In our profession, just about any time we respond……we face the potential of encountering trauma victims.
Whether we are responding to an motor vehicle collision............
Some type of industrial accident..........
A building fire..................
Or some unknown incident, we may encounter some level of trauma patients, or in some cases, even become victims of it ourselves.
The State of Ohio Department of Public Safety has issued us this powerpoint presentation. This is a revision of previous continuing education modules. Some of the trauma information from the past has been revised and there is also new content as well. This will help our personnel triage or “sort” the trauma patients who would be best served by being transported to and treated at one of our area trauma centers.
I kept this slide in the presentation – not so you can see who our state medical director or trauma committee chair person is, but to illustrate the first sentence. Notice how it says ORC….. That’s the Ohio Revised Code. These trauma rules are actually state law. You will notice more reference to state law as we go through the slide show.
These are the learning objectives for this course. Notice more reference to Ohio “law”. “Trauma” itself has a definition. Trauma centers and their level designation will be discussed. You will learn the types of trauma in relation to adult, geriatric and pediatric patients. MOI and co-morbidity with respect to trauma will be discussed. There are some exceptions as to when it is permissible to transport a major trauma patient to a non-trauma center, we will look at those exceptions. Regional protocols and documentation will also be discussed.
Ohio Prehospital Trauma
Triage Rules

*Legal Definitions*

We begin with a section on legal definitions.
The Ohio General Assembly establishes laws in the Ohio Revised Code (ORC).

Laws are amplified by State Boards and agencies through rules established in the Ohio Administrative Code (OAC).

Here are more references to laws. As you can see the Ohio Revised Code (ORC) is state LAW. Those laws are defined more specifically by RULES or the Ohio Administrative Code (OAC). Both are considered binding.
The General Assembly established laws in ORC sections 4765.01 and 4765.40 which define:
- Traumatic injury
- Trauma patient / trauma victim
- Trauma care
- Trauma center
- Trauma triage

These definitions are expanded and clarified for EMS providers by the State Board of Emergency Medical Services in OAC chapters 4765-1 and 4765-14

If anyone cares to check, the slide above cites the sections of the ORC and OAC that define trauma items. Both are available on the ODPS website at: http://ems.ohio.gov/rules.htm
This slide shows Ohio’s legal definition of trauma patient/victim. You can see they must have sustained a traumatic injury and must pose the risks outlined above. Also, it must be a result of one or more of the above causes. Trauma not falling into these categories would not be considered “major trauma”.
Trauma care, as defined above, encompasses ALL facets of care, not just when EMTs have patient care. We are just a part of the overall trauma care. Notice that even rehab is a part of trauma care.
You may have wondered - what makes a hospital a trauma center? A hospital is awarded that status when they satisfy certain conditions.

The qualifications for a hospital to become a trauma center are also defined in law.

A hospital is designated as a trauma center by the State of Ohio when it:
- Receives verification from the American College of Surgeons as an adult or pediatric trauma center or
- Operates under Ohio’s Provisional Trauma Center laws or
- Is located in another state and is licensed or designated as a trauma center by that state
These next slides outline what those conditions are, and what the numerical level designation of trauma centers mean ie: level 1, level 2 etc.
What makes a hospital a trauma center?

A trauma center is a hospital which has the immediate availability of specialized surgeons, physician specialists, anesthesiologists, nurses, resuscitation and life support equipment, and operating rooms on a 24-hour basis to care for severely injured patients.

You can see from this slide, the Hospital’s immediate trauma resources are what determines whether or it can earn the “trauma center” title. We all know trauma patients need immediate care. The hospital needs 24 hour access to all types of medical specialists and equipment to be considered a trauma center.
Why take seriously injured patients directly to a trauma center?

- The definitive care of internal bleeding or traumatic brain injury cannot occur in the prehospital setting or in a routine and timely manner at a non-trauma center hospital.
- Trauma centers have 24-hour availability of emergency medicine and surgical services which allow the patient to be taken directly to the operating room, if needed.
- Studies of over 250,000 Ohio trauma patient records have shown that trauma patients taken to a non-trauma center hospital spend, on average, over four hours at that hospital before transfer to a trauma center is initiated.

Why take patients to a trauma center? It's simple. Trauma patients need to go where they can get care immediately. Drs. Love statistics, and those stats show patients wait up to four hours for transfer to a trauma center when taken to a facility that isn’t set up to handle major trauma.
Trauma centers have numerical level designations 1-4. What does that mean? Does that mean a level 4 is a bad hospital? No. A level 1 has more depth of resources. We will look at each level for a better understanding.
A level 1 trauma center has the facilities to not only provide emergency medical care, they are also engaged in community programs on trauma prevention, and have rehabilitation assets as well. This trauma center can provide total “trauma care” (from the trauma care definition earlier).
A level 2 trauma center CAN provide care for any type of trauma patient, but it lacks the comprehensive aspect of trauma care. This hospital would not be expected to have all the programs and rehab assets that the level 1 designation must have. They do take the lead role, however, in communities not directly served by a level 1 trauma center.

What are the levels of trauma centers and how are they different?

- Level II – A trauma center that provides initial definitive trauma care, regardless of the severity of the injury. Depending on location and available resources, Level II trauma centers may not be able to provide the same comprehensive care as a Level I trauma center. The Level II trauma center assumes responsibility for education and system leadership in areas where a Level I trauma center does not exist.
Level 3 trauma centers are geared towards transfer of care. They do provide some good initial care and stabilization, but a transfer to a higher care facility is likely.
You can imagine that in some locations of Ohio, or any state for that matter, quick access to a major metropolitan hospital is not likely. These areas need advanced trauma care and a level 4 trauma center can provide that and arrange for prompt transfer by the most appropriate means, often this is by med evac.

What are the levels of trauma centers and how are they different?

• Level IV – Level IV trauma facilities provide advanced trauma life support prior to patient transfer in remote areas where a higher level of care is not available.
Transporting trauma victims directly to a trauma center is a law. There are some exceptions as I mentioned earlier.
This slide shows the locations and level designations of the trauma centers in Ohio and near Ohio’s borders. Obviously in the more populous areas, there is better access to upper level trauma centers. The problem is, people can get hurt anywhere. From this map you can estimate a trauma victim may suffer a major trauma event 100 miles or so from the nearest trauma center. Obviously air transport like University Hospital’s medEvac, plays a huge role in these incidents.
UH MedEvac Helicopter.
In the next few slides, trauma patient/victim is defined.
There are three age groups for trauma patients:

- **Pediatric**
  - Age 0 – 15 years

- **Adult**
  - Age 16 – 69 years

- **Geriatric**
  - Age 70 years and older

Note the age groups defining what would be considered “pediatric major trauma”, “geriatric major trauma” and “adult major trauma”. The triage rules for each age group overlap somewhat but there are some specific differences to know.
A trauma patient or trauma victim is a person who has suffered an injury that:

1) Poses a significant risk of loss of life; loss of limb; permanent disfigurement; or permanent disability

    **and**

2) Is caused by blunt or penetrating injury; exposure to electromagnetic, chemical or radioactive energy; drowning, suffocation or strangulation; or a deficit or excess of heat

Simply put, a trauma patient/victim, is a person who’s injuries meet the definition of “traumatic injury”.
The law also breaks down the body by body region, and “hemorrhagic shock” conditions are defined. This is important because when dealing with multiple injuries, more than one body region is likely to be involved creating a higher level of concern. “Hemorrhagic shock” conditions are also defined.

<table>
<thead>
<tr>
<th>Body Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain</td>
</tr>
<tr>
<td>Head, face and neck</td>
</tr>
<tr>
<td>Chest</td>
</tr>
<tr>
<td>Abdomen and pelvis</td>
</tr>
<tr>
<td>Extremities</td>
</tr>
<tr>
<td>Spine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evidence of Hemorrhagic Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed capillary refill (greater than 2 seconds)</td>
</tr>
<tr>
<td>Cool, pale, diaphoretic skin</td>
</tr>
<tr>
<td>Decreasing systolic blood pressure with narrowing pulse pressure (the difference between the systolic and diastolic pressures becoming smaller)</td>
</tr>
<tr>
<td>Altered level of consciousness</td>
</tr>
</tbody>
</table>
During assessments we are always looking at signs and symptoms. We ask questions about numbness/tingling, motor function, we look at color and take pulses. The assessment results are quantified and the result is a decision on whether or not this patient is a “major trauma” patient and the transport decision is made.

“Evidence of neurovascular compromise” includes one or more of the following (“The 5 Ps”)
- Paresthesia (numbness/tingling)
- Pain (severe)
- Paralysis
- Pallor / pale
- Pulselessness

“Evidence of poor perfusion” means one or more of the following:
- Weak distal pulses
- Pallor / paleness
- Cyanosis
- Delayed capillary refill (greater than 2 seconds)
- Tachycardia (appropriate for the patient’s age)
We assess the quality of respirations as well as look for signs of TBI. Evidence of respiratory distress and TBI are listed on the slide.

“Evidence of respiratory distress” includes one or more of the following:
- Stridor
- Grunting
- Retractions
- Cyanosis
- Hoarseness
- Difficulty speaking

“Evidence of traumatic brain injury” means signs of external trauma and physiologic indicators that the brain has suffered an injury caused by external force including, but not limited to:
- Decrease in level of consciousness from the victim’s baseline
- Unequal pupils
- Blurred vision
- Severe or persistent headache
- Nausea or vomiting
- Change in neurological status
“Proximal long bone” is the humerus or femur

“Seat belt sign” is bruises or abrasions on the chest and/or abdomen resulting from the use of a seat belt during a motor vehicle crash

“Signs and symptoms of spinal cord injury” include
- Paralysis
- Weakness
- Numbness / tingling

Here are more assessment definitions and assessment indicators
This slide breaks down the types of major trauma to the most simple form. Anatomic major trauma relates directly to the injury itself and nothing else. Physiologic major trauma is indicated by the body’s reaction to the injury. Low or absent B/P, rapid pulse, depressed LOC are all the body’s reaction to the injury and thus are “physiologic” indicators of major trauma. Major trauma defined by mechanism of injury (MOI) alone is a geriatric consideration only. We will see that in the geriatric slides.
If an injured person has any of the following indicators, they should be transported directly to a trauma center.

Here is where the pediatric, geriatric, and adult major trauma indicators are separated by age group. They are further separated by category, specifically, physiologic and anatomic trauma.
To help sort the information on this slide, I can tell you that any patient under the age of 16, who suffers any of the listed injuries, is a “pediatric major trauma patient - anatomic” and must be taken to trauma center.

**Pediatric Anatomic Indicators**
- Penetrating injury to the head, neck or torso
- Significant penetrating injury to the extremities, proximal to the knee or elbow, with neurovascular compromise
- Visible crush of head, neck or torso
- Abdominal tenderness, distention or seat belt sign
- Flail chest
- Pelvic fracture
Again, any patient under the age of 16, who suffers any of the listed injuries, is a “pediatric major trauma patient - anatomic” and must be taken to trauma center.

**Pediatric Anatomic Indicators**

- Injuries to the extremities with
  - Visible crush
    - or
  - Evidence of neurovascular compromise
- Amputations proximal to the wrist or ankle
- Fracture of 2 or more proximal long bones (humerus or femur)
- Signs and symptoms of spinal cord injury
- Serious burns
  - 2nd or 3rd degree burns over more than 10% of total body surface area
    - or
  - Involving face, airway, hands, feet, genitalia
To help sort the information on this slide, I can tell you that any patient under the age of 16, who suffers a traumatic injury and has a body response as listed in the slide, is a “pediatric major trauma patient - physiological” and must be taken to trauma center.

**Pediatric Physiologic Indicators**

- Glasgow Coma Score of 13 or less
- Loss of consciousness for greater than 5 minutes
- Failure to localize pain (GCS motor score 4 or less)
- Evidence of poor perfusion
  - Weak distal pulse, pallor, cyanosis, delayed cap refill, or tachycardia
- Evidence of respiratory distress or failure
  - Stridor, grunting, retractions, cyanosis, hoarseness, difficulty speaking
To help sort the information on this slide, I can tell you that any patient age 16-69 yrs, who suffers any of the listed injuries, is an “adult major trauma patient - anatomic” and must be taken to trauma center.
Again, any patient, age 16-69 yrs, who suffers any of the listed injuries, is an “adult major trauma patient - anatomic” and must be taken to trauma center.
To help sort the information on this slide, I can tell you that any patient age 16-69, who suffers a traumatic injury and has a body response as listed in the slide, is an “adult major trauma patient - physiological” and must be taken to trauma center.

**Adult Physiologic Indicators**
- Glasgow Coma Score of 13 or less
- Loss of consciousness for greater than 5 minutes
- Failure to localize pain (GCS motor score 4 or less)
- Respiratory rate less than 10 or greater than 29
- Requires endotracheal intubation
- Requires relief of tension pneumothorax
- Pulse rate greater than 120 with evidence of hemorrhagic shock
- Systolic blood pressure less than 90 mm Hg
Geriatric anatomic and physiologic trauma are similar to the adult criteria. An asterisk depicts the differences between the two.
To help sort the information on this slide, I can tell you that any patient age 70 yrs or older, who suffers any of the listed injuries, is a “geriatric major trauma patient - anatomic” and must be taken to trauma center.

Notice here though, that if the patient has injury to two or more body regions, that alone is considered major trauma. Body regions were defined on an earlier slide.

### Geriatric Anatomic Indicators

- Penetrating injury to the head, neck or torso
- Significant penetrating injury to the extremities, proximal to the knee or elbow, with neurovascular compromise
- Visible crush of head, neck or torso
- Abdominal tenderness, distention or seat belt sign
- Flail chest
- Pelvic fracture (this does not include isolated hip fractures)
- Injury sustained in two or more body regions*
Again, any patient age 70 yrs or older, who suffers any of the listed injuries, is a “geriatric major trauma patient - anatomic” and must be taken to trauma center.
To help sort the information on this slide, I can tell you that any patient age 70 or older, who suffers a traumatic injury and has a body response as listed in the slide, is a “geriatric major trauma patient - physiological” and must be taken to trauma center.

The asterisks show differences between adult and geriatric criteria. Note the Systolic B/P less than 100 and any known or possible TBI are considered geriatric major trauma.

<table>
<thead>
<tr>
<th>Geriatric Physiologic Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Glasgow Coma Score of 13 or less</td>
</tr>
<tr>
<td>• Glasgow Coma Score less than 15 with a known or suspected traumatic brain injury*</td>
</tr>
<tr>
<td>• Loss of consciousness for greater than 5 minutes</td>
</tr>
<tr>
<td>• Failure to localize pain (GCS motor score 4 or less)</td>
</tr>
<tr>
<td>• Respiratory rate less than 10 or greater than 29</td>
</tr>
<tr>
<td>• Requires endotracheal intubation</td>
</tr>
<tr>
<td>• Requires relief of tension pneumothorax</td>
</tr>
<tr>
<td>• Pulse rate greater than 120 with evidence of hemorrhagic shock</td>
</tr>
<tr>
<td>• Systolic blood pressure less than 100 mm Hg*</td>
</tr>
</tbody>
</table>
Here is the MOI – geriatric criteria. If the patient suffered ONE proximal long bone fracture, but it was in a MVC, that is considered “geriatric major trauma – MOI”. If the patient, age 70 or older is hit by a vehicle, it is considered “geriatric major trauma – MOI” regardless of injury. Any fall where there is any evidence of TBI is also considered “geriatric major trauma – MOI”.

**Geriatric Mechanism Indicators**
- Fracture of 1 or more proximal long bones (humerus or femur) sustained in a motor vehicle crash*
- Pedestrian struck*
- Falls from any height – including standing – *with evidence of a traumatic brain injury*
Remember, if an injured person has any of the indicators just listed, they must be transported directly to a trauma center.

State law.
As taught in your EMT-B, EMT-I and EMT-P courses, EMS personnel also must be concerned about mechanism of injury & special considerations when determining whether or not to transport to a trauma center.

These should be used as additional factors in decision making, not as stand-alone conditions that will triage a patient to a trauma center.

Here is where MOI and special considerations come in to play. Unless specifically mentioned above in the geriatric MOI section, MOI and other considerations may cause you to categorize a patient to major trauma. But the MOI or special considerations by themselves are not enough to mandate transport to a trauma center.
Check out these MOI criteria. Again, these **alone**, unless discussed in the geriatric section, are not enough to mandate transport to a trauma center.
Mechanism of injury

- Auto vs. pedestrian, greater than 5 mph.
- Auto vs. bicycle, greater than 5 mph.
- Motorcycle crash greater than 20 mph.
- Motorcycle crash with rider separated from bike
- Falls greater than 20 feet

More MOI criteria
These are the special conditions that come into play where you may tilt your transport decision to consider a major trauma hospital. These conditions when combined with traumatic injury can be a dangerous combination worthy of up-triage.

Special Considerations

- Pregnancy
- Co-morbid conditions
  - Cardiac or respiratory disease
  - Liver failure or cirrhosis
  - Insulin-dependent diabetes (Type 1)
  - Compromised immune system
    - Cancer, HIV, Transplant
    - Bleeding disorders or on anti-coagulants
    - Morbidly obese
Again, the MOI and special considerations are not stand alone trauma center transport mandates.
City of Cleveland Spin

- The trauma centers in our area are:
  - Fairview
  - Huron rd.
  - Lakewood
  - Metrohealth Medical Center
City of Cleveland Spin

- Pediatric trauma centers in Cleveland are:
  - Rainbow Babies and Childrens
  - Metrohealth Medical Center
Ohio Prehospital Trauma Triage Rules

*Five Exceptions*

Here are those exceptions to the trauma transport law that have been mentioned.
A patient meeting the major trauma criteria in this talk must be transported to a trauma center unless one or more of the 5 exceptions on this slide are present.
If it is medically necessary to stabilize the patient at a non trauma center prior to transfer, he or she can be taken to a non trauma center but only to stabilize immediately life threatening conditions. Unstable airway, cardiac arrest, and uncontrollable external bleeding are the conditions that need to be present.

Five Exceptions to Mandatory Transport

1. It is medically necessary to transport the patient to a hospital without a trauma center for initial assessment and stabilization before transfer.

These must be legitimate, immediately life-threatening medical reasons:

- Unable to open or maintain airway
- Traumatic arrest
- Uncontrollable external bleeding

EMS agency protocols should provide guidance on when this is appropriate.
Adverse weather conditions or excessive transport time is exception number 2. During a blizzard when transport vehicles are getting stuck in the snow this may be an issue. In areas served by multiple trauma centers it is usually not an issue.
A shortage of resources in Cleveland is not generally an issue either. However, during some type of major WMD event or other MCI incident, it actually may be.
It is generally not a problem in a densely populated area to not have a trauma center available. Trauma centers do not usually close and divert trauma patients.

Five Exceptions to Mandatory Transport

4. No trauma center is able to receive and provide care to the patient without undue delay.

This exception was originally intended to address situations where trauma centers were diverting trauma patients. However, with today’s mature state and regional trauma systems, this is mostly a thing of the past. Trauma centers avoid trauma patient diversion.

If, for some unusual reason, a trauma center diverts your patient, you must use your best judgment, along with guidance from medical control, to determine the next best destination for your trauma patient.
The 5th exception is when the family requests a certain hospital. Obviously your “people skills” will be put to task here in convincing these patients and family members as to why a trauma center is in the patients best interest.
Ohio Prehospital Trauma Triage Rules

*Overtriage and Undertriage*
**Undertriage**

Transporting a severely injured patient to a hospital that is not a trauma center.

- Worst case scenario? The patient dies or suffers complications or disabilities that are avoidable.

Trauma systems aim for 0% undertriage
Can you over triage? Sure you can. Out of an abundance of caution you may decide to take a patient to a trauma center that may not need to be taken there. That can overload the trauma center but it is better than under triage. Hospitals understand and accept this.
There can be regional trauma triage rules as well.
This map of Ohio shows Ohio’s 10 “EMS regions”
Regional trauma rules must at least meet the minimum standards set by the ORC, and they must also be approved by the ODPS EMS board after close scrutiny.
The region applying for a variation in the trauma triage rules has a lot of work to do before even submitting for approval. They must do consults with neighboring regional physicians advisory boards, hospitals in the region, EMS workers doctors and nurses, and local EMS instructors.
These are the limits to what types of variations are allowed. Take a second to look those over.
Ohio Prehospital Trauma Triage Rules

Periodic Review
The trauma triage law mandates this protocol be reviewed and updated based on any new or different data. All the transport data must be sent to the ODPS. They analyze the data on trauma patients and revise criteria based partly on the information they capture. Public hearings are also a factor on revisions.
This is a very often overlooked part of the EMS service. Everyone wants to have great response time and do great care. That is boasted about around firehouse kitchen tables all around the state. Sometimes that great care cannot be gleaned from the report turned in. Area Fire Departments and EMS services MUST continually do run review and establish quality assurance and performance improvement guidelines. With computerized records, the information that goes into these reports is being used to make quality of life decisions with respect to patient outcomes. Those decisions are only as good as the information used to draft them.
Ohio Prehospital Trauma Triage Rules

Summary

Take a couple minutes to read the slide show summary. A couple FYI slides follow the summary so stay tuned.
Ohio Prehospital Trauma Triage Rules
Summary

Questions every EMS provider should consider when evaluating an injured patient and making the decision on where to transport:

Is this patient at risk of losing life or limb?

Is this patient at risk for disability or disfigurement?
Ohio Prehospital Trauma Triage Rules

Summary

Questions every EMS provider should consider when evaluating an injured patient and making the decision on where to transport:

- Is there evidence of respiratory distress or failure?
- Is there evidence of poor perfusion or hemorrhagic shock?
- Are there significant neurological symptoms?
- Are there signs/symptoms of spinal cord injury?
- Is there neurovascular compromise in an extremity?
Ohio Prehospital Trauma Triage Rules

Summary

Questions every EMS provider should consider when evaluating an injured patient and making the decision on where to transport:

- Are there penetrating wounds to the head, neck or torso?
- Are there visible crush injuries?
- Is there abdominal distention, tenderness or seat belt sign?
- Are there signs of a pelvic fracture or flail chest?
- Are there amputations above the wrist or ankle?
- Are there significant, serious burns?
Ohio Prehospital Trauma Triage Rules
Summary

If the answer is yes to any of those questions, the patient must be transported to a trauma center.

Prehospital assessment is key to rapid transport to the appropriate medical facility.
Ohio Prehospital Trauma Triage Rules

Summary

Trauma centers are capable of providing 24-hour surgical care to allow the trauma patient to be taken directly to the operating room, if needed.

Transporting a trauma patient to a non-trauma center hospital can result in significant delay in the patient’s arrival at a trauma center for definitive care.
Ohio Prehospital Trauma Triage Rules

Summary

Undertriage –
- Transporting a severely injured patient to a hospital that is not a trauma center.
- Can result in death or disability of the trauma patient.
- Every trauma system’s goal is to have NO undertriaged trauma patients.

Overtriage –
- Transporting a minimally injured patient to a trauma center.
- Can create a burden on system resources.
- Most trauma systems need 25% - 30% overtriage to ensure ALL severely injured patients get to a trauma center.
Ohio Prehospital Trauma Triage Rules
Summary

Your documentation is very important to improving Ohio’s trauma system. Accurate documentation of the trauma triage criteria an injured person meets (if any), along with all vital signs, allows the EMS Board to improve the efficiency of the system.
Ohio Prehospital Trauma Triage Rules
References and Resources


- Ohio Revised Code, §4765.01, §4765.06, §4765.16, §4765.40, §4765.41

- Ohio Administrative Code, §4765-14-01, §4765-14-02, §4765-14-03, §4765-14-04, §4765-14-05, §4765-14-06, §4765-15-01, §4765-16-01, §4765-17-01
This is a Glasgow Coma scale chart for adult and pediatric patients.
[ RULE OF 9’S ]

ANTERIOR

INFANT

POSTERIOR

PALMAR METHOD
(Patient’s palm)

1%
This concludes this course