

# **Pine Mountain Ski Patrol**

*2016-2017 National Outstanding Small  
Alpine Patrol*



## **2017 Pine Mountain Ski Medical Treatment Protocols**

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**Approved 11/16/2017**

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## INTRODUCTION

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The following protocols have been developed and approved by the Pine Mountain Medical Director, Ski Patrol Director and Management. These protocols define the standard of care for Ski Patrol providers in the area of Pine Mountain Golf & Ski Resort, and delineate the expected practice, actions, and procedures to be followed.

**The protocols are strictly focused on BLS care.** If a higher level of care is warranted, EMS must be contacted for care.

No protocol can account for every clinical scenario encountered, and the Medical Director does recognize that in rare circumstances deviation from these protocols may be necessary and in a patient's best interest. Variance from protocol should always be done with the patient's best interest in mind and backed by documented clinical reasoning and judgment. Whenever possible, prior approval is preferred. Additionally, all variance from protocol should be documented and submitted for review by The Pine Mountain Medical Director, Ski Patrol Director and Management in a timely fashion.

## PHYSICIAN AT THE SCENE/MEDICAL DIRECTION

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### Purpose

- A. To provide guidelines for prehospital personnel who encounter a physician at the scene of an emergency

### General Principles

- A. The prehospital provider has a duty to respond to an emergency, initiate treatment, and conduct an assessment of the patient to the extent possible.
- B. A physician who voluntarily offers or renders medical assistance at an emergency scene is generally considered a "Good Samaritan." However, once a physician initiates treatment, he/she may feel a physician-patient relationship has been established.
- C. Good patient care should be the focus of any interaction between prehospital care providers and the physician.

### Procedure

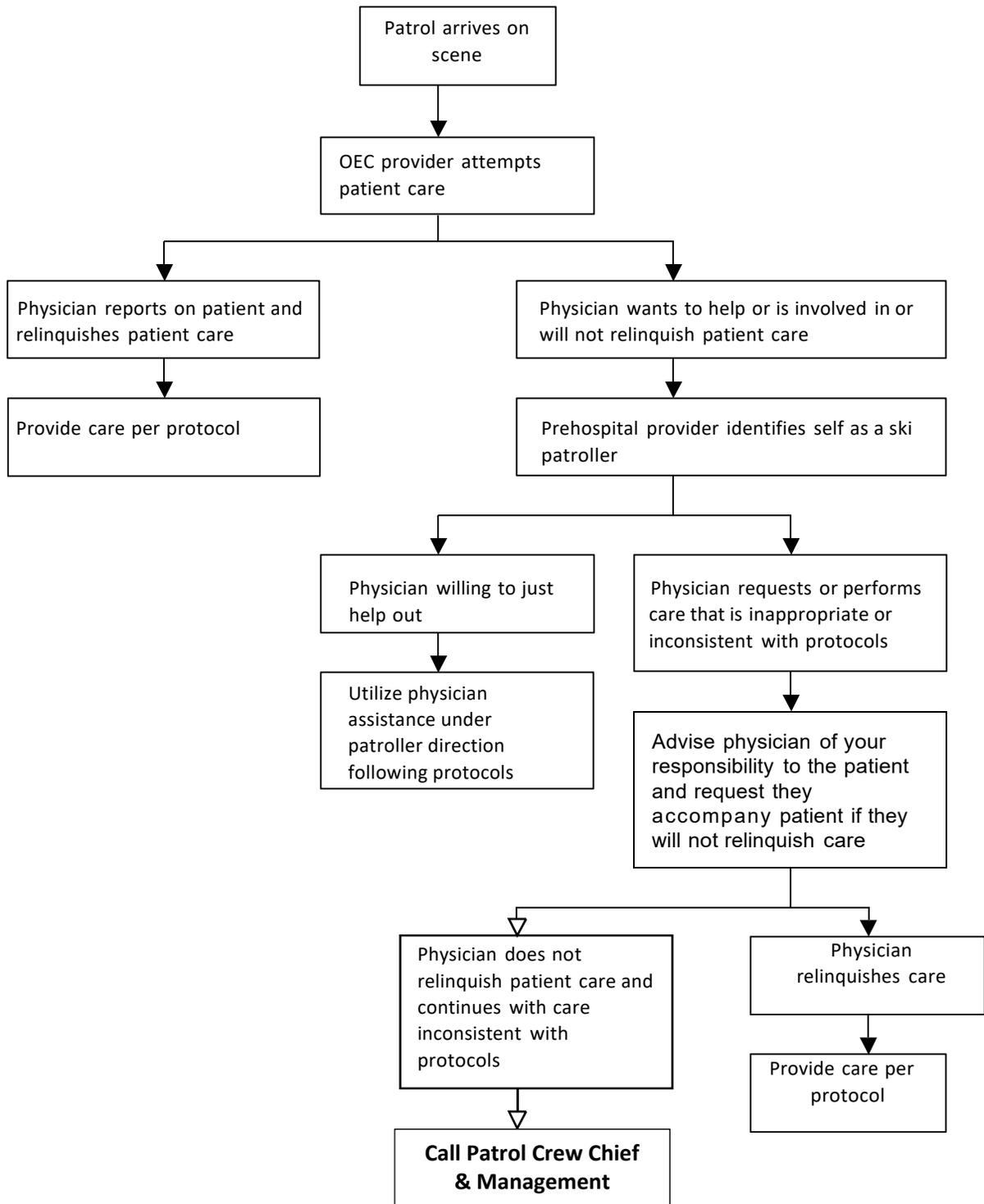
- A. See algorithm below.

### Special notes

- A. Every situation may be different, based on the physician, the scene, and the condition of the patient.

**CONTACT SKI PATROL CREW CHIEF & MANAGEMENT** when any question(s) arise.

## PHYSICIAN AT THE SCENE/MEDICAL DIRECTION ALGORITHM



## GENERAL TRAUMA CARE

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### **BSI**

**Scene safety**

**Consider mechanism**

**Consider need for additional resources**

**General impression**

**ABCs and LOC**

**Rapid Trauma Assessment**

**Prepare for immediate transport**

**SAMPLE history**

Scene Time <10 minutes for unstable patients. Perform procedures enroute as indicated

**Give high flow oxygen for respiratory distress**

- Assist ventilations and manage airway as indicated
- Spinal immobilization if indicated

**Control exsanguinating hemorrhage:**

- Direct pressure
- Consider tourniquet if indicated

**Assess disability and limitation:**

- Brief neuro assessment (AVPU, Circulation, Movement & Sensation)
- Extremity splinting if indicated

**Rapid Transport**

- Treat the patient, for Signs & Symptoms
- If patient has altered mental status or no radial pulses, rapid transport
- Monitor vital signs, ABCs, neuro status, GCS

**Early notification of EMS of patient condition, identified injuries and ETA is important**

**Documentation of mechanism of injury includes:**

- Cause, precipitating factors, hill equipment involved.
- Trajectories and forces involved to patient.
- Helmet use.
- Consider other factors such as drugs, alcohol, medications, diseases, pregnancy, or illness.

## SPINAL IMMOBILIZATION

**No single category of mechanism of injury or clinical scenario can identify all patients who need spinal immobilization**

**Examples of mechanisms of injury (MOI) that imply potential need for spinal immobilization and for whom immobilization should be considered include but are not limited to:**

- MVC/MCC/Bicycle/Equestrian Accident
- Diving / Axial Load
- Fall > 3 feet
- Fall from standing – Specific concern in elderly

**When in doubt about the appropriateness of immobilization, err on the side of caution and immobilize**

**If considering non-immobilization, use the following decision-making tool as a guideline:**

- Is your impression that the patient has a spine injury?
- Is there any midline spinal column tenderness to palpation?
- Is there any neurological complaint or deficit?
- Does the patient have any alteration in mentation or under the influence of drugs or alcohol?
- Is the patient distracted by stress reaction or another injury?
- Is there any other barrier to evaluate for a spinal injury?
  - *e.g.: language or developmental barrier*

**If you answer yes to any question, immobilize the spine. If the answer is no to all points, patient does not require spinal immobilization.**

**It is not within the scope of practice for an OEC technician to remove a patient from spinal immobilization. EMS must be contacted for all immobilized patients. Higher levels of care may have different protocols regarding removal from LSB.**

**While we may not remove, this protocol provides criteria to consider before application.**

### **Non-Immobilization consideration**

- Is your impression that a spine injury exists?
- Is there midline tenderness on palpation?
- Any neurological complaint or deficit?
- Does the patient have altered LOC or under the influence of drugs or Alcohol?
- Is there any barrier to assessment or communication?  
(i.e. language or developmental barrier)

**A “Yes” to any question requires Spinal Immobilization**

## HEAD TRAUMA

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See General Trauma Care Protocol (Pg. 6)

### Glasgow Coma Score (GCS)

(Minimum 3, Maximum 15)

#### GCS?

- May assist with BG check

#### GCS <8

- Open Airway and assist ventilations
- Call EMS

#### GCS>8

- Signs of shock/SBP <90? Call for ALS
- Support ventilations as needed
- Rapid Trauma Assessment
- Treat other injuries per protocol
- Watch for status changes

#### Monitor:

- ABCs, Vital Signs, mental status,
- Rapid EMS Notification/Intervention

**For GCS>8 in an oriented patient without outward signs of trauma, see concussion protocol**

#### GCS Score

##### Eyes:

4. Opens eyes spontaneously
3. Opens eyes to voice
2. Opens eyes to pain
1. Does not open eyes

##### Verbal:

5. Oriented
4. Confused, disoriented
3. Inappropriate words
2. Incomprehensible sounds
1. No sounds

##### Motor:

6. Obeys commands
5. Localizes to painful stimuli
4. Withdrawal to painful stimuli
3. Flexion to painful stimuli
2. Extension to painful stimuli
1. No movement

## CONCUSSION SCREENING

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To be used after GCS is determined to be >8.

If any suspicion for more significant head injury, refer to head trauma section

### Signs of Possible Concussion

- Loss of consciousness
- Balance or Motor Incoordination
  - Stumbles, staggers, sways when standing, slow, deliberate movements, etc
- Disorientation or confusion
- Loss of Memory
- Blank or vacant look
- Visible injury to head/face such as any bruising or swelling

**Any of the above warrant further evaluation by medical personnel.**

## FACE AND NECK TRAUMA

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See General Trauma Care Protocol (Pg. 6)

**Clear airway**

**Rapid trauma assessment**

**Spinal immobilization protocol (Pg. 7)**

**Assess for need for airway management**

**Spinal Immobilization not routinely indicated for penetrating neck injury**

*Penetrating injury is very rarely associated with unstable spinal column*

**If Laryngeal trauma is suspected\***

- Rapid Transport

**Severe Airway Bleeding**

- Rapid Transport
- Direct Pressure if appropriate. Care should be taken not to occlude the carotid arteries bilaterally.

**\* Suspect laryngeal trauma with:**

- Laryngeal tenderness, swelling, bruising
- Voice changes
- Respiratory distress
- Stridor

**With airway stable/controlled:**

- Complete neuro exam
- Assess for subcutaneous air
- Cover/protect eyes as indicated
- Do not try to block drainage from ears, nose
- Save avulsed teeth in saline-soaked gauze, do not scrub clean

**Transport ASAP to appropriate Trauma Center**

- Treat other injuries per protocol
- Suction airway as needed
- Monitor ABCs, Vital Signs, mental status, SpO<sub>2</sub>

## SPINAL TRAUMA

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See General Trauma Care Protocol (Pg. 6)

See Spinal Immobilization Protocol (Pg. 7)

### Spinal immobilization per protocol

- Document neuro assessments before and after immobilization

#### Signs of Spinal Cord Injury:

- Any neurological complaint
- Sensory loss, weakness and/or paralysis
- Numbness, tingling or painful burning in arms, legs

### Rapid transport to appropriate Trauma Center

#### If BP < 90 and/or signs of shock, resuscitate per Traumatic Shock Protocol

- Complete patient assessment
- Treat other injuries per protocol
- Monitor for status changes
- Monitor ABCs, Vital Signs, mental status, SpO<sub>2</sub>

#### Spinal Immobilization not routinely indicated for penetrating neck injury

*Penetrating injury is very rarely associated with unstable spinal column*

**It is not within the scope of practice for an OEC technician to remove a patient from spinal immobilization. EMS must be contacted for all immobilized patients. Higher levels of care may have different protocols regarding removal from LSB.**

## CHEST TRAUMA

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See General Trauma Care Protocol (Pg. 6)

Consider Rapid transport to Trauma Center

### Are you able to oxygenate and ventilate effectively?

- Airway management and assisted ventilations as indicated
- Consider Tension Pneumothorax

### Penetrating Trauma?

- Rapid stabilize and transport
- Consider Tension Pneumothorax
- Occlusive Dressing for Sucking Chest Wounds

### Flail Chest?

- Splint with bulky dressing
- Assess for need for assisted ventilations

### SBP < 90 and/or shock?

- Treat per traumatic shock protocol (Pg. 11) enroute

### Monitor ABCs, Vital Signs, mental status, SpO<sub>2</sub>

## ABDOMINAL TRAUMA

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### General Trauma Care Protocol (Pg. 6)

#### Rapid transport

#### Review Trauma in Pregnancy if pregnant (Pg. 14)

#### Call EMS

#### Penetrating trauma?

- Cover wounds, viscera with gauze dressing
- Do not attempt to repack exposed viscera

#### SBP < 90 and/or shock?

- Resuscitate per Traumatic Shock Protocol (Pg. 11)

#### Monitor ABCs, Vital Signs, mental status, SpO<sub>2</sub>

#### Documentation

- MOI
- Time of injury
- Initial GCS

#### Penetrating trauma

- Object/Speed/Mass

#### Blunt trauma

- Speed
- Helmets

## TRAUMATIC SHOCK

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Trauma with suspected serious injury and/or signs of shock

See General Trauma Care Protocol\_(Pg. 6)

#### Administer oxygen

#### Contact Base for ALS

#### SBP < 90 and/or definite signs of shock?

- If Yes:
  - Evaluate breath sounds, respiratory effort. Support as needed.
  - Consider tension pneumothorax
- If No,
  - Treat enroute
  - Complete General Trauma Care
  - Keep patient warm

#### Monitor:

- ABCs, Vital Signs, mental status
- Rapid EMS activation

Shock is defined as impaired tissue perfusion and may be manifested by any of the following:

- Altered mental status
- Tachycardia
- Poor skin perfusion
- Low blood pressure

Traditional signs of shock may be absent early in the process, therefore, maintain a high index of suspicion and be vigilant for subtle signs of poor perfusion

## AMPUTATIONS

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See General Trauma Care Protocol (Pg. 6)

### **If Uncontrolled Bleeding:**

- Control with direct pressure to bleeding area or vessel
- If bleeding not controlled with direct pressure, see Tourniquet Protocol (Pg. 13)
- Proceed to Controlled Bleeding

### **If Controlled Bleeding**

- If hypotensive, treat per Traumatic Shock Protocol (Pg. 11)

### **If Complete Amputation:**

- Amputated part:
  - Wrap in moist, sterile dressing
  - Place in sealed plastic bag
  - Place bag in ice water
  - Do not freeze part
- Stump:
  - Cover with sterile dressing

### **If Partial/Near Amputation**

- Cover with moist sterile dressing
- Splint near-amputated part in anatomic position

**Monitor and transport to appropriate ER, notify ER of potential need for helicopter transfer. Treat other injuries per protocol**

Many factors enter into the decision to attempt reimplantation (age, location, condition of tissues, other options).

- A decision regarding treatment cannot be made until the patient and part have been examined by a physician—and may not be made at the primary care hospital.
- Try to help the family and patient understand this, and don't falsely elevate hopes.

### Indications

- A tourniquet may be used to control potentially fatal hemorrhage only after other means of hemorrhage control have failed.

### Precautions

- A tourniquet applied incorrectly can increase blood loss.
- Applying a tourniquet can cause nerve and tissue damage whether applied correctly or not. It is meant to stop potentially fatal hemorrhage after direct pressure and dressing have failed.
- Injury due to tourniquet is unlikely if the tourniquet is removed within 1 hour. In cases of life threatening bleeding benefit outweighs theoretical risk.
- A commercially made tourniquet is the preferred tourniquet. If none is available, a blood pressure cuff inflated to a pressure sufficient to stop bleeding is an acceptable alternative. Other improvised tourniquets are discouraged.

### Technique

- First attempt to control hemorrhage by using direct pressure over bleeding area.
- If a discrete bleeding vessel can be identified, point pressure over bleeding vessel is more effective than a large bandage and diffuse pressure.
- If unable to control hemorrhage using direct pressure, apply tourniquet according to manufacturer specifications and using the steps below:
  - Cut away any clothing so that the tourniquet will be clearly visible. NEVER obscure a tourniquet with clothing or bandages.
  - Apply tourniquet proximal to the wound and not across any joints.
  - Tighten tourniquet until bleeding stops. Applying tourniquet too loosely will only increase blood loss by inhibiting venous return.
  - Mark the time and date of application on the patient's skin next to the tourniquet.
  - Keep tourniquet on throughout hospital transport – a correctly applied tourniquet should only be removed by the receiving hospital.

See General Trauma Care Protocol (Pg. 6) and any other applicable Trauma Protocol

### **If <20 Weeks:**

- Priority is Mother
- Transport all patients with any thoracic, abdominal, pelvic injury or complaint

### **If >20 Weeks:**

- Priority is mother.
- Transport all patients.
- Assure hospital is aware of pregnancy and Estimated Gestational Age. Patients with any thoracic, abdominal, or pelvic complaint or injury may require prolonged fetal monitoring in hospital, even if asymptomatic at time of evaluation, and even for seemingly minor mechanism
- Avoid supine position:
  - Place in left lateral recumbent position if possible
  - If immobilized tilt backboard 15 to 30 degrees to the left side
- Interpret Vital Signs with caution. Pregnant patient has:
  - Increased heart rate
  - Decreased blood pressure
  - Increased blood volume
- Pregnant patients having contractions after trauma should be considered to be aborting until proven otherwise. They should be transported rapidly even if vital signs are stable in mother

### **Fundal Height:**

- Palpation of Fundal height can give a rough estimate of gestational age.
- <12 weeks generally not palpable above the pubic bone
- Fundal Height at the Umbilicus is approximately 20 weeks gestational age.
- Each increased centimeter above the umbilicus corresponds to approximately one week more of gestational age

### ABCs

#### Spinal Immobilization *before* moving patient if trauma suspected

#### Assess Mental Status

##### If Awake and Alert

- Remove Wet Garments. Dry the patient and insulate
- Transport, even if initial assessment normal
- Monitor ABC, Vital Signs, Mental Status

##### If Awake but Altered

- Remove Wet Garments, Dry the patient and insulate
- Suction as needed
- Titrate oxygen to >92%
- Transport
- Monitor ABC, Vital Signs, Mental Status

##### If Comatose or Unresponsive

- With Pulse
  - Remove wet garments, dry and insulate patient
  - Heimlich maneuver NOT indicated
  - Consider all causes of Altered Mental Status (Pg. 27)
  - Suction as needed
  - Give Oxygen, use Bag Valve Mask if necessary
  - Monitor ABC, Vital Signs, mental status
- Without Pulse
  - Start CPR, Attach AED, Treat per Universal Pulseless Arrest Protocol with the following changes:

- Drowning/submersion commonly associated with hypothermia.
- Even profound bradycardias may be sufficient in setting of severe hypothermia and decreased O<sub>2</sub> demand
- Good outcomes after even prolonged hypothermic arrest are possible
- Patients should not be pronounced dead until rewarmed in hospital,
- BLS: pulse and respirations may be very slow and difficult to detect if patient is severely hypothermic. If no definite pulse, and no signs of life, begin CPR
- If not breathing, start rescue breathing

## General Trauma Care Protocol

### Rapid transport to Trauma Center

#### Stop burning process:

- Remove clothes if not adhered to patient's skin
- Flood with water only if flames/smoldering present

#### If Respiratory Distress present

- O<sub>2</sub> NRB 15 lpm
- Manage airway and assist ventilations as indicated

Evaluate degree and body surface area involved

#### If Critical Burn\* present

- Rapid transport
- Call for ALS Ambulance

#### If No Critical Burn Present

- Remove rings, jewelry, constricting items
- Dress burns with dry sterile dressings
- Treat other injuries per protocol
- Cover patient to keep warm

Monitor ABCs, Vital Signs, mental status, SpO<sub>2</sub>, ETCO<sub>2</sub>

#### Document:

- Type and degree of burn(s)
- % BSA
- Respiratory status
- Singed nares, soot in mouth
- SpO<sub>2</sub>
- Past Medical History
- Confined space

#### \*Critical Burn:

- 2° > 30% BSA
- 3° > 10% BSA
- Respiratory injury, facial burn
- Associated injuries, electrical or deep chemical burns, underlying PMH (cardiac, Diabetes Mellitus), age < 10 or > 50 yrs
- Burns to hands or genitals may be considered critical

#### Types of Burns:

- Thermal: remove from environment, put out fire
- Chemical: brush off or dilute chemical. Consider HAZMAT
- Electrical: make sure victim is deenergized and suspect internal injuries
- Consider Carbon Monoxide if enclosed space
- Consider Cyanide if plastics, shock,

## UNIVERSAL RESPIRATORY DISTRESS

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For all patients: While assessing ABCs: give supplemental O<sub>2</sub> monitor vital signs including SpO<sub>2</sub>.

**Assess Airway, if obstructed go to Obstructed Airway Protocol. If patent proceed**

**Breathing: If ventilation not adequate for physiologic state**

- Assist ventilations with BVM and airway adjuncts as needed.
- Call 911 for ALS response.

**If ventilations adequate assess for cause**

- Anaphylaxis: Anaphylaxis/Allergic Reaction Protocol (Pg. 19)
- Asthma/COPD: Asthma or COPD Protocol (Pg. 20-21)
- CHF/Pulmonary Edema: CHF/Pulmonary Edema Protocol (Pg. 22)

**Transport**

- Provide supportive care
- Maximize ventilation, O<sub>2</sub> can be titrated to maintain minimum saturations of 92%. Over-oxygenation is harmful to lung tissue so 100% oxygen is not the goal.

### Attempt to determine cause of obstruction

#### Does patient show universal sign of choking?

- Perform Heimlich maneuver
- For visibly pregnant or obese patients perform chest thrusts only
- For infants, 5 chest thrusts, then 5 back slaps

- If obstruction is complete, patient will be mute.
- If patient can speak, obstruction is incomplete

### Assess severity of obstruction

- Unconscious Patient
  - Begin chest thrusts
  - Each time airway is opened look in mouth for Foreign Body and if found, remove it
- Severe Obstruction
  - Open airway with head tilt-chin lift or jaw thrust if craniofacial trauma is suspected
  - Attempt ventilation with BVM
  - If Unable to Clear Airway:
    - Perform Heimlich maneuver
    - For visibly pregnant or obese patients perform chest thrusts only
    - For infants, 5 chest thrusts, then 5 back slaps
  - Continue Efforts and call for EMS if unable to clear
  - If Obstruction Cleared, proceed to next step
- Mild or Partial Obstruction
  - Do not interfere with a spontaneously breathing or coughing patient
  - Position of comfort
  - Give high flow oxygen
  - Suction if needed
  - Supportive care and rapid transport
  - If patient deteriorating or develops worsening distress proceed as for complete obstruction

### If/When Obstruction Cleared

- Position of comfort or left lateral recumbent position
- O<sub>2</sub> to maintain sats >92%
- Monitor ABCs, SpO<sub>2</sub>, Vital Signs
- Suction as needed and be prepared for vomiting, which commonly occurs after obstruction relief

### Allergic Reaction, Anaphylaxis, or Angioedema

- Assess ABCs, give oxygen if O<sub>2</sub> saturation is less than 92%
- If possible, determine likely trigger
- Determine pertinent medical history medications, allergies
- Pay special attention to a history of requiring advanced airway control during anaphylaxis event, Activate ALS ambulance early.
- An early, complete SAMPLE should be obtained before the patient loses control of airway
- Classify based on symptom severity and systems involved
- Other specific protocols may apply: e.g.: obstructed airway
- Call EMS

### Airway Involvement

- Assist patient with Epi-Pen if patient has one
- Transport and Re-assess for signs of deterioration

### General or Systemic Reaction

- For Signs of:
  - Hypotension
  - Signs of poor perfusion
  - Bronchospasm, stridor
  - Altered mental status
- Assist Patient IM Epi-Pen if able
- Transport and Re-assess for signs of deterioration

### If Symptoms localized or Mild

- Transport and Re-assess for signs of deterioration
- Monitor ABCs, SpO<sub>2</sub>, Pulse
- Reassess for signs of deterioration

### Definitions:

- **Anaphylaxis:** severe allergic reaction that is rapid in onset and potentially life-threatening. Multisystem signs and symptoms are present including skin and mucus membranes
  - **Mainstay of treatment is epinephrine**
- **Angioedema:** deep mucosal edema causing swelling of mucus membranes of upper airway. May accompany hives
  - **Epinephrine indicated for any impending airway obstruction.**

### Document:

- History of allergen exposure, prior allergic reaction and severity, medications or treatments administered prior to EMS assessment
- Specific symptoms and signs presented: itching, wheezing, respiratory distress, nausea, weakness, rash, anxiety, swelling of face, lips, tongue, throat, chest tightness, etc.

## ASTHMA

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Follow Universal Respiratory Distress Protocol (Pg. 17)  
and prepare for rapid transport

**Presentation suggests asthma:** (wheezing, prolonged expiratory phase, decreased breath sounds, accessory muscle use, known hx of asthma)

- Give O<sub>2</sub>, Check Pulse Oximetry
- May assist patient with their albuterol if present
- An early, complete SAMPLE should be obtained before the patient deteriorates

If Treatment is adequate transport and continue to monitor

**If Respiratory Distress still present**

- Call for EMS and transport
- Be prepared to assist ventilations
- Reassess for pneumothorax
- Consider possible cardiac cause
- Rule out other possible causes

### Therapeutic Goals:

- Maximize oxygenation
- Decrease work of breathing
- Identify cardiac ischemia (Obtain 12 lead EKG)
- Identify complications, e.g. pneumothorax

### Consider pulmonary and non-pulmonary causes of respiratory distress including:

- pulmonary embolism
- pneumonia
- pulmonary edema
- anaphylaxis
- heart attack
- pneumothorax
- sepsis
- metabolic acidosis (e.g.: DKA)

Follow Universal Respiratory Distress Protocol (Pg. 17)  
and prepare for rapid transport

**Presentation suggests COPD:** (Hx of COPD with wheezing, prolonged expiratory phase, decreased breath sounds, accessory muscle use)

- Give oxygen, check SpO<sub>2</sub>
- May assist patient with their own albuterol inhaler
- Alert Base and Transport

### Therapeutic Goals:

- Maximize oxygenation
- Decrease work of breathing
- Identify cardiac ischemia (Obtain 12 lead EKG)
- Identify complications, e.g. pneumothorax

### Consider Alternative Causes

- Reassess for pneumothorax
- Consider cardiac cause

### Persistent Distress

- Assist ventilations with BVM as needed
- Alert Base and Transport

### Special Notes:

- Correct hypoxia: do not withhold maximum oxygen for fear of CO<sub>2</sub> retention
- Consider pulmonary and non-pulmonary causes of respiratory distress: Examples: pulmonary embolism, pneumonia, pulmonary edema, anaphylaxis, heart attack, pneumothorax, sepsis, metabolic acidosis (e.g.: DKA), Anxiety
- Patients with COPD are older and have comorbidities, including heart disease.
- Wheezing may be a presentation of pulmonary edema, “cardiac asthma”
- Common triggers for COPD exacerbations include: Infection, dysrhythmia (e.g.: atrial fibrillation), myocardial ischemia

Follow Universal Respiratory Distress Protocol (Pg 17)  
and prepare for rapid transport

### **Check Pulse Oxygen Level**

#### **If Oxygenation is adequate**

- Continue monitoring and assessment
- Call for EMS Transport
- Assess and document Lung Sounds

#### **If oxygenation/ventilations are inadequate**

- Ventilate with BVM
- Consider pneumothorax
- May Assist patient with their sublingual nitro if Blood pressure is >120/80
- Call EMS and Transport

#### Therapeutic Goals:

- Maximize oxygenation
- Decrease work of breathing
- Consider cardiac ischemia

## NON-TRAUMATIC CHEST PAIN

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### **General:**

- Consider life-threatening causes of chest pain first in all patients:
  - Acute coronary syndromes (ACS)
  - Pulmonary embolism (PE)
  - Thoracic aortic dissection (TAD)
  - Tension pneumothorax (PTX)
- Call for EMS early

### **Document specific findings:**

- Complete set of vital signs
- General appearance: skin color, diaphoresis
- Cardiovascular exam: presence of irregular heart sounds, JVD, murmur, pulse asymmetry, dependent edema
- Pulmonary exam: crackles/rales and/or wheezes/rhonchi
- Chest wall and abdominal tenderness

### **Treatment:**

- ABCs
- Reassure patient and place in position of comfort
- Place patient on cardiac monitor
- Administer oxygen – titrate to  $\text{SaO}_2 > 92\%$
- If patient  $> 34$  years old or strong concern for cardiac cause if  $< 35$  years old may assist with patient's own aspirin (4 chewable 81mg) and nitro sublingual.

### **Precautions:**

- Nitroglycerine is contraindicated in patients taking medication for erectile dysfunction (phosphodiesterase inhibitors, e.g.: Viagra, Cialis)
- Constant monitoring is essential. As many as 50% of patients with acute MI who develop ventricular fibrillation may have no warning arrhythmias

## ADULT CARDIAC ARREST GENERAL PRINCIPALS

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### **Specific Information Needed For Patient Care Report**

- Onset (witnessed or unwitnessed), preceding symptoms, bystander CPR, downtime before CPR and duration of CPR
- Past History: medications, medical history, suspicion of ingestion, trauma, environmental factors (hypothermia, inhalation, asphyxiation)
- Lack of DNR orders if elderly or infirm.
- AED should be transported with patient and can be downloaded at the hospital

### **Document Specific Objective Findings**

- Unconscious, unresponsive
- Agonal, or absent respirations
- Absent pulses
- Any signs of trauma, blood loss
- Skin temperature

### **General Guidelines: Chest Compressions**

- Push hard (2" compressions in adults) and push fast (100-120/minute)
- Ensure full chest recoil
- Rotate compressors every 2 minutes with rhythm checks (CPR Cycle)
- During CPR, any interruption in chest compressions deprives heart and brain of necessary blood flow and lessens chance of successful defibrillation
  - Continue CPR while defibrillator is charging, and resume CPR immediately after all shocks. Do not check pulses except at end of CPR cycle and AED analysis states 'no shock advised.'
  - Try to coordinate to make analyze/rhythm checks and defibrillation pauses < 10 sec.

### **General Guidelines: Defibrillation**

- In unwitnessed cardiac arrest, give first 2 minutes of CPR without interruptions for ventilation. During this time period passive oxygenation is preferred with OPA and NRB facemask.
- If arrest is witnessed, immediate defibrillation is first priority, CPR should be performed while attaching defibrillator.
- All shocks should be given as single maximum energy shocks
  - AED: Follow voice prompts and follow manufacturer's recommendations

### **General Guidelines: Ventilation during CPR**

- As per AHA guidelines, circulation takes priority over ventilation. It is reasonable for the 1<sup>st</sup> 1-2 cycles of CPR to have passive oxygenation alone rather than active bag-valve-mask respiration if CPR is initiated by a single responder with 2<sup>nd</sup> responder expected to arrive promptly.
- In patients suspected of having a primary respiratory cause of cardiopulmonary arrest, (e.g.: Drowning, COPD or status asthmaticus), adequate ventilation and oxygenation are a priority

- In general, patients with cardiac arrest initially have adequately oxygenated blood, but are in circulatory arrest. Therefore, chest compressions are initially more important than ventilation to provide perfusion to coronary arteries
- Do not interrupt chest compressions and do not hyperventilate. Give one breath every 6-8 seconds in arrested patient. Once every 5-6 seconds upon return of spontaneous circulation in non-breathing patient. Hyperventilation decreases effectiveness of CPR and worsens outcome.

### **General Guidelines: ICD/Pacemaker patients**

- If cardiac arrest patient has an implantable cardioverter defibrillator (ICD) or pacemaker place pacer/defib pads at least 1 inch from device. Biaxillary or anterior posterior pad placement may be used

### **Transport of Cardiac Arrest Patients**

- The best chance of survival for out of hospital cardiac arrest is by providing high quality, uninterrupted CPR and early defibrillation
- It is virtually impossible to perform adequate CPR during transport.
- The ski slope has unique challenges in transport requiring adaptation of traditional CPR
- In general perform 2 rounds of CPR including AED placement and shock if advised. If this does not cause ROSC, rapidly transport the patient to base and resume high-quality CPR while awaiting for EMS.

## UNIVERSAL PULSELESS ARREST

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Perform BLS According to Adult Cardiac Arrest General Principles.

- If witnessed arrest or bystander CPR in progress, apply AED immediately and shock if advised.
- If unwitnessed, unknown down time without CPR, then perform CPR for two minutes (200 compressions) prior to AED analyzing/defibrillation
- Ventilate patient in 30:2 pattern only if you have BVM or barrier device after the first 3 cycles. Otherwise do not pause for ventilations
- If EMS not available within 30 minutes of arrest and CPR has been on-going for 30 minutes without return of pulses, consider termination of resuscitation after direct phone conversation with the physician at the receiving hospital. We must document physician's name.

### See General Trauma Care Protocol (Pg. 6)

Are there obvious signs of death OR the presence of non-survivable injuries?

- Contact EMS for Field Pronouncement

Otherwise Start UNIVERSAL PULSELESS ARREST ALGORITHM (Pg. 25)

### Consider Mechanism of Injury:

- Blunt:
  - Contact EMS for Field Pronouncement
- Penetrating Trauma
  - Unwitnessed arrest – never were signs of life seen?
  - Suspected arrest time > 10 minutes and no signs of life
    - Contact EMS for Field Pronouncement
- Arrest Witnessed <10 minutes
  - Rapid transport
  - General Trauma Care
  - Initiate Basic Life Support
  - CPR with ventilations
- Treat injuries per protocol
- Complete General Trauma Care (Pg. 6)
- Rapid transport to appropriate trauma center

### Non-survivable Injuries:

- Decapitation
- 90% 3<sup>rd</sup> burns
- Evidence of massive head or thoraco-abdominal trauma

### Document:

- General impression
- Mechanism: blunt vs. penetrating
- Time and duration of arrest

## ALTERED MENTAL STATUS

### Altered Mental Status (AMS)

#### Assess ABCs

Go to pulseless arrest (Pg. 25), respiratory distress (Pg. 17) or obstructed airway algorithms (Pg. 18) as appropriate

#### If AMS is Transient:

- Determine character of event
- Consider seizure, syncope and TIA
- Monitor and transport with supportive care
- Transport
  - During transport: give supplemental oxygen, monitor vital signs, airway, and breathing.

#### If AMS is Persistent

- Assess patient with blood glucose if available
- If Diabetic or clinical condition suggests hypoglycemia?
  - Hypoglycemia Protocol (Pg. 28)
- Seizure Activity Present?
  - Seizure Protocol (Pg. 29)
- Perform rapid neurologic assessment including LOC and Cincinnati Prehospital Stroke Score (CPSS)
  - If Focal Deficit go to Stroke Protocol (Pg. 30)
- Consider other causes of AMS:
  - Head trauma, overdose, hypoxia, hypercapnea, heat/cold emergency, sepsis, & metabolic, Alcohol Intoxication
    - See Alcohol Intoxication Protocol if suspected
- During transport: give supplemental oxygen, monitor vital signs, airway, and breathing.

#### AEIOU-TIPS

- Alcohol
- Epilepsy
- Insulin
- Overdose
- Underdose/Uremia
- Trauma
- Infection
- Psychiatric
- Stroke/Shock

## HYPOGLYCEMIA

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Assist obtaining blood glucose level in ANY patient with signs or symptoms consistent with hypoglycemia if patient is a suspected diabetic and has their blood glucose monitoring equipment

- Examples: Altered MS, agitation, focal neurologic deficit, seizure, weakness, diaphoresis, decreased motor tone, pallor

### **If BGL is >70**

- May administer sugar packets (5) if hypoglycemia still most likely cause of symptoms

### **If BGL<70**

- May administer sugar tabs if patient can tolerate oral sugar
- Contact EMS if patient cannot protect their airway
- Consider EMS Transport
- Reassess patient for recovery
- May repeat oral sugar as needed if tolerated

If patient responds appropriately to oral sugar, they may refuse EMS transport. EMS should still be contacted to release the patient.

Patient should be encouraged to eat some food soon as the sugar will metabolize quickly.

### **Support ABCs:**

- Titrate provide O<sub>2</sub> between 92-99%
- Universal seizure precautions (see below)
- Consider the cause (see below)

### **Actively Seizing**

- Contact Base for 911 Ambulance Response
- Transport

### **Seizure Completed**

- Check Pulse and Reassess ABC
- Give Supplemental Oxygen
- Transport and monitor ABCs, vital signs, and neurological condition
- Consider EMS for Cardiac monitoring if recurrent seizures and/or meds given
- Complete head to toe assessment

#### **Consider the Cause of Seizure**

- Epilepsy
- Alcohol withdrawal or intoxication
- Hypoglycemia
- Stimulant use
- Trauma
- Intracranial hemorrhage
- Overdose
- Eclampsia
- Infection: Meningitis, sepsis

#### **Universal Seizure Precautions:**

- Ensure airway patency, but do not force anything between teeth. Nasal Pharyngeal Airway may be useful
- Give oxygen
- Suction as needed
- Protect patient from injury
- Check pulse immediately after seizure stops
- Keep patient on side

#### **Document:**

- Document: Seizure history: onset, time interval, previous seizures, type of seizure
- Obtain medical history: head trauma, diabetes, substance abuse, medications, compliance

### **POSSIBLE STROKE Any acute onset neurological deficit not likely due to trauma**

- Activate Immediate EMS Response
- Assess and stabilize ABCs, titrate O<sub>2</sub>
- Assess Cincinnati Prehospital Stroke Score (Presence of single sign sufficient)
- Determine when last KNOWN to be normal and document specific time: "At 2:15 PM", not "1 hour ago"

#### **Obtain medical history**

- Document medications
- Identify family or friend who may assist with history and decision-making, get contact info and strongly encourage to come to ED as they may be needed for consent for treatments

#### **Consider common stroke mimics/syndrome**

##### **Fully monitor patient and continually reassess:**

- Improvement or worsening of deficit
- Adequacy of ventilation and oxygenation
- Cardiovascular stability

Notify Base of suspected stroke and time of onset of symptoms in order to provide hospital the opportunity for Stroke Alert.

It is more important that you know the timeline of your patient's symptoms than an individual hospital's Stroke Alert criteria

#### **Cincinnati Prehospital Stroke Score**

- Think "FAST" (face, arm, speech, time)
- **Assess Facial Droop**
  - Say: "Smile for me", or "Show me your teeth"
- **Assess Arm Pronator Drift**
  - Demonstrate, and say: "Put your arms up for me like this and hold them while I count to 10"
- **Assess Speech**
  - Say: "Repeat after me: you can't teach an old dog new tricks", or "No ifs, ands, or buts"
- CPSS does not identify all strokes. See below

#### **Stroke Mimics**

- Hypoglycemia
- Post-ictal paralysis
- Complex migraine
- Overdose
- Trauma
- Bell's palsy

- **The Cincinnati Prehospital Stroke Score (CPSS)** is designed to be very reproducible and identify those strokes most likely to benefit from reperfusion therapy, but does not identify all strokes.
- The CPSS is highly specific for stroke, but is not extremely sensitive, meaning if you have a positive CPSS, you are almost certainly having a stroke, but if you do not have a positive CPSS, you still may be having a stroke
- Stroke signs may be very subtle, therefore it is important to know other signs of stroke, which include:
  - Impaired balance or coordination
  - Vision loss
  - Headache
  - Confusion or altered mental status
  - Seizure

### Clinical Alcohol Intoxication

#### Determine LOC and assess ABCs

- Obtain vital signs
- Perform head-to-toe exam
- Determine medical history, medications

#### If suspect hypoglycemia

- See Hypoglycemia protocol (Pg. 28)

#### Evidence of Incapacitating Intoxication

- Notify management and activate EMS response

#### Acute Illness or Injury

- Notify management and consider EMS response

For Mild Symptoms considering release contact crew chief and management.

#### **DEFINITIONS:**

##### **Intoxicated patient with any of the following must be transported to ED:**

- Incapacitating Intoxication
- Inability to maintain airway
- Inability to stand from seated position and walk with minimal assistance
- At immediate risk of environmental exposure or trauma due to unsafe location

##### **Acute Illness or Injury**

- Abnormal vital signs
- Physical complaints that might indicate an underlying medical emergency, e.g.: chest pain
- Seizure or hypoglycemia
- Signs of trauma or history of acute trauma
- Signs of head injury, e.g.: bruising, lacerations, abrasions

### **Patient is agitated and a danger to self or others**

- Attempt to reasonably address patient concerns
- Assemble personnel/Alert Base

Assume the patient has a medical cause of agitation and alert EMS. Have management notify law enforcement if patient may potentially be violent.

#### **General Guideline:**

- Emphasis should be placed on scene safety
- Call EMS and law enforcement early

### **Excited Delirium Syndrome**

- These patients are truly out of control and have a life-threatening medical emergency. They will have some or all of the following sx:
  - Paranoia
  - Disorientation,
  - Hyperaggression,
  - Hallucination,
  - Tachycardia,
  - Increased strength,
  - Hyperthermia
- Contact EMS and wait for them to arrive. Give patient space and allow them to move around, while considering protecting them from environment and protecting others from them.
- Attempt Verbal De-escalation
- **Your safety is the priority, and great caution must be used in attempting to re-direct the patient. It may be safer to remove threats from near the patient rather than confront the patient directly.**

#### **Excited Delirium Syndrome**

The reason for waiting for ALS in the agitated patient is due to the ensuing fight being life threatening to these patients. The key to good patient care here is to have the shortest physical altercation possible. Prolonged physical interaction can lead to irreversible cardiac arrest in these patients.

### **PPE and decontaminate when appropriate**

#### **Obtain specific information:**

- Type of ingestion(s)
- What, when and how much ingested?
- Send the poison, container, all medication and other questionable substances to the ED
- Note actions taken by bystanders or patient (e.g.: induced emesis, “antidotes”, etc)
- Supportive Care is key to overdose management

ABCs, Oxygen, Monitor, ALS Transport

#### **Airway Not Intact:**

- Consider nasal/oral airway, BVM

#### **Hypotension**

- See Hypotension/Shock Protocol (Pg. 37)

#### **Altered Mental Status**

- See Universal Altered Mental Status Protocol (Pg. 27)
- If suspected diabetic and patient has blood glucose monitor may assist with Blood Glucose Level check

#### **Inquire/Consider Specific ingestion**

- Call for 911 Transport
- Contact Poison Control at 800.222.1222 while waiting for Ambulance. Follow their directions that remain consistent with protocols and OEC Scope of practice.

### Abdominal Pain/Vomiting

- Assess ABCs
- Give oxygen
- Identify signs of shock and hypovolemia
- Consider cardiac etiology
- Identify GI bleeding
- Transport in position of comfort
- Head-to-toe assessment

#### Abdominal exam:

- Gently palpate 4 quadrants, noting areas of tenderness, guarding, rigidity or distension
- Note any pulsatile mass
- Note surgical scars

Do not rule out possible cardiac if diabetic, age > 50 and upper abdominal pain or unstable vital signs

- Contact Crew Chief, request ambulance

#### If Hypotensive:

- Hypotensive/shock protocol (Pg. 37)
- Rapid Transport

Monitor and Transport

Frequent monitoring for deterioration in status

#### History:

- Onset, location, duration, radiation of pain
- Associated sx: vomiting, Gastro Urinary sx, hematemesis, coffee ground emesis, melena, rectal bleeding, vag bleeding, known or suspected

#### Elderly Patients:

- Much more likely to have life-threatening cause of symptoms
- Always consider vascular emergencies: Abdominal Aortic Aneurysm, Myocardial Infarction
- Shock may be occult, with absent tachycardia in setting of severe hypovolemia

### Hypothermia and Frostbite

#### **Localized cold injury:** (Frostbite, frostnip)

- Remove wet garments, dry and insulate patient
- Transport, even if initial assessment normal
- Monitor ABC, Vital Signs, mental status
- Dress injured area lightly in clean cloth to protect from further injury
- Do not rub, do not break blisters
- Do not allow injured part to refreeze. Repeated thaw freeze cycles are especially harmful
- Monitor for signs of systemic hypothermia

#### **Systemic hypothermia:** (Presumed to be primary problem based on clinical scenario)

- High Flow O<sub>2</sub>
- ABCs

#### **Awake But Altered:**

- Remove wet garments, dry and insulate patient
- Suction as needed
- Assist patient to check their Blood Glucose Level
- Provide oxygen
- Transport
- Monitor ABC, Vital Signs, mental status

#### **Comatose or Unresponsive**

- Pulseless:
  - Initiate CPR/CCR, attach AED, Treat per Universal Pulseless Arrest (Pg. 24)
- Pulse Present
  - Remove wet garments, dry and insulate patient
  - Consider all causes of Altered Mental Status
  - Suction as needed
  - Check BGL and give oxygen
  - Transport
  - Monitor ABC, Vital Signs, mental status

- Shivering stops around 90 degrees core temperature.
- Fibrillation is common below 88 degrees and may not respond to defibrillation. Prolonged CPR may be necessary.
- Atrial fibrillation is also common in hypothermia while rewarming and does not require treatment.
- Bradycardias should not be treated as they are physiologic.
- Do not automatically assume altered mental status is due to hypothermia, look for other causes.

## HYPERTENSION

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### **Pregnant:**

- Go to OB/GYN Protocol (Pg. 40)

### **If patient BP not abnormally high**

- Transport in position of comfort

### **If BP High:**

- Is patient having chest pain, pulmonary edema, or stroke?
  - Treat for specific protocol
- Altered Mental Status
  - ABCs, Titrate O<sub>2</sub>
- Contact EMS for Transport

Acute stroke victims will frequently have elevated blood pressures which should not be treated in the field

## NON-TRAUMATIC SHOCK

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Non Traumatic Shock may have many different presentations, from a vague complaint of feeling unwell to cardiac arrest. Most important is early recognition and early EMS notification.

### **Early Recognition:**

- Many different presenting signs including malaise, fatigue, weakness, fever, chills, nausea and vomiting, pallor, sweats, altered mental status, syncope
- Obtain Vital Signs early
- If BP <90/60, call EMS and rapid transport
- Heart Rate will generally be rapid in setting of low BP. If HR is low, consider cardiac shock or possible overdose, see appropriate protocol.

### Interventions

- Call EMS
- Transport to base quickly
- Ensure patient is warm and dry
- Supplement oxygen to >92% if needed

## CHILDBIRTH PROTOCOL

ABCs O<sub>2</sub> 15 liters via NRB

Obtain obstetrical history (see text box)

Activate EMS . . . you may soon have multiple patients.

### If suspected imminent childbirth:

- Allow patient to remain in position of comfort
- Visualize perineum
- Determine if there is time to transport

### Delivery not imminent:

- Transport in position of comfort, preferably on left side to patient's requested hospital if time and conditions allow
- Monitor for progression to imminent delivery

**Imminent Delivery:** *Crowning or bulging of perineum present*

### Emergency Childbirth Procedure

- If there is a prolapsed umbilical cord or apparent breech presentation, go to obstetrical complications protocol (Pg. 40) and initiate immediate transport
- For otherwise uncomplicated delivery:
  - Position mother supine on flat surface, if possible
  - Do not attempt to impair or delay delivery
  - Support and control delivery of head as it emerges
  - Protect perineum with gentle hand pressure
  - Check for cord around neck, gently remove from around neck, if present
  - Suction mouth, then nose of infant as soon as head is delivered
  - If delivery not progressing, baby is "stuck", see obstetrical complications protocol (Pg. 40) and begin immediate transport
  - As shoulders emerge, gently guide head and neck downward to deliver anterior shoulder. Support and gently lift head and neck to deliver posterior shoulder
  - Rest of infant should deliver with passive participation – get a firm hold on baby
  - Keep newborn at level of mother's vagina until cord stops pulsating and is double clamped

### Overview:

- Patroller called to a possible prehospital childbirth should determine if there is enough time to transport expectant mother to hospital or if delivery is imminent
- If imminent, stay on scene and immediately prepare to assist with the delivery

### Obstetrical History:

- Number of pregnancies (gravida)
- Live births (para)
- Expected delivery date
- Length of previous labors
- Narcotic use in past 4 hours

### Critical Thinking:

- Normal pregnancy is accompanied by higher heart rates and lower blood pressures
- Shock will be manifested by signs of poor perfusion
- Labor can take 8-12 hours, but as little as 5 minutes if high PARA
- The higher the PARA, the shorter the labor is likely to be
- High risk factors include: no prenatal care, drug use, teenage pregnancy, Diabetes Mellitus, hypertension, cardiac disease, prior breech or C section, preeclampsia, twins
- Note color of amniotic fluid for meconium staining

**Postpartum Care Mother:**

- Placenta should deliver in 20-30 minutes. If delivered, collect in plastic bag and bring to hospital. Do not pull cord to facilitate placenta delivery and do not delay transport awaiting placenta delivery
- If the perineum is torn and bleeding, apply direct pressure with sanitary pads
- Postpartum hemorrhage – see obstetrical complications protocol
- Initiate transport once delivery of child is complete and mother can tolerate movement

**Postpartum Care Infant:**

- Suction mouth and nose only if signs of obstruction by secretions
- Respirations should begin within 15 seconds after stimulating reflexes. If not, begin artificial ventilations at 30-40 breaths/min
- If apneic, cyanotic or HR < 100, begin neonatal resuscitation (3:1 compression to breath)
- Dry baby and wrap in warm blanket
- Baby's warmth is important, consider placing a clean hat on its head.
- After umbilical cord stops pulsating, double clamp 6" from infant abdominal wall and cut between clamps with sterile scalpel. If no sterile cutting instrument available, lay infant on mother's abdomen and do not cut clamped cord
- Document 1 and 5 minute APGAR scores

	<b>0</b>	<b>1</b>	<b>2</b>	<b>1 Min</b>	<b>5 Min</b>
<b>Activity</b>	Absent	Arms & Legs Flexed	Active Movement		
<b>Pulse</b>	Absent	<100 BPM	>100 BPM		
<b>Grimace</b>	Flaccid	Some Flexion of Extremities	Active Motion		
<b>Appearance</b>	Blue – Pale	Body Pink, Extremities Blue	Completely Pink		
<b>Respiration</b>	Absent	Slow, Irregular	Vigorous Cry		

### **For All Patients with obstetrical complications**

- Do not delay: immediate rapid transport
- Give high-flow oxygen
- Treat signs of shock per Medical Hypotension/Shock Protocol (Pg. 37)

### **Possible actions for specific complications (below)**

- The following actions may not be feasible in every case, nor may every obstetrical complication be anticipated or effectively managed in the field. These should be considered “best advice” for rare, difficult scenarios. In every case, initiate immediate transport to definite care at hospital

### **Prolapsed Umbilical Cord**

- Discourage pushing by mother
- Position mother in trendelenberg or supine with hips elevated
- Place gloved hand in mother’s vagina and elevate the presenting fetal part off of cord until relieved by physician
- Feel for cord pulsations
- Keep exposed cord moist and warm

### **Breech Delivery**

- Never attempt to pull infant from vagina by legs
- IF legs are delivered gently elevate trunk and legs to aid delivery of head
- Head should deliver in 30 seconds. If not, reach 2 fingers into vagina to locate infant’s mouth. Press vaginal wall away from baby’s mouth to access an airway
- Apply gentle abdominal pressure to uterine fundus
- IF infant delivered see childbirth protocol – Postpartum care of infant and mother

### **Shoulder Dystocia**

- Support baby’s head
- Suction oral and nasal passages
- DO NOT pull on head
- May facilitate delivery by placing mother with buttocks just off the end of bed, flex her thighs upward and gentle open hand pressure above the pubic bone
- If infant delivered see childbirth protocol – Postpartum care of infant and mother

### **Postpartum Hemorrhage**

- Massage abdomen (uterine fundus) until firm
- Initiate rapid transport
- Note type and amount of bleeding

### **Complications of Late Pregnancy**

- **3rd Trimester Bleeding (6-8 months)**
  - High flow O<sub>2</sub> via Non-ReBreather
  - Suspect placental abruption or placenta previa
  - Initiate rapid transport
  - Position patient on left side
  - Note type and amount of bleeding
- **Eclampsia/Toxemia**
  - High flow O<sub>2</sub> via NRB, check Blood Glucose if patient's monitor is available
  - SBP > 140, DBP > 90, peripheral edema, headache, seizure
  - Transport position of comfort
  - See seizure protocol (Pg. 29)

## MEDICATIONS

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***Description is for information only, and Patrol is not expected to know the pharmacology of these medications. You are expected to know the basic indications for assisting with the medicine. You may assist the patient in taking these medications only if the patient can provide the medication themselves.***

### Description

- Albuterol is a selective  $\beta$ -2 adrenergic receptor agonist. It is a bronchodilator and positive chronotrope.
- Because of its  $\beta$  agonist properties, it causes potassium to move across cell membranes inside cells. This lowers serum potassium concentration and makes albuterol an effective temporizing treatment for unstable patients with hyperkalemia.

### Onset & Duration

- Onset: 5-15 minute after inhalation
- Duration: 3-4 hours after inhalation

### Indications

- Bronchospasm

### Contraindications

- Severe tachycardia is a relative contraindication

### Adverse Reactions

- Tachycardia
  - Palpitations
  - Dysrhythmias
- Drug Interactions
- Sympathomimetics may exacerbate adverse cardiovascular effects.
  - $\beta$ -blockers may antagonize albuterol.

### How Supplied MDI: 90 mcg/metered spray (17-g canister with 200 inhalations)

### Dosage and Administration

- Adult: Two puffs of their oral inhaler
- Children: 1-2 puffs of their oral inhaler
- Use of Spacer is always encouraged

### Protocols:

- Asthma
- COPD
- Allergy and Anaphylaxis

### Special Considerations

- May precipitate angina pectoris and dysrhythmias
- Should be used with caution in patients with suspected or known coronary disease, diabetes mellitus, hyperthyroidism, prostatic hypertrophy, or seizure disorder
- Wheezing associated with anaphylaxis should first be treated with the patient's epinephrine autoinjector.

### **Description**

- Aspirin inhibits platelet aggregation and blood clotting and is indicated for treatment of acute coronary syndrome in which platelet aggregation is a major component of the pathophysiology. It is also an analgesic and antipyretic

### **Indications**

- Suspected acute coronary syndrome.

### **Contraindications**

- Active gastrointestinal bleeding
- Aspirin allergy

### **How Supplied**

- Chewable tablets 81mg

### **Dosage and Administration**

- 324mg PO of patient's aspirin

### **Protocol**

- Chest Pain

### **Special Considerations**

- Patients with suspected acute coronary syndrome taking warfarin (Coumadin) or clopidogrel (Plavix) may still be given aspirin

## EPINEPHRINE (ADRENALINE)

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### **Description**

- Endogenous catecholamine alpha, beta-1, and beta-2 adrenergic receptor agonist. Causes dose-related increase in heart rate, myocardial contractility and oxygen demand, peripheral vasoconstriction and bronchodilation.

### **Indications**

- Anaphylaxis

### **Adverse Reactions**

- Tachycardia and tachydysrhythmia
- Hypertension
- Anxiety
- May precipitate angina pectoris

### **Dosage and Administration**

- Epinephrine Auto-Injector: REQUIRES EMS CONTACT, may assist patient with:
  - Adult: 0.3 mg IM with autoinjector (adult EpiPen)
  - Pediatric: 0.15 mg IM with autoinjector (EpiPen Jr.)

### **Protocol**

- Allergy and Anaphylaxis Protocol

### **Special Considerations**

- May increase myocardial oxygen demand and angina pectoris. Use with caution in patients with known or suspected Coronary Artery Disease.

**Description**

- Short-acting peripheral venodilator decreasing cardiac preload and afterload

**Onset & Duration**

- Onset: 1-3 min.
- Duration: 20-30 min.

**Indications**

- Pain or discomfort due to suspected Acute Coronary Syndrome
- Pulmonary edema due to congestive heart failure

**Contraindications**

- Hypotension SBP < 100
- If SBP drops more than 20 after a dose do not give repeat doses
- Recent use of erectile dysfunction (ED) medication (e.g. Viagra, Cialis)

**Adverse Reactions**

- Hypotension
- Headache
- Syncope

**Dosage and Administration**

- 0.4 mg (1/150 gr) sublingually or spray, every 5 minutes as needed up to a total of 3 doses for persistent Chest Pain.

**Protocol**

- Adult Chest Pain

## ORAL GLUCOSE (GLUTOSE, INSTA-GLUCOSE)

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### **Description**

- Glucose is the body's basic fuel and is required for cellular metabolism

### **Indications**

- Known or suspected hypoglycemia and able to take orally

### **Contraindications**

- Inability to swallow or protect airway
- Unable to take oral meds for another reason

### **Administration**

- One Full Packet

### **Protocols**

- Universal Altered Mental Status Protocol (Pg. 27)
- Hypoglycemia (Pg. 28)

## OXYGEN

### Description

- Oxygen added to the inspired air increases the amount of oxygen in the blood, and thereby increases the amount delivered to the tissue. Tissue hypoxia causes cell damage and death. Breathing, in most people, is regulated by small changes in the acid-base balance and CO<sub>2</sub> levels. It takes relatively large decreases in oxygen concentration to stimulate respiration.

### Indications

- Suspected hypoxemia or respiratory distress from any cause
- Acute chest or abdominal pain
- Hypotension/shock states from any cause
- Trauma
- Suspected carbon monoxide poisoning
- Obstetrical complications, childbirth

### Precautions

- If the patient is not breathing adequately, the treatment of choice is assisted ventilation, not just oxygen.
- When pulse oximetry is available, titrate SpO<sub>2</sub> per protocol. This may take some time.
- Do not withhold oxygen from a COPD patient out of concerns for loss of hypoxic respiratory drive. This is never a concern in the prehospital setting with short transport times

### Administration

- Minor Medical/Trauma
  - Low Flow, 1-4 LPM
- Severe Medical/Trauma
  - High Flow, 10-15 LPM

### Special Notes

- Do not use permanently mounted humidifiers. If the patient warrants humidified oxygen, use a single patient use device.
- Adequate oxygenation is assessed clinically and with the SpO<sub>2</sub> while adequate ventilation is assessed with clinically and with ETCO<sub>2</sub>.

### OXYGEN FLOW RATES

Method	Flow Rate	Oxygen Inspired Air (approx.)
Room Air		21%
Nasal Cannula	1-6LPM	24-44%
Simple Facemask	8-10LPM	40-60%
Non-rebreather Facemask	10LPM	90%
Bag-Valve Mask (BVM)	12LPM	40%
BVM with Reservoir	10-15LPM	90-100%