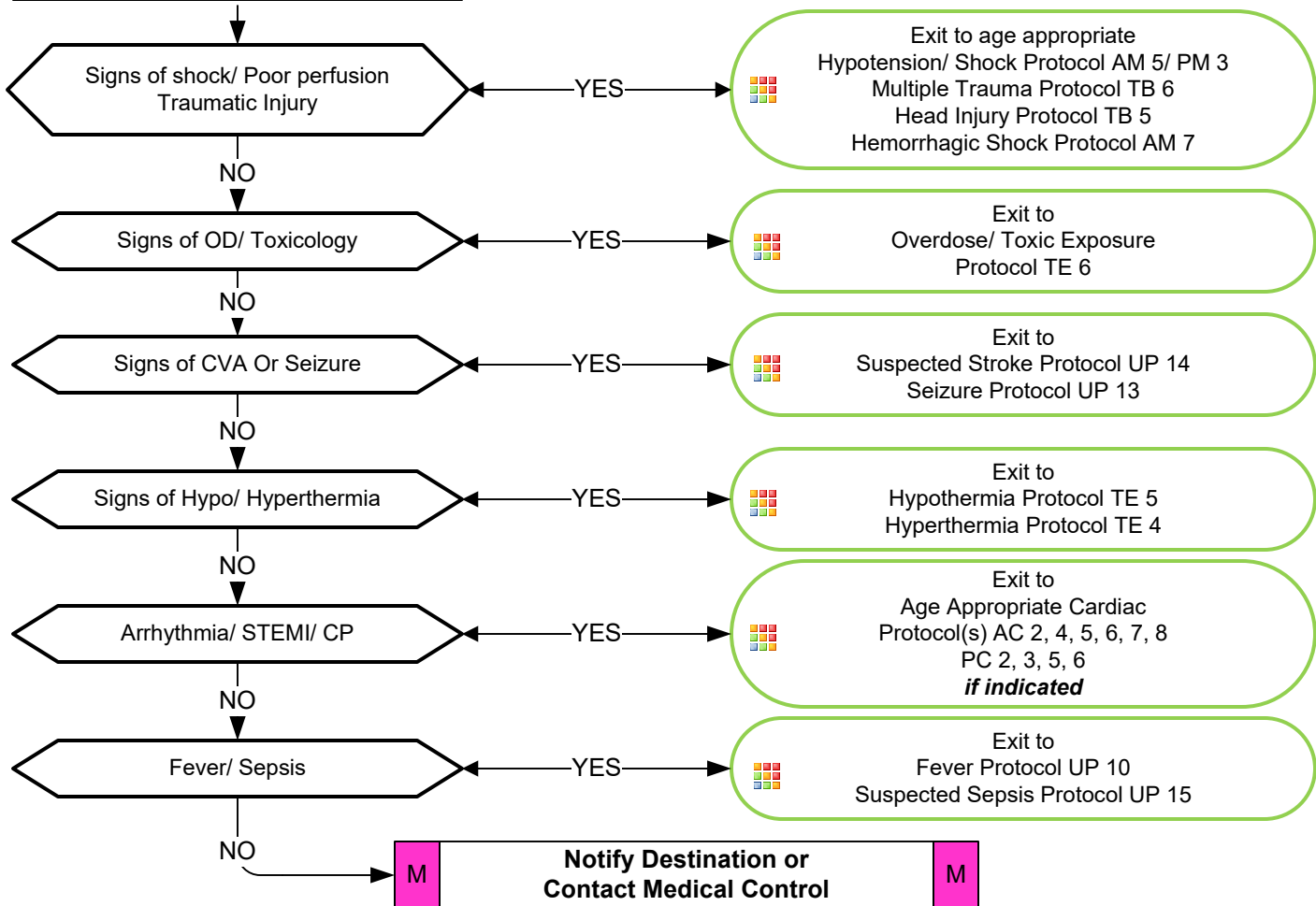
Signs and Symptoms

- Decreased mental status or lethargy
- Change in baseline mental status
- Bizarre behavior
- Hypoglycemia (cool, diaphoretic skin)
- Hyperglycemia (warm, dry skin; fruity breath; Kussmaul respirations; signs of dehydration)
- Irritability

Differential

- Head trauma
- CNS (stroke, tumor, seizure, infection)
- Cardiac (MI, CHF)
- Hypothermia
- Infection (CNS and other)
- Thyroid (hyper / hypo)
- Shock (septic, metabolic, traumatic)
- Diabetes (hyper / hypoglycemia)
- Toxicological or Ingestion
- Acidosis / Alkalosis
- Environmental exposure
- Pulmonary (Hypoxia)
- Electrolyte abnormality
- Psychiatric disorder

 Age Appropriate Airway Protocol(s) AR 1 - 7 if indicated	
EMR	Blood Glucose Analysis Procedure
	12 Lead ECG Procedure
 IV or IO Access Protocol UP 6	
 Age Appropriate Diabetic Protocol(s) AM 2/ PM 2 if indicated	



Altered Mental Status

Pearls

- **Recommended Exam:** Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.
- **AMS may present as a sign of an environmental toxin or Haz-Mat exposure, protect personal safety.**
- **General:**
 - **The patient with AMS poses one of the most significant challenges.**
 - **A careful assessment of the patient, the scene, and the circumstances should be undertaken.**
 - **Assume the patient has a life threatening cause of their AMS until proven otherwise.**
 - **Pay careful attention to the head exam for signs of bruising or other injury.**
 - **Information found at the scene must be communicated to the receiving facility.**
 - **Patients not able to communicate with you coherently require a complete secondary survey (head-to-toe) exam to assess for trauma, infection, or signs of maltreatment/ abuse, or neglect.**
 - **Acute Stroke should be considered in all patients with acute AMS when < 24 hours from onset.**
- **Substance misuse:**
 - Patients ingesting substances can pose a great challenge.
 - DO NOT assume recreational drug use and/ or alcohol are the sole reasons for AMS.
 - Misuse of alcohol/ recreational drugs may lead to hypoglycemia or occult trauma.
 - More serious underlying medical and trauma conditions may be the cause.
- **Behavioral health:**
 - The behavioral health patient may present a great challenge in forming a differential.
 - DO NOT assume AMS is the result solely of an underlying psychiatric etiology.
 - Often an underlying medical or trauma condition precipitates a deterioration of a patients underlying disease.
- **Spinal Motion Restriction/ Trauma:**
 - Only utilize spinal immobilization if the situation warrants.
 - The patient with AMS may worsen with increased agitation when immobilized.
- **It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon**
- Consider Restraints if necessary for patient's and/ or personnel's protection per Restraints: Physical/Chemical procedure.

Back Pain

History

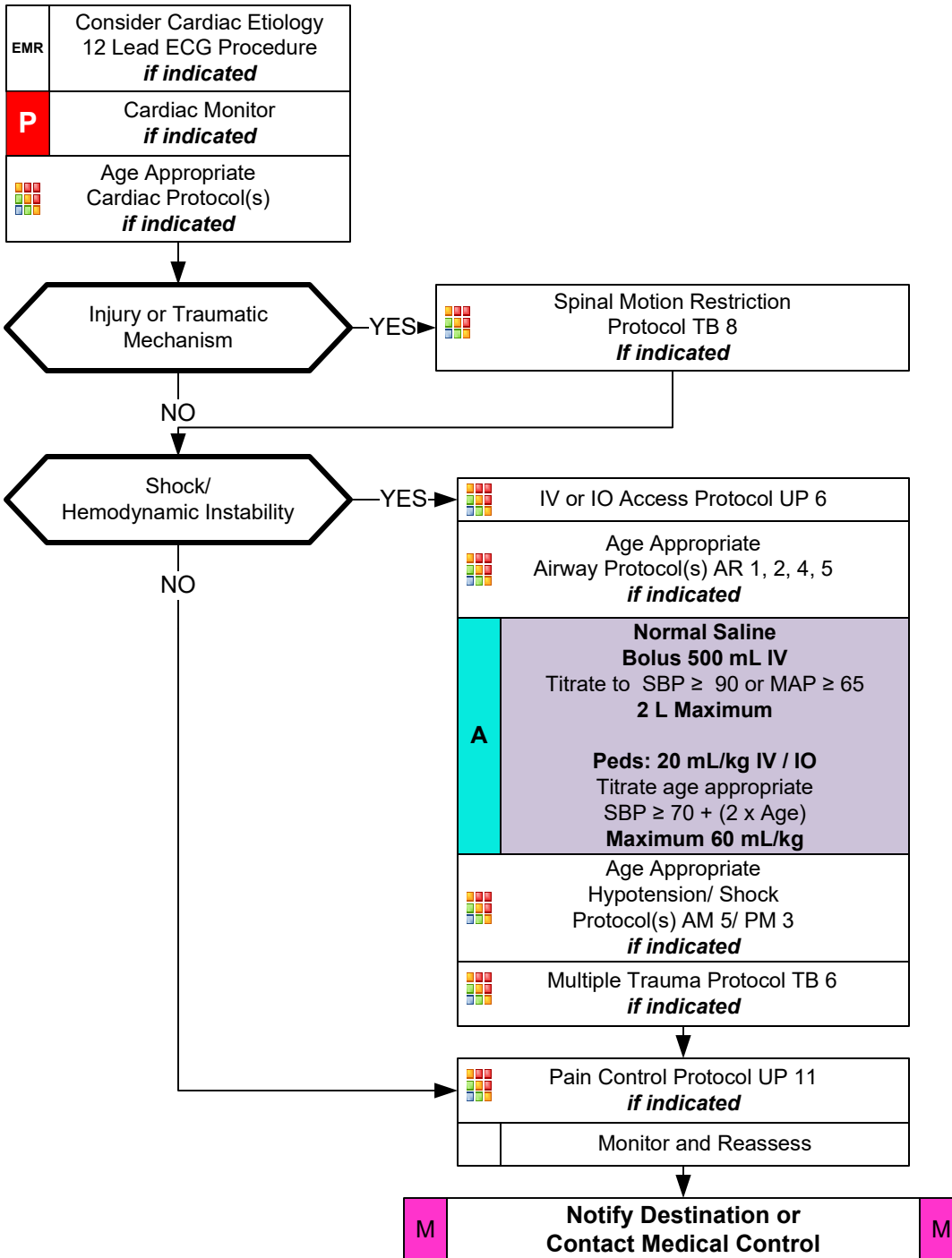
- Age
- Past medical history
- Past surgical history
- Medications
- Onset of pain / injury
- Previous back injury
- Traumatic mechanism
- Location of pain
- Fever
- Improvement or worsening with activity

Signs and Symptoms

- Pain (paraspinous, spinous process)
- Swelling
- Pain with range of motion
- Extremity weakness
- Extremity numbness
- Shooting pain into an extremity
- Bowel / bladder dysfunction

Differential

- Muscle spasm / strain
- Herniated disc with nerve compression
- Sciatica
- Spine fracture
- Kidney stone
- Pyelonephritis
- Aneurysm
- Pneumonia
- Spinal Epidural Abscess
- Metastatic Cancer
- AAA



Back Pain

Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Neuro, Lower extremity perfusion, Back**
- **Back pain is one of the most common complaints in medicine and affects more than 90% of adults at some point in their life. Back pain is also common in the pediatric population. Most often it is a benign process but in some circumstances can be life or limb threatening.**
- **Consider pregnancy or ectopic pregnancy with abdominal or back pain in women of childbearing age.**
- **Consider abdominal aortic aneurysm with abdominal pain especially in patients over 50 and/ or patients with shock/ poor perfusion. Patients may have abdominal pain and/ or lower extremity pain with diminished pulses. Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 35, diabetics and/ or women especially with upper abdominal complaints.**
- **Red Flags which may signal a more serious process associated with back pain:**
 - Age > 50 or < 18
 - Neurological deficit (leg weakness, urinary retention, or bowel incontinence)
 - IV Drug use
 - Fever
 - History of cancer, either current or remote
 - Night time pain in pediatric patients
- **Cauda equina syndrome is where the terminal nerves of spinal cord are being compressed (Symptoms include):**
 - Saddle anesthesia (numbness between the genitalia and rectum)
 - Recent onset of bladder and bowel dysfunction. (Urine retention and bowel incontinence)
 - Severe or progressive neurological deficit in the lower extremity.
 - Motor weakness of thigh muscles or foot drop
- **Back pain associated with infection:**
 - Fever/ chills.
 - IV Drug use (consider spinal infection)
 - Recent bacterial infection like pneumonia.
 - Immune suppression such as HIV or patients on chronic steroids like prednisone.
 - Meningitis.
- **Spinal motion restriction in patients with underlying spinal deformity should be maintained in their functional position.**
- **Kidney stones typically present with an acute onset of flank pain which radiates around to the groin area.**

IV or IO Access

History

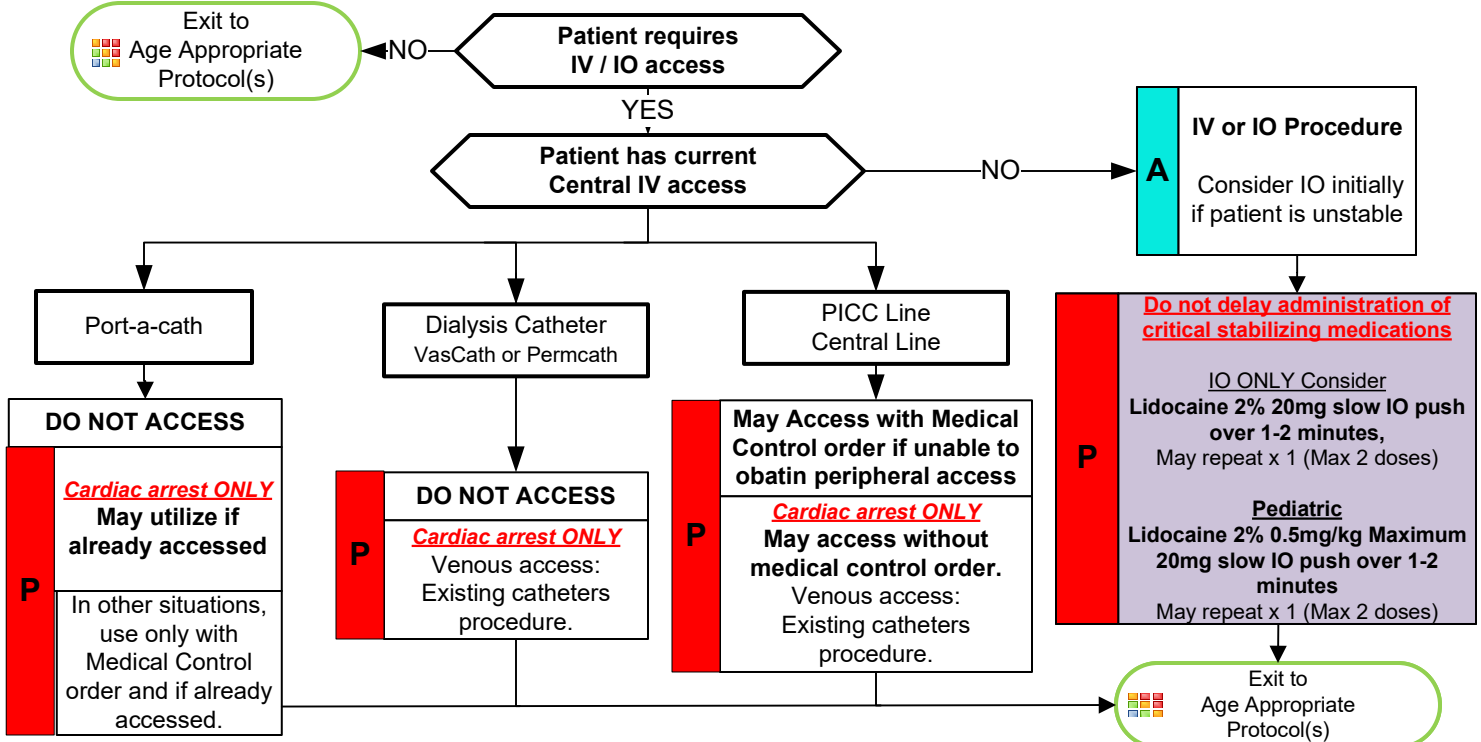
- Chronic medical conditions requiring recurrent need for IV access for medication, hydration, or blood sampling.
- Medical condition requiring administration of IV medications at home.
- End-stage renal disease requiring hemodialysis.
- Chronic medical condition requiring IV nutrition.

Signs and Symptoms

- Fever
- Bleeding
- Hypotension
- Redness, swelling, and/or pain at IV catheter site
- Shortness of breath
- Chest pain
- IV catheter patency

Differential

- Infection or sepsis
- Infection of catheter
- Clotted IV catheter
- Air embolism
- Pneumothorax
- Overdose of home medication
- Shock



Pearls

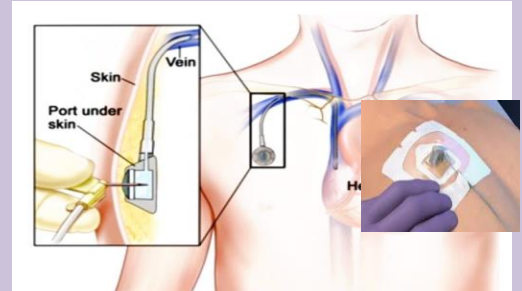
- Frequent encounter of patients with IV access devices and confusion as to which device can be accessed and used by EMS providers are common.
- If unclear about device use, always ask "Is this device used for dialysis?"
- When accessing central catheter, always ensure sterility of catheter connection point by cleaning port with alcohol, or similar disinfectant, 2 – 3 times prior to access.
- Central line catheters are available to paramedics for access, typically only if unable to obtain IV/IO access. Peripheral access is preferred. Medical control must be contacted for use of these catheters outside a cardiac arrest situation.
- Central line catheters placed for hemodialysis are NOT available for access by EMS providers unless the patient is in cardiac arrest.
- Long term IV access is frequently needed for a variety of indications:
 - Medication administration such as antibiotics, pain relief, or chemotherapy.
 - Administration of IV nutrition or feeding.
 - Need for multiple IV line access or recurrent blood sampling.
 - Poor vasculature requiring repeated attempts at IV access.
 - End-stage renal disease requiring hemodialysis.
- Common complications of central access devices:
 - Infection
 - Damage to vasculature
 - Air embolism
 - Loss of patency due to clogging or clotting
 - Pneumothorax

IV or IO Access

Types of IV catheters:

Port-a-Cath® :

Surgically implanted device allowing easy access to venous system.
The port and the catheter are all placed beneath the skin.
Requires a special kit and a specific needle to access.
Paramedic does NOT routinely access this device.
Paramedic may utilize if already accessed with needle/ extension.



Dialysis Catheter:

Surgically implanted device used to access the vasculature for hemodialysis.

May be tunneled under the skin with access on outside of skin surface or may be non-tunneled with greater portion of catheter on outside of skin surface.

Catheter has a RED port indicating use for dialysis:

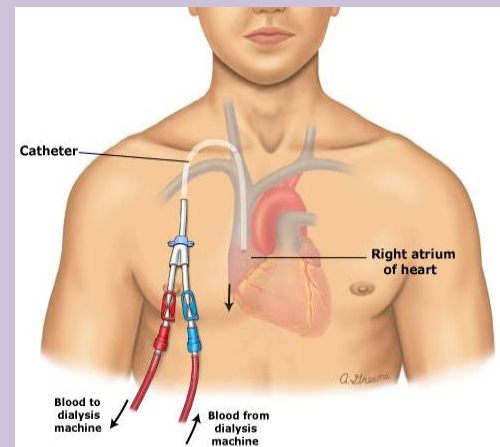
Most catheters have a RED port and a BLUE port.

Some catheters have a RED port and a WHITE port.

Dialysis catheters may be used for both short and long-term dialysis and should not be accessed or used for delivery of fluids, medications, antibiotics, or blood products as it increases risk of infection, which then requires removal and subsequent loss of dialysis access.

Paramedics do NOT routinely access this device.

Paramedics MAY access during cardiac arrest only
(Only if IV or IO access cannot be established.)



PICC (Peripherally Inserted Central Catheters):

Long catheter inserted into a vein in arm or leg (less common) with the tip of the catheter positioned into the central circulation.

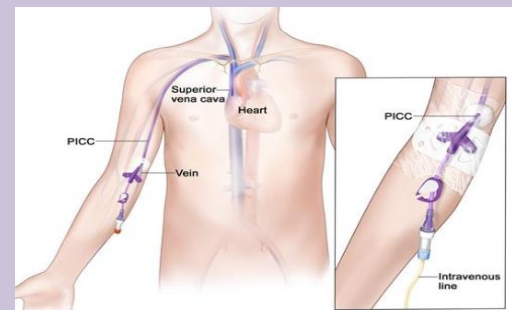
Used for long-term IV fluids, medication administration, blood administration or blood draws.

May have 1 or 2 ports (possibly more, but less common.)

Port ends usually white, blue, or purple. (May be red, less common and is not used for dialysis.)

Paramedic may access and utilize following clean technique with medical control order (usually only when unable to obtain peripheral IV/IO access).

Paramedic may access and utilize in cardiac arrest.



Central Lines:

Catheter placed in large vein in the neck, under the clavicle, or in the groin.

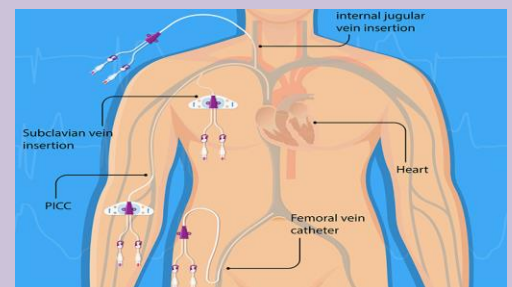
Used for long-term IV fluids, medication administration, blood administration or blood draws.

May have 1 - 4 ports (possibly more, but less common.)

Port ends usually white, blue, or purple. (May be red, less common and is not used for dialysis.)

Paramedic may access and utilize following sterile technique with medical control order (usually only when unable to obtain peripheral IV access).

Paramedic may access and utilize in cardiac arrest.



Dental Problems

History

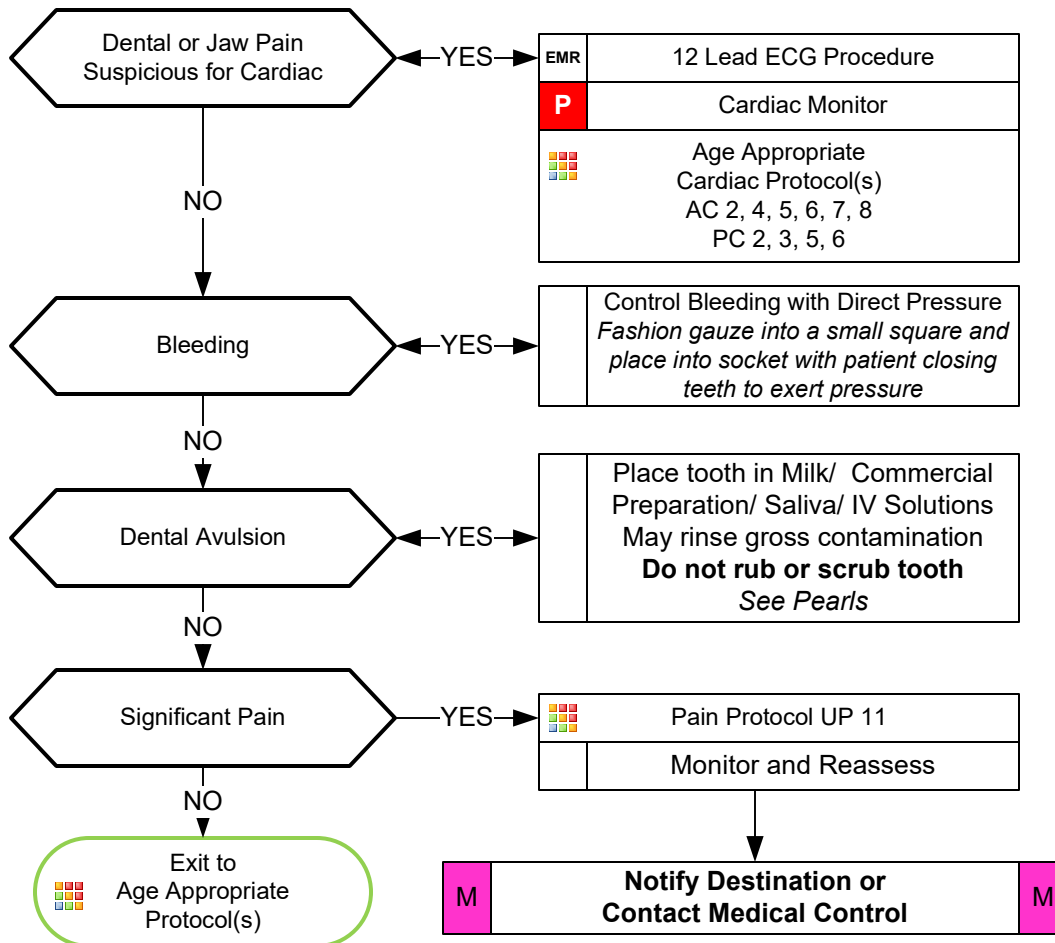
- Age
- Past medical history
- Medications
- Onset of pain / injury
- Trauma with "knocked out" tooth
- Location of tooth
- Whole vs. partial tooth injury

Signs and Symptoms

- Bleeding
- Pain
- Fever
- Swelling
- Tooth missing or fractured

Differential

- Decay
- Infection
- Fracture
- Avulsion
- Abscess
- Facial cellulitis
- Impacted tooth (wisdom)
- TMJ syndrome
- Myocardial infarction



Pearls

- **Recommended Exam: Mental Status, HEENT, Neck, Chest, Lungs, Neuro**
- Significant soft tissue swelling to the face or oral cavity can represent a cellulitis or abscess.
- Scene and transport times should be minimized in complete tooth avulsions. Reimplantation is possible within 4 hours if the tooth is properly cared for, but unlikely when > 1 hour from time of injury.
- Cardiac chest pain may radiate to the jaw and teeth mimicking dental pain.
- **Avulsed tooth:**
 - Handle tooth by the crown, do not touch the root.
 - Rinse tooth if soiled but do not scrub, as this can damage the ligaments vital for possible reimplantation.
 - Rinse with mild, commercial tooth solution, normal saline or lactated ringers, or the patient's own saliva if dry.
 - Transport tooth in milk, commercial solution, patient's own saliva, or IV solution in a container to protect.

Indwelling Central Line Emergencies

History

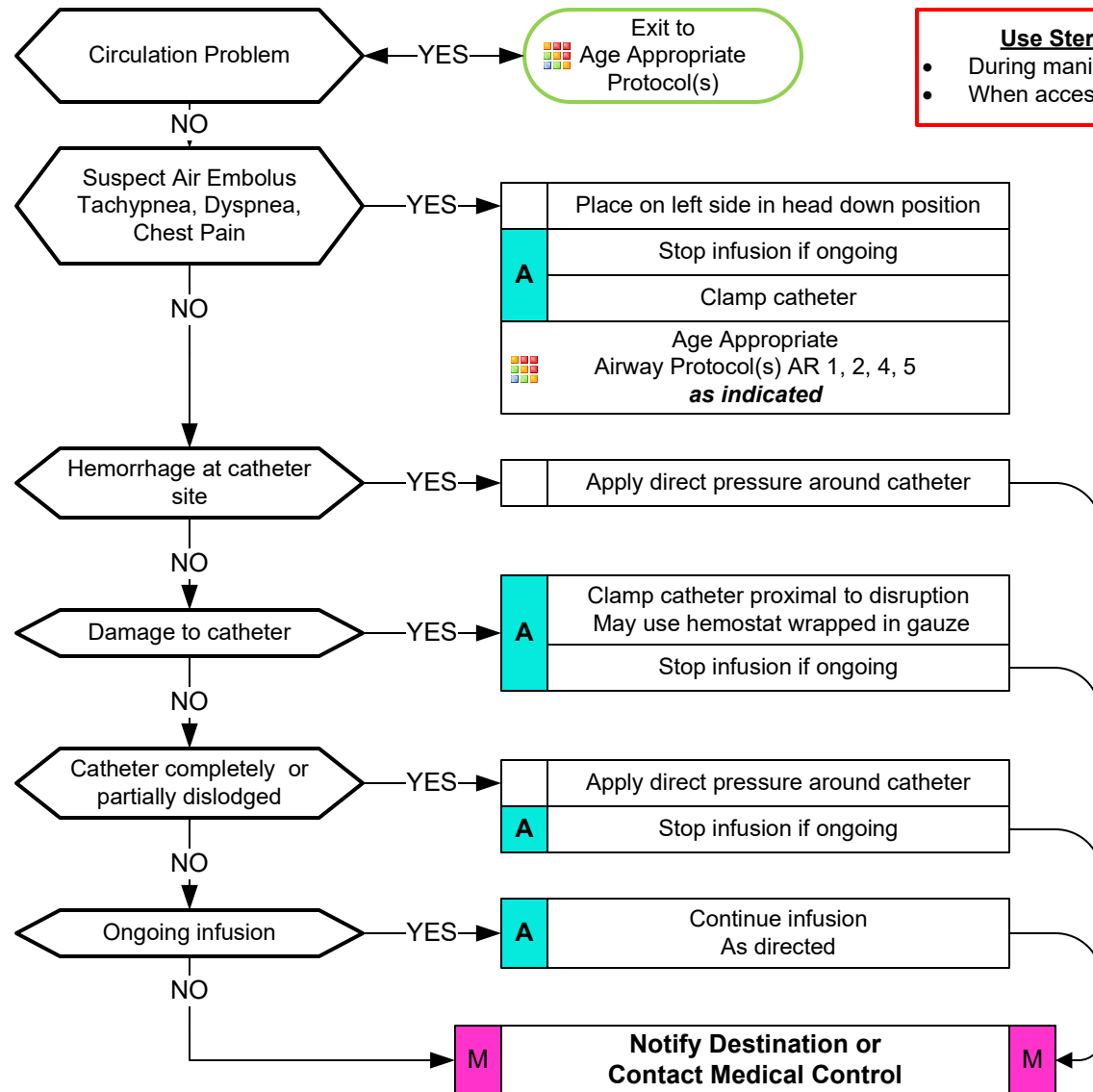
- Central Venous Catheter Type
Tunneled Catheter
(Broviac/ Hickman)
- PICC (peripherally inserted
central catheter)
- Implanted catheter
(Mediport/ Hickman)
- Occlusion of line
- Complete or partial dislodge
- Complete or partial disruption

Signs and Symptoms

- External catheter dislodgement
- Complete catheter dislodgement
- Damaged catheter
- Bleeding at catheter site
- Internal bleeding
- Blood clot
- Air embolus
- Erythema, warmth or drainage
about catheter site indicating
infection

Differential

- Fever
- Hemorrhage
- Reactions from home nutrient or medication
- Respiratory distress
- Shock



Use Sterile Technique:

- During manipulation of central line
- When accessing central line

Pearls

- Always involve family/ caregivers as they may have specific knowledge and skills related to catheter device.**
- Use strict sterile technique when accessing/ manipulating an indwelling catheter.**
- Cardiac arrest: May access central catheter and utilize if functioning properly.**
- Do not attempt to force catheter open if occlusion evident.
- Some infusions may be detrimental to stop. Ask family or caregiver if it is appropriate to stop or change infusion – ONLY AT PARAMEDIC LEVEL.
- Hyperalimentation infusions (IV nutrition): If stopped for any reason, monitor for hypoglycemia.

Epistaxis

History

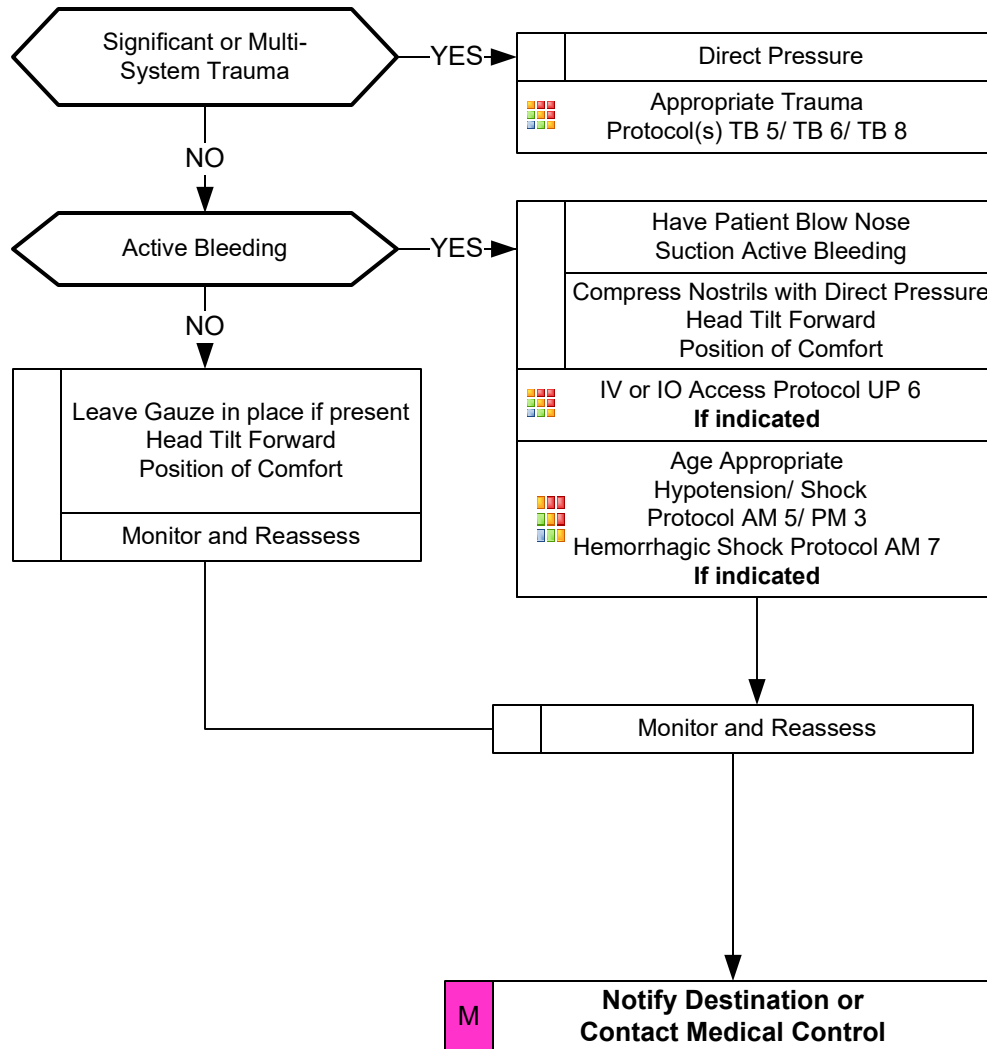
- Age
- Past medical history
- Medications (HTN, anticoagulants, aspirin, NSAIDs)
- Previous episodes of epistaxis
- Trauma
- Duration of bleeding
- Quantity of bleeding

Signs and Symptoms

- Bleeding from nasal passage
- Pain
- Nausea
- Vomiting

Differential

- Trauma
- Infection (viral URI or Sinusitis)
- Allergic rhinitis
- Lesions (polyps, ulcers)
- Hypertension



Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60
 Ages ≥ 1 month: SBP < 70
 Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90
 Ages ≥ 65: SBP < 110

All ages Shock Index:
 HR > SBP

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- 20 minutes of continuous pressure should be maintained without letting up.
- It is very difficult to quantify the amount of blood loss with epistaxis.
- Bleeding may also be occurring posteriorly. Evaluate for posterior blood loss by examining the posterior pharynx.
- Anticoagulants include warfarin (Coumadin), Apixaban (Eliquis), heparin, enoxaparin (Lovenox), dabigatran (Pradaxa), rivaroxaban (Xarelto).
- Anti-platelet agents like aspirin, clopidogrel (Plavix), aspirin/ dipyridamole (Aggrenox), ticlopidine (Ticlid), apixaban (Eliquis) and many over the counter headache relief powders can contribute to bleeding .

Fever/ Infection Control

History

- Age
- Duration of fever
- Severity of fever
- Past medical history
- Medications
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Environmental exposure
- Last acetaminophen or ibuprofen

Signs and Symptoms

- Warm
- Flushed
- Sweaty
- Chills/Rigors

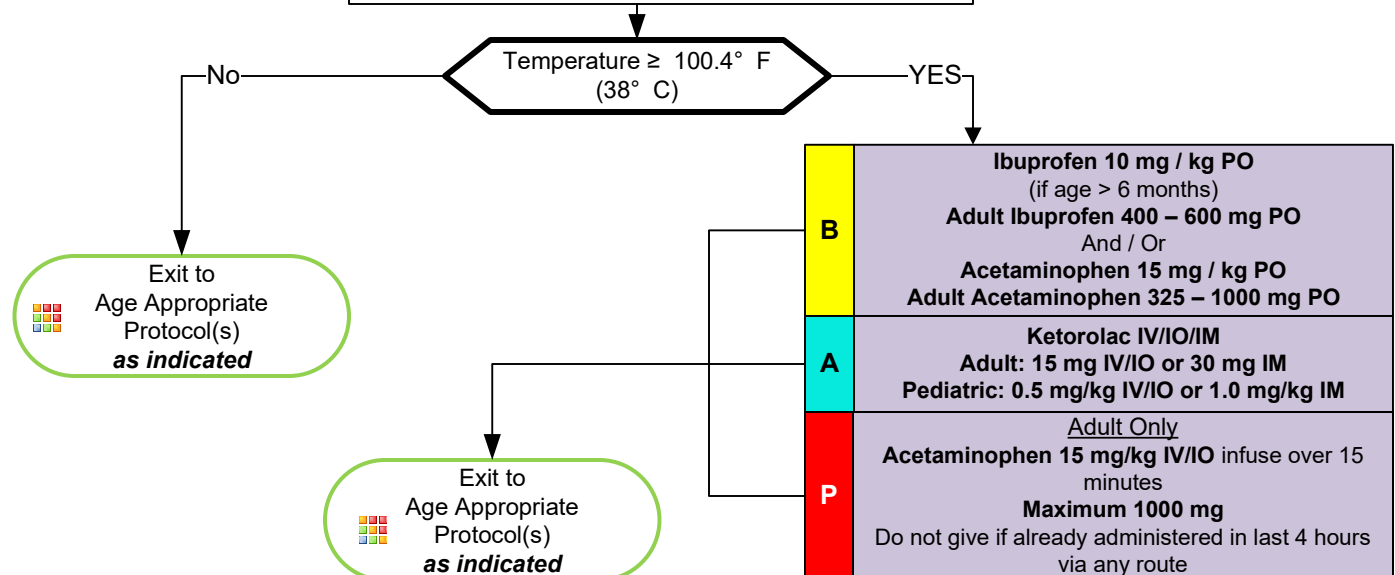
Associated Symptoms (Helpful to localize source)

- Myalgias, cough, chest pain, headache, dysuria, abdominal pain, mental status changes, rash

Differential

- Infections / Sepsis
- Cancer / Tumors / Lymphomas
- Medication or drug reaction
- Connective tissue disease
 - Arthritis
 - Vasculitis
- Hyperthyroidism
- Heat Stroke
- Meningitis

	Contact, Droplet, and Airborne Precautions See Pearls
EMR	Temperature Measurement
	IV or IO Access Protocol UP 6 If indicated



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.
- Patients with a history of liver failure should not receive acetaminophen.
- **Acetaminophen IV /IO:**
 - Preference would be to infuse with use of IV pump. If IV pump not available may infuse without pump but should still be infused over minimum of 15 minutes.
 - If not using an IV pump and dose is <1000mg remove extra medication using syringe before infusing to prevent accidental overdose
- **Airborne precautions** include standard PPE plus an N95 mask and eye protection for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient. This level of precaution should be utilized when illnesses spread via small particulates are suspected. (e.g. **Tuberculosis**)
- **Droplet precautions** include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient. This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected. A patient with a potentially infectious rash should be treated with droplet precautions.
- **Contact precautions** include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions. This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- **All-hazards precautions** include standard PPE plus airborne precautions plus contact precautions. This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. **SARS, SARS-CoV-2, COVID-19, MERS, Monkeypox**).
- Rehydration with fluids increases the patient's ability to sweat and improves heat loss.
- Allergies to NSAIDs (non-steroidal anti-inflammatory medications) are a contraindication to Ibuprofen. Do not give to patients who have renal disease or renal transplant.
- Avoid NSAIDs and acetaminophen in the setting of environmental heat emergencies.
- **Do not** give aspirin to a child, age ≤ 15 years.

Pain Control

History

- Age
- Location
- Duration
- Severity (1 - 10)
- If child use Wong-Baker faces scale
- Past medical history
- Medications
- Drug allergies

Signs and Symptoms

- Severity (pain scale)
- Quality (sharp, dull, etc.)
- Radiation
- Relation to movement, respiration
- Increased with palpation of area

Differential

- Per the specific protocol
- Musculoskeletal
- Visceral (abdominal)
- Cardiac
- Pleural/ Respiratory
- Neurogenic
- Renal (colic)



Specific Complaint Protocol

Assess Pain Severity

Combination of Pain Scale, MOI, circumstances, Injury or Illness severity

Mild

Moderate to Severe

B	Ibuprofen 10 mg/kg PO (If age > 6 months) (400 – 600 mg typical adult) Maximum 800 mg Or Acetaminophen 15 mg/kg PO (325 – 1000 mg typical adult) Maximum 1000 mg
	Adult Only Acetaminophen 15 mg/kg IV/IO infuse over 15 minutes Maximum 1000 mg Do not give if already administered in last 4 hours via any route
If no improvement Consider IV or IO Access Protocol UP 6 if indicated	
Monitor and Reassess Every 10 minutes	

IV or IO Access Protocol UP 6	
A	Ketorolac 15 mg IV / IO 30 mg IM Peds: 0.5 mg/kg IV / IO 1.0 mg/kg IM Maximum 30 mg
	Cardiac Monitor
P	Fentanyl 25 – 100 mcg IV / IO / IM / IN Repeat every 5 minutes Maximum 3 mcg/kg Peds: 1 mcg/kg IV / IO / IM / IN May repeat 0.5 mcg/kg every 5 minutes Maximum 2 mcg/kg
	Ketamine 0.3 mg/kg IV / IO Infuse or IV push over 10 minutes May repeat in 20 minutes x2 Maximum 30 mg single dose Or Ketamine 1 mg/kg IN Maximum 100mg (1mL) in each nare and 5mg/kg total
Monitor and Reassess Every 10 minutes	
M	Notify Destination or Contact Medical Control

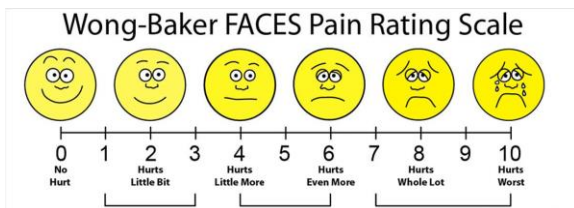
Universal Protocol Section

Pain Control

Pearls

- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded before and after medication delivery and at patient hand off. Monitor BP closely as sedative and pain control agents may cause hypotension.**
- **Ketamine: caution when using for pain control:**
Slow infusion or IV push over 10 minutes is associated with less side effects. Do not administer by rapid IV push.
Both arms of the treatment protocol may be used in concert. For patients in Moderate pain for instance, you may use the combination of an oral medication and parenteral if no contraindications are present.
- **Acetaminophen IV /IO:**
Preference would be to infuse with use of IV pump. If IV pump not available may infuse without pump but should still be infused over minimum of 15 minutes.
If not using an IV pump and dose is <1000mg remove extra medication using syringe before infusing to prevent accidental overdose
- **Pediatrics:**
For children use Numeric (> 9 yrs), Wong-Baker faces (4-16yrs) or FLACC scale (0-7 yrs) as needed to assess pain.

Wong-Baker Faces Scale



FLACC Scale

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

- **Vital signs should be obtained before, 10 minutes after, and at patient hand off with all pain medications.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction in the event no transport occurs.
- Do not administer **Acetaminophen** to patients with a history of liver disease.
- Burn patients may required higher than usual opioid doses to titrate adequate pain control.
- Consider anti-emetic(s) for nausea and/ or vomiting.
- Avoid NSAIDS in cases of renal disease.

Police Custody

History

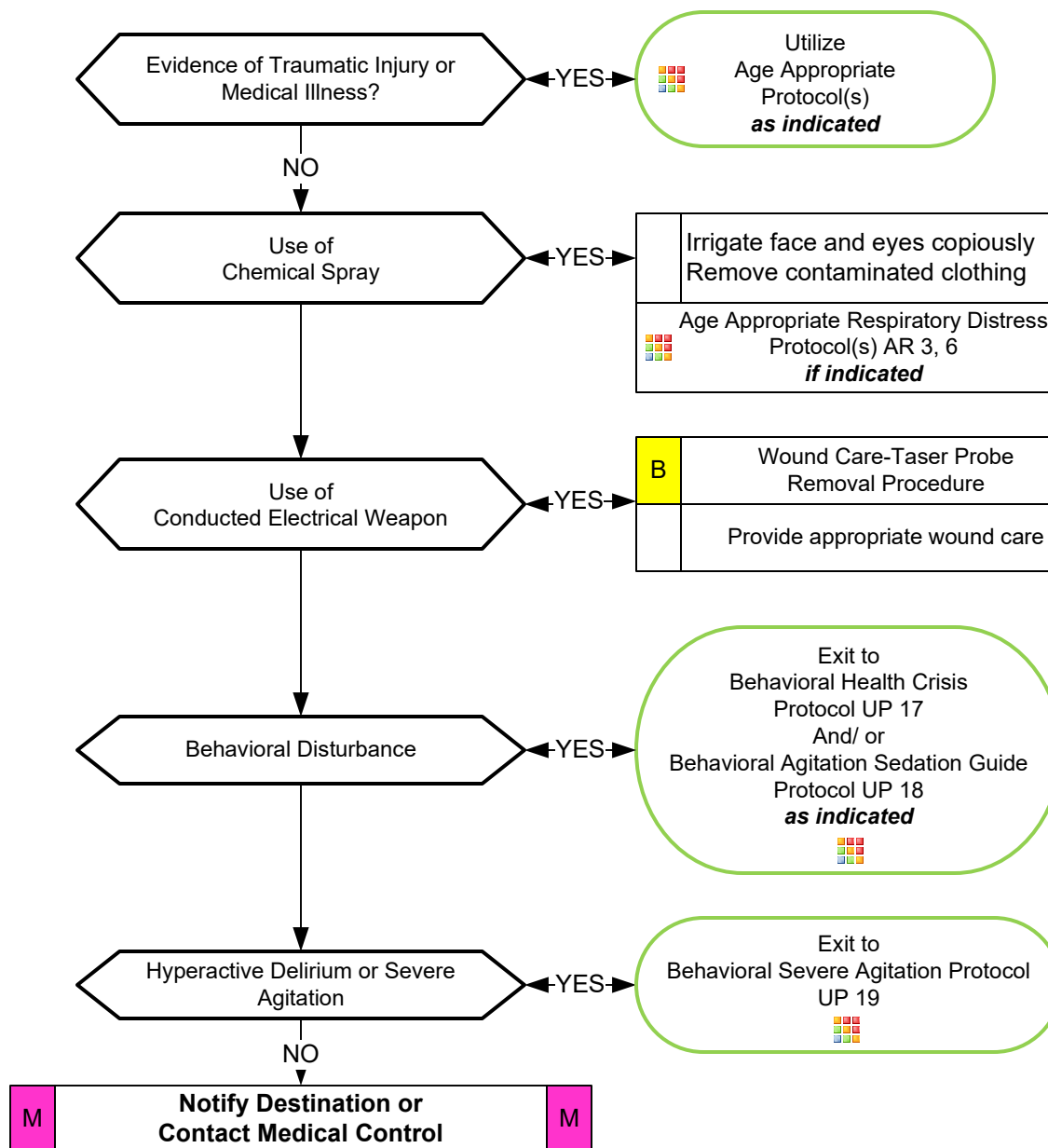
- Traumatic Injury
- Drug Abuse
- Cardiac History
- History of Asthma
- Psychiatric History

Signs and Symptoms

- External signs of trauma
- Palpitations
- Shortness of breath
- Wheezing
- Altered Mental Status
- Intoxication/Substance Abuse

Differential

- Agitated Delirium Secondary to Psychiatric Illness
- Agitated Delirium Secondary to Substance Abuse
- Traumatic Injury
- Closed Head Injury
- Asthma Exacerbation
- Cardiac Dysrhythmia



Police Custody

Pearls

- **Patient does not have to be in police custody or under arrest to utilize this protocol.**
- **Agencies should work together to formulate a disposition in the best interest of the patient.**
- **Patients restrained by law enforcement devices must be transported and accompanied by a law enforcement officer in the patient compartment who is capable of removing the devices.**
- **All patients who receive either physical and chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- If an asthmatic patient is exposed to irritant/ pepper spray and released to law enforcement, all parties should be advised to immediately contact EMS if wheezing/ difficulty breathing occurs.
- All patients with decision-making capacity in police custody retain the right to participate in decision-making regarding their care and may request care or refuse care of EMS.
- If extremity/ chemical/ law enforcement restraints are applied, follow restraint procedure.
- **Hyperactive Delirium with Severe Agitation:**
- Medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent/ bizarre behavior, insensitivity to pain, hyperthermia and increased strength.
- Potentially life-threatening and associated with use of physical control measures, including physical restraints and Tasers.
- Most commonly seen in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines or similar agents. Alcohol withdrawal or head trauma may also contribute to the condition.
- **If patient suspected of Hyperactive Delirium with Severe Agitation suffers cardiac arrest, consider a fluid bolus, administration of calcium gluconate (or chloride), and sodium bicarbonate early.**
- Never transport in prone position. Get the patient out of prone position as soon as possible.
- Patients exposed to chemical spray, with or without history of respiratory disease, may develop respiratory complaints up to 20 minutes post exposure.

Seizure

History

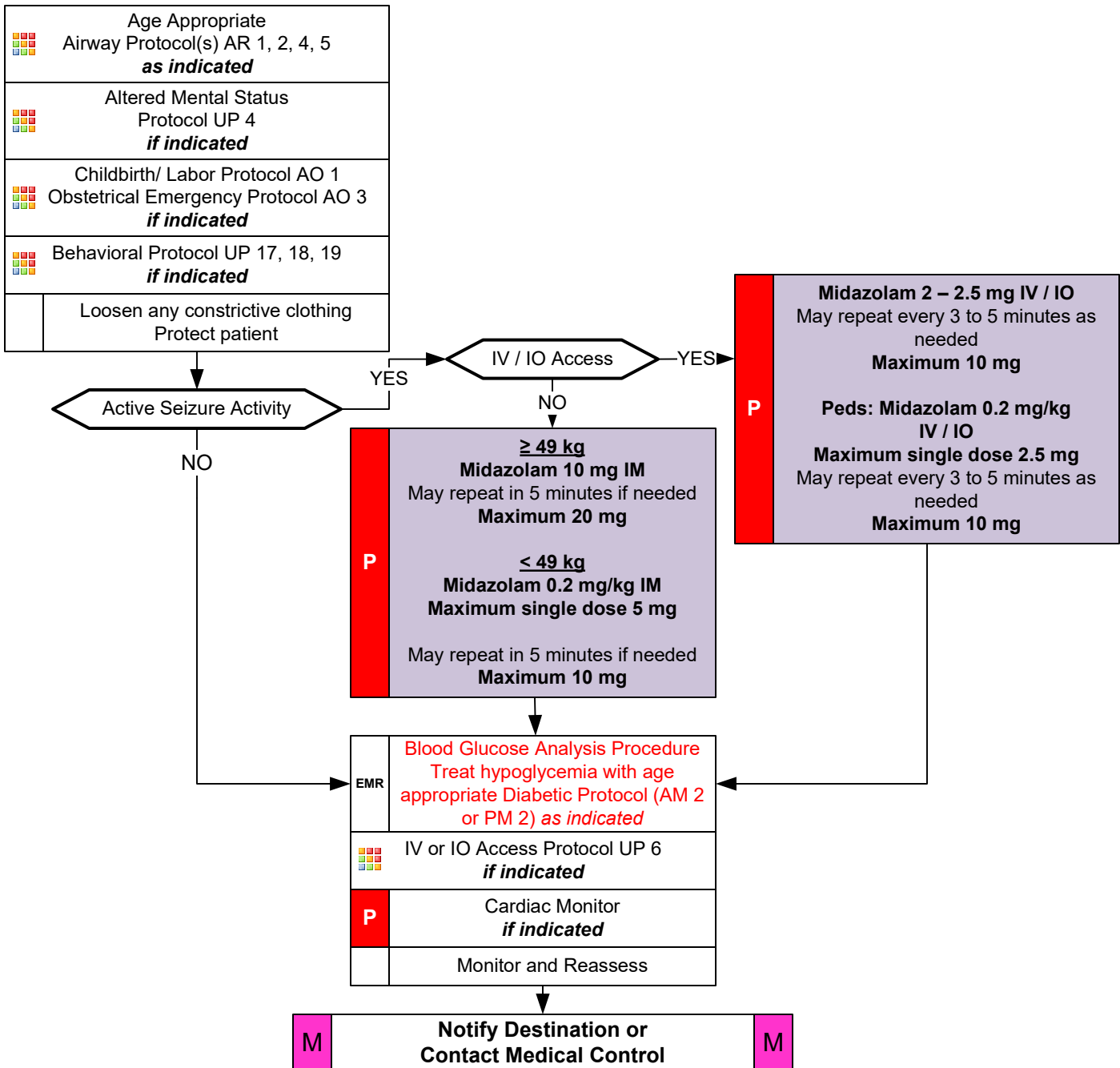
- Reported / witnessed seizure activity
- Previous seizure history
- Medical alert tag information
- Seizure medications
- History of trauma
- History of diabetes
- History of pregnancy
- Time of seizure onset
- Document number of seizures
- Alcohol use, abuse or abrupt cessation
- Fever

Signs and Symptoms

- Decreased mental status
- Sleepiness
- Incontinence
- Observed seizure activity
- Evidence of trauma
- Unconscious

Differential

- CNS (Head) trauma
- Tumor
- Metabolic, Hepatic, or Renal failure
- Hypoxia
- Electrolyte abnormality (Na, Ca, Mg)
- Drugs, Medications, Non-compliance
- Infection / Fever
- Alcohol withdrawal
- Eclampsia
- Stroke
- Hyperthermia
- Hypoglycemia



Seizure

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **Brief seizure-like activity can be seen following ventricular fibrillation or ventricular tachycardia associated cardiac arrest.**
- **Status epilepticus is defined by seizure activity lasting > 5 minutes or multiple seizures without return to baseline.**
- **Most seizure activity is brief, lasting only 1 – 2 minutes, and is associated with transient hypoventilation.**
- **Be prepared for airway problems and continued seizures.**
- **Seizure activity may be a marker of closed head injury, especially in the very young, examine for trauma.**
- **Adult:**
 - **Midazolam 10 mg IM is effective in termination of seizures.**
 - **Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.**
- **Pediatrics:**
 - **Midazolam 0.2 mg/kg (Maximum 5 mg) IM is effective in termination of seizures.**
 - **Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.**
- **Do not delay administration of anti-epileptic drugs to check for blood glucose.**
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures** affect only a part of the body and are not usually associated with a loss of consciousness, but can propagate to generalized seizures with loss of consciousness.
- **Be prepared to assist ventilations especially if midazolam is used.**
- **Optimal conditions for patients refusing transport following a seizure:**

Known history of seizures/epilepsy	Seizure not associated with drugs or alcohol
Full recovery to baseline mental status	Only 1 seizure episode in the past hour
No injuries requiring treatment or evaluation	Seizure not associated with pregnancy
Adequate supervision	

Suspected Stroke

History

- Previous CVA, TIA's
- Previous cardiac / vascular surgery
- Associated diseases: diabetes, hypertension, CAD
- Atrial fibrillation
- Medications (blood thinners)
- History of trauma
- Sickle Cell Disease
- Immune disorders
- Congenital heart defects
- Maternal infection / hypertension

Signs and Symptoms

- Altered mental status
- Weakness / Paralysis
- Blindness or other sensory loss
- Aphasia / Dysarthria
- Syncope
- Vertigo / Dizziness
- Vomiting
- Headache
- Seizures
- Respiratory pattern change
- Hypertension / hypotension

Differential

- See Altered Mental Status
- TIA (Transient ischemic attack)
- Seizure
- Todd's Paralysis
- Hypoglycemia
- Stroke
 - Thrombotic or Embolic (~85%)
 - Hemorrhagic (~15%)
- Tumor
- Trauma
- Dialysis / Renal Failure

	EMS Stroke Screen Assessment
EMR	Blood Glucose Analysis Procedure
	Treat hypoglycemia per age appropriate Diabetic protocol (AM 2, PM 2)

Exit to
Appropriate
Protocol(s)
as indicated

NO → **Consistent with Acute Stroke**

YES

Determine:
1. Last Known Well Time
2. Time of Symptom Discovery

Keep Scene Time to ≤ 15 Minutes
Provide Early Notifications of Destination Facility Suspected Stroke Alert

	Altered Mental Status Protocol UP 4 if indicated
EMR	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6
	Age Appropriate Cardiac Protocol(s) AC 2, 4, 5, 6, 7, 8 PC 2, 3, 5, 6 if indicated
	Seizure Protocol UP 13 if indicated

M **Notify Destination or Contact Medical Control** **M**

Suspected Stroke

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures.**
- **Acute Stroke care is evolving rapidly. Time of Onset/ Last Seen Normal may be changed at any time depending on the capabilities and resources of your regional hospital(s).**
- **Time of Onset or Last Seen Normal:**
Be very precise in gathering data to establish the time of onset and report as an actual time (i.e. 13:47 NOT “about 45 minutes ago.”)
Without this information patient may not be able to receive thrombolytics at facility.
Wake up stroke: Time starts when patient last awake or symptom free.
- **Time of Symptom Discovery:**
Time when symptoms of stroke are first noticed by patient, bystanders, witnesses, or family/ caregivers.
- **Sources of information pertaining to Last Known Well Time or Symptoms Onset:**
You are often in the best position to determine the actual Time of Onset while you have family, friends or caretakers available.
Often these sources of information may arrive well after you have delivered the patient to the hospital. Delays in decisions due to lack of information may negatively impact patient care.
Obtain contact information (CELL phone number and name) of best witnesses and give to hospital providers.
- The differential listed in the UP 4 Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- Document the EMS Stroke Screen, in the ePCR.
- **Pediatrics:**
Strokes do occur in children, they are slightly more common in ages < 2, in boys, and in African-Americans. Newborn and infant symptoms consist of seizures, extreme sleepiness, and using only one side of the body. Children and teenagers symptoms may consist of severe headaches, vomiting, sleepiness, dizziness, and/or loss of balance or coordination.

Suspected Sepsis

History

- Duration and severity of fever
- Past medical history
- Medications/ Recent antibiotics
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Indwelling medical device
- Last acetaminophen or ibuprofen
- Recent Hospital/ healthcare facility
- Bedridden or immobile
- Elderly and very young – at risk
- Prosthetic device / indwelling device

Signs and Symptoms

- Warm
- Flushed
- Sweaty
- Chills/ Rigors
- Delayed cap refill
- Mental status changes

Associated Symptoms (Helpful to localize source)

- myalgias, cough, chest pain, headache, dysuria, abdominal pain, rash

Differential

- Infections: UTI, Pneumonia, skin/ wound
- Cancer/ Tumors/ Lymphomas
- Medication or drug reaction
- Connective tissue disease: Arthritis, Vasculitis
- Hyperthyroidism
- Heat Stroke
- Meningitis
- Hypoglycemia/hypothermia
- MI/ CVA

Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60
Ages ≥ 1 month: SBP < 70
Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90
Ages ≥ 65: SBP < 110

All ages Shock Index:
HR > SBP

Consider: Contact, Droplet, and Airborne Precautions

Temperature Measurement Procedure
if available



Fever/ Infection Control Protocol UP 10
if needed



Altered Mental Status Protocol UP 4
if needed



12 Lead ECG Procedure



IV or IO Access Protocol UP 6
If indicated



Cardiac Monitor

Exit to
Age Appropriate
Condition Appropriate
Protocol(s)

Sepsis Screen
Positive

A

Normal Saline 500 mL Bolus
Repeat as needed
Titrate SPB ≥ 90 mmHg or
MAP > 65 mmHg
Maximum 2 L

Peds: 20 mL/kg IV / IO
Repeat to titrate
Age Appropriate
SBP ≥ 70 + 2 x Age
Maximum 60 mL/kg

P

If no improvement with fluid
administration, consider
norepinephrine

Norepinephrine
4mg in 250ml D5W,
infuse @ 2-10mcg/min
Peds: 0.05-0.1 mcg/kg/min
Max of 2mcg/kg/min

Titrate to SBP>90 or MAP >65 (or
age appropriate minimum SBP) and/
or signs of improved perfusion

Adult Only: May consider **push**
dose epinephrine 5-20mcg (0.5-
2ml) every 1-5 minutes until
Norepinephrine drip started.

Age Appropriate
Hypotension/ Shock
Protocol AM 5/ PM 3

MAP
(Mean Arterial Pressure)

$SBP + 2(DBP)$
3

Monitor usually calculates this
value on screen

Adult SIRS Criteria

Temperature
≥ 100.4° F (38° C)
Or
≤ 96.8° F (36° C)

AND

Any 1 of the following:
HR > 90
RR > 20
EtCO < 25 mmHg

Pediatrics SIRS Criteria

Temperature
Same as adult

AND

Heart Rate

1 month – 1 year > 180
2 – 5 years > 140
6 – 12 years > 130
13 – 18 years > 120

Notify Destination or
Contact Medical Control

Universal Protocol Section

Suspected Sepsis

Pearls

- **Recommended Exam:** Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- **Recommended Exam Pediatrics:** In childhood, physical assessment reveals important clues for sepsis. Look for mental status abnormalities such as anxiety, restlessness, agitation, irritability, confusion, or lethargy. Cardiovascular findings to look for include cool distal extremities, capillary refill >3 seconds, or mottled skin.
- Sepsis is a life threatening condition where the body's immune response to infection injures its own tissues and organs.
- Severe sepsis is a suspected infection with 2 or more SIRS criteria along with organ dysfunction, such as AMS, hypotension, or hypoxia.
- Perfusion unimproved after fluid bolus.
- Following each fluid bolus, assess for pulmonary edema. Consider administration of norepinephrine.
- Supplemental oxygen should be given and titrated to oxygenation saturation $\geq 92\%$.
- EKG should be obtained with suspected sepsis, but should not delay care in order to obtain.
- Abnormally low temperatures increase mortality and are found often in geriatric patients.
- Quantitative waveform capnography can be a reliable surrogate for lactate monitoring in detecting metabolic distress in sepsis patients. EtCO₂ < 25 mm Hg are associated with serum lactate levels > 4 mmol/L.
- Patients with a history of liver failure should not receive acetaminophen.
- **Droplet precautions** include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient. This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected. A patient with a potentially infectious rash should be treated with droplet precautions.
- **Airborne precautions** include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions. This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- **All-hazards precautions** include standard PPE plus airborne precautions plus contact precautions. This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS, SARS-CoV-2, COVID-19, MERS, Monkeypox).

Syncope

History

- Cardiac history, stroke, seizure
- Occult blood loss (GI, ectopic)
- Females: LMP, vaginal bleeding
- Fluid loss: nausea, vomiting, diarrhea
- Past medical history
- Medications

Signs and Symptoms

- Loss of consciousness with recovery
- Lightheadedness, dizziness
- Palpitations, slow or rapid pulse
- Pulse irregularity
- Decreased blood pressure

Differential

- Vasovagal
- Orthostatic hypotension
- Cardiac syncope
- Micturition / Defecation syncope
- Psychiatric
- Stroke
- Hypoglycemia
- Seizure
- Shock (see Shock Protocol)
- Toxicological (Alcohol)
- Medication effect (hypertension)
- PE
- AAA

 Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 if indicated	
EMR	Blood Glucose Analysis Procedure Treat hypoglycemia per age appropriate Diabetic Protocol (PM 2 or AM 2)
	12 Lead ECG Procedure
 IV or IO Access Protocol UP 6	
P	Cardiac Monitor
 Altered Mental Status Protocol UP 4 if indicated	
 Age Appropriate Cardiac Protocol(s) AC 2, 4, 5, 6, 7, 8 PC 2, 3, 5, 6 if indicated	
 Age Appropriate Hypotension/ Shock Protocol AM 5/ PM 3 if indicated	
 Multiple Trauma Protocol TB 6 Spinal Motion Restriction Procedure/ Protocol TB 8 if indicated	

Serious Signs/ Symptoms
Hypotension, poor
perfusion, shock

YES →

NO ↓

M

Notify Destination or
Contact Medical Control

M

Age Specific Blood Pressure indicating possible shock

Age 0 – 28 days: SBP < 60

Ages ≥ 1 month: SBP < 70

Age 1 – 9: SBP < 70 + (2x Age)

Ages 10 – 64: SBP < 90

Ages ≥ 65: SBP < 110

All ages Shock Index:
HR > SBP

 IV or IO Access Protocol UP 6 Consider 2 Large Bore sites	
A	Normal Saline 500 mL Bolus Repeat as needed Titrate SPB ≥ 90 mmHg or ≥ 65 Maximum 2 L
	Peds: 20 mL/kg IV / IO Repeat as needed SBP ≥ 70 + 2 x Age Maximum 60 mL/kg

Exit to
Age Appropriate
Condition Appropriate
Protocol(s)

Syncope

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Syncope is both loss of consciousness and loss of postural/ muscle tone with collapse. Symptoms preceding the event are important in determining etiology.**
- **Syncope often is due to a benign process but can be an indication of serious underlying disease in both the adult and pediatric patient.**
- **Often patients with syncope are found normal on EMS evaluation. In general patients experiencing syncope require cardiac monitoring and emergency department evaluation.**
- **Differential should remain wide and include:**

Cardiac arrhythmia	Neurological problem	Choking	Pulmonary embolism
Hemorrhage	Stroke	Respiratory	Hypo or Hyperglycemia
GI Hemorrhage	Seizure	Sepsis	
- **High-risk patients:**

Age $\geq$ 60	Syncope with exertion
History of CHF	Syncope with chest pain
Abnormal ECG	Syncope with dyspnea
- **Abdominal/ back pain in women of childbearing age should be treated as pregnancy related until proven otherwise.**
- **The diagnosis of abdominal aneurysm should be considered with abdominal pain, with or without back and/ or lower extremity pain or diminished pulses, especially in patients over 50 and/ or patients with shock/ poor perfusion. Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 35, diabetics, and/ or women especially with upper abdominal complaints.**
- **Heart Rate: Tachycardia is one of the first clinical signs of dehydration, typically increases as dehydration becomes more severe.**
- **Syncope with no preceding symptoms or event may be associated with an arrhythmia.**
- **Assess for signs and symptoms of trauma if associated or questionable fall with syncope.**
- **Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope.**
- **In general these patients should be transported: Patients who experience syncope associated with headache, neck pain, chest pain, abdominal pain, back pain, dyspnea, or dyspnea on exertion need prompt medical evaluation.**
- **More than 25% of geriatric syncope is cardiac dysrhythmia based.**

Behavioral Health Crisis

History

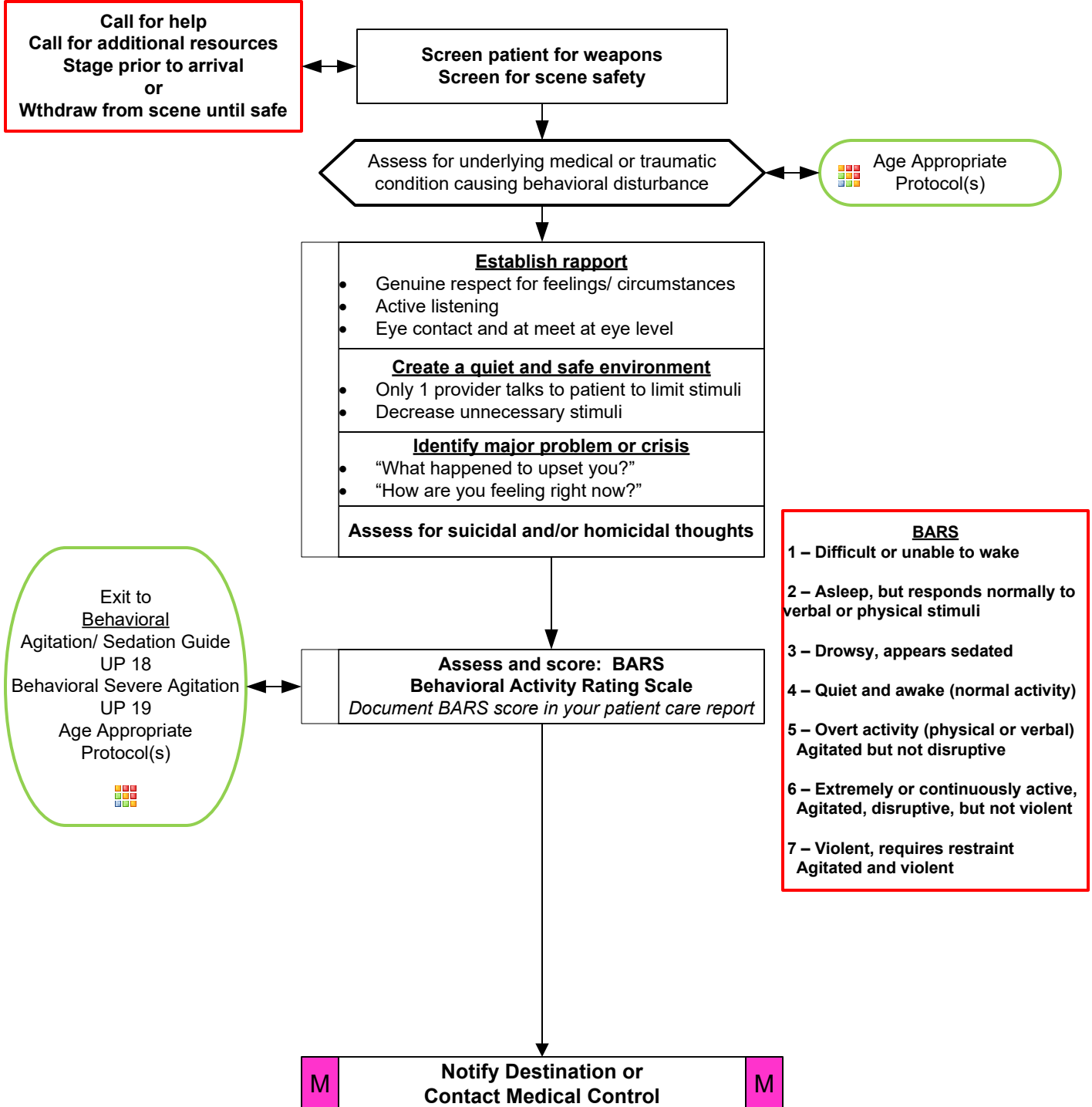
- Situational crisis
- Psychiatric illness/medications
- Injury to self or threats to others
- Medic alert tag
- Substance abuse / overdose
- Diabetes

Signs and Symptoms

- Anxiety, agitation, confusion
- Affect change, hallucinations
- Delusional thoughts, bizarre behavior
- Combative violent
- Expression of suicidal / homicidal thoughts

Differential

- Altered Mental Status
- Alcohol Intoxication
- Toxin / Substance abuse
- Medication effect / overdose / withdrawal
- Depression
- Bipolar (manic-depressive)
- Schizophrenia
- Anxiety disorders



Behavioral Health Crisis

Pearls

- **Recommended Exam:** Mental Status, Skin, Heart, Lungs, Neurologic status
- **Crew/ responders safety is the main priority.** Call for assistance, stage, or withdraw from scene if necessary.
- **Law Enforcement:**
Any patient who is handcuffed or placed in locked restraints by Law Enforcement and transported by EMS, must be accompanied by law enforcement during transport.
Patient should preferentially not be transported with upper extremities hand-cuffed behind back as this prevents proper assessment and could lead to injury.
Consider multidisciplinary coordination with law enforcement to approach verbal de-escalation, or restraint.
- **Maintain high-index of suspicion for underlying medical or traumatic disorder causing or contributing to behavioral disturbance. Medical causes more likely in ages < 12 or > 40.**
- **General communications techniques**
Ask Open-ended questions (questions that cannot be answered with a yes/no)
"Tell me how we can help you?" "What caused you to call 911 today?"
Active listening (stay engaged, be able to summarize patient's story, use your body language to convey listening)
Eye contact, nodding your head, periodically repeating back part of patient's story
Encouraging (remain positive, convey interest in patient's crisis)
"Tell me more about that..."
Clarifying questions (ask patient to rephrase or repeat if you don't understand)
"I'm not sure I understand, can you...?"
Emotional labeling (naming emotions patient is demonstrating, validating emotions)
"You look upset." "You seem angry."
Conversational pause (okay to allow a period of silence for patient to process information)
- **Behavioral health disturbance incidents are increasing and commonly involve the following:**

Substance misuse	Psychosis
Depression/ Anxiety/ Stress Reactions / Bipolar	Schizophrenia or schizophrenia-like illness
- **Restraints:**
All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.
Do not position or transport any restrained patient in such a way that could impact the patient's respiratory or circulatory status.
Patients should never be transported in the prone position and should be taken out of the prone position on scene as soon as possible.
- **Maintain high-index of suspicion for medical, trauma, abuse, or neglect causes:**
Hypoglycemia, hyperglycemia, overdose, substance abuse, hypoxia, head injury, shock, sepsis, stroke, etc.
Domestic violence, child or geriatric abuse/ neglect.
- **Extrapyramidal reactions:**
Condition causing involuntary muscle movements or spasms typically of the face, neck and upper extremities. May present with contorted movements. Typically an adverse reaction to antipsychotic drugs like Haloperidol. When recognized, paramedic may give **Diphenhydramine 50 mg IV / IO / IM / PO** in adults or **1 mg/kg IV / IO / IM / PO**.
Pediatric; max 50mg.

Behavioral Agitation/ Sedation Guide

Behavioral Activity Rating Scale (BARS)

Behavioral Activity Rating Scale
BARS scoring: 1 - 4

YES

No sedation required

Exit to
Age Appropriate
Protocol(s)

NO

Behavioral Activity Rating Scale
BARS scoring: 5

Agitated but not disruptive
Able to calm and redirect

YES

Verbal De-escalation

NO

NO

Condition Improving?

YES

Exit to
Age Appropriate
Protocol(s)

Behavioral Activity Rating Scale
BARS scoring: 6

Agitated and disruptive
Not violent

Yes

IV or IO Access Protocol UP 6
if indicated

Midazolam 2.5 mg IV / IO / IN
5 mg IM

Age ≥ 65
1 – 2.5 mg IV / IO / IN
2.5 mg IM

Peds: 0.1 – 0.2 mg/kg
IV / IO / IM / IN

All Ages: Repeat x1 (Max 2 doses) after 5 minutes if needed

Consider
Restraints Physical/Chemical Procedure
Monitor per restraint procedure
if indicated

NO

Condition Improving?

YES

Exit to
Age Appropriate
Protocol(s)

BARS

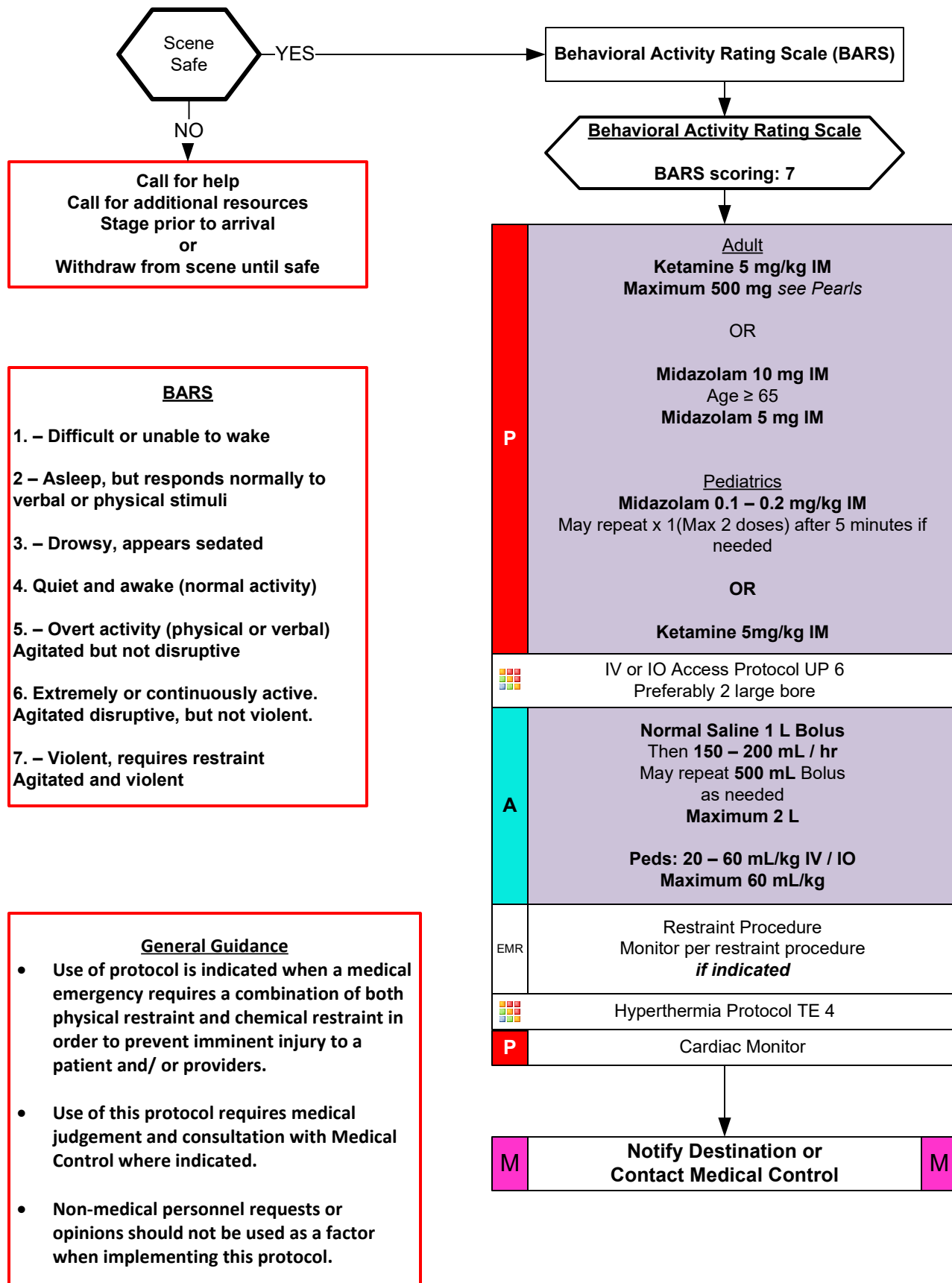
- 1 – Difficult or unable to wake
- 2 – Asleep, but responds normally to verbal or physical stimuli
- 3 – Drowsy, appears sedated
- 4 – Quiet and awake (normal activity)
- 5 – Overt activity (physical or verbal)
Agitated but not disruptive
- 6 – Extremely or continuously active,
Agitated, disruptive, but not violent
- 7 – Violent, requires restraint
Agitated and violent

Behavioral Activity Rating Scale
BARS scoring: 7

Agitated and violent

Exit to
Behavioral Severe Agitation
Protocol UP 19

Behavioral Severe Agitation



Behavioral Severe Agitation

Pearls

- **Any use of physical or chemical restraint requires continuous observation and reassessment by ALS personnel.**
- **Hyperactive Delirium with Severe Agitation:**
 - Medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent/ bizarre behavior, insensitivity to pain, hyperthermia and increased strength.
 - Potentially life-threatening and associated with use of physical control measures, including physical restraints.
 - Most commonly seen in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines or similar agents.
 - Alcohol or substance withdrawal as well as history of head trauma may also contribute to the condition.
- **Restraint use:**
 - Once restrained, prevent patient from continued struggle, which can worsen metabolic condition.
 - Prevent patient from assuming a prone position for prolonged period, move to supine position as quickly as possible.
 - Team approach for sedation and restraint
 - 1 provider for each limb.
 - 1 provider to lead restraint, maintain airway and control head.
 - 1 Provider to administer medication.
 - Do not position prone or prone with restraints, as this can impede respiration and ventilation.
- Hyperthermia: Assess for and treat hyperthermia.