For Emergency Healthcare Professionals

EMS pocket

Prehospital Reference Guide

Börm
Bruckmeier
Publishing

Includes **Algorithms** from the
American Heart Association

4. Trauma

4.1 Trauma Triage Guidelines

Criteria for Transport to Trauma Center

4.1.1 Adult Trauma Triage Guidelines

Statement of Intent

The following trauma triage guidelines are provided to assist in determining the disposition of adult trauma patients (**in a small number of patients**). These guidelines are intended to be utilized in conjunction with clinical judgment. It is understood that these are guidelines only and are to be used whenever possible in communication with a base station physician.

Step I: Assess Vital Signs and Level of Consciousness

- Glasgow Coma Scale +/-12 or AVPU* = P or U
- Systolic BP < 90
- Pulse < 60/min or > 130/min
- Respiration < 10/min or > 29/min

(*AVPU = responsive to voice, pain, or unresponsive)

If any of these assessments ⇒ transport to nearest Trauma Center!

Step II: Assess Anatomy of Injury

- Penetrating injuries (e.g. gunshot wounds, stab wounds) to head, neck, torso, extremities (above the elbow and knee)
- Flail chest
- Fractures (more than one fracture involving humerus and/or femur)
- Pelvic fractures
- Paralysis or evidence of a spinal cord injury
- Amputation (→ 86) above wrist or ankle
- Burns (→ 88) when combined with other major injuries
- High voltage electrical injury

If any of these assessments ⇒ transport to nearest Trauma Center!

Step III: Assess Mechanism of Injury (Required Consult with Medical Command, when Available)

- Ejection from motor vehicle
- Extrication > 20 min with an injury
- Falls > 20 feet
- Unrestrained passenger in vehicle roll over
- Pedestrian, motorcyclist or pedalcyclist thrown or run over

If any of these assessments ⇒ transport to nearest Trauma Center!

In trauma patient with none of the above assessments ⇒ transport to local hospital

Reference: Triage Guidelines, NJ Department of Health & Senior Services, Office of Emergency Medical Services, http://www.state.nj.us/health/ems/triage.htm

4.1.2 Pediatric Trauma Triage Guidelines

Statement of Intent

The following pediatric trauma triage guidelines are provided to assist in determining the disposition of children 12 years of age or younger. Use the adult trauma triage guidelines for children older than 12 years of age. It is understood that these are guidelines only and are to be used, whenever possible, in communication with a base station physician. These guidelines are intended to be utilized in conjunction with clinical judgment..

Step I: Assess Vital Signs and Level of Consciousness

- AVPU = responsive to voice, pain, or unresponsive
- Evidence of poor perfusion (skin pallor, cool extremities, weak distal pulses, cyanosis/mottling, etc.)
- Heart rate:
  - child < 5 yr old: < 80/min or > 180/min
  - child > 6 yr old: < 60/min or > 160/min
- Respiratory rate > 60, or respiratory distress, or apnea
- Capillary refill > 2 seconds (evaluated on warm body part)

If any of these assessments ⇒ transport to nearest Trauma Center!

Step II: Assess Anatomy of Injury

- Penetrating injuries (ex. gunshot/stab wounds) to the head, neck, torso or extremities (above the elbow and knee)
- Flail chest
- Difficulty or inability to maintain a patent airway
- Fractures - more than one involving the humerus and/or femur
- Pelvic fractures
- Paralysis or evidence of spinal cord injury
- Amputation above the wrist or ankle
- Burns when combined with other major injuries
- Seat belt mark on the torso

If any of these assessments ⇒ transport to nearest Trauma Center!

Step III: Assess Mechanism of Injury

- Ejection from motor vehicle
- Falls > 3x patient's height
- Extrication time > 20 mins with an injury
- High voltage electrical injury
- Unrestrained passenger in vehicle roll over
- Pedestrian, motorcyclist or pedalcyclist thrown or run over
- Front seat passenger with deployment of air bag (same side)

If any of these assessments ⇒ transport to nearest Trauma Center!

In pediatric trauma patient with none of the above assessments ⇒ transport to local hospital

Reference: Triage Guidelines, NJ Department of Health & Senior Services, Office of Emergency Medical Services, http://www.state.nj.us/health/ems/triage.htm

4.2. Glasgow Coma Scale

Activity	Adult Response	Infant Response	Score
Eye opening	Spontaneous	Spontaneous	**4**
	To speech	To speech or sound	**3**
	To pain	To pain	**2**
	None	None	**1**
Best verbal response	Oriented (to person, place, month, year)	Oriented (infant coos or babbles)	**5**
	Confused	Confused (infant irritable cries)	**4**
	Inappropriate words	Inappropriate words (infant cries to pain)	**3**
	Incomprehensible sounds	Incomprehensible sounds (infant moans to pain)	**2**
	None	None	**1**
Best motor response	Obeys commands	Obeys (infant moves spontaneous/ purposefully)	**6**
	Localizes pain	Localizes (infant withdraws to touch)	**5**
	Withdraws from pain	Withdraws from pain	**4**
	Flexion to pain	Abnormal flexion to pain (decorticate)	**3**
	Extension to pain	Extension to pain (decerebrate)	**2**
	None	None	**1**
GCS-Score			**3-15**

GCS > 8 = Somnolent		GCS < 8 = Unconscious		
>12	Mild, minor head injury	8-7	coma grade I	light coma
12-9	Moderate head injury	6-5	coma grade II	
Somnolence: sleepy, easy to wake - Stupor: hypnoid, hard to awake		4	coma grade III	deep coma
		3	coma grade IV	

4.3 Revised Trauma Score

Used to rapidly assess patients at the scene of an accident.

Parameter	Finding	Points
Respiratory rate	>29 per minute	**4**
	10–29 per minute	**3**
	6-9 per minute	**2**
	1-5 per minute	**1**
	Nil	**0**
Systolic blood pressure	>89 mm Hg	**4**
	76-89 mm Hg	**3**
	50-75 mm Hg	**2**
	1-49 mm Hg	**1**
	Nil	**0**
Glasgow Coma Score	13-15	**4**
	9-12	**3**
	6-8	**2**
	4-5	**1**
	3	**0**
RTS-Score		**0-12**

Revised trauma score = (points for respiratory rate) + (points for systolic blood pressure) + (points for Glasgow coma score)

Maximum score (indicating least affected) = 12
Minimum score (indicating most affected) = 0

4.4. Pediatric Trauma Score

Criteria	+ 2	+ 1	- 1
Weight	> 20 kg	10-20 kg	< 10 kg
Airway	Normal	Maintainable without invasive procedure	Not maintainable, needs invasive procedure
Systolic Blood Pressure	> 90 mmHg	50-90 mmHg	< 50 mmHg
CNS	Awake	Obtunded	Comatose
Open Wounds	None	Minor	Major or Penetrating or Burns
Skeletal Trauma, Fracture	None	Closed or suspected Fx	Open or multiple Fx

Interpretation	
9-12	Minor trauma
6-8	Critical injury, transport to pediateric trauma center
0-5	Life threatening, transport to pediateric trauma center
< 0	Usually fatal

4.5. Normal Pediatric Vital Signs

See chapter Pediatrics, →169

4.6 START - Triage of a Large Number of Patients

4.6.1 START Principles

The START (Simple Triage and Rapid Treatment) process permits a very few rescuers without spezialized training to rapidly triage a **large number of patients**. The START process was developed in the early 1980's by Hoag Hospital and the Newport Beach Fire Department (California).

START Goals

Find and transport all "**RED: Immediates**".
Focus on the **RED: Immediate"** patients. Everyone else can wait

START Step I: Get up and Walk

Tell all the people who can get up and walk to move to a specific area. If they can get up and walk, they are probably not at risk of immediate death. Tag these as "**GREEN: Minor**".

START Step II: Begin Where You Stand

Begin by moving from where you stand. Move in an orderly and systematic manner through the remaining victims, stopping at each person for a quick assessment and tagging.

START Step III: Evaluate Patients Using RPM

Now check your **RPM**s:

- **R**espirations (30)
- **P**ulse (2)
- **M**ental Status. (can do)

Each patient must be evaluated quickly, in a systematic manner, starting with respiration (breathing).

The initial patient assessment and treatment should take less than 30 seconds for each patient.

Reference: (c) Hoag Hospital and the Newport Beach Fire Department (California)

Respiration

- None → open the airway
  - Still none → Tag as **"BLACK: Deceased"**.
  - Restored → Tag as **"RED: Immediate"**.
- Present
  - Above 30 → Tag as **"RED: Immediate"**.
  - Below 30 → **Check Perfusion**

Perfusion

- Radial Pulse absent **OR** Capillary Refill > 2 sec
  → Tag as **"RED: Immediate"**.
- Radial Pulse present **OR** Capillary Refill < 2 sec
  → Check **Mental Status**

Mental Status

- **Can not** follow simple commands (unconscious or altered LOC)
  → Tag as **"RED: Immediate"**.
- **Can** follow simple commands
  → Tag as **"YELLOW: Delayed"**.

If there is any suspicion of a hazardous materials spill - stay away!

You cannot stop during this survey. There are only 3 treatments:

- Open airway, insert OPA
- Stop bleeding
- Elevate lower extremities

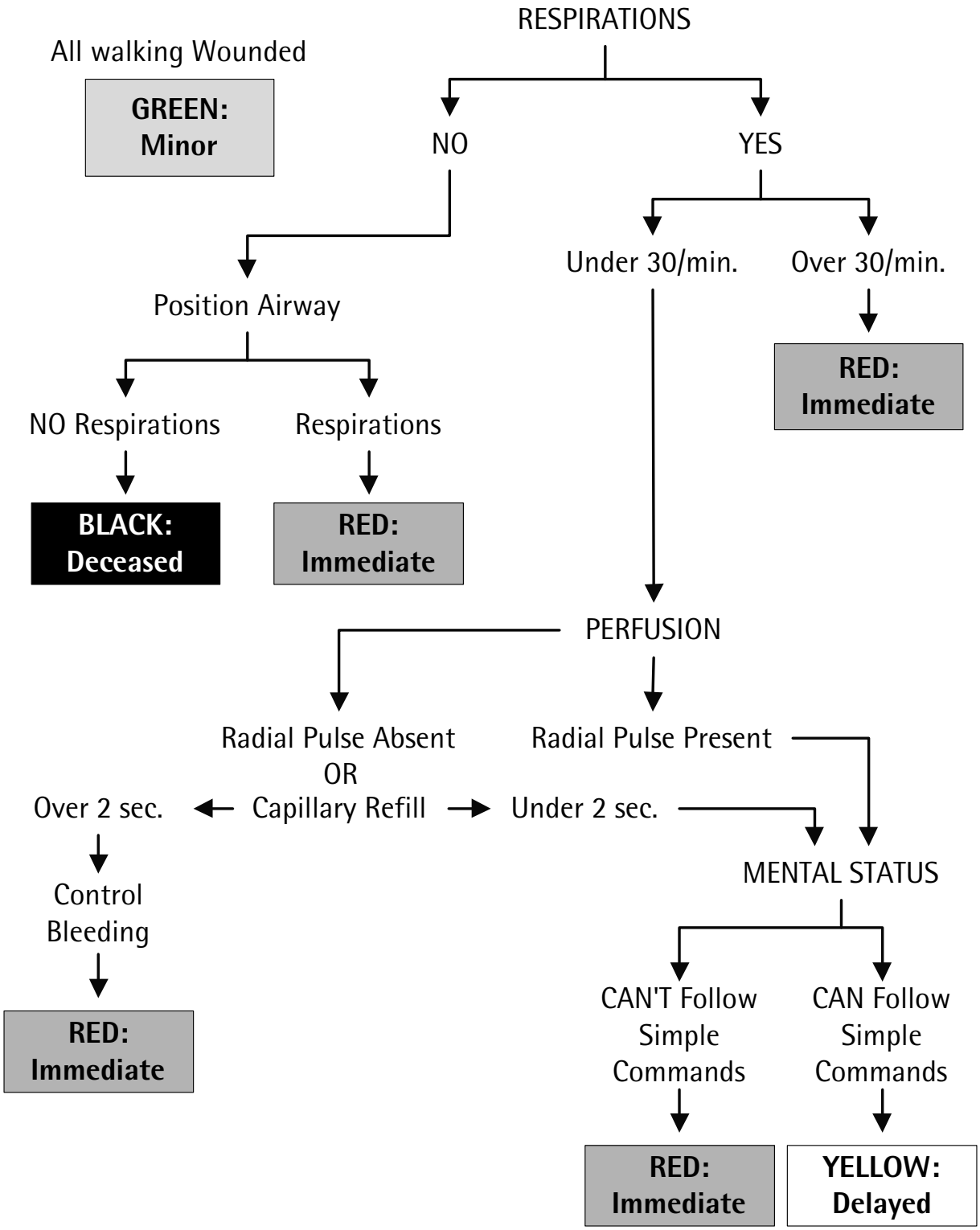
The patients will be re-triaged for further evaluation, treatment, stabilization, and transportation by other rescuers.

Reference: (c) Hoag Hospital and the Newport Beach Fire Department (California)

The Four Colors of Triage

GREEN	**Minor**	"Move The Walking Wounded"; delayed care: can delay up to three hours
BLACK	**Dead/Dying**	No Resp. after Head Tilt /OPA; victim is dead: no care required
RED	**Immediate**	**R**espirations: > 30 OR **P**ulse no radial pulse OR **M**ental Status - can not follow simple commands; Immediate care: life-threatening
YELLOW	**Delayed**	Otherwise; urgent care: can delay up to one hour

4.6.2 START Algorithm



Reference: (c) Hoag Hospital and the Newport Beach Fire Department (California)