The logo is a shield-shaped emblem with a blue and red border. At the top, the text "UNIVERSITY OF RICHMOND" is written in blue. Below this, the word "EMS" is written in large, bold, red letters with a blue outline. On either side of "EMS" is a red ECG line. In the center of the shield is a blue Star of Life with a white caduceus in the middle. Below the Star of Life, the text "EST. 1998" is written in blue. At the bottom of the shield is a blue spider on a red web.

UNIVERSITY OF RICHMOND

EMS

**First
Responder
Healthcare
Protocols**

Richmond Ambulance Authority

Patient Care Protocols



**20 years of EMS innovation
and prehospital care**

SECTION: Contents

PROTOCOL TITLE:

REVISED: 02/ 2012

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Section 0-1

SECTION: Introduction

PROTOCOL TITLE: Acknowledgements

REVISED: 02/2012

According to the current Old Dominion EMS Alliance protocol book, ODEMSA published its first pre-hospital patient care protocols in 1993 to serve as a standard guide for over 3,000 emergency medical services providers in the 9,000 square mile region. It was a monumental task that took two years and involved nearly 500 people, including emergency physicians and nurses, hospital pharmacists, and pre-hospital providers from every certification level. For the first time, EMS providers from South Hill to Ashland and from South Boston to Hopewell had a standard set of protocols to deliver care to the sick and injured in central Virginia. These protocols set a minimum standard by which the region would treat its patients.

Since that time, the Richmond Ambulance Authority (RAA), in conjunction with Virginia Commonwealth University Medical Center, has continually worked to enhance the protocols and create the benchmark for high quality patient care internationally. Together with our medical director, Chief Executive Officer, and Chief of Clinical Services, the providers of emergency medical care in Richmond have helped bring EMS-related studies and cutting edge treatments to our citizens.

Because of the specialty protocols used by RAA patient care providers, it was deemed necessary to develop a protocol document that reflected the high standard expected by our operational medical director. During 2009-2010, members of the Clinical Services Committee completed an extensive review and revision of the protocols.

RAA gratefully acknowledges the commitment and dedication of the Clinical Services Committee in revising these guidelines. Their contribution of countless hours of work and collaboration has led to this valuable resource that assists RAA in maintaining its goal of providing world-class EMS through innovative patient care.

Special thanks should be given to the following for their extensive work on this project.

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Protocol

1-1

SECTION: Adult Cardiovascular Emergencies

PROTOCOL TITLE: BLS Pulseless Arrest

REVISED: 02/ 2012

BLS PULSELESS ARREST

- Perform initial assessment:

1. Open airway. Assess for breathing while checking for responsiveness.
2. Assess pulse at carotid artery for a minimum of 5 seconds, maximum of 10 seconds.
3. Place patient on AutoPulse or begin manual CPR for 30 seconds. Provide continuous compressions and asynchronous ventilations with 1:10 ventilation to compression ratio. Do not stop CPR, if possible, until patient improves or resuscitation efforts are stopped.
4. Insert oropharyngeal airway and give two (2) ventilations with Bag Valve Mask (1 second each). Visualize chest rise and fall, readjust airway as needed.
5. Attach AED as soon as available.

- Analyze rhythm with AED. If “SHOCK ADVISED”, follow prompts and give one (1) shock.

- If “NO SHOCK ADVISED” or shock was administered, resume CPR immediately.

- Provide two (2) minutes of CPR with 1:10 asynchronous ventilation to compression ratio.

- Insert King LTS-D Rescue Airway. Upon insertion of King LTS-D, give one (1) breath every 6-8 seconds. DO NOT interrupt continuous compressions to ventilate.

- Attach capnography to rescue airway device and record numerical value.

- After two (2) minutes of CPR, reanalyze rhythm. If “SHOCK ADVISED”, follow prompts and give one (1) shock.

- If “NO SHOCK ADVISED” or shock was administered, resume CPR immediately.

- Provide two (2) minutes of CPR with 1:10 asynchronous ventilation to compression ratio.

- Continue with analyze rhythm/ shock/ CPR sequence until ALS assistance arrives or patient begins to have spontaneous movement

- Contact Medical Control at any time for assistance.

- Transport promptly to closest appropriate facility.

POSSIBLE CAUSES OF PULSELESS ARREST

A – Acidosis, Alcohol	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Sepsis
I – Insulin	P – Psych, Porphyria, Pharmacy
O – Oxygenation, Overdose	S – Space occupying lesion, Subarachnoid hemorrhage, Stroke, Sepsis
U – Uremia	

PEARLS:

1. If airway is maintainable initially with a BVM, delay rescue airway insertion until after initial defibrillation. The best airway is an effective airway with the least potential complications.
2. Continue CPR while AED is charging.
3. Defibrillate when band of AutoPulse is constricted around patient to minimize impedance.
4. CPR should not be stopped for any reason, if at all avoidable, other than to check for rhythm post-defibrillation. Any stop of compressions should be kept as short as possible, preferably a maximum of 10 seconds. Rescue airway placement should be performed during compressions.
5. Pay close attention to rate of manual ventilation. The rate should be maintained at 10 breaths per minute. Hyperventilation should be avoided because it decreases preload, cardiac output, coronary perfusion, and cerebral blood flow.

BLS PULSELESS ARREST

Protocol 1-2

SECTION: Adult Cardiovascular Emergencies

PROTOCOL TITLE: Non-Traumatic Chest Discomfort

REVISED: 02/ 2012

NON-TRAUMATIC CHEST DISCOMFORT

OVERVIEW:

Non-traumatic chest discomfort is a common pre-hospital patient complaint. It always should be considered life-threatening until proven otherwise. The discomfort may be caused by acute myocardial infarction (AMI) or angina pectoris, which is a sign of inadequate oxygen supply to the heart muscle. Factors which increase the likelihood of heart disease include > 50 years of age, history of hypertension, diabetes mellitus, hypercholesterolemia, and strong family history of coronary artery disease.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Medications - PMH (MI, Angina, DM, HTN) - Allergies (ASA, Morphine) - Recent physical exertion - Onset - Quality (crushing, sharp, dull, constant, etc.) - Region/ Radiation/ Referred - Severity (1-10) - Time (duration/ repetition) - Viagra, Levitra, Cialis 	<ul style="list-style-type: none"> - CP (pressure, aching, and/ or tightness) - Location (sub-sternal, epigastric, arm, jaw, neck, shoulder) - Radiation of pain - Pale, diaphoresis - Shortness of breath - Nausea, vomiting, dizziness - Non-specific illness 	<ul style="list-style-type: none"> - Trauma vs. Medical - Angina vs. MI - Pericarditis - Mitral valve prolapse - Pulmonary embolism - Asthma/ COPD - Pneumothorax - Aortic dissection or aneurysm - GI reflux, hiatal hernia - Esophageal spasm - Chest wall injury or pain - Pleural pain - Musculo-skeletal pain

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** only if SpO2 is < 94%, patient is experiencing shortness of breath, or evidence of heart failure is noted during assessment. Titrate oxygen to return of normal SpO2 and respiratory effort.
- If patient has no active GI bleeding and no sensitivity to aspirin:
 1. Administer **Aspirin 324 mg PO**, regardless of patient's personal aspirin regimen. If patient self-administers aspirin, per EMS dispatch aspirin protocol immediately prior to EMS arrival, aspirin may be withheld and must be documented in report.

Protocol 1-3

SECTION: Adult Cardiovascular Emergencies

PROTOCOL TITLE: Acute Myocardial Infarction

REVISED: 02/ 2012

ACUTE MYOCARDIAL INFARCTION

OVERVIEW:

The optimal treatment for acute myocardial infarction (AMI) is rapid percutaneous coronary intervention (PCI). A key component of this would be the rapid assessment of the patient, including 12-lead ECG acquisition and transmission of all pertinent data to the appropriate hospital to allow for decreased door to cath lab time. In case of likely STEMI (manifested by 12-lead ECG changes, unstable angina, or failure to respond to treatment) care should be focused with this goal in mind.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Medications - PMH (MI, Angina, DM, HTN) - Allergies (ASA, Morphine) - Recent physical exertion - Onset - Quality (crushing, sharp, dull, constant, etc.) - Region/ Radiation/ Referred - Severity (1-10) - Time (duration/ repetition) - Viagra, Levitra, Cialis 	<ul style="list-style-type: none"> - CP (pressure, aching, and/ or tightness) - Location (sub-sternal, epigastric, arm, jaw, neck, shoulder) - Radiation of pain - Pale, diaphoresis - Shortness of breath - Nausea/ vomiting, dizziness - Non-specific illness 	<ul style="list-style-type: none"> - Trauma vs. Medical - Angina vs. MI - Pericarditis - Pulmonary embolism - Asthma/ COPD - Pneumothorax - Aortic dissection or aneurysm - GI reflux, hiatal hernia - Esophageal spasm - Chest wall injury or pain - Pleural pain

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** only if SpO2 is < 94%, patient is experiencing shortness of breath, or evidence of heart failure is noted during assessment. Titrate oxygen to return of normal SpO2 and respiratory effort.
- If patient has no active GI bleeding and no sensitivity to aspirin:
 1. Administer **Aspirin 324 mg PO**, regardless of patient's personal aspirin regimen. If patient self-administers aspirin, per EMS dispatch aspirin protocol immediately prior to EMS arrival, aspirin may be withheld and must be documented in report.
- If patient has **prescribed Nitroglycerin**, assist patient with the medication if:
 1. Systolic **BP is >100 mmHg**.
 2. Patient has not used any **erectile dysfunction medication in past 24 hours**.
 - Cialis (Tadalafil), Viagra (Sildenafil), Levitra (Vardenafil Hcl)

Protocol

1-4

SECTION: Adult Cardiovascular Emergencies

PROTOCOL TITLE: Bradycardia

REVISED: 02/ 2012

OVERVIEW:

Brady-arrhythmias can be caused by two mechanisms: depression of sinus nodal activity or conduction system blocks. In both situations, subsidiary pacemakers take over and pace the heart, provided the pacemaker is located above the bifurcation of the Bundle of His, and the rate is generally adequate to maintain cardiac output. The need for emergent treatment is guided by two considerations: evidence of hypoperfusion and the potential of the rhythm to degenerate into a more profound bradycardia or ventricular Asystole.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Past medical history- Medications- Beta Blockers- Calcium channel blockers- Clonidine- Digitalis- Pacemaker	<ul style="list-style-type: none">- Heart rate < 60 bpm- Chest pain- Respiratory distress- Hypotension or shock- Altered mental status- Syncope	<ul style="list-style-type: none">- Acute myocardial infarction- Hypoxia- Hypothermia- Sinus bradycardia- Athletes- Head injury (elevated ICP) or stroke- Spinal cord lesion- Sick sinus syndrome- AV blocks (1st, 2nd, or 3rd degree)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment. Maintain patent airway and assist breathing as needed.
- Perform focused assessment and treat symptoms

BRADYCARDIA

Protocol 1-5

SECTION: Adult Cardiovascular Emergencies

PROTOCOL TITLE: Shock - Cardiogenic

REVISED: 02/ 2012

SHOCK - CARDIOGENIC

OVERVIEW:

Shock is often defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Blood loss (vaginal or gastrointestinal) - AAA, ectopic - Fluid loss (vomiting, diarrhea) - Fever - Infection - Cardiac ischemia (MI, CHF) - Medications - Allergic Reaction - Pregnancy 	<ul style="list-style-type: none"> - Restlessness, confusion - Weakness, dizziness - Weak, rapid pulse - Pale, cool, clammy skin - Delayed capillary refill - Difficulty breathing - Hypotension - Coffee-ground emesis - Tarry stools 	<ul style="list-style-type: none"> - Shock <ul style="list-style-type: none"> Hypovolemic Cardiogenic Septic Neurogenic Anaphylactic - Ectopic pregnancy - Dysrhythmia - Pulmonary embolus - Tension pneumothorax - Medication effect, overdose - Vaso-vagal - Physiologic (pregnancy)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Place patient supine with feet elevated 10-12 inches, trendelenburg position.

<u>Hypovolemic Shock</u>	<u>Distributive Shock</u>	<u>Cardiogenic Shock</u>	<u>Obstructive Shock</u>
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

PEARLS:

1. Circulatory failure is due to inadequate cardiac function.
2. Cardiogenic shock should be considered when an MI is suspected and there is no specific indication of volume related shock.
3. Pulmonary edema/ CHF may cause cardiogenic shock.
4. Marked, symptomatic tachycardia and bradycardia will cause cardiogenic shock.

Protocol 2-1

SECTION: Adult Medical Emergencies

PROTOCOL TITLE: Medical Assessment

REVISED: 02/ 2012

MEDICAL ASSESSMENT

OVERVIEW:

The ability to perform an accurate assessment is one of the most important skills in EMS. The information gained during the assessment is used to make decisions regarding emergency interventions, such as the need for immediate airway management and ventilation; to formulate a differential field diagnosis; and to provide continued and advanced pre-hospital care enroute to a receiving facility. Since this information is used in clinical decision-making, it is important that the assessment findings are interpreted correctly and efficiently.

SCENE SURVEY:

Scene evaluation is one of the most important parts of pre-hospital EMS. Maintaining you and your crew's safety is paramount and begins from the moment of dispatch to a call. The communications center begins obtaining information with each 911 call about possible problems and circumstances the pre-hospital provider may confront. The general rule is to never compromise the rescuers to aid the victim.

Upon entering a scene, a general impression should be formed, typically prior to any physical contact with the patient. Patients are usually categorized as either medical or trauma during the scene survey and general impression. At times, a patient may be both, as one may have led to the other. Until the condition is identified or the possibility of spine injury is ruled out, manual in-line spinal stabilization

must be established and maintained.

PRIMARY ASSESSMENT:

The primary assessment is based on assessment of the patient's airway, breathing, circulation, neurologic disability, and exposure. During the primary assessment, as patient problems are identified, critical interventions are initiated. The basic steps remain the same, whether at a scene or during an inter-facility transport.

AIRWAY:

The patient's airway should be assessed to determine whether it is patent, maintainable, or not maintainable. For any patient who may have a traumatic injury, cervical spine precautions should be utilized while the airway is evaluated. Assessment of the patient's level of consciousness, in conjunction with assessment of the airway status, provides an impression of the effectiveness of the patient's current airway status. If an airway problem is identified, the appropriate intervention should be initiated. The decision to use a particular intervention depends on the nature of the patient's problem and the potential for complications during transport. The ability of patient to speak with a clear unobstructed voice is strong evidence of both airway patency and protection. However, in the patient that has lost protective airway

Summary of Scene Survey and Management

- Obtain overview and evaluate situation/ scene for potential safety hazards.
- Wear personal protective equipment (PPE) appropriate to hazards of the scene and/ or patient.
- Gain access to the patient.
- Determine the number of patients and additional resources needed.
- Provide life-sustaining care to the patient.
- Prepare and remove the patient from the incident scene.
- Prepare the patient for transport to the hospital.
- Provide the patient with treatment enroute.
- Notify the intended receiving facility in a timely manner to prepare for patient arrival.

Summary of Primary Airway Assessment

- Airway: Patent, maintainable, un-maintainable
- Level of consciousness
- Skin appearance: Ashen, pale, gray, cyanotic, or mottled
- Preferred posture to maintain airway
- Airway clearance
- Sounds of obstruction

reflexes, the assessment stops, and immediate action should be taken to establish airway patency. Supplemental oxygen, per assessment, should be given to all patients before transport. Specific equipment, such as a pulse oximeter or CO₂ detector, help provide continuous airway evaluation during transport.

BREATHING:

The assessment of ventilation begins with noting whether the patient is breathing. If the patient is apneic or in severe respiratory distress, immediate interventions are required. If the patient has any difficulty with ventilation, the problem must be identified and the appropriate intervention initiated. Emergent interventions may include manual ventilation of the patient via bag valve mask, endotracheal intubation, and/or needle thoracentesis.

Summary of Primary Breathing Assessment

- Rate and depth of respirations
- Cyanosis
- Position of the trachea
- Presence of obvious injury or deformity
- Work of breathing
- Use of accessory muscles
- Flaring of nostrils
- Presence of bilateral breath sounds
- Presence of adventitious breath sounds
- Asymmetric chest movements
- Palpation of crepitus
- Integrity of chest wall
- Oxygen saturation measured with pulse oximetry

CIRCULATION:

Palpation of both the peripheral and the central pulse provides information about the patient's circulatory status. The quality, location, and rate of the patient's pulses should be noted along with the temperature of the patient's skin being assessed while obtaining the pulses. Observation of the patient's level of consciousness may also help evaluate the patient's perfusion status initially.

Active bleeding should be quickly controlled with direct pressure and/ or tourniquet per assessment. The patient should also be observed for indications of circulatory compromise. Skin color and temperature, diaphoresis, and

capillary refill are all indicators of circulatory compromise during an assessment.

Intravenous access should be obtained for administration of fluid, blood, or medications per assessment. Depending on the patient's location and the accessibility veins, peripheral, central, or intraosseous access may be used as necessary. Regardless of type of access, fluid resuscitation must always be guided by the patient's response.

Summary of Primary Circulation Assessment

- Pulse rate and quality
- Skin appearance: Color
- Peripheral pulses
- Skin temperature
- Level of consciousness
- Urinary output
- Blood Pressure
- Cardiac monitor

DISABILITY:

The basic, primary neurological assessment includes assessment of the level of consciousness; the size, shape, and response of the pupils; and motor sensory function. The simple method of AVPU should be used to evaluate the patient's overall level of consciousness.

The Glasgow Coma Scale (GCS) provides assessment of the patient's level of consciousness and motor function and may serve as a predictor of morbidity and mortality after brain injury.

If the patient has an altered mental status, it must be determined whether the patient has ingested any toxic substances, such as alcohol or other drugs, or may be hypoxic because of illness or injury. A patient with an altered mental status may pose a safety problem during transport. Use of chemical sedation or physical restraint may be necessary to ensure safe transport of the patient and EMS providers.

EXPOSURE:

As much of the patient's body as possible should be exposed for examination, depending on complaint, with the effects of the environment on the patient kept in mind. Discovery of hidden problems before the patient is loaded for transport may allow time to intervene and avoid disastrous complications. Although exposure for examination is emphasized most frequently in care of the trauma patient, it is equally important in the primary assessment of the patient with a medical illness.

The pre-hospital provider should always look under dressings or clothing, which may hide complications or potential problems. Clothing may hide bleeding that occurs as a result of thrombolytic therapy or rashes that may indicate potentially contagious conditions. In inter-facility transport, intravenous access can be wrongly assumed underneath a bulky cover. Once patient assessment has been completed, keep in mind that the patient must be kept warm. Hypothermia can cause cardiac arrhythmias, increased stress response, and hypoxia.

Summary of Primary Disability (Neurological) Assessment		
A - Alert		
V - Responds to verbal stimuli		
P - Responds to painful stimuli		
U - Unresponsive		
Glasgow Coma Scale (GCS)		
Eye Opening:	Spontaneous	4
	To voice	3
	To pain	2
	No response	1
Verbal Response:	Oriented	5
	Confused	4
	Inappropriate words	3
	Incomprehensible	2
	No response	1
Motor Response:	Obeys commands	6
	Localizes (pain)	5
	Withdraws (pain)	4
	Flexion (pain)	3
	Extension (pain)	2
	No response	1

Summary of Primary Exposure Assessment
- Identification of injury, active bleeding, or indication of a serious illness.

SECONDARY FOCUSED ASSESSMENT:

The secondary assessment is performed after the primary assessment is completed and involves evaluation of the patient from head to toe. Illness specific information is collected by means of inspection, palpation, and auscultation during the secondary assessment. Whether the patient has had an injury or is critically ill, the pre-hospital provider should observe, and listen to the patient.

The secondary assessment begins with an evaluation of the patient's general appearance. The pre-hospital provider should observe the surrounding environment and evaluate it's effects on the patient. Is the patient aware of the environment? Is there appropriate interaction between the patient and the environment?

Determination of the amount of pain the patient has as a result of illness or injury is also an important component of the patient assessment. Baseline information should be obtained about the pain the patient has so that the effectiveness of interventions can be assessed during transport. Pain relief is one of the most important interventions for pre-hospital patient care providers.

Assessment Acronyms

S.A.M.P.L.E.	O.P.Q.R.S.T.
S - Signs and Symptoms	O - Onset (When did the problem/ pain begin?)
A - Allergies	P - Provocation (What makes the problem/ pain worse?)
M - Medications	Q - Quality (Can you describe the problem/ pain?)
P - Pertinent past medical history	R - Radiation (Does the pain move anywhere?)
L - Last oral intake	S - Severity (On a scale of 1-10, how bad is the pain?)
E - Events leading up to the event	T - Time (Does the condition come and go? Duration?)

Summary of Secondary Assessment

<p>Skin:</p> <ul style="list-style-type: none"> - Presence of petechia, purpura, abrasions, bruises, scars, or birthmarks - Rashes - Abnormal skin turgor - Signs of abuse or neglect <p>Head and Neck:</p> <ul style="list-style-type: none"> - Presence of lacerations, contusions, raccoon eyes, Battle's sign, or drainage from the nose, mouth, and ears - Gross visual examination - Abnormal extra-ocular movements - Position of the trachea - Neck veins - Swallowing difficulties - Presence of lymphadenopathy or neck masses <p>Ears, Nose, and Throat:</p> <ul style="list-style-type: none"> - Lack of tearing - Sunken eyes - Color of the sclera <p>Mouth and Throat:</p> <ul style="list-style-type: none"> - Mucous membranes - Breath odor - Injuries to teeth 	<p>Thorax, Lungs, and Cardiovascular System:</p> <ul style="list-style-type: none"> - Breath sounds - Heart Sounds <p>Abdomen:</p> <ul style="list-style-type: none"> - Shape and size - Bowel sounds - Tenderness - Firmness - Masses (i.e. suprapubic masses) - Femoral pulses - Pelvic tenderness - Color of drainage from naso-gastric or oro-gastric tubes <p>Genitourinary:</p> <ul style="list-style-type: none"> -Rectal bleeding <p>Extremities and Back:</p> <ul style="list-style-type: none"> - Gross motor and sensory function - Peripheral pulses - Lack of use of an extremity - Deformity, angulation - Wounds, abrasions - Vertebral column, flank, buttocks - Equipment is appropriately applied (i.e. traction splints, extremity splints, cervical collar)
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Protocol 2-2

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Abdominal Pain

REVISED: 02/ 2012

ABDOMINAL PAIN

OVERVIEW:

Abdominal pain is one of the most common presenting complaints in emergency medicine. In up to 42% of patients, the etiology remains obscure. Recalling the differences between generalized types of pain can be helpful diagnostically. Visceral abdominal pain results from stretching of the autonomic nerve fibers. The pain may be described as cramp like, colicky, or gaseous and is often intermittent. Obstruction is often the cause. Somatic pain occurs when pain fibers located in the parietal peritoneum are irritated by chemical or bacterial inflammation. The pain is described as sharp, more constant, and more precisely located. Referred pain is any pain felt at a distance from a diseased organ. Referred pain generally follows certain classic patterns, for example, diaphragmatic irritation often radiates to the supra-clavicular area.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Past medical, surgical history - Medications - Time of onset - Palliation, provocation - Quality (crampy, constant, sharp, dull, etc) - Region, radiation, referred - Severity (1-10) - Duration, repetition - Fever - Last meal - Last bowel movement, consistency - Menstrual history, pregnancy 	<ul style="list-style-type: none"> - Pain (location, migration) - Distension, rigidity - Unequal, absent femoral pulses - Diaphoresis - Orthostatic changes - Tenderness - Nausea, vomiting, diarrhea - Constipation - Vaginal bleeding, discharge - Pregnancy - Associated symptoms (helpful to localize source) Fever, headache, weakness, malaise, myalgias, cough, mental status changes, rash 	<ul style="list-style-type: none"> - Pneumonia, CHF - Pulmonary embolus - Liver (hepatitis) - Gallbladder - Myocardial infarction - Pancreatitis - Kidney stone - Abdominal aneurysm - Appendicitis - Pelvic (PID, ectopic pregnancy, ovarian cyst) - Spleen enlargement - Bowel obstruction

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Assess abdomen for pulsating masses.
- Use distraction (through conversation, etc) and breathing techniques to help patient alleviate pain.
- If shock is present, without pulsating masses, refer to *Hypovolemic Shock (Non-Cardiac) Patient Care Protocol*.

PEARLS:

1. Abdominal pain may be the first sign of an impending rupture of the appendix, liver, spleen, ectopic pregnancy, or aneurysm. Monitor for signs of hypovolemic shock.
2. If a pulsating mass is felt, suspect an abdominal aneurysm and discontinue palpation.
3. Abdominal pain in women of childbearing age should be treated as an ectopic pregnancy until proven otherwise.
4. Appendicitis presents with vague, periumbilical pain that migrates to the RLQ over time.
5. Kidney stones present with flank pain that migrates to the lower quadrants.
6. Ask the patient to point to the pain. The farther from the umbilicus the patient points, the more likely the pain is to be organic in origin.
7. Simple pain management techniques include oxygen administration, splinting, speaking in a calm, reassuring voice, and placing the patient in his position of comfort.

Protocol 2-3

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Allergic Reaction / Anaphylaxis

REVISED: 02/ 2012

ALLERGIC REACTION / ANAPHYLAXIS

OVERVIEW:

Allergic reactions and anaphylaxis are serious and potentially life-threatening medical emergencies. It is the body's adverse reaction to a foreign protein, i.e. food medicine, pollen, insect sting or any ingested, inhaled, or injected substance. Patients with allergic reactions frequently have local or generalized swelling while anaphylaxis can be characterized by wheezing, airway compromise, and/or systolic BP <90 mmHg. The most common symptoms are urticaria and angioedema, occurring in approximately 88% of patients. The next most common manifestations are respiratory symptoms, such as upper airway edema, dyspnea, and wheezing. Cardiovascular symptoms of dizziness, syncope, and hypotension are less common, but it is important to remember that cardiovascular collapse may occur abruptly, without the prior development of skin or respiratory symptoms.

Constant monitoring of the patient's airway and breathing is mandatory.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Onset and location - Insect sting or bite - Food allergy/ exposure - New clothing, soap, detergent - Past history of reactions - Medication history 	<ul style="list-style-type: none"> - Itching or hives - Coughing, wheezing, or respiratory distress - Chest or throat constriction - Difficulty swallowing - Hypotension or shock - Edema 	<ul style="list-style-type: none"> - Urticaria (rash only) - Anaphylaxis (systemic effect) - Shock (vascular effect) - Angioedema (drug induced) - Aspiration/ airway obstruction - Vaso-vagal event - Asthma or COPD - Congestive heart failure

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Evaluate severity of patient's reaction. If patient's reaction is severe, administer **0.3mg Epi-Pen Auto-Injector** or, if the patient has a prescribed **Epinephrine Auto Injector**, assist patient with the medication.
- If patient is wheezing and has prescribed **metered dose inhaler**, provider may assist patient in self-administration.

PEARLS:

1. A thorough assessment and a high index of suspicion are required for all potential allergic reaction patients.
2. Individuals with asthma, atopic dermatitis (eczema), prior anaphylactic history, and those who delay treatment are at greater risk for a fatal reaction.
3. It is strongly recommended that all patients receiving anti-cholinergic medications should be transported for observation following treatment for return of symptoms.
4. Gastrointestinal symptoms occur most commonly in food-induced anaphylaxis, but can occur with other causes. Oral pruritus is often the first symptom observed in patients experiencing food-induced anaphylaxis. Abdominal cramping is also common, but nausea, vomiting, and diarrhea are frequently observed as well.
5. Contrary to common belief that all cases of anaphylaxis present with cutaneous manifestations, such as hives or mucocutaneous swelling, up to 20% of anaphylactic episodes may not involve these signs and symptoms on initial presentation. Moreover, up to 80% of fatal reactions to food-induced anaphylaxis in children were not associated with cutaneous manifestations.

Protocol 2-4

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Behavioral Emergencies

REVISED: 02/ 2012

BEHAVIORAL EMERGENCIES

OVERVIEW:

Psychiatric patients may have an illness that presents with symptoms such as delusions, hallucinations, depression, or significant trauma. The patient's symptoms demand immediate response as they may appear intense, raise the anxiety levels of those around the patient to an intolerable level, or create problems in the immediate environment. The patient may perceive their life to be at immediate risk, either from suicide or their current inability to make logical decisions. Remember that **personal safety takes priority over patient intervention**. Patient care should be focused with preventing/ mitigating hyperthermia, agitated delirium, positional asphyxia, hypoxia, and physical harm.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Situational crisis - Psychiatric illness/ medications - Injury to self or threats to others - Plan - History of suicide attempts - Substance abuse/ overdose - Diabetes 	<ul style="list-style-type: none"> - Anxiety, agitation, and/ or confusion - Affect change - Auditory and/ or visual hallucinations - Delusional thoughts, bizarre behavior - Combative and/ or violent - Expression of suicidal/ homicidal thoughts 	<ul style="list-style-type: none"> - See <i>Unconscious/ Syncope/ AMS Patient Care Protocol</i> - Diabetic - Hypoxia - Stroke - Brain trauma - Alcohol intoxication - Toxin/ substance abuse - Medication effect/ overdose - Withdrawal Syndromes - Depression - Bipolar (manic-depressive), schizophrenia, anxiety disorders

EMT-BASIC

- Maintain safe position and distance from patient allowing for escape and/or evasion at all times. Do not "invade" the patient's personal space. Call for police response when dealing with continued hostility.
- Attempt verbal intervention to calm and reassure the patient and offer help.
- Be alert to warning signs of impending outbursts of violence:
 - a. Tense posture
 - b. Loud or threatening speech by patient
 - c. Increasing or hyper-motor muscular activity
 - d. Aggressive "body language"
 - e. The provider's own intuition
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- If patient is deemed to be violent or uncooperative ask for Police Assistance do not attempt to restrain the patient
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain blood glucose sample.
- If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. Do not leave patient alone once patient contact has been made unless your safety has been compromised. Your safety is the primary concern. If necessary, leave equipment on scene.
2. Every suicide act, gesture, or verbal threat must be taken seriously. In the Commonwealth of Virginia, patients are unable to refuse care under these circumstances and shall be placed in emergency custody as needed with police assistance, VA Code 37.2-808.
3. Always search, or have police search, patient for weapons or items that could be used as weapons prior to placing patient in ambulance. Pt belongings that are confiscated should be transported in the front of the ambulance or an outside compartment for safety and given to hospital staff on arrival.
4. If a patient must be transported using handcuffs or police flexible wrist restraints, a police officer **must** ride in the ambulance with the patient to the receiving hospital, no exceptions.

Protocol 2-5

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Hyperglycemia

REVISED: 02/ 2012

HYPERGLYCEMIA

OVERVIEW:

Symptomatic hyperglycemia is defined as a blood glucose level >300 mg/dl with signs of severe dehydration, altered mental status, and/ or shock. Hyperglycemia is usually the result of an inadequate supply of insulin to meet the body's needs. The body will attempt to excrete the excess sugar into the urine causing osmotic diuresis. Ketone and acid production begins as the body uses other sources of fuel for metabolism. Hyperglycemic emergencies in patients with diabetes can generally be broken into two categories: Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycemic State (HHS), also known as Hyperosmolar Hyperglycemic Non-ketotic Coma (HHNC). Most pre-hospital care should be focused around the treatment of severe dehydration and support of vital functions.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - History of diabetes - Onset of symptoms - Medications 	<ul style="list-style-type: none"> - Anxiety, agitation, and/ or confusion - Dry, red, and/ or warm skin - Acetone (fruity) smell on breath - Kussmaul respirations - Dry mouth, intensive thirst - Abnormal/ hostile behavior - Tachycardia - Dizziness/ headache 	<ul style="list-style-type: none"> - See <i>Unconscious/ Syncope/ AMS Patient Care Protocol</i> - Hypoxia - Stroke - Brain trauma - Alcohol intoxication - Toxin/ substance abuse - Medication effect/ overdose

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Consider other possible causes of altered mental status and/ or unconsciousness.
- Obtain blood glucose sample.
- If glucose is <60 mg/ dl, refer to *Hypoglycemia Patient Care Protocol*. words, or inability to speak

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

PEARLS:

1. Use aseptic techniques to draw blood from finger.
2. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on or fan site to dry faster.
3. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results.
4. On RAA's current glucometer, Ascensia Contour, a reading of "HI" on the monitor is >600 mg/dl and should be documented as such in EPCR.
5. It is estimated that 2-8% of all hospital admissions are for the treatment of DKA, while mortality for DKA is between 2-10%. Published mortality rates for HHS vary, but the trend is that the older the patient and higher the osmolarity, the greater the risk of death.

Protocol 2-6

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Hypoglycemia

REVISED: 02/ 2012

OVERVIEW:

Symptomatic hypoglycemia is defined as a blood glucose level <60 mg/dl with signs of altered mental status and/ or unconsciousness. The many signs and symptoms that are associated with hypoglycemia can be divided into two broad categories: adrenergic and neurologic. Adrenergic stimulation due to the increased epinephrine levels and neurologic due to central nervous system dysfunction from the decreased glucose levels.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- History of diabetes- Onset of symptoms- Medications- Fever or recent infection- Alcohol consumption- Last meal	<ul style="list-style-type: none">- Anxiety, agitation, and/ or confusion- Cool, clammy skin- Diaphoresis- Seizure- Decreased visual acuity, blindness- Abnormal/ hostile behavior- Tachycardia- Hypertension- Dizziness, headache, weakness	<ul style="list-style-type: none">- See <i>Unconscious/ Syncope/ AMS Patient Care Protocol</i>- Hypoxia- Seizure- Stroke- Brain trauma- Alcohol intoxication- Toxin/ substance abuse- Medication effect/ overdose

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Consider other possible causes of altered mental status and/ or unconsciousness.
- Obtain blood glucose sample.
- If glucose is >300 mg/ dl, refer to *Hyperglycemia Patient Care Protocol*.
- If glucose is <60 mg/dl **and** patient is alert, able to maintain airway, and follow commands, administer **Oral Glucose 15 gm** (1 tube). Oral glucose may be repeated as needed, max dose of 45 gm (3 tubes).
- If the patient can hold a cup or plate without assistance and can swallow on command, encourage the patient to consume simple and complex carbohydrates. Attempt to document volume of food/ liquid ingested. If grams of sugar are known, document as well

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

PEARLS:

1. Use aseptic techniques to draw blood from finger.
2. Blood glucose levels should be taken from extremity opposite IV and medication administration for most accurate reading.
3. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on or fan site to dry faster.
4. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results.
5. On RAA's current glucometer, Ascensia! Contour, a reading of "LOW" on the monitor is <10 mg/dl and should be documented as such in EPCR.
6. When administering IV fluids, a minimum amount should be delivered as large amounts may lower blood glucose level and impede original goal of administering Dextrose.
7. Patients who are consuming aspirin, acetaminophen, anti-psychotic drugs, beta-blockers, oral diabetic medications, or antibiotics such as sulfa-based, tetracycline, and amoxicillin that experience a hypoglycemic episode are at a greater risk for relapse. These patients should have a responsible party with them after release if patient is treated without transport.
8. An inadequate amount of glucose for heat production, combined with profound diaphoresis, may place a hypoglycemic patient at greater risk for hypothermia. Keep patient warm as needed.
9. Glucagon causes a breakdown of stored glycogen to glucose. Glucagon may not work if glycogen stores are previously depleted due to liver dysfunction, alcoholism, or malnutrition.
10. Any patient that has been administered Glucagon should be transported for further evaluation.
11. Effects of Glucagon may take up to 30 minutes.
12. Any patient that has had a hypoglycemic episode without a clear reason should be transported for further evaluation.

Protocol 2-7

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Malignant Hyperthermia

REVISED: 02/ 2012

MALIGNANT HYPERTHERMIA

OVERVIEW:

The body temperature is contingent upon the balance between heat production and heat loss. Regulation of body temperature is dependent upon the principals of conduction, convection, and evaporation. Populations at a greater risk for hyperthermic emergencies include the elderly, the poor (who lack adequate air conditioning), those who suffer from malnutrition, and those who have chronic illnesses or substance addiction. Predisposing factors commonly intervene over days rather than minutes or hours. Hyperthermia may occur in the presence of numerous host factors. These factors include many that affect thermoregulation through heat loss mechanisms (lack of acclimatization, fatigue, lack of sleep, dehydration, and skin disorders), while others contribute to heat production (obesity, lack of physical fitness, febrile illness, or sustained exercise). Changes in cognitive function appear to occur before the development of the physical symptoms associated with heat stress. Time distortion, memory impairment, or deterioration in attention are frequent cognitive characteristics associated with heat stress.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Past medical history - Medications - Exposure to increased temperatures, humidity - Extremes of age - Extreme exertion - Time, length of exposure - Poor PO intake - Fatigue, muscle cramping 	<ul style="list-style-type: none"> - Altered mental status - Unconsciousness - Hot, dry, or sweaty skin - Pale, clammy skin - Hypotension, shock - Seizures - Nausea - Weakness, dizziness, syncope - Rapid, shallow respirations 	<ul style="list-style-type: none"> - Fever - Dehydration - Medications - Hyperthyroidism (storm) - Delirium tremens (DT's) - Heat cramps - Heat exhaustion - Heat stroke - CNS lesions, tumors

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain temperature and monitor during treatment.
- Begin cooling as indicated by patient assessment.
 - Remove excess and constrictive clothing.
 - Provide air conditioning or manual fanning, if possible.
 - Ice packs may be used to assist cooling by applying to the axillae, neck, and groin.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- If possible overdose is suspected, refer to appropriate *Toxicological Patient Care Protocol*.

PEARLS

1. Extremes of age, young and old, are more susceptible to extreme temperatures.
2. Cocaine, amphetamines, and salicylates may elevate body temperature.
3. Sweating generally stops as core temperature rises above 104° F.
4. Intense shivering may occur as patient is cooled.

Protocol 2-8

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Hypothermia

REVISED: 02/ 2012

HYPOTHERMIA

OVERVIEW:

Hypothermia is defined as a core temperature less than 35° Celsius/ 95° Fahrenheit. While most commonly seen in cold climates, it may develop without exposure to extreme environmental conditions. Hypothermia is not uncommon in temperate regions and may develop indoors even during summer. Hypothermia should be considered in any patient with an altered level of consciousness in a cool and/or wet environment. Individuals at the extremes of age and those of altered mental status are more susceptible to developing hypothermia. Vasoconstriction and bradycardia may cause extreme difficulty while attempting to palpate a pulse. Radiation accounts for the greatest form of heat loss (55-65%). Conduction normally accounts for only 2-3%, but increases up to five times in wet clothes and twenty five times in cold water. In patients that are hypothermic, the complete absence of a pulse should be confirmed for 60 seconds before initiating chest compressions.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Past medical history- Medications- Exposure to environment even in normal temperatures- Exposure to extreme cold- Extremes of age- Drug use: alcohol, barbiturates- Infection, sepsis- Length of exposure, wetness	<ul style="list-style-type: none">- Cold, clammy- Shivering- Mental status changes- Extremity pain, sensory abnormality- Bradycardia- Hypotension, shock	<ul style="list-style-type: none">- Sepsis- Environmental exposure- Hypoglycemia- CNS dysfunction<ul style="list-style-type: none">StrokeHead injurySpinal cord injury

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Remove all wet patient clothing.
- Begin re-warming, if indicated, and prevent further heat loss.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

Stages of Hypothermia

Normal Cold Response (35° C – 37° C / 95.1° F – 98.6° F)

- Feeling of cold
- Shivering
- Vasoconstriction

Mild Hypothermia (34° C – 35° C / 93° F – 95° F)

- Maximum shivering at 35° C / 95° F
- Cold, pale skin (vasoconstriction)
- Pulse and BP are normal or elevated
- Increasing rate of respirations
- Mild confusion
- Slurred speech
- Unsteady gait
- Amnesia

Moderate Hypothermia (30° C – 34° C / 86° F – 93° F)

- No longer shivering
- Bradycardia
- Decreased respirations
- Increased risk of cardiac arrhythmia (A-Fib)
- Intense vasoconstriction – surface pooling (promotes afterdrop)
- Decreased LOC
- Increased mortality in major trauma by 40-50%

Severe Hypothermia (<30° C / <86° F)

- Intense vasoconstriction – surface pooling (promotes afterdrop)
- Lethal cardiac dysrhythmias (V-Fib)
- Non-cardiac pulmonary edema
- As core temp continues to decrease, risk of cardiac arrest increases dramatically

PEARLS:

1. NO PATIENT IS DEAD UNTIL THEY'RE WARM AND DEAD, unless patient presents with injuries incompatible with life.
2. Extremes of age, young and old, are more susceptible to effects of temperature.
3. With temperature less than 31° C / 88° F, ventricular fibrillation is a common cause of death. Patient with extreme hypothermia MUST be handled gently.
4. Cardiac arrest patients should be warmed to a core temperature of at least 29.5° C / 85° F before administering medications, as they may build in the system due to metabolism being ineffective.
5. Defibrillation should be limited to one (1) shock prior to warming core to >29.5° C / 85° F.
6. If the temperature is unable to be measured, treat based on the suspected temperature.
7. Hypothermia may cause severe bradycardia.
8. Shivering ceases when core temperature is below 32° C / 90° F.
9. Hot packs can be activated and placed in the armpit and groin areas, if available.
10. If patient is found with wet clothes, patient should be exposed prior to application of blankets.
11. Hypothermic patients also exhibit “cold diuresis.” Peripheral vasoconstriction initially causes central hypervolemia to which the kidneys respond by excreting large amounts of dilute urine causing dehydration. Alcohol and water immersion increase this process.

ued

HYPOTHERMIA

Protocol 2-9

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Nausea/Vomiting

REVISED: 02/ 2012

NAUSEA / VOMITING

OVERVIEW:

The pre-hospital provider should be very careful to insure that patients who present with vague complaints such as nausea and vomiting are given due regard. The patient's symptoms and recent history must determine the most appropriate care. Frequently, treatment of an underlying cause and limiting movement may resolve or greatly reduce these complaints. However, persistent nausea and vomiting of unknown etiology may respond well to pharmaceutical therapy. Female patients, most importantly, do not necessarily have classic symptoms of MI, in this situation symptoms may only be nausea or vomiting. All patient's presenting with nausea and vomiting should be screened for potential life-threats initially. Anti-emetic treatment should occur only as a secondary priority.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Time of last meal - Last bowel movement, emesis - Improvement, worsening with food or activity - Duration of signs and symptoms - Other sick contacts - Past medical, surgical history - Medications - Menstrual history (pregnancy) - Travel history - Recent trauma 	<ul style="list-style-type: none"> - Pain - Character of pain (constant, intermittent, sharp, dull, etc) - Distention - Constipation - Diarrhea - Anorexia - Radiation - Associated symptoms (helpful to localize source) - Fever, headache, blurred vision, weakness, malaise, myalgias, cough, dysuria, mental status changes, rash 	<ul style="list-style-type: none"> - CNS (increased pressure, headache, stroke, lesions, trauma, hemorrhage, vestibular) - Myocardial infarction - Drugs (NSAID's, antibiotics, narcotics, chemotherapy) - GI or renal disorders - Gynecological disease (ovarian cyst, PID) - Infections (pneumonia, influenza) - Electrolyte abnormalities - Food or toxin induced - Medications, substance abuse - Pregnancy - Psychologic

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.

PEARLS:

1. Nausea and vomiting has many subtle, sometimes life threatening causes. Do not minimize it's importance as a symptom.
2. Atypical CVAs and vertebrobasilar artery compromise may present as benign vertigo or labyrinthitis. Therefore, it is recommended that all cases of vertigo should be transported for physician evaluation whenever possible.
3. For nausea and vomiting associated with dehydration, fluid replenishment may be sufficient in improving patient comfort and reduce the need for medication administration.
4. Ensuring a complete differential diagnosis will identify life-threats and concerns that should receive priority over anti-emetic treatment.
5. In cases of toxic ingestion, including alcohol, poisons, and drug overdoses, vomiting is an internal protective mechanism and should not be prevented with pharmacological therapy in the pre-hospital environment. Care should be given to prevent aspiration.

Protocol 2-10

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Pain Management

REVISED: 02/ 2012

PAIN MANAGEMENT

OVERVIEW:

The practice of pre-hospital emergency medicine requires expertise in a wide variety of pharmacological and non-pharmacological techniques to treat acute pain resulting from a myriad of injuries and illness. One of the most essential missions for all healthcare providers should be the relief and/ or prevention of pain and suffering. Approaches to pain relief must be designed to be safe and effective in the organized chaos of the pre-hospital environment. The degree of pain and the hemodynamic status of the patient will determine the rapidity of care.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Location - Duration - Severity (1-10) - Past medical history - Medications - Drug allergies 	<ul style="list-style-type: none"> - Severity (pain scale) - Quality (sharp, dull, etc) - Radiation - Relation to movement, respiration - Increased with palpation of area 	<ul style="list-style-type: none"> - Per the specific protocol Musculoskeletal Visceral (abdominal) Cardiac Pleural, respiratory Neurogenic Renal (colic)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Make patient as comfortable as possible.

Universal Pain Assessment Tool

Verbal Descriptor Scale						
	No pain	Mild pain	Moderate pain	Severe pain	Very severe pain	Excruciating Pain
Scale						
	Alert Smiling	No humor Serious, flat	Furrowed brow Pursed lips Breath holding	Wrinkled nose Raised upper lip Rapid breathing	Slow blink Open mouth	Eyes closed Moaning Crying
Activity Tolerance Scale	No pain	Can be ignored	Interferes with tasks	Interferes with concentration	Interferes with basic needs	Bed rest required
Spanish	Nada de dolor	Unpoquito dedolor	Un dolor leve	Dolor fuerte	Dolor demasiado fuerte	Un dolor insoportable

PEARLS:

1. Pain severity (0-10) is a vital sign that should be recorded before and after IV or IM medication administration and upon arrival at destination.
2. Contraindications to Morphine administration include hypotension, head injury, respiratory depression, and severe COPD.
3. All patients should have drug allergies ascertained prior to administration of pain medication.
4. Patient's receiving narcotic analgesics should be administered oxygen.
5. Narcotic analgesia was historically contraindicated in the pre-hospital setting for abdominal pain of unknown etiology. It was thought that analgesia would hinder the ER physician or surgeon's evaluation. It has now become widely accepted that severe pain actually confounds physical assessment of the abdomen and that narcotic analgesia rarely diminishes all of the pain related to the abdominal pathology. The goal in this instance is to reduce, not eliminate the discomfort to allow for a proper exam.

Protocol 2-11

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Respiratory Distress

REVISED: 02/ 2012

RESPIRATORY DISTRESS

OVERVIEW:

Respiratory distress or dyspnea is one of the most common medical complaints witnessed in pre-hospital medicine. Most patients describe it as a sensation of shortness of breath or a feeling of “air hunger” accompanied by labored breathing. Dyspnea may be caused by pulmonary or cardiac disease or by any mechanism that causes hypoxia. It may be mild, manifesting only on exertion, or severe, occurring at rest. The most common causes of non-cardiac dyspnea in the pre-hospital environment involve asthma, chronic obstructive pulmonary disease (COPD), pneumonia, and bronchitis. The wheezing patient may present in different ways, some may not even complain of wheezing, but rather just with shortness of breath, cough, or chest tightness. Wheezing patients are often apprehensive and distressed and, at times, so severe that they may not be able to speak in complete sentences. Oxygenation may be compromised to the point that there is a decrease in the patient’s level of consciousness. These signs are clues that the patient needs immediate and aggressive therapy. Treatment is aimed at restoring the patient’s pCO₂ to a normal state. Remember, **all that wheezes, may not be asthma.**

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Asthma, COPD, chronic bronchitis, emphysema, congestive heart failure - Home treatment (oxygen, inhaler, nebulizer) - Medications (theophylline, steroids, bronchodilators) - Toxic exposure, smoke inhalation 	<ul style="list-style-type: none"> - Shortness of breath - Purse lip respirations - Decreased ability to speak - Increased respiratory rate and effort - Use of accessory muscles - Tripoding - Wheezing, rhonchi, rales - Fever, cough - Tachycardia 	<ul style="list-style-type: none"> - Asthma - Anaphylaxis - Aspiration - COPD (emphysema, bronchitis) - Pleural effusion - Pulmonary embolism - Pneumothorax - Cardiac (MI, CHF) - Pericardial Tamponade - Upper respiratory infection - Hyperventilation, anxiety - Inhaled toxins

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- If patient is wheezing and has **prescribed metered dose inhaler**, provider may assist patient in self-administration. As an alternative, the patient may be allowed to use their own nebulized medication during transport. The nebulizer should be run with 6-8 liters of Oxygen.
- Look for signs of pulmonary edema

PEARLS:

1. Status asthmaticus is defined as a severe prolonged asthma attack non-responsive to therapy.
2. A silent chest in respiratory distress is a pre-respiratory arrest sign.
3. Magnesium Sulfate and Epinephrine should only be used for patients in non-responsive distress that is refractory to initial treatments.
4. Patients with COPD, emphysema, and chronic bronchitis usually have a lowered baseline level of pulmonary function. These patients often have a history of chronic cough, sputum production, and dyspnea on exertion.
5. The classic presentation of a patient with emphysema is the appearance of the “pink puffer,” with rapid, shallow breathing through pursed lips, with a thin body habitus, a barrel chest, and the use of accessory muscles with respirations.
6. The classic presentation of a patient with bronchitis is the appearance of the “blue bloater”, with slow, deep, and labored breathing, a overweight body habitus, and, at times, cyanotic.

Protocol 2-12

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Seizures

REVISED: 02/ 2012

SEIZURES

OVERVIEW:

A seizure is a period of altered neurologic function caused by abnormal neuronal electrical discharges. Approximately 1% - 2% of the general population has recurrent seizures. Generalized seizures begin with an abrupt loss of consciousness. If motor activity is present, it symmetrically involves all four extremities. Episodes that develop over minutes to hours are less likely to be seizures. Most seizures only last 1-2 minutes. Patients with seizure disorders tend to have stereotype, or similar, seizures with each episode and are less likely to have inconsistent or highly variable attacks. True seizures are usually not provoked by emotional stress. Most seizures are followed by a postictal state of lethargy and confusion.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Reported, witnessed - Seizure activity description - Previous seizure history - Medic alert tag information - Seizure medications - History of trauma - History of diabetes mellitus - History of pregnancy 	<ul style="list-style-type: none"> - Decreased mental status - Sleepiness - Incontinence - Observed seizure activity - Evidence of trauma 	<ul style="list-style-type: none"> - CNS (head) trauma - Brain tumor - Metabolic, hepatic, renal failure - Diabetic - Hypoxia - Electrolyte abnormality - Drugs, medications, non-compliance - Infection, fever, meningitis - Alcohol withdrawal - Eclampsia - Stroke - Hyperthermia

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Note the characteristics of seizure activity.
- Check blood glucose sample. If glucose is <60 mg/dl or >300mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

TYPES OF SEIZURES

<u>Generalized</u>	<u>Simple Partial</u>	<u>Complex Partial</u>
<ul style="list-style-type: none"> -Absence (Petit-Mal) -Atonic (Drop Attack) -Myoclonic (Brief bilateral jerking) -Tonic-Clonic (Grand-Mal) 	<ul style="list-style-type: none"> -Focal/ Local: Localized twitching of hand, arm, leg, face, or eyes. Patient may be conscious/ unconscious 	<ul style="list-style-type: none"> -Temporal Lobe -Psychomotor

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

PEARLS:

1. Status epilepticus is defined as two or more consecutive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
2. Grand Mal seizures generalized in nature and associated with loss of consciousness, incontinence, and tongue trauma.
3. Focal seizures affect only a specific part of the body and are not usually associated with loss of consciousness.
4. Jacksonian seizures are seizures that start as focal in nature and become generalized.
5. Petit Mal seizures may be localized to a single muscle group or may not involve visible seizure activity at all. Always examine pupils for nystagmus, which would alert provider to continued seizure activity.
6. Respirations during an active seizure should be considered ineffective and airway maintenance should occur per assessment.
7. Be prepared for airway problems and continued seizures.
8. Investigate possibility of trauma and substance abuse.
9. Be prepared to assist ventilations as dosage of Valium is increased.

Protocol 2-13

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Shock – Hypovolemia

REVISED: 02/ 2012

SHOCK – HYPOVOLEMIA

OVERVIEW:

Shock is often defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Blood loss (vaginal or gastrointestinal) - AAA, ectopic - Fluid loss (vomiting, diarrhea) - Fever - Infection - Cardiac ischemia (MI, CHF) - Medications - Allergic Reaction - Pregnancy 	<ul style="list-style-type: none"> - Restlessness, confusion - Weakness, dizziness - Weak, rapid pulse - Pale, cool, clammy skin - Delayed capillary refill - Hypotension - Coffee-ground emesis - Tarry stools 	<ul style="list-style-type: none"> - Shock <ul style="list-style-type: none"> Hypovolemic Cardiogenic Septic Neurogenic Anaphylactic - Ectopic pregnancy - Dysrhythmia - Pulmonary embolus - Tension pneumothorax - Medication effect, overdose - Vaso-vagal - Physiologic (pregnancy)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.

Classes of Shock

<u>Hypovolemic Shock</u>	<u>Distributive Shock</u>	<u>Cardiogenic Shock</u>	<u>Obstructive Shock</u>
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or metabolic shock.	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

PEARLS:

1. Hypotension can be defined as a systolic blood pressure <90 mmHg.
2. Consider performing orthostatic vital signs on patients with non-traumatic hypotension if blood or fluid loss is suspected.
3. Trendelenburg fails to increase BP and/or cardiac output in most patients, does not improve tissue oxygenation, results in displacement of only 1.8% of total blood volume, and actually decreases cardiac output in the hypotensive patient. It has also been proven to produce right ventricular stress and deterioration of pulmonary function.
4. GI bleeding may be a less obvious cause of hypovolemic shock if it has been gradual.
5. Ectopic pregnancy may be a less obvious cause of hypovolemic shock. Consider this diagnosis in all women of child-bearing age if there is a complaint of abdominal or pelvic pain.

Protocol 2-14

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Stroke

REVISED: 02/ 2012

STROKE

OVERVIEW:

Stroke is a major cause of disability and the third leading cause of death in the U.S. There are two main mechanisms of stroke: (1) Blood vessel occlusion (85% of all strokes); and (2) Blood vessel rupture. Ischemic strokes are most often caused by large vessel thrombosis, although embolism or hypoperfusion can cause them. Causes of thrombosis include atherosclerosis, vessel dissection, and some infectious diseases. Hemorrhagic strokes are divided into intracerebral (ICH) and subarachnoid (SAH) hemorrhages. Risk factors for ICH include heart disease, hypertension, smoking, diabetes, elevated cholesterol, older age, prior stroke, family history, and cocaine use. Stroke symptoms will present according to which area of the brain is being inadequately perfused.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Previous CVA/TIA's - Previous cardiac/ vascular surgery - Associated diseases; diabetes, hypertension, CAD, atrial fibrillation - Medications (blood thinners) - History of trauma 	<ul style="list-style-type: none"> - Altered mental status - Weakness, paralysis - Blindness or other sensory loss - Aphasia, dysarthria - Syncope - Vertigo, dizziness - Vomiting - Headache - Seizures - Respiratory pattern change - Hypertension, hypotension 	<ul style="list-style-type: none"> - See <i>Unconscious/ Syncope/ AMS Patient Care Protocol</i> - TIA - Seizure - Hypoglycemia - Stroke: <ul style="list-style-type: none"> - Thrombotic - Embolic - Hemorrhagic - Tumor - Trauma

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Perform and document neurological exam using Cincinnati Stroke Scale.
- Consider other possible causes of altered mental status.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

CINCINNATI STROKE SCALE

Facial Droop:

Have the patient smile, show teeth and stick out tongue.

Normal: Equal movement of all facial muscles.

Abnormal: One side of face does not move equal with other.

Arm Drift:

Have patient extend arms, close eyes, and hold for 10 seconds.

Normal: Both arms move equally or not at all.

Abnormal: One arm does not move or drifts unequally.

Abnormal Speech:

Have patient say "you can't teach an old dog new tricks".

Normal: Patient uses correct words, in order, without slurring or delay.

Abnormal: Slurred, inappropriate, or repetitive

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

PEARLS:

1. With duration of symptoms of less than 3 hours, scene and transport times should be minimized so the patient may receive the maximum benefit of thrombolytic therapy.
2. Onset of symptoms is defined as the last **witnessed** time the patient was symptom free (i.e. a patient awakening with stroke symptoms would be defined as an onset time of the previous night when the patient was symptom free).
3. The differentials listed in the *Unconscious/ Syncope/ AMS Patient Care Protocol* should also be considered.
4. Be alert for airway problems (difficulty swallowing, vomiting, aspiration, etc).
5. Hypoglycemia can present as a localized neurological deficit in the elderly.
6. The risk of stroke is 13 times greater than normal in the first 2 months after an AMI.
7. Patients with strokes are often found to have an underlying “silent” MI. A stroke may be the result of the low flow state in the peri-MI period.

Protocol 2-15

SECTION: Adult General Medical Emergencies

PROTOCOL TITLE: Unconscious / Syncope / AMS

REVISED: 02/ 2012

UNCONSCIOUS/ SYNCOPE/ AMS

OVERVIEW:

The unconscious patient is one of the most difficult patient-management problems in pre-hospital care. Causes range from benign problems to potentially life-threatening cardiopulmonary or central nervous system disorders. In the usual clinical approach to a patient, the provider first obtains a history, performs a physical examination, and then administers treatment. However, this sequence must be altered for patients that are unconscious or with an altered level of consciousness. Simple syncope may be the result of a wide variety of medical problems, although the major cause of syncope is a lack of oxygenated blood to the brain. In this situation it is quickly remedied when the patient collapses, improving circulation to the brain. Altered LOC is such a major variance from normal neurological function that immediate supportive efforts may be required. Efforts should be made to obtain as much of an HPI as possible from family members or bystanders.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Cardiac history, stroke, seizures - Occult blood loss (GI, ectopic) - Females (LMP, vaginal bleeding) - Fluid loss (nausea, vomiting, diarrhea) - Past medical history - Recent trauma - Complaint prior to event 	<ul style="list-style-type: none"> - Loss of consciousness with recovery - Lightheadedness, dizziness - Palpitations, slow or rapid pulse - Pulse irregularity - Decreased blood pressure 	<ul style="list-style-type: none"> - Vasovagal - Orthostatic hypotension - Cardiac syncope/ dysrhythmia - Micturation/ defecation syncope - Psychiatric - Stroke - Hypoglycemia - Seizure - Shock - GI Bleed - Ectopic Pregnancy - Toxicological (ETOH) - Medication effect (hypertension)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Perform and document neurological exam using Cincinnati Stroke Scale.
- Consider other possible causes of altered mental status.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

Protocol 3-1

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Trauma Patient Assessment

REVISED: 02/ 2012

TRAUMA PATIENT ASSESSMENT

OVERVIEW

Each year, one out of three Americans sustains a traumatic injury. Trauma is a major cause of disability in the United States and accounts for approximately 140,000 deaths annually. Trauma is the leading cause of death in people under 44 years of age, accounting for half the deaths of children under 4 years of age, and 80% of deaths in persons 15 to 24 years of age.

As a responder, your actions within the first few moments of arriving on the scene of a traumatic injury are crucial to the success of managing the situation. Within these moments, you must size up the situation, mitigate as many hazards as possible, establish incident command, rapidly triage patients and ultimately assess, treat and extricate patients from the scene. In doing so, you must decide when to extricate a patient and what treatment is essential to improve the patient's chances of survival, based on your knowledge, previous experience and a problem-based assessment algorithm.

The trauma patient varies in presentation based on the type and mechanism of injury. Primarily, the pre-hospital EMS provider is concerned with five areas in the field; securing the scene to protect both rescuers and patients, conducting a primary assessment and managing any life threats, performing a rapid trauma assessment, extricating the victim rapidly while protecting the cervical spine, and immobilizing and transporting the victim to an appropriate facility while conducting a secondary and ongoing surveys.

SCENE SURVEY

As with all scene responses, assessment of the situation begins from the moment of first dispatch. You must not only consider the information received, but take into account the time of day, traffic, weather, safety issues and potential resources that may be required. As you arrive, the first concern should be to assess the scene for safety of responding pre-hospital EMS providers and to develop an index of suspicion for potential injuries based upon the scene and mechanism of injury. Your safety always comes first, followed by your team, then your patient.

Summary of Scene Survey

- Evaluate situation/ scene for potential safety hazards.
- Obtain an overview of the scene to determine Mechanism of Injury (MOI) include damage to vehicle, structures, furniture, etc
- Wear personal protective equipment (PPE) appropriate to hazards of the scene and/ or patient.
- Gain access to the patient.
- Determine the number of patients and additional resources needed.

Once it is determined that the scene is manageable, begin patient triage. There has been some controversy as to which triage method or methods should be used, as there are at least nine different triage tools available worldwide, including two pediatric versions, but there is little evidence supporting one method over the other. The most common methods found in literature are Simple Triage and Rapid Treatment (START) and JumpSTART (the pediatric version of START), which are both used in North America and by Richmond Ambulance Authority.

PRIMARY ASSESSMENT

Once all hazards have been mitigated and you can safely function, you should continue on to the primary assessment to look for any life-threatening injuries. These are injuries and instability of the respiratory and cardiovascular systems that would most likely be fatal within minutes if they are not immediately found and corrected. The approach to the trauma patient is based on the same primary assessment of the patient's airway, breathing, circulation, neurologic disability, and exposure used for all patients. Unlike a medical patient, the mechanism of injury should also be quickly determined and considered.

A – AIRWAY / C-SPINE STABILIZATION/ LEVEL OF RESPONSIVENESS

These three activities should occur as a simultaneous event. Talking to the patient as you initiate manual stabilization will help calm the patient and allow you to determine their level of consciousness and responsiveness. Assessment of the neurological status should be made using the Glasgow Coma Scale (GCS) and AVPU mnemonic. A patient who is talking generally has an adequate airway, but a patient who is lethargic, obtunded or even comatose needs to have his airway opened via a jaw-thrust maneuver and assessed for patency. Commonly found in severe trauma are oral and facial injuries, which can cause significant hemorrhage and increase the chance of airway occlusion and aspiration. Airway adjuncts including an oropharyngeal airway, nasopharyngeal airway, endotracheal tube, King LTS-D rescue airway, and surgical cricothyrotomy should be used as deemed necessary to maintain and/ or secure a patient's airway. Head and neck alignment is paramount during airway control, as cervical spine injury cannot be ruled out in the field. Always be ready to suction an airway with a large-bore suction device.

Summary of Primary Airway, C-spine, and LOC Assessment

- Airway: Patent, maintainable, un-maintainable
- Level of consciousness, altered mental status
- Skin appearance: Ashen, pale, gray, cyanotic, or mottled
- Facial fractures, head fractures, c-spine step-off
- Airway clearance
- Sounds of obstruction
- Glasgow coma scale, AVPU

Summary of Primary Disability (Neurological) Assessment**A.V.P.U.**

- A - Alert
- V - Responds to verbal stimuli
- P - Responds to painful stimuli
- U – Unresponsive

Glasgow Coma Scale (GCS)

Eye Opening:	Spontaneous	4
	To voice	3
	To pain	2
	No response	1
Verbal Response:	Oriented	5
	Confused	4
	Inappropriate words	3
	Incomprehensible	2
	No response	1
Motor Response:	Obeys commands	6
	Localizes (pain)	5
	Withdraws (pain)	4
	Flexion (pain)	3
	Extension (pain)	2
	No response	1

B – BREATHING

Once the airway is assessed and managed, a quick assessment of the patient's breathing should be performed. If weather permits, and a chest injury is suspected, exposing the chest is prudent. With a stethoscope in one hand, wrap both hands around the patient's chest high along the mid-axillary line, then repeat on the other side. This allows you to assess for the presence or absence of breath sounds and to feel for equal expansion, crepitus and/or flail segments while visualizing for any injuries. Treatments that may be initiated here include high-flow oxygen, manual ventilations, stabilizing flail segments, sealing penetrating chest wounds and decompressing a suspected tension pneumothorax.

Summary of Primary Breathing Assessment

- Rate and depth of respirations
- Cyanosis
- Position of the trachea
- Presence of obvious injury or deformity
- Work of breathing
- Use of accessory muscles
- Flaring of nostrils
- Presence of bilateral breath sounds
- Asymmetric chest movements
- Palpation of crepitus
- Integrity of chest wall

C – CIRCULATION

Palpation of both the peripheral and the central pulse provides information about the patient's circulatory status. The quality, location, and rate of the patient's pulses should be noted along with the temperature of the patient's skin being assessed while obtaining the pulses. Assessing a general rate, as in too slow or too fast, can assist in determining underlying conditions. A slow, steady, strong pulse may indicate a head injury; a weak rapid pulse may mean the patient is in shock. Peripheral pulses may also be absent as a result of direct injury

Summary of Primary Circulation Assessment

- Pulse rate and quality
- Skin appearance: Color
- Peripheral pulses
- Skin temperature
- Level of consciousness
- Open wounds
- Arterial and/ or venous hemorrhage

or sympathetic nervous system response. This compensatory mechanism causes peripheral vasoconstriction. Radial pulses are usually present when the systolic BP is greater than 80 mmHg, femoral pulses indicate a systolic BP greater than 60 mmHg, and carotid pulses indicate a systolic BP greater than 50 mmHg. Observation of the patient's level of consciousness may also help evaluate the patient's perfusion status initially.

Generally, just looking around the patient is enough to discover gross hemorrhage, but always consider that heavy jackets, grass and other soft porous materials may absorb blood, giving a falsely low estimated blood loss. In these circumstances, perform a quick body sweep starting at the head and working toward the feet, checking at natural voids, such as behind the neck or knees. Active bleeding should be quickly controlled with direct pressure and/ or tourniquet, per assessment. The patient should also be observed for indications of circulatory compromise. Skin color and temperature, diaphoresis, and capillary refill are all indicators of circulatory compromise during an assessment.

The primary assessment is a fix-as-you-go process and complications require your immediate attention, making every effort to correct them before moving onto the next section of the assessment. When a problem is identified during the primary assessment, immediately declare the patient as high-priority and begin rapid extrication.

RAPID TRAUMA ASSESSMENT

A trauma assessment is indicated for any patient whose MOI involves environmental factors (burns, drowning, toxic inhalation, etc), motion, or the transfer of a significant amount of energy to that patient (motor vehicle collisions, projectile penetrations, rapid deceleration, etc). As the primary assessment is meant to look for injuries and conditions that may be fatal in minutes, the rapid trauma assessment looks for injuries or conditions that are more subtle or may not be evident for a longer period (15-30 minutes).

As others are preparing for the extrication, do a very rapid trauma assessment looking for gross injuries that may pose a problem during extrication, such as multiple long bone or pelvic fractures that may cause pain, further injury and hemorrhage if care is not taken when moving the patient from the vehicle to a backboard. Although this maneuver is "rapid," it does not allow for compromise of the cervical spine. Cervical spine injuries should be considered in all trauma patients until they can be ruled out by appropriate medical personnel. A stiff cervical collar, backboard, spider straps, head blocks, and tape, or an appropriate substitution as the need or situation arises, should be used to protect the cervical spine during transport. Neurological assessments of all extremities should be performed and documented before and after all immobilization.

To properly perform the rapid trauma assessment, the patient must be fully exposed. Do not feel guilty about cutting away obtrusive clothing if there is a high index of suspicion for injuries based upon the mechanism; however, take into account when and where you expose the patient. If there is a large crowd, maintain the patient's modesty by exposing only what is vital to the assessment and treatment and/or shielding the patient from the crowd with sheets or tarps. Also consider body temperature during exposure, as patients rapidly lose body heat through convection and radiation to the surrounding environment. No matter the temperature outside, always cover the patient with sheets or blankets and consider turning down, or off, the air-conditioning in the ambulance, as cold blood is less likely to clot and trauma patients are more prone to hypothermia.

If any serious conditions are found during the rapid trauma assessment, stabilize the patient as soon as possible, but determine to what extent. Look at the patient's overall condition and perform a risk-benefit analysis to determine if the proposed treatment would make a difference in the outcome versus how long it would take to accomplish that treatment considering the patient's other injuries. Also consider whether the desired treatment could be done safely enroute to the intended receiving facility.

Always be aware of the time you are spending on scene or on a particular task and be ready to transport if the patient's condition changes. Transport to the closest hospital is always warranted if you are unable to obtain or maintain an airway. Notify the hospital of the airway problem so they can have the appropriate equipment, medications, and personnel in place prior to the patient's arrival.

SECONDARY ASSESSMENT

Typically, the secondary assessment begins once any life threats to the patient's airway, breathing, and circulation have been managed and any major injuries are stabilized. In a trauma situation, parts of the secondary assessment may have to occur simultaneously with other assessments, but should never interfere with them. The ability to do this is directly dependent upon the number of people available and the space they are working in.

VITAL SIGNS

When and where you obtain vital signs is directly related to the severity of the patient's condition, the number of responders on the scene, and available access to the patient. Vital signs are commonly left until the patient is in the ambulance and all critical and essential treatment has been established. Occasionally, when there are enough responders, one person may be delegated to obtain vital signs, but remember that this should not delay transport.

Vital sign trending is the practice of continually retaking vital signs to identify changes in patient condition. In the trauma patient, this occurs minimally every five minutes, or whenever the patient's condition changes. Trending will help to determine patient stability and alert providers to impending problems.

ONGOING ASSESSMENT

The ongoing assessment involves continually reassessing the patient any time his or her condition changes, an intervention is performed, or after any movement. This includes asking the patient if he is feeling better or worse. Assessing mental status, Glasgow Coma Scale, and pupils will help determine any changes in the patient's neurologic status. Also regularly reassess the patient's ABCs. Constant assessment of neurovascular status will alert you to developing paralysis, shock or a splint that is improperly applied. Finally, reassessing after interventions is important and may include effectiveness and tightness of splints, patency and flow rates of intravenous lines, and confirmation of endotracheal tube placement.

Summary of Secondary Assessment

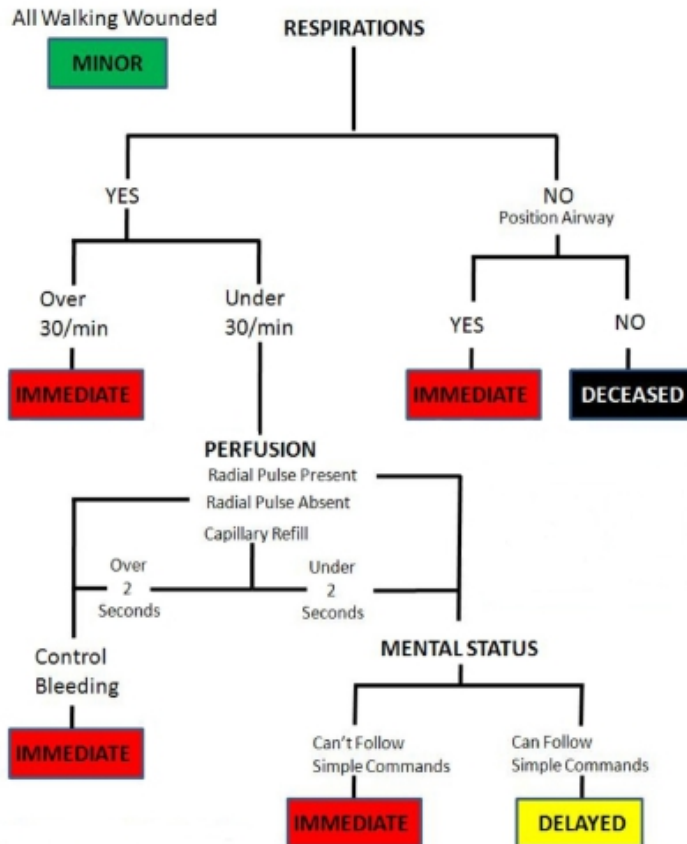
<p>Skin:</p> <ul style="list-style-type: none"> - Presence of petechia, purpura, abrasions, bruises, scars, or birthmarks - Lacerations, uncontrolled hemorrhage - Rashes - Abnormal skin turgor - Signs of abuse or neglect <p>Head and Neck:</p> <ul style="list-style-type: none"> - Presence of lacerations, contusions, raccoon eyes, Battle's sign, or drainage from the nose, mouth, and ears - Gross visual examination - Abnormal extra-ocular movements - Position of the trachea - Neck veins - Swallowing difficulties - Nuchal rigidity - Presence of lymphadenopathy or neck masses - Vertebral step-off <p>Ears, Nose, and Throat:</p> <ul style="list-style-type: none"> - Hemorrhage - Sunken eyes - Obstruction - Drainage - Gross assessment of the hearing - Foreign body <p>Mouth and Throat:</p> <ul style="list-style-type: none"> - Mucous membranes - Breath odor - Injuries to teeth - Drooling - Drainage - Airway obstruction 	<p>Thorax, Lungs, and Cardiovascular System:</p> <ul style="list-style-type: none"> - Breath sounds - Open Pneumothorax - Crepitus - Paradoxical motion - Heart Sounds <p>Abdomen:</p> <ul style="list-style-type: none"> - Shape and size - Bowel sounds - Tenderness - Rigidity - Evisceration - Masses (i.e. suprapubic masses) - Pelvic tenderness, crepitus, or instability <p>Genitourinary:</p> <ul style="list-style-type: none"> - Rectal bleeding - Color of urine <p>Extremities and Back:</p> <ul style="list-style-type: none"> - Gross motor and sensory function - Peripheral pulses - Lack of use of an extremity - Deformity, angulation - Wounds, abrasions - Vertebral column, flank, buttocks - Equipment is appropriately applied (i.e. traction splints, extremity splints, cervical collar)
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Assessment Acronyms

S.A.M.P.L.E.	O.P.Q.R.S.T.
S - Signs and Symptoms	O - Onset (When did the problem/ pain begin?)
A - Allergies	P - Provocation (What makes the problem/ pain worse?)
M - Medications	Q - Quality (Can you describe the problem/ pain?)
P - Pertinent past medical history	R - Radiation (Does the pain move anywhere?)
L - Last oral intake	S - Severity (On a scale of 1-10, how bad is the pain?)
E - Events leading up to the event	T - Time (Does the condition come and go? Duration?)

T.I.C.S.	D.C.A.P./ B.T.L.S.	
T - Tracks, tags, tattoos	D - Deformities	B - Burns
I - Instability	C - Contusions	T - Tenderness
C - Crepitus	A - Abrasions	L - Lacerations
S - Scars	P - Punctures	S - Swelling

START TRIAGE
(Simple Triage and Rapid Treatment)



TRAUMA PATIENT ASSESSMENT

Protocol 3-2

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Abdominal Trauma

REVISED: 02/ 2012

ABDOMINAL TRAUMA

OVERVIEW:

Blunt and penetrating trauma are major causes of morbidity and mortality in the United States. In blunt force abdominal trauma, the spleen and liver are the most commonly injured organs, with a mortality rate of roughly 8.5%. Nearly three-quarters of all blunt trauma injuries involve vehicles and of that, two-thirds of the injuries occur in males, with a peak incidence in patients between ages 14 – 30. Penetrating trauma has a slightly higher mortality, depending on the mechanism of injury, ranging up to about 12%. Gunshot and stab wounds combine to cause 95% of penetrating abdominal injuries. When performing a focused abdominal assessment, be organized, efficient, and thorough. Initial abdominal examinations only identify injury about 65% of the time; secondary exams are needed when there is a high index of suspicion for abdominal trauma. A proper abdominal examination involves exposing the entire abdomen from the nipple line to the groin and using a standard examination sequence of inspection, auscultation, percussion, and palpation.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Time of injury - Mechanism: blunt vs penetrating - Loss of consciousness - Damage to structure, vehicle - Location in structure or vehicle - Speed, details of MVC - Restraints, protective devices - Medical history - Medications - Evidence of multi-system trauma 	<ul style="list-style-type: none"> - Pain, swelling, bleeding - Deformity, lesions - Altered mental status, unconsciousness - Respiratory distress, failure - Hypotension, shock - Arrest - Significant mechanism of injury 	<ul style="list-style-type: none"> - Intra-abdominal bleeding - Pelvis fracture - Abuse

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, bilateral breath sounds, mental status, and GCS.
- Place patient on pulse oximetry and administer **Oxygen** per respiratory assessment.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Identify mechanism of injury.

Impaled Objects

Stabilize impaled objects in place with bulky dressings.

Severe hemorrhage from open penetrating injury

Control bleeding with well-aimed direct pressure directly on the bleeding source.
Once controlled, apply dry, sterile dressing.

Evisceration with protruding abdominal contents

Loosely wrap any protruding abdominal contents with a sterile dressing moistened with Normal Saline and cover in entirety with an occlusive dressing over top.

PEARLS

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Avoid overly aggressive fluid administration, provide fluid boluses to maintain systolic BP between 90 – 100mmHg, or a mean arterial pressure of 65mmHg.
3. Abdominal eviscerations are a surgical emergency. The protruding organ requires careful cleaning and evaluation prior to reinsertion. Do not attempt to reinsert the organs in the pre-hospital setting.
4. Impaled objects in the abdomen often tamponade internal hemorrhage, and removing them may trigger significant internal bleeding. Remember that any bump against the object moves the distal end in the organ and worsens damage.
5. Pain management is an essential component to good trauma care. Simple pain management techniques include oxygen administration, splinting, speaking in a calm, reassuring voice, and placing the patient in his or her position of comfort. When spinal immobilization is required, flexing the patient's knees toward the chest helps relax the abdominal muscles.

Protocol 3-3

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Burns

REVISED: 02/ 2012

BURNS

OVERVIEW:

Burns are a devastating form of trauma associated with high mortality rates, lengthy rehabilitation, cosmetic disfigurement, and permanent physical disabilities. Thermal, chemical, electrical, nuclear radiation, or solar sources may cause burns. Burns can affect more than just the skin. They can affect the body's fluid and chemical balance, temperature regulation, and musculoskeletal, circulatory, and respiratory functions. Burns are classified by degree, 1° (superficial) some reddening to skin, 2° (partial thickness) has blistering and deep reddening to the skin, and 3° (full thickness) causes damage to all skin layers and is either charred/ black or white/ leathery with little or no pain at the site. The patient's palm equals 1% of body surface area when determining the area affected. This is sometimes more helpful than using the "rule of nines" especially with pediatric patients.

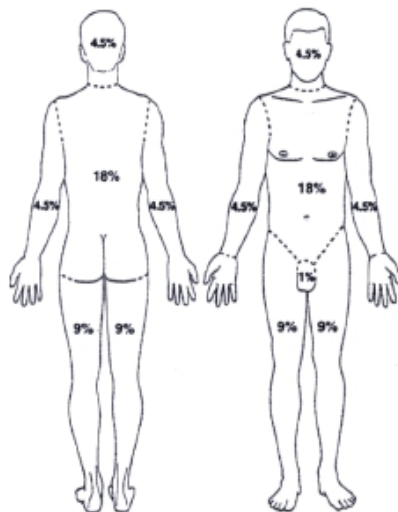
<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Type of exposure (heat, gas, chemical) - Inhalation injury - Time of injury - Past medical history - Medications - Other trauma 	<ul style="list-style-type: none"> - Burns, pain, swelling - Dizziness - Loss of consciousness - Hypotension/ shock - Airway compromise, distress - Singed facial or nasal hair - Hoarseness, wheezing 	<ul style="list-style-type: none"> - Superficial (1°), red and painful - Partial thickness (2°), blistering - Full thickness (3°), painless and charred leathery skin - Chemical - Thermal - Radiation

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC). Obtain manual C-spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** via Non-Rebreather Mask. Use humidified Oxygen, if available, if inhalation injury is suspected.
- Stop the burning process.
- Brush off solid/ dry chemicals **prior** to irrigation. Some chemicals may react with water.
- Apply copious Normal Saline/ Sterile Water irrigation for caustic substance burns.
- Cover thermal burns with dry sterile dressing.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Determine extent of burn
- If signs of inhalation injury are noted, refer to *Inhalation Injury Patient Care Protocol*.

PEARLS

1. Remove patient's clothing as appropriate. Remove rings, bracelets and other constricting items in areas of burn, if possible.
2. Critical burns: burns over >25% BSA; 2° burns >10% BSA; 2° and 3° burns to the face, eyes, hands, or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These patients should be transferred directly to a Level 1 Trauma Center.
3. Have a high index of suspicion and a low intubation threshold when treating burn patients with possible airway involvement. Early intubation is recommended in significant inhalation injuries.
4. Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
5. Burn patients are prone to hypothermia – never cool burns that involve >15% BSA.
6. Never overlook the possibility of multi-system trauma.
7. Burns are extremely painful. Strongly consider pain management medications as needed.



Protocol 3-4

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Drowning / Near Drowning

REVISED: 02/ 2012

DROWNING/ NEAR DROWNING

OVERVIEW:

Approximately 4500 people die of submersion in the United States each year, making drowning the third leading cause of accidental death. Drowning, like other causes of death, often strikes the young or otherwise healthy individual. Prevention is the most important step to reduce these unnecessary deaths. The patient prognosis after near drowning depends on the speed of rescue and resuscitation, emphasizing the role of emergency care. Treatment of near drowning begins at the scene with rapid, cautious removal of the victim from the water. Spinal precautions should be observed if the mechanism of injury such as high velocity impact, diving, or surfing raises suspicion of such injuries. Concern of saltwater vs. freshwater aspiration is not of immediate importance in the pre-hospital environment. Factors that increase survivability include; (1) the younger the age, (2) the colder the water, (3) the cleaner the water, and (4) the less time submerged.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Submersion in water, regardless of depth - Possible history of trauma (i.e. diving board) - Duration of submersion - Temperature of the water - Type of water 	<ul style="list-style-type: none"> - Unresponsive - Mental status changes - Decreased or absent vital signs - Vomiting - Coughing 	<ul style="list-style-type: none"> - Trauma - Pre-existing medical problem - Pressure injury (diving) <ul style="list-style-type: none"> Barotrauma Decompression sickness

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Assess respiratory effort and mental status. Begin manual CPR if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per respiratory assessment.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization, if possible.
- Continuously reassess respiratory effort and mental status. If respirations become ineffective or with increased effort and decreased mental status, begin manual ventilation with Bag Valve Mask.
- Remove wet clothing and prevent heat loss with dry blankets.
- If signs of hypothermia are present, refer to *Hypothermia Patient Care Protocol*.

PEARLS

1. Near drowning patients are at high risk for experiencing secondary drowning several hours after the initial event. Secondary drowning occurs when delayed flash pulmonary edema occurs. All patients suspected of submersion need to be transported for further evaluation.
2. Adult Respiratory Distress Syndrome (ARDS) and pneumonia can both occur following the inhalation of water into lungs causing damage to the alveoli. Make every effort to transport these patient to the hospital for further evaluation.
3. With cold water there is no time limit, attempt resuscitation on all patients unless patient presents with injuries incompatible with life.

Protocol 3-5

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Electrical Injuries

REVISED: 02/ 2012

ELECTRICAL INJURIES

OVERVIEW:

Electrical injuries cause over 1,000 deaths in the United States each year. The vast majority of electrical injuries are caused by generated electricity, such as that encountered in power lines and household outlets. Relative to the external damage caused by electrical injuries, internal damage is often more severe, and can include damage to muscles, blood vessels, organs, and nerves. Damaged muscle releases myoglobin and potassium, which can precipitate in the kidneys and cause acute renal failure. Electrical current as low as 20 mA can cause respiratory arrest and as little as 50 mA can cause ventricular fibrillation. Although long-bone fractures and spinal injuries can occur due to falls after electrocution, they can additionally occur due to severe titanic muscle spasms with high amplitude electrocutions. Before treating any patient with an electrical injury, ensure your personal safety. Do not touch the patient if the patient is still in contact with the electrical source.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Lightning or electrical exposure- Single or multiple victims- Trauma secondary to fall from high wire or MVC into line- Duration of exposure- Voltage and current (AC/DC)	<ul style="list-style-type: none">- Burns- Pain- Entry and exit wounds- Hypotension and shock- Cardiac and/ or respiratory arrest	<ul style="list-style-type: none">- Cardiac arrest- Respiratory arrest- Seizure- Burns- Multisystem trauma

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Assess respiratory effort and mental status. Begin manual CPR if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per respiratory assessment.
- Continuously reassess respiratory effort and mental status. If respirations become ineffective or with increased effort and decreased mental status, begin manual ventilation with Bag Valve Mask.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Determine extent of burn
- Cover thermal burns with dry sterile dressing.

PEARLS

1. Ventricular fibrillation and asystole are the common presenting dysrhythmias associated with electrical injuries.
2. Injuries are often hidden. The most severe injuries will occur internally in the muscles, vessels, organs, and nerves.
3. In a mass casualty lightning incident, attend to victims in full arrest first. If the victim did not arrest initially, the probability of ROSC and survivability is higher.
4. Do not overlook other trauma (i.e. falls).
5. Lightning is a massive DC shock most often leading to asystole as a dysrhythmia.
6. In lightning injuries, most of the current will travel over the body surface producing flash burns over the body that appear as freckles.

Protocol 3-6

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Head Injury

REVISED: 02/ 2012

HEAD INJURY

OVERVIEW:

Brain injury and its accompanying pathologic processes continue to be the leading cause of mortality associated with trauma. Whether the injury is due to a blunt or penetrating mechanism, bleeding or swelling of the brain and surrounding tissue may lead to an increase in pressure within the cranial cavity (intracranial pressure, ICP). If pressure within the skull is not controlled, neurologic changes may produce signs and symptoms ranging from headache to coma with loss of protective reflexes. Blunt force trauma may result in scalp injury, skull fracture, and meningeal and brain tissue injury. Penetrating trauma may produce focal or diffuse injury, depending on the velocity of the penetrating object. Although the pre-hospital provider cannot reverse the brain tissue damage from the initial/primary brain injury that has already occurred, they can play a major role in preventing or limiting the processes that exacerbate and lead to a secondary brain injury. The pre-hospital provider's goal is to focus on reversing any hypoxia, hypotension, hypercarbia, acidosis, or increasing intracranial pressure.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Time of injury - Mechanism: blunt vs penetrating - Loss of consciousness - Bleeding - Medical history - Medications - Evidence of multi-system trauma 	<ul style="list-style-type: none"> - Pain, swelling, bleeding - Altered mental status, unconsciousness - Respiratory distress, failure - Cushing's reflex triad - Cheyne-Stokes and Biot's respirations - Unequal, dilated, sluppish pupil - Vomiting - Significant mechanism of injury 	<ul style="list-style-type: none"> - Skull fracture - Brain injury (concussion, contusion, hemorrhage, laceration) - Epidural hematoma - Subdural hematoma - Subarachnoid hemorrhage - Spinal injury - Diabetic - Seizure disorder - Abuse

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, mental status, and GCS.
- Immobilize patient using full spinal precautions. Avoid excessive compression around the neck by cervical collar. Assess and document PMS in all extremities before and after immobilization.
- Place patient on pulse oximetry and administer **100% Oxygen** per respiratory effort assessment. If signs of herniation are present, ventilate with Bag Valve Mask at 20 bpm.
- Obtain blood glucose sample.

PEARLS

1. Hyperventilation is not recommended with head-injury patients who do not have symptoms of herniation syndrome, as auto-regulatory mechanisms are intact and hyperventilation may worsen cerebral perfusion pressure.
2. One of the most important indicators of worsening head injury is a change in LOC and/ or GCS.
3. Increased ICP may cause hypertension and bradycardia (Cushing's response).
4. Hypotension usually indicates injury or shock unrelated to the head injury and should be treated aggressively.
5. A decrease of two (2) or more in the patient's GCS should be considered due to a severe head injury until proven otherwise.
6. Supine positioning may also increase ICP transiently. The patient may benefit from a reverse Trendelenburg position; however, it may reduce cerebral blood flow, especially if the head is elevated greater than 30°. If the patient is immobilized to a backboard, slightly elevate (15° or less) the head end of the board.
7. Recognize that "normal" blood pressure is not as important as "normal for the patient" when assessing maintenance of adequate cerebral blood flow and adequate cerebral perfusion.

Protocol 3-7

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Musculoskeletal Trauma

REVISED: 02/ 2012

TISSUE TRAUMA

OVERVIEW:

Musculoskeletal and soft issue injuries are generally non-life-threatening, however, they can be associated with other life-threatening injuries. In addition, they can be life threatening if not properly managed. Although often obvious and dramatic in nature, the pre-hospital provider must not allow distraction from treating other immediate life-threatening injuries. Early, proper management of patients with musculoskeletal and soft tissue injuries can significantly reduce morbidity and mortality.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Type of injury - Mechanism: crush, penetrating, amputation - Time of injury - Open vs closed wound/ fracture - Wound contamination - Medical history - Medications 	<ul style="list-style-type: none"> - Pain - Swelling - Deformity - Altered sensation - Decreased range of motion - Diminished pulse/ capillary refill - Decreased extremity temperature 	<ul style="list-style-type: none"> - Abrasion - Contusion - Laceration - Sprain - Dislocation - Fracture - Amputation

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per assessment.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Assess range of motion of injured area and neurovascular status distal to injury.

Minor Lacerations

All lacerations should be bandaged with an appropriate sterile dressing.

Hemorrhage

Apply direct pressure and sterile dressing to wound. If hemorrhage is severe and not controlled with pressure bandage, apply tourniquet and document time of application.

Suspected Fractures or Dislocations

Stabilize the injury site in position of comfort to prevent further injury and reassess neurovascular status distal to injury. If open fracture is noted, apply appropriate sterile dressing to open wound.

Amputation

Wrap amputated part in clean, sterile dressing moistened with Normal Saline. Seal wrapped amputated part in plastic bag and place plastic bag in container with ice, if available. If patient is unstable and amputated part is not easily found, do not delay transport to locate.

PEARLS

1. In amputation, time is critical, do not delay transport to find amputated part if not easily and quickly located.
2. Hip, knee, and elbow dislocations and fractures have the highest incidence of vascular compromise.
3. Any patient with neurovascular compromise should be rapidly transported to the closest appropriate facility.
4. Blood loss may be concealed or not apparent with extremity injuries.
5. Lacerations must be evaluated and repaired within 6 hours from the time of injury for greatest likelihood of proper healing.
6. 30% of female elderly hip fractures are not due just to fall, but rather cardiac event prior to a ground level fall.

Protocol 3-8

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Sexual Assault

REVISED: 02/ 2012

SEXUAL ASSAULT

OVERVIEW:

A patient that has experienced the trauma of rape or sexual abuse may present in a variety of ways. Physical trauma may be evident along with emotional trauma, which is very prevalent in these situations. In other cases, emotional trauma may be the only presenting problem. Pre-hospital EMS providers may be thrust into the role of mediator, buffer, or confidant. They may even be subject to violent aggression on the part of the victims or their families. Injuries associated with sexual assault may vary widely. They can be as subtle as slight pain or discomfort or as grossly evident as either debilitating or disfiguring trauma. The victim's injuries also may not be obvious or visible on first inspection, some may even deny injuries and relate untruthful information regarding the occurrence. The pre-hospital provider must develop and foster rapport with the victim to gain the victim's confidence, so that accurate information can be obtained.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Type of injury - Mechanism: rape, sodomy, sexual abuse - Timeline of incidents - Medical history - Medications 	<ul style="list-style-type: none"> - Physical injuries - Emotional injuries - Recurring injuries - Withdrawal, hostility 	<ul style="list-style-type: none"> - Emotional trauma - Behavioral disorder - Traumatic injury - Toxicological exposure

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Perform wound care only to determine severity and provide hemorrhage control.
- Assess for other illnesses or injuries.
- If an acute medical condition is noted during assessment, refer to appropriate *Medical Patient Care Protocol*.
- If physical trauma is noted during assessment, refer to appropriate *Trauma Patient Care Protocol*.
- Discourage the patient from changing clothes or bathing.
- Handle the patient's clothing as little as possible.
- Transport promptly in position of comfort to appropriate facility. Reassess vital signs as indicated.

PEARLS

1. Use paper bags for all clothing and blood-stained articles, if available. If the patient's clothing is removed after leaving the scene, bag and label each item separately.
2. Do not ask questions about the patient's sexual history or practices, or questions that might make the patient feel guilty.
3. Do not examine the patient's genitalia unless there is severe injury, and then do so only with the patient's permission.
4. Maintain the crime scene and chain of evidence by turning over any transported items to forensic nursing staff at receiving facility, if possible.
5. The receiving facility should be contacted prior to transport to notify of patient complaint and ascertain if forensic nursing (SANE) is available. EMS may be diverted due to lack of proper treatment capabilities.

Protocol 3-9

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Thoracic Trauma

REVISED: 02/ 2012

THORACIC TRAUMA

OVERVIEW:

Thoracic injuries can be very dramatic, presenting with obvious physical findings that lead to immediate identification and management during the initial assessment, while others may only exhibit subtle signs and symptoms that can be easily missed initially. A high index of suspicion, accurate assessment, and frequent reassessment are necessary to identify both the apparent and less obvious thoracic injuries that could lead to lethal consequences. Thoracic injury may result from both penetrating and blunt trauma. Penetrating trauma has a tendency to be more obvious due to the presence of an open wound while blunt trauma may produce findings such as large contusions, tenderness, fractured ribs or flailed segments, or relatively little external evidence of injury. Although little external injury may be present, the patient may be suffering from multiple and severe organ, vascular, and structural injuries.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Time of injury- Mechanism: blunt vs penetrating- Loss of consciousness- Damage to structure, vehicle- Location in structure or vehicle- Speed, details of MVC- Restraints, protective devices- Medical history- Medications- Evidence of multi-system trauma	<ul style="list-style-type: none">- Pain, swelling, bleeding- Deformity, lesions- Altered mental status, unconsciousness- Respiratory distress, failure- Hypotension, shock- Arrest- Significant mechanism of injury	<ul style="list-style-type: none">- Tension pneumothorax- Flail chest- Pericardial tamponade- Open chest wound- Hemothorax

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, bilateral breath sounds, mental status, and GCS.
- Place patient on pulse oximetry and administer **Oxygen** per respiratory assessment.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Identify mechanism of injury.

Open Pneumothorax

Occlude initially with gloved hand as soon as found.
As rapidly as possible, apply an occlusive dressing, taped on three sides over wound.

PEARLS

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Some injuries, such as simple rib fractures, may produce such excruciating pain that the patient intentionally hypoventilates to reduce chest wall movement causing secondary hypoxia.
3. Due to the amount of external noise, a possible pneumothorax should not be determined by lung sounds alone. In the presence of a true tension pneumothorax, the patient will also show signs of increasing tachycardia, decreasing SpO₂, tachypnea, and anxiety. Tracheal deviation away from the affected side is a late sign and may be difficult to assess in obese patients.
4. Careful reassessment of lung sounds should occur continuously. A patient that initially only has an open pneumothorax may quickly develop a tension pneumothorax and need needle thoracentesis after an occlusive dressing has been applied.
5. A true flail segment is two or three adjacent ribs fractured in two or more places and has the ability to move independently of the remaining chest wall.
6. Although paradoxical motion is often thought to be the hallmark sign of a flail chest, when the ribs fracture, the intercostal muscles may spasm, causing the flail segment to be initially stabilized. Paradoxical motion may be initially missed upon inspection while a thorough palpation exam will reveal any instability.
7. Stabilizing a flail segment with sandbags or other devices is no longer recommended.

Protocol

4-1

SECTION: Toxicological Emergency Patient Care

PROTOCOL TITLE: Opiate Overdose

REVISED: 02/ 2012

OPIATE OVERDOSE

OVERVIEW:

The goal in treating an opiate overdose patient is generally not to wake the patient, but to maintain breathing and the airway. While difficult, this is especially important as opiates are often mixed with hyper-dynamic substances and other drugs at the street level, and the opiate may be masking or suppressing other toxic effects. Unfortunately, the history of poisoning/ overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Use or suspected use of a potentially toxic substance- Substance ingested, route, and quantity used- Time of use- Reason (suicidal, accidental, criminal)- Available medications in home- Past medical history	<ul style="list-style-type: none">- Mental status changes- Hypotension/ hypertension- Hypothermia/ hyperthermia- Decreased respiratory rate- Tachycardia, other dysrhythmias- Seizures	<ul style="list-style-type: none">- Tricyclic anti-depressants (TCAs)- Acetaminophen (Tylenol)- Depressants- Stimulants- Anticholinergic- Cardiac medications- Solvents, alcohols- Cleaning agents- Insecticides

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- If the patient is unconscious or having seizures, refer to appropriate patient care protocol.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment. Assist ventilations via bag valve mask as necessary.
- Suction oropharynx as necessary.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- Restrain patient for safety of patient and providers prior to awakening patient. Pt restraint should be achieved with patient positioned **supine** on stretcher using four-point soft extremity restraints with cravats in addition to five-point stretcher belt restraints. **Do not “hog tie” patient, sandwich patient between backboards, or restrain patient in the prone position.** Restraints can be removed once patient has returned to normal mental status and patient’s response to treatment can be assessed and patient is deemed to be calm and not a threat.

Opiate Toxidrome

<ul style="list-style-type: none">- Altered Mental Status- Miosis- Unresponsiveness- Shallow Respirations	<ul style="list-style-type: none">- Slow Respiratory Rate- Decreased Bowel Sounds- Hypothermia- Hypotension
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PEARLS:

1. If patient is a suspected opiate addict, the administration of Naloxone should be titrated to increase respirations to normal levels without fully awakening patient to prevent hostile and confrontational episodes.
2. Any patient receiving Naloxone should be transported for continued monitoring and not be allowed to refuse transport. Many opiates have a longer bioavailability than Naloxone, therefore re-sedation may occur.
3. If patient has obviously aspirated, consider bypassing Naloxone administration and initiate oral intubation.
4. Some opiate overdose patients will respond well to simple assisted ventilations with 100% oxygen.
5. Do not rely on patient history of ingestion, especially in suicide attempts.
6. All medications should be continued as outlined in protocol until supply is exhausted. Remember, RAA ambulances have two (2) drug boxes for use, if needed to continue care.

Protocol

4-2

SECTION: Toxicological Emergency Patient Care

PROTOCOL TITLE: Hyperdynamic Crisis / Overdose

REVISED: 02/ 2012

HYPERDYNAMIC CRISIS / OVERDOSE

OVERVIEW:

Hyperdynamic drugs, also known as sympathomimetics, include cocaine, methamphetamine, amphetamine, and MDMA (ecstasy). Patient care should be focused on preventing/mitigating hyperthermia, agitated delirium, positional asphyxia, hypoxia, and physical self-harm. With true hyper-dynamic crisis (tachycardia, agitation, hyperthermia, and/or hypertension), treatment with benzodiazepines is indicated in addition to rhythm specific therapy or anti-hypertensive meds (with the exception of beta-blockers). Unfortunately, the history of poisoning/ overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Use or suspected use of a potentially toxic substance- Substance ingested, route, and quantity used- Time of use- Reason (suicidal, accidental, criminal)- Available medications in home- Past medical history	<ul style="list-style-type: none">- Mental status changes- Hypotension/ hypertension- Hypothermia/ hyperthermia- Decreased respiratory rate- Tachycardia, other dysrhythmias- Seizures	<ul style="list-style-type: none">- Tricyclic anti-depressants (TCAs)- Acetaminophen (Tylenol)- Depressants- Stimulants- Anticholinergic- Cardiac medications- Solvents, alcohols- Cleaning agents- Insecticides

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- If the patient is unconscious or having seizures, refer to appropriate patient care protocol.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- Provide as low stimulus environment as possible during transport.
- Obtain temperature and monitor during treatment.
- Begin cooling as indicated by patient assessment.
 - Remove excess and constrictive clothing. Allow for adequate heat dissipation.
 - Air conditioning or manual fanning, if possible.

Hyperdynamic (stimulant) Toxidrome

- Restlessness	- Insomnia	- Hyperthermia
- Excessive speech and motor activity	- Tachycardia	- Hallucinations
- Tremors	- Hypertension	- Seizures

PEARLS:

1. Do not rely on patient history of ingestion, especially in suicide attempts.
2. Bring bottles, contents, and emesis to ER with patient.
3. Use of sedatives (benzodiazepines) is highly recommended for even moderate agitation from hyperdynamic use, and may decrease heat production, decrease cardiac toxicity, and improve outcomes, as well as improve provider safety.
4. Use of Haldol and/ or Phenergan with patients under the active influence of hyperdynamics is relatively contraindicated due to these drugs effects on seizure threshold, heat production, and general side effects that may complicate care.
5. MDMA, and the more toxic drug PMA, have both amphetamine and hallucinatory like effects. The stimulant effects of MDMA/PMA, which enable users to performs physical exertion (like dancing) for extended periods, may also lead to dehydration, tachycardia, and hypertension. MAOI's may potentiate toxic effects. While any of the hyperdynamics can be dangerous, MDMA and PMA especially have been known to cause a marked increase in body temperature (malignant hyperthermia) leading to rapid onset of muscle breakdown, DIC, seizures, renal failure, and cardiovascular system failure.
6. All medications should be continued as outlined in protocol until supply is exhausted. Remember, RAA ambulances have two (2) drug boxes for use, if needed to continue care.

Protocol

4-3

SECTION: Toxicological Emergency Patient Care

PROTOCOL TITLE: Tricyclic Anti-Depressant (TCA) Overdose

REVISED: 02/ 2012

TRICYCLIC ANTI-DEPRESSANT OVERDOSE

OVERVIEW:

Tricyclic Anti-depressants (TCA's) are a leading cause of death in intentional overdoses. Aggressive care at onset of signs and symptoms is essential, as the patient can decompensate quickly. Early s/s include widening of the QRS, tachycardia, hypotension and altered LOC. Unfortunately, the history of poisoning/ overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Use or suspected use of a potentially toxic substance- Substance ingested, route, and quantity used- Time of use- Reason (suicidal, accidental, criminal)- Available medications in home- Past medical history	<ul style="list-style-type: none">- Mental status changes- Hypotension/ hypertension- Hypothermia/ hyperthermia- Decreased respiratory rate- Tachycardia, other dysrhythmias- Seizures	<ul style="list-style-type: none">- Acetaminophen (Tylenol)- Depressants- Stimulants- Anticholinergic- Cardiac medications- Solvents, alcohols- Cleaning agents- Insecticides

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- If the patient is unconscious or having seizures, refer to appropriate patient care protocol.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. Amiodarone is contraindicated as are other drugs that widen the QRS,
2. Due to dopamine blockade, as well as catecholamine depletion, Epinephrine is considered a more effective vasopressor than dopamine, although fluids should be aggressively administered first.
3. Common TCA's include, but are not limited to, Elavil, Triavil, Etrafon, Amitriptyline.
4. Do not rely on patient history of ingestion, especially in suicide attempts.
5. Bring bottles, contents, and emesis to ER with patient.
6. All medications should be continued as outlined in protocol until supply is exhausted. Remember, RAA ambulances have two (2) drug boxes for use, if needed to continue care.

Protocol

4-4

SECTION: Toxicological Emergency Patient Care

PROTOCOL TITLE: Sedative Overdose

REVISED: 02/ 2012

SEDATIVE OVERDOSE

OVERVIEW:

This protocol includes alcohol, benzodiazepines, and GHB analog overdoses. It may include other CNS depressants as well. Patient care should be focused on supporting the airway, respiratory function, and preventing/mitigating self harm. Of the sedatives commonly seen, GHB analogs are some of the most unpredictable and difficult to manage. Unfortunately, the history of poisoning/ overdose is notoriously unreliable whether it is obtained from the patient, friends and family members or emergency services personnel. Despite the possible inaccuracies, the most important historical factors include **what** poison was involved, **how much** was taken, **how** it was taken, **when** it was taken, **why** it was taken, and especially **what else** was taken. Poison Control may be contacted at any time for information on poisoning (1-800-222-1222) but **only Medical Control may give patient treatment orders.**

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Use or suspected use of a potentially toxic substance- Substance ingested, route, and quantity used- Time of use- Reason (suicidal, accidental, criminal)- Available medications in home- Past medical history	<ul style="list-style-type: none">- Mental status changes- Hypotension/ hypertension- Hypothermia/ hyperthermia- Decreased respiratory rate- Bradycardia, other dysrhythmias- Seizures- Nausea/ vomiting	<ul style="list-style-type: none">- Tricyclic anti-depressants (TCAs)- Acetaminophen (Tylenol)- Depressants- Stimulants- Anticholinergic- Cardiac medications- Solvents, alcohols- Cleaning agents- Insecticides

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- If the patient is unconscious or having seizures, refer to appropriate patient care protocol.
- Place patient on pulse oximetry and administer **Oxygen**, per patient assessment.
- Suction oropharynx as necessary.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

Sedative Toxidrome

<ul style="list-style-type: none">- Sedation- Confusion- Delirium- Hallucinations	<ul style="list-style-type: none">- Coma- Paresthesias- Dysesthesias- Diplopia	<ul style="list-style-type: none">- Blurred Vision- Slurred Speech- Ataxia- Nystagmus
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GHB (Gamma-Hydroxy Butyrate) and analogs

- Onset of signs and symptoms typically 10-40 min. post ingestion, last approximately 4-8 hours, and are cleared in typically 12-14 hours post ingestion.
- Signs and symptoms include: bradycardia, seizure like activity, deep sedation/CNS depression with some patients showing rapid & severe mental status changes (including combativeness), nausea and vomiting. Alcohol severely exacerbates signs and symptoms.
- Be prepared to forcibly restrain patient, and ensure crew safety due to the sudden return to combativeness that is common with this drug.
- Intubation is seldom needed, but if required, restrain and sedate patient to protect airway from trauma and extubation.
- Most GHB analog related deaths involve co-ingestion of alcohol. Therefore alcohol consumption should be considered a significant co-morbid factor.

PEARLS:

1. Do not rely on patient history of ingestion, especially in suicide attempts.
2. Bring bottles, contents, and emesis to ER with patient.
3. All medications should be continued as outlined in protocol until supply is exhausted.
Remember, RAA ambulances have two (2) drug boxes for use, if needed to continue care.

SEDATIVE OVERDOSE

Protocol

4-6

SECTION: Toxicological Emergency Patient Care

PROTOCOL TITLE: Withdrawal Syndromes

REVISED: 02/ 2012

WITHDRAWAL SYNDROMES

OVERVIEW:

This protocol includes withdrawal from alcohol, benzodiazepines, and GHB analogs, as they have similar presentations, physiology, and treatments. A patient undergoing active withdrawal may mimic hyper-dynamic toxicity, and may be difficult to diagnose. These patients have many of the same risk factors as patients in hyper-dynamic crisis including agitated delirium, positional asphyxia, hyperthermia, and seizures. Other patients withdrawing from stimulants may have severe cravings, paranoia, suicidal ideations, exhaustion, and other symptoms. Good clinical judgment is mandatory when dealing with these situations to decide when to (and when not to) treat the patient. Withdrawal does not require complete abstinence from a drug, simply reaching sub-normal (for that patient) levels can make a patient symptomatic. Early withdrawal consists of mild anxiety and craving. This progresses in severity to excessive adrenergic effects including tachycardia, hyperventilation, systolic hypertension, diaphoresis, low-grade fever, hallucinations, intense anxiety, tremor, and insomnia. Some patients (up to 50% in cases of alcohol, and GHB) may experience true delirium, severe hyperthermia and seizures.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Use or suspected use of a potentially toxic substance- Substance ingested, route, and quantity used- Time of use- Reason (suicidal, accidental, criminal)- Available medications in home- Past medical history	<ul style="list-style-type: none">- Mental status changes- Hypotension/ hypertension- Hypothermia/ hyperthermia- Decreased respiratory rate- Bradycardia, other dysrhythmias- Seizures- Nausea/ vomiting	<ul style="list-style-type: none">- Tricyclic anti-depressants (TCAs)- Acetaminophen (Tylenol)- Depressants- Stimulants- Anticholinergic- Cardiac medications- Solvents, alcohols- Cleaning agents- Insecticides

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen**, per patient assessment.
- Suction oropharynx as necessary.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300mg/dl, refer to *Hypoglycemia or Hyperglycemia Patient Care Protocol*.

	Onset/ Duration	Autonomic Instability	Neuro-Psychiatric Symptoms	Mortality
GHB	1-6 hours to 14 days	Mild	Severe	Unknown
Benzodiazepines	1-3 days	Moderate	Moderate	1%
Alcohol	6-12 hours to 7 days	Severe	Moderate	5-15%

PEARLS:

1. While the delirium associated with withdrawal is the result of abstinence rather than ingestion from certain drugs, the delirium itself continues to pose a life threat to the patient, especially with regard to restraint and pharmacologic agents used.
2. Use of Haldol or Phenergan with patients suffering from active withdrawal from GHB, alcohol, or GHB analogs is relatively contraindicated in the pre-hospital setting due to these drugs effect on seizure threshold, heat production and general side effects that may complicate care.
3. With marked agitation, liberal use of low dose benzodiazepines may be very helpful in relieving symptoms, as well as prevention of myoclonic tremors and/or seizure activity.
4. Do not rely on patient history of ingestion, especially in suicide attempts.
5. Bring bottles, contents, and emesis to ER with patient.
6. All medications should be continued as outlined in protocol until supply is exhausted. Remember, RAA ambulances have two (2) drug boxes for use, if needed to continue care.

Protocol 5-1

SECTION: Pediatric Cardiovascular Emergencies

PROTOCOL TITLE: BLS Pulseless Arrest

REVISED: 02/ 2012

BLS PULSELESS ARREST

EMT Basic

- Perform initial assessment:
 1. Confirm pulselessness at femoral and brachial artery.
 2. If witnessed arrest immediately apply attach AED, when available. If <8 years old, use PEDIATRIC multi-function defibrillation pads, if available.
 3. If unwitnessed arrest, begin manual CPR for 30 seconds (compression/ventilation ratio of 30:2 single rescuer, 15:2 with 2 rescuers) prior to analyzing rhythm. Do not stop CPR, if possible, until patient improves or resuscitation efforts are stopped.
 4. Open airway, insert oropharyngeal airway, begin manual ventilation with 100% oxygen via BVM. Visualize chest rise and fall, readjust airway as needed.

Infant (<1 year old)

- Begin CPR (compression/ventilation ratio of 30:2 single rescuer, 15:2 with 2 rescuers) utilizing the “2 thumb encircling” technique without delay. Do not stop CPR, if possible, until patient improves or resuscitation efforts are stopped.

Child (1 – 8 years old)

- Analyze rhythm. If “SHOCK ADVISED”, give one (1) shock
- If “NO SHOCK ADVISED” or shock was administered, resume CPR immediately.
- Provide two (2) minutes or five (5) complete compression/ventilation cycles of CPR.
- Analyze rhythm. If “SHOCK ADVISED”, give one (1) shock
- If “NO SHOCK ADVISED” or shock was administered, resume CPR immediately.
- Provide two (2) minutes or five (5) complete compression/ventilation cycles of CPR.
- Continue with analyze rhythm/ shock/ CPR sequence until ALS assistance arrives or patient begins to have spontaneous movement
- If patient is > 3 feet (36 inches) in length insert appropriately sized KING LT rescue airway.
- Contact Medical Control at any time for assistance.
- Transport promptly to closest appropriate facility.

POSSIBLE CAUSES OF PULSELESS ARREST

A – Acidosis, Alcohol	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Sepsis
I – Insulin	P – Psych, Porphyria, Pharmacy
O – Oxygenation, Overdose	S – Space occupying lesion, Subarachnoid hemorrhage, Stroke, Sepsis
U – Uremia	

PEARLS:

1. Immediately stop the transport at the nearest safe opportunity and call for ALS assistance via Richmond Ambulance Authority Communications Center. Per RAA's operational medical director, BLS units MAY NOT continue transport of patient in cardiac arrest without ALS assistance onboard.
2. If airway is maintainable initially with a BVM, delay rescue airway insertion until after initial defibrillation. The best airway is an effective airway with the least potential complications.
3. Continue CPR while AED is charging.
4. CPR should not be stopped for any reason, if at all avoidable, other than to check rhythm immediately prior to defibrillation. Any stop of compressions should be kept as short as possible, preferably a maximum of 10 seconds. Rescue airway placement should be performed during compressions.
5. Pay close attention to rate of manual ventilation. Hyperventilation produces decrease in preload, cardiac output, coronary perfusion, and cerebral blood flow.
6. AED may be used for patients all ages. For children less than 8 years of age, use a pediatric compatible AED. If a pediatric compatible AED, is not available, use a standard AED.
7. A numerical capnography value will appear in the left upper corner of the AED screen once attached.

Protocol 5-2

SECTION: Pediatric Cardiovascular Emergencies

PROTOCOL TITLE: Bradycardia

REVISED: 02/ 2012

BRADYCARDIA

OVERVIEW:

Bradycardia is the most common dysrhythmia in the pediatric population. Bradycardia, in pediatric patients, typically is the result of some form of respiratory depression and initial treatment should be directed to ensuring that the patient is breathing adequately and providing supplemental oxygenation and ventilation as needed. Since the etiology of bradycardia is usually hypoxemia, initial management is ventilation and oxygenation while perfusion is maintained with chest compressions in children with a heart rate of less than 60 beats per minute. Symptomatic bradycardia is defined in pediatrics as hypotension or other S/S of poor perfusion, with a (relative to age) bradycardia. Most bradycardia is hypoxia related, and will usually respond to oxygenation.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Past medical history - Foreign body exposure - Respiratory distress or arrest - Apnea - Possible toxic or poison - Environmental exposure - Congenital disease - Medication (maternal or infant) 	<ul style="list-style-type: none"> - Heart rate < 60 bpm - Delayed capillary refill or cyanosis - Mottled, cool skin - Hypotension or arrest - Altered mental status 	<ul style="list-style-type: none"> - Respiratory effort - Respiratory obstruction - Foreign body, secretions - Croup, epiglottitis - Hypovolemia - Hypothermia - Infection, sepsis - Medication, toxin - Hypoglycemia - Trauma

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximeter and administer **Oxygen** per patient assessment. Maintain patent airway and assist breathing as needed.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

POSSIBLE CAUSES OF BRADYCARDIA/ PULSELESS ELECTRICAL ACTIVITY

A – Acidosis, Alcohol	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Sepsis
I – Insulin	P – Psych, Porphyria, Pharmacy
O – Oxygenation, Overdose	S – Space occupying lesion, Subarachnoid hemorrhage, Stroke, Sepsis
U – Uremia	

*****PEDIATRIC BRADYCARDIA IS USUALLY RESULT OF HYPOXIA*****

PEARLS:

1. Pharmacological treatment of bradycardia is based upon the presence or absence of significant signs and symptoms (symptomatic vs. asymptomatic).
2. Although noninvasive pacing may be attempted, typically bradycardias of hypoxic etiology do not respond. First line therapy is prompt airway support, ventilation and oxygenation.
3. Capture thresholds in children are similar to those in adults. Studies indicate no relationship between body surface area, weight, and capture thresholds and although many children will achieve capture between 50-100 mA, higher current requirements are possible. The pacing rate must be set high enough to perfuse the patient
4. Electrical capture during transcutaneous pacing is defined as an electrical stimulus marker followed by a wide QRS complex, with no underlying intrinsic rhythm, followed by a T-wave. This should occur for each electrical complex.
5. Mechanical capture is confirmed when the patient's pulse matches the displayed pace rate. Because pacing stimuli generally causes muscular contractions that can be mistaken for a pulse, you should never take a pulse on the left side of the body to confirm mechanical capture. Pectoral muscle contractions due to pacing also do not indicate mechanical capture. To avoid mistaking muscular response to pacing stimuli for arterial pulsations, use ONLY the 1. Femoral artery or 2. Right brachial or radial artery for confirming mechanical capture.

Protocol 6-1

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Medical Assessment

REVISED: 02/ 2012

MEDICAL ASSESSMENT

OVERVIEW:

Few encounters cause greater anxiety for medical providers than a pediatric patient experiencing a life-threatening situation. Although pediatric calls only account for approximately 10% of all EMS calls, they can be among the most stressful. Pre-hospital providers need to be prepared to face these challenges, as prompt recognition and treatment of potentially life-threatening diseases in children in the field may have a significant impact on the outcome of the patient. Of the 10% of EMS calls that involve pediatric patients, fewer than 5% are for life- or limb-threatening situations. When EMS does respond to a pediatric call, treatment such as administering oxygen, starting an IV or performing endotracheal intubation can be involved in more than 50% of the cases.

PRIMARY ASSESSMENT:

Approach to the pediatric patient varies with the patient's age and the nature of illness or injury. It is critical that EMS providers be cognizant of the emotional and physiological needs of a child throughout the assessment. It is equally important to identify the needs of the child's family members. In this stressful environment, family members will be trying to find the cause of injury or illness in their child and may be unruly when the answers they seek are not available or are contrary to what is expected.

The key to pediatric assessment in EMS is to identify and manage immediate life threats. It is often easy to determine whether a child is sick just by looking at him. Sick kids look sick. If a child is active, appropriate and alert, he is not sick. The opposite is true as well. If a child is inactive and non-interactive, assume he is sick until proven otherwise. The most widely accepted approach to forming a general impression in a child is using the Pediatric Assessment Triangle. This tool is especially useful because the assessment criteria are determined during the general impression. This assessment can be performed from across the room, before contact with the patient is ever made.



AIRWAY:

The patient's airway should be assessed to determine whether it is patent, maintainable, or not maintainable. For any patient who may have a traumatic injury, cervical spine precautions should be utilized while the airway is evaluated. Assessment of the patient's level of consciousness, in conjunction with assessment of the airway, provides an impression of the effectiveness of the patient's current airway status. If an airway problem is identified, the appropriate intervention should be initiated. The decision to use a particular intervention depends on the nature of the patient's problem and the potential for complications during transport. Specific equipment, such as a pulse oximeter or capnography, help provide continuous airway evaluation during transport.

It is important to also be able to identify differences between adult and pediatric anatomy and physiology.

The anatomical and physiologic variations between adults and children can cause confusion if the EMS provider does not fully understand these differences.

Summary of Primary Airway Assessment

- Airway: Patent, maintainable, un-maintainable
- Level of consciousness
- Skin appearance: Ashen, pale, gray, cyanotic, or mottled
- Preferred posture to maintain airway
- Airway clearance
- Sounds of obstruction

Differences in the Pediatric Airway

- Larger tongue in relation to free space in oropharynx.
- Trachea is more pliable and smaller in diameter with immature tracheal rings
- Epiglottis is large and is more u-shaped or oblong
- Larynx is at the level of the 1st or 2nd vertebrae
- Mainstem bronchi has less angle

BREATHING:

The assessment of ventilation begins with noting whether the patient is breathing. If the patient is apneic or in severe respiratory distress, immediate interventions are required. If the patient has any difficulty with ventilation, the problem must be identified and the appropriate intervention initiated. Emergent interventions may include manual ventilation of the patient via bag valve mask, endotracheal intubation, and/or needle thoracentesis.

Normal respirations in an infant can be irregular and, as a result, respiratory rates should be assessed over a minimum of 30 seconds, but ideally 60 seconds. The variability of respiration in infants may not produce an

accurate rate when only observed for 15 seconds. It is important to note that the variable rate of respiration in infants may include cessation in breathing for up to 20 seconds. Anything greater than 20 seconds should be considered abnormal and will require intervention.

CIRCULATION:

Palpation of both the peripheral and the central pulse provides information about the patient's circulatory status. The quality, location, and rate of the patient's pulses should be noted along with the temperature of the patient's skin being assessed while obtaining the pulses. Observation of the patient's level of consciousness may also help evaluate the patient's perfusion status initially.

Although the pediatric and adult heart share identical anatomy, several important distinctions need to be made between the adult and pediatric cardiovascular systems.

First, the adult heart increases its stroke volume by increasing inotropy (strengthening contractions) and chronotropy (increasing heart rate). In contrast, the pediatric heart can only increase chronotropy in an attempt to increase stroke volume. The pediatric heart has low compliance as it relates to volume; therefore, it cannot compensate well by increasing stroke volume. Consequently, heart rate should be seen as a significant clinical marker when monitoring cardiac output in the fetus, neonate and pediatric patient. When the pediatric patient becomes bradycardic, it should be assumed that cardiac output has been drastically reduced. Bradycardia is most commonly caused by hypoxia. Bradycardia may be an early sign of hypoxia in the neonate; however, it is an ominous sign of severe hypoxia in the infant and child.

Capillary refill time is typically quite accurate in children and considered to be reliable in most cases. Just as in the adult patient, environmental factors like cold ambient temperatures can influence capillary refill times and should be taken into consideration. For this reason, capillary refill time should be assessed closer to the core in areas like the kneecap or forearm. Normal capillary refill time is less than two to three seconds.

Summary of Primary Breathing Assessment

- Rate and depth of respirations
- Cyanosis
- Work of breathing
- Use of accessory muscles
- Flaring of nostrils
- Presence of bilateral breath sounds
- Presence of adventitious breath sounds
- Asymmetric chest movements
- Oxygen saturation measured with pulse oximetry

Summary of Primary Circulation Assessment

- Pulse rate and quality
- Skin appearance: Color
- Peripheral pulses
- Skin temperature
- Level of consciousness
- Urinary output
- Blood Pressure
- Cardiac monitor
- Invasive monitor

Protocol

6-1

Continued

MEDICAL ASSESSMENT

DISABILITY:

The basic, primary neurological assessment includes assessment of the level of consciousness; the size, shape, and response of the pupils; and motor sensory function. The simple method of AVPU should be used to evaluate the patient's overall level of consciousness.

Summary of Primary Disability (Neurological) Assessment

- A - Alert
- V - Responds to verbal stimuli
- P - Responds to painful stimuli
- U - Unresponsive

The Glasgow Coma Scale (GCS) provides assessment of the patient's level of consciousness and motor function and may serve as a predictor of morbidity and mortality after brain injury.

If the patient has an altered mental status, it must be determined whether the patient has ingested any toxic substances, such as alcohol or other drugs, or may be hypoxic because of illness or injury. A patient with an altered mental status may pose a safety problem during transport. Use of chemical sedation or physical restraint may be necessary to ensure safe transport of the patient and EMS providers.

Glasgow Coma Scale (GCS)

Infant < 1 year			Child 1-4 yrs		
Eye Opening:	Spontaneous	4	Eye Opening:	Spontaneous	4
	To voice	3		To voice	3
	To pain	2		To pain	2
	No response	1		No response	1
Verbal Response:	Coos, babbles	5	Verbal Response:	Speaks, interacts, social	5
	Irritable cry, consolable	4		Confused speech, consolable	4
	Cries persistently to pain	3		Inappropriate, inconsolable	3
	Moans to pain	2		Incomprehensible, agitated	2
	No response	1		No response	1
Motor Response:	Spontaneous	6	Motor Response:	Spontaneous	6
	Withdraws (touch)	5		Localizes (pain)	5
	Withdraws (pain)	4		Withdraws (pain)	4
	Decorticate flexion	3		Decorticate flexion	3
	Decerebrate extension	2		Decerebrate extension	2
	No response	1		No response	1

EXPOSURE:

As much of the patient's body as possible should be exposed for examination, depending on complaint, with the effects of the environment on the patient kept in mind. Discovery of hidden problems before the patient is loaded for transport may allow time to intervene and avoid disastrous complications. Although exposure for examination is emphasized most frequently in care of the trauma patient, it is equally important in the primary assessment of the patient with a medical illness.

Summary of Primary Exposure Assessment

- Identification of injury, active bleeding, or indication of a serious illness.
- Appropriate tube placement: Endotracheal tubes, chest tubes, feeding tubes, naso-gastric or orogastric tubes, and urinary catheters.
- Intravenous access: Peripheral, central, and intraosseous

The pre-hospital provider should always look under dressings or clothing, which may hide complications or potential problems. Clothing may hide bleeding that occurs as a result of thrombolytic therapy or rashes that may indicate potentially contagious conditions. In inter-facility transport, intravenous access can be wrongly assumed underneath a bulky cover. Once patient assessment has been completed, keep in mind that the patient must be kept warm. Hypothermia can cause cardiac arrhythmias, increased stress response, and hypoxia.

SECONDARY FOCUSED ASSESSMENT:

The secondary assessment is performed after the primary assessment is completed and involves evaluation of the patient from head to toe. Illness specific information is collected by means of inspection, palpation, and auscultation during the secondary assessment. Whether the patient has had an injury or is critically ill, the pre-hospital provider should observe, and listen to the patient.

The secondary assessment begins with an evaluation of the patient's general appearance. The pre-hospital provider should observe the surrounding environment and evaluate it's effects on the patient. Is the patient aware of the environment? Is there appropriate interaction between the patient and the environment?

Determination of the amount of pain the patient has as a result of illness or injury is also an important component of the patient assessment. Baseline information should be obtained about the pain the patient has so that the effectiveness of interventions can be assessed during transport. Pain relief is one of the most important interventions for pre-hospital patient care providers.

Assessment Acronyms

S.A.M.P.L.E.	O.P.Q.R.S.T.
S - Signs and Symptoms	O - Onset (When did the problem/ pain begin?)
A - Allergies	P - Provocation (What makes the problem/ pain worse?)
M - Medications	Q - Quality (Can you describe the problem/ pain?)
P - Pertinent past medical history	R - Radiation (Does the pain move anywhere?)
L - Last oral intake	S - Severity (On a scale of 1-10, how bad is the pain?)
E - Events leading up to the event	T - Time (Does the condition come and go? Duration?)

Summary of Secondary Assessment

<p>Skin:</p> <ul style="list-style-type: none"> - Presence of petechia, purpura, abrasions, bruises, scars, or birthmarks - Rashes - Abnormal skin turgor - Signs of abuse or neglect <p>Head and Neck:</p> <ul style="list-style-type: none"> - Presence of lacerations, contusions, raccoon eyes, Battle's sign, or drainage from the nose, mouth, and ears - Gross visual examination - Abnormal extra-ocular movements - Position of the trachea - Neck veins - Swallowing difficulties - Nuchal rigidity - Presence of lymphadenopathy or neck masses <p>Ears, Nose, and Throat:</p> <ul style="list-style-type: none"> - Lack of tearing - Sunken eyes - Color of the sclera - Drainage - Gross assessment of the hearing <p>Mouth and Throat:</p> <ul style="list-style-type: none"> - Mucous membranes - Breath odor - Injuries to teeth - Drooling - Drainage 	<p>Thorax, Lungs, and Cardiovascular System:</p> <ul style="list-style-type: none"> - Breath sounds - Heart Sounds <p>Abdomen:</p> <ul style="list-style-type: none"> - Shape and size - Bowel sounds - Tenderness - Firmness - Masses (i.e. suprapubic masses) - Femoral pulses - Pelvic tenderness - Color of drainage from naso-gastric or oro-gastric tubes <p>Genitourinary:</p> <ul style="list-style-type: none"> - Rectal bleeding - Color of urine in catheter <p>Extremities and Back:</p> <ul style="list-style-type: none"> - Gross motor and sensory function - Peripheral pulses - Lack of use of an extremity - Deformity, angulation - Wounds, abrasions - Vertebral column, flank, buttocks - Equipment is appropriately applied (i.e. traction splints, extremity splints, cervical collar)
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Protocol 6-2

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Abdominal Pain

REVISED: 02/ 2012

ABDOMINAL PAIN

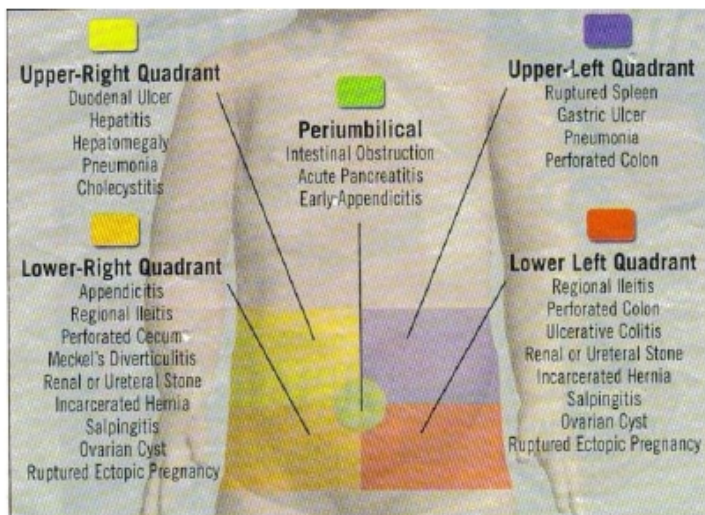
OVERVIEW:

Abdominal pain is one of the most common presenting complaints in emergency medicine. In up to 42% of patients, the etiology remains obscure. Recalling the differences between generalized types of pain can be helpful diagnostically. Visceral abdominal pain results from stretching of the autonomic nerve fibers. The pain may be described as cramp like, colicky, or gaseous and is often intermittent. Obstruction is often the cause. Somatic pain occurs when pain fibers located in the parietal peritoneum are irritated by chemical or bacterial inflammation. The pain is described as sharp, more constant, and more precisely located. Referred pain is any pain felt at a distance from a diseased organ. Referred pain generally follows certain classic patterns, for example, diaphragmatic irritation often radiates to the supra-clavicular area.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Past medical, surgical history - Medications - Time of onset - Palliation, provocation - Quality (crampy, constant, sharp, dull, etc) - Region, radiation, referred - Severity (1-10) - Duration, repetition - Fever - Last meal - Last bowel movement, consistency - Menstrual history, pregnancy 	<ul style="list-style-type: none"> - Pain (location, migration) - Distension, rigidity - Unequal, absent femoral pulses - Diaphoresis - Orthostatic changes - Tenderness - Nausea, vomiting, diarrhea - Dysuria - Constipation - Vaginal bleeding, discharge - Pregnancy - Associated symptoms (helpful to localize source) Fever, headache, weakness, malaise, myalgias, cough, mental status changes, rash 	<ul style="list-style-type: none"> - Pneumonia - Pulmonary embolus - Liver (hepatitis) - Peptic ulcer disease, gastritis - Gallbladder - Pancreatitis - Kidney stone - Appendicitis - Bladder, prostate disorder - Pelvic (PID, ectopic pregnancy, ovarian cyst) - Spleen enlargement - Bowel obstruction - Gastroenteritis (infectious)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Use distraction (through conversation, toys, etc) and breathing techniques to help patient alleviate pain.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- If shock is present, without pulsating masses, refer to *Pediatric Hypovolemic Shock Patient Care Protocol*.

**PEARLS:**

1. Abdominal pain may be the first sign of an impending rupture of the appendix, liver, spleen, ectopic pregnancy, or aneurysm. Monitor for signs of hypovolemic shock.
2. If a pulsating mass is felt, suspect an abdominal aneurysm and discontinue palpation.
3. Abdominal pain in women of childbearing age should be treated as an ectopic pregnancy until proven otherwise.
4. Appendicitis presents with vague, periumbilical pain, which migrates to the RLQ over time.
5. Ask the patient to point to the pain. The farther from the umbilicus the patient points, the more likely the pain is to be organic in origin.
6. Simple pain management techniques include oxygen administration, splinting, speaking in a calm, reassuring voice, and placing the patient in their position of comfort.

Protocol 6-3

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Allergic Reaction / Anaphylaxis

REVISED: 02/ 2012

ALLERGIC REACTION / ANAPHYLAXIS

OVERVIEW:

Acute respiratory emergencies in the pediatric patient are common. When not properly treated, respiratory distress can result in significant morbidity and mortality. Anaphylaxis in children commonly results from insect stings and, less frequently, from food or medications. Signs of shock as well as upper and lower airway obstruction are frequently present. If the reaction involves the respiratory system, signs similar to severe asthma may be present (cyanosis, wheezing, respiratory arrest). Patients with allergic reactions frequently have local or generalized swelling while anaphylaxis can be characterized by wheezing, airway compromise, and/ or hypotension.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Onset and location- Insect sting or bite- Food allergy/ exposure- New clothing, soap, detergent- Past history of reactions- Medication history	<ul style="list-style-type: none">- Itching or hives- Coughing/ wheezing or respiratory distress- Chest or throat constriction- Difficulty swallowing- Hypotension or shock- Edema	<ul style="list-style-type: none">- Urticaria (rash only)- Anaphylaxis (systemic effect)- Shock (vascular effect)- Angioedema (drug induced)- Aspiration/ airway obstruction- Vaso-vagal event- Asthma

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Evaluate severity of patient's reaction. If patient's reaction is severe, administer **0.15mg Epi-Pen Auto-Injector** or, if the patient has a prescribed **Epinephrine Auto Injector**, assist patient with the medication.
- Maintain warmth and prevent heat loss.

PEARLS:

1. The most important component of respiratory distress is airway control.
2. Any pediatric patient presenting with substernal and intercostal retractions is in immediate need of treatment and transport. Do not delay transport with treatments that can be completed enroute.
3. Avoid intravenous initiation or medication administration into same extremity as bite or allergen site.

Protocol 6-4

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Fever

REVISED: 02/ 2012

FEVER

OVERVIEW:

Fever is a common chief complaint of children encountered in the pre-hospital environment. Patients with fever present in many different ways, depending on the age of the patient, the rate of rise of the temperature, the magnitude of the fever, the etiology of the fever, and the underlying health of the patient. The patient's skin will be warm to the touch, and may be flushed on observation. The patient may also complain of being warm and perspiring. It is important to recognize that fever represents a symptom of an underlying illness and the actual illness must be determined and treated. Flu-like symptoms may accompany fevers, but it should not be assumed that fevers with these symptoms are minor, as there may be a serious underlying medical condition. Febrile seizures usually are self-limiting and typically occur once from a rapid rise in temperature, usually above 101.8°F/ 38.7°C. If more than one seizure occurs, causes other than fever should be suspected. The first occurrence of a seizure warrants the most concern, because the benign nature of the illness has not been established.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Duration of fever - Severity of fever - Any previous decrease or elevation of fever since onset - Past medical history - Medications - Immuno-compromised (transplant, HIV, diabetes, cancer) - Recent illness or socialization with others with illness. - Vaccinations - Poor PO intake - Urine production, decrease in diapers - Last acetaminophen, dose 	<ul style="list-style-type: none"> - Altered mental status - Unconsciousness - Hot, dry, or flushed skin - Tachycardia - Hypotension, shock - Seizures - Nausea, vomiting - Weakness, dizziness, syncope - Restlessness - Loss of appetite - Decreased urine output - Rapid, shallow respirations - Associated symptoms (helpful in localizing source): Myalgias, cough, chest pain, headache, dysuria, abdominal pain, mental status changes, rash 	<ul style="list-style-type: none"> - Infection, sepsis - Neoplasms, cancer, tumors, lymphomas - Medication or drug reaction - Connective tissue disease - Vasculitis - Thermoregulatory disorder - Hyperthyroid - Heat Stroke - Drug fever

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- If seizure activity is noted, refer to *Pediatric Seizure Patient Care Protocol*.
- Obtain complete history of incident, if possible, document temperature and monitor for any temperature change during treatment.
- If temperature is greater than 106°F/ 41°C, refer to *Pediatric Hyperthermia Patient Care Protocol*.

- Begin passive cooling by removing excess and constrictive clothing. Avoid over-exposure.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. Fevers with rashes are abnormal and should be considered very serious.
2. Fevers in infants 2 months old and under should be considered very serious.
3. Patient may seize if temperature change is rapid, be cautious and prepared to manage both seizure activity and airway at all times.
4. If fever is present with hypotension, it may indicate the patient is in septic shock.
5. Febrile seizures are more likely in children with a history of febrile seizures.
6. Proper history should include normal PO intake and any change that is noted by parent, i.e. normal amount of breast-feeding with length of feeding or bottles with amount and current intake documented in same specifics.
7. It is important to know if an elevation in temperature signals the abrupt onset of fever or represents the gradual worsening of a long-term fever.
8. Cooling in the pre-hospital environment with water, alcohol, or ice is discouraged.
9. Fevers in children of 104°F / 40°C for greater than 24 hours should be considered serious.
10. A common error in the treatment of fever is to wrap the patient in multiple layers of clothing and blankets. This only contributes to the rise in temperature.

Protocol 6-5

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Foreign Body Aspirations

REVISED: 02/ 2012

FOREIGN BODY ASPIRATION

OVERVIEW:

Airway obstruction is one of the most readily treatable yet immediately life-threatening emergency faced by pre-hospital providers. Approximately 3000 deaths occur each year in the United States from choking. Most of these deaths are in children younger than four years of age. In children, you should consider the possibility of foreign body aspiration in any patient who presents with ongoing respiratory distress or resolved respiratory distress. The child may have a history of a sudden onset of respiratory distress with choking and cough, by an absence of symptoms and then followed by delayed stridor or wheezing. This cycle occurs when the foreign body is not cleared from the airway but passes distally into the smaller airways. In children, a foreign body may also lodge in the esophagus, causing stridor. Patients may present with any degree of obstruction from simple hoarseness cleared with a cough to complete obstruction requiring a surgical airway, such as a cricothyrotomy. Significant airway obstruction can occur at any time. Early recognition and treatment is essential to a successful outcome. Because of this, it is important to distinguish this problem from more serious conditions that cause sudden respiratory failure, but are treated differently.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - What was happening at onset? - Any toys missing - Fever - Traumatic mechanism - Improvement or worsening with movement - Past medical history - Past surgical history - Medications 	<ul style="list-style-type: none"> - Stridor, hoarseness, wheezing - Ineffective respirations - Universal sign of choking - Tachycardia - Tachypnea - Flushing, cyanosis, chills, diaphoresis - Presence of drooling, trismus, angio-neurotic edema 	<ul style="list-style-type: none"> - Croup - Epiglottitis - Angio-neurotic edema - Traumatic obstruction - Chemical or thermal injury - Abscesses - Tumors and cysts

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Determine extent of airway obstruction.
- If patient is breathing (even labored) and can cough or talk, transport without delay.
- Place patient on pulse oximetry and administer **Oxygen**, per patient assessment.
- If history suggests epiglottitis or croup, refer to *Pediatric Respiratory Distress Croup/ Epiglottitis Patient Care Protocol*.
- If patient is not breathing or unable to talk, begin procedures to attempt removal without delay:
 - If patient is <12 months old, deliver up to five (5) back blows and up to five (5) chest thrusts, until foreign body is expelled or patient becomes unconscious.
 - If patient is >12 months old, perform abdominal thrusts until foreign body is expelled or patient becomes unconscious.

- If patient becomes unconscious, perform tongue jaw lift and visualize oropharynx.
- If foreign body is seen in oropharynx, carefully remove object with magill forceps.
- Re-attempt to ventilate and repeat appropriate airway clearing procedure, if needed, until successful.

PEARLS:

1. Abnormal auscultative sounds are more inspiratory if the foreign body is in the extra-thoracic trachea. If the object is in the intra-thoracic trachea, noises will be symmetric but sound more prominent in the central airways. The sounds are a coarse wheeze (sometimes referred to as an inspiratory stridor) heard with the same intensity over the entire chest.
2. Once the foreign body passes the carina, the breath sounds are usually asymmetric. However, remember that the chest of younger patients transmits sound well, and the stethoscope head is often bigger than the lobes being auscultated. A lack of asymmetry should not dissuade the provider from considering the diagnosis.

Protocol 6-6

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Hyperglycemia

REVISED: 02/ 2012

HYPERGLYCEMIA

OVERVIEW:

Diabetes mellitus is the most common endocrine disorder of childhood, affecting approximately 2/1,000 school-age children in the United States. Symptomatic hyperglycemia is defined as a blood glucose level >300 mg/dl with signs of severe dehydration, altered mental status, and/ or shock. Hyperglycemia is usually the result of an inadequate supply of insulin to meet the body's needs. The body will attempt to excrete the excess sugar into the urine causing osmotic diuresis. Ketone and acid production begins as the body uses other sources of fuel for metabolism. Hyperglycemic emergencies in patients with diabetes can generally be broken into two categories: Diabetic Ketoacidosis (DKA) and Hyperosmolar Hyperglycemic State (HHS), also known as Hyperosmolar Hyperglycemic Non-ketotic Coma (HHNC). Most pre-hospital care should be focused around the treatment of severe dehydration and support of vital functions.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - History of diabetes - Onset of symptoms - Medications 	<ul style="list-style-type: none"> - Anxiety, agitation, and/ or confusion - Dry, red, and/ or warm skin - Fruity/ acetone smell on breath - Kussmaul respirations - Dry mouth, intensive thirst - Abnormal/ hostile behavior - Tachycardia - Dizziness/ headache 	<ul style="list-style-type: none"> - See <i>Unconscious/ Syncope/ AMS Patient Care Protocol</i> - Hypoxia - Brain trauma - Alcohol intoxication - Toxin/ substance abuse - Medication effect/ overdose

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Suction oropharynx as necessary. Place patient on their side unless trauma is suspected.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain complete history of incident, if possible. Consider other possible causes of unconsciousness.
- Obtain blood glucose sample. If glucose is <60 mg/ dl, refer to *Pediatric Hypoglycemia Patient Care Protocol*.
- Elevate head of stretcher if patient showing signs and symptoms of cerebral edema.

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

PEARLS:

1. Use aseptic techniques to draw blood from finger.
2. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on or fan site to dry faster.
3. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results.
4. On RAA's current glucometer, Ascensia! Contour!, a reading of "HI" on the monitor is >600 mg/dl and should be documented as such in EPCR.
5. It is estimated that 2-8% of all hospital admissions are for the treatment of DKA, while mortality for DKA is between 2-10%. Published mortality rates for HHS vary, but the trend is that the older the patient and higher the osmolarity, the greater the risk of death.

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Hypoglycemia

REVISED: 02/ 2012

HYPOGLYCEMIA

OVERVIEW:

Symptomatic hypoglycemia is defined as a blood glucose level <60 mg/dl with signs of altered mental status and/ or unconsciousness. The many signs and symptoms that are associated with hypoglycemia can be divided into two broad categories: adrenergic and neurologic. The adrenergic stimulation is due to the increased epinephrine levels and the neurologic due to central nervous system dysfunction from the decreased glucose levels.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - History of diabetes - Onset of symptoms - Medications - Fever or recent infection - Alcohol consumption - Last meal 	<ul style="list-style-type: none"> - Anxiety, agitation, and/ or confusion - Cool, clammy skin - Diaphoresis - Seizure - Decreased visual acuity, blindness - Abnormal/ hostile behavior - Tachycardia - Hypertension - Dizziness, headache, weakness 	<ul style="list-style-type: none"> - See <i>Unconscious/ Syncope/ AMS Patient Care Protocol</i> - Hypoxia - Seizure - Stroke - Brain trauma - Alcohol intoxication - Toxin/ substance abuse - Medication effect/ overdose

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-Spine, if indicated.
- Suction oropharynx as necessary. Place patient in recovery position unless trauma is suspected.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain complete history of incident, if possible. Consider other possible causes of unconsciousness.
- Obtain blood glucose sample. If glucose is >300 mg/ dl, refer to *Pediatric Hyperglycemia Patient Care Protocol*.
- If glucose is <60 mg/ dl **and** patient is alert, able to maintain airway, and follow commands, administer **15gm Oral Glucose PO**.
- Reassess blood glucose after all medications and q 10 minutes.

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol	T – Trauma, Tumor
E – Epilepsy	I – Insulin
I – Infection, Sepsis	P – Psychosis
O – Overdose	S – Stroke
U – Uremia Kidney Failure	

PEARLS:

1. Hypoglycemia is the most common metabolic problem in neonates.
2. Use aseptic techniques to draw blood from finger.
3. Blood glucose levels should be taken from extremity opposite IV and medication administration for most accurate reading.
4. Allow alcohol to dry completely prior to puncturing finger for blood glucose level. Alcohol may cause inaccurate readings. Do not blow on or fan site to dry faster.
5. After puncturing finger, use only moderate pressure to obtain blood. Excessive pressure may cause rupture of cells causing inaccurate results.
6. On RAA's current glucometer, Ascensia Contour, a reading of "LOW" on the monitor is <10 mg/dl and should be documented as such in EPCR.
7. When administering IV fluids, a minimum amount should be delivered as large amounts may lower blood glucose level and impede original goal of administering Dextrose.
8. Patients who are consuming aspirin, acetaminophen, anti-psychotic drugs, beta-blockers, oral diabetic medications, or antibiotics such as sulfa-based, tetracycline, and amoxicillin that experience a hypoglycemic episode are at a greater risk for relapse. These patients should have a responsible party with them after release if patient is treated without transport.
9. An inadequate amount of glucose for heat production, combined with profound diaphoresis, may place a hypoglycemic patient at greater risk for hypothermia. Keep patient warm as needed.
10. Glucagon causes a breakdown of stored glycogen to glucose. Glucagon may not work if glycogen stores are previously depleted due to liver dysfunction, alcoholism, or malnutrition.
11. Effects of Glucagon may take up to 30 minutes.
12. Any patient that has had a hypoglycemic episode without a clear reason should be transported for further evaluation.

Protocol 6-8

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Malignant Hyperthermia

REVISED: 02/ 2012

MALIGNANT HYPERTHERMIA

OVERVIEW:

The body temperature is contingent upon the balance between heat production and heat loss. Regulation of body temperature is dependent upon the principals of conduction, convection, and evaporation. Populations at a greater risk for hyperthermic emergencies include the poor (who lack adequate air conditioning), those who suffer from malnutrition, and those who have chronic illnesses. Predisposing factors commonly intervene over days rather than minutes or hours. Hyperthermia may occur in the presence of numerous host factors. These factors include many that affect thermoregulation through heat loss mechanisms (lack of acclimatization, fatigue, lack of sleep, dehydration, and skin disorders), while others contribute to heat production (obesity, lack of physical fitness, febrile illness, or sustained exercise). Changes in cognitive function appear to occur before the development of the physical symptoms associated with heat stress. Time distortion, memory impairment, or deterioration in attention are frequent cognitive characteristics associated with heat stress.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Past medical history - Medications - Exposure to increased temperatures, humidity - Extremes of age - Extreme exertion - Time, length of exposure - Poor PO intake - Fatigue, muscle cramping 	<ul style="list-style-type: none"> - Altered mental status - Unconsciousness - Hot, dry, or sweaty skin - Pale, clammy skin - Hypotension, shock - Seizures - Nausea - Weakness, dizziness, syncope - Rapid, shallow respirations 	<ul style="list-style-type: none"> - Fever - Dehydration - Medications - Hyperthyroidism (storm) - Delirium tremens (DT's) - Heat cramps - Heat exhaustion - Heat stroke - CNS lesions, tumors

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain temperature and monitor during treatment.
- Begin cooling as indicated by patient assessment.
 - Remove excess and constrictive clothing.
 - Ice packs may be used to assist cooling by applying to the axillae, neck, and groin.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. Extremes of age, young and old, are more susceptible to extreme temperatures.
2. Cocaine, amphetamines, and salicylates may elevate body temperature.
3. Sweating generally stops as core temperature rises above 104° F.
4. Intense shivering may occur as patient is cooled.
5. Patient may seize if temperature change is rapid, be cautious and prepared to manage both seizure activity and airway at all times.
6. Although more prevalent in elderly patients, children may develop heat edema due to sitting for long periods of time in a hot environment. Swelling of the ankles, feet, and hands may be noted on examination in these situations.
7. A heat rash, sometimes referred to as a “prickly heat” is due to an acute inflammation caused by blocking of the sweat pores. This type of injury is prevalent in infants exposed to a hot environment.
8. Heat cramps occur most often during rest after long periods of exertion and depletion of electrolytes. Although most common in calf muscles, severe cramping may involve the entire body.
9. Heat tetany may result from hyperventilation in hot environments. The signs and symptoms associated by respiratory alkalosis caused by this injury include paresthesia, circumoral paresthesia, and carpopedal spasms.

Protocol 6-9

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Hypothermia

REVISED: 02/ 2012

HYPOTHERMIA

OVERVIEW:

Hypothermia is defined as a core temperature less than 35° Celsius/ 95° Fahrenheit. While most commonly seen in cold climates, it may develop without exposure to extreme environmental conditions. Hypothermia is not uncommon in temperate regions and may develop indoors even during summer. Individuals at the extremes of age and those of altered mental status are more susceptible to developing hypothermia. Radiation accounts for the greatest form of heat loss (55-65%). Conduction normally accounts for only 2-3%, but increases up to five times in wet clothes and twenty five times in cold water.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Past medical history - Medications - Exposure to environment even in normal temperatures - Exposure to extreme cold - Extremes of age - Drug use: alcohol, barbiturates - Infection, sepsis - Length of exposure, wetness 	<ul style="list-style-type: none"> - Cold, clammy - Shivering - Mental status changes - Extremity pain, sensory abnormality - Bradycardia - Hypotension, shock 	<ul style="list-style-type: none"> - Sepsis - Environmental exposure - Hypoglycemia - CNS dysfunction Stroke Head injury Spinal cord injury

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain temperature and monitor during treatment.
- Assess heart rate for 60 seconds. If pulse is present (regardless of rate) and temperature is < 30° C/ 86° F, DO NOT begin chest compressions.
- Remove any wet clothing and wrap patient in dry blanket(s)
- Maintain warmth and prevent further heat loss.
- Obtain blood glucose sample. If glucose is <60 mg/dl, refer to *Hypoglycemia Patient Care Protocol*.

Stages of Hypothermia

Normal Cold Response (35°C – 37°C / 95.1°F – 98.6°F)

- Feeling of cold
- Shivering
- Vasoconstriction

Mild Hypothermia (34°C – 35°C / 93°F – 95°F)

- Maximum shivering at 35°C / 95°F
- Cold, pale skin (vasoconstriction)
- Pulse and BP are normal or elevated
- Increasing rate of respirations
- Mild confusion
- Slurred speech
- Unsteady gait
- Amnesia

Moderate Hypothermia (30°C – 34°C / 86°F – 93°F)

- No longer shivering
- Bradycardia
- Decreased respirations
- Increased risk of cardiac arrhythmia (A-Fib)
- Intense vasoconstriction – surface pooling (promotes afterdrop)
- Decreased LOC
- Increased mortality in major trauma by 40-50%

Severe Hypothermia (<30°C / <86°F)

- Intense vasoconstriction – surface pooling (promotes afterdrop)
- Lethal cardiac dysrhythmias (V-Fib)
- Non-cardiac pulmonary edema
- As core temp continues to decrease, risk of cardiac arrest increases dramatically

PEARLS:

1. NO PATIENT IS DEAD UNTIL THEY'RE WARM AND DEAD, unless patient presents with injuries incompatible with life.
2. Extremes of age, young and old, are more susceptible to effects of temperature.
3. With temperature less than 31°C / 88°F, ventricular fibrillation is a common cause of death. Patient with extreme hypothermia MUST be handled gently.
4. Cardiac arrest patients should be warmed to a core temperature of at least 29.5°C / 85°F before administering medications, as they may build in the system due to metabolism being ineffective.
5. Defibrillation should be limited to one (1) shock prior to warming core to >29.5°C / 85°F.
6. If the temperature is unable to be measured, treat based on the suspected temperature.
7. Hypothermia may cause severe bradycardia.
8. Shivering ceases when core temperature is below 32°C / 90°F.
9. Hot packs can be activated and placed in the armpit and groin areas, if available.
10. If patient is found with wet clothes, patient should be exposed prior to application of blankets.
11. Hypothermic patients also exhibit “cold diuresis.” Peripheral vasoconstriction initially causes central hypervolemia to which the kidneys respond by excreting large amounts of dilute urine causing dehydration. Alcohol and water immersion increase this process.

Protocol 6-10

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Nausea and Vomiting

REVISED: 02/ 2012

NAUSEA AND VOMITING

OVERVIEW:

The pre-hospital provider should be very careful to insure that patients who present with vague complaints such as nausea and vomiting are given due regard. The patient's symptoms and recent history must determine the most appropriate care. Frequently, treatment of an underlying cause and limiting movement may resolve or greatly reduce these complaints. However, persistent nausea and vomiting of unknown etiology may respond well to pharmaceutical therapy. Female patients, most importantly, do not necessarily have classic symptoms of MI, in this situation symptoms may only be nausea or vomiting. All patient's presenting with nausea and vomiting should be screened for potential life-threats initially. Anti-emetic treatment should occur only as a secondary priority.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Time of last meal - Last bowel movement, emesis - Improvement, worsening with food or activity - Duration of signs and symptoms - Other sick contacts - Past medical, surgical history - Medications - Menstrual history (pregnancy) - Travel history - Recent trauma 	<ul style="list-style-type: none"> - Pain - Character of pain (constant, intermittent, sharp, dull, etc) - Distention - Constipation - Diarrhea - Anorexia - Radiation - Associated symptoms (helpful to localize source) - Fever, headache, blurred vision, weakness, malaise, myalgias, cough, dysuria, mental status changes, rash 	<ul style="list-style-type: none"> - CNS (increased pressure, headache, stroke, lesions, trauma, hemorrhage, vestibular) - Myocardial infarction - Drugs (NSAID's, antibiotics, narcotics, chemotherapy) - GI or renal disorders - Gynecological disease (ovarian cyst, PID) - Infections (pneumonia, influenza) - Electrolyte abnormalities - Food or toxin induced - Medications, substance abuse - Pregnancy - Psychologic

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. Nausea and vomiting has many subtle, sometimes life threatening causes. Do not minimize it's importance as a symptom.
2. Ondansetron may not be as effective for vertigo and labyrinthitis related nausea and vomiting.
3. For nausea and vomiting associated with dehydration, fluid replenishment may be sufficient in improving patient comfort and reduce the need for medication administration.
4. Ensuring a complete differential diagnosis will identify life-threats and concerns that should receive priority over anti-emetic treatment.
5. In cases of toxic ingestion, including alcohol, poisons, and drug overdoses, vomiting is an internal protective mechanism and should not be prevented with pharmacological therapy in the pre-hospital environment. Care should be given to prevent aspiration.
6. Ondansetron is also safe and effective for nausea and vomiting in trauma patients and can be used in conjunction with pain management.
7. Proper documentation should include the mental status and vital signs before and after medication administration.

Protocol 6-11

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Pain Management

REVISED: 02/ 2012

PAIN MANAGEMENT

OVERVIEW:

The practice of pre-hospital emergency medicine requires expertise in a wide variety of pharmacological and non-pharmacological techniques to treat acute pain resulting from a myriad of injuries and illness. One of the most essential missions for all healthcare providers should be the relief and/ or prevention of pain and suffering. Approaches to pain relief must be designed to be safe and effective in the organized chaos of the pre-hospital environment. The degree of pain and the hemodynamic status of the patient will determine the rapidity of care.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Age - Location - Duration - Severity (1-10) - Past medical history - Medications - Drug allergies 	<ul style="list-style-type: none"> - Severity (pain scale) - Quality (sharp, dull, etc) - Radiation - Relation to movement, respiration - Increased with palpation of area 	<ul style="list-style-type: none"> - Per the specific protocol Musculoskeletal Visceral (abdominal) Cardiac Pleural, respiratory Neurogenic Renal (colic)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Make patient as comfortable as possible.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. Pain severity (0-10) is a vital sign that should be recorded before and after IV or IM medication administration and upon arrival at destination.
2. Contraindications to Morphine administration include hypotension, head injury, and respiratory depression.
3. All patients should have drug allergies ascertained prior to administration of pain medication.
4. Patient's receiving narcotic analgesics should be administered oxygen.
5. Narcotic analgesia was historically contraindicated in the pre-hospital setting for abdominal pain of unknown etiology. It was thought that analgesia would hinder the ER physician or surgeon's evaluation. It has now become widely accepted that severe pain actually confounds physical assessment of the abdomen and that narcotic analgesia rarely diminishes all of the pain related to the abdominal pathology. The goal in this instance is to reduce, not eliminate the discomfort to allow for a proper exam.

Universal Pain Assessment Tool

Verbal Descriptor Scale						
	No pain	Mild pain	Moderate pain	Severe pain	Very severe pain	Excruciating Pain
Wong-Baker Scale						
	Alert Smiling	No humor Serious, flat	Furrowed brow Pursed lips Breath holding	Wrinkled nose Raised upper lip Rapid breathing	Slow blink Open mouth	Eyes closed Moaning Crying
Activity Tolerance Scale	No pain	Can be ignored	Interferes with tasks	Interferes with concentration	Interferes with basic needs	Bed rest required
Spanish	Nada de dolor	Unpoquito dedolor	Un dolor leve	Dolor fuerte	Dolor demasiado fuerte	Un dolor insoportable

PAIN MANAGEMENT

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Poisoning / Overdose

REVISED: 02/ 2012

OVERVIEW:

Ingestion and overdose are among the most common pediatric “accidents”. The substance usually is a medication prescribed for family members or for the child. Other commonly ingested poisons include cleaning chemicals, plants and anything that fits in a child’s mouth. Primary manifestations may be a depressed mental status and/or respiratory and cardiovascular compromise. Contact Medical Control for **patient care orders**. Contact Poison Control (804-828-1222 or 800-222-1222) for advice. **Do not confuse Poison Control with Medical Control.**

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Use or suspected use of a potentially toxic substance - Substance ingested, route, and quantity used - Time of use - Reason (suicidal, accidental, criminal) - Available medications in home - Past medical history 	<ul style="list-style-type: none"> - Mental status changes - Hypotension/ hypertension - Hypothermia/ hyperthermia - Decreased respiratory rate - Tachycardia, other dysrhythmias - Seizures 	<ul style="list-style-type: none"> - Acetaminophen (Tylenol) - Depressants - Stimulants - Anticholinergic - Cardiac medications - Solvents, alcohols - Cleaning agents - Insecticides

EMT-BASIC

- Remove the patient from the toxic environment, if applicable.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine, if indicated.
- Suction oropharynx as necessary.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain a complete history of the incident and recover remainder of ingested substance, if possible.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- Maintain warmth and prevent heat loss.

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Respiratory Distress - Asthma

REVISED: 02/ 2012

OVERVIEW:

Respiratory distress is characterized by a clinically recognizable increase in work of breathing while respiratory failure is characterized by ineffective respirations with a decreased level of consciousness. Acute respiratory emergencies in the pediatric patient are common. When not properly treated, respiratory distress can result in significant morbidity and mortality. Asthma is a common childhood illness that affects nearly 9% of all children. The treatment of patients in severe asthmaticus must be prompt and efficient. Decisive intervention is mandatory to insure the best outcome. Appearance of the child reflects the adequacy of oxygenation and ventilation. An increased effort to breathe may indicate an airway obstruction or lack of oxygenation. Decreased breathing effort may indicate impending respiratory failure.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Time of onset - Possibility of foreign body - Medical history - Medications - Fever or respiratory infection - Other sick siblings - History of trauma 	<ul style="list-style-type: none"> - Wheezing or stridor - Respiratory retractions - See-saw respirations - Diaphoresis - Tripod position - Increased heart rate - Altered LOC - Anxious appearance 	<ul style="list-style-type: none"> - Asthma - Aspiration - Foreign body - Infection - Pneumonia, croup, epiglottitis - Congenital heart disease - Medication or toxin - Trauma

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- If patient is wheezing and has prescribed metered dose inhaler, provider may assist patient in self-administration. As an alternative, the patient (or family) may be allowed to use their own nebulized medication during transport. The nebulizer should be run with 6-8 liters of Oxygen.
- Maintain warmth and prevent heat loss
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. The most important component of respiratory distress is airway control.
2. Any pediatric patient presenting with substernal and intercostal retractions is in immediate need of treatment and transport. Do not delay onscene with treatments that can be completed enroute.
3. Intramuscular epinephrine administration assists with bronchodilation throughout lung tissue. In children <8 years of age, it should be administered in the lateral thigh for optimal drug delivery. In children >8 years of age, the deltoid can be used.
4. There is no limit to the number of nebulized treatments a patient can receive. All patients will become tachycardic during their treatments, but this should not prevent further beta agonist therapy.
5. Cough variant asthma (CVA) occurs in all ages but is commonly seen in young children. CVA is manifested as a night-time cough without wheezing, and is thought to be a subset of asthma. Chronic cough is a common presentation, and if the cough is mainly nocturnal and has been present for greater than two weeks, a trial of asthma medications may be warranted for CVA. This is particularly true if there is a personal history of allergy and a family history of allergy and/or asthma. Medications may consist of bronchodilators, inhaled or oral corticosteroids, or leukotriene modifiers. In one study in Japan, between one third and one half of children with chronic cough went on to develop typical asthma.

Protocol 6-14

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Respiratory Distress – Croup / Epiglottitis

REVISED: 02/ 2012

RESP. DISTRESS – CROUP / EPIGLOTTITIS

OVERVIEW:

Croup (or laryngotracheobronchitis) is an acute viral infection of the upper airway, leading to swelling and the classical symptoms of a "barking" cough, stridor, and hoarseness. It may produce mild, moderate, or severe symptoms, which often worsen at night. It is often treated with a single dose of oral steroids; occasionally epinephrine is used in more severe cases. It is a common infection that occurs in 15% of children, usually between 6 months and 5–6 years of age. Epiglottitis is swelling of the epiglottis, which leads to breathing problems. Swelling of the epiglottis is usually caused by the bacteria *Haemophilus influenzae* (H. influenza), although it may be caused by other bacteria or viruses. Upper respiratory infections can lead to epiglottitis. Medicines or diseases that weaken the immune system can make adults more prone to epiglottitis. Epiglottitis is most common in children between 2 and 6 years old. Rarely, epiglottitis can occur in adults, and it may be easily overlooked in such patients. Respiratory Syncytial Virus (RSV) is a very common virus that leads to mild, cold-like symptoms in adults and older healthy children. It can be more serious in young babies, especially to those in certain high-risk groups. RSV is the most common germ that causes lung and airway infections in infants and young children. Most infants have had this infection by two years of age. Outbreaks of RSV infections typically begin in the fall and run into the spring.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Time of onset - Possibility of foreign body - Medical history - Medications - Fever or respiratory infection - Other sick siblings - History of trauma 	<ul style="list-style-type: none"> - Wheezing or stridor - Respiratory retractions - See-saw respirations - Diaphoresis - Tripod position - Increased heart rate - Altered LOC - Anxious appearance 	<ul style="list-style-type: none"> - Asthma - Aspiration - Foreign body - Infection - Pneumonia, croup, epiglottitis - Congenital heart disease - Medication or toxin - Trauma

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Administer **Normal Saline 5.0 ml via nebulizer**. The nebulizer should be administered with 6-8 liters of Oxygen.
- If epiglottitis is suspected, do not touch or examine airway.
- Maintain warmth and prevent heat loss
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

PEARLS:

1. The most important component of respiratory distress is airway control.
2. Any pediatric patient presenting with substernal and intercostal retractions is in immediate need of treatment and transport. Do not delay onscene with treatments that can be completed enroute.
4. Stridor may be present on exam of patients with epiglottitis. Airway manipulation may worsen condition, patient will usually sit in best position for airway control.
5. Acute viral laryngeotracheal bronchitis (CROUP), Albuterol and Atrovent provide no substantial benefits due to the causation for this condition.
6. Racemic Epinephrine should only be used in cases of extreme respiratory distress. Patients receiving nebulized Racemic Epinephrine must be monitored closely for a minimum of three (3) hours in the emergency department.

Protocol 6-15

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Seizure

REVISED: 02/ 2012

SEIZURE

OVERVIEW:

A seizure is a period of altered neurologic function caused by abnormal neuronal electrical discharges. Approximately 1% - 2% of the general population has recurrent seizures. Generalized seizures begin with an abrupt loss of consciousness. If motor activity is present, it symmetrically involves all four extremities. Episodes that develop over minutes to hours are less likely to be seizures. Most seizures only last 1-2 minutes. Patients with seizure disorders tend to have stereotypic, or similar, seizures with each episode and are less likely to have inconsistent or highly variable attacks. True seizures are usually not provoked by emotional stress. Most seizures are followed by a postictal state of lethargy and confusion.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Reported, witnessed - Seizure activity description - Previous seizure history - Medic alert tag information - Seizure medications - History of trauma - History of diabetes mellitus - History of pregnancy 	<ul style="list-style-type: none"> - Decreased mental status - Sleepiness - Incontinence - Observed seizure activity - Evidence of trauma 	<ul style="list-style-type: none"> - CNS (head) trauma - Tumor - Metabolic, hepatic, renal failure - Diabetic - Hypoxia - Electrolyte abnormality - Drugs, medications, non-compliance - Infection, fever, meningitis - Alcohol withdrawal - Eclampsia - Stroke - Hyperthermia

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Suction oropharynx as necessary.
- Obtain history of incident, if possible, and assess for cause of seizure. Refer to appropriate *Pediatric Care Protocol* as needed.
- Note the characteristics of seizure activity.
- Contact Medical Control for guidance.
- If glucose is <60 mg/dl or >300mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- Maintain warmth and prevent heat loss.

TYPES OF SEIZURES

<u>Generalized</u>	<u>Simple Partial</u>	<u>Complex Partial</u>
Absence (Petit-Mal)	Focal/ Local:	Temporal Lobe
Atonic (Drop Attack)	Localized twitching of	Psychomotor
Myoclonic (Brief bilateral jerking)	hand, arm, leg, face, or	
Tonic-Clonic (Grand-Mal)	eyes. Patient may be	
	conscious/ unconscious	

PEARLS:

1. Respirations during an active seizure should be considered ineffective and airway maintenance should occur per assessment.
2. Status epilepticus is defined as two or more consecutive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
3. Grand Mal seizures generalized in nature and associated with loss of consciousness, incontinence, and tongue trauma.
4. Focal seizures affect only a specific part of the body and are not usually associated with loss of consciousness.
5. Jacksonian seizures are seizures that start as focal in nature and become generalized.
6. Petit Mal seizures may be localized to a single muscle group or may not involve visible seizure activity all. Always examine pupils for nystagmus, which would alert provider to continued seizure activity.
7. Be prepared for airway problems and continued seizures.
8. Investigate possibility of trauma and substance abuse.
9. Be prepared to assist ventilations as dosage of Valium is increased.

SEIZURE

Protocol 6-16

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Shock - Hypovolemia

REVISED: 02/ 2012

SHOCK – HYPOVOLEMIA

OVERVIEW:

Shock is often defined as a state of inadequate tissue perfusion. This may result in acidosis, derangements of cellular metabolism, potential end-organ damage, and death. Early in the shock process, patients are able to compensate for decreased perfusion by increased stimulation of the sympathetic nervous system, leading to tachycardia and tachypnea. Later, compensatory mechanisms fail, causing a decreased mental status, hypotension, and death. Early cellular injury may be reversible if definitive therapy is delivered promptly.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Blood loss (vaginal or gastrointestinal) - AAA, ectopic - Fluid loss (vomiting, diarrhea) - Fever - Infection - Cardiac ischemia (MI, CHF) - Medications - Allergic Reaction - Pregnancy 	<ul style="list-style-type: none"> - Restlessness, confusion - Weakness, dizziness - Weak, rapid pulse - Pale, cool, clammy skin - Delayed capillary refill - Hypotension - Coffee-ground emesis - Tarry stools 	<ul style="list-style-type: none"> - Shock <ul style="list-style-type: none"> Hypovolemic Cardiogenic Septic Neurogenic Anaphylactic - Ectopic pregnancy - Dysrhythmia - Pulmonary embolus - Tension pneumothorax - Medication effect, overdose - Vaso-vagal - Physiologic (pregnancy)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-Spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Control hemorrhage. Reassess for and consider other possible causes of shock.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.

CLASSES OF SHOCK

<u>Hypovolemic Shock</u>	<u>Distributive Shock</u>	<u>Cardiogenic Shock</u>	<u>Obstructive Shock</u>
Caused by hemorrhage, burns, or dehydration.	Maldistribution of blood, caused by poor vasomotor tone in neurogenic shock, sepsis, anaphylaxis, severe hypoxia, or metabolic shock.	Caused by necrosis of the myocardial tissue, or by arrhythmias.	Caused by impairment of cardiac filling, found in pulmonary embolism, tension pneumothorax, or cardiac Tamponade.

POSSIBLE CAUSES OF UNCONSCIOUSNESS

A – Acidosis, Alcohol, Abuse	T – Toxidromes, Trauma, Temperature, Tumor
E – Endocrine, Electrolytes, Encephalopathy	I – Infection, Intussusception
I – Insulin	P – Psychogenic, Porphyria, Pharmacological
O – Oxygenation, Overdose, Opiates	S – Space occupying lesion, Subarachnoid
U – Uremia	hemorrhage, Stroke, Sepsis, Seizure, Shock

PEARLS:

1. Consider performing orthostatic vital signs on patients with non-traumatic hypotension if blood or fluid loss is suspected.
2. GI bleeding may be a less obvious cause of hypovolemic shock if it has been gradual. Ask patient about possible melena, hematemesis, and hematochezia.
3. Ectopic pregnancy may be a less obvious cause of hypovolemic shock. Consider this diagnosis in all women of child-bearing age if there is a complaint of abdominal or pelvic pain.

Protocol 6-17

SECTION: Pediatric General Medical Emergencies

PROTOCOL TITLE: Unconscious / Syncope / AMS

REVISED: 02/ 2012

UNCONSCIOUS / SYNCOPED / AMS

OVERVIEW:

The unconscious patient is one of the most difficult patient-management problems in pre-hospital care. Causes range from benign problems to potentially life-threatening cardiopulmonary or central nervous system disorders. In the usual clinical approach to a patient, the provider first obtains a history, performs a physical examination, and then administers treatment. However, this sequence must be altered for patients that are unconscious or with an altered level of consciousness. Simple syncope may be the result of a wide variety of medical problems, although the major cause of syncope is a lack of oxygenated blood to the brain. In this situation it is quickly remedied when the patient collapses, improving circulation to the brain. Altered LOC is such a major variance from normal neurological function that immediate supportive efforts may be required. Efforts should be made to obtain as much of an HPI as possible from family members or bystanders.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Cardiac history, stroke, seizures - Occult blood loss (GI, ectopic) - Females (LMP, vaginal bleeding) - Fluid loss (nausea, vomiting, diarrhea) - Past medical history - Recent trauma - Complaint prior to event 	<ul style="list-style-type: none"> - Loss of consciousness with recovery - Lightheadedness, dizziness - Palpitations, slow or rapid pulse - Pulse irregularity - Decreased blood pressure 	<ul style="list-style-type: none"> - Vasovagal - Orthostatic hypotension - Cardiac syncope/ dysrhythmia - Micturition/ defecation syncope - Psychiatric - Hypoglycemia - Seizure - Shock - GI Bleed - Ectopic Pregnancy - Toxicological (ETOH) - Medication effect (hypertension)

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Protect C-spine, if indicated.
- Suction oropharynx as necessary.
- Place patient in lateral recumbent position unless trauma is noted.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Obtain a complete history of the incident if possible.
- Consider other possible causes of altered mental status.
- Obtain blood glucose sample. If glucose is <60 mg/dl or >300 mg/dl, refer to *Pediatric Hypoglycemia or Hyperglycemia Patient Care Protocol*.
- Maintain warmth and prevent heat loss.

Protocol

7-1

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Abdominal Trauma

REVISED: 02/ 2012

ABDOMINAL TRAUMA

OVERVIEW:

Blunt and penetrating trauma are major causes of morbidity and mortality in the United States. Pediatric abdominal anatomy differs from adults in several unique ways. There is significantly less protection due to thinner muscle walls and less fat. Ribs protecting the thoracic abdomen have increased flexibility more easily allowing the ribs to injure the abdominal organs. Solid organs within the pediatric abdomen have a larger surface area thus a greater area is exposed for potential injury. The organ attachments are also more elastic, increasing the chances of tearing and shearing injuries. Lastly, the bladder extends to the umbilicus in the pediatric patient, increasing its chance for injury. When performing a focused abdominal assessment, be organized, efficient, and thorough. Initial abdominal examinations only identify injury about 65% of the time; secondary exams are needed when there is a high index of suspicion for abdominal trauma. A proper abdominal examination involves exposing the entire abdomen from the nipple line to the groin and using a standard examination sequence of inspection, auscultation, percussion, and palpation.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Time of injury- Mechanism: blunt vs penetrating- Loss of consciousness- Damage to structure, vehicle- Location in structure or vehicle- Speed, details of MVC- Restraints, protective devices- Medical history- Medications- Evidence of multi-system trauma	<ul style="list-style-type: none">- Pain, swelling, bleeding- Deformity, lesions- Altered mental status, unconsciousness- Respiratory distress, failure- Hypotension, shock- Arrest- Significant mechanism of injury	<ul style="list-style-type: none">- Intra-abdominal bleeding- Pelvis fracture- Abuse

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, bilateral breath sounds, mental status, and GCS.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Continuously reassess respiratory effort and mental status. If respirations become ineffective or with increased effort and decreased mental status, begin manual ventilation with Bag Valve Mask.
- Control hemorrhage and assess for signs and symptoms of shock.
- Immobilize patient using full spinal precautions, if indicated, using padding to elevate torso. Assess and document PMS in all extremities before and after immobilization.
- Identify mechanism of injury.

Impaled objects

Stabilize impaled objects in place with bulky dressings.

Severe hemorrhage from open penetrating injury

Control bleeding with well-aimed direct pressure directly on the bleeding source. Once controlled apply dry, sterile dressing.

Evisceration with protruding abdominal contents

Loosely wrap any protruding abdominal contents with a sterile dressing moistened with Normal Saline and cover in entirety with an occlusive dressing over top.

PEARLS

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Abdominal eviscerations are a surgical emergency. The protruding organ requires careful cleaning and evaluation prior to reinsertion. Do not attempt to reinsert the organs in the pre-hospital setting.
3. Impaled objects in the abdomen often tamponade internal hemorrhage, and removing them may trigger significant internal bleeding. Remember that any bump against the object moves the distal end in the organ and worsens damage.

Protocol 7-2

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Burns

REVISED: 02/ 2012

BURNS

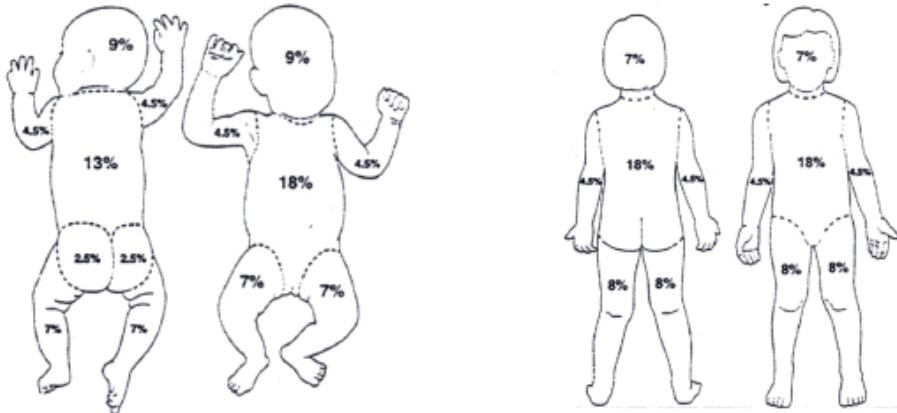
OVERVIEW:

Burns are a devastating form of trauma associated with high mortality rates, lengthy rehabilitation, cosmetic disfigurement, and permanent physical disabilities. Thermal, chemical, electrical, nuclear radiation, or solar sources may cause burns. Burns can affect more than just the skin. Burns are classified by degree, 1° (superficial) some reddening to skin, 2° (partial thickness) has blistering and deep reddening to the skin, and 3° (full thickness) causes damage to all skin layers and is either charred/ black or white/ leathery with little or no pain at the site. The patient's palm equals 1% of body surface area when determining the area affected. Scald injuries are more common in younger children while flame injuries are more common in older children and account for the most fatalities. Smoke inhalation is the most common cause of death in the first hour after a burn injury. Children who have burn injuries are at a greater risk than adults for shock and hypothermia because of their proportionately large body surface.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Type of exposure (heat, gas, chemical) - Inhalation injury - Time of injury - Past medical history - Medications - Other trauma 	<ul style="list-style-type: none"> - Burns, pain, swelling - Dizziness - Loss of consciousness - Hypotension/ shock - Airway compromise, distress - Singed facial or nasal hair - Hoarseness, wheezing 	<ul style="list-style-type: none"> - Superficial (1°), red and painful - Partial thickness (2°), blistering - Full thickness (3°), painless and charred leathery skin - Chemical - Thermal - Radiation

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Obtain manual C-spine, if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment. Use humidified Oxygen, if available, if inhalation injury is suspected.
- Continuously reassess respiratory effort and mental status. If respirations become ineffective or with increased effort and decreased mental status, begin manual ventilation with Bag Valve Mask.
- Immobilize patient using full spinal precautions, if indicated. Assess and document PMS in all extremities before and after immobilization.
- Determine extent of burn



PEARLS

1. Remove patient's clothing as appropriate. Remove rings, bracelets and other constricting items in areas of burn, if possible.
2. Critical burns: any burns over >25% BSA; 2° burns >10% BSA; 2° and 3° burns to the face, eyes, hands, or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These patients should be transferred directly to a Level 1 Trauma Center.
3. Have a high index of suspicion and a low intubation threshold when treating burn patients with possible airway involvement. Early intubation is recommended in significant inhalation injuries.
4. Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
5. Burn patients are prone to hypothermia – never cool burns that involve >15% BSA.
6. Never overlook the possibility of multi-system trauma.
7. Burns are extremely painful. Strongly consider pain management medications as needed.
8. Assess for potential child abuse and follow appropriate reporting mechanism as needed.
9. Keep the child warm and protect from hypothermia. Be cautious with cool dressings.
10. Consider transport to burn center.

BURNS

Protocol 7-3

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Drowning / Near Drowning

REVISED: 02/ 2012

DROWNING / NEAR DROWNING

OVERVIEW:

Approximately 4500 people die of submersion in the United States each year, making drowning the third leading cause of accidental death. Drowning, like other causes of death, often strikes the young or otherwise healthy individual. Prevention is the most important step to reduce these unnecessary deaths. The patient prognosis after near drowning depends on the speed of rescue and resuscitation, emphasizing the role of emergency care. Treatment of near drowning begins at the scene with rapid, cautious removal of the victim from the water. Spinal precautions should be observed if the mechanism of injury such as high velocity impact, diving, or surfing raises suspicion of such injuries. Concern of saltwater vs. freshwater aspiration is not of immediate importance in the pre-hospital environment. Factors that increase survivability include; (1) the younger the age, (2) the colder the water, (3) the cleaner the water, and (4) the less time submerged.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Submersion in water, regardless of depth- Possible history of trauma (i.e. diving board)- Duration of submersion- Temperature of the water	<ul style="list-style-type: none">- Unresponsive- Mental status changes- Decreased or absent vital signs- Vomiting- Coughing	<ul style="list-style-type: none">- Trauma- Pre-existing medical problem- Pressure injury (diving) Barotrauma Decompression sickness

EMT-BASIC

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess for signs of trauma. Obtain manual C-Spine.
- Assess respiratory effort and mental status. Begin manual CPR if indicated.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Continuously reassess respiratory effort and mental status. If respirations become ineffective or with increased effort and decreased mental status, begin manual ventilation with Bag Valve Mask.
- Immobilize patient using full spinal precautions per assessment. Assess and document PMS in all extremities before and after immobilization.
- Remove wet clothing and prevent heat loss with dry blankets.
- If signs of hypothermia are present, refer to *Pediatric Hypothermia Patient Care Protocol*.

PEARLS

1. Near drowning patients are at high risk for experiencing secondary drowning several hours after the initial event. Secondary drowning occurs when delayed flash pulmonary edema occurs. All patients suspected of submersion need to be transported for further evaluation.
2. Adult Respiratory Distress Syndrome (ARDS) and pneumonia can both occur following the inhalation of water into lungs causing damage to the alveoli. Make every effort to transport these patient to the hospital for further evaluation.
3. With cold water there is no time limit, attempt resuscitation on all patients unless patient presents with injuries incompatible with life.
4. Drowning is a leading cause of death among would-be rescuers.
5. With pressure injuries (decompression/ barotrauma), consider transport or availability of a hyperbaric chamber.

DROWNING / NEAR DROWNING

Protocol

7-4

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Head Injury

REVISED: 02/ 2012

HEAD INJURY

OVERVIEW:

Brain injury and its accompanying pathologic processes continue to be the leading cause of mortality associated with trauma. Whether the injury is due to a blunt or penetrating mechanism, bleeding or swelling of the brain and surrounding tissue may lead to an increase in pressure within the cranial cavity (intracranial pressure, ICP). If pressure within the skull is not controlled, neurologic changes may produce signs and symptoms ranging from headache to coma with loss of protective reflexes. Blunt force trauma may result in scalp injury, skull fracture, and meningeal and brain tissue injury. Penetrating trauma may produce focal or diffuse injury, depending on the velocity of the penetrating object. Although the pre-hospital provider cannot reverse the brain tissue damage from the initial/primary brain injury that has already occurred, they can play a major role in preventing or limiting the processes that exacerbate and lead to a secondary brain injury. The pre-hospital provider's goal is to focus on reversing any hypoxia, hypotension, hypercarbia, acidosis, or increasing intracranial pressure.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Time of injury- Mechanism: blunt vs penetrating- Loss of consciousness- Bleeding- Past medical history- Medications- Evidence of multi-system trauma	<ul style="list-style-type: none">- Pain, swelling, bleeding- Altered mental status, unconsciousness- Respiratory distress, failure- Vomiting- Seizure- Major traumatic mechanism of injury	<ul style="list-style-type: none">- Skull fracture- Brain injury (concussion, contusion, hemorrhage, or laceration)- Epidural hematoma- Subdural hematoma- Subarachnoid hemorrhage- Spinal injury- Abuse

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, mental status, and GCS.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Immobilize patient using full spinal precautions, if indicated, using padding to elevate torso. Assess and document PMS in all extremities before and after immobilization.
- Identify mechanism of injury.
- Obtain blood glucose level.

PEARLS

1. Hyperventilation is not recommended with head-injury patients who do not have symptoms of herniation syndrome, as auto-regulatory mechanisms are intact and hyperventilation may worsen cerebral perfusion pressure.
2. One of the most important indicators of worsening head injury is a change in LOC and/ or GCS.
3. Increased ICP may cause hypertension and bradycardia (Cushing's response).
4. Hypotension usually indicates injury or shock unrelated to the head injury and should be treated aggressively.
5. A decrease of two (2) or more in the patient's GCS should be considered due to a severe head injury until proven otherwise.
6. Supine positioning may also increase ICP transiently. The patient may benefit from a reverse Trendelenburg position; however, it may reduce cerebral blood flow, especially if the head is elevated greater than 30°. If the patient is immobilized to a backboard, slightly elevate (15° or less) the head end of the board.
7. Recognize that "normal" blood pressure is not as important as "normal for the patient" when assessing maintenance of adequate cerebral blood flow and adequate cerebral perfusion.

Protocol 7-5

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Musculoskeletal Trauma

REVISED: 02/ 2012

MUSCULOSKELETAL TRAUMA

OVERVIEW:

Musculoskeletal and soft issue injuries are generally non-life-threatening, however, they can be associated with other life-threatening injuries. In addition, they can be limb threatening if not properly managed. Although often obvious and dramatic in nature, the pre-hospital provider must not allow distraction from treating other immediate life-threatening injuries. Early, proper management of patients with musculoskeletal and soft tissue injuries can significantly reduce morbidity and mortality.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Type of injury- Mechanism: crush, penetrating, amputation- Time of injury- Open vs closed wound/ fracture- Wound contamination- Medical history- Medications	<ul style="list-style-type: none">- Pain- Swelling- Deformity- Altered sensation- Decreased range of motion- Diminished pulse/ capillary refill- Decreased extremity temperature	<ul style="list-style-type: none">- Abrasion- Contusion- Laceration- Sprain- Dislocation- Fracture- Amputation

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine, if indicated.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, bilateral breath sounds, mental status, and GCS.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Immobilize patient using full spinal precautions, if indicated, using padding to elevate torso. Assess and document PMS in all extremities before and after immobilization.
- Identify mechanism of injury.
- Assess range of motion of injured area and neurovascular status distal to injury.

Minor Lacerations

Lacerations requiring closure should be bandaged with a appropriate sterile dressing.

Hemorrhage

Apply direct pressure and sterile dressing to wound. If hemorrhage is severe and not controlled with pressure bandage, apply tourniquet and document time of application.

Suspected Fractures or Dislocations

Stabilize the injury site in position of comfort to prevent further injury and reassess neurovascular status distal to injury. If open fracture is noted, apply appropriate sterile dressing to open wound.

Amputation

Wrap amputated part in clean, sterile dressing moistened with Normal Saline. Seal wrapped amputated part in plastic bag and place plastic bag in container with ice, if available.
If patient is unstable and amputated part is not easily found, do not delay transport to locate.

PEARLS

1. In amputation, time is critical, do not delay transport to find amputated part if not easily and quickly located.
2. Hip, knee, and elbow dislocations and fractures have the highest incidence of vascular compromise.
3. Any patient with neurovascular compromise should be rapidly transported to the closest appropriate facility.
4. Blood loss may be concealed or not apparent with extremity injuries.
5. Lacerations must be evaluated and repaired within 6 hours from the time of injury for greatest likelihood of proper healing.
6. 30% of female elderly hip fractures are not due just to fall, but rather cardiac event prior to a ground level fall.

Protocol 7-6

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Suspected Child Abuse

REVISED: 02/ 2012

SUSPECTED CHILD ABUSE

OVERVIEW:

Patterns of child abuse can reflect any form of physical and/ or mental trauma but are usually characterized by unexplained or poorly explained injuries of different ages and delay in seeking medical care. Bruises are the most common form of child abuse. These are especially characteristic on the face or genitals. Bruises may have patterns reflecting the item with which the child was struck or may be of different colors or ages. Burns are involved in approximately 5-10% of cases of abuse. Look for locations that would be difficult to accidentally burn. Over 50% of fractures in children >1 years old are caused by abuse. Rib, skull, and mid-shaft long bone fractures are virtually always due to abuse. Very few young children are able to generate the force to break large bones, unless there is a clear external cause such as a motor vehicle crash. Head trauma is usually caused by blunt trauma and trauma secondary to shaken baby syndrome. Children have very large heads in proportion to their bodies, and shaking may result in whiplash injuries with often fatal subdural hematomas. Abdominal injuries due to abuse are second only to head trauma in abuse fatalities. There are often no external signs of injuries. The provider should note other vague medical symptoms such as repeated vomiting, abdominal pain, and distention in a child with other evidence of abuse. Observation, transport, and reporting are the key responsibilities of the pre-hospital provider.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none"> - Time of injury - Mechanism: blunt vs penetrating - Loss of consciousness - Bleeding - Past medical history - Medications - Evidence of multi-system trauma 	<ul style="list-style-type: none"> - Pain, swelling, bleeding - Altered mental status, unconsciousness - Respiratory distress, failure - Vomiting - Seizure - Major traumatic mechanism of injury 	<ul style="list-style-type: none"> - Skull fracture - Brain injury (concussion, contusion, hemorrhage, or laceration) - Epidural hematoma - Subdural hematoma - Subarachnoid hemorrhage - Spinal injury

- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Refer to appropriate *Pediatric Trauma Patient Care Protocol* as needed, per patient assessment.
- Objectively and accurately record the history of the patient's injuries as given by the child, parent(s), and/ or caregiver.
- Reassess airway, respiratory effort, circulation, and mental status.
- Transport promptly in position of comfort and reassess vital signs as indicated.

Common Indications of Abuse

1. Patient's or caregiver's story is not consistent with the severity or type of patient's injury, or is not consistent with normal behavior and abilities of a child that age.
2. Parents or caregivers contradict each other and/ or change history or are reluctant to give history.
3. Parents or caregivers delay in seeking medical attention.
4. Timing of injury by parent or caregiver history does not agree with age of injury found during assessment.
5. Parent's or caregiver's emotional response is not appropriate to the severity of the injury.
6. Abuse is mentioned but blamed on an outside, unknown person.

Common Signs of Abuse

<ul style="list-style-type: none"> - Scars, Marks, or Bruises - Various in different stages of healing explained as the result of one (1) incident. - Areas such as the buttocks and lower back, genitals and inner thighs, cheeks, upper lip, neck, and ear lobes. - Odd shapes (hands, cords, belts, belt buckles, from human bites, etc). - Ligature marks on the wrists and/ or ankles. - Unexplained Shock or Altered Mental Status 	<ul style="list-style-type: none"> - Burns - From cigarettes, in the shape of an iron, or other hot objects. - Stocking-glove scald burns form immersion of extremities and/ or buttocks. - Burns to the buttocks or genitals. - Trauma to Genitals or Rectal Areas - Pain, itching, bruising, and/ or bleeding. - Unexplained Fractures
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PEARLS:

1. Do not accuse or confront parent(s) or caregiver(s) of suspicions.
2. Objectively and accurately record the history of the patient's injuries as given by the child, parent(s), and/ or caregiver. Use quotations to record information given while performing patient care.
3. Report suspicions to the receiving facility emergency department physician on arrival. If unable to report suspicions to receiving physician, report suspicions immediately to Child Protective Services.
4. Maintain strict confidentiality about the case.
5. Proof of abuse is not needed to make a report, but there should be "reasonable cause to suspect". A pre-hospital provider reporting suspected or alleged child abuse is protected from successful prosecution for reporting the case.

SUSPECTED CHILD ABUSE

Protocol

7-7

SECTION: Pediatric Trauma Patient Care

PROTOCOL TITLE: Thoracic Trauma

REVISED: 02/ 2012

THORACIC TRAUMA

OVERVIEW:

Thoracic injuries can be very dramatic, presenting with obvious physical findings that lead to immediate identification and management during the initial assessment, while others may only exhibit subtle signs and symptoms that can be easily missed initially. A high index of suspicion, accurate assessment, and frequent reassessment are necessary to identify both the apparent and less obvious thoracic injuries that could lead to lethal consequences. Thoracic injury may result from both penetrating and blunt trauma. Penetrating trauma has a tendency to be more obvious due to the presence of an open wound while blunt trauma may produce findings such as large contusions, tenderness, fractured ribs or flailed segments, or relatively little external evidence of injury. Although little external injury may be present, the patient may be suffering from multiple and severe organ, vascular, and structural injuries.

<u>HPI</u>	<u>Signs and Symptoms</u>	<u>Differential Diagnosis</u>
<ul style="list-style-type: none">- Time of injury- Mechanism: blunt vs penetrating- Loss of consciousness- Damage to structure, vehicle- Location in structure or vehicle- Speed, details of MVC- Restraints, protective devices- Medical history- Medications- Evidence of multi-system trauma	<ul style="list-style-type: none">- Pain, swelling, bleeding- Deformity, lesions- Altered mental status, unconsciousness- Respiratory distress, failure- Hypotension, shock- Arrest- Significant mechanism of injury	<ul style="list-style-type: none">- Tension pneumothorax- Flail chest- Pericardial tamponade- Open chest wound- Hemothorax

EMT-BASIC

- Assess for signs of trauma. Obtain manual C-Spine.
- Perform initial assessment (General impression, Airway, Breathing, Circulation, LOC).
- Assess respiratory effort, bilateral breath sounds, mental status, and GCS.
- Place patient on pulse oximetry and administer **Oxygen** per patient assessment.
- Continuously reassess respiratory effort and mental status. If respirations become ineffective or with increased effort and decreased mental status, begin manual ventilation with Bag Valve Mask.
- Control hemorrhage and assess for signs and symptoms of shock.
- Identify mechanism of injury.
- Immobilize patient using full spinal precautions, if indicated, using padding to elevate torso. Assess and document PMS in all extremities before and after immobilization.

Open Pneumothorax

Occlude initially with gloved hand as soon as found. As rapidly as possible, apply an occlusive dressing, taped on three sides over wound.

PEARLS

1. The amount of external bleeding is not an indicator of the potential severity of internal bleeding associated with an underlying trauma.
2. Some injuries, such as simple rib fractures, may produce such excruciating pain that the patient intentionally hypoventilates to reduce chest wall movement causing secondary hypoxia.
3. Due to the amount of external noise, a possible pneumothorax should not be determined by lung sounds alone. In the presence of a true tension pneumothorax, the patient will also show signs of increasing tachycardia, decreasing SpO₂, tachypnea, and anxiety. Tracheal deviation away from the affected side is a late sign.
4. Careful reassessment of lung sounds should occur continuously. A patient that initially only has an open pneumothorax may quickly develop a tension pneumothorax and need needle thoracentesis after an occlusive dressing has been applied.
5. A true flail segment is two or three adjacent ribs fractured in two or more places and has the ability to move independently of the remaining chest wall.
6. Although paradoxical motion is often thought to be the hallmark sign of a flail chest, when the ribs fracture, the intercostal muscles may spasm, causing the flail segment to be initially stabilized. Paradoxical motion may be initially missed upon inspection while a thorough palpation exam will reveal any instability.
7. Stabilizing a flail segment with sandbags or other devices is no longer recommended.