Contra Costa County Emergency Medical Services

Cardiac Arrest

History
- Code status (DNR or POLST)
- Events leading to arrest
- Estimated downtime
- History of current illness
- Past medical history
- Medications
- Existence of terminal illness

Signs and Symptoms
- Unresponsive
- Apneic
- Pulseless

Differential
- Medical vs. trauma
- VF vs. pulseless VT
- Asystole
- PEA
- Primary cardiac event vs. respiratory arrest or drug overdose

Decomposition
- Rigor mortis
- Dependent lividity
- Injury incompatible with life or traumatic arrest with asystole
- Do not begin resuscitation
- Follow Policy 1004 – Determination of Death

For suspected Excited Delirium patients
- Consider fluid bolus early and contact Base Hospital for Sodium Bicarbonate order

Criteria for death/no resuscitation
- Review DNR/POLST form

AT ANY TIME
- Return of spontaneous circulation
- Go to Post Resuscitation TG

Follow Airway TG

Cardiac monitor
- EtCO₂ monitoring

Shockable rhythm?
- Yes
- Follow VF/VT and Airway TG as indicated
- Follow Asystole/PEA and Airway TG as indicated

No

Apply AED if available

Shockable rhythm?
- Yes
- Begin continuous chest compressions
- Push hard (> 2 inches) and fast (100-120/min)
- Use metronome to ensure proper rate
- Change compressors every 2 minutes
- (Limit changes/pulse checks to < 5 seconds)
- Apply mechanical compression device if available
- ALS available?
- Yes

No

Continue CPR
- 5 cycles over 2 minutes
- Repeat and assess
- Follow Airway TG

Follow Airway TG

End

Apply mechanical compression device if available

Follow Airway TG

Notify receiving facility.
Contact Base Hospital for medical direction

Automatic defibrillation

Continue CPR
- 5 cycles over 2 minutes
- Repeat and assess

Follow Airway TG

2019 DRAFT
Pearls

• Efforts should be directed at high quality and continuous chest compressions with limited interruptions. Consider early IO placement if available or direct IV access if anticipated.
• Passive ventilation for the first three cycles (6 minutes) of CPR. After that time, the patient should be ventilated using a BLS airway and BVM at a rate of 6 ventilation/minute (1:10 seconds) with continuous CPR.
• Placement of an advanced airway should be deferred unless a provider is unable to ventilate the patient with a BLS airway and BVM.
• Do not delay chest compressions while applying any device or intervention.
• Use a metronome during chest compression to ensure proper rate.
• In cases of clear-cut traumatic arrest, epinephrine is not indicated in PEA or asystole. Epinephrine will not correct arrest caused by a tension pneumothorax, cardiac tamponade, or hemorrhagic shock. If there is any doubt as to the cause of arrest, treat as a non-traumatic arrest.
• Provide resuscitative efforts on scene for up to 30 minutes to maximize chance of ROSC.
• If resuscitative efforts do not attain ROSC, consider cessation of efforts per Policy 1004 – Determination of Death.
• The AutoPulse device is limited to 80 compressions/minute, which is acceptable when using this device during cardiac arrest.
• Resuscitation is based on proper planning and organized execution. Procedures require space and patient access. Make room to work. Utilize a team focused approach assigning responders to predetermined tasks.
• Reassess and document ETT placement and EtCO₂ frequently, after every move, and at transfer of care.
• Maternal arrest: Treat mother per appropriate TG with immediate notification to the Base Hospital along with rapid transport. Place pillows or padding underneath mother to displace fetus from inferior vena cava as to ensure continued fetal blood circulation; left lateral position. IV/IO access should be preferably placed above the diaphragm. Defibrillation is safe at all energy levels.
**History**
- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- End stage renal disease
- Suspected hypothermia
- Suspected overdose
  - Tricyclic
  - Digitalis
  - Beta blockers
  - Calcium channel blockers
- DNR, POLST or living will

**Signs and Symptoms**
- Pulseless
- Apneic or agonal respirations

**Differential**
- Hypovolemia (e.g. trauma, AAA or other)
- Cardiac tamponade
- Hypothermia
- Drug overdose (e.g. tricyclic, digitalis, beta blockers, or calcium channel blockers)
- Massive myocardial infarction
- Hypoxia
- Tension pneumothorax
- Pulmonary embolus
- Acidosis
- Hyperkalemia

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**Cardiac Arrest TG**

Criteria for death / no resuscitation
- Review DNR / POLST form

**Cardiac Arrest TG**

Criteria for discontinuation?
- Yes
  - Discontinue Resuscitation
  - Follow Policy 1004 – Determination of Death
- No

**Shockable rhythm?**
- Yes
  - Consider Chest Decompression Procedure
- No

**Search for reversible causes and treat appropriately**
- Establish IV/IO
- Normal Saline bolus 1000ml IV/IO
- Epinephrine (1:10,000) 1mg IV/IO
  - Repeat every 3 to 5 minutes
- Consider early Base Hospital contact for transport decision for witnessed arrest with strong suspicion of pulmonary embolism or witnessed V. Fib arrest resistant to four (4) shocks

**Criteria for discontinuation?**
- Yes
  - Discontinue Resuscitation
  - Follow Policy 1004 – Determination of Death
- No

**AT ANY TIME**

Return of spontaneous circulation
- Go to Post Resuscitation TG

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

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**Decomposition**
- Rigor mortis
- Dependent lividity
- Injury incompatible with life or unwitnessed traumatic arrest with asystole
- Do not begin resuscitation
- Follow Policy 1004 – Determination of Death

**Follow rhythm appropriate TG**

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**Notify receiving facility.**
**Contact Base Hospital for medical direction**
**Asystole/PEA**

**Pearls**

- Efforts should be directed at high quality and continuous chest compressions with limited interruptions and early defibrillation when indicated. Consider early IO placement if available or direct IV access if anticipated.
- Passive ventilation for the first three cycles (6 minutes) of CPR. After that time, the patient should be ventilated using a BLS airway and BVM at a rate of 6 ventilation/minute (1:10 seconds) with continuous CPR.
- Placement of an advanced airway should be deferred unless a provider is unable to ventilate the patient with a BLS airway and BVM.
- Use a metronome during chest compression to ensure proper rate.
- Provide resuscitative efforts on scene for up to 30 minutes to maximize chance of ROSC.
- If resuscitative efforts do not attain ROSC, consider cessation of efforts per Policy 1004 – Determination of Death.
- The AutoPulse device is limited to 80 compressions/minute, which is acceptable when using this device during cardiac arrest.
- SURVIVAL FROM PEA OR ASYSTOLE is based on identifying and correcting the CAUSE: consider a broad differential diagnosis with early and aggressive treatment of possible causes.
- Potential association of PEA with hypoxia may exist, so placing an effective BLS airway with oxygenation early may provide benefit.
- PEA caused by sepsis or severe volume loss may benefit from higher volume of normal saline administration.
- Return of spontaneous circulation after Asystole/PEA requires continued search for underlying cause of cardiac arrest.
- Treatment of hypoxia and hypotension are important after resuscitation from Asystole/PEA.
- Asystole is commonly an end stage rhythm following prolonged VF or PEA with a poor prognosis.
- Discussion with the Base Hospital can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.
Definitions

Effective Jan 2016

Adult Cardiac Treatment Guidelines

Contra Costa County Emergency Medical Services

V-Fib/Pulseless V-Tach

### History
- Events leading to arrest
- Estimated downtime
- Prior resuscitation attempts
- Past medical history
- Medications
- Known terminal illness

### Signs and Symptoms
- Pulseless
- Apneic

### Differential
- Medical vs. trauma
- VF vs. pulseless VT
- Asystole
- PEA
- Primary cardiac event vs. respiratory arrest or drug overdose
- Consider reversible causes

---

**Entering from Cardiac Arrest TG**

**Defibrillation 200J**

- Resume high quality chest compressions
- Change compressors every 2 minutes
  - (Limit changes/pulses checks < 5 seconds)
- Establish IV/IO

**Defibrillation 300J**

- Resume high quality chest compressions
- Change compressors every 2 minutes
  - (Limit changes/pulses checks < 5 seconds)
- Epinephrine (1:10,000) 1mg IV/IO
  - Repeat every 3 to 5 minutes

**Defibrillation 360J**

- Resume high quality chest compressions
- Change compressors every 2 minutes
  - (Limit changes/pulses checks < 5 seconds)
- If V-Fib/Pulseless V-Tach is refractory after 3 shocks
  - Continue aggressive CPR and give medications during compressions
- Amiodarone 300mg IV/IO
  - May repeat 150mg if rhythm persists
- Consider early Base Hospital contact for transport decision for witnessed arrest with strong suspicion of pulmonary embolism or witnessed V. Fib arrest resistant to four (4) shocks

**Criteria for discontinuation?**

- Yes: Discontinue Resuscitation
  - Follow Policy 1004 – Determination of Death
- Exit to Post Resuscitation TG

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

**Entry to Post Resuscitation TG**

- Return of spontaneous circulation

- AT ANY TIME

- Go to Post Resuscitation TG

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**Notify receiving facility.**

**Contact Base Hospital for medical direction**

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Treatment Guideline AC03

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2019 DRAFT
Pearls

• Efforts should be directed at high quality and continuous chest compressions with limited interruptions and early defibrillation when indicated. Consider early IO placement if available or direct IV access if anticipated.
• Passive ventilation for the first three cycles (6 minutes) of CPR. After that time, the patient should be ventilated using a BLS airway and BVM at a rate of 6 ventilation/minute (1:10 seconds) with continuous CPR.
• Placement of an advanced airway should be deferred unless a provider is unable to ventilate the patient with a BLS airway and BVM.
• Use a metronome during chest compression to ensure proper rate.
• Provide resuscitative efforts on scene for up to 30 minutes to maximize chance of ROSC.
• If resuscitative efforts do not attain ROSC, consider cessation of efforts per Policy 1004 – Determination of Death.
• Contact Base Hospital prior to transport of non-ROSC patients.
• The AutoPulse device is limited to 80 compressions/minute, which is acceptable when using this device during cardiac arrest.
• Effective chest compressions and prompt defibrillation are the keys to successful resuscitation.
• Reassess and document ETT placement and EtCO₂ frequently, after every move, and at transfer of care.
• Do not stop chest compressions to check for placement of ETT or to give medications.
Wide Complex Tachycardia

**History**
- Medications (e.g. Aminophylline, Adderall, diet pills, thyroid supplements, decongestants, and Digoxin)
- Diet (e.g. caffeine and chocolate)
- Drugs (e.g. nicotine and illegal drugs)
- Past medical history
- History of palpations/heart racing
- Syncope/near syncope
- Renal failure
- Missed dialysis

**Signs and Symptoms**
- Heart rate > 150
- Systolic BP < 90
- Dizziness, chest pain, shortness of breath, altered mental status or diaphoresis
- CHF
- Potential presenting rhythm:
  - Atrial/sinus tachycardia
  - Atrial fibrillation/flutter
  - Multifocal atrial tachycardia
  - Ventricular tachycardia

**Differential**
- Heart disease (e.g. WPW or valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, pain, or emotional stress
- Fever
- Hypoxia
- Hypovolemia or anemia
- Drug effect/overdose (see History)
- Hypothyroidism
- Pulmonary embolus

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**Assess symptom severity**

Unstable (HR typically > 150)
- Cardiac monitor
- Consider sedation pre-cardioversion
  - Midazolam 1mg IV/IO
  - May repeat if needed in 1-2mg increments
  - Maximum 5mg
- EtCO₂ monitoring
- Establish IV/IO

- If rhythm change, repeat 12-Lead ECG
- Synchronized cardioversion
  - 100J
  - May repeat in escalating energy (200J, 300J, 360J)
- 12-Lead ECG
  - or
  - repeat if rhythm change

Stable
- Cardiac monitor
- Establish IV/IO
- 12-Lead ECG
- EtCO₂ monitoring

- If symptomatic, consider
  - Amiodarone 150mg IV/IO drip over 10 minutes
  - May repeat x 1 dose if needed

- If rhythm change, repeat 12-Lead ECG
- DEFIBRILLATION
  - 200J
  - May repeat in escalating energy (300J, 360J)
- 12-Lead ECG
  - or
  - repeat if rhythm change

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Notify receiving facility. Contact Base Hospital for medical direction.
Pearls

- Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE.
- If at any point the patient becomes unstable, move to the unstable arm of the algorithm.
- For ASYMPTOMATIC patients (or those with only minimal symptoms, such as palpitations) and any tachycardia with a rate of approximately 100 – 120 with a normal blood pressure, consider CLOSE OBSERVATION or fluid bolus rather than immediate treatment with an anti-arrhythmic medication. For example, a patient’s “usual” atrial fibrillation may not require emergent treatment.
- Typical sinus tachycardia is in the range of 100 to (200 – the patient’s age) beats per minute.
- Symptomatic tachycardia usually occurs at rates of 120 – 150 and typically ≥ 150 beats per minute. Patients who are symptomatic with heart rates < 150 likely have impaired cardiac function, such as CHF.
- Serious Signs/Symptoms include: Hypotension; acutely altered mental status; signs of shock/poor perfusion; chest pain with evidence of ischemia (e.g. STEMI, T-wave inversions, or depressions); and acute CHF.
- Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Continue pulse oximetry and EtCO\textsubscript{2} monitoring is required for all wide complex tachycardia patients.
- Providers must export all monitor data to EHR when caring for and treating wide complex tachycardia patients.
History
- Congestive heart failure
- Past medical history
- Medications (e.g., Digoxin, Lasix, Viagra, Sildenafil, Levitra, Vardenafil, Cialis, or Tadalafil)
- Cardiac history including past MI

Signs and Symptoms
- Respiratory distress with bilateral rales
- Apprehension or orthopnea
- Jugular vein distension
- Pink, frothy sputum
- Peripheral edema or diaphoresis
- Chest pain

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

History
- • Congestive heart failure
- • Past medical history
- • Medications (e.g., Digoxin, Lasix, Viagra, Sildenafil, Levitra, Vardenafil, Cialis, or Tadalafil)
- • Cardiac history including past MI

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- • Pneumonia
- • Pulmonary embolus
- • Pericardial tamponade
- • Toxic exposure
Pearls

- Opioids have NOT been shown to improve the outcomes of EMS patients with pulmonary edema. Even though this has historically been a mainstay of EMS treatment, it is no longer routinely recommended.

- 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 for severe hypotension.

- Carefully monitor the patient’s level of consciousness, chest pain, and respiratory status with the above interventions.

- If a patient has taken their own nitroglycerin without relief, consider potency of medication. Provider maximum doses do not include patient administered doses.

- Consider MI in all of these patients: Diabetic, geriatric, and female patients often have atypical pain or only generalized complaints.

- Document CPAP application using the CPAP procedure in the EHR. Document the 12-Lead ECG in the EHR as a procedure along with the interpretation.
Contra Costa County Emergency Medical Services

**Allergic Reaction/Anaphylaxis**

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

**Signs and Symptoms**
- Itching or hives
- Coughing, wheezing or respiratory distress
- Chest or throat restriction
- Difficulty swallowing
- Hypotension or shock
- Edema
- Nausea or vomiting
- Feeling of impending doom

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

**Assess symptom severity**

- **Systemic**
  - Assist patient with self-prescribed Epinephrine Auto-Injector if available
  - Administer Epinephrine Auto-Injector
  - Epinephrine 1:1,000 0.3mg IM (Use 0.15mg for patients > 50 years of age)
  - Establish IV/IO
  - Cardiac monitor
  - EtCO₂ monitoring
  - Albuterol nebulizer 5mg Repeat as needed if indicated
  - Normal Saline bolus 500ml IV/IO Repeat as needed to Max of 1L
  - If hypotensive or no improvement, Epinephrine 1:10,000 titrated in 0.1mg increments slow IV/IO Maximum 0.5mg
  - Consider, Diphenhydramine 50mg IV/IO/IM
  - Consider, 12-Lead ECG
  - Airway Procedure if indicated

- **Localized**
  - Establish IV/IO
  - Cardiac monitor
  - Consider, Diphenhydramine 50mg IV/IO/IM
  - Monitor and reassess
  - Monitor for worsening signs and symptoms

- **Notify receiving facility. Contact Base Hospital for medical direction**

**Airway Procedure if indicated**

**E**: Establish IV/IO
**D**: Diphenhydramine 50mg IV/IO/IM
**P**: Epinephrine 1:1,000 0.3mg IM (Use 0.15mg for patients > 50 years of age)
**O**: Oral oropharyngeal airway

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**Treatment Guideline A04**

Page 1 of 2

2019 DRAFT
Pearls

- 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 anaphylactic reactions with moderate or severe symptoms. IM Epinephrine should be administered as priority before or during attempts at IV or IO access.
- Anaphylaxis that is unresponsive to initial treatment of IM Epinephrine may require IV Epinephrine administration.
- Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash or skin involvement.
- Angioedema is seen in moderate to severe reactions and is swelling involving the face, lips, or airway structures. This can also be seen in patients taking ACE-inhibitor blood pressure medications such as Prinivil, Zesteril, or Lisinopril; medications typically ending in -il.
- Epinephrine may precipitate cardiac ischemia. The following patients should receive half the adult dose of Epinephrine (0.15mg Epinephrine 1:1,000) for the initial dose and any repeated doses:
  - Patients with a history of coronary artery disease, MI, stents, CHF, cardiac surgery; OR
  - Patients over 50 years of age.
  - EMT Optional Scope – use an EpiPen Junior.
- Adult patient who receive Epinephrine should receive a 12-Lead ECG at some point during their care, but this should NOT delay the administration of Epinephrine.
- All patients with respiratory symptoms must have continuous pulse oximetry and EtCO₂ measurement.
- The shorter the onset of symptoms from contact with an allergen, generally the more severe the reaction.
**Dialysis/Renal Failure**

**History**
- Peritoneal or hemodialysis
- Anemia
- Catheter access noted
- Shunt access noted
- Hyperkalemia

**Signs and Symptoms**
- Hypotension
- Bleeding
- Fever
- Electrolyte imbalance
- Nausea or vomiting
- Altered mental status
- Seizure
- Cardiac arrhythmia

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

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**Flowchart**

1. **Graft or fistula bleeding?**
   - Yes → **Exit to appropriate TG**
   - No → **CHF or pulmonary edema?**

2. **CHF or pulmonary edema?**
   - Yes → **Exit to CHF/Pulmonary Edema TG**
   - No → **Cardiac arrest?**

3. **Cardiac arrest?**
   - Yes → **Establish IV/IO**
   - No → **Blood glucose analysis**

**Blood glucose analysis**
- If systolic blood pressure is < 90, Normal Saline bolus 500ml
  - Repeat to goal SBP > 90
  - Maximum 1L
- Established IV/IO
- 12-Lead ECG
- Establish IV/IO
- Cardiac monitor
- **Notify destination or contact Base Hospital**

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**Calcium Chloride 1g IV/IO**
- 20ml flush IV/IO prior to administering next med

**Sodium Bicarbonate**
- 50mEq IV/IO

**Sodium Bicarbonate 50mEq IV/IO**
- Albuterol nebulizer 5mg
  - May repeat x3 or until IV meds are administered

**Notify destination or contact Base Hospital**
Peaked T-waves are a sign of hyperkalemia. Increased extracellular potassium reduces myocardial excitability, which results in the depression of both pace making and conducting tissues. Progressively worsening hyperkalemia leads to suppression of impulse generation by the SA node and reduced conduction by the AV node and HIS-Purkinje system, resulting in bradycardia and conduction blocks that ultimately lead to cardiac arrest.

In order to treat hyperkalemia in the prehospital setting, the QRS must be ≥ 0.12 seconds. If the patient has not yet arrested, be prepared for the patient to do so. Early recognition and treatment is essential to helping reverse this critical condition.

**Pearls**
- Do not take blood pressure or start IV in extremity which has a fistula/graft in place.
- For dialysis patients whose peripheral access site (fistula/graft) has already been accessed, the existing IV line may be used by a paramedic for administration of fluids or medications.
- Paramedics may access a dialysis fistula/graft if the patient is in cardiac arrest and attempts at IV and IO access have failed.
- If local pressure does not control significant hemorrhage from dialysis fistula or graft, utilize a tourniquet to stop bleeding. Apply the tourniquet as far away from the fistula/graft as possible.
- Always consider hyperkalemia in all dialysis or renal failure patients.
- Sodium Bicarbonate and Calcium Chloride should not be mixed. Ideally, administer in separate lines.
- Renal failure and dialysis patients generally have numerous medical problems. Hypertension and cardiac disease are prevalent.
**History**
- Asthma; COPD – chronic bronchitis, emphysema, and congestive heart failure
- Home treatment (e.g. oxygen or nebulizer)
- Medications (e.g. Theophylline, steroids, inhalers)
- Toxic exposure or smoke inhalation

**Signs and Symptoms**
- Shortness of breath
- Pursed lip breathing
- Decreased ability to speak
- Increased respiratory rate and effort
- Wheezing or rhonchi
- Use of accessory muscles
- Cough
- Tachycardia

**Differential**
- Asthma
- Anaphylaxis
- Aspiration
- COPD (emphysema or bronchitis)
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin (e.g. carbon monoxide, etc.)

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Flowchart:
- **E** Support airway
- **P**
  - Support airway
  - Cardiac monitor
  - 12-Lead ECG
  - EtCO₂ monitoring
  - Establish IV/IO

  - Obvious distress with ↓ air movement?
    - Yes: Apply Oxygen to maintain goal SpO₂ 93 to 95%
    - No: PERI-ARREST OR SEVERE DISTRESS
      - Consider administering Epinephrine 1:1,000 0.3mg IM simultaneously with Albuterol nebulizer 5mg

  - Albuterol nebulizer 5mg
    - Repeat as needed
    - Consider CPAP

  - Improving?
    - Yes: Notify receiving facility. Contact Base Hospital for medical direction
    - No: If no improvement, consider Epinephrine 1:1,000 0.3mg IM (Use 0.15mg for patients > 50 years of age)

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*Contra Costa County Emergency Medical Services*

**Dyspnea**

**Treatment Guideline A09**

Page 1 of 2

*2019 DRAFT*
Pearls

- Patients receiving epinephrine should receive a 12-Lead ECG at some point in their care in the prehospital setting, but this should NOT delay the administration of Epinephrine.
- Epinephrine may precipitate cardiac ischemia. The following patients should receive half the adult dose of Epinephrine (0.15mg Epinephrine 1:1,000) for the initial dose and any repeated doses:
  - Patients with a history of coronary artery disease, MI, stents, CHF, cardiac surgery; OR
  - Patients over 50 years of age and have a heart rate ≥ 150.
- Pulse oximetry and continuous EtCO₂ monitoring is required for all respiratory patients.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.
- CPAP is not a ventilation device. Patients with an inadequate respiratory rate or depth of respiration will need assistance with a BVM.
History
- Code status (DNR or POLST)
- Events leading to arrest
- Estimated downtime
- Prior resuscitation attempts
- Past medical history
- Medications
- Existence of terminal illness
- Suspected physical abuse

Signs and Symptoms
- Unresponsive
- Apneic
- Pulseless

Differential
- Respiratory failure (foreign body, secretions, infection)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Hypothermia
- Tension pneumothorax, cardiac tamponade, or PE
- Toxin or medication
- Electrolyte abnormalities (glucose, potassium)
- Acidosis

Decomposition
Rigor mortis
Dependent lividity
Injury incompatible with life or traumatic arrest with asystole
Do not begin resuscitation
Follow Policy 1004 – Determination of Death

Criteria for death/no resuscitation
Review DNR/POLST form

Newly born < 31 days old
Yes
No

Shockable rhythm?
Yes
No

Begin chest compressions
Push hard (1.5 inches Infant / 2 inches Children) and fast (100-120/min)
Use metronome to ensure proper rate
Change compressors every 2 minutes
(Limit changes / pulse checks to < 5 seconds)
For children over 8 years, use 30:2 ratio
For children 1 month to 8 years, use 15:2 ratio

ALS available?
Yes
No

Apply AED if available

Automated defibrillation
Continue CPR
5 cycles over 2 minutes
Repeat and assess

Follow Pediatric Asystole/PEA and Airway TGs as indicated
Follow Pediatric VF/VT
Pediatric Tachycardia and Airway TGs as indicated

Notify receiving facility.
Contact Base Hospital for medical direction

AT ANY TIME
Return of spontaneous circulation
Go to Post Resuscitation TG

No resuscitation

Cardiac monitor
EtCO₂ monitoring

Shockable rhythm?
Yes
No

Basic airway procedure
For patients > 40 kg
Intubate with ETT as appropriate
or
For patients > 4 ft and > 40 kg
Place King Airway as appropriate
Pearls

• Efforts should be directed at high quality chest compressions with limited interruptions and early defibrillation when indicated. Compress 1.5 inches in infants and 2 inches in children. Consider early IO placement if available or direct IV access if anticipated.

• DO NOT HYPERVENTILATE: The compression to ventilation ratio is 15:2.

• Do not delay chest compressions while applying any device or intervention.

• In cases of clear-cut traumatic arrest, epinephrine is not indicated in PEA or asystole. Epinephrine will not correct arrest caused by a tension pneumothorax, cardiac tamponade, or hemorrhagic shock. If there is any doubt as to the cause of arrest, treat as a non-traumatic arrest.

• Use a metronome during chest compression to ensure proper rate.

• Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with a BVM and appropriately sized mask. Patient survival is often dependent on proper ventilation and oxygenation.

• Resuscitation is based on proper planning and organized execution. Procedures require space and patient access. Make room to work. Utilize team focused approach assigning responders to predetermined tasks.

• Prevent hypothermia by moving to a warm environment and avoid unnecessary exposure.
Pediatric Behavioral

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

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

Differential
- Altered mental status
- Alcohol intoxication
- Toxin / substance abuse
- Medication effect/overdose
- Withdrawal symptoms
- Depression
- Bipolar (manic-depressive)
- Schizophrenia
- Anxiety disorders
- Hypoglycemia

Excited Delirium Syndrome
Paranoia, disorientation, extremely aggressive or violent, hallucinations, tachycardia, increased strength, hyperthermia, and clearly a danger to self or others

Aggressive or agitated, possible psychosis, possible danger to self, or others

For patients ≥ 12 years of age
Midazolam
Use Pediatape and refer to dosing guide

Consider restraints
Monitor restraints and PMS if indicated
Consider external cooling measures
Monitor and reassess
Establish IV
Blood glucose analysis
Cardiac monitor

Exit to appropriate TG, if indicated
- Altered Mental Status TG
- Overdose/Toxic Ingestion TG
- Head Trauma TG

Assume patient has medical cause of behavioral change

Notify receiving facility. Contact Base Hospital for medical direction

Midazolam
Contact Base Hospital for additional order

Diabetic TG

2019 DRAFT
Pearls

- Crew/responder safety is the main priority. See Policy 1008 – Managing Assaultive Behavior/Patient Restraint.
- Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS must be accompanied by Law Enforcement in the ambulance.
- Avoid using benzodiazepines for patients with alcohol intoxication.
- Limit IN administrations to ½ dose in each nare.
- All patients who receive either physical restraint or chemical sedation must be continuously observed by EMS personnel. This includes direct visualization of the patient as well as cardiac and pulse oximetry monitoring.
- Consider all possible medical/trauma causes for behavior (e.g. hypoglycemia, overdose, substance abuse, hypoxia, seizure, head injury, etc.).
- Use caution when considering the use of Midazolam with postictal patients.
- Do not irritate the patient with a prolonged exam. Be thorough but quick.
- Do not overlook the possibility of associated domestic violence or child abuse.
- If patient suspected of excited delirium and suffers cardiac arrest, consider fluid bolus and sodium bicarbonate early.
- Do not position or transport any restrained patient in a way that negatively affects the patient’s respiratory or circulatory status (e.g. hog-tied or prone positions). Do not place backboards, splints or other devices on top of the patient.
- If restrained, the extremities that are restrained will have a circulation check at least every 15 minutes. The first of these checks should occur as soon after placement of the restraints as possible. This shall be documented in the EHR.

Excited Delirium Syndrome:

This is a medical emergency. The condition is a combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent/bizarre behavior, insensitivity to pain, hyperthermia and increased strength. The condition is life-threatening and is often associated with use of physical control measures, including physical restraints, and tasers. Most commonly seen in male patients with a history of serious mental illness or drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines, bath salts, or similar agents. Alcohol withdrawal or head injury may also contribute to the condition.
Pediatric Brief Resolved Unexplained Event (BRUE)

**History**
- Recent trauma, infection (e.g., fever, cough)
- GERD
- Congenital heart disease
- Seizures
- Medications

**Signs and Symptoms**
- Brief decrease/change in mentation
- Brief period of cyanosis or pallor
- Brief absence, decrease or irregular respirations
- Brief marked change in muscle tone
- Brief altered responsiveness

**Differential**
- GERD
- Pertussis
- Respiratory infection
- Seizure
- Infection
- Abuse

An infant ≤ 1 year who experienced an episode frightening to the observer, which is characterized by:
- cyanosis or pallor
- absent, decreased, or irregular breathing
- choking or gagging
- change in muscle tone
- altered level of consciousness

 Patients experiencing a BRUE should be transported to an appropriate hospital for further evaluation

Contact the Base Hospital for all AMA requests

Notify receiving facility. Contact Base Hospital for medical direction

**Pearls**
- BRUE was formally known as Apparent Life Threatening Event (ALTE).
- BRUE is formally diagnosed in the ED only when there is no explanation for a qualifying event after a physician conducts an appropriate history and physical examination.
- Always consider non-accidental trauma in any infant who presents with BRUE.
- Even with a normal physical examination at the time of EMS contact, patients that have experienced BRUE should be transported for further evaluation.
- It is important to document sleeping position as parent co-sleeping with child is associated with infant deaths.
Contra Costa County Emergency Medical Services

Trauma Triage

ACTIVATION

Unmanageable airway or Traumatic arrest not meeting field determination

Measure vital signs and level of consciousness

- GCS ≤ 13
- Systolic blood pressure < 90mmHg
- Adult respiratory rate < 10 or > 29 or need for ventilatory support
- Infant (< 1 year of age) respiratory rate < 20

Assess anatomy of injury

- All penetrating injuries to head, neck, torso, groin, pelvis, buttocks, and extremities above the elbow or knee
- Chest wall instability or deformity (e.g. flail chest)
- Two or more proximal long bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation above the wrist or ankle
- Pelvic instability

Assess mechanism of injury and evidence of high-energy impact

- Adult fall > 20 feet
- Pediatric fall > 10 feet or 2-3 times height of child
- High risk auto crash with > 12 inches intrusion on patient side or > 18 inches at any site of passenger compartment
- Ejection (partial or complete)
- Death in same passenger compartment

- Open or depressed skull deformity
- Traumatic paralysis
- Major burn associated with trauma

Meets Destination / Call-in Criteria?

Closest facility

Trauma Center transport with early notification

Trauma Center transport with early notification

Call for destination decision
### Risk Factor Advisory

Patients with either high energy or low energy mechanisms are more prone to serious injury if they have one or more of the following risk factors:

- Pregnancy over 20 weeks
- Communication barrier (e.g., age, language, psychiatric, or developmental issues)
- Age 55 or older
- Patient taking anticoagulants or with known bleeding disorder

### High energy mechanism

- Motor vehicle crash
  - Estimated impact speed of > 40 mph
  - Mechanical extrication required by fire department personnel
  - Rollover with unrestrained occupant

- Person struck by a vehicle at < 20 mph

- Person ejected/fell from other object (e.g., motorcycle, horse, or ATV)

- Blunt assault with weapon (e.g., pipe, bat, or golf club)

- Falls > 10 but < 20 feet

*This list is not all-inclusive and other high energy mechanisms encountered also merit Base Hospital contact*

### Low energy mechanism

- Low energy mechanisms should merit Base Hospital contact if symptoms, physical findings, or concern are encountered.

- Examples include, but are not limited to ground level or short falls

For situations not described above, consider Base Hospital contact if paramedic has concern that a serious injury may exist
Pearls

- Do *not* let alcohol confuse the clinical picture. Alcoholics may have unrecognized injuries, particularly head bleeds.
- A complete hands-on head-to-toe assessment is required for all trauma patients.
- Transport should be initiated within 10 minutes of ambulance arrival unless patient requires extrication.

Age Categories

Adult Patient – Trauma patients 15 years of age and older.
Pediatric Patients – Trauma patients under the age of 15 years.

Trauma Receiving Facilities

Adult Trauma Centers – John Muir Medical Center – Walnut Creek is the designated trauma center for adults in Contra Costa County. In some circumstances, patients may be transported to other trauma receiving facilities. Alameda County Medical Center (Highland) and Eden Medical Center are trauma receiving facilities that, when they are the closest trauma receiving facility, may be appropriate for ground transport of trauma patients.

Pediatric Trauma Centers – UCSF Benioff Children’s Hospital of Oakland (CHO) is the most appropriate destination for the majority of pediatric trauma patients.
- John Muir Medical Center – Walnut Creek may be an appropriate trauma receiving facility for critically injured pediatric trauma patients who are near arrest or have a very prolonged transport time. UC Davis Medical Center is also a pediatric trauma receiving facility and may be utilized when helicopter transport is involved.

Receiving Facilities – Local hospitals that are not trauma receiving facilities are destinations for patients who are triaged by the Base Hospital at the time of report as not requiring trauma center care. A trauma receiving facility may also serve as the receiving facility when it is the patient’s facility of choice.

Low Energy Mechanism Trauma

Low energy mechanism trauma may reveal significant trauma. Examples include, but are not limited to ground level or short falls, blunt assault without a weapon (e.g. closed fist), low speed motor vehicle crash, or other blunt trauma (e.g. sports injury). Symptoms or concern may include:

- Symptoms in the presence of head injury such as headache, vomiting, loss of consciousness, repetitive questioning, abnormal, or combative behavior or new onset of confusion
- Pain level greater than 5/10 related to head, neck, or torso injury
- Any concerns due to hypotension, tachycardia, or tachypnea
- Systolic BP < 110mmHg in patients 65 years of age or older
- Torso injury with tenderness of abdomen, chest/ribs or back/flank
- Suspected hip dislocation or pelvis injury

Other Definitions

Unmanageable Airway – A patient whose airway is unable to be adequately maintained with BLS or ALS maneuvers. Adult trauma patients are candidates for immediate redirection to the trauma center following airway stabilization at a non-trauma receiving facility.

Traumatic Arrest – Patients who do not qualify for field determination of death but have or develop cardiopulmonary arrest should be transported to the closest Basic ED by ground ambulance. Exceptions:

- Patients with penetrating trauma who arrest (pulseless, apneic, or pulseless with agonal respirations) after the arrival of transport personnel should be immediately transported to a trauma center if transport time is 20 minutes or less to that facility. If no Trauma Center is available within 20 minutes, patients should be transported to the closest basic emergency department.
- If a helicopter crew is present at the time of arrest (blunt or penetrating) and the air transport can be initiated immediately, use of helicopter to transport to a trauma center is appropriate.
Clinical Indications:

1. Capnography shall be used when available with the use of all advanced airway procedures and as required by treatment guidelines.

Procedure:

1. Attach capnography sensor to the advanced airway or any other oxygen delivery device, including bag-valve mask and nasal cannula.
2. Note that EtCO₂ level and waveform changes. Values shall be documented in the EHR.
3. The capnometer shall remain in place and be monitored throughout prehospital care and transport.
4. Any loss of EtCO₂ detection or waveform may indicate an airway problem and should be immediately addressed and thoroughly documented.
5. Document the procedure and results in the EHR.

Notes:

1. EtCO₂ readings may be unreliable if the patient is in shock or has poor perfusion.
2. Normal EtCO₂ levels range from 32 – 36, but this may vary based on the patient’s underlying respiratory and metabolic status.
3. EtCO₂ levels that rise from a normal baseline to or above 40 generally indicates hypoventilation is occurring.
4. Patient stimulation, use of a BVM, or use of Naloxone may be appropriate based on the situation.
Clinical Indications:
1. Patient situations with suspected blood or fluid loss, or dehydration with no indication for spinal immobilization. Orthostatic vital signs are not routinely recommended.
2. Patients > 8 years of age, or patients larger than the Pediatape.
3. Orthostatic vital signs are not sensitive nor specific for volume loss or dehydration and may induce syncope in some cases. Assessment of orthostatic vital signs are not routinely recommended.

Procedure:
2. With the patient supine and after a period of 3 minutes in position, obtain blood pressure and pulse.
3. Have the patient stand. Protect the patient from falling, but do not allow the patient to lean on an object for support.
6. After 3 minutes, obtain blood pressure and pulse.
7. If the systolic blood pressure falls ≥ 20 mmHg or diastolic blood pressure falls ≥ 10 mmHg, the patient is considered to be orthostatic.
8. If a patient experiences dizziness upon sitting or standing or is obviously dehydrated based on history or physical exam, formal orthostatic examination should be omitted and fluid resuscitation initiated.
9. If a patient is orthostatic, initiate fluid resuscitation.
**Indication:** Seizure/Behavioral/Sedation for Cardioversion/Sedation for Advanced Airway

Concentration = 5 mg/ml

Single dose only – Repeat doses require Base Hospital order

<table>
<thead>
<tr>
<th>COLOR</th>
<th>Doses (mg)</th>
<th>Give (ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray</td>
<td>0.5 mg</td>
<td>0.1 ml</td>
</tr>
<tr>
<td>Pink</td>
<td>0.75 mg</td>
<td>0.15 ml</td>
</tr>
<tr>
<td>Red</td>
<td>0.85 mg</td>
<td>0.17 ml</td>
</tr>
<tr>
<td>Purple</td>
<td>1 mg</td>
<td>0.2 ml</td>
</tr>
<tr>
<td>Yellow</td>
<td>1.25 mg</td>
<td>0.25 ml</td>
</tr>
<tr>
<td>White</td>
<td>1.75 mg</td>
<td>0.35 ml</td>
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<tr>
<td>Blue</td>
<td>2 mg</td>
<td>0.4 ml</td>
</tr>
<tr>
<td>Orange</td>
<td>2.75 mg</td>
<td>0.55 ml</td>
</tr>
<tr>
<td>Green</td>
<td>3.25 mg</td>
<td>0.65 ml</td>
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<tr>
<td>40kg</td>
<td>4 mg</td>
<td>0.8 ml</td>
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<tr>
<td>50kg</td>
<td>4.5 mg</td>
<td>0.9 ml</td>
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<tr>
<td>≥ 60kg</td>
<td>5 mg</td>
<td>1 ml</td>
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</tbody>
</table>

Note: Titrate dosage in 0.5 – 1mg increments to desired effect (seizure cessation) or 5mg maximum dose.
<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication</th>
<th>Dosing</th>
<th>Cautions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atropine</td>
<td>Organophosphate overdose</td>
<td>Refer to pediatric dosing guide</td>
<td>Doses less than 0.5mg can cause paradoxical bradycardia.</td>
<td>Can dilate pupils, aggravate glaucoma, cause urinary retention, confusion, and dysrhythmias including V-Tach and V-Fib. Increases myocardial oxygen consumption. Bradycardia in children is primarily related to respiratory issues – assure adequate ventilation first.</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>Hydrofluoric acid exposure</td>
<td>500mg IV/IO for tetany or cardiac arrest</td>
<td>Use cautiously or not at all in patients on digitalis. Avoid extravasation. Rapid administration can cause dysrhythmias or arrest.</td>
<td>Administer 20ml flush IV/IO when delivering in conjunction with Sodium Bicarbonate.</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>Crush injury</td>
<td>1g IV/IO over 60 seconds</td>
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<tr>
<td>Calcium Chloride</td>
<td>Suspected hyperkalemia</td>
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<tr>
<td>Dextrose 10%</td>
<td>Hypoglycemia</td>
<td>Initial - 100ml IV Repeat – 150ml if glucose remains ≤ 60mg/dl</td>
<td>Can cause tissue necrosis if IV is infiltrated</td>
<td>Recheck blood glucose after administration.</td>
</tr>
<tr>
<td>Diphendryamine</td>
<td>Allergic reaction</td>
<td>50mg IV/IO/IM</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Diphendryamine</td>
<td>Dystonic reaction</td>
<td>25-50mg IV/IO or 50mg IM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epi 1:10,000</td>
<td>Cardiac arrest</td>
<td>1mg IV/IO every 3-5 minutes</td>
<td>May cause serious dysrhythmias or exacerbate angina.</td>
<td>Alpha and beta sympathomimetic. Use ½ dose for patients: • with history of CAD; or • &gt; 50 years of age</td>
</tr>
<tr>
<td>Epi 1:10,000</td>
<td>Cardiac arrest/ Bradycardia</td>
<td>Refer to pediatric dosing guide</td>
<td>In adult anaphylactic patients, should be used if patient is hypotensive or no improvement after Epi 1:1,000 IM dose. In pediatric anaphylactic patients, should only be administered if Epi 1:1,000 IM dose is ineffective.</td>
<td></td>
</tr>
<tr>
<td>Epi 1:10,000</td>
<td>Anaphylactic shock</td>
<td>0.1mg slow IV/IO increments titrated to effect to a max of 0.5mg</td>
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<tr>
<td>Epi 1:10,000</td>
<td>Refer to pediatric dosing guide</td>
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<td>Drug</td>
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<tr>
<td>Epi 1:1,000</td>
<td>Anaphylactic shock</td>
<td>0.3mg IM</td>
<td>Never administer IV/IO. Use with caution in asthma patients with a history of hypertension or coronary artery disease. May cause serious dysrhythmias or exacerbate angina.</td>
<td>Use ½ dose for patients: • with history of CAD; or • &gt; 50 years of age</td>
</tr>
<tr>
<td></td>
<td>Asthma/COPD or Pediatric respiratory</td>
<td>0.3mg IM</td>
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<td></td>
<td>distress</td>
<td>Refer to pediatric dosing</td>
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<tr>
<td></td>
<td>guide</td>
<td>guide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EpiPen</td>
<td>Allergic reaction/Anaphylaxis</td>
<td>1 auto-injector</td>
<td>See Epinephrine 1:1,000 and Epinephrine 1:10,000</td>
<td>See Epinephrine 1:1,000 and Epinephrine 1:10,000</td>
</tr>
<tr>
<td>EpiPen Jr.</td>
<td></td>
<td>1 auto-injector</td>
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</tr>
<tr>
<td>Fentanyl</td>
<td>Pain control</td>
<td>Initial - 25-200mcg IV/IO</td>
<td>Can cause hypotension or respiratory depression.</td>
<td>Recheck vital signs between each dose. Hypotension is more common in patients with low cardiac output or volume depletion. Respiratory depression is reversible with naloxone. Additional IV/IO doses can be administered every 5 minutes. IM and IN doses can be repeated once in 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>or 50-100mcg IM or 100mcg IN</td>
<td>or 50-100mcg IM or 100mcg IN</td>
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<tr>
<td></td>
<td>May repeat to max of 200mcg</td>
<td>Refer to pediatric dosing</td>
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<td></td>
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<td>guide</td>
<td>guide</td>
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<tr>
<td>Glucagon</td>
<td>Hypoglycemia</td>
<td>1mg IM</td>
<td>None</td>
<td>Effect may be delayed 15-20 minutes</td>
</tr>
<tr>
<td></td>
<td>Refer to pediatric dosing guide</td>
<td></td>
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<tr>
<td>Lidocaine</td>
<td>IO anesthetic</td>
<td>Initial – 40mg IO</td>
<td>None</td>
<td>Effect may be delayed 15-20 minutes</td>
</tr>
<tr>
<td></td>
<td>Repeat dose – 20mg if painful</td>
<td>Refer to pediatric dosing</td>
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<td></td>
<td>guide</td>
<td>guide</td>
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<tr>
<td>Midazolam</td>
<td>Seizure</td>
<td>5mg IV/IO/IM/IN</td>
<td>Use caution in patients over 60 years of age.</td>
<td>Observe respiratory status after administration.</td>
</tr>
<tr>
<td></td>
<td>May repeat to a max of 10mg</td>
<td>Refer to pediatric dosing</td>
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<td></td>
<td>guide</td>
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<td>Indication</td>
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</tr>
<tr>
<td>Midazolam</td>
<td><strong>Behavioral emergency</strong></td>
<td>Initial - 5mg IM/IN or 1-3mg IV in 1mg increments&lt;br&gt;May repeat to a max of 5mg&lt;br&gt;For excited delirium Initial – 5mg IM/IN&lt;br&gt;May repeat to a max of 10mg</td>
<td>For patients ≥ 12 years of age only. Refer to pediatric dosing guide</td>
<td>Use caution in patients over 60 years of age. Observe respiratory status after administration. For pediatric patients, repeat orders require Base Hospital orders.</td>
</tr>
<tr>
<td></td>
<td><strong>Sedation for pacing or cardioversion</strong></td>
<td>1mg IV/IO&lt;br&gt;Tritrate in 1-2mg increments to a max of 5mg</td>
<td>Refer to pediatric dosing guide</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Sedation of patient with an advanced airway</strong></td>
<td>2-5mg IV/IO&lt;br&gt;May repeat to a max of 5mg</td>
<td>Refer to pediatric dosing guide</td>
<td></td>
</tr>
<tr>
<td>Naloxone</td>
<td><strong>Respiratory depression or apnea</strong></td>
<td>2mg IN or 1-2mg IV/IM</td>
<td>Refer to pediatric dosing guide</td>
<td>Abrupt withdrawal symptoms and combative behavior may occur. IN administration preferred unless patient is in shock or has copious secretions/blood in nares. Shorter duration of action than that of narcotics. Titrate to effect of normal respirations; it is not necessary to fully wake the patient.</td>
</tr>
<tr>
<td>Naloxone</td>
<td><strong>Overdose</strong></td>
<td>1 preload syringe&lt;br&gt;Refer to pediatric dosing guide</td>
<td>See Naloxone</td>
<td>See Naloxone</td>
</tr>
</tbody>
</table>

**Reference**

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<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication</th>
<th>Dosing</th>
<th>Cautions</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitroglycerin</td>
<td>Pulmonary edema</td>
<td>0.4mg SL if systolic BP &gt; 90mmHg</td>
<td>Do not administer if STEMI is detected.</td>
<td>Perform 12-Lead ECG prior to administration.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.8mg SL if systolic BP &gt; 150mmHg</td>
<td>Can cause hypotension and headache. Do not administer if systolic BP &lt; 90mmHg or heart rate &lt; 50.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>May repeat to max of 3 doses</td>
<td>Do not administer if patient has taken Viagra, Levitra, Staxyn, or Stendra within past 24 hours or Cialis if taken within 36 past hours.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chest pain</td>
<td>0.4mg SL</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>May repeat to a max of 3 doses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ondansetron</td>
<td>Vomiting or severe nausea</td>
<td>4mg IV/IO/IM/ODT</td>
<td>Administer IV/IO dose over 1 minute as rapid administration may cause syncope.</td>
<td>None</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>Tricyclic antidepressant</td>
<td>1mEq/kg IV/IO</td>
<td>Can precipitate with or inactivate other drugs.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>overdose</td>
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<tr>
<td></td>
<td>Crush injury</td>
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<tr>
<td></td>
<td>Hyperkalemia</td>
<td>50mEq IV/IO</td>
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