

When Lightning Strikes

Management of Lightning Injuries

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Financial Disclosures



Cerebro
NEUROTECH

Virginia
Concussion
Initiative
Supporting all young minds

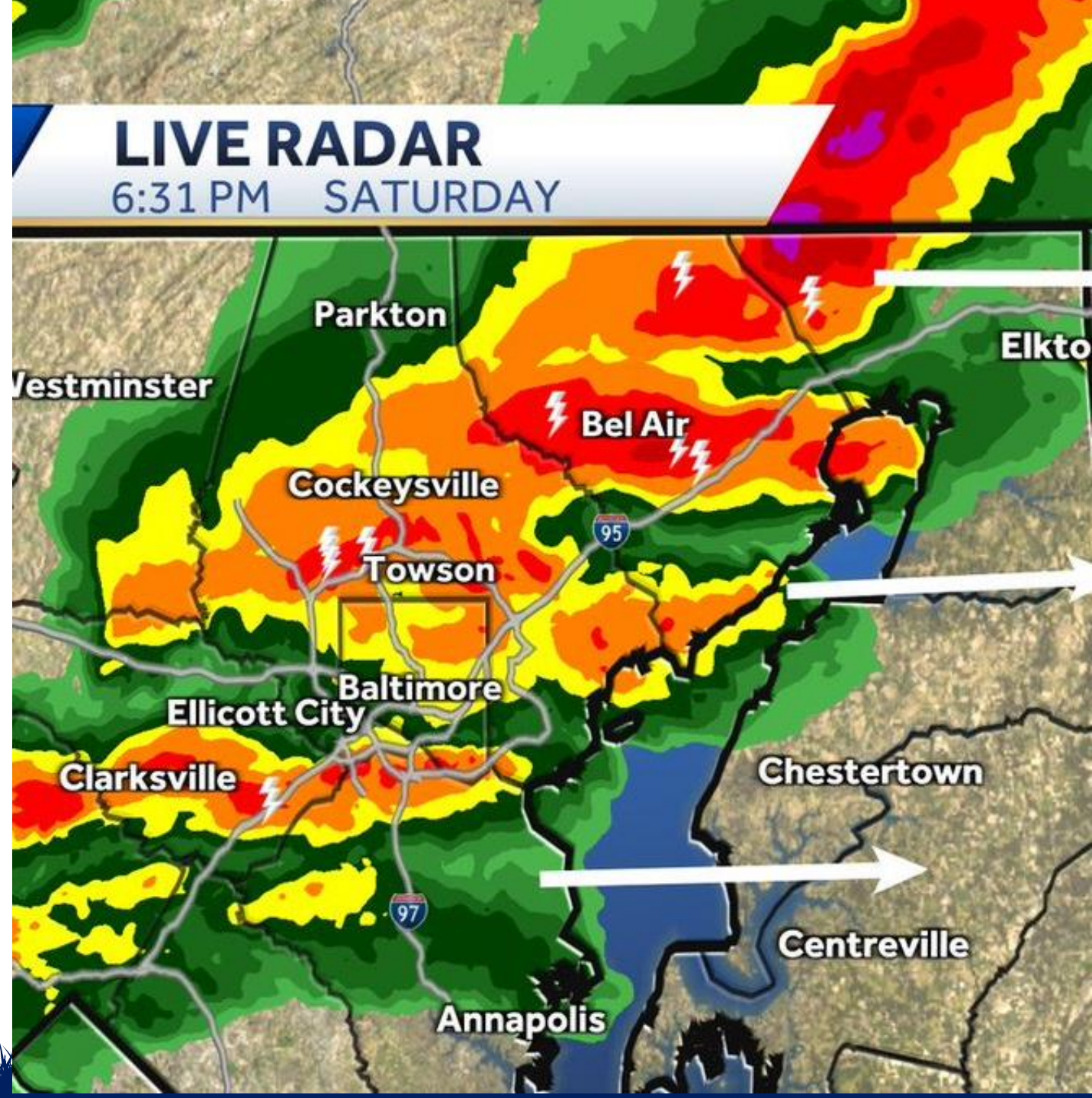
WORLD
ATHLETICS™

Goals

- Discuss the dangers of lightning injuries
- Define a mass casualty incident (MCI)
- Describe the basic principles of MCI triage
- Describe the principle of “reverse triage” in a lightning strike event.
- Review a case scenario involving a MCI with lightning injuries

The Problem

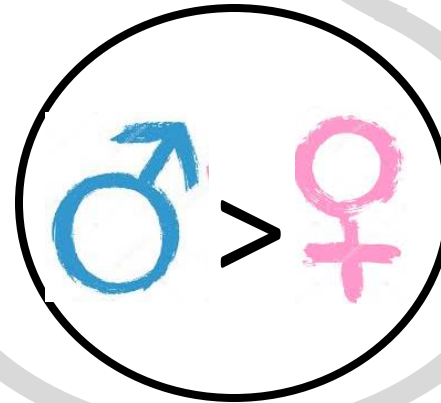
- **Policy:**
“Racing will cease when lightning is detected within 5 mi of the racetrack...”
- **Race Official:**
“We are monitoring the situation”



Epidemiology- Lightning injuries fatalities

Most common sports associated with lightning injuries are soccer, golf, & running

Most Common Cause of Death Is Cardiac Arrest



Athletes age 20-29 are at highest risk



Mechanism of Injury

- Direct Strike
- Contact
- Side-Flash/Splash
- Step Voltage
- Upward Streamer
- Barotrauma

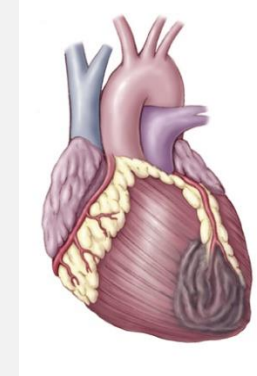


Physiology of Injury



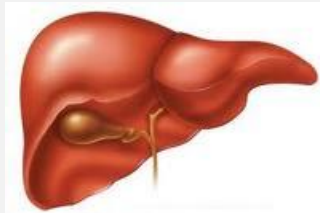
Neuro:

Acute AMS & Seizures possible
Short & long-term neurologic dysfunction
Possible neuropsych dysfunction also



Cardiac:

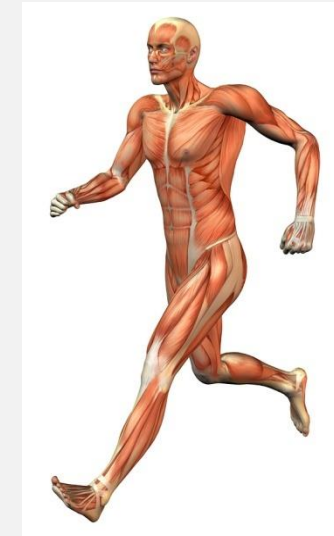
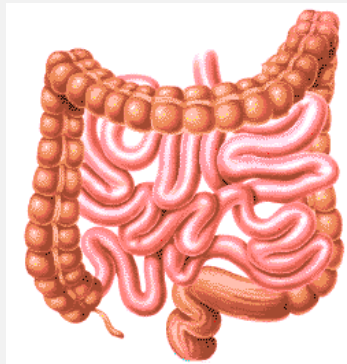
Long QT
VT/VF
ST segment changes



Solid Organ:

Thermal injury
Necrosis
Rhabdomyolysis
DIC

Hollow Organ: Barotrauma



Skeletal Muscle:

Rhabdomyolysis

Pathognomonic Injury



Lichtenberg figures- fern patterns on the skin

Fatal Lightning Events

~ 30 deaths/year in the US

True incidence of injury is difficult to estimate

Non-fatal injuries are likely under-reported

MCI can, and do, happen

Ft. Gordon , GA- July 2022; 9 injured, 1 fatality

Lafayette Park, Washington DC, Summer 2022, 3 fatalities, 1 injured



Lightning & Sporting Events

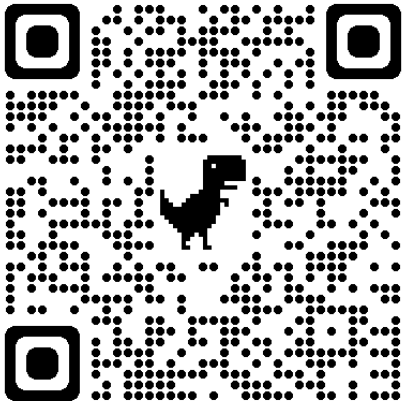
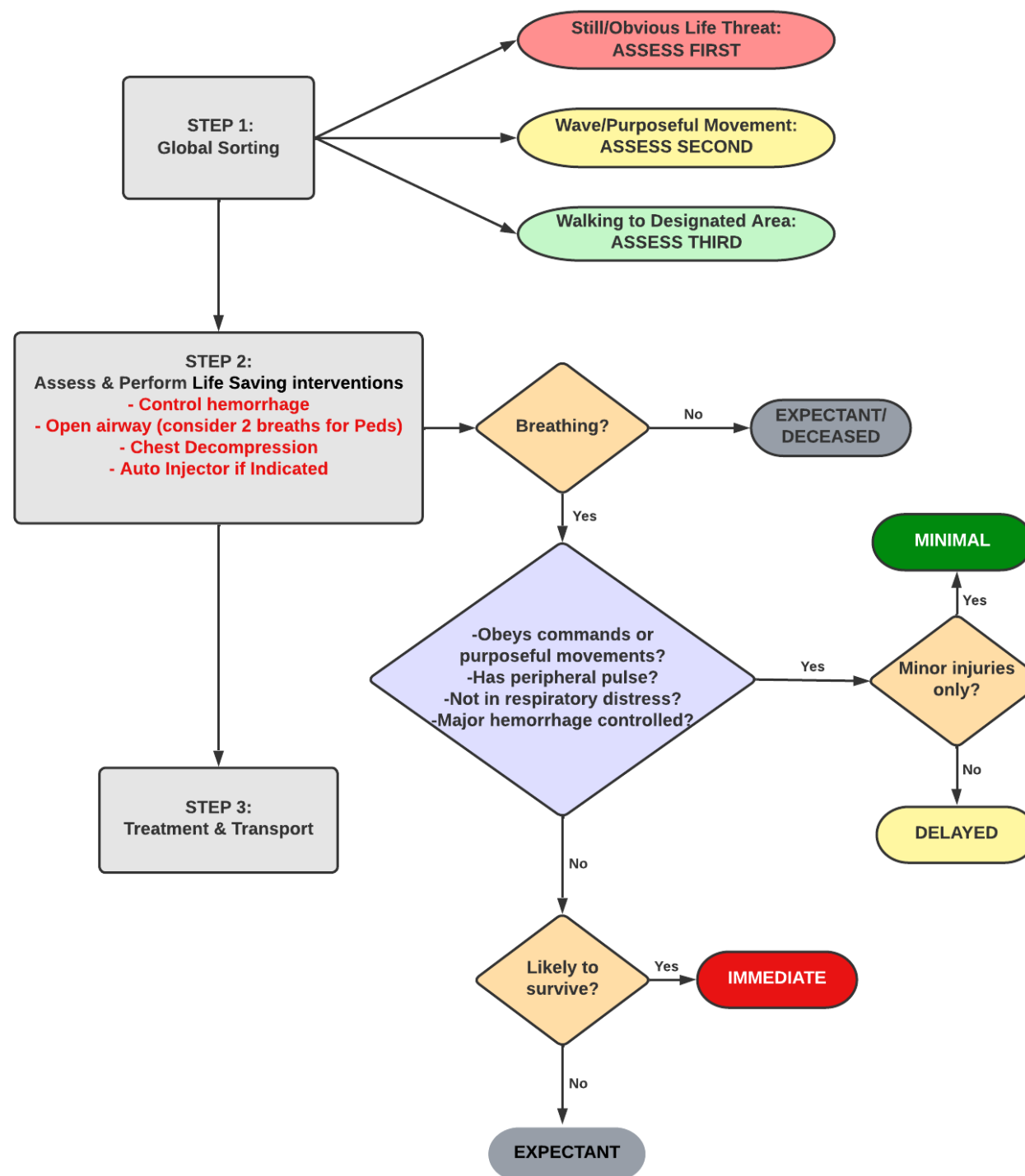


Mass Casualty Incident

- Any event in which the number of casualties exceeds the available resources, including personnel and equipment.
- This may be a ***single event*** such as a structure collapse, bombing/shooting or a ***slowly developing event*** such as a disease outbreak
 - Weather events may be either



SALT Triage



Other Triage Methods- START Triage

A = No respirations

B = $RR > 30$

C = Cap < 2s / No Rad Pulse

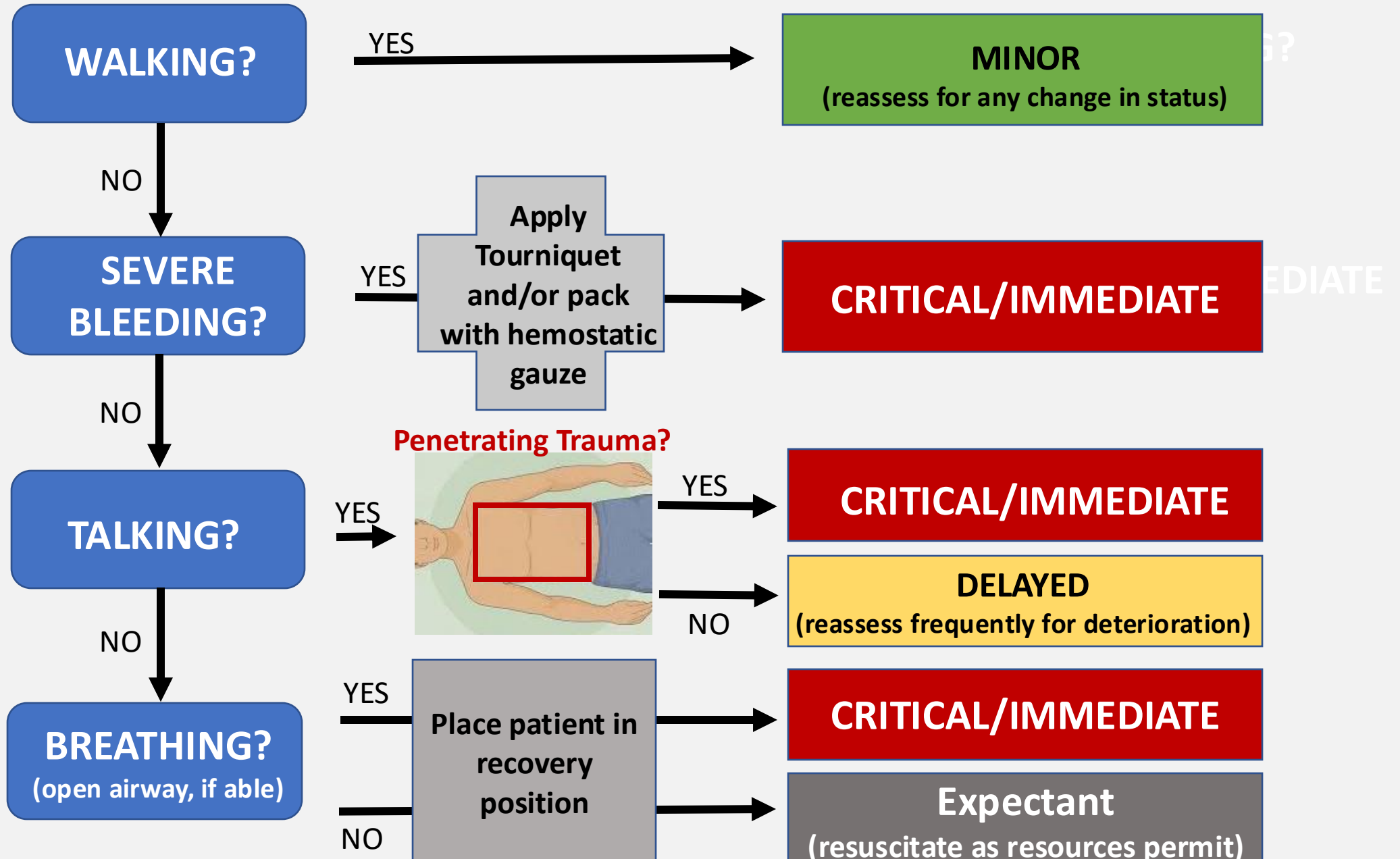
D = Can't follow commands

Not green, red or black

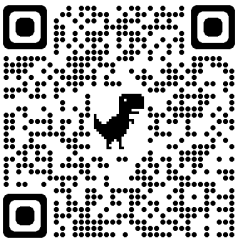
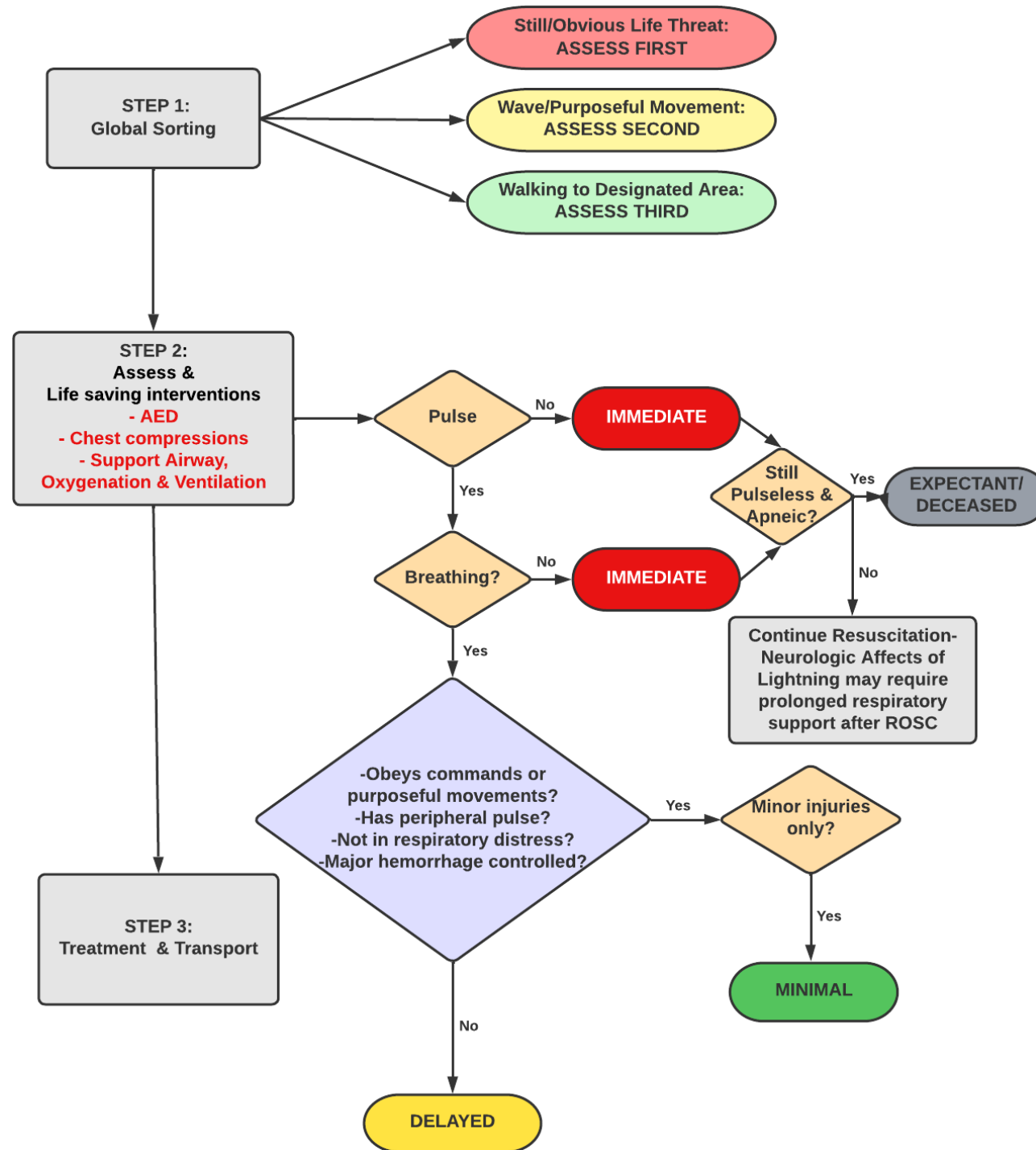
Can walk away



Ten Second Triage (TST)



“Reverse” Triage



Case



- Storm during baseball game
- Teams take shelter in dugouts
- Fans take shelter in the snack bar
- Lightning strikes a light pole, splashing over to the dugout, and the pole crashes onto the snack bar

Case



Assess Situation-
MCI with both trauma & lightning injuries



Call for help-
Coordinate resources



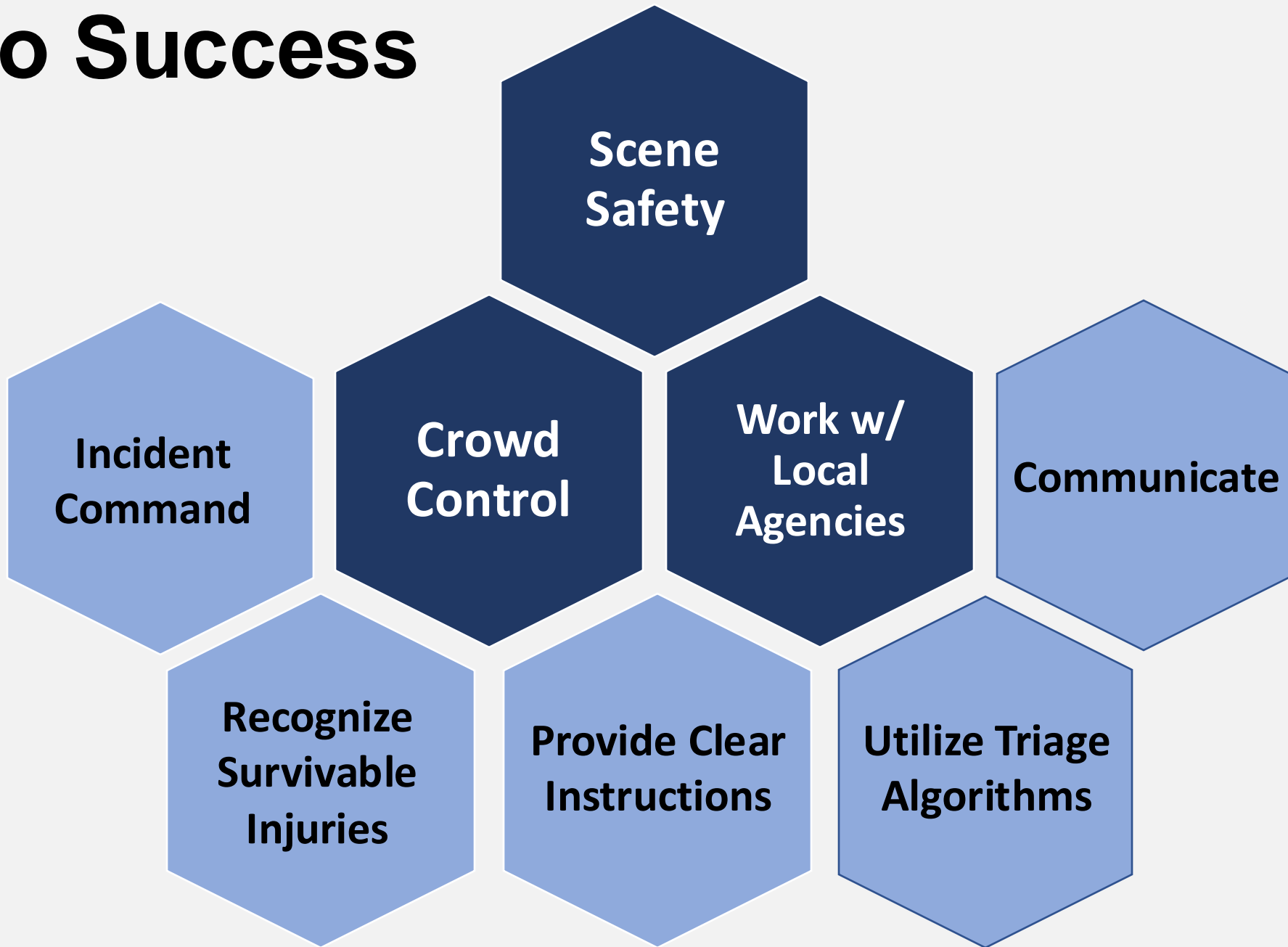
Begin Triage-
Provide instructions & begin delivering care



Keys to Success



Keys to Success





Conclusion

- MCI → ANY incident in which casualties exceed immediately available resources
- MCI triage is used to quickly sort patients and distribute them to appropriate care sites
- Lightning strikes can lead to multiple organ system injuries, including cardiac arrest.
- Reverse triage is used to increase survival from cardiac arrest in lightning strike events

References

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