



Altered Mental Status

History

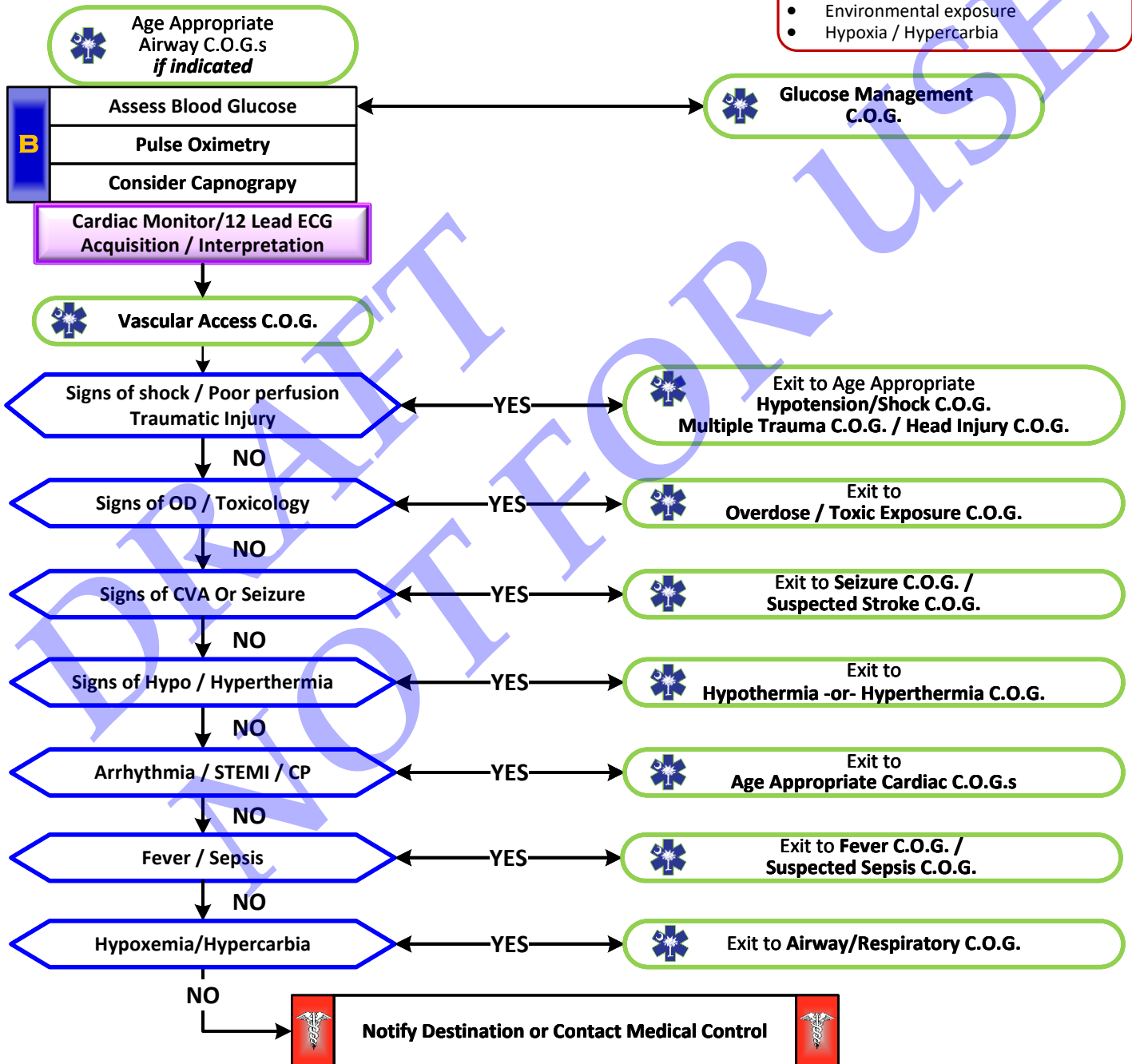
- Known diabetic, medic alert tag
- Drugs, drug paraphernalia
- Report of illicit drug use or toxic ingestion
- Past medical history
- Medications / Trans-Dermal Patches
- History of trauma
- Change in condition
- Changes in feeding or sleep habits

Signs/Symptoms

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

Differential

- **AEIOU-TIPS**
- Acidosis / Alkalosis / Alcohol
- Epilepsy - Seizure-CNS (stroke, tumor, seizure, infection)
- Infection (CNS, Sepsis, Other)
- Overdose/Toxicologic/Ingestion
- Uremia / Electrolyte abnormality
- Trauma / Head trauma
- Thyroid (hyper / hypo)
- Insulin - Diabetes (hyper / hypoglycemia)
- Psychiatric disorder
- Pulmonary (Hypoxia)
- Shock (septic, metabolic, traumatic)
- Cardiac (MI, CHF)
- Hypothermia / Hyperthermia
- Environmental exposure
- Hypoxia / Hypercarbia





Altered Mental Status

PEARLS

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro. Pay careful attention to the head exam for signs of bruising or other injury.**
- **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.**
 - ❖ **Information found at the scene must be communicated to the receiving facility.**
- Naloxone may be given by EMTs, or AEMTs by either auto-injector or nasal spray only per local medical control option.
- Do not let alcohol confuse the clinical picture. Patients who routinely consume alcohol frequently develop hypoglycemia and may have unrecognized injuries.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.
- **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 may lead to hypoglycemia.
 - 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 patient's 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.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.
- **It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon**
- **KEY DOCUMENTATION ELEMENTS:**
 - Glasgow Coma Score (GCS) or AVPU description
 - Baseline developmental status and change from baseline.
 - Known / Suspected Alcohol or Drug use
 - Vital signs to include: Temperature – when able. SpO2.
 - Consideration of Sepsis as etiology
 - Pupil and Neck Examination
 - IV Fluids administered for poor perfusion / hypotension – Fluid Type and Volume administered.
 - Blood Glucose Level
 - Naloxone used as therapeutic intervention – not diagnostic tool
 - Carbon Monoxide Detector used when available.



Seizure

History

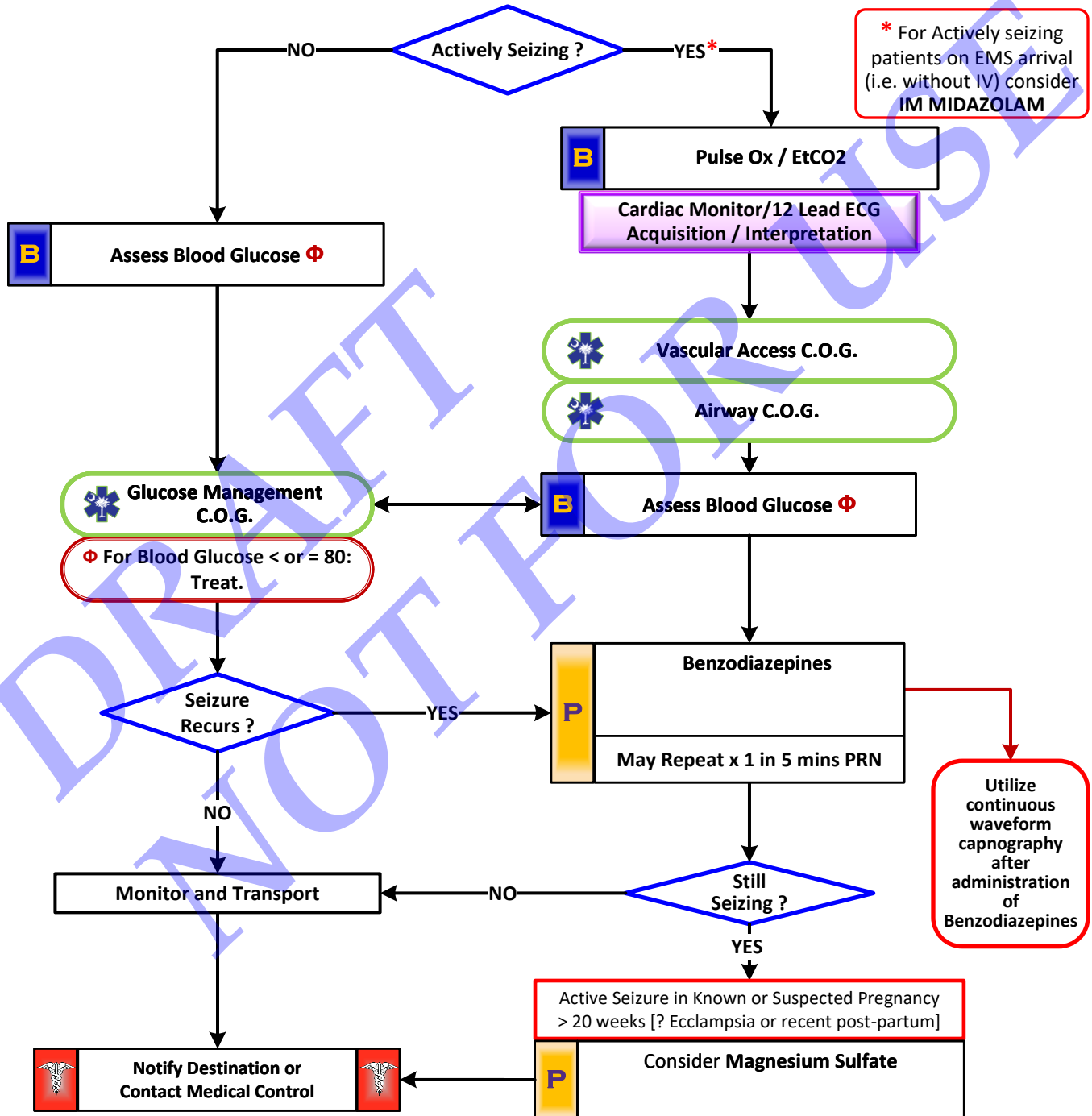
- Reported / witnessed seizure activity
- Previous seizure history
- Medical alert tag information
- Seizure medications – Names and Compliance
- History of trauma
- History of diabetes
- History of pregnancy
- Time of seizure onset
- Document number of seizures
- Alcohol use abuse or abrupt cessation
- Fever
- Abrupt cessation of Benzodiazepines
- Document Number and Duration of Seizures

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: Vital Signs (including Temperature), Mental Status, Neuro, HEENT, Heart, Lungs,**
- **Consider Spinal Motion Restriction.**
- **Maintain SpO₂ > or = 94%.**
- **Φ For Blood Glucose Level of < or = 80 – TREAT for hypoglycemia.**
- **Status epilepticus** is defined as two or more successive seizures without a period of consciousness or recovery.
This is a true emergency requiring rapid treatment, and transport – and may require airway control,
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures (petit mal)** affect only a part of the body and are not usually associated with a loss of consciousness
- **Jacksonian seizures** are seizures which start as a focal seizure and become generalized.
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- Be prepared to assist ventilations especially if diazepam or midazolam is used.
- Medication Administration:
 - IM route is preferred over IV or IO if IV not already established.
 - IN route as an alternative.
 - **Midazolam IM preferred if no access.** Dosages per local medical control.
 - Other Benzodiazepines may be effective if Midazolam is not available.
- **Obtain continuous waveform capnography after Benzodiazepine administration.**
- For any seizure in a pregnant or recently delivered patient, follow the OB Emergencies Protocol.
- **For actively seizing patients on EMS arrival, (i.e. no IV) consider IM VERSED (Midazolam) prior to establishing IV access.**
- Hypoglycemic patients who are treated in the field for seizure should be transported to hospital, regardless of whether they return to baseline mental status after treatment
- For new onset seizures or seizures that are refractory to treatment, consider other potential causes including, but not limited to, trauma, stroke, electrolyte abnormality, toxic ingestion, hyperthermia, pregnancy or post-partum woman with eclampsia.
- The use of midazolam IM as an intervention is at least as safe and effective as intravenous lorazepam for prehospital seizure cessation
- **KEY DOCUMENTATION ELEMENTS:**
 - Actively seizing during transport and time of seizure onset/cessation
 - Document Number and Duration of Seizures
 - Onset, focality, direction of eye deviation
 - Concurrent symptoms of apnea, cyanosis, vomiting, bowel/bladder incontinence, or fever
 - Medication amounts/routes given by bystanders or prehospital clinicians
 - Neurologic status (GCS, nystagmus, pupil size, focal neurologic deficit, or signs of stroke)
 - Blood glucose level



Nausea, Vomiting, 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

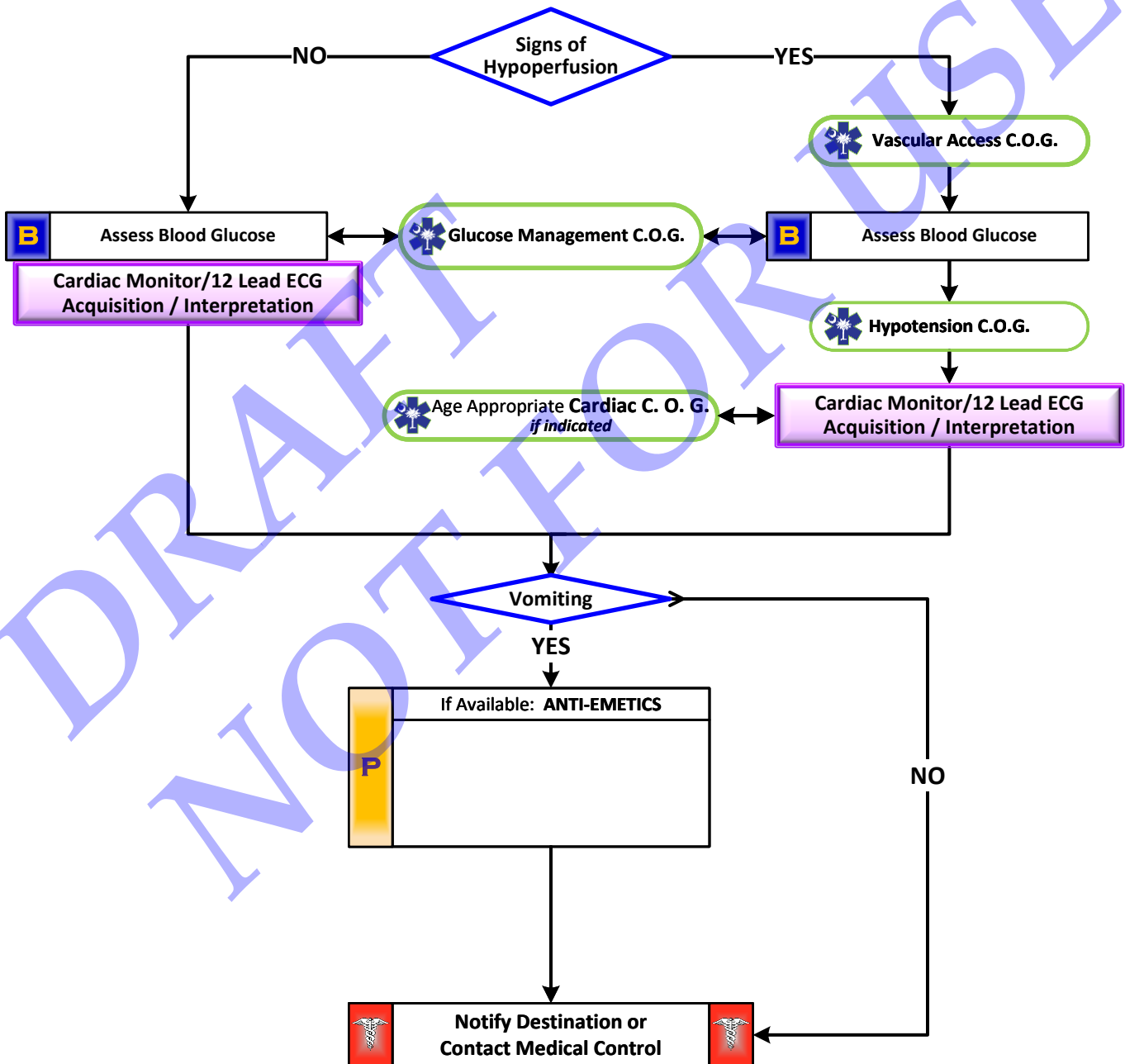
Associated symptoms:

(Helpful to localize source)

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
- Gynecologic disease (ovarian cyst, PID)
- Infections (pneumonia, influenza)
- Electrolyte abnormalities
- Food or toxin induced
- Medication or Substance abuse
- Pregnancy
- Psychological





Nausea, Vomiting, Diarrhea

PEARLS

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro, in females – Prenancy Status**
- **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 > 50, diabetics and / or women especially with upper abdominal complaints.**
- Document the mental status and vital signs prior to administration of antiemetic medications.
- Beware of vomiting only in children. Pyloric stenosis, bowel obstruction, Trauma, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Heart Rate: One of the first clinical signs of dehydration almost always increased heart rate. Tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.
- Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, carbon monoxide poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), and organophosphate poisoning. Maintain a high index of suspicion.
- **Promethazine (Phenergan) may cause sedative effects in pediatric patients and ages ≥ 60 and the debilitated, etc.) When giving promethazine IV dilute with 10 mL of normal saline and administer slowly as it can also harm the veins.**
 - ❖ ***Infiltration of Promethazine can cause severe injury – even loss of the extremity – ensure IV patency before administration.***
- **KEY DOCUMENTATION ELEMENTS:**
 - Patient Age, Weight and/or Length based weight measure for pediatric patients
 - Risk Factors for Heart Disease
 - Blood Glucose Level
 - Medications Given Including: Time, Dose, Dose Units, Route, Response, and Complications or Adverse Events
 - Vital Signs – Before AND After medication administration AND After each fluid bolus
 - History and Physical regarding etiology of Nausea, Vomiting, and/or Diarrhea
 - EKG performed and interpretation documented if cardiac risk factors are present.



Fever / Infection Control

History

- Age
- Duration of fever
- Severity of fever
- Past medical history
- Medications
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Environmental exposure
- History of Travel – especially outside of US
- Last acetaminophen or ibuprofen
- **Vaccine History**

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

HYPOTENSIVE ?

YES

Vascular Access
C.O.G.

Hypotension
C.O.G.

Consider Sepsis
C.O.G.

NO

Temperature Measurement Procedure

Temperature > 100.4° F (38° C)
If available consider:

Ibuprofen
(Age > 6 months: 10 mg/kg PO)
Adult Ibuprofen 400-600 mg PO
OR

Acetaminophen
(**Pediatrics:** 15 mg/Kg PO)
Adult Acetaminophen 325-1000 mg PO

Temp > 105.5

YES

Hyperthermia C.O.G. with Active Cooling

NO

Exit to Appropriate C.O.G.

Notify Destination or Contact Medical Control



Fever / Infection Control

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.
- **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).
- Rehydration with fluids increased the patient's ability to sweat and improves heat loss.
- **Do not** give aspirin to a child.
- **KEY DOCUMENTATION ELEMENTS:**
 - History of exposure (pets, occupational, wild animals) or other recent illness.
 - History of Travel (particularly outside of the US)
 - Drug and Toxin history including recent antimicrobials
 - Physical Examination and any localizing symptoms
 - Initial Vital Signs (including temperature and how it was measured – i.e. core, axillary, oral, rectal, tympanic, etc)
 - All interventions and response to interventions
 - Medications administered – including timing and dose of medication
 - Active Cooling measures administered.



Sepsis

History

- ❖ Age > 18 years old
- ❖ Duration of fever
- ❖ Severity of Fever
- ❖ Altered Mental Status
- ❖ Past Medical History
- ❖ Absent Spleen
- ❖ Medications
- ❖ Indwelling Medical Device
- ❖ Immunocompromise
 - Transplant
 - HIV
 - Diabetes
 - Cancer
 - Date of Last Chemotherapy
- ❖ Environmental Exposure
- ❖ Last Acetaminophen
- ❖ Recent hospitalization/Healthcare Facility Stay
- ❖ Bedridden or Immobile

Signs and Symptoms/ Significant Findings

- ❖ Hyperthermia (>100.4° F / 38° C)
- ❖ Hypothermia (< 96.8° F / 35° C)
- ❖ Tachypnea
- ❖ Tachycardia
- ❖ Acute mental status change
- ❖ Urinary Tract Infection
- ❖ Pneumonia
- ❖ Skin / soft tissue infection
- ❖ Abdominal Infection
- ❖ Wound Infection
- ❖ Suspected meningitis, endocarditis, or osteomyelitis

Differential:

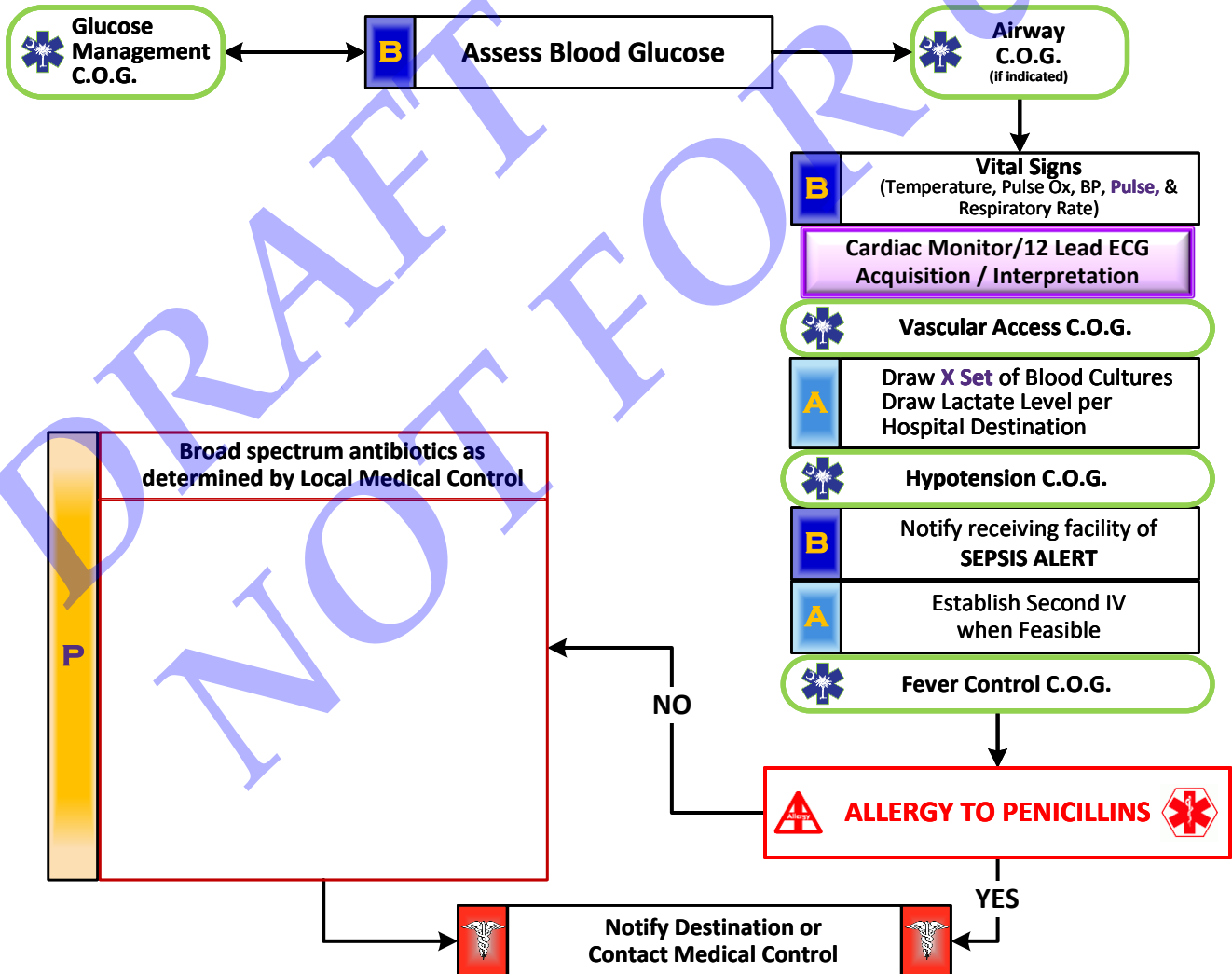
- ❖ Infections
- ❖ Malignancy - Cancer
- ❖ Medication / Drug Reaction
- ❖ Hyperthyroidism
- ❖ Acute mental status change
- ❖ Urinary Tract Infection
- ❖ Pneumonia
- ❖ Skin / soft tissue infection
- ❖ Abdominal Infection
- ❖ Wound Infection
- ❖ Suspected meningitis, endocarditis, or osteomyelitis
- ❖ MI / CVA
- ❖ Heat Stroke

CRITERIA FOR SEPSIS PROTOCOL:

1. Are any two of the following symptoms present AND new to the patient?
- Hyperthermia (> 100.4° F or 38° C) or Hypothermia (< 96.8° F or 36° C)
 - Heart Rate > 90 beats per minute
 - Respiratory Rate > 20 breaths per minute OR Mechanical Ventilation
 - Signs of poor perfusion (such as SBP < 90 mmHg)

2. Is the patient's presentation suggestive of any of the following infections?

- Pneumonia (cough/thick sputum)
- Urinary Tract Infection
- Acutely AMS / change
- Blood stream / Catheter related
- Abdominal pain and/or diarrhea
- Wound Infection
- Skin / Soft Tissue Infection





Sepsis

Collecting Cultures

- ❖ Maintain aseptic technique at all times
- ❖ Put on a new set of clean gloves
- ❖ Prepare site with Chloraprep
 - Clean 2 inch site
 - Allow site to dry
 - Do not touch once cleaned
- ❖ Remove cap from culture bottles
- ❖ Clean bottle diaphragm with alcohol and allow to dry
- ❖ Venipuncture and draw blood
- ❖ Add 5 – 10 mL of blood in each bottle
 - Aerobic first
 - Anaerobic Second

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

EtCO₂ < 25 mmHg

ADULT qSOFA Criteria

SBP ≤ 100 mmHg

RR ≥ 22

AMS or new mental status change

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 extremities, capillary refill >3 seconds, or mottled skin.**
- **If unable to obtain cultures, do NOT administer antibiotics.**
- **Determine the hospital destination prior to drawing cultures. Use appropriate kit for that destination hospital (kits differ based on the hospital facility).**
- **Utilize Sepsis Checklist**
- **Specific Broad Spectrum Antibiotics are determined by the Local MCP. State Approved Formulary notes these as “Broad Spectrum Antibiotics”.**
- **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 and 2 or more SIRS criteria (or qSOFA) with organ dysfunction such as AMS or hypotension.
- **Septic shock** is severe sepsis and poor perfusion unimproved after fluid bolus.
- Agencies administering antibiotics should **inquire about drug allergies specific to antibiotics or family of antibiotics.**
- Following each fluid bolus, assess for pulmonary edema. Consider administration of agency specific vasopressor.
- Supplemental oxygen should be given and titrated to guideline oxygenation saturation
- EKG should be obtained with suspected sepsis, but should not delay care in order to obtain.
- Abnormally low temperatures increase mortality and 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.
- **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).
- **Agency Medical Director may require contact of medical control prior to administering any medication.**
- **KEY DOCUMENTATION:**
 - Presenting Vital Signs (B/P, Pulse Rate, Respiratory Rate, SpO₂, Temperature, EtCO₂ (if available).
 - Ongoing repeat assessments: Blood Glucose, Cardiac Rhythm Changes, Pulse, Blood Pressure
 - Documentation of Sepsis Checklist.
 - Documentation of Blood Culture Acquisition with Time of Collection and Site.
 - Documentation of Antibiotics Administered – with Time of Administration, Dose, Antibiotic Name.
 - Any Adverse events following administration of medications.



Sepsis Checklist

EMS EVALUATION AND TREATMENT OF SEPSIS – TOOL

Date:	EMS Arrival Time:	Unit #:
Lead Medic:	Culture Drawn by:	

Evaluation for Sepsis:

- Are any two of the following symptoms present AND new to the patient?
 - Hyperthermia (> 100.4 ° F or 38 ° C) or Hypothermia (< 96.8 ° F or 36 ° C)
 - Heart Rate > 90 beats per minute
 - Respiratory Rate > 20 breaths per minute OR Mechanical Ventilation
 - Signs of poor perfusion (such as SBP < 90 mmHg)
- Is the patient's presentation suggestive of any of the following infections?
 - Pneumonia (cough/thick sputum)
 - Urinary Tract Infection
 - Acutely AMS / change
 - Blood stream / Catheter related
 - Abdominal pain and/or diarrhea
 - Wound Infection
 - Skin / Soft Tissue Infection

Glucose	
Result:	mg/dL
Normal Range 80 – 120 mg/dL	
Temperature	
Result:	

If positive for sepsis, call a **SEPSIS ALERT** and follow the directions on the below:

TREATMENT FOR SEPSIS

Confirm NO PENICILLIN ALLERGY. If PENICILLIN ALLERGY DO NOT ADMINISTER ANTIBIOTICS

Draw Blood Culture (8cc – 10cc of blood in each vial) Time Drawn: _____

- Prepare a 2 inch site area with Chloraprep and allow to dry
- Disinfect the top of each culture bottle with alcohol and allow to dry
- Inoculate the aerobic (Blue Cap) bottle first and then the anaerobic (Purple Cap) bottle
- Minimum of 3 cc of blood in aerobic bottle is required to proceed with antibiotic therapy
- If unable to draw cultures **DO NOT ADMINISTER ANTIBIOTICS**

Draw point of care lactate (only good for 30 minutes)	Time Drawn:	
Begin fluid resuscitation:	Total Given:	
Presumed sepsis antibiotic selection:	Antibiotic:	
Antibiotic	Dose:	
Antibiotic Time Initiated	Time Hung	



Epistaxis

History

- Age
- Past medical history
- Medications (HTN, anticoagulants, Aspirin, NSAIDS, Xarelto, Eliquis, Pradaxa, Plavix, Heparin, Lovenox, Aggrenox, Brilinta)
- 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

B

Compress Nostrils
Ice Packs (if Available)
Tilt Head Forward

Consider Oxymetazoline (Afrin®)
 Nasal Spray/Drops

Transport UPRIGHT Leaning Forward
Unless unstable – then
Transport in LATERAL DECUBITUS Position

Exit as indicated to:
Airway C.O.G.
Chest Pain C.O.G.
Vascular Access C.O.G.
Hypertension C.O.G.
Hypotension C.O.G.

P

Consider Anti-Emetics

Notify Destination or
Contact Medical Control



Epistaxis

PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Past Medical History:**
 - Previous episodes of epistaxis
 - History of Bleeding issues
 - History of Atrial Fibrillation, Atrial Flutter, CHF
- 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** Aspirin, Coumadin, non-steroidal anti-inflammatory medications (Ibuprofen), and many over the counter headache relief powders.
 - » Warfarin (Coumadin) » Apixaban (Eliquis)
 - » Dabigatran (Pradaxa) » Rivaroxaban (Xarelto) » Heparin » Enoxaparin (Lovenox)
- **Antiplatelet Agents include:**
 - » Aspirin » Clopidogrel (Plavix) » Aspirin/Dipyridamole (Aggrenox) » Ticlopidine (Ticlid)
 - » Ticagrelor (Brilinta) » Ibuprofen (OTC) » Naproxen (OTC) » Other OTC Headache Powders and Preparations
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs
 - History of bleeding/epistaxis
 - Medications taken by patient
 - Treatment administered



Pain Control: Adult



History

- Age
- Location
- Duration
- Severity (1 - 10)
- 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)

Patient care according to C.O.G. based on Specific Complaint

Assess Pain Severity:
Combination of Pain Scale, MOI,
Circumstances, Injury, or Illness
Severity

Pain Severity > 6 out of 10
OR
Indication for IV / IM Medication

NO

Consider If Available:
Ibuprofen or Acetaminophen

Consider If Available:
Nitrous Oxide

B Pulse Ox / EtCO2

Vascular Access C.O.G.

B	Consider: Nitrous Oxide
	Must reassess patient at least every 15 minutes after sedative medication
P	Consider Ketorolac
	Morphine or Fentanyl* * ONLY these MAXIMUM doses may be administered PRIOR to OLMC contact
	Morphine* 0.1 mg/kg up to 5 mg. May repeat Q 5 minutes. Max Dose = 10 mg
	Fentanyl* 2 mcg/kg up to 100 mcg. May repeat Q 5 minutes. Max Dose = 200 mcg
	Consider anti-emetics as needed
	Consider dissociative Ketamine for Refractory Pain

Smaller doses of Narcotics MAY be utilized to achieve pain control. Repeat dosing of Narcotics is restricted to 5 minute intervals UNTIL the MAXIMUM dose is reached prior to OLMC Contact

Only ONE Narcotic agent may be utilized prior to OnLine Medical Direction

Relative Contraindications For IV Pain Control:

- Severe Head Injury
- End-Stage Lung Disease
- Untreated Hypotension

Relative Contraindications For Non-Steroidal Agents :

- Active Bleeding
- Possible Surgery
- Renal Disease

Notify Destination or Contact Medical Control

ADULT MEDICAL



Pain Control: Adult



PEARLS

- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.
- Vital signs should be obtained pre, 15 minutes post, and at disposition with all pain medications.
- **Smaller doses of Narcotics may be utilized based upon Service Medical Control Physician instruction – i.e. LESS than 0.1 mg/kg Morphine or LESS than 2 mcg/kg Fentanyl. The narcotic dosing may be repeated ONLY at 5 minutes or greater intervals and ONLY until the MAXIMUM DOSE LISTED is reached until Online Medical Control is established.**
- Relative Contraindications to the use of a narcotic include hypotension, head injury, respiratory distress or severe Lung Disease.
 - **Be prepared and observe for respiratory depression with ANY administration of narcotic Analgesic, sedative, or anti-emetic agents – particularly if given in combination.**
 - **Extra caution should be taken with patients under the influence of alcohol, drugs, or other sedative medications.**
- **Consider alternatives in patients who have known drug allergies to NSAID's (non-steroidal anti-inflammatory medications), with active bleeding, or in patients who may need surgical intervention such as open fractures or fracture deformities.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction.
- **Ibuprofen** should not be given for headaches or abdominal pain, history of gastritis, stomach ulcers, fracture, or if patient will require sedation.
- Do not administer any PO medications for patients who may need surgical intervention such as open fractures or fracture deformities, headaches, or abdominal pain.
- See drug list for other contraindications for Narcotics, Acetaminophen, Nitrous Oxide, and Ibuprofen.
 - **Only ONE NARCOTIC Agent may be used PRIOR TO OnLine Medical Control Direction. (i.e. May not “max out” one agent and then utilize a second agent prior to OnLine Medical Direction.)**
- **Ketamine: appropriate indications for pain control:**
 - Patients who have developed opioid-tolerance. Sick cell crisis patients with opioid-tolerance.
 - Patients who have obstructive sleep apnea.
 - May use in combination with opioids to limit total amount of opioid administration.
- **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.
 - Avoid in patients who have cardiac disease or uncontrolled hypertension.
 - Avoid in patients with increased intraocular pressure such as glaucoma.
 - Avoid use in combination with benzodiazepines due to decreased respiratory effort.
- **Both arms of the treatment 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.**
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs (Pulse, Blood Pressure, Respiratory Rate, Neurologic Status) with Pulse Oximetry
 - Acquisition of Known Patient Allergies PRIOR to administration of any medications.
 - Documentation of Initial Patient Pain Scale Assessment
 - Documentation of medication administration with Correct Dose
 - Documentation of Patient Reassessment with repeat Vital Signs and Patient Pain Scale assessment.
 - Medical Control Signature on ePCR within 72 Hours.



Abdominal Pain

History

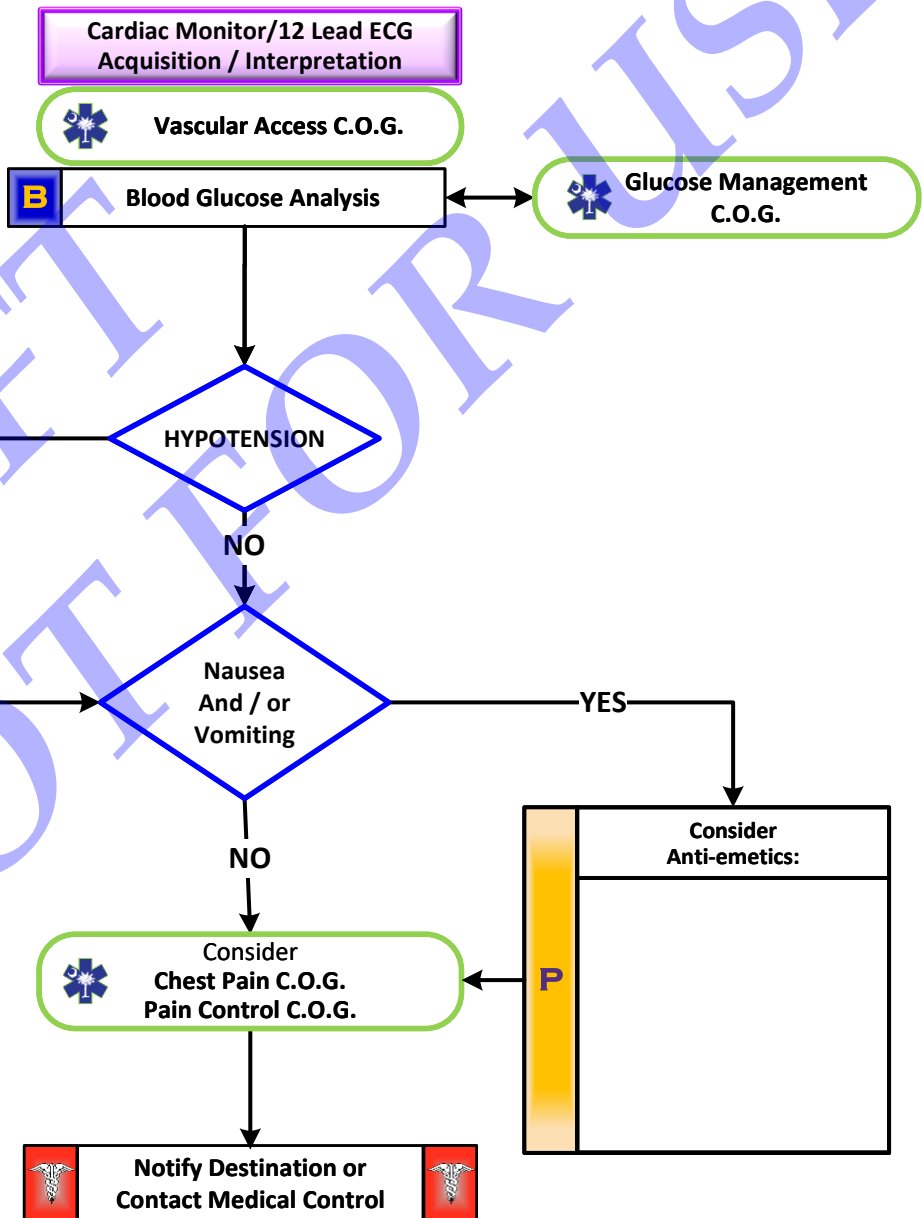
- Age
- Past medical / surgical history
- Medications
- Onset
- Palliation / Provocation
- Quality (crampy, constant, sharp, dull, etc.)
- Region / Radiation / Referred
- Severity (1-10)
- Time (duration / repetition)
- Fever
- Last meal eaten
- Last bowel movement / emesis
- Menstrual history (pregnancy)

Signs and Symptoms

- Pain (location / migration)
- Tenderness
- Nausea
- Vomiting
- Diarrhea
- Dysuria
- Constipation
- Vaginal bleeding / discharge
- Pregnancy
- **Associated symptoms: (Helpful to localize source)**
Fever, headache, weakness, malaise, myalgias, cough, headache, mental status changes, rash

Differential

- Pneumonia or Pulmonary embolus
- Liver (hepatitis, CHF)
- Peptic ulcer disease / Gastritis
- Gallbladder
- Myocardial infarction
- Pancreatitis
- Kidney stone
- Abdominal aneurysm
- Appendicitis
- Bladder / Prostate disorder
- Pelvic (PID, Ectopic pregnancy, Ovarian cyst)
- Spleen enlargement
- Diverticulitis
- Bowel obstruction
- Gastroenteritis (infectious)





Abdominal Pain

PEARLS

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lung, Abdomen, Back, Extremities, Neuro**
- **Pertinent Assessment Findings:**
 - » Guarding
 - » Abdominal Tympany to percussion
 - » Tenderness focal to a specific abdominal quadrant
 - » Absence of or significant inequality of femoral or LE pulses
 - » Rebound Tenderness
 - » Presence of "pulsatile" abdominal mass
 - » Hyper or Hypothermia
 - » Rectal Bleeding, hematemesis, vaginal bleeding
 - » Abdominal Distension
 - » Jaundice
- Document the mental status and vital signs prior to administration of anti-emetics.
- Abdominal pain in women of childbearing age should be treated as an ectopic pregnancy until proven otherwise.
- ECG Monitoring/Interpretation should be strongly considered in patients > 40 years old – or in ANY patient with history of Cardiovascular Disease.
- **Consider cardiac etiology in patients > 40, diabetics and / or women especially with upper abdominal complaints.**
- The diagnosis of abdominal aneurysm dissection should be considered with abdominal pain in patients over 50.
- Repeat vital signs after each bolus.
- Appendicitis may present with vague, peri-umbilical pain which migrates to the RLQ over time
- **Heart Rate: One of the first clinical signs of dehydration - almost always - increased heart rate. Tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.**
- Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Document the mental status and vital signs prior to administration of any anti-emetic.
- Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, carbon monoxide poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), and organophosphate poisoning. Maintain a high index of suspicion.
- **Promethazine (Phenergan) may cause sedative effects in pediatric patients and ages ≥ 60 and the debilitated, etc. When giving promethazine IV dilute with 10 mL of normal saline and administer slowly as it can also harm the veins.**
 - ❖ ***Infiltration of Promethazine can cause severe injury – even loss of the extremity – assure IV patency before administration.***
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial and repeat Vital Signs
 - Assessment of abdomen to include
 - Findings on palpation/percussion including the presence or absence of masses
 - Presence and nature of tenderness / pain
 - Treatment and Response to Treatment
 - Medications administered including dosage and timing



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

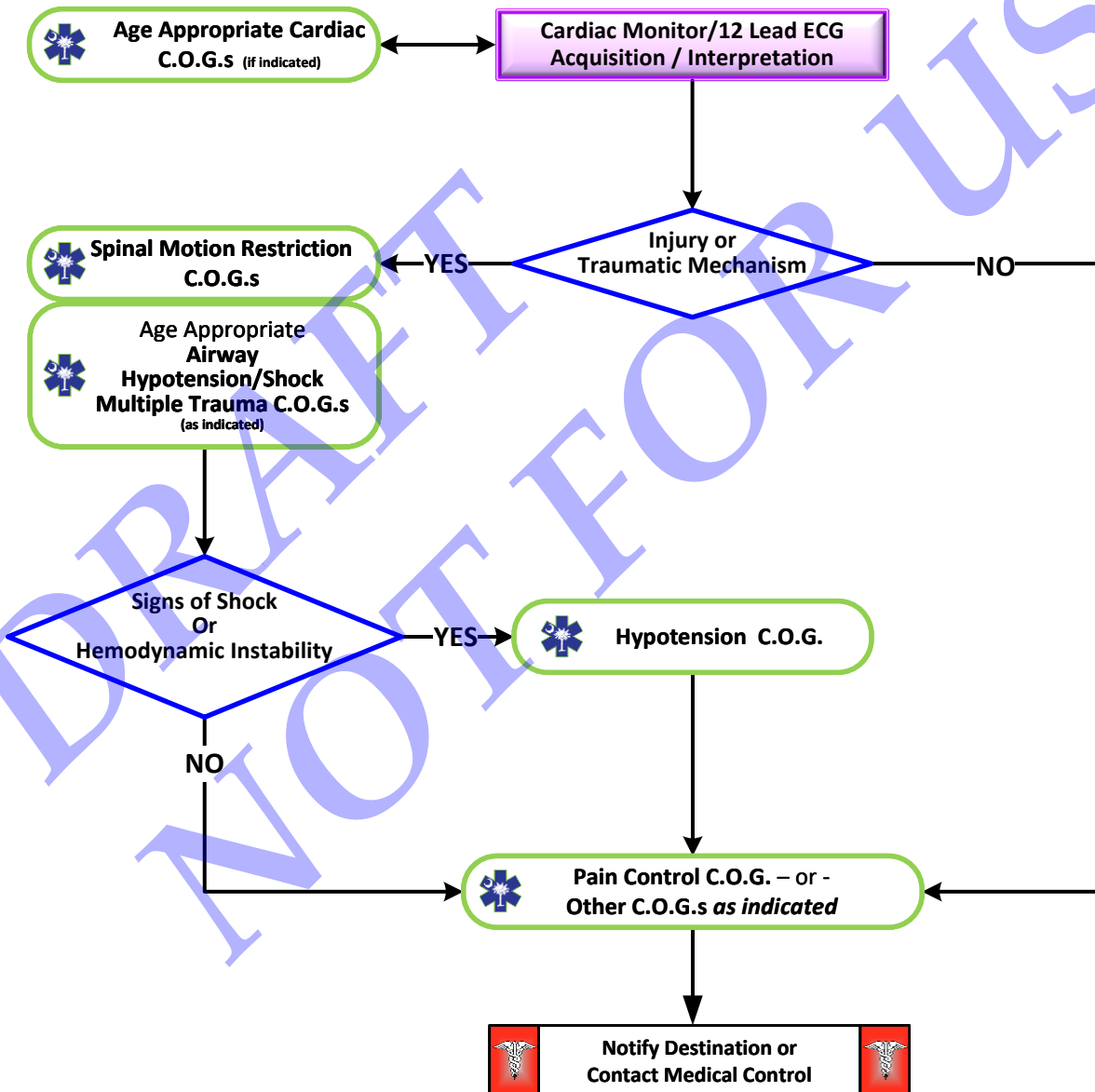
Signs and Symptoms

- 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 (AAA)
- Pneumonia
- Spinal Epidural Abscess
- Metastatic Cancer

ADULT MEDICAL





Back Pain

PEARLS

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Neuro, Lower extremity perfusion**
- 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 > 50, diabetics and / or women especially with upper abdominal complaints.
- **Red Flags** which may signal 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
 - ❖ Nighttime pain in pediatric patients
- Cauda equina syndrome develops when the terminal nerves of spinal cord are being compressed (Symptoms include):
 - ❖ Saddle anesthesia
 - ❖ 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 user (consider spinal epidural abscess)
 - ❖ Recent bacterial infection like pneumonia.
 - ❖ Immune suppression such as:
 - ❖ HIV or patients on chronic steroids like prednisone, recent chemotherapy or transplant.
 - ❖ Recent spinal surgery or procedures (e.g. epidural; lumbar puncture; pain management injections)
 - ❖ 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.
- **KEY DOCUMENTATION ELEMENTS:**
 - Assessment of back and abdomen to include findings on palpation/percussion including presence or absence of masses and presence and nature of tenderness/pain.
 - Assessment of initial and changes in neurologic status
 - Assessment of initial and changes in perfusion/pulses.



Sickle Cell Pain/Crisis

History

- PMH
- History of Complications:
 - Acute Chest Syndrome
 - Stroke
 - Splenic Sequestration
 - Severe Anemia
- Frequency of Crisis/Typical Pain Symptoms
- Medications
- Home Pain Control Regimen
- Fever

Signs and Symptoms

- Pain – Onset & Progression
- Chest Pain
- Dyspnea / Hypoxemia
- Pallor
- Abdominal Pain
- Stroke Like Symptoms
- Fever
- Hypertension
- Calf Pain / Swelling

Differential

- Vaso-occlusive Crisis
- Anemia
- Acute Chest Syndrome
- Septic Arthritis
- Bacteremia / Infection / Sepsis
- Priapism (Identified Males)

B	Pulse Oximetry
	Consider Supplemental Oxygen Therapy
	Consider Capnography

Oxygenation saturation	≥	%
	Or	
		EtCO ₂ 35 – 45 mmHg

Vascular Access C.O.G.

NS or RL Bolus

Cardiac Monitor/12 Lead ECG Acquisition / Interpretation

Pain Control C.O.G.

Notify Destination or Contact Medical Control



Sickle Cell Pain/Crisis

PEARLS

- **Recommended Exam: Vital Signs with Temperature and Oxygen Sats, Mental Status, HEENT, Chest, Cardiac, Abdominal, GU (Male), Neuro, Musculoskeletal**
- Assess for life-threatening complications of sickle cell disease. These patients have a significantly higher risk of complications – in addition to pain crises.
- **Fever is a significant finding.**
- These patients tolerate acute blood loss poorly due to baseline anemia.
- Provide appropriate treatment for pain, respiratory distress, and shock.
- These patients may have a markedly higher tolerance for narcotic medications if they are taking them on a regular basis.
 - Be sure to document the patient's home medications and last use of narcotics.
- Patients with sickle cell trait can have acute pain crises in extreme conditions (e.g. heat exhaustion, dehydration, and severe cold).
- **KEY DOCUMENTATION ELEMENTS:**
 - Assess for Vital Signs – including Respiratory Status and Neuro Status and ability to move all joints.
 - Documentation of how this pain crisis compares with others in terms of location, severity, and triggers
 - Documentation of home medications – including home narcotics and last dose and time.



Dialysis / Renal Failure

History

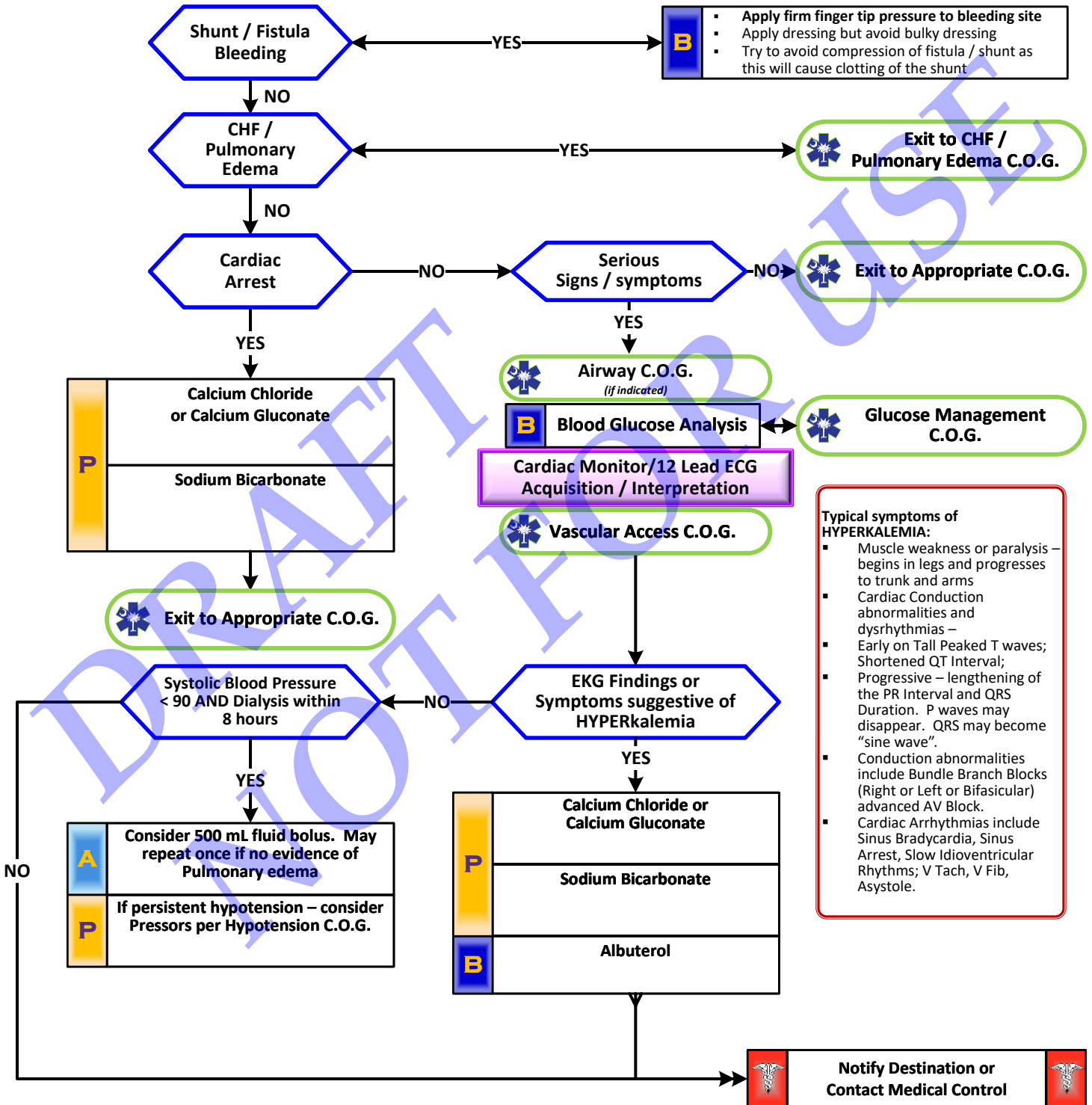
- Peritoneal or Hemodialysis
- Missed Dialysis Appointment/s
- Anemia
- Catheter access noted
- Shunt / Fistula access noted
- Hyperkalemia

Signs and Symptoms

- Hypotension
- Shortness of Breath
- Bleeding from Shunt or AV Fistula
- Fever
- Electrolyte imbalance (Abnormal EKG)
- Nausea and / or vomiting
- Altered Mental Status / Stroke /Weakness
- Seizure / Cramping
- Arrhythmia / Chest Pain / Shortness of Breath
- Dysequilibrium Syndrome

Differential

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



ADULT MEDICAL



Dialysis / Renal Failure

PEARLS

- **Recommended exam: Mental status. Neurological. Lungs. Heart.**
- **Do not take Blood Pressure or start IV in extremity which has a shunt / fistula in place.**
- **Access of shunt indicated in the peri-arrest or cardiac arrest patient only with no other available access. IO if available.**
- Always consider Hyperkalemia in all dialysis or renal failure patients.
- **Dialysis Disequilibrium Syndrome** is an uncommon but serious complication of hemodialysis:
 - Neurologic Symptoms include Headaches, disturbed consciousness, convulsions, coma
 - Fatigue, Nausea & Vomiting
 - More Common in elderly and pediatrics; Patients with pre-existing CNS lesions (Stroke or Head Trauma); Cerebral Edema (malignant hypertension, hyponatremia, hepatic encephalopathy); Severe Metabolic Acidosis.
- **Sodium Bicarbonate and Calcium Chloride / Gluconate** should not be mixed. Ideally give in separate lines.
- **End stage renal disease (ESRD) is increasing in the U.S. These patients demonstrate greater all-cause mortality, cardiovascular events, and hospitalization rates when compared to those with normal renal function.**
 - ESRD patients possess high risk for neurologic complications, cardiopulmonary pathology, infection, and access site complications.
 - Neurologic issues include uremic encephalopathy, seizures, and cerebrovascular pathology.
 - Cardiopulmonary complications include pericarditis, pericardial effusion/tamponade, acute coronary syndrome, sudden cardiac death, electrolyte abnormalities, pulmonary edema,
 - Infections are common with patients often presenting atypically. Access site infections must be treated aggressively. The most common complication of Continuous Ambulator Peritoneal Dialysis (CAPD) is peritonitis which occurs on an average once every 15-18 months.
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs (Blood Pressure, Pulse, Respiratory Rate, SpO2, Temperature)
 - Last Dialysis
 - Patient Medications
 - EKG if symptomatic or indicated.
 - Therapeutic Interventions and Response to Interventions



Anaphylaxis / Allergic Reaction

History

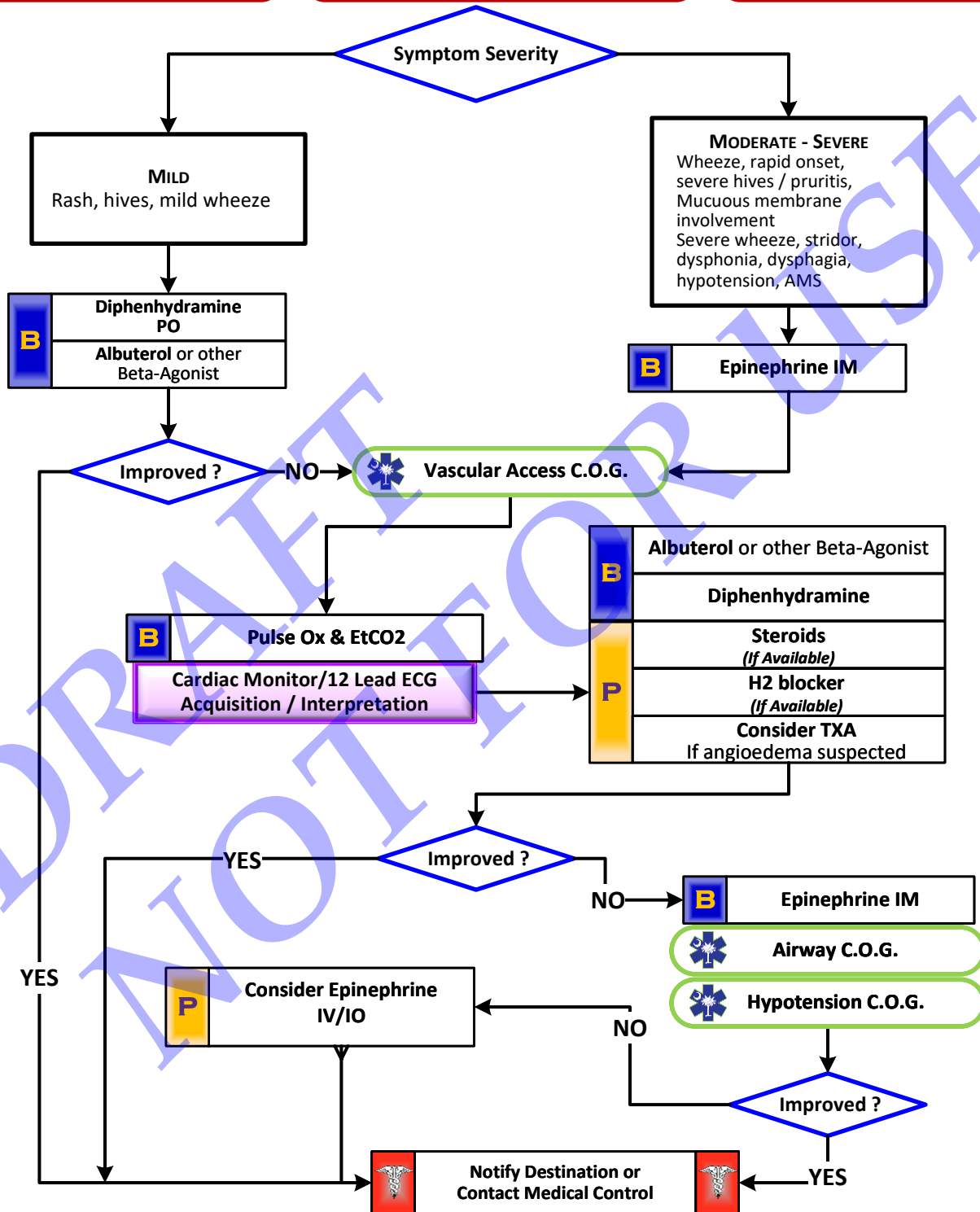
- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

Signs and Symptoms

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

Differential

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





Anaphylaxis / Allergic Reaction

* **Anaphylaxis Epinephrine Kit should include the following recommended items:**

- 1 – Tuberculin Syringe – 1 mL
- 2 – 20-22 gauge 1" – 1 ½" needles
- 2 – Alcohol Prep Pads
- 1 - Epinephrine Ampule or Vial 1:1,000 = 1 mg/1 mL

*The Pediatric dosage should match the dose of a Pediatric Epinephrine Auto-Injector (0.15 mg).

*The Adult dosage should match the dose of an Adult Epinephrine Auto-Injector (0.3 mg).

* If Patient has respiratory involvement, consider Albuterol per local Medical Control Option

* See Anaphylaxis Emergency Kit Procedures for further details for EMTs and AEMTs

PEARLS

- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine is the drug of choice and the first drug that should be administered in acute anaphylaxis (Moderate to Severe Symptoms.) IM Epinephrine should be administered in priority before or during attempts at IV or IO access.**
- **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.
 - **Moderate to Severe symptoms:**
 - Flushing, hives, itching, erythema **PLUS** symptomatic respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Typical findings for Angioedema include:**
 - Onset in minutes to hours and spontaneous resolution in hours to a few days
 - Involvement of face, lips, larynx, and bowels
 - Asymmetric distribution
 - Tendency to **not** involve gravitationally-dependent areas
 - Involvement of face, lips, larynx, and bowels
- **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 (Angiotensin Converting Enzyme Inhibitors (ACE-I)) like Prinivil / Zestril (lisinopril)-typically end with "-il".**
- **Fluids and Medication titrated to maintain a SBP >70 + (age in years x 2) mmHg.**
- **EMT-B may administer Epinephrine IM and may administer from EMS supply.**
 - Agency Medical Director may require contact of medical control prior to administering any medication.
- **EMT-B may administer diphenhydramine by oral route only and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT-B / MR administering any medication.
- **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 symptoms to contact, the more severe the reaction.
- **Strongly recommend: Contact Medical Control** prior to administering epinephrine in patients who are >50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. These patients should generally receive a 12 lead ECG.
- **KEY DOCUMENTATION ELEMENTS:**
 - Medications administered
 - Dose and Concentration of epinephrine administered
 - Route of Epinephrine Administration
 - Time of Epinephrine Administration/s
 - Patient Signs & Symptoms
 - Vital Signs with Blood Pressure, Pulse Rate, Oxygen Saturations BEFORE and AFTER Epinephrine Administration
 - Airway management interventions



Respiratory Distress

History

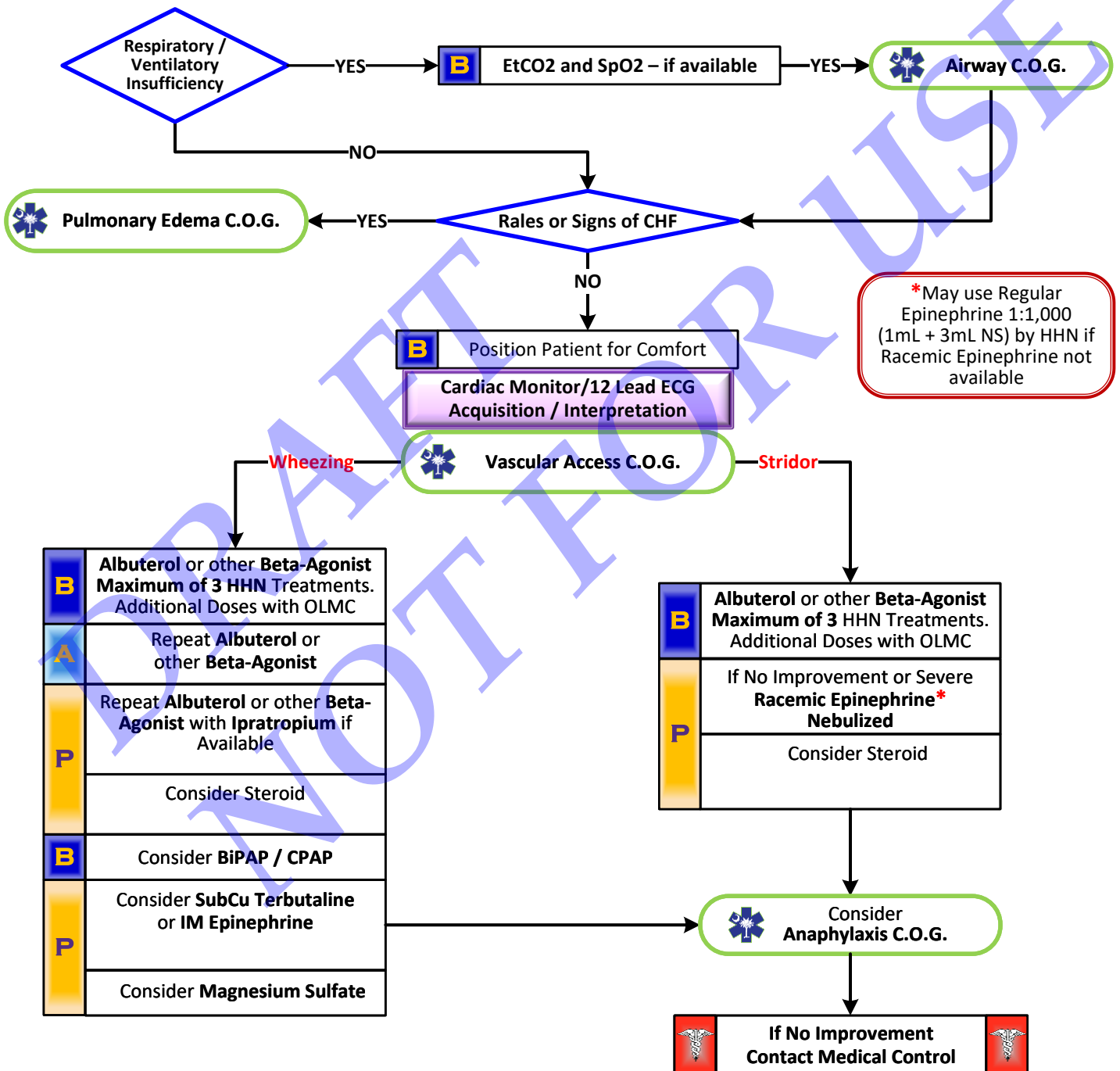
- Asthma; COPD – chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers, Digoxin, Lasix, Bumex, Viagra, Sildenafil, Levitra/vardenafil, Cialis/tadalafil)
- Toxic exposure, smoke inhalation

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.)





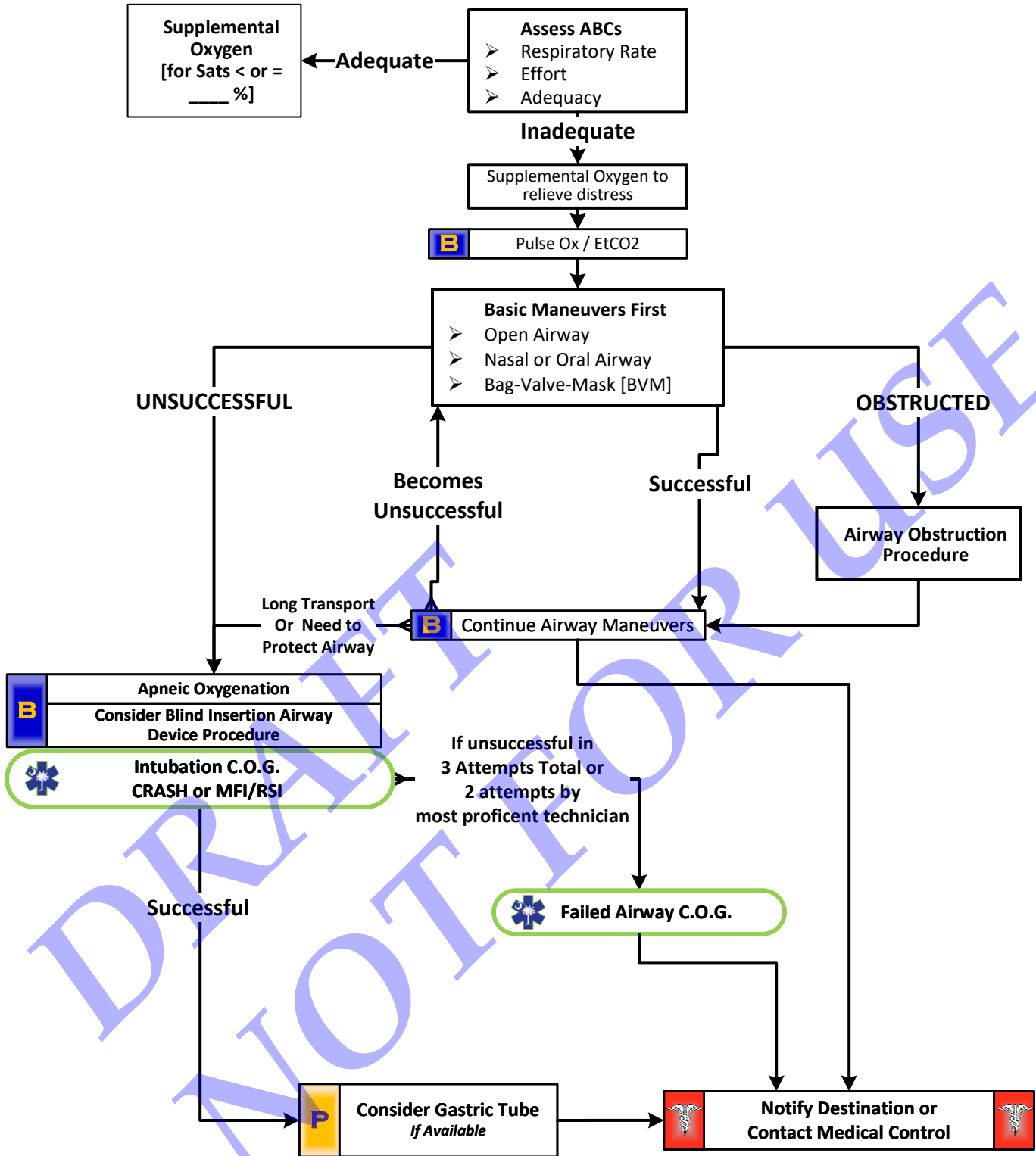
Respiratory Distress

PEARLS

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- 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.
- **Combination nebulizers containing albuterol and ipratropium:**
 - Patients may receive up to 3 combination nebulizer treatments.
 - Following 3 combination nebulizers, it is acceptable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
 - If severe allergic reaction or anaphylaxis is suspected, give immediately and repeat until improvement.
 - If allergic reaction is not suspected, administer with impending respiratory failure and no improvement.
 - May use Regular Epinephrine 1:1,000 if Racemic Epinephrine not available (Admixture: 1 mL + 3mL NS).
- Consider Magnesium Sulfate with impending respiratory failure and no improvement.
- Pulse oximetry should be monitored continuously if there is indication of respiratory distress or there is a decline in patients status despite normal pulse oximetry readings
- Consider End-tidal CO2 monitoring if available.
- **CPAP or Non-Invasive Positive Pressure Ventilation:**
 - May be used with COPD, Asthma, Allergic reactions, and 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.
- Pulmonary edema may present with wheezing as well as rales and rhonchi. Consider CHF/Pulmonary Edema protocol if not improving with respiratory treatments.
- **Strongly Recommend: Contact Medical Control** prior to administering epinephrine in patients who are > 50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. A 12-lead ECG should generally be performed on these patients.
- **Realtime Waveform Capnography is:**
 - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
 - **Strongly Recommended / Strongly Encouraged for all unstable patients**
 - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial key aspects of the physical examination and after each intervention.
 - Respiratory Rate
 - Oxygen Saturation
 - EtCO2 / Waveform shape
 - Breath Sounds and Quality
 - Use of Accessory Muscles
 - Mental Status
 - Response to Interventions



Airway, Adult (General)





Airway, Adult (General)

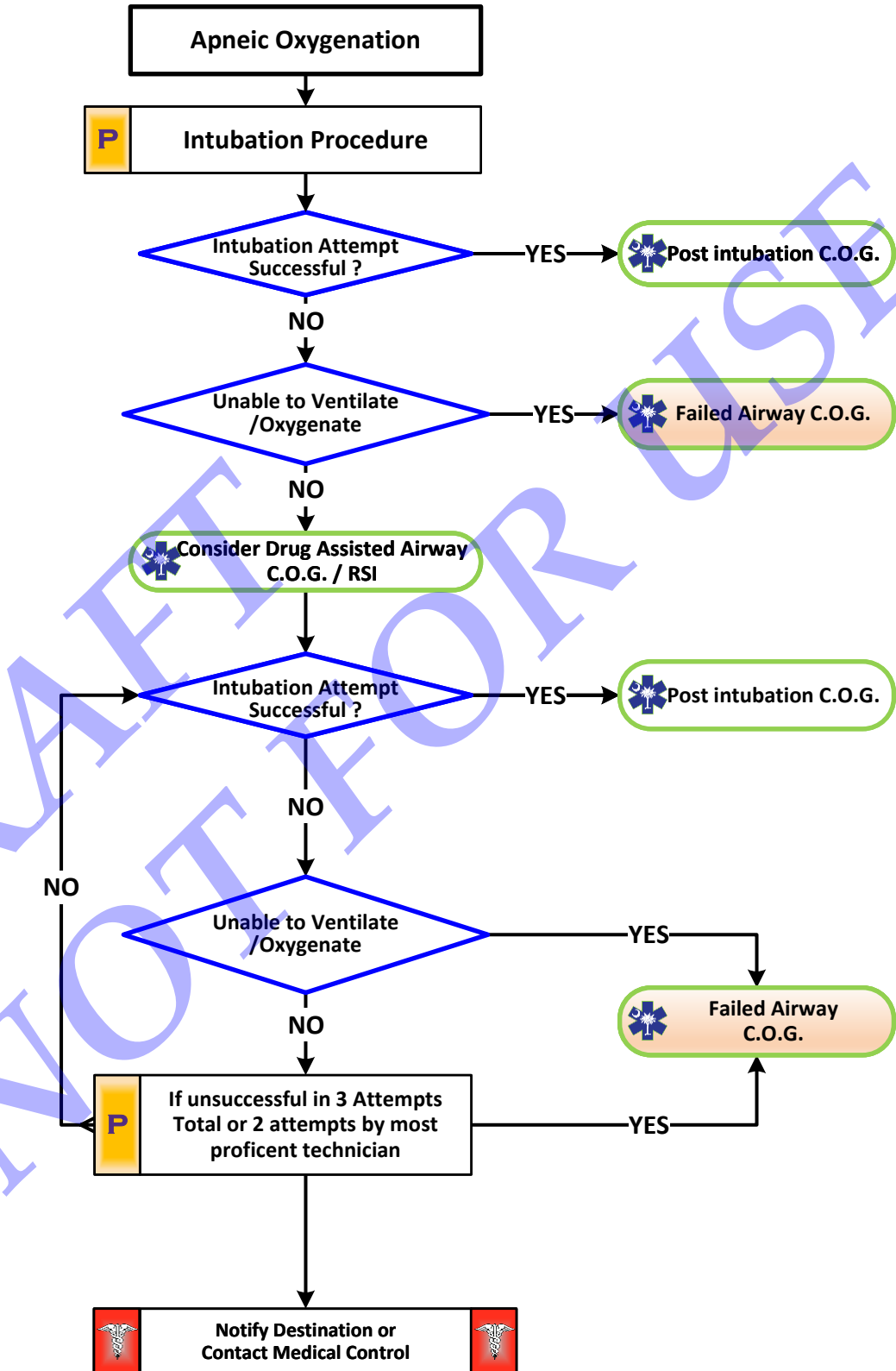
PEARLS

- This protocol is only for use in ADULT patients.
- Capnometry (Color) or capnography is mandatory with all methods of intubation. Document results.
- **Realtime Waveform Capnography is:**
 - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
 - **Strongly Recommended / Strongly Encouraged for all unstable patients**
 - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of > 95 %, it is acceptable to continue with basic airway measures instead of using a BIAD or Intubation.**
- **For the purposes of this protocol an adequate airway is when the patient is receiving appropriate oxygenation and ventilation – and not at an undue risk of aspiration or deterioration**
- **An Intubation Attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.**
- **Ventilatory rate should be sufficient to maintain a EtCO₂ of 35-45. Avoid hyperventilation.**
- **It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.**
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- Maintain C-spine motion restriction for patients with suspected spinal injury.
- Do not assume hyperventilation is psychogenic - use oxygen, not a paper bag.
- BURP maneuver may be used to assist with difficult intubations.
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO₂ of 30-35. Procedure may worsen outcome in some cases.
- Gastric tube placement should be considered in all intubated patients if available.
- It is important to secure the endotracheal tube well and consider c-collar to better maintain ETT placement.
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs and Appropriate Physical Examination
 - Efforts to maintain/improve airway
 - Indications for Advanced Airway Management
 - Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO₂); bradycardia, hypotension, or cardiac arrest
 - Peri-intubation / Cricothyrotomy period encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.**
 - Post-intubation with advanced airway, EtCO₂ value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), **and** at the time of patient transfer in the ED
 - Documentation of ALL attempts at intubation based upon definition.
 - Documentation of all times – including:
 - Initial Assessment
 - Drug Administration
 - Time of Advanced Airway Attempts
 - Time of Cricothyrotomy
 - Contact with Receiving Facility



CRASH Airway

CRASH Airway Protocol





CRASH Airway

DRAFT
NOT FOR USE

ADULT RESPIRATORY



Airway

Drug Assisted Airway Management (DAAM)



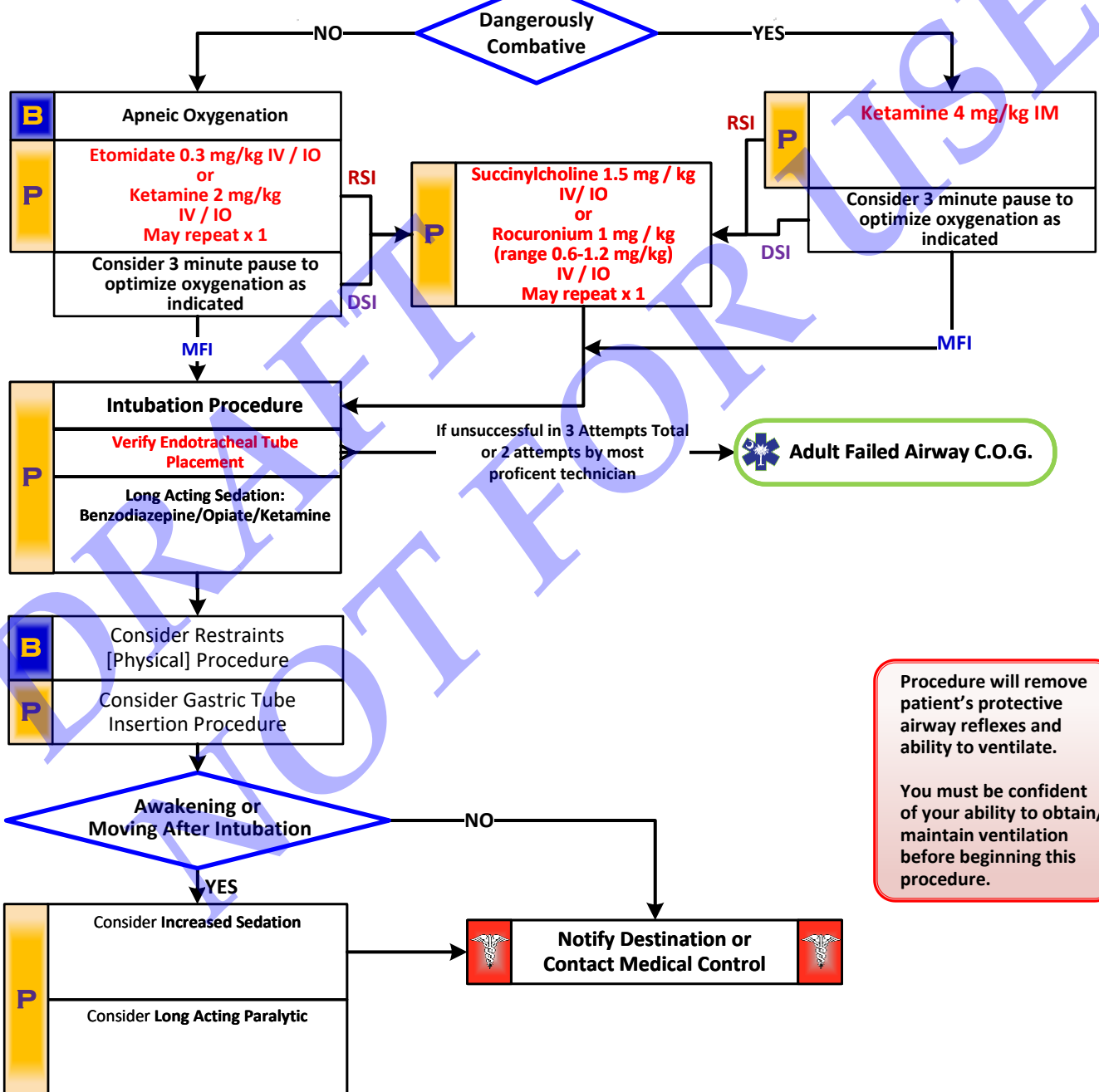
Indications for DAAM / MFI / RSI
 Failure to protect the airway
 Unable to oxygenate
 Unable to ventilate
 Impending airway compromise

DAAM: Drug Assisted Airway Management
 DSI: Delayed Sequence Intubation
 MFI: Medication Facilitated Intubation
 RSI: Rapid Sequence Intubation

B Preoxygenate 100% O2
A Manage Hypotension
 Vascular Access C.O.G.

At any point in this protocol where the patient is able to be intubated – intubation may proceed.
 If paralytics omitted continue to follow MFI protocol.

P Assemble:
 Airway Equipment
 Suction Equipment
 Alternative Airway Device/s



ADULT RESPIRATORY

Procedure will remove patient's protective airway reflexes and ability to ventilate.
 You must be confident of your ability to obtain/maintain ventilation before beginning this procedure.



Airway

Medication Facilitated / Rapid Sequence Intubation



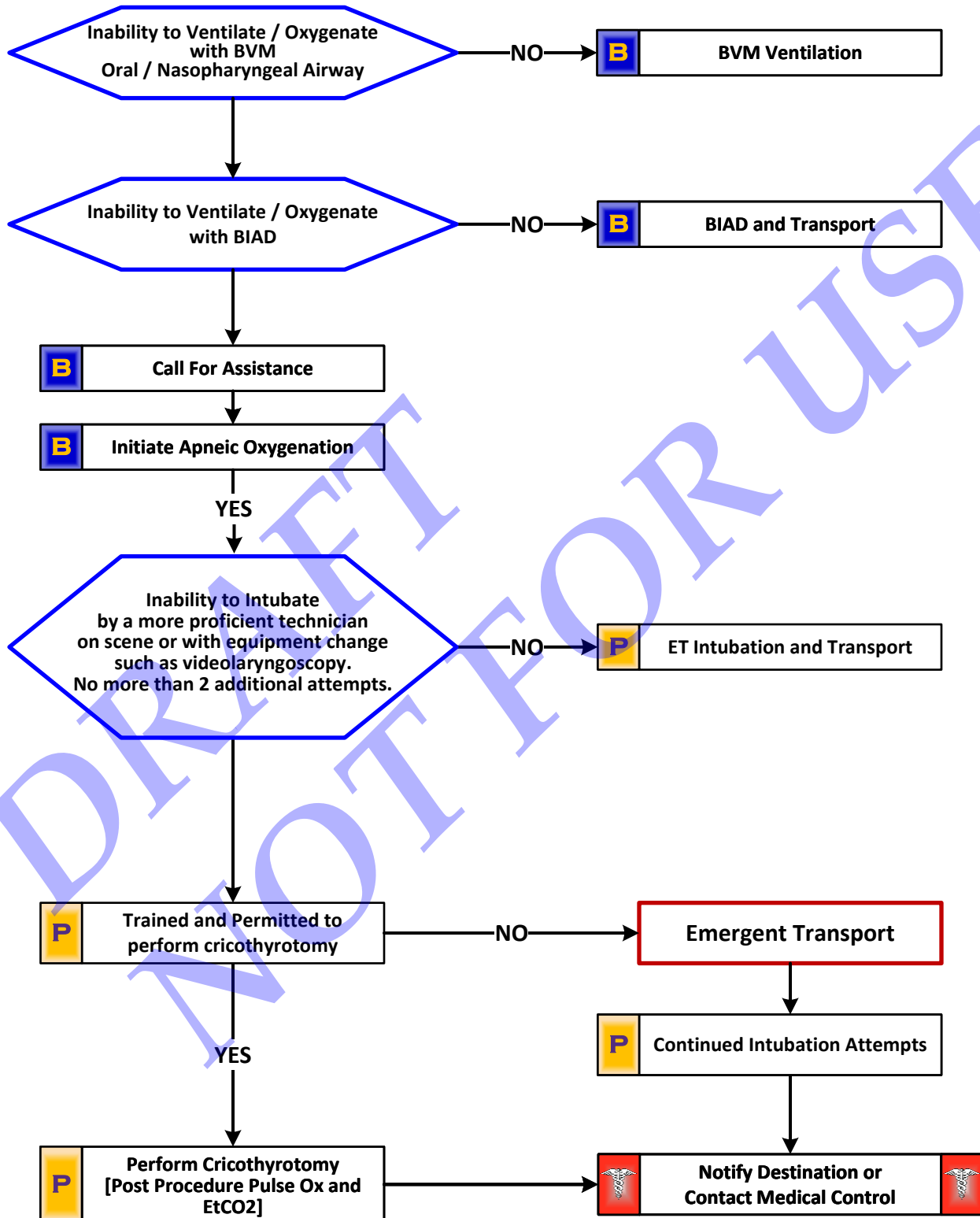
PEARLS

- Agencies must maintain a separate Performance Improvement Program specific to Medication Facilitated and/or Rapid Sequence Intubation. 100% QA is required for all patients undergoing Drug Assisted Airway Management – DSI / MFI / RSI.
- This procedure requires at least 1 Paramedic and a second credentialed/licensed medical provider. Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation.
- Patients with hypoxia and/or hypotension are at risk of cardiac arrest when a sedative and paralytic medication are administered. Hypoxia and hypotension require resuscitation and correction prior to use of these combined agents.
- This protocol is only for use in ADULT (non-pediatric) patients.
- Before administering any paralytic drug, screen for contraindications with a thorough history and neurologic exam.
- Realtime Waveform Capnography is:
 - Required for ALL Intubated Patients and Cricothyrotomy Patients*
 - Strongly Recommended / Strongly Encouraged for all unstable patients
 - Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)
- Consider Videolaryngoscopy on 1st attempt if available.
- If First intubation attempt fails, make an adjustment and try again:
 - Different laryngoscope blade
 - Change cricoid pressure; No longer routinely recommended and may worsen your view.
 - Different ETT size
 - Change head positioning - align external auditory canal with sternal notch / proper positioning if not contraindicated.
 - Consider applying BURP maneuver (Back [posterior], Up, and to patient's Right)
- Protect the patient from self-extubation when the drugs wear off. Longer acting paralytics may be needed post-intubation.
- RSI not recommended in urban setting (short transport) when able to maintain oxygen saturation \geq _____ %.
- RSI is a well studied intervention that may reduce morbidity in patients requiring intubation but DSI may be indicated in patients who are hypoxic and resistive to correction prior to sedation and in who it is presumed the hypoxia can be corrected by non-invasive measures after sedation.
- Consider Naso or orogastric tube placement in all intubated patients to limit aspiration and decompress stomach if needed.
- **KEY DOCUMENTATION POINTS:**
 - Vital Signs and Appropriate Physical Examination
 - Efforts to maintain/improve airway
 - Indications for Advanced Airway Management
 - Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO₂); bradycardia, hypotension, or cardiac arrest
 - Peri-intubation / Cricothyrotomy period encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.**
 - Post-intubation with advanced airway, EtCO₂ value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), **and** at the time of patient transfer in the ED
 - Documentation of ALL attempts at intubation based upon definition.
 - Documentation of all times – including:
 - Initial Assessment
 - Drug Administration
 - Time of Advanced Airway Attempts
 - Time of Cricothyrotomy
 - Time of Successful Airway Placement
 - Contact with Receiving Facility



Airway, Adult - Failed

Two (2) failed intubation attempts by most proficient technician on scene or anatomy inconsistent with intubation attempts. NO MORE THAN THREE (3) ATTEMPTS TOTAL





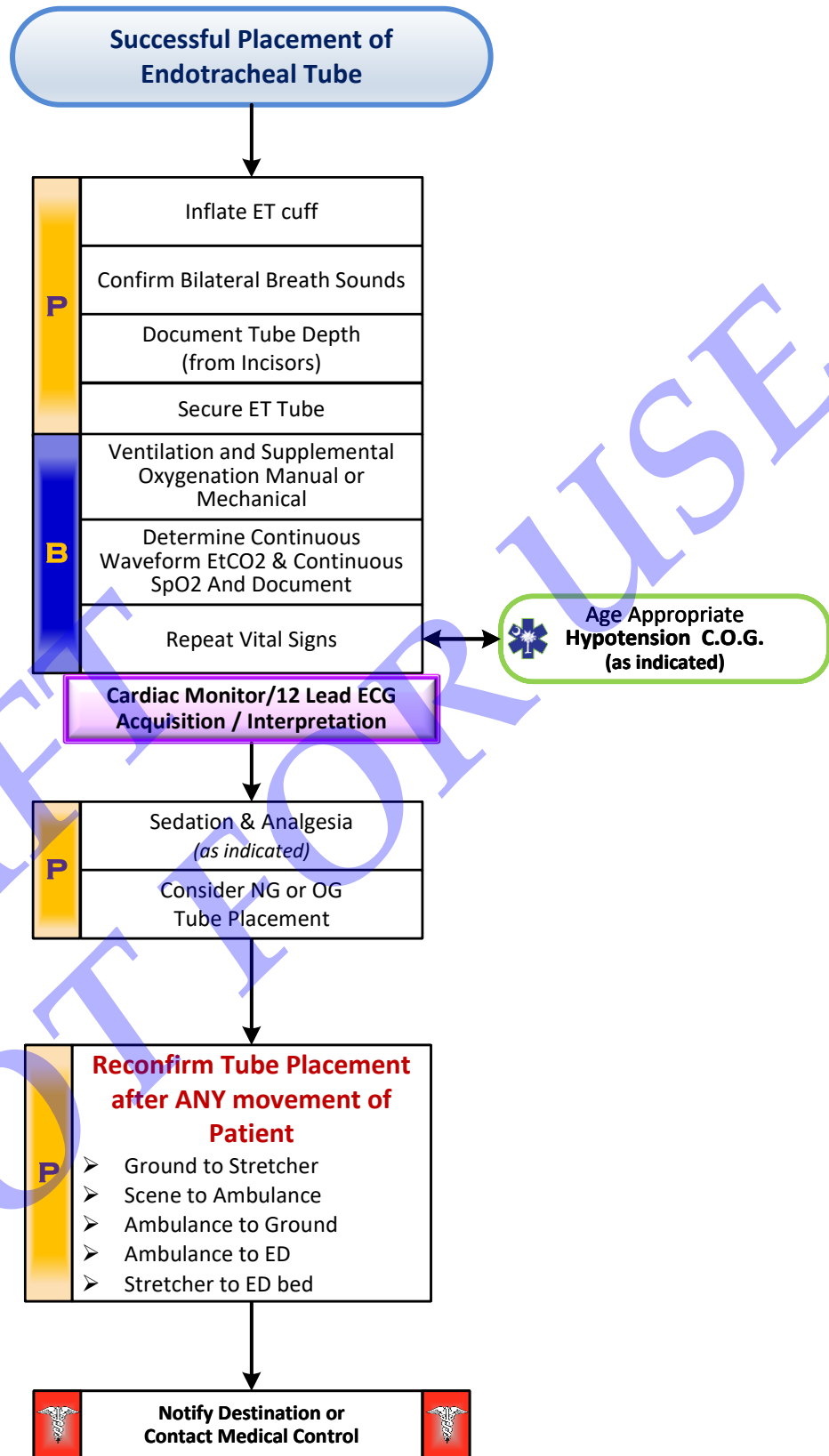
Airway, Adult - Failed

PEARLS

- EMS airway management must focus on rapid assessment and simultaneous interventions
- Optimize oxygenation and ventilation
- Minimize complications – either natural (aspiration) or iatrogenic (improper placement of device)
- Generally – the least invasive – and least time consuming method that achieves the goal of care is the desired path.
- If the patient can adequately oxygenate and ventilate on their own – then there is time for a more thorough evaluation and plan for course of action. Consider:
 - Improving positioning
 - Additional IV access
 - Better lighting
 - More assistance (personnel)
- Always have a back up plan – and back up equipment. Including a plan for failed airway immediately accessible.
- If a difficult airway is suspected (and potentially then a Failed Airway scenario) – call for additional assistance. It is unlikely that there will be too many assistants.
- ❖ **CRASH** Airway Management is indicated for:
 - Full cardiac and/or Respiratory Arrest
 - Agonal cardiorespiratory activity
 - Ineffective respirations
 - Pulseless rhythms (excepting patients with LVADs)
- If the patient appears to be lower risk for Difficult Airway – but needs a secure/managed airway – then move to intubation – with RSI being the preferred option.
- ❖ **Failed airway Protocol** is appropriate in situations where:
 - There have been 3 unsuccessful attempts to intubate or 2 by the most proficient technician.
 - Can't Intubate – Can't Oxygenate
- **Cricothyrotomy remains the final common pathway if other measures are unsuccessful or if the oxygenation status becomes untenable.**
- **Realtime Waveform Capnography is:**
 - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
 - **Strongly Recommended /Strongly Encouraged for all unstable patients**
 - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs and Appropriate Physical Examination
 - Efforts to maintain/improve airway
 - Indications for Advanced Airway Management
 - Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO₂); bradycardia, hypotension, or cardiac arrest
 - Peri-intubation / Cricothyrotomy period** encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.
 - Post-intubation with advanced airway, EtCO₂ value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), and at the time of patient transfer in the ED
 - Documentation of ALL attempts at intubation based upon definition.
 - Documentation of all times – including:
 - Initial Assessment
 - Drug Administration
 - Time of Advanced Airway Attempts
 - Time of Cricothyrotomy
 - Time of Successful Airway Placement
 - Contact with Receiving Facility
 - Completion of Airway Management Form



Post Intubation Management





Post Intubation Protocol

PEARLS:

- **All intubated patients must have continuous waveform capnography and continuous SpO2 monitoring.**
- All intubated patients should be placed on EKG monitoring
- **For all intubated patients:**
 - Note tube size
 - Note depth of tube placement at the incisors
 - Confirm bilateral breath sounds
 - Confirm placement with EtCO2
 - Recheck vital signs immediately following intubation
 - Recheck pupillary response following intubation
 - Note number of attempts to intubate and performing clinician
- **Reconfirm Tube Placement after ANY movement of Patient (whether intubated by Paramedic – or intubated at other facility prior to transport)**
 - Ground to Stretcher; Scene to Ambulance
 - Ambulance to Ground; Ambulance to ED; Stretcher to ED bed
 - Hospital bed to stretcher; Hospital to Ambulance loading
- Post-Intubation maintain appropriate sedation and analgesia
- Document all ventilator settings
- Document any periods of hypoxemia, bradycardia, or hypotension.
- **Key Documentation Points:**
 - Vital Signs and Appropriate Physical Examination – to include Breath Sounds before and after Intubation.
 - Efforts to maintain/improve airway
 - Indications for Advanced Airway Management
 - Occurrence of peri-intubation or post cricothyrotomy hypoxia (< 90% SpO2); bradycardia, hypotension, or cardiac arrest
 - Peri-intubation / Cricothyrotomy period** encompasses the time from administration of any sedative/paralyzing agent up to 10 minutes after the final airway procedure has been terminated.
 - Post-intubation with advanced airway: EtCO2 value and capnograph should be documented immediately after airway placement, with each patient movement (e.g., into and out of ambulance), and at the time of patient transfer in the ED
 - Documentation of ALL attempts at intubation based upon definition.
 - Completion of Airway Management Form
 - Documentation of all times – including:
 - Initial Assessment
 - Drug Administration
 - Time of Advanced Airway Attempts
 - Time of Cricothyrotomy
 - Time of Successful Airway Placement
 - Contact with Receiving Facility



Emergencies Involving Ventilators

History

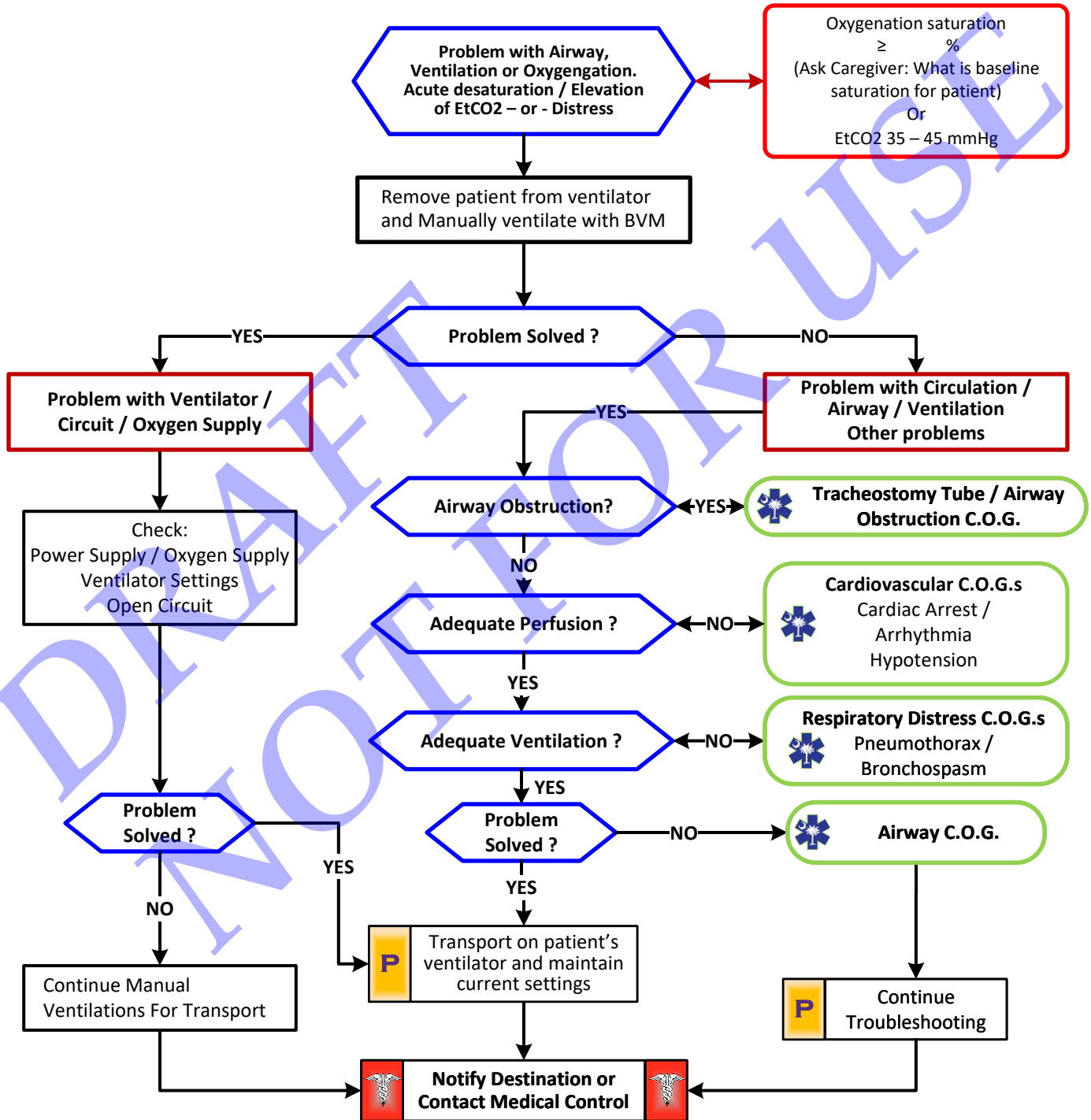
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchopulmonary dysplasia, muscular dystrophy)

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





Emergencies Involving Ventilators

DRAFT NOT FOR USE

PEARLS

- Always talk to family / caregivers as they have specific knowledge and skills.
- If using the patient's ventilator – bring caregiver knowledgeable in ventilator operation during transport.
- Always use patient's equipment if available and functioning properly.
- **Continuous pulse oximetry and end tidal CO2 monitoring must be utilized during assessment and transport.**
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.
- Unable to correct ventilator problem: Remove patient from ventilator and manually ventilate using BVM.
- **Take patient's ventilator to hospital even if not functioning properly.**
- **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.
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs with SpO2 and EtCO2
 - Determination of Problem if Identified
 - All Interventions and response to interventions



Respiratory Distress With a Tracheostomy Tube

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)

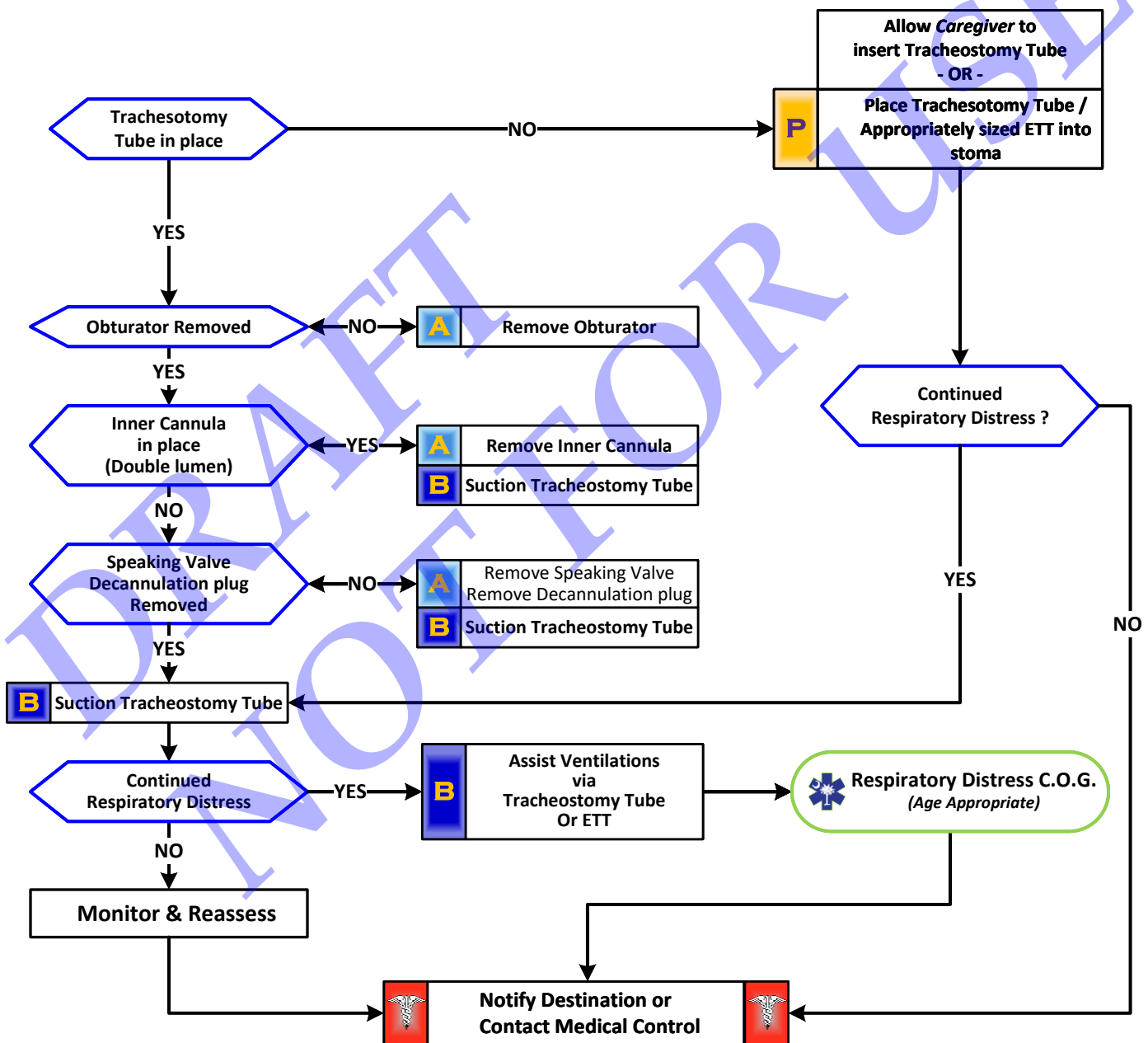
Signs and Symptoms

- 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
- Mucous Plug
- Infection
- Congenital heart disease
- Medication or toxin
- Trauma

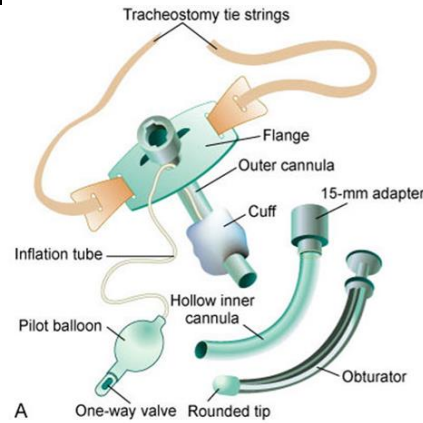
❖ If Tracheostomy Tube unable to be Cleared and Patient is in extremis – Remove Tracheostomy Tube.
 ❖ EMERGENT SUCTIONING of Tracheostomy Tube may be performed by ALL Levels (when patient is unable to breathe adequately).



ADULT RESPIRATORY



Respiratory Distress With a Tracheostomy Tube



PEARLS

- Always talk to family / caregivers as they have specific knowledge and skills.
- If Tracheostomy Tube unable to be Cleared and Patient is *in extremis* – Remove Tracheostomy Tube.
- EMERGENT SUCTIONING of Tracheostomy Tube may be performed by ALL Levels (when patient is unable to breathe adequately).
- 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.
- DOPE: Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.
- KEY DOCUMENTATION ELEMENTS:
 - Findings on Arrival
 - Manipulations of Tracheostomy Tube – detailed.
 - Initial Vital Signs and Physical Examination
 - Interventions attempted including the method of airway intervention, the size of the equipment used, and the number of attempts to achieve successful result
 - Indications for advanced airway management
 - Subsequent/Repeat Vital Signs and Physical Examination following interventions
 - Occurrence of hypoxia (< 90% SpO₂) at anytime, bradycardia (age based), hypotension, or cardiac or respiratory arrest.
 - Post manipulation EtCO₂ and continuous waveform capnography
 - If patient is not transported – documentation as to reason for non-transport, patient safety determination, and signature of party accepting non-transport.



Syncope

History

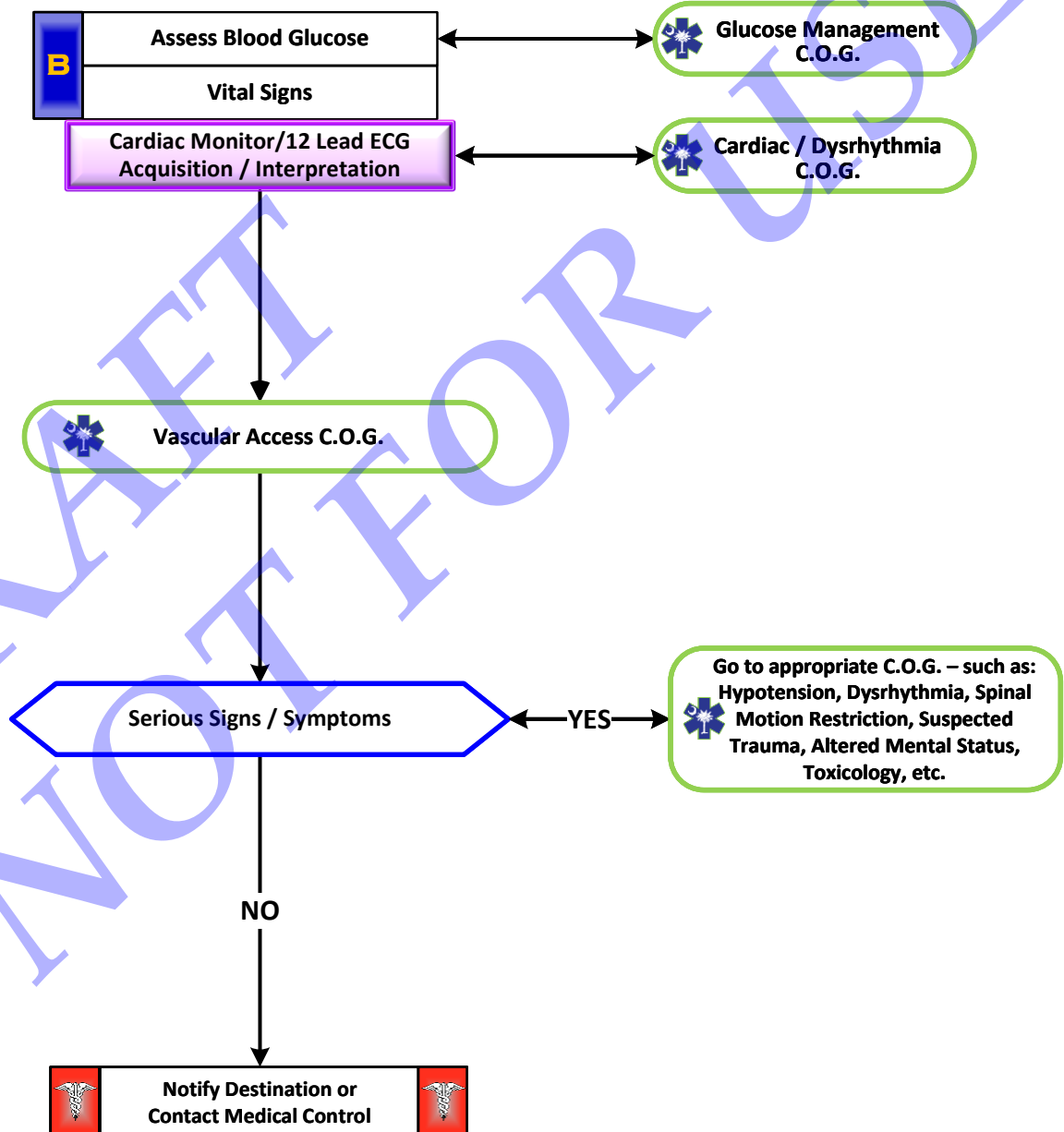
- Cardiac history, stroke, seizure
- Prodrome or Sudden
- Circumstances
- Occult blood loss (GI, ectopic)
- Females: LMP, vaginal bleeding
- Fluid loss: nausea, vomiting, diarrhea
- Past medical history
- Medications

Signs and Symptoms

- Loss of consciousness with recovery
- Lightheadedness, dizziness
- Palpitations, slow or rapid pulse
- Pulse irregularity
- Decreased blood pressure
- Consider Post-Ictal State
- Chest Pain
- Dyspnea
- Diaphoresis
- Trauma from fall

Differential

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





Syncope

PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro, Skin.**
- Syncope is both loss of consciousness and loss of postural tone. 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.
- 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 > 50, diabetics and / or women especially with upper abdominal complaints.
- Heart Rate: One of the first clinical signs of dehydration - almost always - increased heart rate. Tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.
- Syncope with no preceding symptoms or event may be associated with dysrhythmia.
- 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.
- 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.

Differential should remain wide and include:

Cardiac dysrhythmia	Neurological problem	Choking	Seizure
Pulmonary embolism	Hemorrhage	Stroke	Sepsis
Respiratory	Hypo or Hyperglycemia	GI Hemorrhage	

High-risk patients:

Age > 60	Syncope with exertion	History of CHF
Syncope with chest pain	Abnormal ECG	Syncope with dyspnea

Age specific blood pressure

0 – 28 days > 60 mmHg	1 month - 1 year > 70 mmHg
1 - 10 years > 70 + (2 x age) mmHg	11 years and older > 90 mmHg

KEY DOCUMENTATION ELEMENTS:

- Presenting Cardiac Rhythm (include ALL EKG Strips)
- Cardiac Rhythm present when patient is symptomatic (include ALL EKG Strips)
- Any Cardiac Rhythm Changes (include ALL EKG Strips)
- Blood Pressure, Pulse, Respiratory Rate, SpO2
- Blood Glucose Level
- Symptoms immediately preceding event
- Patient status on EMS Arrival – recovered or still symptomatic



Suspected Stroke

History

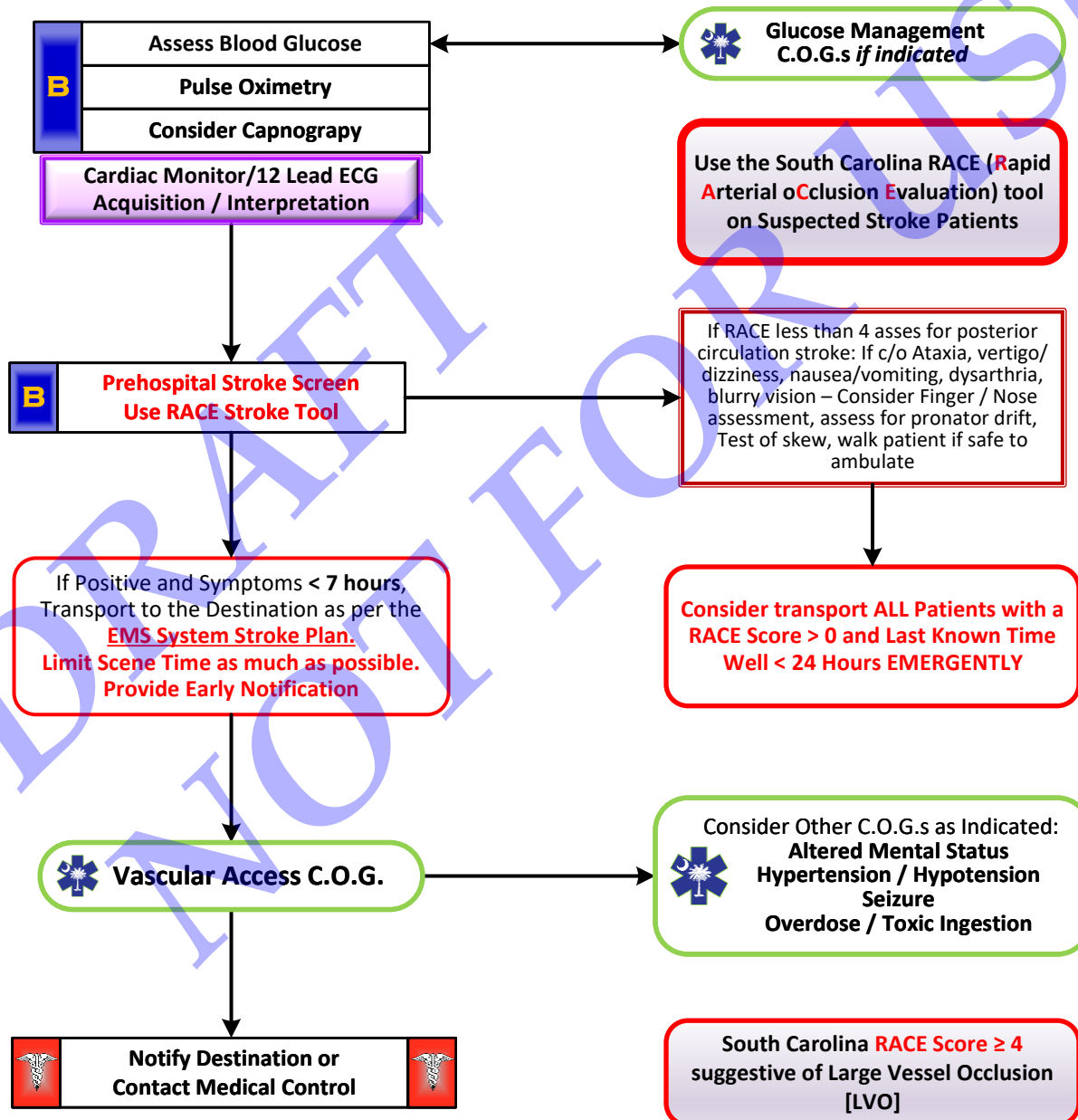
- Prior Stroke / TIA
- Previous cardiac / vascular surgery
- Associated diseases: diabetes, hypertension, CAD
- Atrial fibrillation
- Medications (blood thinners)
- History of trauma

Signs and Symptoms

- Altered mental status
- Weakness / Paralysis
- Blindness or other sensory loss
- Aphasia / Dysarthria
- Syncope
- Vertigo / Dizziness
- Posterior Circulation
 - Loss of Balance
 - Loss of Coordination
 - Difficulty Walking
- Vomiting
- Headache
- Seizures
- Respiratory pattern change
- Hypertension / hypotension

Differential

- See Altered Mental Status
- TIA (Transient ischemic attack)
- Seizure
- Hypoglycemia
- Tumor
- Trauma





Suspected Stroke

PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **RACE is based on Acute Non-Traumatic Symptoms ONLY.**
- **ALL RACE SCORES > 0 are indicative of Stroke.**
- **RACE SCORE \geq 4 is INDICATIVE of Large Vessel Occlusion (LVO) Stroke that may benefit from interventional procedures.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient. With a duration of symptoms of less than 24 hours, scene times should be limited to 10 minutes, early destination notification/activation should be provided and transport times should be minimized based on the EMS System Stroke Plan.**
- **Onset of symptoms** is defined as the last witnessed time the patient was symptom free (i.e. awakening with stroke symptoms would be defined as an onset time of the previous night when patient was symptom free)
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Consider the possibility of Posterior Circulation Stroke – Particularly in younger patients.
- If RACE less than 4 assess for posterior circulation stroke: If c/o Ataxia, vertigo/dizziness, nausea/vomiting, dysarthria, blurry vision – Consider Finger / Nose assessment, assess for pronator drift, Test of skew, walk patient if safe to ambulate
- Maintain Head of Bed elevation at 15 – 30 degrees.
- Elevated blood pressure is commonly present with stroke. Consider treatment per Hypertensive Protocol.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit.
- Document the Stroke Screen results in the ePCR.
- Document the 12 Lead ECG as a procedure in the ePCR.
- **KEY DOCUMENTATION ELEMENTS**
 - “Last known well” must be specific
 - If the patient was last known well prior to bedtime the night before, that time is the time to be documented (not time the patient woke up with symptoms present)
 - Blood glucose results
 - Specific validated stroke scale used and findings
 - * R.A.C.E Scoring is mandatory for South Carolina EMS for Suspected Stroke Patients**
 - Time of notification to receiving hospital
- **KEY PERFORMANCE MEASURES**
 - Documentation of time “last known well”
 - Use of validated stroke scale
 - Blood glucose level obtained
 - Minimize EMS scene time
 - Hospital stroke team pre-arrival alert or activation occurred as early as possible after positive stroke assessment finding



Suspected Stroke

R. A. C. E. Score



SC EMS R. A. C. E. Stroke Scale			
Rapid Arterial Occlusion Evaluation Scale			
ITEM	Instruction	RESULT	SCORE
Facial Palsy	Ask Patient to show their teeth (Smile)	Absent: Symmetrical movement	0
		Mild: Slightly Assymetrical	1
		Moderate To Severe: Completely Assymetrical	2
Arm Motor Function	Extending the arm of the patient 90 deg(if sitting) or 45 deg (if supine) palms up	Normal to Mild: Limb upheld > 10 seconds	0
		Moderate: Limb upheld < 10 seconds	1
		Severe: Patient unable to raise arm against gravity	2
Leg Motor Function	Extending the leg of the patient 30 deg (in supine position) One Leg at a time	Normal to Mild: Limb upheld > 5 seconds	0
		Moderate: Limb upheld < 5 seconds	1
		Severe: Patient unable to raise leg against gravity	2
*Head & Gaze Deviation	Observe range of motion of eyes and look for head turning to one side	Absent: Normal Eye Movements of both sides and no head deviation observed	0
		Present (Eyes and/or head deviation to one side observed)	1
*Aphasia (If patient has RIGHT sided weakness)	As Patient to follow two simple commands: 1. Close Your Eyes. 2. Make a Fist	Normal: Performs both tasks correctly	0
		Moderate: Performs only 1 of 2 tasks correctly	1
		Severe: Cannot perform either task	2
*Agnosia (If Patient has LEFT sided weakness)	Inability to recognize familiar objects. Ask patient: 1. "Whose arm is this?" (while showing the affected arm). 2. "Can you move your arm?"	Normal: Appropriate or correct answer	0
		Moderate: Does not recognize limb or states that they can move it - but cannot	1
		Severe: Does not recognize arm or is unaware of arm	2
*Head/Eye Gaze Deviation or if patient is mute and does not follow commands = HIGH Likelihood of Large Vessel Occlusion (LVO)		RACE SCALE TOTAL = 9	
		Maximum RACE Score = 9	
		ANY Score > 0 is a "Stroke Alert"	
		ANY Score > or = 4 is LIKELY LVO	
KEY CHECK POINTS:	<input type="checkbox"/> Emergency Contact		
	<input type="checkbox"/> Last Known Well (Normal) Time		
	<input type="checkbox"/> Medication List		

ADULT CARDIOVASCULAR



Suspected Stroke

REPERFUSION CHECKLIST

The Reperfusion Checklist is an important component in the initial evaluation, treatment, and transport of patients suffering from an acute ST-elevation myocardial infarction (STEMI) or acute Stroke. Both of these conditions can be successfully treated using fibrinolysis (thrombolytics) if the patient arrives at the appropriate hospital within the therapeutic window of time.

This form should be completed for all acute STEMI and acute Stroke patients.

Patient's Name

ePCR Number:

Date:

YES

NO

1. Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?

YES

NO

2. Has the patient developed a sudden neurologic deficit with a positive R.A.C.E. Stroke Screen?

3. Are there any contraindications to fibrinolysis

If any of the following are checked "YES" – fibrinolysis MAY be contraindicated

YES

NO

Systolic Blood Pressure greater than 180 mm Hg

YES

NO

Diastolic Blood Pressure greater than 110 mm Hg

YES

NO

Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm

YES

NO

History of structural Central Nervous System disease (tumors, masses, hemorrhage, etc.)

YES

NO

Significant closed head or facial trauma within the previous 3 months

YES

NO

Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding

YES

NO

Bleeding or clotting problem or on blood thinners

YES

NO

CPR performed greater than 10 minutes

YES

NO

Currently Pregnant

YES

NO

Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure

4. STEMI Patients Only – Does the patient have severe heart failure or cardiogenic shock?

These patients may benefit more from a percutaneous coronary intervention (PCI) capable hospital

YES

NO

Presence of pulmonary edema (rales greater than halfway up lung fields)

YES

NO

Systemic hypoperfusion (cool and clammy)

If any contraindication is checked as "Yes" and an acute Stroke is suspected by exam or a STEMI is confirmed by ECG, activate the EMS Stroke Plan or EMS STEMI Plan for fibrinolytic ineligible patients.

This may require the EMS Agency, an Air Medical Service, or a Specialty Care Transport Service to transport directly to a specialty center capable of interventional care within the therapeutic



Stroke Patient Destination Determination by Stroke Center Capability



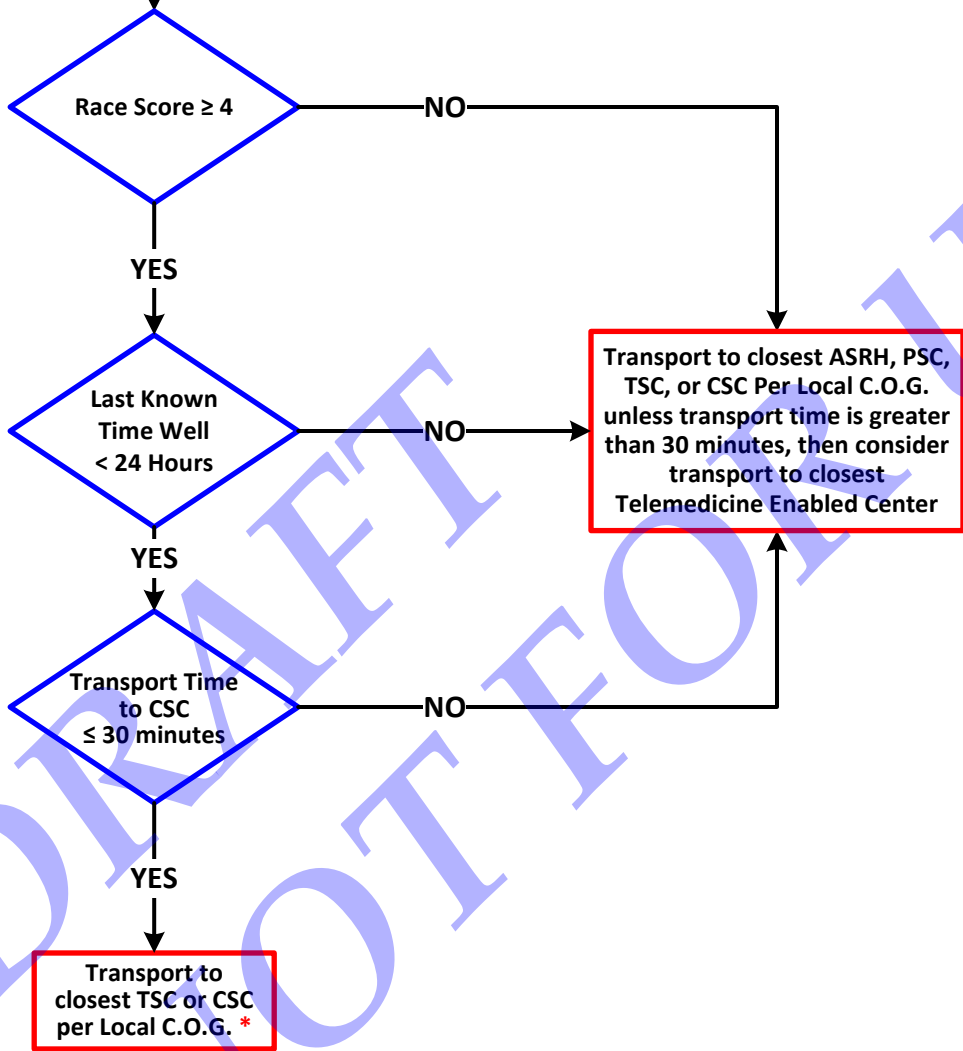
B

STROKE SCREEN POSITIVE

Determine and Document Time Last Known Well

Perform and Document RACE Score

- CSC = Comprehensive Stroke Center
- TSC = Thrombectomy-Capable Stroke Center
- PSC = Primary Stroke Center
- ASRH = Acute Stroke Ready Hospital



ADULT CARDIOVASCULAR

* Local Medical Control

Acute Stroke Ready Hospital (ASRH), Primary Stroke Center (PSC), Thrombectomy-Capable Stroke Center (TSC) * Comprehensive Stroke Center (CSC) are universal terms used to designate a facility's capabilities in caring for an acute stroke patient.

It is incumbent upon local Medical Control Physicians to identify all facilities within their service area and to incorporate them within their own stroke patient destination guidelines.



Stroke Patient Destination Determination by Stroke Center Capability



Current Stroke Center Designations can be found at:

<https://scdhec.gov/health/diseases-conditions/heart-disease-stroke/stroke>

DRAFT
NOT FOR USE

ADULT CARDIOVASCULAR



Hypotension (Symptomatic)

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
- Cardiomyopathy
- Trauma

Signs and Symptoms

- Restlessness, confusion
- Weakness, dizziness
- Weak, rapid pulse
- Pale, cool, clammy skin
- Delayed capillary refill
- Coffee-ground emesis
- Tarry stools
- AMS,
- Decreased urine output and/or decreased po intake.
- Tachycardia out of proportion to temperature
 - Consider normal Heart Rate if on Beta Blockers

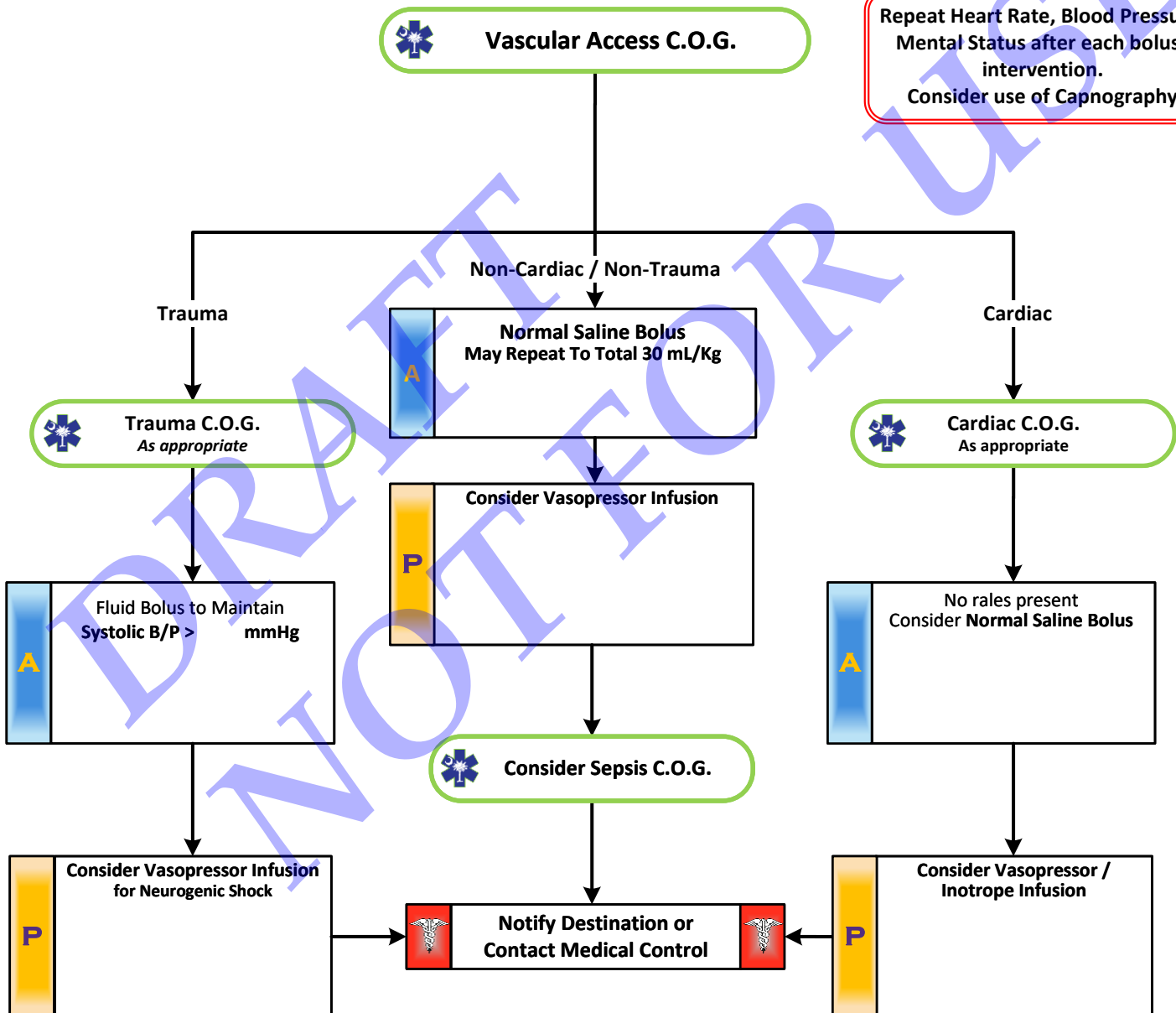
Differential

- Shock
 - Hypovolemic
 - Cardiogenic
 - Septic
 - Neurogenic
 - Anaphylactic
- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolus
- Tension pneumothorax
- Medication effect / overdose
- Vasovagal
- Physiologic (pregnancy)



Vascular Access C.O.G.

Repeat Heart Rate, Blood Pressure, Mental Status after each bolus/ intervention.
Consider use of Capnography





Hypotension (Symptomatic)

Epinephrine for Bolus Dosing

INDICATIONS: For use in patients with **unresponsive** hypotension.

RELATIVE CONTRAINDICATIONS: Age > 50; Known Heart Disease; Tachyarrhythmias

Admixture:

Epinephrine 1:10,000 (Cardiac Epinephrine = 100 mcg/mL)

Draw 9 mL of Normal Saline into a Syringe

Draw 1 mL of Epinephrine 1:10,000 (100 mcg/mL) into the syringe with 9 mL of Normal Saline

Shake admixture well

Yields: 10 mL of Epinephrine at 10 mcg/mL (1:100,000).

LABEL SYRINGE

Dose: 0.5 – 2 mL (5 – 20 mcg) IV push Q 1 – 5 minutes

PEARLS:

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- Hypotension can be defined as a systolic blood pressure of less than 90. This is not always reliable and should be interpreted in context and patient's typical BP if known.
- Shock often may present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.
- Fluid of up to 30 mL/kg of isotonic fluid (per Local Medical Control) by administering rapid, predetermined boluses (e.g., 500 mL) unless the MAP goal is achieved, or pulmonary edema develops.
 - If available, the administration of packed red blood cells, other blood components or whole blood may be indicated for hemorrhagic shock
 - Early, aggressive IV fluid administration is essential in the treatment of suspected septic shock
- Patients predisposed to shock:
 - Immunocompromised (patients undergoing chemotherapy or with a primary or acquired immunodeficiency)
 - Adrenal insufficiency (Addison's disease, congenital adrenal hyperplasia, chronic or recent steroid use)
 - History of a solid organ or bone marrow transplant
 - Elderly
- In most adults, tachycardia is the first sign of compensated shock, and may persist for hours, caution if patient on Beta Blockers
- Hypotension may indicate uncompensated shock, which may progress to cardiopulmonary failure within minutes.
- Repeat Vital Signs AFTER each Bolus or Change in Pharmacologic Therapy (Change in Dose or Agent).
- 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 ventricular/septum/valve, toxins.
- **Distributive Shock:**
 - Sepsis, Anaphylactic, Neurogenic (hallmark is warm, dry, pink skin with normal capillary refill time and typically alert), Toxins.
- **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:**
 - State where body cannot produce enough steroids (glucocorticoids/mineralocorticoids). May have primary adrenal disease or more commonly have stopped a steroid like prednisone. Usually hypotensive with nausea, vomiting, dehydration and/or abdominal pain.
 - If suspected Paramedic should give Methylprednisolone 125 mg IM / IV / IO or Dexamethasone 10 mg IM / IV / IO. Use steroid agent specific to your drug list. May administer prescribed steroid carried by patient IM / IV / IO. 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 physician.
 - May use steroid agent specific to your drug list.
- **KEY DOCUMENTATION ELEMENTS:**
 - Medications administered
 - Full vital signs (pulse, blood pressure, respiratory rate, neurologic status) with reassessment at minimum Q 15 minutes or more frequently as appropriate.
 - Amount of Fluids Administered
 - Lactate Level if your service performs this.
 - Notification of receiving facility on Transport.



Hypertensive Emergency / Urgency

History

- Documented hypertension
- Related diseases: diabetes, CVA, renal failure, cardiac
- Medications (compliance ?)
- Erectile dysfunction medication (Levitra/Cialis/Viagra)
- Pregnancy

Signs and Symptoms

One of these

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

- AND -

At least one of these

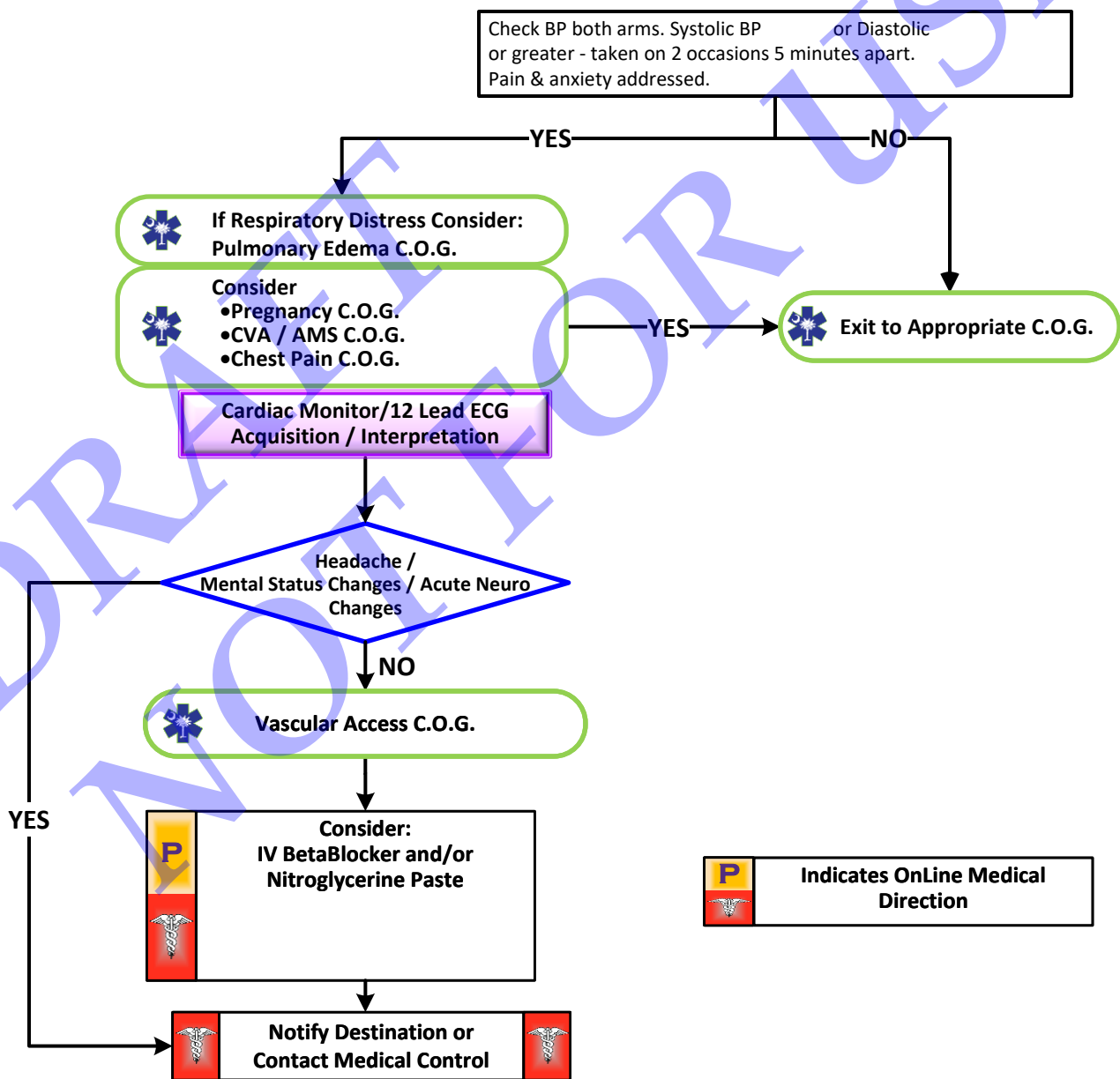
- Headache
- Nosebleed
- Blurred vision
- Dizziness
- Chest Pain
- SOB
- AMS
- Hematuria

Differential

- Hypertensive encephalopathy
- Primary CNS Injury (Cushing's response = bradycardia with 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.



P Indicates OnLine Medical Direction

ADULT CARDIOVASCULAR



Hypertensive Emergency / Urgency

DRAFT NOT FOR USE

PEARLS

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Extremities, Neuro**
- **Never treat elevated blood pressure based on one set of vital signs or on vital signs alone.**
- Symptomatic hypertension is typically revealed through end organ damage to the cardiac, CNS or renal systems.
- Ensure that the appropriate size blood pressure cuff is utilized for body habitus.
- Check blood pressure in both arms.
- All symptomatic patients with hypertension should be transported with their head elevated at 30 degrees.
- Consider aortic aneurysm if patient is experiencing severe or dull pain in the abdomen, chest, lower back or groin.
- **KEY DOCUMENTATION ELEMENTS:**
 - Blood pressure obtained in both arms
 - Blood pressure obtained every 10 minutes
 - Medication dose and timing, if administered



Chest Pain: Cardiac and STEMI

History

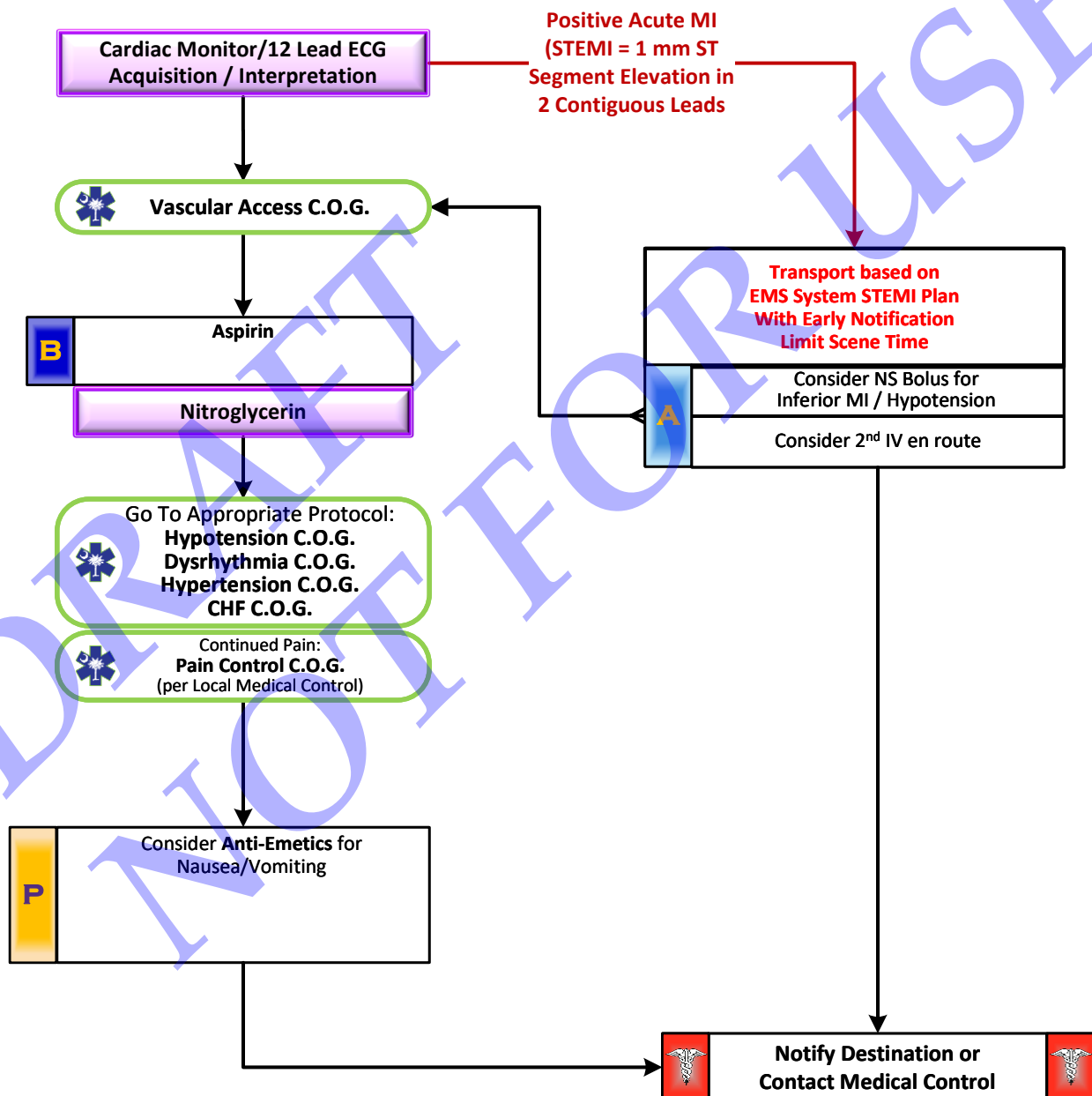
- Age
- Medications
- **Erectile Dysfunction Medication**
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies (Aspirin, Morphine, Lidocaine)
- Recent physical exertion
- Palliation / Provocation
- Quality (crampy, constant, sharp, dull, etc.)
- Region / Radiation / Referred
- Severity (1-10)
- Time (onset /duration / repetition)

Signs and Symptoms

- CP (pain, pressure, aching, vicelike tightness)
- Location (substernal, epigastric, arm, jaw, neck, shoulder)
- Radiation of pain
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness
- **Time of Onset**

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





Chest Pain: Cardiac and STEMI

Killip Classification in Acute Myocardial Infarction

Killip Classification	PAO2 (on Room Air)	Clinical Description	Estimated Mortality
Class 1	Normal	No clinical evidence of left ventricular (LV) failure	6%
Class 2	Slightly Reduced	Findings consistent with mild to moderate heart failure (eg, S3 gallop, lung rales less than one-half way up the posterior lung fields, or jugular venous distension)	17%
Class 3	Abnormal	Overt pulmonary edema	38%
Class 4	Severely Abnormal	Cardiogenic shock	67%

ADULT CARDIOVASCULAR

PEARLS:

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Positive Acute MI (STEMI = cardiac symptoms > 15 minutes and < 12 hours AND ST segment elevation of ≥ 1 mm in 2 or more Anatomically Contiguous Leads OR Left Bundle Branch Block NOT KNOWN to be present in past)**
- ****High Risk: Cardiogenic shock** – inadequate tissue perfusion due to low cardiac output. Systolic Blood Pressure ≤ 90 mm Hg in setting of acute myocardial infarction. (Killip class ≥ III)
- Patients with STEMI (ST-Elevation Myocardial Infarction) or positive Reperfusion Checklist should be transported to the appropriate destination based on the EMS System STEMI Plan
- **Avoid Nitroglycerin (NTG) in patients who use erectile dysfunction medication (Viagra (Sildenafil) or Levitra (Vardenafil) < 24 hours; or Cialis (Tadalafil) < 36 hours) due to possible severe hypotension.**
- ***Travel Time** defined with understanding that PCI can be completed within 90 minutes or less including transport time.
- Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (EMT-P)
- Nitroglycerin and Narcotics may be repeated per dosing guidelines
- **If patient has taken NTG without relief, consider potency of medication.**
- **Monitor for hypotension after administration of NTG and/or Narcotics / Opiates**
- **Perform a patient interview, examination and treatment as simultaneously and expediently as possible, do not excessively delay treatment or transportation of this patient.**
- Diabetics, female, and geriatric patients often have atypical pain or only generalized complaints.
- **Additional Information is appended in POLICY: STEMI.**
- **KEY DOCUMENTATION ELEMENTS:**
 - Time of Symptom Onset
 - Time of patient contact by EMS to the time of 12 lead EKG acquisition
 - Time Aspirin (ASA) administered – OR – Reason why not given
 - Time of STEMI notification
 - Medications Administered and Time
 - Initial and Subsequent 12 lead EKGs



Chest Pain: Cardiac and STEMI

REPERFUSION CHECKLIST

The Reperfusion Checklist is an important component in the initial evaluation, treatment, and transport of patients suffering from an acute ST-elevation myocardial infarction (STEMI) or acute Stroke. Both of these conditions can be successfully treated using fibrinolysis (thrombolytics) if the patient arrives at the appropriate hospital within the therapeutic window of time.

This form should be completed for all acute STEMI and acute Stroke patients.

Patient's Name

ePCR Number:

Date:

YES

NO

1. Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?

YES

NO

2. Has the patient developed a sudden neurologic deficit with a positive R.A.C.E. Stroke Screen?

3. Are there any contraindications to fibrinolysis

If any of the following are checked "YES" – fibrinolysis MAY be contraindicated

YES

NO

Systolic Blood Pressure greater than 180 mm Hg

YES

NO

Diastolic Blood Pressure greater than 110 mm Hg

YES

NO

Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm

YES

NO

History of structural Central Nervous System disease (tumors, masses, hemorrhage, etc.)

YES

NO

Significant closed head or facial trauma within the previous 3 months

YES

NO

Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding

YES

NO

Bleeding or clotting problem or on blood thinners

YES

NO

CPR performed greater than 10 minutes

YES

NO

Currently Pregnant

YES

NO

Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure

4. STEMI Patients Only – Does the patient have severe heart failure or cardiogenic shock?

These patients may benefit more from a percutaneous coronary intervention (PCI) capable hospital

YES

NO

Presence of pulmonary edema (rales greater than halfway up lung fields)

YES

NO

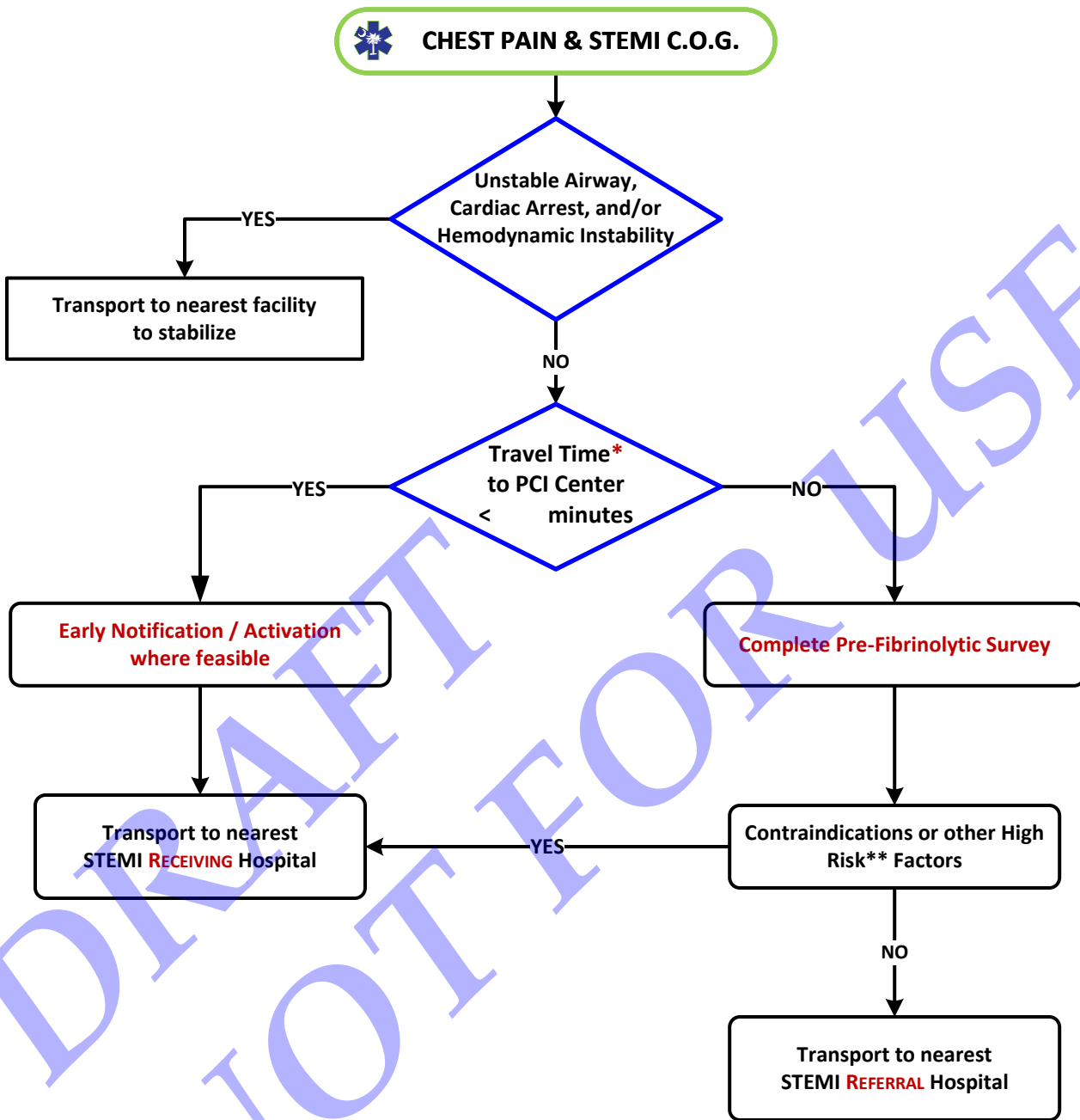
Systemic hypoperfusion (cool and clammy)

If any contraindication is checked as "Yes" and an acute Stroke is suspected by exam or a STEMI is confirmed by ECG, activate the EMS Stroke Plan or EMS STEMI Plan for fibrinolytic ineligible patients.

This may require the EMS Agency, an Air Medical Service, or a Specialty Care Transport Service to transport directly to a specialty center capable of interventional care within the therapeutic



Chest Pain: STEMI Transport



***Consider Air Medical Activation if time to Cath Lab can be achieved in < minutes and is NOT ACHIEVABLE by Ground Transport**



Chest Pain: STEMI Transport

Killip Classification in Acute Myocardial Infarction

Killip Classification	PAO2 (on Room Air)	Clinical Description	Estimated Mortality
Class 1	Normal	No clinical evidence of left ventricular (LV) failure	6%
Class 2	Slightly Reduced	Findings consistent with mild to moderate heart failure (eg, S3 gallop, lung rales less than one-half way up the posterior lung fields, or jugular venous distension)	17%
Class 3	Abnormal	Overt pulmonary edema	38%
Class 4	Severely Abnormal	Cardiogenic shock	67%

DRAFT NOT FOR USE

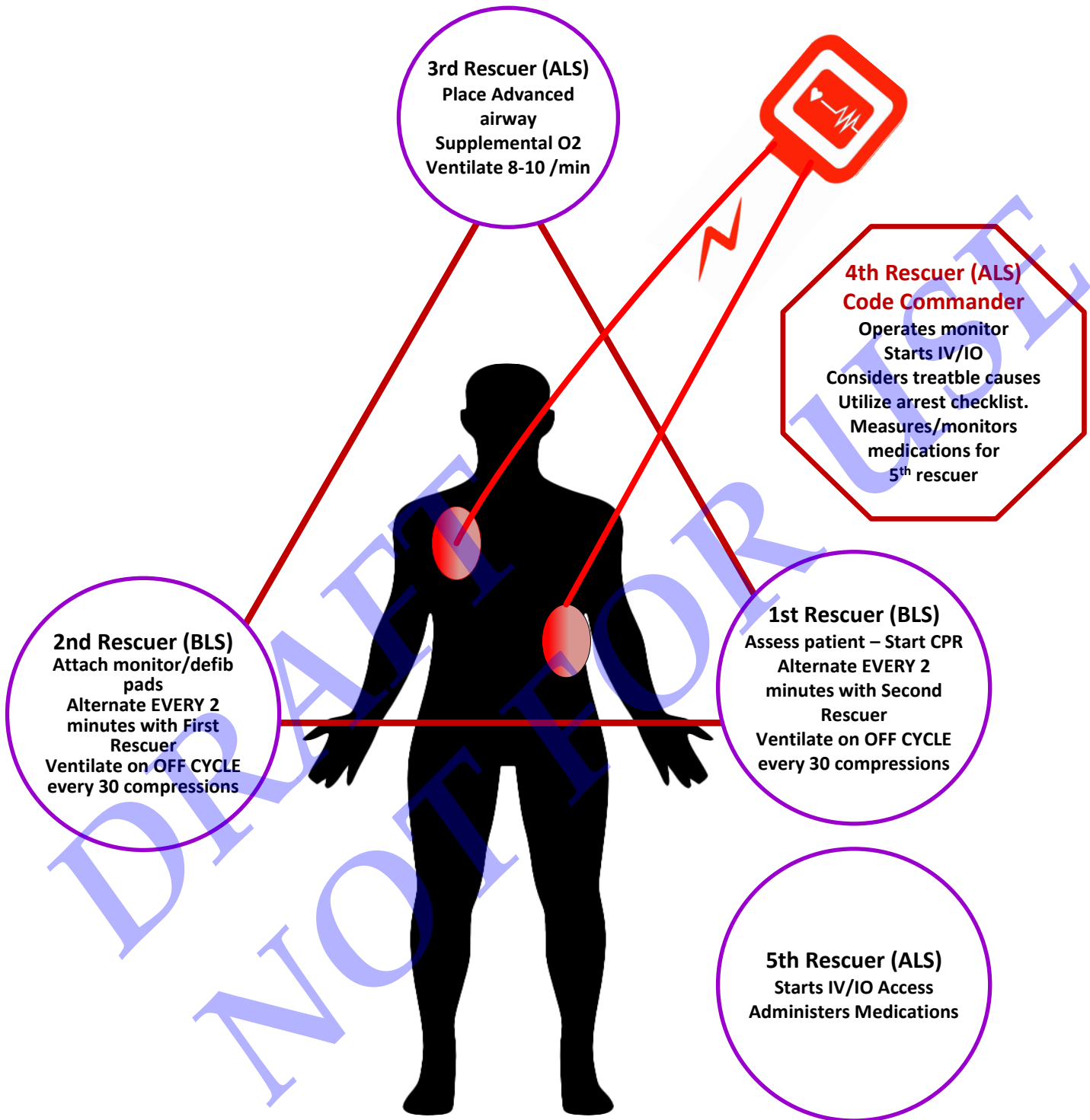
ADULT CARDIOVASCULAR

PEARLS

- **Positive Acute MI (STEMI = cardiac symptoms > 15 minutes and < 12 hours AND ST segment elevation of ≥ 1 mm in 2 or more Anatomically Contiguous Leads OR Left Bundle Branch Block NOT KNOWN to be present in past)**
- ****High Risk: Cardiogenic shock** – inadequate tissue perfusion due to low cardiac output. Systolic Blood Pressure ≤ 90 mm Hg in setting of acute myocardial infarction. (Killip class ≥ III)
- Patients with STEMI (ST-Elevation Myocardial Infarction) or positive Reperfusion Checklist should be transported to the appropriate destination based on the EMS System STEMI Plan
- *Travel Time defined with understanding that PCI can be completed within 90 minutes or less including transport time.
- **Additional Information is appended in POLICY: STEMI.**
- **KEY DOCUMENTATION ELEMENTS:**
 - Time of Symptom Onset
 - Time of patient contact by EMS to the time of 12 lead EKG acquisition
 - Time Aspirin (ASA) administered – OR – Reason why not given
 - Time of STEMI center notification
 - Medications Administered and Time
 - Initial and Subsequent 12 lead EKGs
 - Completion of Pre-Fibrinolytic Survey



Team Focused CPR





Team Focused CPR

Ensure Adequate Space To work

The following is listed in the order of importance:
Each rescuer has a specific job during the Code

1 st Crew on Scene	1 st Rescuer	Begin Continuous High Quality CPR Compressions. Push Hard [Adult: > 2 inches; Child > 1.5 inches] and Fast [100-120/min]. Change compressors EVERY 2 minutes (limit changes/pulse checks to <5 sec) during entire arrest
	2 nd Rescuer	Attach AED/Monitor and Defibrillate as necessary. Provide Ventilations with BVM
		1 st and 2 nd Rescuers rotate EVERY 2 mins.
2 nd Crew on Scene	3 rd Rescuer	Assumes airway: Consider BIAD/ Intubation Compressions should NOT BE STOPPED for intubation
	4 th Rescuer	Establish Team Leader/Code Commander. Utilize Cardiac Arrest Checklist
	5 th Rescuer	Initiate IV/IO and administer appropriate medications per Code Commander
All Crews	Follow appropriate arrest Protocols	
	1 st /2 nd /3 rd Rescuer	Once advanced airway is in place, ventilate every 6-8 seconds. DO NOT Interrupt compressions except for changes/pulse checks

CODE COMMANDER

- Responsible for Patient Care
- Ensures High Quality Chest Compressions
- Ensures frequent Compressor Changes
- Responsible for Communication with Family
- Operates Monitor
- Utilizes the Event Button
- Measures and Calls For Medications by 5th Rescuer at Time of Administration

PEARLS

- **Ensuring High Quality Chest Compressions with minimal interruptions takes PRIORITY.**
- Adequate compressions with timely defibrillation are the keys to success
- Monitor in "Paddles" Mode with Metronome on.
- Do NOT HYPERVENTILATE.
- IF Advanced Airway is NOT established – Compression to Breath Ratio should be 30:2 for adult and 15:2 for child.
- Once Advanced airway is in place – ventilate at 8 – 10 breaths per minute.
- Each breath should be administered over 1 second with just enough air to notice chest rise.
- Continue compressions while monitor/AED is charging
- All Breaks in Compressions to be < 5 seconds.
- Consider possible CAUSE of the arrest early. Consider traditional ACLS "Hs and Ts" for PEA.
- **KEY DOCUMENTATION ELEMENTS:**
 - Per Ventricular Fibrillation / PEA Protocol



Cardiac Arrest

History:

- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Signs of lividity, rigor mortis
- DNR/POST/MOST form

Signs and Symptoms:

- Unresponsive
- Apneic
- Pulseless

Differential:

- Medical vs Trauma
- V. fib vs Pulseless V. tach
- Asystole
- Pulseless electrical activity (PEA)

Criteria for Death / No Resuscitation
Review DNR / POST / MOST Form

NO

YES

B

Begin Continuous High Quality Chest Compressions
Push Hard (≥ 2 inches)
Push Fast (100 - 120 / min)
Change Compressors every 2 minutes
(sooner if fatigued)
(Limit changes / pulse checks ≤ 10 seconds)

Ventilate 1 breath every 6 seconds
30:2 Compression:Ventilation if no Advanced Airway
Monitor EtCO2 if available

TYPICAL CRITERIA TO WITHHOLD:

- Patients pulseless or apneic with a valid South Carolina EMS DNR order or POLST orders governing their care.
- Rigor mortis, dependent lividity, decomposition.
- Trauma incompatible with life such as decapitation, massive crush injury, incineration, or body frozen solid.
- Patients 18 years and older not known to be pregnant with documented pulseless down time exceeding 15 min without CPR and found to apneic, pulseless, with unresponsive pupils and in asystole without suspicion of hypothermia upon the arrival of EMS.
- Mass casualty victims triaged to be expired or expectant.

Follow Team Focused CPR Protocol and Approach when possible Utilize Cardiac Arrest Checklist

B AED Procedure if available

ALS Available

YES

Cardiac Monitor Interpretation

VF / VT Protocol / Tachycardia C.O.G.s (as indicated)

Shockable Rhythm

YES

Asystole / PEA C.O.G. (as indicated)

Shockable Rhythm

NO

VF / VT Protocol / Tachycardia C.O.G.s (as indicated)

Shockable Rhythm

YES

AT ANY TIME
Return of Spontaneous Circulation



Go to Post Resuscitation C.O.G.

Arrest secondary to Opioid OD?

YES

Consider Naloxone

Termination on Scene C.O.G. as indicated

Notify Destination or Contact Medical Control



Cardiac Arrest

PEARLS

- **Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **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.**
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.**
 - All Cardiac Arrest patients should have continuous waveform capnography applied
 - 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 .
- **Defibrillation:**
 - Follow manufacture'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 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 - **Opioid Overdose** - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
 - **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
- **Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.**
- **KEY DOCUMENTATION ELEMENTS:**
 - Resuscitation attempted and all interventions performed
 - Arrest witnessed / Not-witnessed.
 - CPR Prior to EMS Arrival
 - First monitored rhythm
 - Outcome / Any ROSC
 - Presumed Etiology (Presumed Primary Cardiac; Trauma; Submersion; Respiratory; Other Non-Cardiac; Unknown)
 - Documentation of all acquired EKG Strips
 - Documentation of Termination of Resuscitation Efforts and reasons for Termination.
 - Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.



Cardiac Arrest

CRITERIA TO WITHHOLD:

- Patients pulseless or apneic with a valid South Carolina EMS DNR order or POLST orders governing their care.
- Patients found with rigor mortis, dependent lividity, decomposition.
- Trauma incompatible with life such as decapitation, massive crush injury, incineration, or body frozen solid.
- Blunt major trauma patients 18 years and older not known to be pregnant found to apneic, pulseless and without organized ECG activity upon the arrival of EMS.
- Penetrating trauma patients 18 years and older who are not known to be pregnant, found apneic, pulseless and asystolic with no spontaneous movement or pupillary reflex on EMS arrival.
- Patients 18 years and older not known to be pregnant with documented pulseless down time exceeding 15 min without CPR and found to apneic, pulseless, with unresponsive pupils and in asystole without suspicion of hypothermia upon the arrival of EMS.
- Mass casualty victims triaged to be expired or expectant.

TERMINATION OF RESUSCITATION CRITERIA

- The physical environment becomes unsafe for providers and they are not able to take the patient enroute to an emergency department.
- Trauma patients 18 years and older not known to be pregnant with EMS witnessed cardiopulmonary arrest with greater than 15 min time of transport to an emergency department and no response to ALS resuscitative efforts of 15 min or more.
- Patients 18 years and older not known to be pregnant with asystole or wide complex PEA rate less than 30 (no shock advised for BLS), unresponsive pupils, EtCO₂ < 10 and who are not suspected to be hypothermic who are unresponsive to:
 - >> 10 or more min of BLS care followed by 10 min of ALS resuscitative efforts or
 - >> 20 min of ALS efforts or
 - >> 30 minutes of BLS care with no ALS available.



Cardiac Arrest

Typical Criteria for Withholding CPR

Local (+)	Local (-)	Criteria
		Patient Pulseless or apneic with valid SC EMS DRN order, POST (MOST/POLST) form Governing their care
		Patients found with Rigor Mortis
		Patients found with Dependent Lividity
		Patients found with Decomposition
		Trauma incompatible with life:
		Decapitation
		Massive Crush Injury
		Incineration
		Body Frozen Solid
		Major Blunt Trauma - Patient > 18 years of age - NOT known to be pregnant found:
		Apneic
		Pulseless
		Without organized EKG Activity on EMS arrival
		Penetrating Trauma Patients - > 18 years of age - NOT known to be pregnant found:
		Apneic
		Pulseless
		Asystolic
		No spontaneous movement on EMS Arrival
		No pupillary reflex on EMS Arrival
		Patients > 18 years of age NOT known to be pregnant found:
		Documented Downtime > 15 minutes without CPR AND found:
		Apneic
		Pulseless
		No pupillary reflex on EMS Arrival
		Asystolic
		No suspicions of hypothermia
		Mass casualty victims triaged as expired or expectant

ADULT CARDIOVASCULAR



Ventricular Fibrillation Pulseless Ventricular Tachycardia

History

- Estimated down time
- Past medical history
- Medications
- Events leading to arrest
- Renal failure / dialysis
- DNR or living will

Signs and Symptoms

- Unresponsive, apneic, pulseless
- Ventricular fibrillation or ventricular tachycardia on ECG

Differential

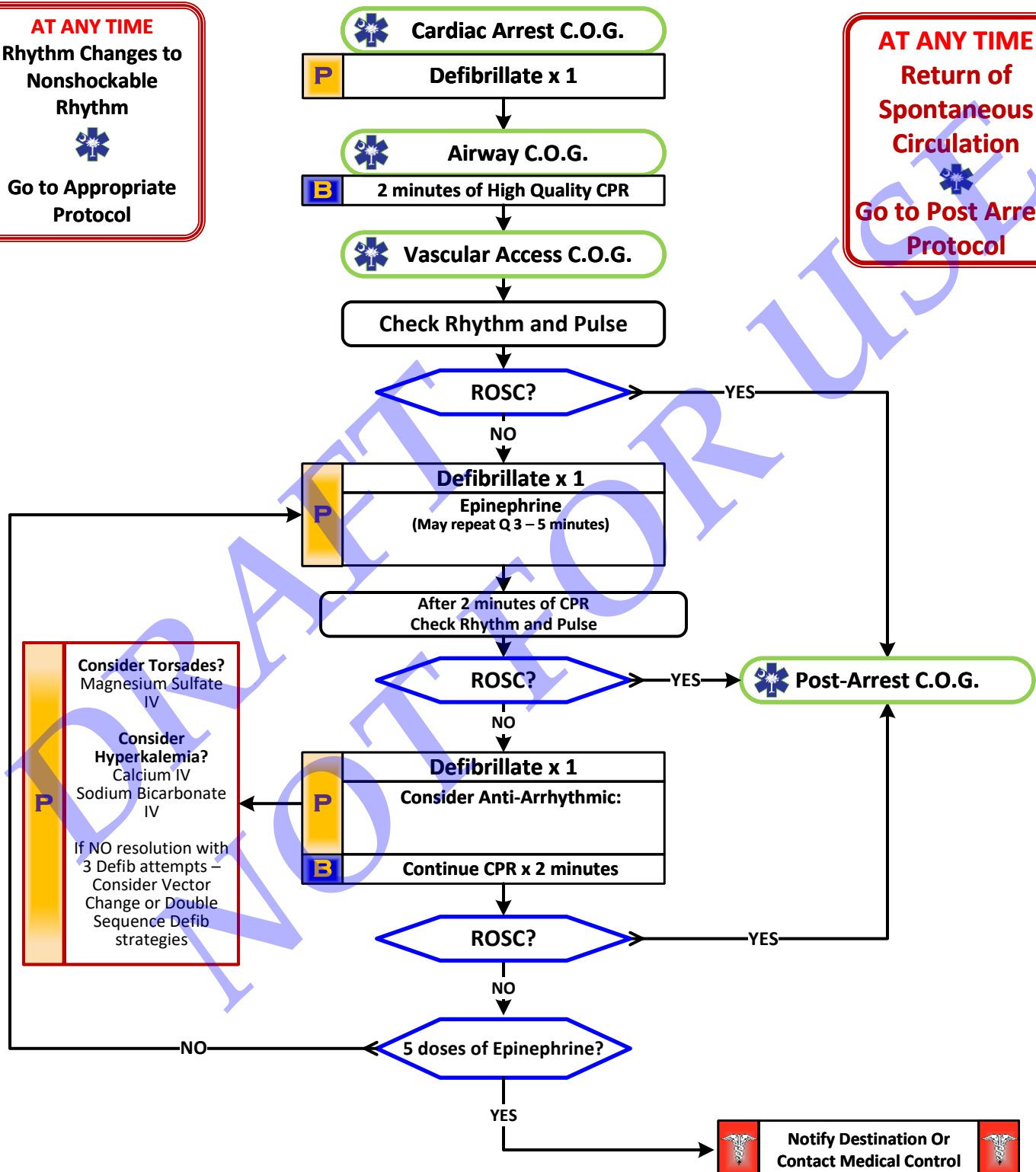
- Asystole
- Artifact / Device failure
- Cardiac
- Endocrine / Metabolic
- Drugs
- Pulmonary

AT ANY TIME
Rhythm Changes to
Nonshockable
Rhythm

Go to Appropriate
Protocol

AT ANY TIME
Return of
Spontaneous
Circulation

Go to Post Arrest
Protocol





Ventricular Fibrillation

Pulseless Ventricular Tachycardia

DRAFT FOR USE

PEARLS

- **Recommended Exam: Mental Status, Cardiovascular, Pulses**
- Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- Calcium and sodium bicarbonate if hyperkalemia is suspected (renal failure, dialysis).
- **Treatment priorities are: uninterrupted High Quality chest compressions, defibrillation, then IV access and airway control.**
- Polymorphic V-Tach (Torsades de Pointes) may benefit from administration of magnesium sulfate if available.
- **If NO resolution with 3 Defib attempts – Consider Vector Change or Double Sequence Defib strategies**
- Do not stop CPR to check for placement of ET tube or to give medicines.
- If arrest not witnessed by EMS then 2 full minutes of High Quality CPR prior to 1st defibrillation.
- Effective CPR and prompt defibrillation are the keys to successful resuscitation.
- If BVM is ventilating the patient successfully, intubation should be deferred until rhythm has changed or 4 or 5 defibrillation sequences have been completed.
- **KEY DOCUMENTATION ELEMENTS:**
 - Resuscitation attempted and all interventions performed
 - Arrest witnessed / Not-witnessed.
 - CPR Prior to EMS Arrival
 - First monitored rhythm
 - Outcome / Any ROSC
 - Presumed Etiology (Presumed Primary Cardiac; Trauma; Submersion; Respiratory; Other Non-Cardiac; Unknown)
 - Documentation of all acquired EKG Strips
 - Documentation of Termination of Resuscitation Efforts and reasons for Termination.
 - Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.



Ventricular Fibrillation Pulseless Ventricular Tachycardia

Typical Criteria for Terminating CPR

Local (+)	Local (-)	Criteria
		Physical environment becomes unsafe for providers
		EMS unable to take the patient enroute to Emergency Department
		Trauma Patients > 18 years of age NOT Known to be pregnant with:
		EMS witnessed Cardiopulmonary Arrest with > 15 minutes time transport to Emergency Department
		EMS witnessed Cardiopulmonary Arrest with NO RESPONSE to ALS resuscitative measure for > 15 minutes
		Patients > 18 years of age NOT Known to be pregnant with
		Asystole or Wide Complex PEA rate < 30
		Unresponsive Pupils
		EtCO2 <10 mmHg
		Not suspected to be hypothermic
		Unresponsive to:
		10 or more mins of BLS Care followed by > 10 mins of ALS resuscitative efforts - or
		> 20 minutes of ALS efforts - or
		> 30 minutes of BLS care with no ALS Available
		High Quality CPR has been performed.
		Airway management with confirmed effective ventilations. Acceptable airway management techniques include blind insertion airway device (IGEL or King LT), orotracheal intubation, nasotracheal intubation.
		Waveform Capnography has been initiated, observed, and trended throughout management of arrest.
		IV or IO access achieved with rhythm appropriate medications administered.
		All providers involved in the patient's care agree that discontinuation is appropriate

ADULT CARDIOVASCULAR



Asystole Pulseless Electrical Activity (PEA)

HISTORY

- Past medical history
- Medications
- Events leading to arrest
- End stage renal disease
- Estimated downtime
- Suspected hypothermia
- Suspected overdose
 - Tricyclics
 - Digitalis
 - Beta blockers
 - Calcium channel blockers
- DNR, POST, MOST, Advanced Directives form

Signs and Symptoms

- Pulseless
- Apneic
- Unresponsive
- Electrical activity on ECG
- No heart tones on auscultation

Differential

- Hypovolemia (Trauma, AAA, other)
- Hypoxia
- Hydrogen Ion Excess – [Acidosis]
- Hypoglycemia
- Hypokalemia / Hyperkalemia
- Hypothermia
- Tamponade [Cardiac]
- Tension pneumothorax
- Thrombosis [Massive myocardial infarction]
- Thrombosis [Pulmonary embolus]
- Toxins [Drug overdose (Tricyclics, Digitalis, Beta blockers, Calcium channel blockers)]

- Cardiac Arrest C.O.G.
- Airway C.O.G.
- Vascular Access C.O.G.

AT ANY TIME
Return of
Spontaneous
Circulation

Go to Post
Resuscitation
Protocol

Glucose Management
C.O.G.

P	Epinephrine every 3 – 5 mins
A	Normal Saline Bolus
B	Assess Blood Glucose
P	Consider Naloxone ¹
	Consider Glucagon ²
	Consider Calcium Chloride / Calcium Gluconate ³
	Consider Bicarbonate ⁴
	Consider Inotrope Infusion
	Consider Chest Decompression ⁵
	Consider Atropine (Rate < 60)

1. Naloxone for suspected opioid overdose.
2. Glucagon for suspected Beta Blocker or Calcium Channel Blocker Overdose.
3. Calcium for suspected Calcium Channel Blocker etiology or Hyperkalemia
4. Bicarbonate for Tricyclic Overdose, Hyperkalemia, Renal Failure
5. Chest Decompression for Tension Pneumothorax

STOP RESUSCITATION

Criteria For Discontinuation?*

Notify Destination Or
Contact Medical Control



Asystole Pulseless Electrical Activity (PEA)

TYPICAL CRITERIA FOR DISCONTINUATION OF RESUSCITATIVE MEASURES (Also see [POLICY: Discontinuation of Resuscitative Measures](#))

Discontinuation of CPR and ALS intervention for non-traumatic cardiac arrest patient may be implemented without Online Medical Control authorization in the following patients:

- Patient is 18 years of age or older.
- High quality CPR has been performed.
- Airway management with confirmed effective ventilations. Acceptable airway management techniques include blind insertion airway device (IGEL or King LT), orotracheal intubation, nasotracheal intubation.
- Waveform Capnography has been initiated, observed, and trended throughout management of arrest.
- IV or IO access achieved with rhythm appropriate medications administered.
- All providers involved in the patient's care agree that discontinuation is appropriate

RHYTHM:

- Persistent VF/VT (after 3 or more defibrillations)
 - Do not perform Termination of Resuscitation, initiate transport.
- Asystole or PEA
 - If EtCO₂ < 10mmHg, consider termination after 20 minutes.
 - If EtCO₂ ≥ 10mmHg, consider termination of resuscitation after 30 minutes.
 - Times begin when chest compressions are started by a credentialed fire or EMS provider
- Traumatic arrests can be terminated on-scene without contacting Medical Control if at any point the patient presents with asystole or a wide complex PEA less than 30

TERMINATION OF RESUSCITATION CRITERIA

- The physical environment becomes unsafe for providers and they are not able to take the patient enroute to an emergency department.
- Trauma patients 18 years and older not known to be pregnant with EMS witnessed cardiopulmonary arrest with greater than 15 min time of transport to an emergency department and no response to ALS resuscitative efforts of 15 min or more.
- Patients 18 years and older not known to be pregnant with asystole or wide complex PEA rate less than 30 (no shock advised for BLS), unresponsive pupils, EtCO₂ < 10 and who are not suspected to be hypothermic who are unresponsive to:
 - >> 10 or more min of BLS care followed by 10 min of ALS resuscitative efforts or
 - >> 20 min of ALS efforts or
 - >> 30 minutes of BLS care with no ALS available.

PEARLS

- **Recommended Exam: Mental Status, Cardiovascular, Pulse**
- Consider each possible cause listed in the differential: Survival is based on identifying and correcting the cause!
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.
- Consider differential diagnosis of arrest and potential benefit of ED intervention, particularly in younger otherwise healthy patients.
- If resuscitation is performed in a public setting or one felt to be inappropriate to terminate, work the arrest until the patient can be transferred to ambulance. Continue resuscitative efforts enroute to nearest appropriate emergency department.
- Consider contacting online medical control for field termination orders if appropriate.
- **KEY DOCUMENTATION ELEMENTS:**
 - Resuscitation attempted and all interventions performed
 - All Medications and Interventions with Time of Administration.
 - Arrest Witnessed/Non-Witnessed
 - Time Down if known
 - Location of Arrest
 - First Monitored Rhythm
 - CPR Prior to EMS Arrival
 - Any ROSC
 - Presumed Etiology:
 - » Primary Cardiac » Trauma » Submersion » Respiratory
 - » Drug Use » Other/Non-Cardiac » Unknown
 - Include all EKG Rhythm Strips



Asystole Pulseless Electrical Activity (PEA)

Typical Criteria for Terminating CPR		
Local (+)	Local (-)	Criteria
		Physical environment becomes unsafe for providers
		EMS unable to take the patient enroute to Emergency Department
		Trauma Patients > 18 years of age NOT Known to be pregnant with:
		EMS witnessed Cardiopulmonary Arrest with > 15 minutes time transport to Emergency Department
		EMS witnessed Cardiopulmonary Arrest with NO RESPONSE to ALS resuscitative measure for > 15 minutes
		Patients > 18 years of age NOT Known to be pregnant with
		Asystole or Wide Complex PEA rate < 30
		Unresponsive Pupils
		EtCO2 <10 mmHg
		Not suspected to be hypothermic
		Unresponsive to:
		10 or more mins of BLS Care followed by > 10 mins of ALS resuscitative efforts - or
		> 20 minutes of ALS efforts - or
		> 30 minutes of BLS care with no ALS Available
		High Quality CPR has been performed.
		Airway management with confirmed effective ventilations. Acceptable airway management techniques include blind insertion airway device (IGEL or King LT), orotracheal intubation, nasotracheal intubation.
		Waveform Capnography has been initiated, observed, and trended throughout management of arrest.
		IV or IO access achieved with rhythm appropriate medications administered.
		All providers involved in the patient's care agree that discontinuation is appropriate



Post Resuscitation [ROSC]

History

- Respiratory arrest
- Cardiac arrest

Signs/Symptoms

- Return of pulse

Differential

- Continue to address specific differentials associated with the original dysrhythmia

Repeat Primary Assessment

B Continue ventilatory support

- O2 Sats \geq %
- EtCO₂ ideally 35 – 45
- DO NOT HYPERVENTILATE**

Reversible Causes

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

Vascular Access C.O.G.

Post Intubation C.O.G.

Airway C.O.G.

Glucose Management C.O.G.

B Vital Signs / Check Blood Glucose

STEMI C.O.G.

Cardiac Monitor/12 Lead ECG Acquisition / Interpretation

Perform serial 12-lead EKGs to assess for evidence of reversible cause of arrest such as STEMI or electrolyte derangement (e.g., hyperkalemia)

P Continue Anti-Arhythmic if Return of Spontaneous Circulation (ROSC) was associated with its use.

Hypotension
SBP < 90 mmHg
Or MAP < 60

Tachydysrhythmia
or Significant Ectopy

Bradycardia

Hypotension C.O.G.

Ventricular Tachycardia C.O.G.

Bradycardia C.O.G.

Dysrhythmias are common and usually self limiting after ROSC. If Dysrhythmia Persists follow Rhythm Appropriate C.O.G.

If arrest reoccurs, revert to appropriate C.O.G. and/or initial successful treatment

Notify Destination or Contact Medical Control



Post Resuscitation [ROSC]

- **PEARLS**
- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, , Extremities, Neuro**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs. Titrate FiO2 to maintain SpO2 of >92%.**
- Most patients immediately post resuscitation will require ventilatory assistance.
- 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.
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs.
- Titrate Pressor Agent to maintain a systolic blood pressure > 90 mmHg or a MAP of > 60. Ensure adequate fluid resuscitation is ongoing.
- **Realtime Waveform Capnography is:**
 - **Required for ALL Intubated Patients and Cricothyroidotomy Patients***
 - **Strongly Recommended /Strongly Encouraged for all unstable patients**
 - **Strongly Recommended / Strongly Encouraged for utilization of any Airway Device (e.g. BIAD)**
- **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.
- **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 each 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.
- **KEY DOCUMENTATION:**
 - Immediate post-arrest rhythms, vital signs (Pulse Rate, Blood Pressure, Respiratory Rate, Neurologic Status) and Oxygen Saturation.
 - Documentation of EndTidal CO2 measurements by Continuous Waveform Capnography.
 - Post-ROSC 12 lead EKG.



Ventricular Tachycardia (With A Pulse)

History

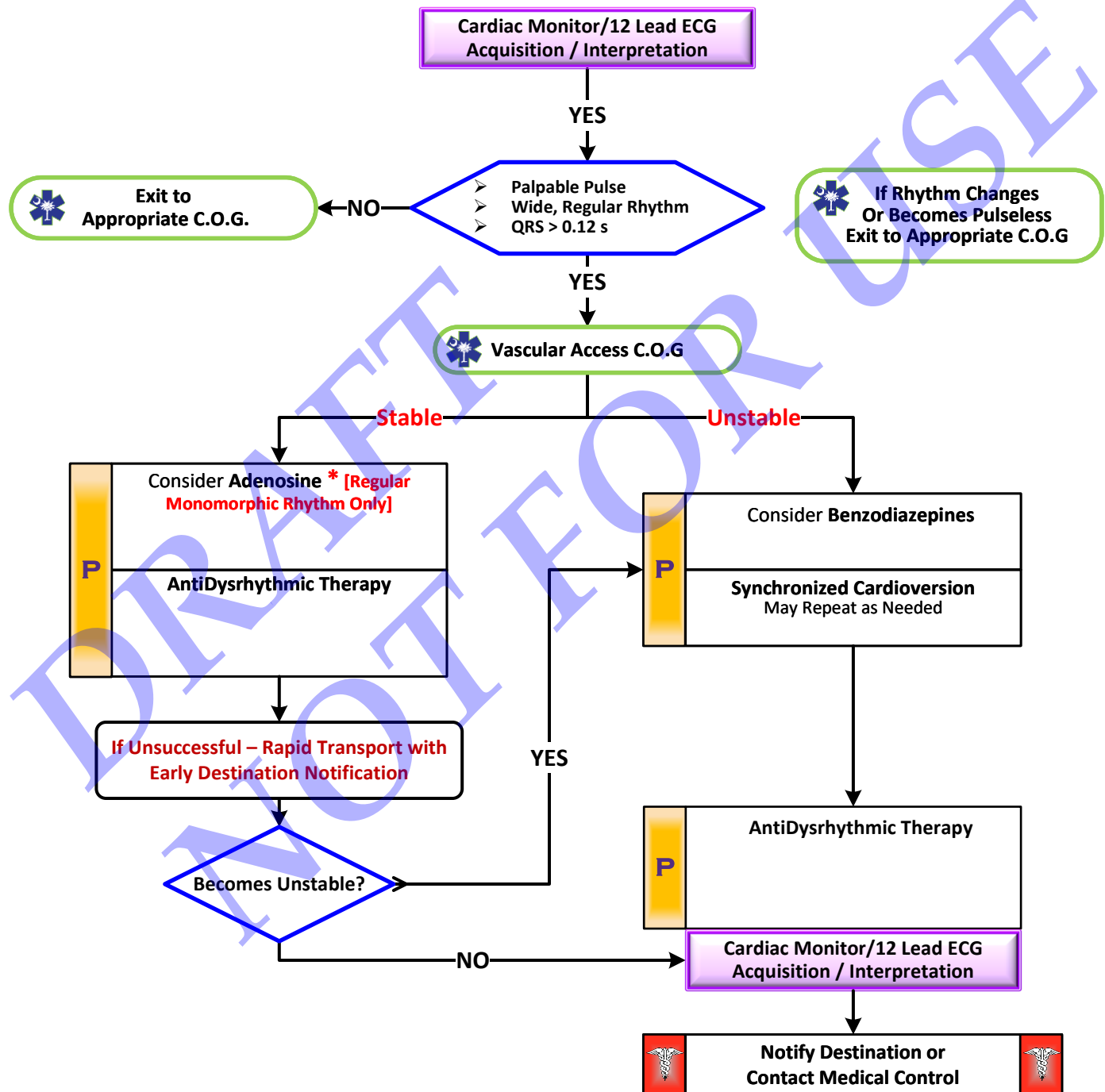
- Past medical history / medications, diet, drugs.
- Syncope / near syncope
- CHF
- Palpitations
- Pacemaker
- Allergies: lidocaine / novacaine

Signs and Symptoms

- Ventricular tachycardia on ECG (Intermittent and symptomatic or sustained)
- Rapid pulse
- Chest pain, shortness of breath
- Dizziness
- Rate usually 150 - 180 bpm for sustained V-Tach
- **QRS > .12 Sec**

Differential

- Artifact / Device failure
- Cardiac
- Endocrine / Metabolic
- Drugs
- Pulmonary





Ventricular Tachycardia (With A Pulse)

PEARLS

- **Recommended Exam: Mental Status, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- For witnessed / monitored ventricular tachycardia, try having patient cough.
- Polymorphic V-Tach (Torsades de Pointes) may benefit from the administration of **Magnesium Sulfate** if available.
- If presumed hyperkalemia (end-state renal disease, dialysis, etc.), administer **Sodium Bicarbonate**.
- * Adenosine should **NOT** be given for unstable or for irregular or for polymorphic wide-complex tachycardias as it may cause degeneration of the arrhythmia to Ventricular Fibrillation.
- Calcium Channel Blocker administered **ONLY** with Narrow Complex Tachydysrhythmia.
- Monitor for hypotension after administration of Antidysrhythmics.
- Monitor for respiratory depression and hypotension associated with Sedation.
- Continuous pulse oximetry is required for all Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial rhythm and all rhythm changes
 - Time, Dose, and Response to medications given
 - Cardioversion times, Synchronization, Number of Attempts, Joules, and Response
 - Obtain monitor strips before, during, and after each intervention. Monitor strips should be appended to ePCR.
 - Patient Weight
 - Pediatric length based tape color (for pediatrics who fit on tape).
 - History of event supporting treatment of underlying causes.
 - Blood Sugar Obtained
 - Use of Sedation for responsive patients



Supraventricular Tachycardia Atrial Fibrillation (QRS ≤ 120ms)

History

- Medications (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin, Ritalin, Adderall)
- Diet (caffeine, chocolate)
- Drugs (nicotine, cocaine)
- Past medical history
- History of palpitations / heart racing
- Syncope / near syncope

Signs and Symptoms

- HR > 150/Min
- **QRS < .12 Sec (if QRS > .12 sec, go to V-Tach C.O.G.)**
- **If history of WPW, go to V-tach C.O.G.**
- Dizziness, CP, SOB
- Potential presenting rhythm
Atrial/Sinus tachycardia
Atrial fibrillation / flutter
Multifocal atrial tachycardia

Differential

- Heart disease (WPW, Valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, Pain, Emotional stress
- Fever
- Hypoxia
- Hypovolemia or Anemia
- Drug effect / Overdose (see HX)
- Hyperthyroidism
- Pulmonary embolus

Exclusions:

- Sinus Tachycardia
- WPW
- Wide QRS

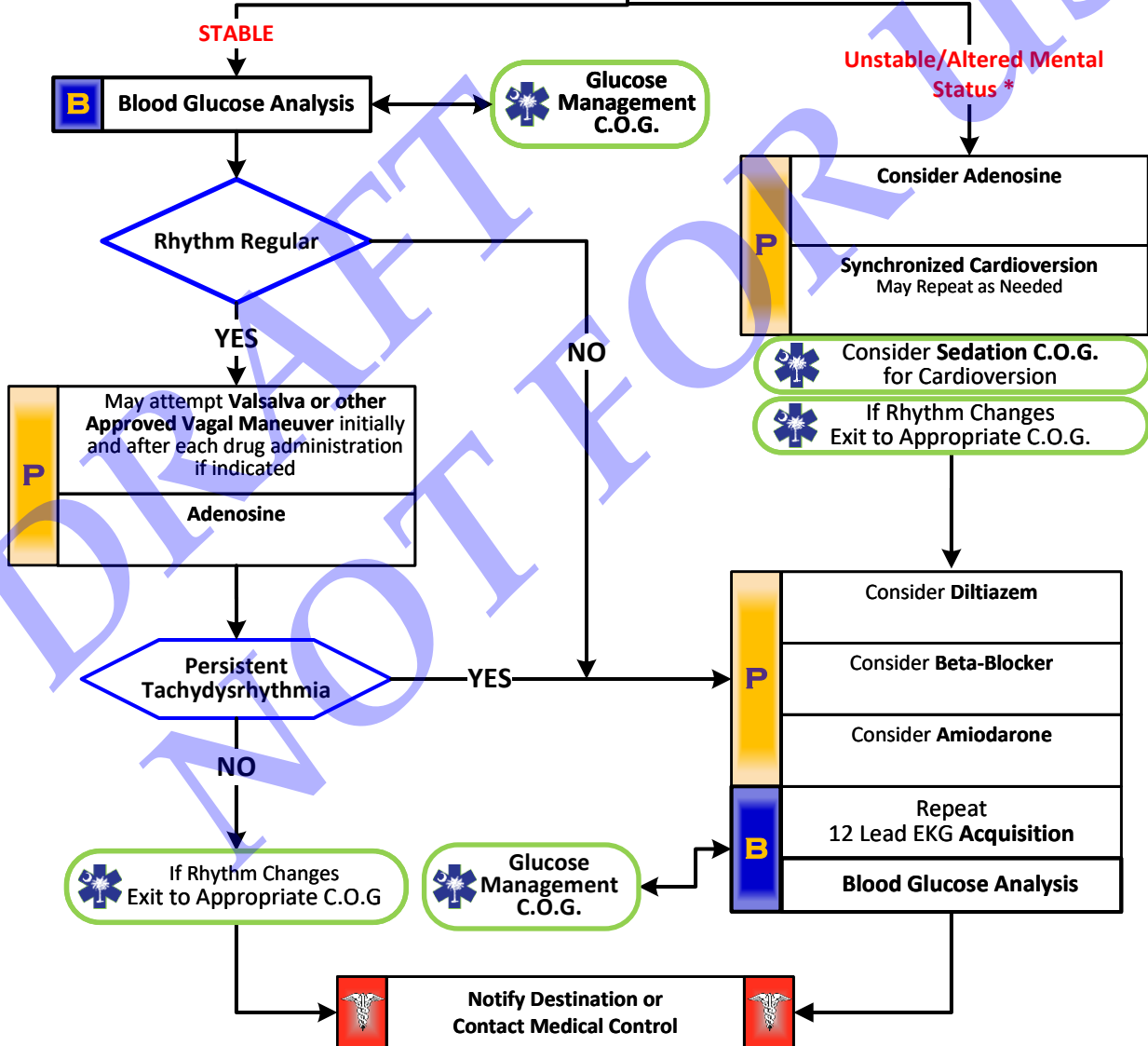


Vascular Access C.O.G.

Cardiac Monitor/12 Lead ECG Acquisition / Interpretation

*** If patient is unstable and with NO current vascular access – initial therapy with synchronized electrical cardioversion is warranted**

ADULT CARDIOVASCULAR





Supraventricular Tachycardia Atrial Fibrillation

PEARLS

- **Recommended Exam: Mental Status, Neck, Lung, Heart (Pulses), Abdomen, Back, Extremities, Neuro, Skin.**
- If patient has history or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g., Diltiazem) or Beta Blockers.
- Calcium Channel Blocker administered ONLY with Narrow Complex Tachydysrhythmia.
- Adenosine may not be effective in identifiable atrial flutter/fibrillation, yet is not harmful.
- Monitor for hypotension after administration of Calcium Channel Blocker or Beta Blockers.
- Monitor for respiratory depression and hypotension associated with sedation.
- Continuous pulse oximetry is required for all SVT Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial rhythm and all rhythm changes
 - Time, Dose, and Response to medications given
 - Cardioversion times, Synchronization, Number of Attempts, Joules, and Response
 - Obtain monitor strips before, during, and after each intervention. Monitor strips should append to ePCR.
 - Patient Weight
 - Pediatric length based tape color (for pediatrics who fit on tape).
 - History of event supporting treatment of underlying causes.
 - Blood Sugar Obtained
 - Use of Sedation for responsive patients



Bradycardia

History

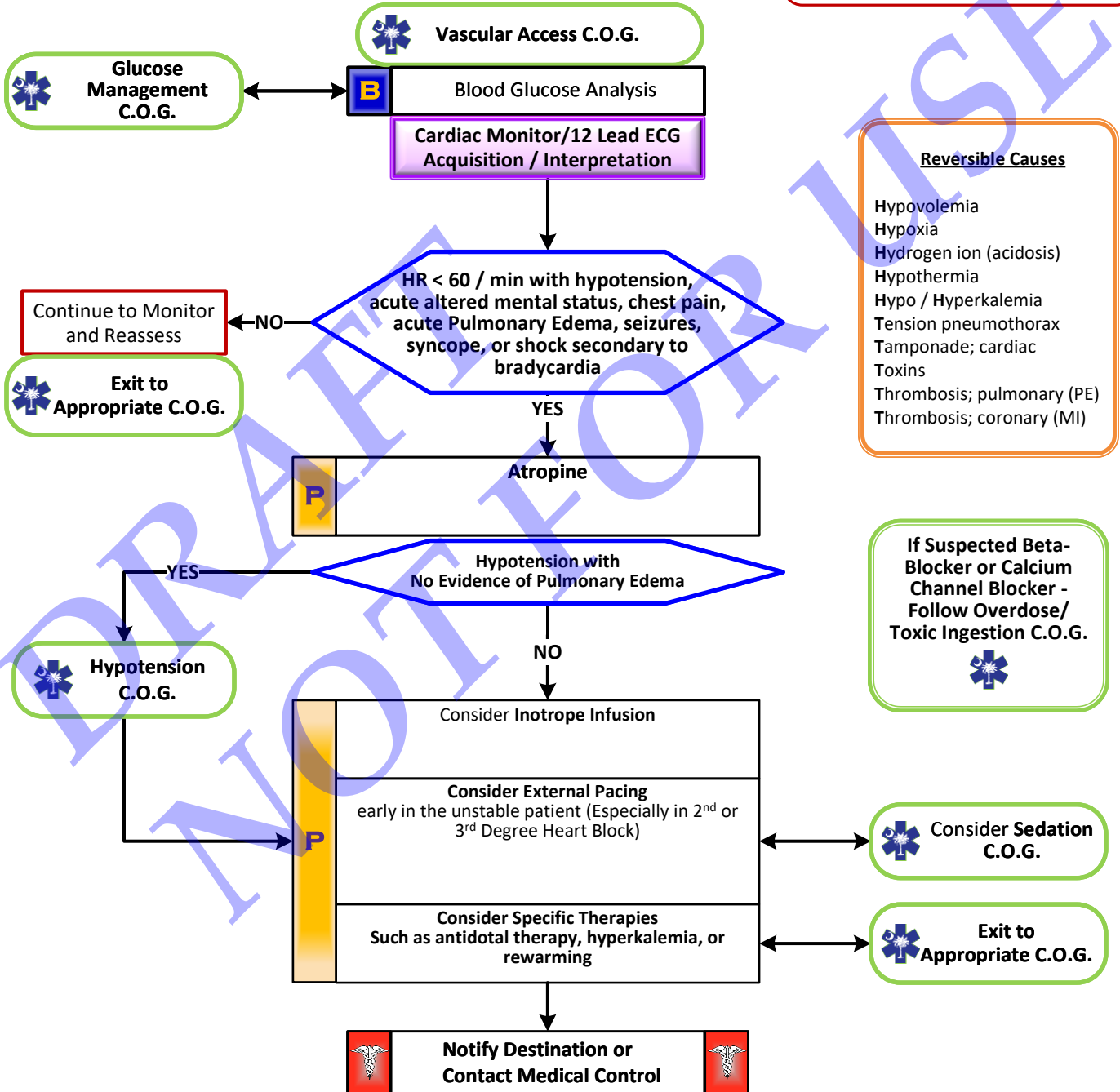
- Past medical history
- Medications
 - Beta-Blockers
 - Calcium channel blockers
 - Clonidine
 - Digoxin
- Pacemaker

Signs and Symptoms

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

Differential

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



Reversible Causes

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

If Suspected Beta-Blocker or Calcium Channel Blocker - Follow Overdose/ Toxic Ingestion C.O.G.

ADULT CARDIOVASCULAR



Bradycardia

PEARLS

- **Recommended Exam: Mental Status, Neck, Heart, Pulses, Lungs, Neuro**
- The use of Antidysrhythmics, Beta Blockers, and Calcium Channel Blockers in heart block can worsen Bradycardia and lead to asystole and death.
- **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 Chloride or 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.**
- **Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.**
- Pharmacological treatment of Bradycardia is based upon the presence or absence of symptoms. **If symptomatic treat. If asymptomatic - monitor only.**
- **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 epinephrine.**
 - **Epinephrine or Dopamine may be considered if no response to Atropine.**
- **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.**
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- **Remember:** The use of Atropine for PVCs in the presence of a MI may worsen heart damage.
- If vascular access is problematic and the patient is symptomatic, initial therapy with external pacing may be warranted.
- Consider treatable causes for Bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial Vital Signs and Blood Glucose
 - Cardiac Rhythm / Rate
 - Time, dose, and response to medications administered
 - Pacing:
 - Time started or discontinued
 - Rate, Joules, Capture
 - Response Rate
 - Sedation utilized – dose and timing
 - Patient Weight
 - Pediatric length based on tape color
 - History of event supporting treatment of underlying causes



CHF/Pulmonary Edema

History

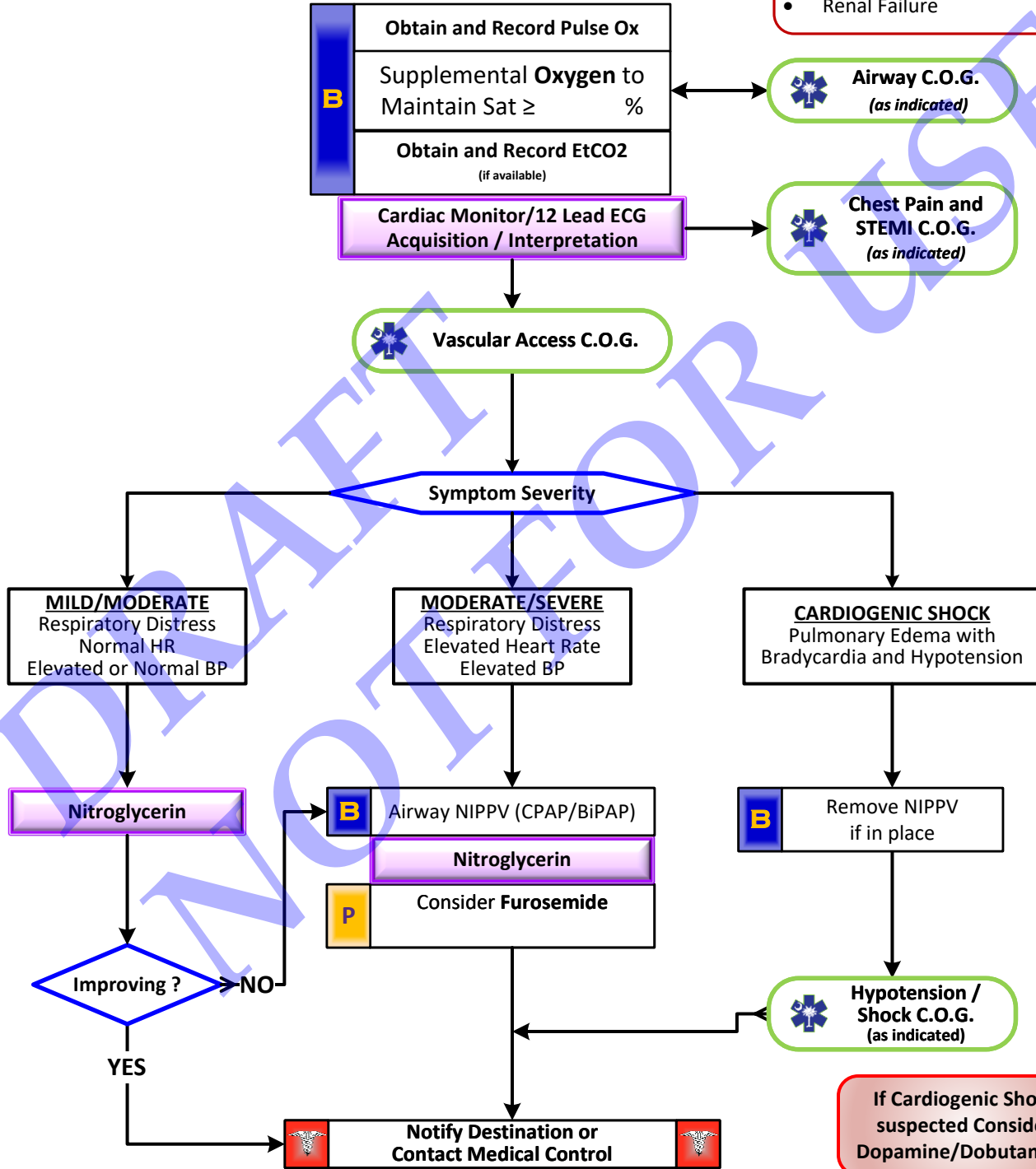
- Past medical history
- **PMH: Cardiac History: Previous CHF or Myocardial Infarction**
- Medications (Digoxin, Diuretics, Entresto)
- **Erectile Dysfunction Medication**

Signs/Symptoms

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

Differential

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





CHF/Pulmonary Edema

Nitroglycerin Bolus Dosing

INDICATIONS: For use in patients with systolic Blood Pressure > 160 mmHg or MAP > 120 mmHg who have marked dyspnea and signs of Congestive Heart Failure

CONTRAINDICATIONS: Aortic Stenosis; HOCM; Recent use of phosphodiesterase inhibitor (Viagra, Cialis, Levitra)

Admixture:

10 mg of Nitroglycerin mixed with 10 mL of NS = 1000 mcg/mL

5 mg of Nitroglycerin mixed with 10 mL of NS = 500 mcg/mL

Administration:

1 mg Bolus Dosing Q 5 minutes (1000 mcg/5 minutes)

3 mg Total Maximum Dosing unless directed otherwise by OLMC

Killip Classification in Acute Myocardial Infarction

Killip Classification	PAO2 (on Room Air)	Clinical Description	Estimated Mortality
Class 1	Normal	No clinical evidence of left ventricular (LV) failure	6%
Class 2	Slightly Reduced	Findings consistent with mild to moderate heart failure (eg, S3 gallop, lung rales less than one-half way up the posterior lung fields, or jugular venous distension)	17%
Class 3	Abnormal	Overt pulmonary edema	38%
Class 4	Severely Abnormal	Cardiogenic shock	67%

PEARLS

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Extremities, Neuro**
- 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.
 - Diabetic patients, females, and the elderly often experience only weakness, shortness of breath, nausea/ vomiting, and back or jaw pain – or atypical symptoms
- If patient has taken nitroglycerin without relief, consider potency of the medication.
- Monitor for hypotension after administration of nitroglycerin.
- Allow the patient to be in their position of comfort to maximize their breathing effort.
- Agency medical director may require Contact of Medical Control.
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial Vital Signs including B/P, Pulse Rate, Respiratory Rate, SpO2, EtCO2,
 - Pertinent Exam: Cardiac Sounds, Chest Auscultation, Jugular Veins, Peripheral Edema, Accessory muscle use
 - Presenting Symptoms: Chest Pain, Dyspnea, Palpitations, Edema, etc.
 - EKG Evaluation and Strips.
 - Repeat Vital Signs as above + Repeat Physical Examination
 - Interventions and response to interventions



Emergencies Involving LVADs

History

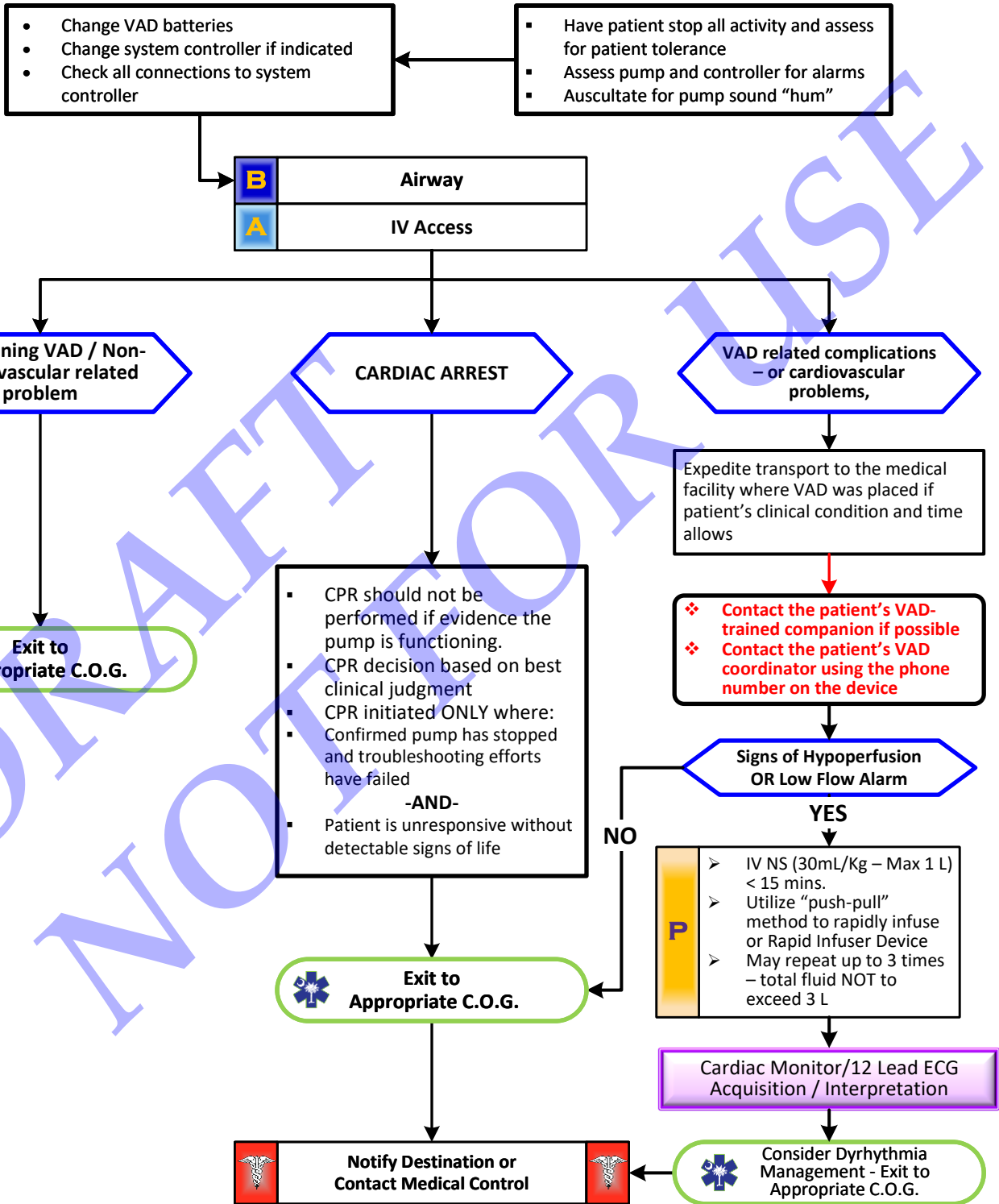
- Adult patient with Implantable Left Ventricular Assist Device
- Previous history of VAD malfunction

Signs and Symptoms

- Device Alarms
- Syncope
- Shock
- Pallor
- Diaphoresis
- Altered Mental Status
- Power or equipment failure at residence
- Auscultate for “hum” of device

Differential

- Low Batteries or Battery Failure
- Infection
- Stroke / Transient Ischemic Attack (TIA)
- Bleeding
- Arrhythmia
- Cardiac Tamponade
- Congestive Heart Failure
- Aortic Insufficiency





Emergencies Involving LVADs

Push-Pull IV Bolus Administration

- With IV Line in place – Insert Syringe with Needle into IV Bag Port – or IV Line Port.
- Clamp IV Line Below (distal to) Needle insertion Point (prevents aspiration of blood from patient)
- Aspirate IV Fluid from IV Bag to fill syringe
- Clamp IV Line Above (proximal to) Needle insertion point. (prevents injection of fluid back into IV Bag)
- Release clamp distal to needle insertion point
- Push IV Fluid from syringe into IV Line (patient) while maintaining clamp on proximal portion of IV Line.

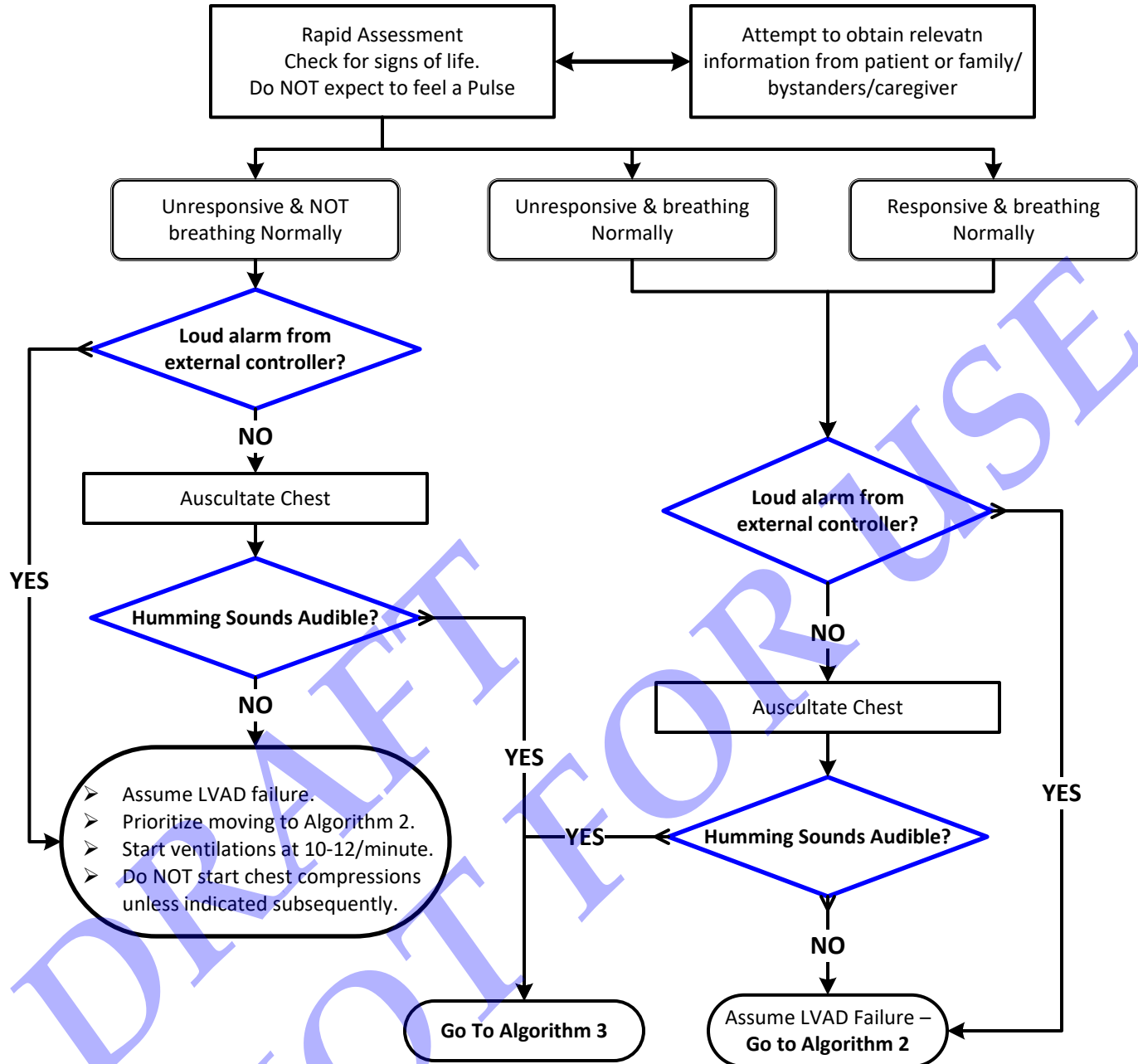
PEARLS

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Always use patient's equipment if available and functioning properly.
- You do not need to disconnect the controller or batteries to:
 - Defibrillate or cardiovert
 - Acquire a 12-lead EKG
- Automatic non-invasive cuff blood pressures may be difficult to obtain due to the narrow pulse pressure created by the continuous flow pump
- Although automatic non-invasive blood pressure cuffs are often ineffective in measuring systolic and diastolic pressure, if they do obtain a measurement, the MAP is usually accurate
- **Flow through many VAD devices is not pulsatile, and patients may not have a palpable pulse or accurate pulse oximetry**
- **The blood pressure, if measurable, may not be an accurate measure of perfusion**
- **Ventricular fibrillation, ventricular tachycardia, or asystole/PEA may be the patient's "normal" underlying rhythm.**
Evaluate clinical condition and provide care in consultation with VAD coordinator
- The patient's travel bag should always accompany them with back-up controller and spare batteries
- If feasible, bring the patient's power module, cable, and display module to the hospital
- **The most common cause for VAD alarms is low batteries or battery failures**
- Other VAD complications:
 - Infection
 - Stroke/Transient ischemic attack (TIA)
 - Bleeding
 - Dysrhythmias
 - Cardiac tamponade
 - Congestive heart failure (CHF)
 - Aortic insufficiency
- Push-pull method involves the drawing up of the fluid in a syringe and pushing it through the IV
- **KEY DOCUMENTATION ELEMENTS:**
 - Information gained from the VAD control box indicating any specific device malfunctions
 - Interventions performed to restore a malfunctioning VAD to normal function
 - Time of notification to and instructions from VAD-trained companion and/or VAD coordinator



Emergencies Involving LVADs

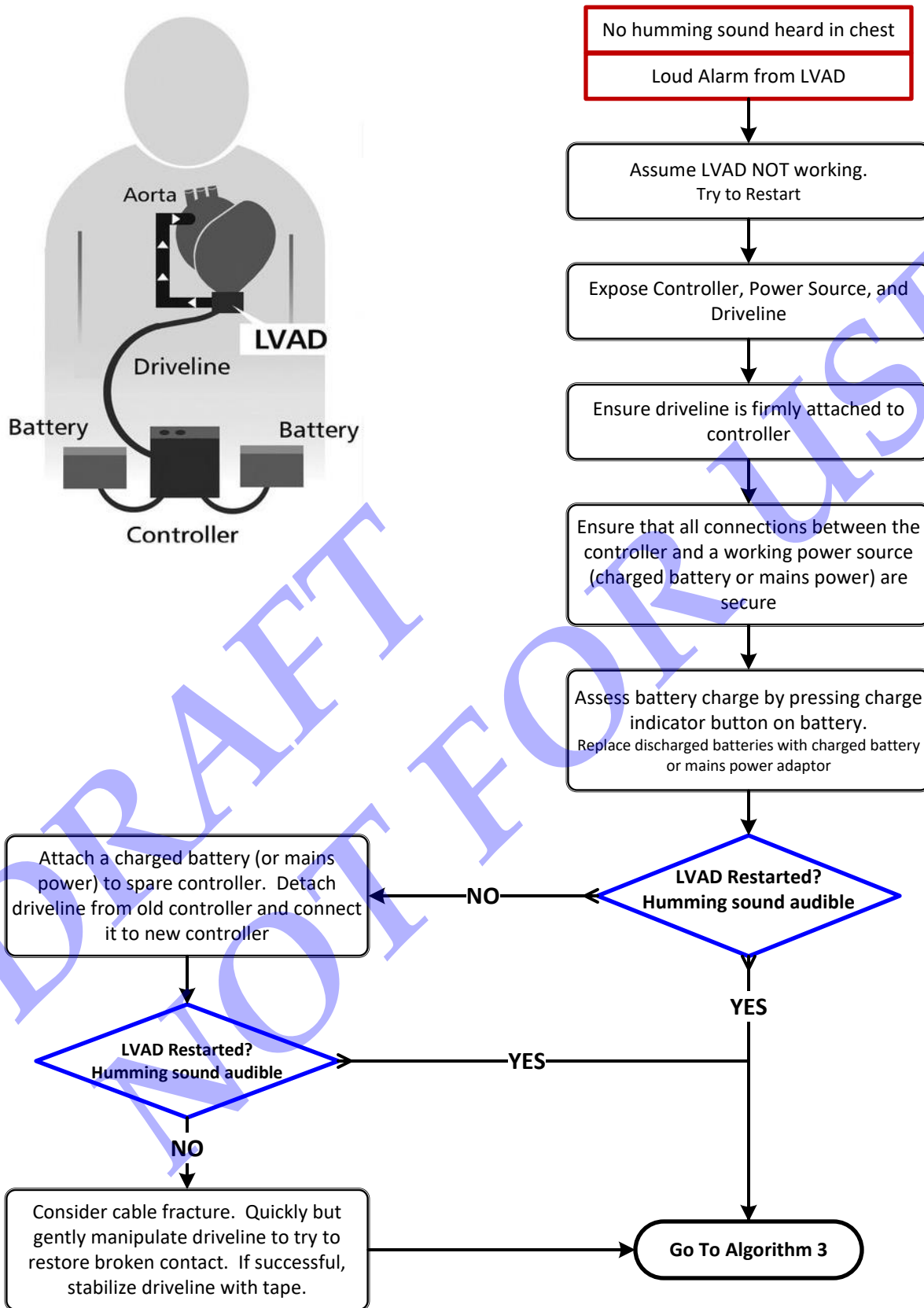
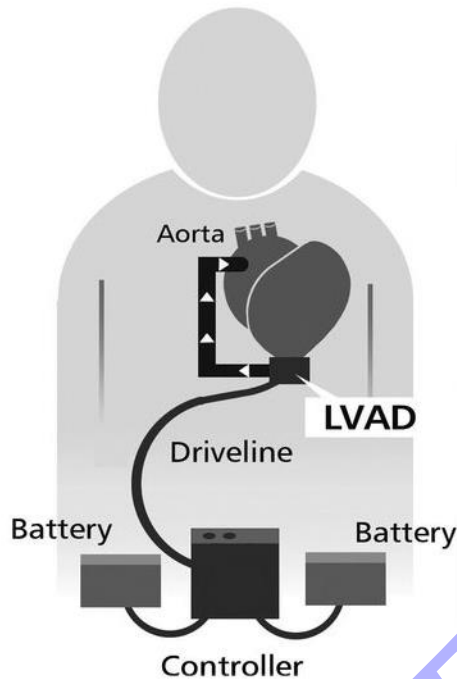
Algorithm 1





Emergencies Involving LVADs

Algorithm 2





Emergencies Involving LVADs

Algorithm 3

