



Field Triage and Bypass



National Guideline for the Field Triage of Injured Patients

RED CRITERIA

High Risk for Serious Injury

Injury Patterns

- Penetrating injuries to head, neck, torso, and proximal extremities
- Skull deformity, suspected skull fracture
- Suspected spinal injury with new motor or sensory loss
- Chest wall instability, deformity, or suspected flail chest
- Suspected pelvic fracture
- Suspected fracture of two or more proximal long bones
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Active bleeding requiring a tourniquet or wound packing with continuous pressure

Mental Status & Vital Signs

- All Patients**
- Unable to follow commands (motor GCS < 6)
 - RR < 10 or > 29 breaths/min
 - Respiratory distress or need for respiratory support
 - Room-air pulse oximetry < 90%
- Age 0-9 years**
- SBP < 70mm Hg + (2 x age in years)
- Age 10-64 years**
- SBP < 90 mmHg or
 - HR > SBP
- Age ≥ 65 years**
- SBP < 110 mmHg or
 - HR > SBP

Patients meeting any one of the above RED criteria should be transported to the highest-level trauma center available within the geographic constraints of the regional trauma system

YELLOW CRITERIA

Moderate Risk for Serious Injury

Mechanism of Injury

- High-Risk Auto Crash
 - Partial or complete ejection
 - Significant intrusion (including roof)
 - >12 inches occupant site OR
 - >18 inches any site OR
 - Need for extrication for entrapped patient
 - Death in passenger compartment
 - Child (age 0-9 years) unrestrained or in unsecured child safety seat
 - Vehicle telemetry data consistent with severe injury
- Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.)
- Pedestrian/bicycle rider thrown, run over, or with significant impact
- Fall from height > 10 feet (all ages)

EMS Judgment

- Consider risk factors, including:**
- Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact
 - Anticoagulant use
 - Suspicion of child abuse
 - Special, high-resource healthcare needs
 - Pregnancy > 20 weeks
 - Burns in conjunction with trauma
 - Children should be triaged preferentially to pediatric capable centers
- If concerned, take to a trauma center**

Patients meeting any one of the YELLOW CRITERIA WHO DO NOT MEET RED CRITERIA should be preferentially transported to a trauma center, as available within the geographic constraints of the regional trauma system (need not be the highest-level trauma center)



Field Triage and Bypass



DRAFT NOT FOR USE

PEARLS

- EMS Service ***must identify*** - in their local protocols - appropriate hospitals when no trauma center is available.
- Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.
- Geriatric patients should be evaluated with a high index of suspicion. Often occult injuries are more difficult to recognize and patients can decompensate unexpectedly with little warning.
- Mechanism is the most reliable indicator of serious injury.
- **When significant Trauma coexists in the Burn Patient – initial transport should be to a BURN Center ONLY if the BURN Center has an appropriate Trauma Designation. IF the available burn center does not have the appropriate TRAUMA designation for the coexistent injuries, or the patient is unstable for the time required to arrive at the burn center, THEN transport should be to the nearest appropriate trauma center first**
- In prolonged extrications or serious trauma, consider air transportation for transport times and the ability to transfuse blood if urgently needed and not available otherwise.
- Scene times should not be delayed for procedures. Procedures should be performed en route when possible. Rapid transport of the unstable trauma patient is the goal.
- **KEY DOCUMENTATION ELEMENTS:**
 - Presence or Absence of defined criteria for transport decision / Reasoning for EMS judgement



Major Trauma

History

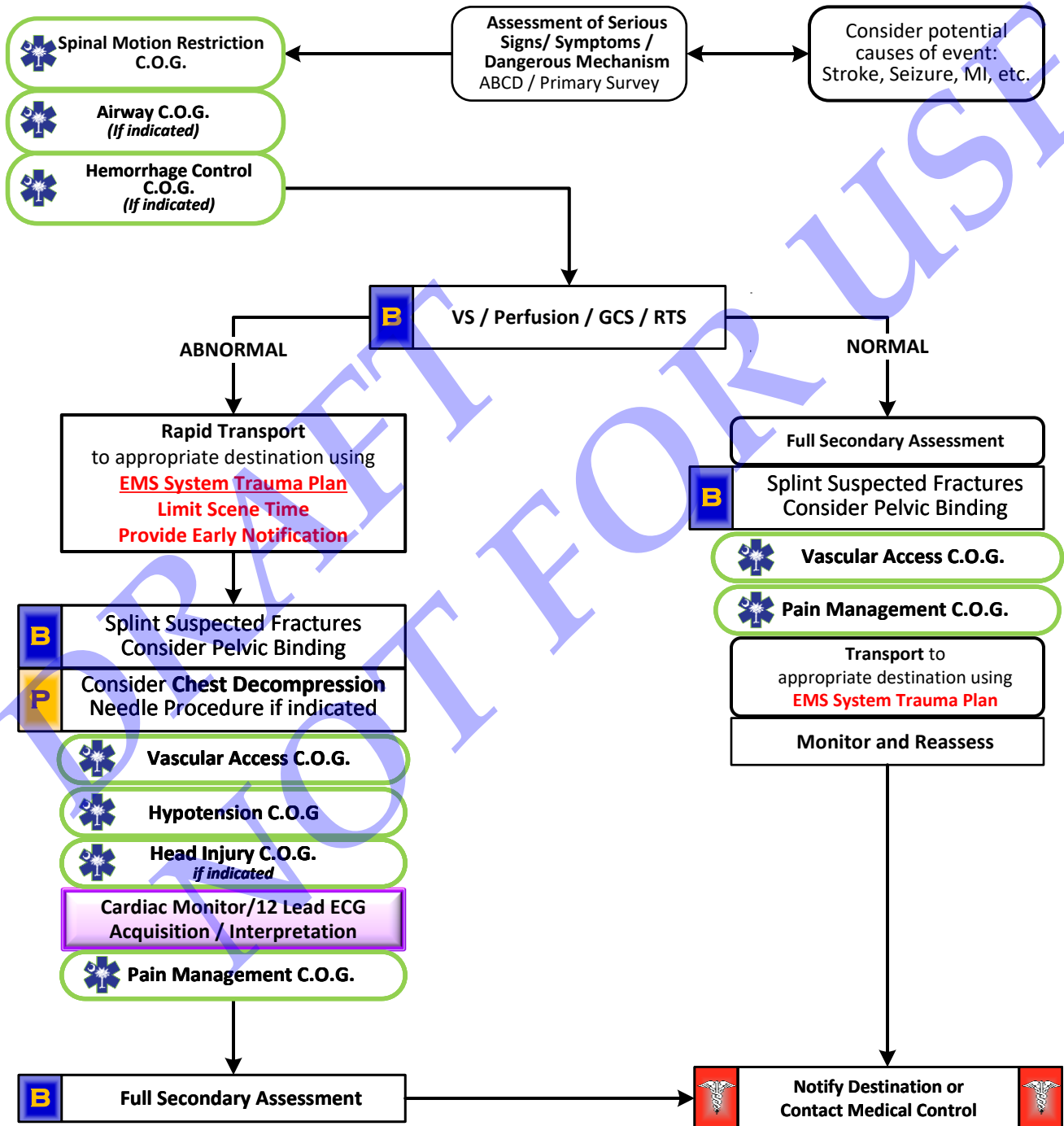
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints / protective equipment
- Past medical history
- Medications

Signs and Symptoms

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

Differential (Life threatening)

- **Chest**
 - Tension pneumothorax
 - Flail chest
 - Pericardial tamponade
 - Open chest wound
 - Hemothorax
- Intra-abdominal bleeding
- Pelvis / Femur fracture
- Spine fracture / Cord injury
- Head injury (see Head Trauma)
- Extremity fracture / Dislocation
- HEENT (Airway obstruction)
- Hypothermia





Major Trauma

REVISED TRAUMA SCORE			
RTS	GCS	SBP	RR
		(mmHg)	Breaths/min
4	13-15	> 89	10-29
3	9-12	76-89	>29
2	6-8	50-75	6-9
1	4-5	1-49	1-5
0	3	0	0
RTS Formula			
$(0.9368)(GCS) + (0.7326)(SBP) + (0.2908)(RR) = RTS$			

Glasgow Coma Scale			
ADULT GLASGOW COMA SCALE		PEDIATRIC GLASGOW COMA SCALE	
	SCORE		SCORE
EYE OPENING (4)		EYE OPENING (4)	
Spontaneous	4	Spontaneous	4
To Speech	3	To Speech	3
To Pain	2	To Pain	2
None	1	None	1
BEST MOTOR RESPONSE (6)		BEST MOTOR RESPONSE (6)	
Obeys Commands	6	Spontaneous Movement	6
Localizes Pain	5	Withdraws to Touch	5
Withdraws from Pain	4	Withdraws from Pain	4
Abnormal Flexion	3	Abnormal Flexion	3
Abnormal Extension	2	Abnormal Extension	2
None	1	None	1
VERBAL RESPONSE (5)		VERBAL REESPONSE (5)	
Oriented	5	Coos, Babbles	5
Confused	4	Irritable Cry	4
Inappropriate	3	Cries To Pain	3
Incomprehensible	2	Moans to Pain	2
None	1	None	1
TOTAL		TOTAL	



ADULT TRAUMA

PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro, Skin,**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- Geriatric patients should be evaluated with a high index of suspicion. Often occult injuries are more difficult to recognize and patients can decompensate unexpectedly with little warning.
- Mechanism is the most reliable indicator of serious injury.
- In prolonged extrications or serious trauma, consider air transportation for transport times and the ability to transfuse blood if urgently needed and not available otherwise.
- Do not overlook the possibility of associated domestic violence or abuse.
- Scene times should **not** be delayed for procedures. Procedures should be performed en route when possible. Rapid transport of the unstable trauma patient is the goal.
- Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained above 90%
- **KEY DOCUMENTATION ELEMENTS:**
 - Mechanism of injury
 - Patient age and sex
 - Primary and secondary survey
 - Apparent injuries
 - Serial vital signs including neurologic status assessments
 - Some clinicians ask for the lowest blood pressure and highest pulse
 - Scene time
 - Procedures performed and patient response
 - Pre-arrival notification and preparation



Head Trauma

History

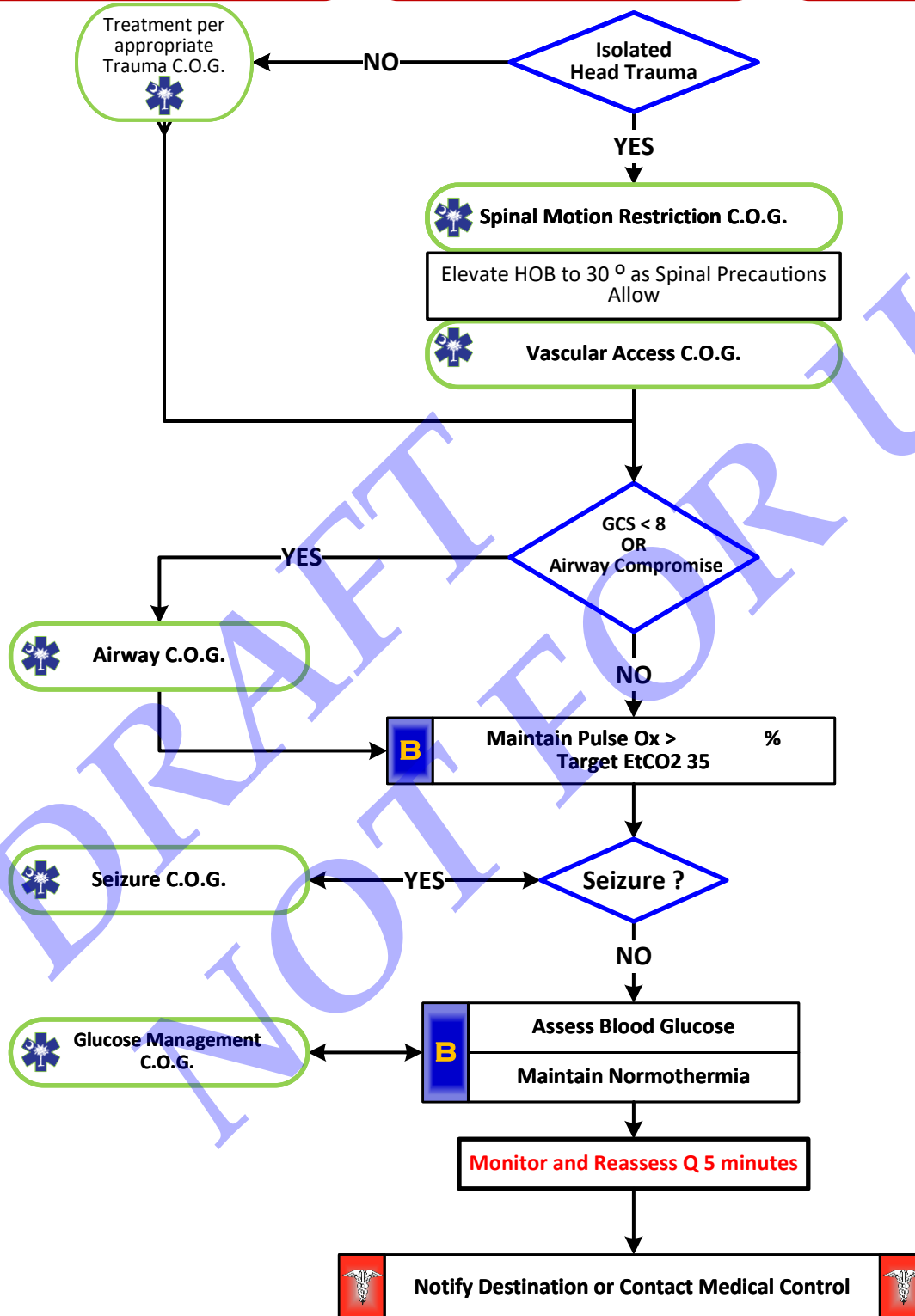
- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications
- Evidence for multi-trauma

Signs and Symptoms

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

Differential

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





Head Trauma

PEARLS

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- If GCS < 12 consider air / rapid transport
- In the absence of Capnography, hyperventilate the patient (adult: 20 breaths/min, child: 30, infant: 35) only if ongoing evidence of brain herniation (blown pupil, decorticate or decerebrate posturing, or bradycardia)
- Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
- Hypotension usually indicates injury or shock unrelated to the head injury and should be aggressively treated.
- The most important item to monitor and document is a change in the level of consciousness.
- Consider Restraints/Sedation if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- Limit IV fluids unless patient is hypotensive.
- Concussions are periods of confusion or LOC associated with trauma which may have resolved by the time EMS arrives. Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.
- In areas with short transport times, RSI/Drug-Assisted Intubation is not recommended for patients who are spontaneously breathing and who have oxygen saturations of greater than 90% with supplemental oxygen
- **KEY DOCUMENTATION ELEMENTS:**
 - High-flow oxygen with non-rebreather (NRB) mask
 - Airway status and management
 - EtCO₂ monitored and documented for all traumatic brain injury (TBI) patients with advanced airway and strict avoidance of hyperventilation, overventilation, and hypocapnia
 - Neurological status with vitals: AVPU, GCS
 - Exams: Neurological and Mental Status Assessment pre- and post-treatment
- **KEY PERFORMANCE MEASURES:**
 - No oxygen desaturation less than 90%
 - No hypotension:
 - Adults: less than 110 mmHg
 - Pediatrics:
 - Age less than 1 month: less than 60 mmHg
 - Age 1–12 months: less than 70 mmHg
 - Age 1–10 years: less than 70 + 2x age in years
 - Assess the patient's blood pressure prior to the administration of any medication that may cause hypotension.
 - EtCO₂ target 40 mmHg (range 35–45 mmHg). Meticulous prevention of hypocapnia in all patients
 - Triage to the appropriate level hospital within the local trauma system



Dental Problems

History

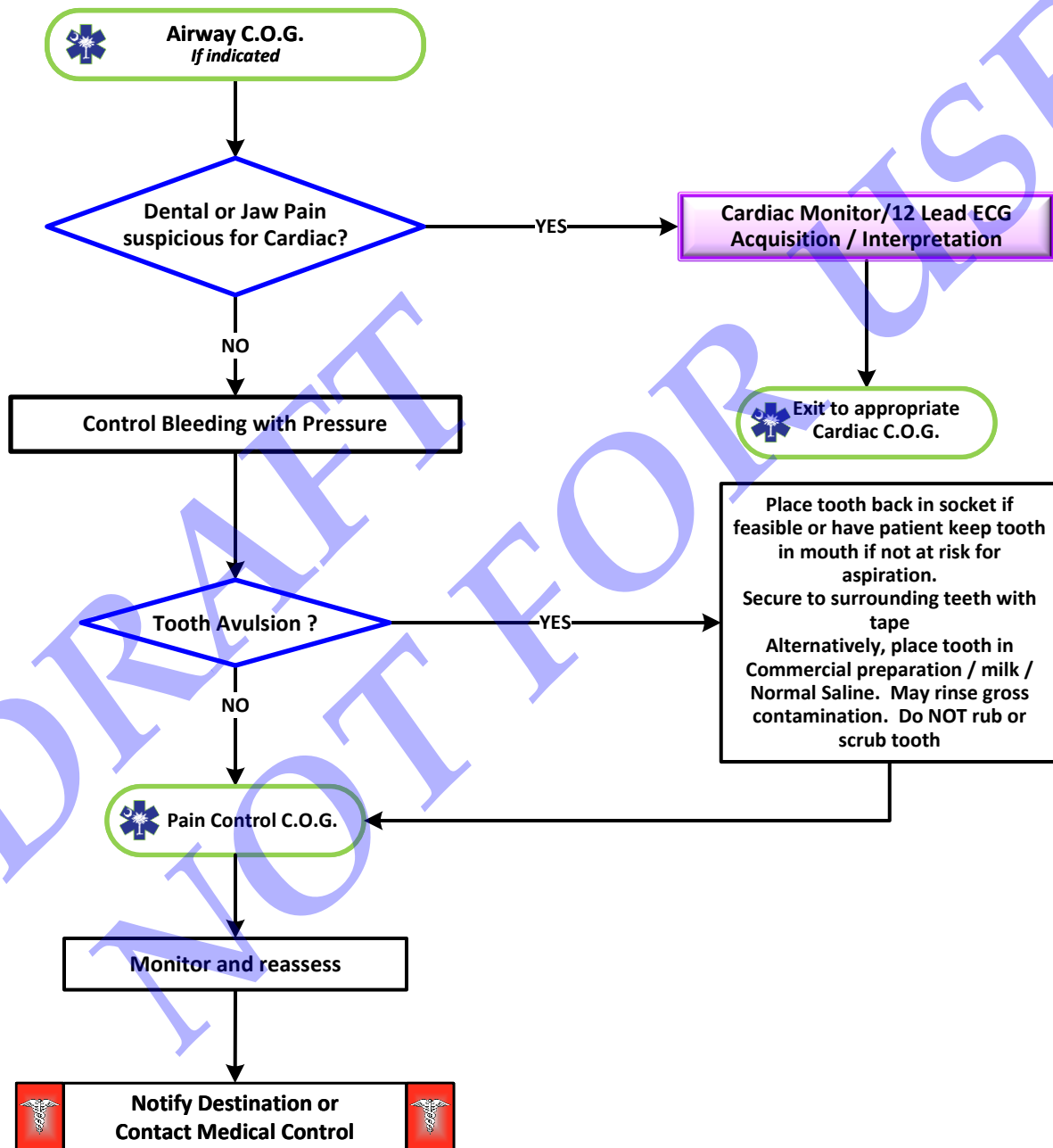
- Age
- Past medical history
- Medications
- Onset of pain / injury
- Trauma with "knocked out" tooth
- Location of tooth
- Whole vs. partial tooth injury

Signs and Symptoms

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

Differential

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





Dental Problems

PEARLS

- **Recommended Exam: Mental Status, HEENT, Neck, Chest, Lungs, Neuro**
- Nontraumatic significant soft tissue swelling to the face or oral cavity can represent a cellulitis or abscess.
- Scene and transport times should be minimized in complete tooth avulsions. Reimplantation is possible within 4 hours if the tooth is properly cared for.
- All tooth disorders typically need antibiotic coverage in addition to pain control.
- Cardiac chest pain can radiate to the jaw.
- All pain associated with teeth should be associated with a tooth which is tender to tapping or touch (or sensitivity to cold or hot).
- DO NOT replace tooth if:
 - Obtunded patient
 - At risk for Aspiration
 - Spinal Immobilization
 - AMS
 - Multiple Teeth missing
- **KEY DOCUMENTATION ELEMENTS:**
 - Airway patency and reassessment
 - Degree and location of hemorrhage
 - Mental status (GCS or AVPU)
 - Technique used to transport tissue or teeth
 - Eye exam documented, when applicable
 - Assessment and management of cervical spine
 - Patient use of anticoagulant medications
- **KEY PERFORMANCE MEASURES:**
 - Appropriate airway management and satisfactory oxygenation



Eye Injuries / Complaint

History

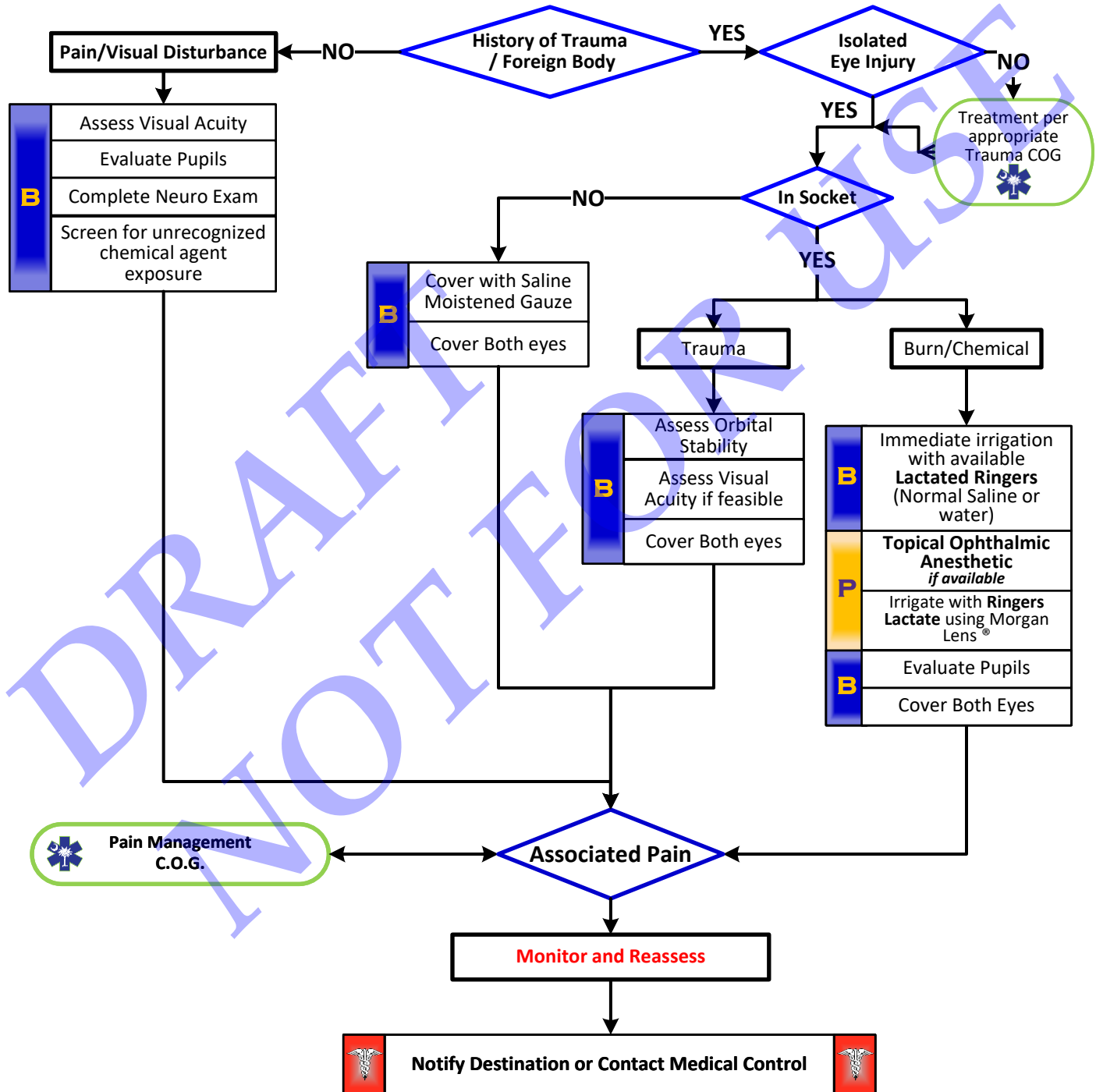
- Time of injury/onset
- Mechanism (blunt/penetrating/chemical)
- Open vs Closed Injury
- Wound contamination
- Medical history
- Involved Chemicals + MSDS Sheets
- Baseline Visual Acuity (Prior to event)

Signs and Symptoms

- Pain, swelling, bleeding
- Deformity / contusion
- Visual Deficit
- Leaking aqueous/vitreous humor
- Limited Extraocular Movements
- "Shooting" / "streaking" Light
- Visible contaminants
- Rust Ring
- Lacrimation
- Redness
- Photophobia
- Hyphema

Differential

- Abrasion / Laceration
- Globe Rupture
- Hyphema
- Retinal detachment/damage
- Optic Nerve Damage
- Orbital fracture
- Orbital compartment syndrome
- Neurological Event
- Acute Glaucoma
- Retinal Artery Occlusion
- Chemical/Thermal burn/Agent of Terror
- Infection / Iritis



ADULT TRAUMA



Eye Injuries / Complaint

PEARLS

- **Recommended Exam: Mental Status, HEENT, Neuro**
- Normal visual acuity can be present even with severe eye injury.
- Remove contact lens whenever possible. (If no evidence of globe rupture)
- Any chemical or thermal burn to the face/eyes should raise suspicion of respiratory insult.
- Orbital fractures raise concern of globe or nerve injury and need repeated assessments of visual status.
- Always cover both eyes to prevent further injury.
- Use shields, not pads, for physical trauma to eyes. Pads are okay for unaffected eye.
- Do not remove impaled objects.
- Suspected globe rupture or compartment syndromes require emergent in-facility intervention.
- Patient should be placed in Fowlers position with any suspected globe injury.
- Lactated Ringer's vs Normal Saline for ocular irrigation:
 - Lactated Ringer's Solution is recommended for ocular irrigation
 - pH closer to that of tears
 - pH (Tears): ~ 7.1
 - pH (Lactated Ringers): ~ 6.0 – 7.5
 - pH (Normal Saline): ~ 4.5 – 7.0
 - Increased patient tolerance. Normal Saline may cause discomfort
 - Buffering capacity: LR returns pH to normal more quickly with either acidic or basic contaminants.
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital Signs + Visual Acuity each eye (where possible)
 - Time of Injury
 - Type of Injury / Exposure
 - Treatment provided
 - Material Safety Data Sheets where known/suspected Chemical Exposure – if possible to obtain.
 - Airway status and management
 - Neurological status with vitals: AVPU, GCS



Extremity Trauma

History

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

Signs and Symptoms

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

Differential

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

B Assess for Pulse, sensory, and motor function



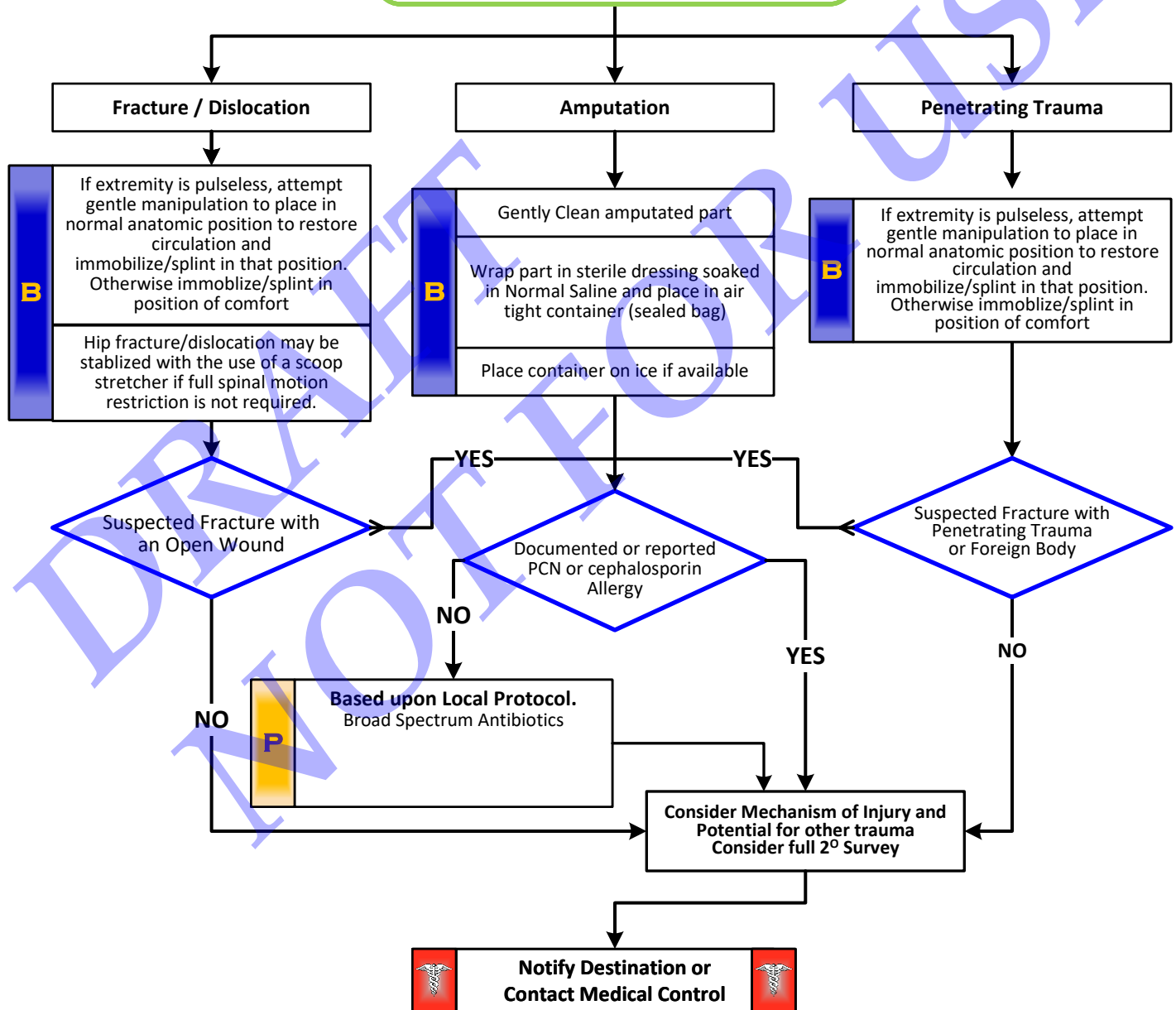
Hemorrhage Control C.O.G.



Consider Vascular Access C.O.G.



Consider Pain Control C.O.G.



ADULT TRAUMA



Extremity Trauma

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PEARLS

- **Recommended Exam: Mental Status, Extremity, Neuro**
- **It is STRONGLY RECOMMENDED that EMS Services use Tourniquets and Hemostatic Agents that are listed based on evaluation by the Committee on Tactical Combat Casualty Care.**
- Peripheral neurovascular status is important.
- In amputations, time is critical. Transport and notify medical control immediately, so that the appropriate destination can be determined.
- Hip dislocations and knee and elbow fracture / dislocations have a high incidence of vascular compromise.
- Urgently transport any injury with vascular compromise.
- Blood loss may be concealed or not apparent with extremity injuries.
- Cooling of amputated tissue/parts is beneficial – but do not allow to freeze.
- Multiple Casualty Incident: Tourniquet Procedure may be considered 1st instead of direct pressure.
- **KEY DOCUMENTATION ELEMENTS:**
 - Vital signs and vascular status of extremity after placement of tourniquet, pressure dressing, packing, and/or splint
 - Time of tourniquet placement
 - Documentation of signs/symptoms of possible compartment syndrome
 - Documentation of any amputated parts, condition, and disposition
 - Documentation of notification of receiving facility of Tourniquet placement and time.
- **PERFORMANCE MEASURES:**
 - Proper placement of tourniquet (location, cessation of bleeding)
 - Proper marking and timing of tourniquet placement and notification of tourniquet placement to subsequent EMS clinicians and ED personnel
 - Appropriate splinting and padding of fractures



Crush Syndrome Trauma

DRAFT FOR USE

PEARLS

- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
- **Scene safety is of paramount importance as typical scenes pose hazards to rescuers. Call for appropriate resources.**
- Avoid Ringers Lactate IV Solution due to potassium and potential worsening hyperkalemia
- Hyperkalemia from crush syndrome can produce ECG changes described in COG, but may also see a bizarre, wide complex rhythm. Wide complex rhythms should also be treated using the Ventricular Tachycardia with a Pulse COG.
- Patients may become hypothermic even in warm environments.
- If the Crush Injury is isolated to an extremity/extremities – application of a proximal venous tourniquet prior to release of the compression may be considered based upon Local COG
- Be prepared for decompensation when releasing the crushing force.
- Hyperkalemia may be a delayed factor with release of prolonged or severe crush but hemodynamic instability may occur immediately.
- **KEY DOCUMENTATION ELEMENTS:**
 - Time of tourniquet application, if applied
 - Neurovascular status of any crushed extremity
 - EKG findings consistent with hyperkalemia
 - Amount of IV fluid administered
- **KEY PERFORMANCE MEASURES:**
 - Initiation of fluid resuscitation prior to extrication
 - EKG/monitor to monitor for dysrhythmias or changes related to hyperkalemia
 - Treatment of hyperkalemia if evidence is noted on EKG



Blast Injury / Incident

History

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

Signs and Symptoms

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

Differential

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

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

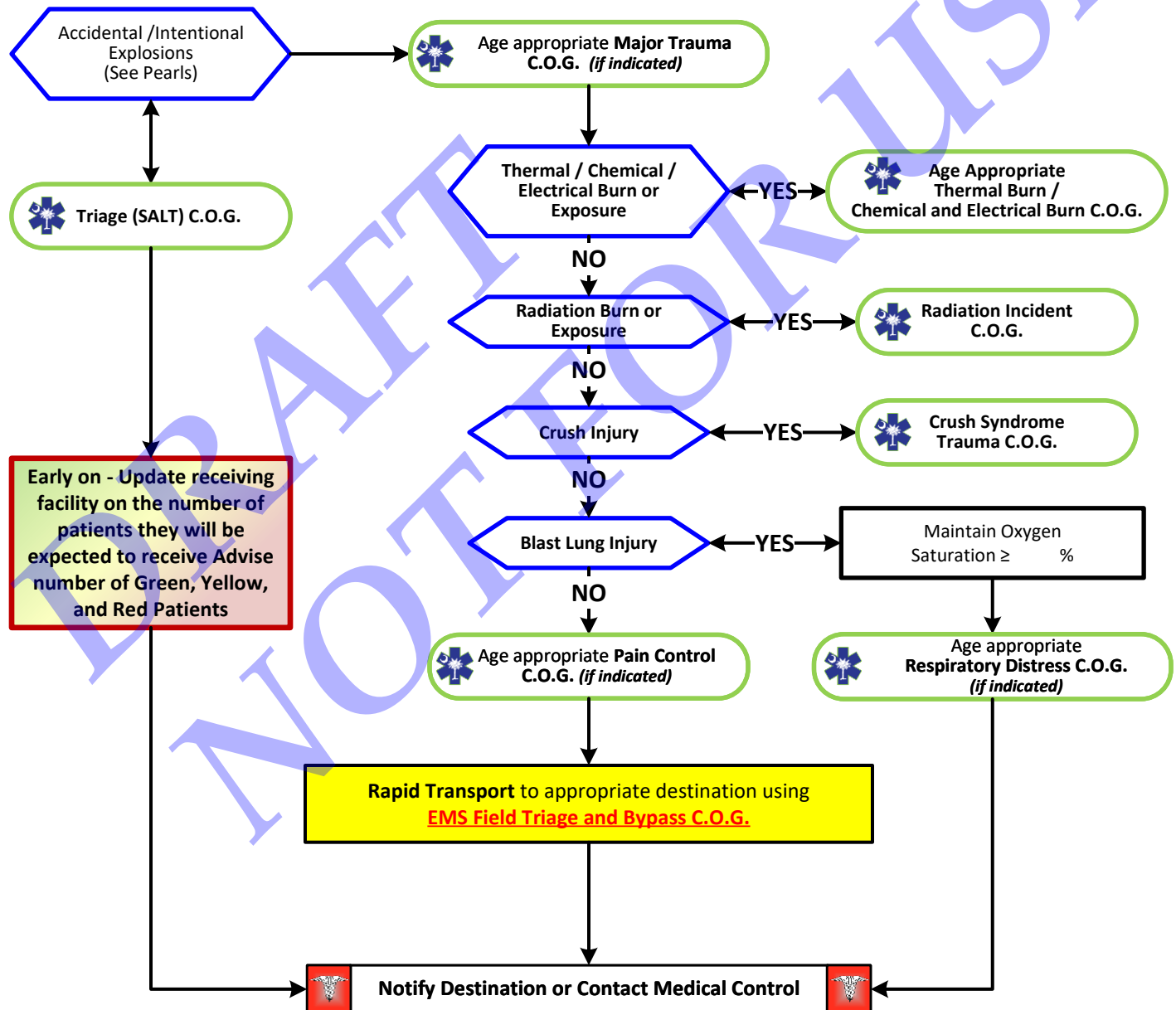
Method of Delivery: Incendiary / Explosive

Nature of Environment: Open / Closed.

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

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

Scene Safety / Consider Possibility of Secondary Devices, Need for Shielded Communications, Need for Patient Decontamination / Need for HAZMAT Gear





Blast Injury / Incident

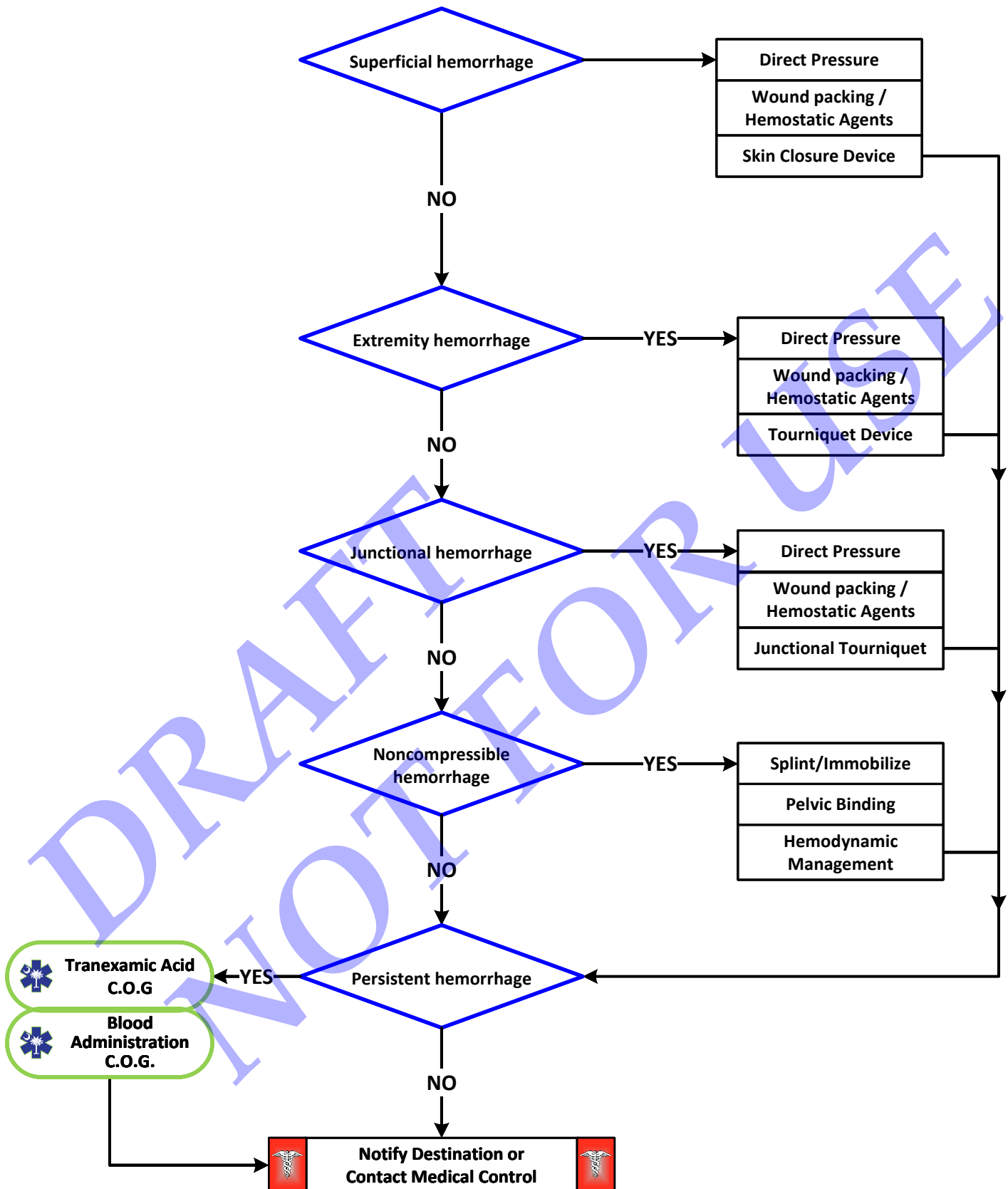
PEARLS

- **Types of Blast Injury:**
 - Primary Blast Injury: From pressure wave.
 - Secondary Blast Injury: Impaled objects. Debris which becomes missiles / shrapnel.
 - Tertiary Blast Injury: Patient falling or being thrown / pinned by debris.
 - Most Common Cause of Death: Secondary Blast Injuries.
- **Triage of Blast Injury patients:**
 - Blast Injury Patients with Burn Injuries Must be Triageed using the Thermal / Chemical / Electrical Burn Destination Guidelines for Critical / Serious / Minor Trauma and Burns
- **Care of Blast Injury Patients:**
 - Blast Injury Patients with Burn Injuries Must be cared for using the Thermal / Chemical / Electrical Burn C.O.G.
 - Use Lactated Ringers (if available) for all Critical or Serious Burns.
- **Blast Lung Injury:**
 - Blast Lung Injury is characterized by respiratory difficulty and hypoxia. Can occur (rarely) in patients without external thoracic trauma. More likely in enclosed space or in close proximity to explosion.
 - Symptoms: Dyspnea, hemoptysis cough, chest pain, wheezing and hemodynamic instability.
 - Signs: Apnea, tachypnea, hypopnea, hypoxia, cyanosis and diminished breath sounds.
 - Air embolism should be considered and patient transported prone and in slight left-lateral decubitus position.
 - Blast Lung Injury patients may require early intubation but positive pressure ventilation may exacerbate the injury, avoid hyperventilation.
 - Air transport may worsen lung injury as well and close observation is mandated. Tension pneumothorax may occur requiring chest decompression. Be judicious with fluids as volume overload may worsen lung injury.
- **Accident Explosions:**
 - Attempt to determine source of the blast to include any potential threat for distribution of hazardous materials/ particles.
 - Evaluate scene safety to include the source of the blast that may continue to spill explosive liquids or gases.
 - Consider structural collapse / Environmental hazards / Fire.
 - Conditions that led to the initial explosion may be redeveloping and lead to a second explosion.
 - Patients who can, typically will attempt to move as far away from the explosive source as they safely can.
- **Intentional Explosions:**
 - Attempt to determine source of the blast to include any potential threat for dissemination of particles of hazardous materials.
 - **Greatest concern is potential threat for a secondary device.**
 - Evaluate surroundings for suspicious items; unattended back packs or packages, or unattended vehicles.
 - **If patient is unconscious or there is(are) fatality(fatalities) and you are evaluating patient(s) for signs of life: Before moving note if there are wires coming from the patient(s), or it appears the patient(s) is(are) lying on a package/pack, or bulky item, do not move the patient(s), quickly back away and immediately notify a law enforcement officer.**
 - If no indications the patient is connected to a triggering mechanism for a secondary device, expeditiously remove the patient(s) from the scene and begin transport to the hospital.
 - Protect the airway and cervical spine, however, beyond the primary survey, care and a more detailed assessment should be deferred until the patient is moved to a secured environment
 - If there are signs the patient was carrying the source of the blast, notify law enforcement immediately and most likely, a law enforcement officer will accompany patient to the hospital.
 - Consider the threat of structural collapse, contaminated particles and / or fire hazards.
 - Take care to minimize disruption of scene, avoid movement of the obviously expired and preserve clothing/debris/ evidence, minimize traffic through the scene as allowed by proper patient management
- **KEY DOCUMENTATION ELEMENTS**
 - Airway status and intervention
 - Breathing status:
 - Quality of breath sounds (equal bilaterally)
 - Adequacy of respiratory effort
 - Oxygenation
 - Documentation of burns, including Total Burn Surface Area (TBSA) [See Burns Guideline]
 - Documentation of possible toxic chemical contamination
- **KEY PERFORMANCE MEASURES**
 - Airway assessment and early and aggressive management
 - Appropriate IV fluid management
 - Transport to trauma or burn center
 - In Multi-Patient events – notification of receiving facility/facilities of numbers of patients to be expected and categorization by Green, Yellow, and Red designations.



HEMORRHAGE CONTROL

ADULT TRAUMA





HEMORRHAGE CONTROL

Recommended Devices & Adjuncts (Tourniquets & Hemostatic Agents)

TOURNIQUETS, LIMB NON-PNEUMATIC

Common Name / Brand Name	DLA Nomenclature	NSN
Combat Application Tourniquet (CAT) Gen 7	Tourniquet Nonpneumatic Combat Application One-Handed 37.5" LG 1	6515-01-521-7976
Combat Application Tourniquet (CAT) Gen 6	Tourniquet Nonpneumatic Combat Application One-Handed 37.5" LG 1	Until Replaced by Gen7 6515-01-527-3841
Ratcheting Medical Tourniquet (RMT) Tactical	Tourniquet, One Handed Burke Device Tactical	6515-01-670-2240
SAM Extremity Tourniquet (SAM-XT)	Tourniquet Nonpneumatic 25S	6515-01-587-9943
SOFT-Tactical Tourniquet-Wide (SOFTT-W)	Tourniquet Nonpneumatic Nylon Strap 1.5" Wide Nylon Strap for Br	6515-01-656-6191
Tactical Mechanical Tourniquet (TMT)	Tourniquet Nonpneumatic Tactical Mechanical Tourniquet	6515-01-667-6027
TX2 Tourniquet (TX2)	Tourniquet Nonpneumatic TX2 Ratcheting One-Hand Coyote	6515-01-667-6208
TX3 Tourniquet (TX3)	Tourniquet Nonpneumatic TX3 Ratcheting OD Green One Hand	

(Alphabetical)

TOURNIQUETS, LIMB PNEUMATIC

Common Name / Brand Name	DLA Nomenclature	NSN
Emergency Medical Tourniquet (EMT)	Tourniquet Pneumatic Single-hand application fits upper and lower	6515-01-580-1645
Tactical Pneumatic Tourniquet 2" (TPT2)	Tourniquet Pneumatic Slide Fastener	6515-01-656-4831

HEMOSTATIC DRESSINGS/DEVICES

Common Name / Brand Name	DLA Nomenclature	NSN
Combat Gauze (CG) Z-Fold	Bandage Gauze Impregnated 3" W X 4 YDS L Kaolin Hemostatic Quik	6510-01-562-3325
Celox Gauze, Z-fold 5'	Dressing Hemostatic Celox Gauze 3" X5' Z-folded	6510-01-623-9910
ChitoGauze	Dressing Hemostatic 144" length 3" width coated with Chitosan	6510-01-591-7740
X-Stat, Single Applicator	Applicator Hemostatic Sponges and Dispenser Xstat-30 Each	6510-01-644-7335
TClamp	Clamp Hemorrhage Control Sterile Medical Grade Polycarbonate	6515-01-629-7044

PEARLS

- **Recommended Exam: Mental Status, Extremity, Neuro**
- **It is STRONGLY RECOMMENDED that EMS Services use Tourniquets and Hemostatic Agents that are listed based on evaluation by the Committee on Tactical Combat Casualty Care.**
- Peripheral neurovascular status is important.
- Pressure point use has been de-emphasized – but may remain an effective adjunct for hemorrhage control in certain circumstances
- Significant blood loss may be concealed or not apparent.
- Multiple Casualty Incident: Tourniquet Procedure may be considered 1st instead of direct pressure.
- Use of tourniquet for hemorrhage is strongly recommended if sustained direct pressure or hemostatic agent/wound packing is ineffective or impractical;
- Use a commercially produced, windlass, pneumatic, or ratcheting device, which has been demonstrated to occlude arterial flow and avoid narrow, elastic, or bungee-type devices;
 - Utilize improvised tourniquets only if no commercial device is available;
- Do not release a properly applied tourniquet until the patient reaches definitive care
- Apply a topical hemostatic agent, in combination with direct pressure, for wounds in anatomic areas where tourniquets cannot be applied and sustained direct pressure alone is ineffective or impractical;
 - Only apply topical hemostatic agents in a gauze format that support wound packing;
 - Only utilize topical hemostatic agents which have been determined to be effective and safe in a standardized laboratory injury model
- **KEY DOCUMENTATION ELEMENTS**
 - Vital signs and vascular status of extremity after placement of tourniquet, pressure dressing, packing, and/or splint
 - Time of tourniquet placement
 - Documentation of signs/symptoms of possible compartment syndrome
 - Documentation of notification of receiving facility of Tourniquet placement and time.
- **KEY PERFORMANCE MEASURES**
 - Proper placement of tourniquet (location, cessation of bleeding)
 - Proper marking and timing of tourniquet placement and notification of tourniquet placement to subsequent EMS clinicians and ED personnel
 - Proper utilization of TXA and Blood Product Administration C.O.Gs



Burns: Thermal

History

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

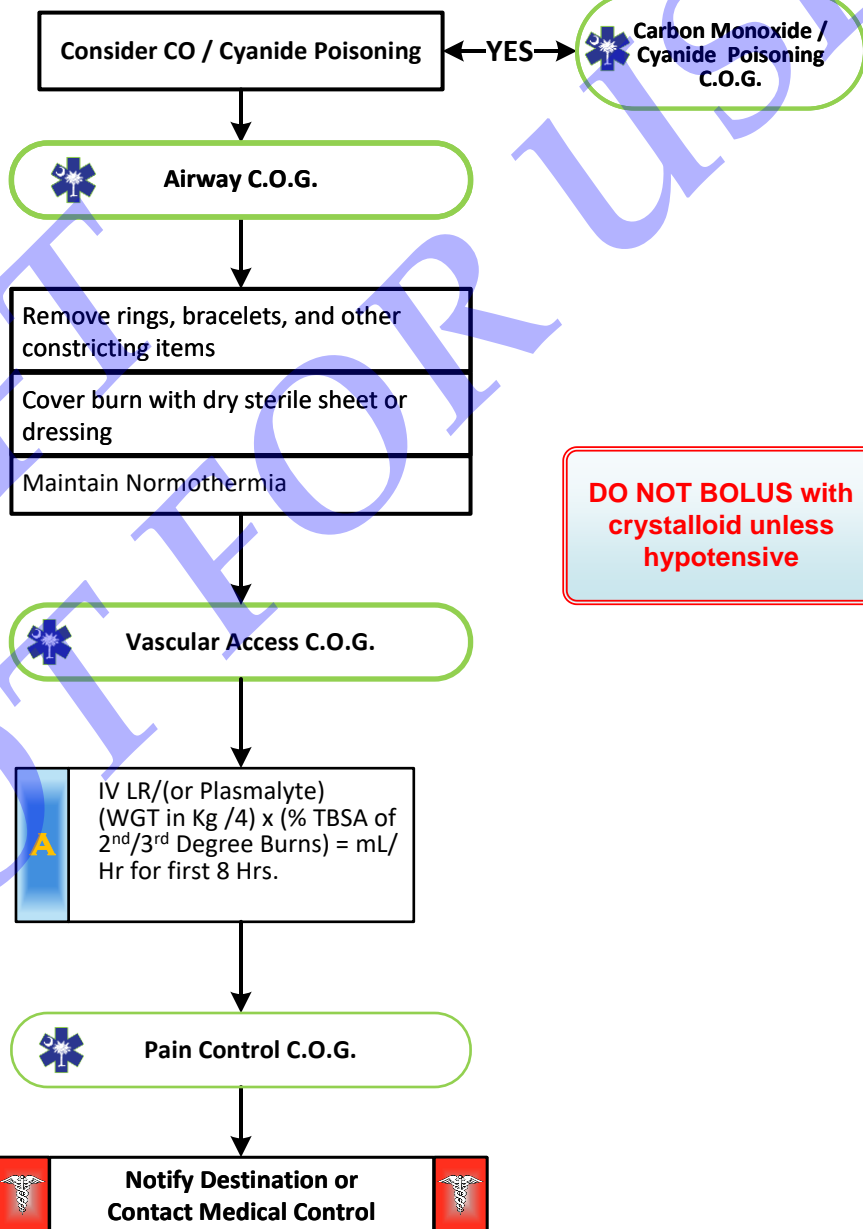
Signs and Symptoms

- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress
- Singed facial or nasal hair
- Hoarseness / wheezing

Differential

- **Superficial (1st Degree)** red and painful
- **Partial Thickness (2nd Degree)** blistering
- **Full Thickness (3rd Degree)** painless/ charred or leathery skin
- **Thermal**
- **Chemical**
- **Electrical**
- **Radiation**

STOP THE BURN !



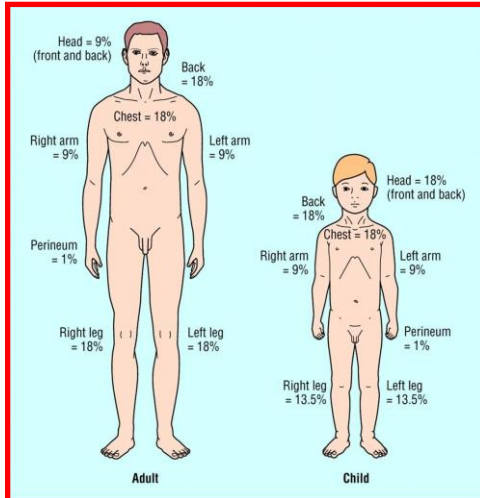
When significant Trauma coexists in the Burn Patient – initial transport should be to a BURN Center ONLY if the BURN Center has an appropriate Trauma Designation.

IF the available burn center does not have the appropriate TRAUMA designation for the coexistent injuries, or the patient is unstable for the time required to arrive at the burn center, THEN transport should be to the nearest appropriate trauma center first

DO NOT BOLUS with crystalloid unless hypotensive



Burns: Thermal



1. The IV solution should be changed to Lactated Ringers if it is available. It is preferred over Normal Saline.

2. If > 1-2 hours from Burn Center starting IV Fluid Rate: $(2 \times \text{wgt in Kg} \times \%TBSA) / 16$

Critical or Serious Burns

- > 5-15% total body surface area (TBSA); 2nd or 3rd degree burns, or
- 3rd degree burns > 5% TBSA for any age group, or
- circumferential burns of extremities, or
- electrical or lightning injuries, or
- suspicion of abuse or neglect, or
- inhalation injury, or
- chemical burns, or
- burns of face, hands, perineum, or feet, or
- any burn requiring hospitalization.

(These burns will require direct transport to a burn center, or transfer once seen at a local facility where the patient can be stabilized with interventions such as airway management or pain relief if this is not available in the field or the distance to a Burn Center is significant.)

**Critical
(Red)**

**Serious
(Yellow)**

**Minor
(Green)**

>15% TBSA 2nd/3rd Degree Burn
Burns with Multiple Trauma
Burns with definite airway compromise
(Transport to a Burn Center when reasonable or reasonably accessible. Less than 30 minutes is a reasonable distance, at Service discretion for further distances.
If not accessible, Burn Center does not have appropriate trauma designation, or patient unstable, transport to nearest Level 1 Trauma Center.)

5-15% TBSA 2nd/3rd Degree Burn
Suspected Inhalation injury,
Hypotension or GCS < 14
(Transport to a Burn Center when reasonable or reasonably accessible. Less than 30 minutes is a reasonable distance, at Service discretion for further distances.
If not accessible or patient unstable, transport to nearest Level 1 Trauma Center.)

< 5% TBSA 2nd/3rd Degree Burn
No inhalation injury, Not Intubated, Normotensive GCS>14
(If within 30 minutes of a burn center by ground, transport directly to burn center. If further, transport to the Local Hospital)

PEARLS

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- Burn patients are Trauma Patients, evaluate for multisystem trauma.
- **When Trauma coexists in the Burn Patient – initial transport to a verified Trauma Center based on the Trauma Triage and Bypass Protocol is warranted.**
- Ensure whatever has caused the burn, is no longer contacting the injury. (Stop the burning process!)
- Early intubation is required when the patient experiences significant inhalation injuries. Symptoms such as dyspnea, hypoxia, tachypnea and accessory muscle use are indications for intubation. Deep 3rd degree facial burns and coughing up copious black carbonaceous sputum are more specific indicators of inhalation burns. If in doubt – intubate. Flash burns to face and smoking on oxygen, singed nasal hair, 2nd degree burns to face, mild amounts of soot present do not usually require intubation..
- Potential CO exposure should be treated with 100% oxygen. (For patients suffering from CO inhalation, transport to a hospital equipped with a hyperbaric chamber is indicated [when reasonably accessible.]. For patients with > 5-15% TBSA proceed to burn center on 100% FIO₂.)
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Burn patients are prone to hypothermia - never apply ice or cool burns, must maintain normal body temperature.
- Evaluate the possibility of child abuse with children and burn injuries.
- **KEY DOCUMENTATION ELEMENTS:**
 - Initial airway status
 - Total volume of fluid administered
 - Body surface area of second- and third-degree burns (TBSA)
 - Pulse and capillary refill exam distally on any circumferentially burned extremity
 - Pain scale documentation and pain management



Tranexamic Acid (TXA)

This Protocol addresses treatment of the ADULT patient ≥ 18 years of age who presents with **traumatic, life-threatening, non-compressible bleeding** with any of the following, or alternatively for angioedema per C.O.G.

- Systolic Blood Pressure < 90 mmHg
- Heart Rate > 120 beats per minute
- Bleeding or presumed bleeding that is NOT controllable by direct pressure, wound packing, or tourniquet application
- Ongoing significant Blood Loss (> 500 mL)

Services wishing to utilize TXA must have predefined letter of agreement or Memorandum of Understanding from the Trauma Center to which that service will transport these patients.

 Vascular Access C.O.G.

 Hypotension C.O.G.

TRANEXAMIC ACID (TXA)

1* Gram mixed into 50 or 100 mL NS over 10 minutes IV/IO

(*Method of Administration of TXA will be determined by Local Medical Control Physician in consultation with the Trauma Center)

[*An alternative method of administration by slow IV Push of 1 GM TXA over 10 minutes may also be utilized – but is less preferred]

(May be administered in conjunction with Fluid Resuscitation)

P



Tranexamic Acid (TXA)

PEARLS:

- **DO NOT ADMINISTER Tranexamic Acid (TXA) if ANY** of the following are present:
 - Time of injury is > 3 hours prior
 - Patient has an active (within the last 24 hours) thromboembolic event (active stroke, myocardial infarction, or pulmonary embolism)
 - Traumatic Arrest > 5 minutes
 - Any patient with a known allergy to Tranexamic Acid (TXA)
 - Penetrating Cranial injury
 - Traumatic Brain Injury (TBI) with exposed brain matter
 - Isolated hanging or drowning victims
 - Cervical Cord Injury with motor deficits
- In the bleeding patient, hemorrhage control and appropriate resuscitation remain the priority.
- **Prehospital TXA use should NEVER supersede** field bleeding control needs, prompt transport or the administration of blood/plasma products.
- $MAP = [SBP + (2 \times DBP)] / 3$
- **KEY DOCUMENTATION ELEMENTS:**
 - Indications for utilization of TXA
 - Vital Signs
 - Dosage of TXA Administered
 - How TXA is Administered
 - IV Infusion
 - Slow (>10 minutes) IV Push
 - Documentation of patient Identification as having received TXA
 - Documentation of appropriate notification of receiving facility personnel at time of hand-off that patient has received TXA.



Tranexamic Acid (TXA)

TXA ADMINISTRATION GUIDELINES

Date _____ ePCR # _____

Patient Name _____

ALL of the following criteria must be met for TXA administration:

- Age \geq 18 years
- Traumatic mechanism
- Life-threatening hemorrhage
- Unresponsive to standard treatment

AND the addition of one or more of the following:

- SBP < 90 mmHg
- HR > 120 bpm (sustained)
- Bleeding not controlled with other measures
- Ongoing significant estimated blood loss of > 500 ml

ALTERNATIVELY

- May be used for treatment of angioedema if criteria per C.O.G. are met

The following are **EXCLUSION** criteria under **ANY INDICATION**.
For **ANY YES ANSWER – WITHHOLD TXA ADMINISTRATION**.

- | <u>Yes</u> | <u>No</u> | |
|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Time of injury with duration > 3 hours |
| <input type="checkbox"/> | <input type="checkbox"/> | Traumatic arrest duration > 5 minutes |
| <input type="checkbox"/> | <input type="checkbox"/> | Active thromboembolic event in last 24 hours |
| <input type="checkbox"/> | <input type="checkbox"/> | Known allergy or hypersensitivity to TXA |
| <input type="checkbox"/> | <input type="checkbox"/> | Penetrating cranial injury |
| <input type="checkbox"/> | <input type="checkbox"/> | Blunt TBI with exposed brain matter |
| <input type="checkbox"/> | <input type="checkbox"/> | Isolated hanging or drowning victims |
| <input type="checkbox"/> | <input type="checkbox"/> | Cervical cord injury with motor deficits |

Time of Administration: _____

ADULT TRAUMA



Blood Administration



Mechanism of Injury / Nature of Illness

Patients age > 5 years with:

- Signs of massive hemorrhage
- Traumatic injury (Penetrating or Blunt)
- Suspected dissecting / rupturing aneurysm (Abdominal or Thoracic)
- GI Bleeding
- Signs of intra-abdominal bleeding

Physiological Parameters:

- Systolic (SBP) < 90 mmHg
- HR > 120 bpm
- Shock Index (SI) > 0.9
- Pediatric Patients > 5 Y/O whose VS are consistent with blood loss as defined by their weight or age-based parameters in the Pediatric Multiple Trauma Protocol

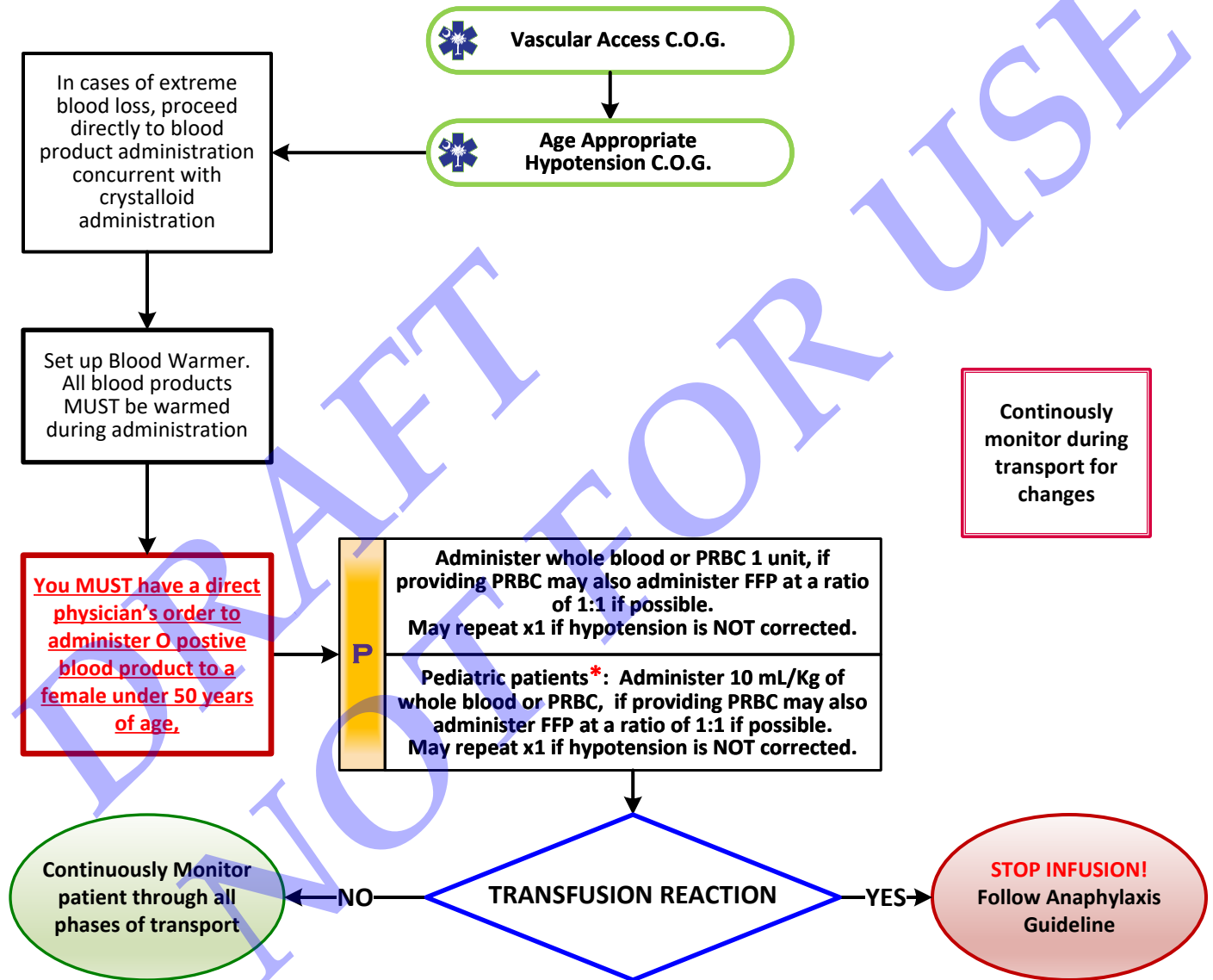
DEFINITIONS:

- ❖ Shock Index (SI): HR divided by SBP = SI

REQUIRED DOCUMENTATION:

- ☐ In Flowchart and ePCR document Rh type, amount, unit lot number, and expiration date for EVERY unit administered to patient.

If patient with Mechanism of Injury / Nature of Illness + 2 Physiological Parameters



*A Pediatric patient is defined as ≤ 12 years old and < 55 Kg

ADULT TRAUMA



Blood Administration



PEARLS:

- **If administering O positive blood product to a female under 50 years of age, you MUST have a DIRECT physician's order! No Standing Order or Protocol is acceptable.**
- Prime blood tubing and warmer. Tubing should be changed after 2 Units if possible, or as manufacturer recommends. Care should be taken to prevent hypothermia.
- Monitor patients for signs and symptoms of transfusion reaction and adverse effects, including temperature at time of infusion and 15 minutes after start.
- **For any reaction, STOP the infusion**, remove all tubing and product from the patient and save all equipment. Flush IV line.
- Consider any fluid overload issues such as CHF or patient weight (pediatrics) , and monitor for signs and symptoms appropriately.
- **Allergic reaction** (onset <15 min) –
 - Minor/Mild: Mild skin itching or hives < 25% body,
 - Moderate: Temp 38C (100.4F) or change of >1C (>1.8F) from pre-transfusion value, chills, and hives/rash >25% body
- **Febrile transfusion reactions:** -
 - Temp 38C (100.4F) or change of >1C (>1.8F) from pre-transfusion value, chills, headache, facial flushing, palpitations, cough, chest tightness, increased pulse rate and/or flank pain
- **Hemolytic transfusion reaction:** -
 - Immediate lysis of transfused blood can result in fever and/or tachycardia.
 - Other symptoms can include chills, back/flank pain, nausea/vomiting, dyspnea, flushing, bleeding, and/or hypotension.
 - Begin aggressive NS 0.9% treatment
- **Dilutional thrombocytopenia** - Generally not seen with infusion of 1 – 2 units, unless patient has pre-existing thrombocytopenia or disseminated intravascular coagulation.
- **Potassium intoxication (hyperkalemia)** - Symptoms can include flaccidity, muscle twitching, bradycardia, EKG changes (tall peaked T waves, prolonged P-R interval, absent P waves, prolonged QRS) and/or cardiac arrest.
- **Hypocalcemia: (from citrate toxicity that binds Ca)** - Symptoms can include arrhythmias, hypotension, muscle cramping, nausea, vomiting, seizure activity, and/or tingling sensation in the fingers. Patient with acute or chronic hepatic insufficiency are at relatively higher risk of citrate toxicity. To avoid, administer PRBC no faster than 1 unit every 5 minutes. Treatment with Calcium Gluconate 1 gm infused slowly in a different IV/IO line.
- Contact Medical Control for additional boluses as necessary
- **KEY DOCUMENTATION ELEMENTS:**
 - ❑ **Pre-transfusion:**
 - ❑ Reason for transfusion, including relevant clinical data.
 - ❑ Vital Signs and Clinical History
 - ❑ The components to be transfused and their dose/volume and rate.
 - ❑ **During transfusion:**
 - ❑ Identification of Paramedic starting the transfusion.
 - ❑ Date and time transfusion started and completed.
 - ❑ Donation number of the blood component.
 - ❑ Record of observations made before, during and after transfusion.
 - ❑ **Post-transfusion:**
 - ❑ Management and outcome of any transfusion reactions or other adverse events.
 - ❑ Whether the transfusion achieved the desired outcome (e.g. improvement in symptoms, improvement in Vital Signs, etc.).
 - ❑ Provide any completed blood product containers to receiving facility on patient transfer
 - ❑ **OTHER:**
 - ❑ **If administering O positive blood product to a female under 50 years of age, you MUST have a DIRECT physician's order! You must obtain that physician's name and signature while in the Emergency Department.**



Blood Administration



Clinical Indications:

- Any patient where Blood Product Administration is indicated in the blood administration guideline, or where as ordered by a Physician.
- **Blood products are NOT to be administered to patients in Cardiac Arrest**

Procedure:

- Large bore IV access available. Separate IV sites are needed for FFP and PRBC products
- Normal Saline IV fluid initiated
- Remove Units from storage to be administered. **TWO** providers must cross check and confirm transfusion is required prior to administration
 - Verify Correct patient
 - Verify Blood Component is correct (Correct type, Correct component)
 - Verify Expiration Date
 - Confirm Temperature monitor in each unit is appropriate (not out of range/red)
 - Check for discoloration or gas bubbles present
 - **Check and document patient temperature**
- If patient has apparent capacity and condition allows, discuss the procedure with the patient
- Prime the tubing set and blood warmer if applicable
 - EMS provided blood and blood products must be warmed during administration
 - Interfacility blood administration does not have to be warmed
- Initiate blood product administration and set appropriate rate
- Monitor for transfusion reactions during the next 15 minutes
 - Second temperature must be taken at this time (i.e 15 minutes into transfusion).
 - If a reaction occurs, **STOP** infusion and follow appropriate guideline. Retain all blood product and tubing for source testing
- Document the procedure, time, and results
 - **Blood product type, expiration date, and lot number MUST be documented for EACH blood product unit administered**
 - **Patient temperature must be documented prior to and 15 minutes after initiation of blood product administration**
 - Blood bank paperwork must be completed with the appropriate form given to the receiving staff at transfer of patient care
 - Always keep a copy of transfusion documents for records.

❖ **If administering O positive blood product to a female under 50 years of age, you MUST have a DIRECT physician's order!**