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# TRAUMA LECTURES

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# The Trauma Team

## From Prehospital through the ED

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# Objectives

At the conclusion of this presentation the participant will be able to:

- Describe the prehospital through Emergency Department (ED) assessment priorities
- Discuss emergent  interventions for life threatening  injuries
- Explore several evidence based practice changes/controversies in prehospital and ED trauma care

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# Underlying Principles

- Readiness, hyper-vigilance, consistent organization and clear cut communication produces effective outcomes
- Practice makes perfect
- The success of a trauma resuscitation is only as good as its team
- A proficient trauma team cannot function without a “skilled” team leader!

# EMS Assessment


- Primary Assessment
- Vitals/History
- Secondary Survey

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# General Guidelines

Trauma alert criteria

Scene time

Destination protocols

Vascular access and fluid administration

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# Maintain C-spine/Open Airway

- While sizing up the scene the prehospital provider determines if there is a reason to maintain C-spine on their patient.

# Suspected Spinal Injuries
## (Not Meeting Major Trauma Criteria)

**This protocol is for awake and stable adult and pediatric patients NOT meeting the Major Trauma Criteria (Protocol T – 6).**

**Spine injury should be suspected if blunt mechanism of injury is present and should be treated if one or more of the following criteria is present:**

### IMMOBILIZATION CRITERIA

1. **Altered Mental Status for any reason, including possible intoxication from alcohol or drugs (GCS <15 or AVPU other than A).**
2. **Complaint of neck and/or spine pain or tenderness.**
3. **Weakness, tingling, or numbness of the trunk or extremities at any time since the injury.**
4. **Deformity of the spine not present prior to this incident.**
5. **Distracting injury or circumstances (i.e. anything producing an unreliable physical exam or history).**

***High risk mechanisms of injury associated with unstable spinal injuries include, but are not limited to:***

- **Axial load (i.e. diving injury, spearing tackle)**
- **High speed motorized vehicle crashes or rollover**
- **Falls greater than standing height**

**IF THERE IS ANY DOUBT, SUSPECT THAT A SPINE INJURY IS PRESENT!**

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# Example: Major Trauma Criteria (New York)

- Glasgow Coma Scale is less than or equal to 13
- Respiratory rate is <10 or more than 29
- Pulse rate is < 50 or more than 120
- Systolic blood pressure is < 90 mmHg
- Penetrating injuries to head, neck, torso or proximal extremities
- Two or more suspected proximal long bone fractures
- Suspected flail chest
- Suspected spinal cord injury or limb paralysis
- Amputation (except digits)
- Suspected pelvic fracture
- Open or depressed skull fracture

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# Mechanism of Injury

- Ejection or partial ejection from an automobile
- Death in the same passenger compartment
- Extrication time in excess of 20 minutes
- Vehicle collision resulting in 12 inches of intrusion in to the passenger compartment
- Motorcycle crash >20 MPH or with separation of rider from motorcycle
- Falls from greater than 20 feet
- Vehicle rollover (90 degree vehicle rotation or more) with unrestrained passenger
- Vehicle vs. pedestrian or bicycle collision above 5 MPH

# Challenges


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# Airway

- Airway patency and evaluation of spontaneous breathing is the crucial first step and the single greatest priority in any injured patient
- All trauma patients need oxygen until proven otherwise

# Airway Adjuncts

King Airway

LMA

Combitube

# Prehospital Intubation

- Improves outcome

  Field intubation has been associated with significant decreases in mortality in patients with severe head injury both alone and in combination with other injuries.


mikeledray / Shutterstock.com

# Prehospital Intubation

No change in Outcome


(Murray et al., 2000; Arbabi et al., 2004)

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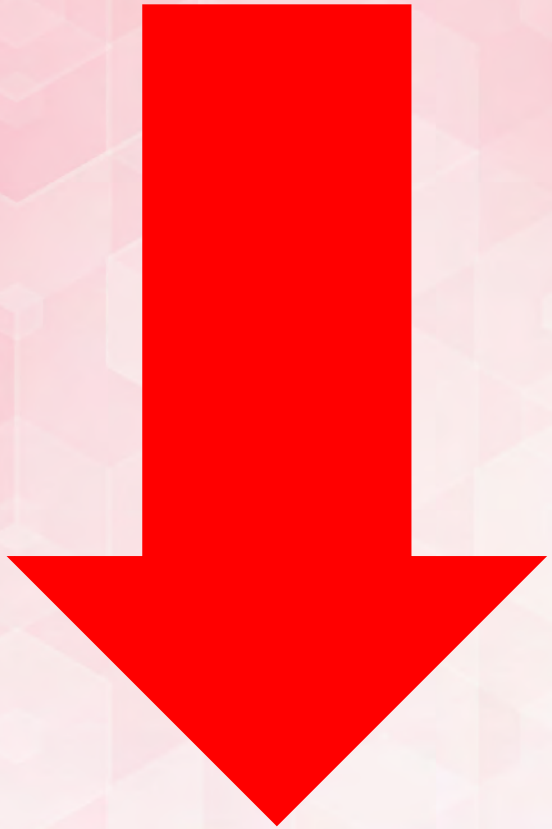
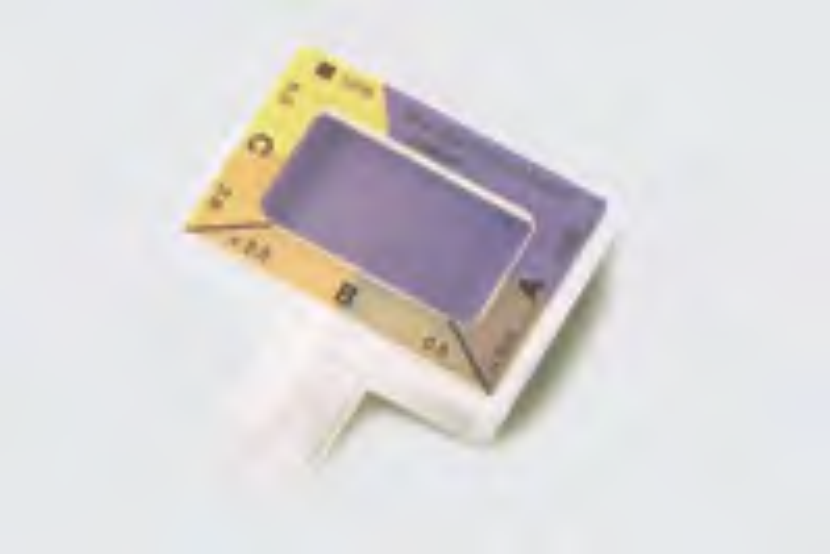
# Prehospital Intubation

Worsens Outcome



(Davis et al., 2005; Bukur, 2011)

# Example of EMS Intubation Protocol



- Consider intubation if GCS is less than 8 or airway cannot be maintained
- If patient is intubated or has an airway such as Combitube, King, LMA $P_{ET}CO2$ levels should be continually monitored and maintained at 33 – 43 mmHg if available

# You Can (almost) Always Bag

# Circulation

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# Hemorrhage Control

**Proven effective techniques of hemorrhage control:**

- Direct pressure
- Tourniquets

**Unproven techniques:**

- Elevation of limb
- Pressure points
- Cold application

Wikihow.com

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# Tourniquets

Special Operations Forces Tactical Tourniquet

# Indications for Tourniquet

- Hemorrhage from an extremity that cannot be controlled with direct pressure or a pressure bandage.
- Traumatic amputation
- There may be times (tactical, rescue, entrapped patient, multiple patient scene, backwoods environment) when tourniquet application is the best first option.

**There are no contraindications for applying a tourniquet**

https://www.bleedingcontrol.org/

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# Tourniquet Safety


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# 2 large bore IV's?

# Common Protocols

- Initiate IV/IO (18ga or larger) and hang  NS, if approved.
- Consider 2nd IV/IO where hypovolemia is suspected (Adult only)
- (Adult) If SBP < 100 mmHg or heart rate > 120, initiate a fluid bolus of Normal Saline: 500 ml

(Cotton et al, 2009)

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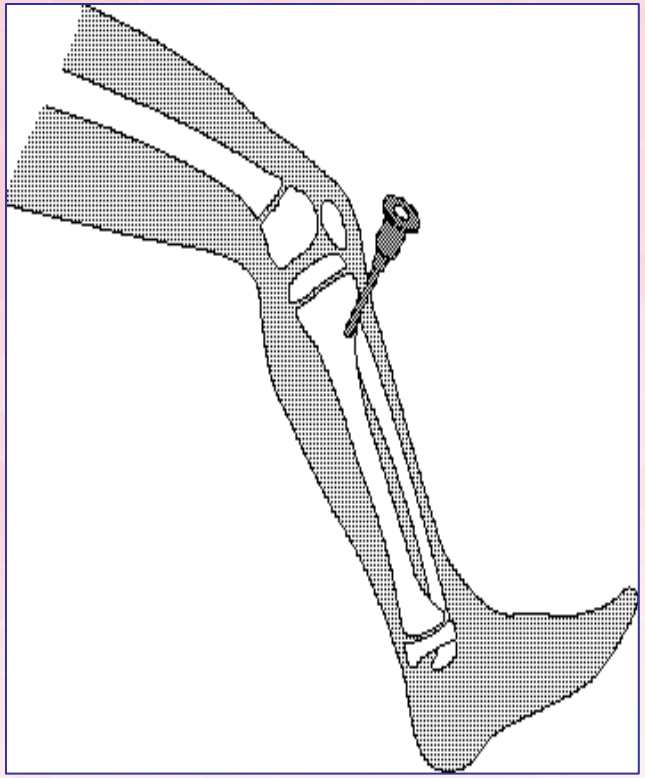
# EZ-IO Intraosseous Infusion Device

# Splinting

George Green/Shutterstock.com

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# Traction Splinting


# Pelvic Fractures

- Physical exam is unreliable
- DO NOT ROCK or palpate the pelvis in the prehospital arena
- Avoid log rolling as much as possible
- Apply splint if in your area  protocols

www.expeditionmedicine.co.uk/

# Optimizing Prehospital Resuscitation

- Low volume or no fluid administration in major trauma
- Splint all fractures
- Dress all wounds
- Wrap pelvic fractures with binder (if in protocol)
- Tourniquets
- Limit scene time to 10 minutes

# Teamwork Continues


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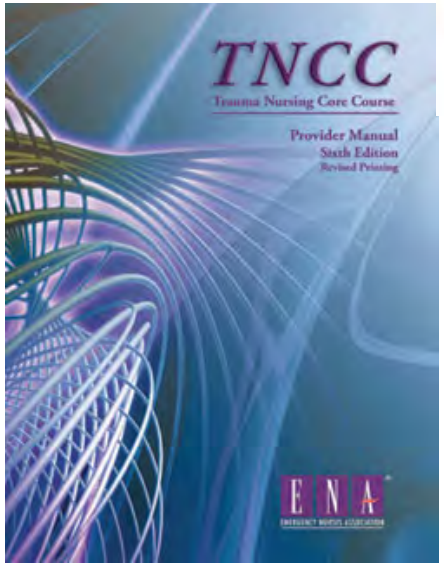
ATCN
ADVANCED TRAUMA CARE FOR NURSES®


ATLS
ADVANCED TRAUMA LIFE SUPPORT




# Trauma Team Training Course

**Prepares teams of 5 to care for trauma victims with the limited resources found at African rural hospital and health centers**

CNIS Safer Surgery, Obstetrics + Communities in Africa
Canadian Network for International Surgery

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# Communication

- Physiologic Criteria
- Mechanism of Injury
- Interventions

**Pay attention to episodic events of hypotension!**

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# 2011 CDC GUIDELINES

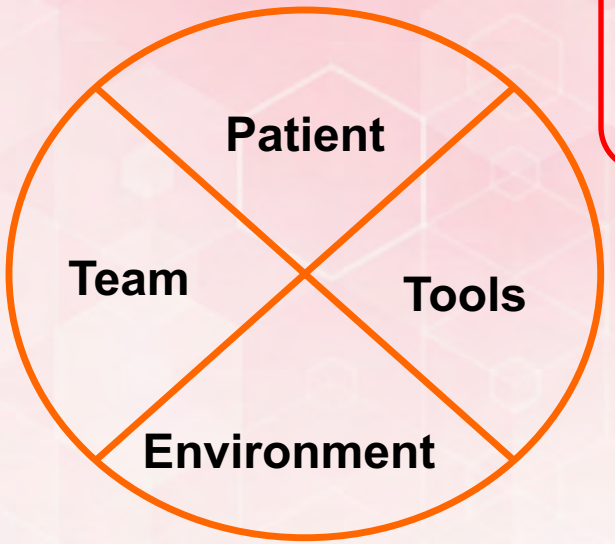
- Physiologic ⟶ Highest level of care
- MOI ⟶ Highest level of care
- MOI ⟶ Trauma Center
- Special patients/considerations

(Centers for Disease Control and Prevention, 2011)

# Situation Awareness

**Premise**

- Cause of instability must be recognized and corrected quickly by using a systematic approach.
- It is important to identify and prioritize systemic compromise.




Detection (Perception)

Diagnosis

Prediction

# Most Potentially Preventable Trauma Deaths are related to:

- Airway obstruction
- Hemorrhage
  - Hemopneumothorax
  - Intracavitary bleeding
  - Intracranial hemorrhage

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# We all need to know our A, B, C, Ds

1. All trauma patients need oxygen until proven otherwise
2. All trauma patients are bleeding until proven otherwise
3. All trauma patients have a cervical spine injury until proven otherwise
4. All unconscious trauma patients have a brain injury until proven otherwise

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# Hemodynamically unstable trauma patients need an early definitive airway:

- Prevents aspiration
- Reduces the oxygen debt of breathing
- Maximizes systemic oxygen delivery
- Corrects  acid base disturbances
- Allow clinician to focus on other life-threatening issues

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# Breathing

**All trauma patients need oxygen until proven otherwise**


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# Hemorrhage:

**All trauma patients are bleeding until proven otherwise**

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# Recognize Trouble!

Trauma patients with prehospital hypotension that are normotensive on arrival should have an arterial blood gas with BD interpreted early upon admission to help identify those patients who are at risk for “crumping.”

(Bilello et al, 2011)

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# Hemorrhage: 5 Anatomic Areas of Origin

| Box 1. Bedside assessment of the 5 cardinal sites of massive adult hemorrhage | | |
|---|---|---|
| Anatomic site | Modality | Reliability |
| Intraperitoneal | FAST | Positive test is diagnostic; negative test is suspect |
| | DPL | Gross positive is diagnostic; technically positive only is suspect |
| Retroperitoneal | Pelvic radiograph | Unstable fracture pattern is suggestive |
| Thoracic (pleural) | Chest radiograph | Positive test is usually diagnostic |
| Multiple long-bone factures | Physical examination | US and radiograph confirmatory but do not quantify blood loss |
| External bleeding | Physical examination | Positive findings diagnostic but do not quantify blood loss |
| FAST = focused assessment with sonography for trauma; DPL = diagnostic peritoneal lavage; US = ultrasonography | | |

(Kirkpatrick, Ball, D'Amours, & Zygun, 2008)

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# Resuscitation

- For Resuscitation to Occur:
  - Adequate perfusion and tissue oxygenation must be restored
- Resuscitation Measures Directed at:
  - Control the bleeding
  - End points
    - Normothermia
    - Normal INR
    - No base deficit

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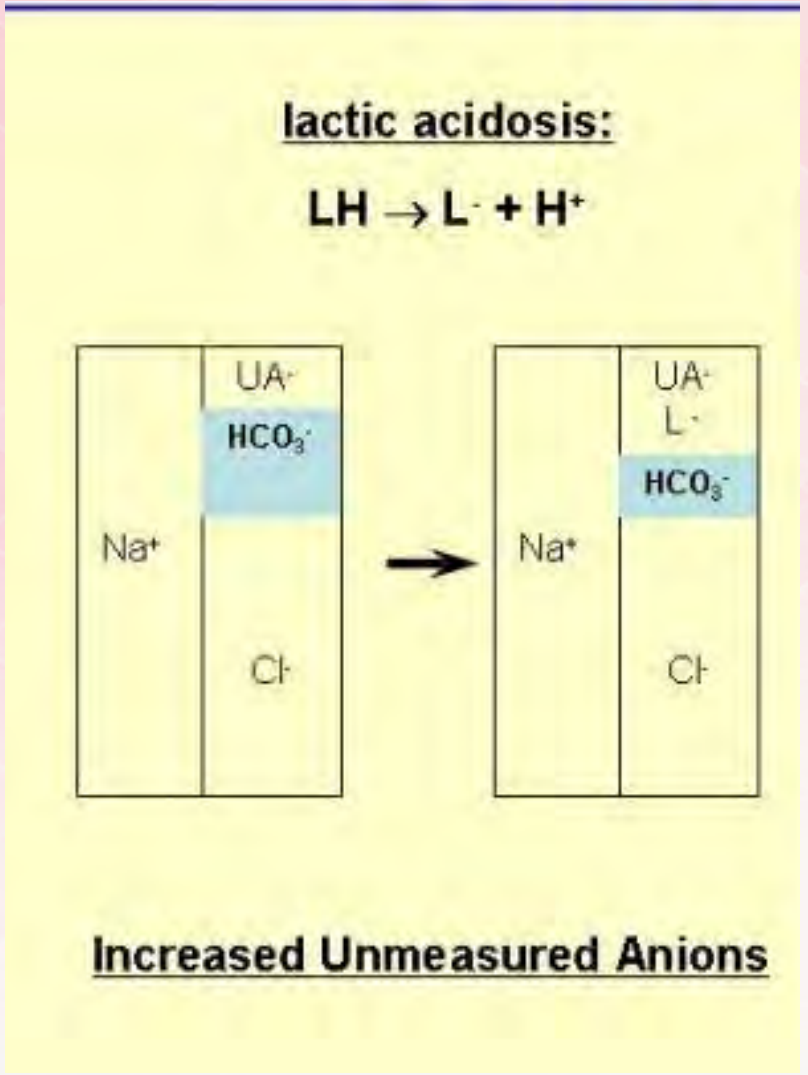
# Indicators of Anaerobic Metabolism and Acidosis

- ↓ serum pH (7.35 – 7.45)
- ↑ base deficit (2 to -2)
- ↑ serum lactate (0.4 – 1.8 mmol/L)

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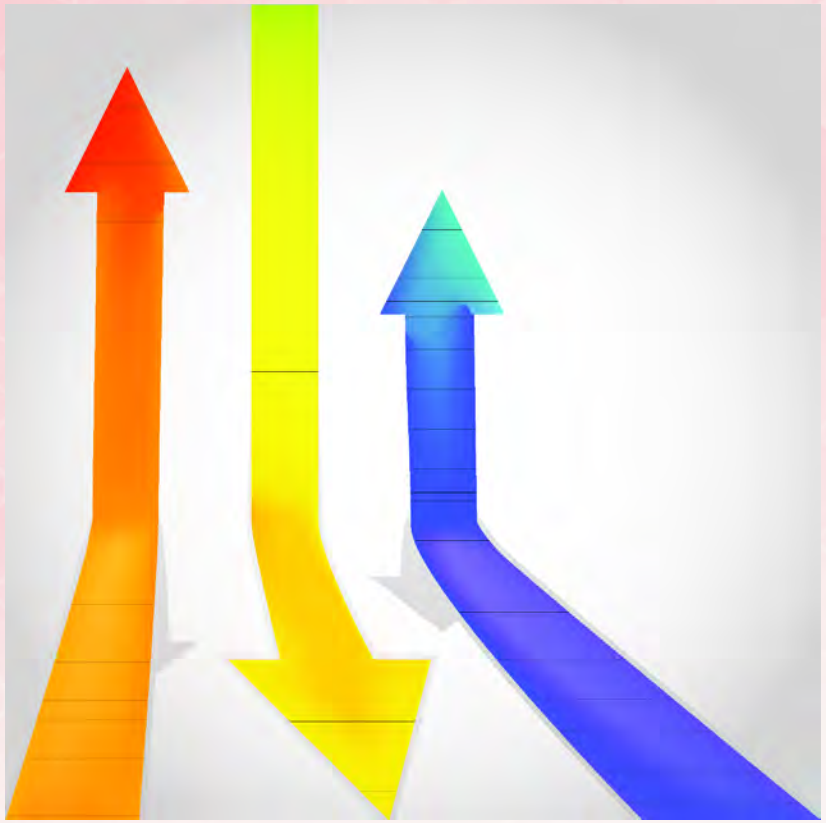
# Base Deficit

- Amount of fixed base (bicarbonate) required to correct the pH of an aliquot of blood to 7.40 at 37 C
- Excellent correlation of base deficit to lactate and pH
- Normalizes rapidly with adequate resuscitation and control of hemorrhage

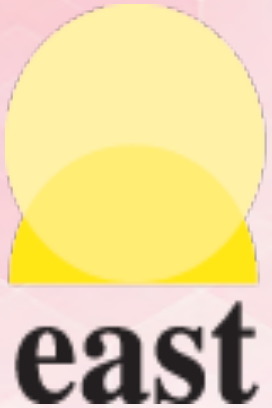


# Classic Resuscitation Endpoints

- B/P, HR
- pulse pressure
- Mentation
- Urine output
- base deficit
- serum lactate
- serum pH

# EAST Practice Guidelines

**“Withholding and termination of resuscitation of adult cardiopulmonary arrest secondary to trauma: Resource document to the joint NAEMSP-ASCOT position statements”**




The Eastern Association for the Surgery of Trauma

(Millin, Galvagno, Khandker, Malki, & Bulger, 2013)

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Damage-control resuscitation (DCR) is a lifesaving intervention in trauma victims aimed to avoid irreversible hypothermia, acidosis, and coagulopathy

# ABC's of Damage Control Resuscitation

- A = acidosis (base deficit ≤ 8)
- B = blood loss (hemoperitoneum > 1,500 mL)
- C = cold (temperature < 35-C)
- D = damage (New ISS [NISS]  35)

# Optimizing ED Trauma Resuscitation-

**Control hemorrhage**

- Direct pressure to all external bleeding
- Rapid suturing of all scalp and facial wounds
- Rapid application or evaluation of  Thomas/Hare Traction splints for femur fracture
- Binder for pelvic fracture
- Rapid reduction and pressure dressings of mangled extremities

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# Optimizing Trauma Resuscitation in the Emergency Department

- Low volume blood sampling
  - 3 cc for ISTAT: Na/K/Cl/Ca, Hgb, Hct, PO2, PCO2, pH, PT, INR, Lactic acid, Creatinine, Troponin
- Use FAST to rapidly detect intra-abdominal fluid
- Auto transfusion of thoracic blood using a chest tube drainage/auto-transfusion system
  - Avoid spilling blood on floor during chest tube insertion

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# Optimizing ED Trauma Resuscitation- Fluid Resuscitation

- Minimize crystalloid
- Early resuscitation with 1:1 RBC to FFP
- Warm all fluids
- Move quickly to definitive intervention (OR/IR)

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# Optimizing Resuscitation Across the Continuum

- Operating Room
  - Rapid exposure
  - Evacuation of  blood
  - Packing
  - Control contamination
  - Anticipate and fight the “trauma triad” of death: Hypothermia, Acidosis, Coagulopathy
- Reassess/Plan


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# ICU

# Persistent Metabolic Acidosis Indicates


- Continued bleeding
- Inadequate resuscitation
- Myocardial dysfunction

# Interventions to Decrease the Need for Blood Transfusion

- Intervene early in resuscitation to STOP bleeding
- Conserve blood early
- Aggressive, rapid, and efficient operative interventions
- Use novel surgical methods to STOP bleeding in the operating theater
- Early use of interventional radiology when appropriate
- Correct hypothermia, acidosis, coagulopathy

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# Neurological

All unconscious trauma patients have brain injury until proven otherwise

# Goal Directed Therapy

- High risk patients
  - Geriatric patients
  - Pediatric patients
  - Pregnant women
- Anticoagulants
- Beta blockers

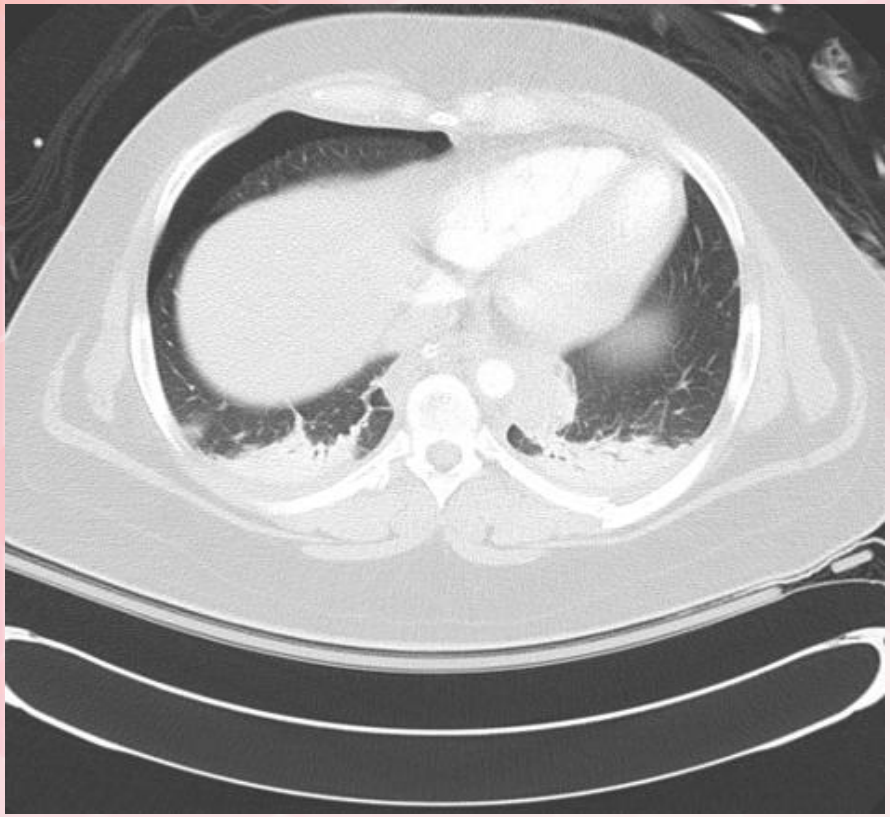
# “Routine Trauma Labs”

Information provided by routine admission chemistry and coagulation profiles in trauma patients seldom lead to clinical interventions.

**Should not be ordered routinely on admission in trauma patients**

(Tasse, Janzen, Ahmed, & Chung, 2008)

# CT Scan for thoracic trauma



***An occult pneumothorax seen on a CT scan that was not detected on a plain anteroposterior supine chest radiograph.***

- Recognize the insensitivity of the AP CXR to detection of pneumothoraces
- Remarkably large occult pneumothoraces may be present without an obvious anterolateral pleural stripe on AP CXR

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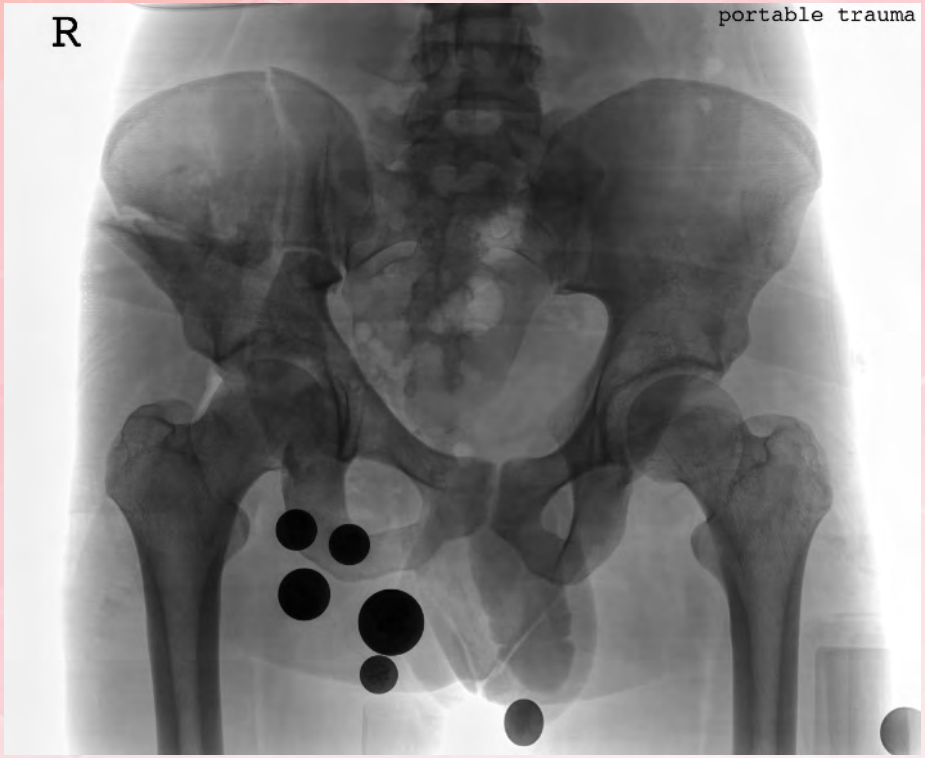
# Routine Pelvic X-ray




- ATLS advocates as an adjunct to primary survey in **multiply injured** trauma patients

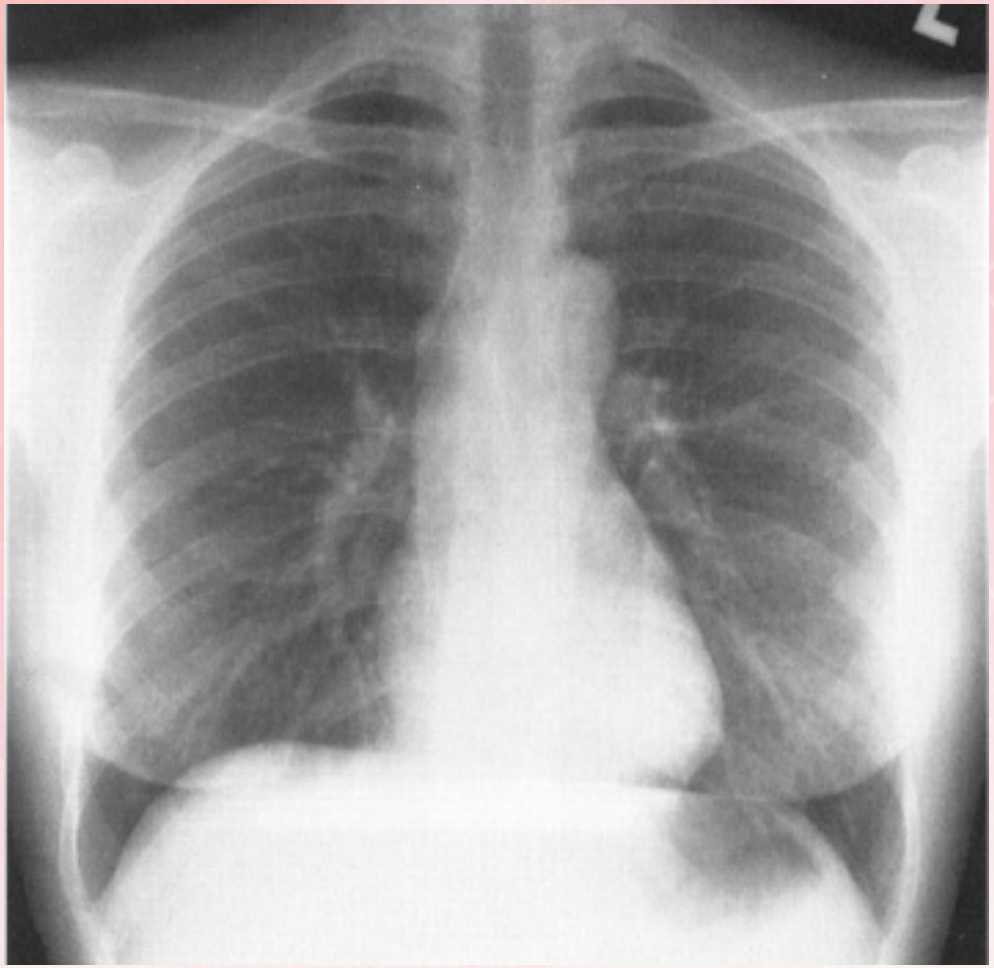
(American College of Surgeons, 2012)

# Routine Cervical Spine X-ray

- The primary screening modality is axial computed tomography (CT) from the occiput to T1 with sagittal and coronal reconstructions
- Plain radiographs contribute no additional information and should not be obtained

(Como et al, 2009)

# Routine Chest X-ray



Chest x-ray

- Early
- Valuable
- Significant injury
- Position of patient
- Never delay procedures for x-ray

(American College of Surgeons, 2012)

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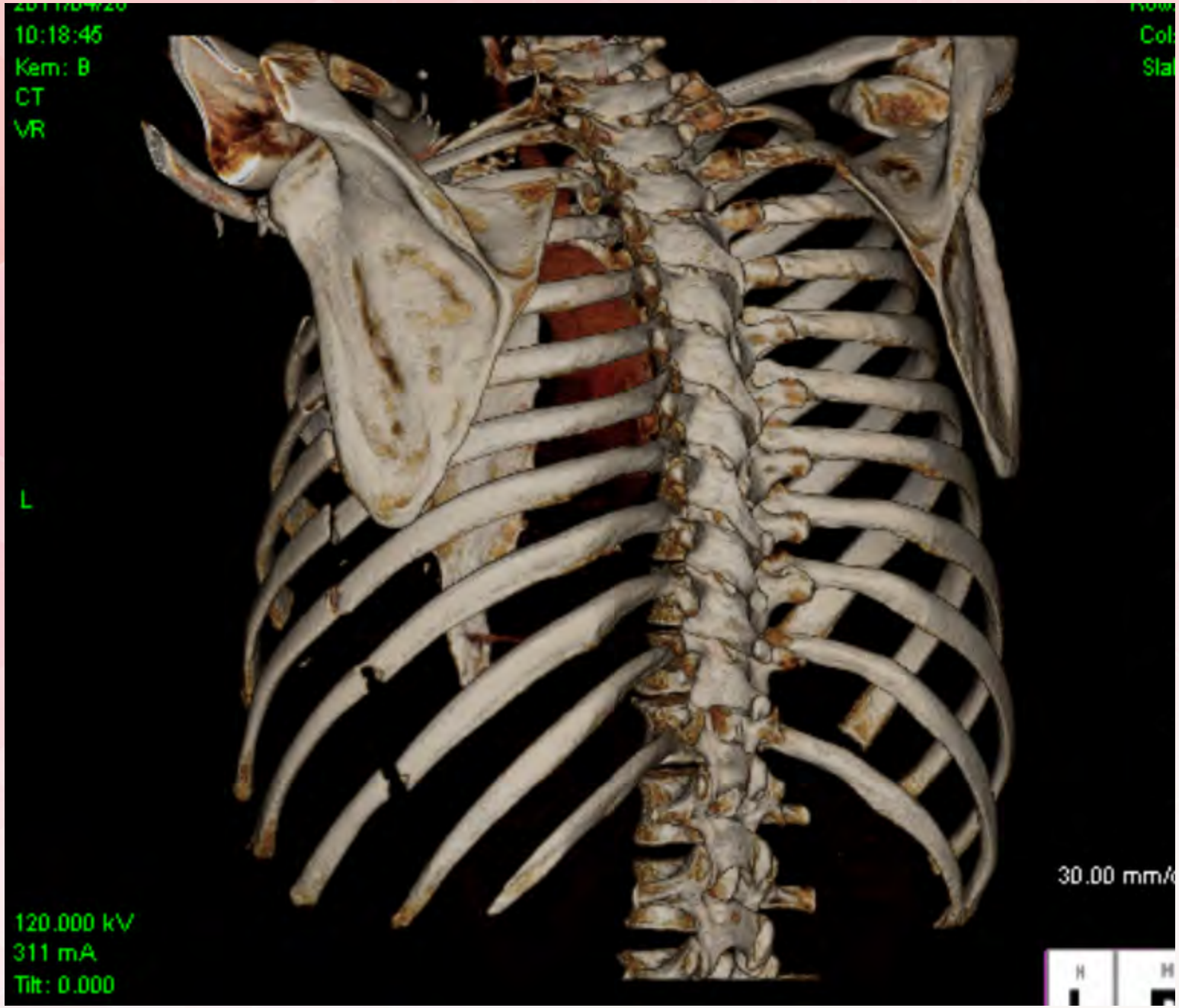
# Computed Tomography

- Used for hemodynamically stable patients
- Noninvasive procedure
- Newer helical scanners


10:18:45
Kern: B
CT
VR
L
120.000 kV
311 mA
Tilt: 0.000

# Consistent organization and clear cut communication produces effective outcomes

- Well established and maintained clear roles and goals
- Similar training- street through hospital
- Effective function of the team begins with the Team leader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# Summary and Conclusions

- It takes a team
- Team communicates
- Team uses research based protocols
- Team has a defined leader
- Trauma centers save lives!

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# Hospital Disaster Response:

## Mass Casualty Response

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# Objectives

## At the conclusion of this presentation the participant will be able to:

- Review the incidence of disaster declaration in the US to gain an understanding of the epidemiology of disasters.
- Review the incidence of the “Active Shooter” .
- Discuss the National Response Framework and its mission of ensuring an effective national response.
- Explore the National Incident Management System as the operational tool to implement the National Response Framework Doctrine.
- Explore the Incident Command system and its planning cycle.
- Explore the elements of the health care system’s planning and response to disaster events.
- Understand the hospital’s emergency response procedures and processes to manage a disaster incident.
- Review the ethical and psychosocial implications associated with an emergency response.

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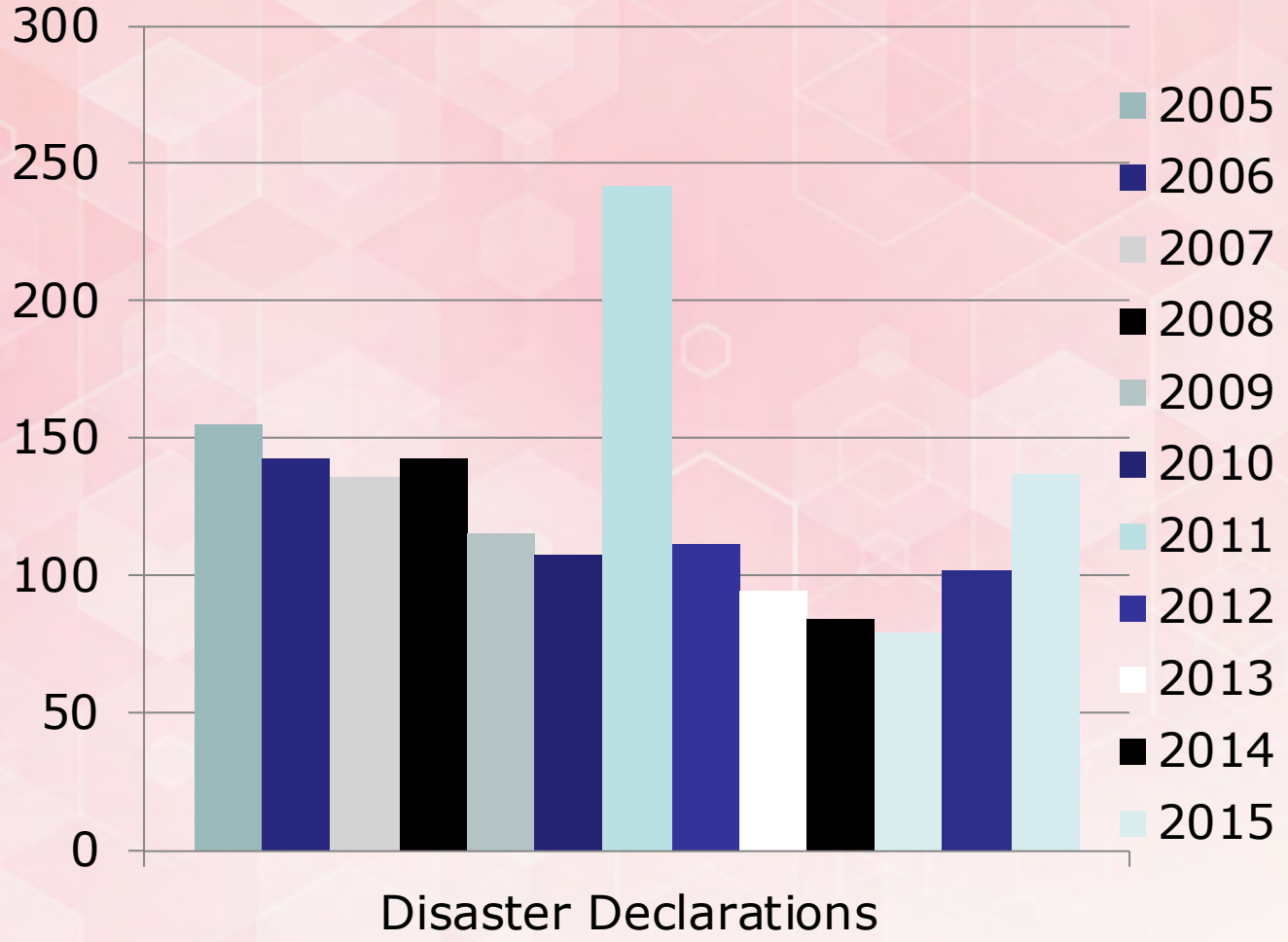
# Disaster

- Disaster
  - Crisis situation causing resources to become overwhelmed
- Disaster Management
  - Actions in response to unexpected events taken by an organization or group following occurrence of unexpected effects that result in, or threaten loss of life or resources, and which threat the continued function of the organization or group.
- Natural or Man Made
- Emergency Response Plan

# Historical Review




(United States Federal Emergency Management Agency, 2017)

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# FEMA State Major Disaster Declarations

| State | | State | |
|---|---|---|---|
| Alabama | 83 | Hawaii | 48 |
| Alaska | 61 | Idaho | 46 |
| Arizona | 83 | Illinois | 60 |
| Arkansas | 72 | Indiana | 48 |
| California | 286 | Iowa | 63 |
| Colorado | 88 | Kansas | 70 |
| Connecticut | 31 | Kentucky | 74 |
| Delaware | 21 | Louisiana | 79 |
| District of Columbia | 20 | Maine | 58 |
| Florida | 145 | Maryland | 32 |
| Georgia | 65 | Massachusetts | 48 |
| Guam | 15 | Michigan | 37 |

(United States Federal Emergency Management Agency, 2017)

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# FEMA State Major Disaster Declarations

| State | | State | |
|---|---|---|---|
| Minnesota | 67 | Ohio | 54 |
| Mississippi | 72 | Oklahoma | 185 |
| Montana | 79 | Oregon | 104 |
| Nebraska | 62 | Pennsylvania | 59 |
| Nevada | 85 | Puerto Rico | 36 |
| New Hampshire | 50 | Marshall Islands | 29 |
| New Jersey | 50 | Rhode Island | 22 |
| New Mexico | 84 | South Carolina | 30 |
| New York | 96 | South Dakota | 71 |
| North Carolina | 59 | Tennessee | 69 |

(United States Federal Emergency Management Agency, 2017)

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# FEMA State Major Disaster Declarations

| State | | State | |
|---|---|---|---|
| Texas | 344 | Washington | 152 |
| Utah | 36 | West Virginia | 68 |
| Vermont | 45 | Wisconsin | 48 |
| Virgin Islands | 25 | Wyoming | 32 |
| Virginia | 64 | | |

(United States Federal Emergency Management Agency, 2017)

# 2017 Disaster Declarations

| State | | State | |
|---|---|---|---|
| Alaska | 1 | Louisiana | 4 |
| Alabama | 3 | Michigan | 1 |
| Arkansas | 1 | Missouri | 1 |
| Arizona | 3 | Mississippi | 4 |
| California | 31 | Montana | 8 |
| Florida | 8 | North Dakota | 1 |
| Georgia | 5 | Nebraska | 2 |
| Iowa | 1 | New Hampshire | 1 |
| Idaho | 4 | New Mexico | 2 |
| Kansas | 8 | Nevada | 7 |

(United States Federal Emergency Management Agency, 2017)

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# 2017 Disaster Declarations

| State | | State | |
|---|---|---|---|
| New York | 2 | Utah | 3 |
| Oklahoma | 6 | Virgin Islands | 4 |
| Oregon | 6 | Vermont | 1 |
| Puerto Rico | 4 | Washington | 4 |
| South Carolina | 2 | Wisconsin | 1 |
| South Dakota | 2 | West Virginia | 1 |
| Texas | 1 | Wyoming | 2 |

(United States Federal Emergency Management Agency, 2017)

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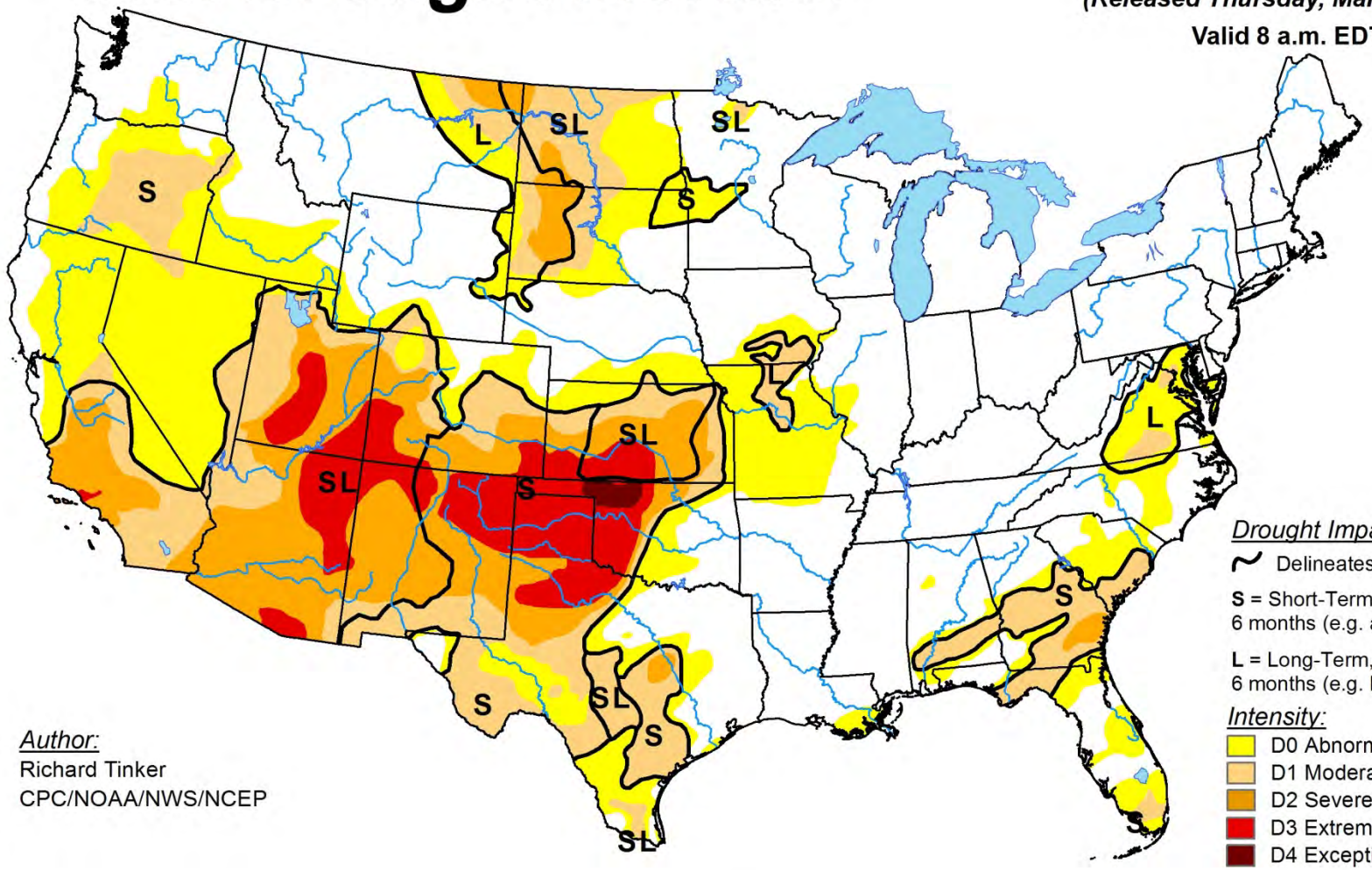
# U.S. Drought Monitor

**March 13, 2018**

***(Released Thursday, Mar. 15, 2018)***

**Valid 8 a.m. EDT**





*Author:*
Richard Tinker
CPC/NOAA/NWS/NCEP


*Drought Impact Types:*

~ Delineates dominant impacts

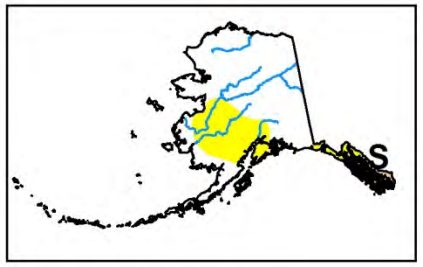
**S** = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)

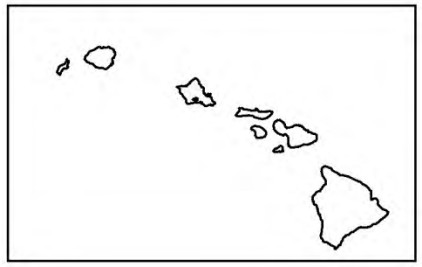
**L** = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

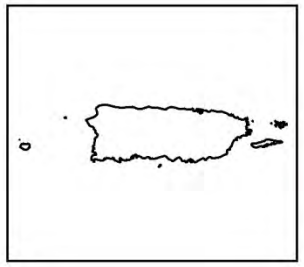
*Intensity:*

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.*





USDA NDMC DEPARTMENT OF COMMERCE NOAA

**http://droughtmonitor.unl.edu/**

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# US Reported Earthquake 2015

| State | | State | |
|---|---|---|---|
| Alabama | 6 | Montana | 19 |
| Alaska | 1575 | Nebraska | 3 |
| Arizona | 10 | Nevada | 172 |
| California | 130 | New Mexico | 12 |
| Colorado | 7 | New York | 2 |
| Connecticut | 1 | Oklahoma | 888 |
| Hawaii | 53 | Oregon | 3 |
| Idaho | 38 | Tennessee | 1 |
| Kansas | 60 | Texas | 21 |
| Michigan | 2 | Utah | 4 |
| Mississippi | 3 | Washington | 11 |
| Missouri | 5 | Wyoming | 198 |

(United States Geological Survey, 2017)

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# Reported Earthquakes

- January 1, 2015 – December 31, 2017
- Alaska – January 2016
- Oklahoma – September 2016

(United States Federal Emergency Management Agency, 2017)

# Disaster Declarations - Fires

January 1, 2015 to December 31, 2017

- California Wildfires – October 2017
- Tennessee Wildfires – December 2016
- Washington Wildfires – October 2015
- California Valley Wildfires – September 2015

(United States Federal Emergency Management Agency, 2017)

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# Disaster Declarations – Flooding January 1, 2015 – December 31, 2017

| Event | | Event | |
|---|---|---|---|
| Pueblo of Acoma | 12-20-2017 | Washington | 4-21-2017 |
| New York | 11-14-2017 | California | 4-1-2017 |
| Idaho | 10-7-2017 | California | 3-16-2017 |
| Idaho | 8-27-2017 | Pennsylvania | 12-2-2016 |
| Wyoming | 8-5-2017 | Minnesota | 11-2-2016 |
| North Dakota | 7-12-2017 | Iowa | 10-31-2016 |
| Missouri | 5-11-2017 | Wisconsin | 10-20-2016 |
| Idaho | 5-18-2017 | Iowa | 9-29-2016 |
| Idaho | 4-21-2017 | Maryland | 9-16-2016 |
| Utah | 4-2102017 | Louisiana | 8-14,2016 |

(United States Federal Emergency Management Agency, 2017)

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# Disaster Declarations – Hurricane

January 1, 2015 to December 31, 2017

- Mississippi – November 2017
- Alabama – November 2017
- South Carolina – October 2017
- Louisiana – October 2017
- South Carolina – October 2017
- Puerto Rico – September 2017
- Virgin Islands – September 2017
- Georgia – September 2017
- Florida – September 2017
- Texas – August 2017

(United States Federal Emergency Management Agency, 2017)

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# Disaster Declarations – Hurricane

- Virginia – November 2016
- South Carolina – October 2016
- Georgia – October 2016
- Florida – October 2016
- Florida – September 2016

(United States Federal Emergency Management Agency, 2017)

# Disaster Declaration – Mud/Landslide

January 1, 2015 – December 31, 2017

- Hawaii Severe Storms, flooding, landslides and mudslides – September 2016 – Declaration in October of 2016

(United States Federal Emergency Management Agency, 2017)

# Tornado Hospital Impact


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# Disaster Declarations - Tornado

January 1, 2015 to December 31, 2017

- Oklahoma – May 2017
- Louisiana – February 2017
- Georgia – January 2017
- Mississippi – January 2017
- Montana – June 2016

(United States Federal Emergency Management Agency, 2017)

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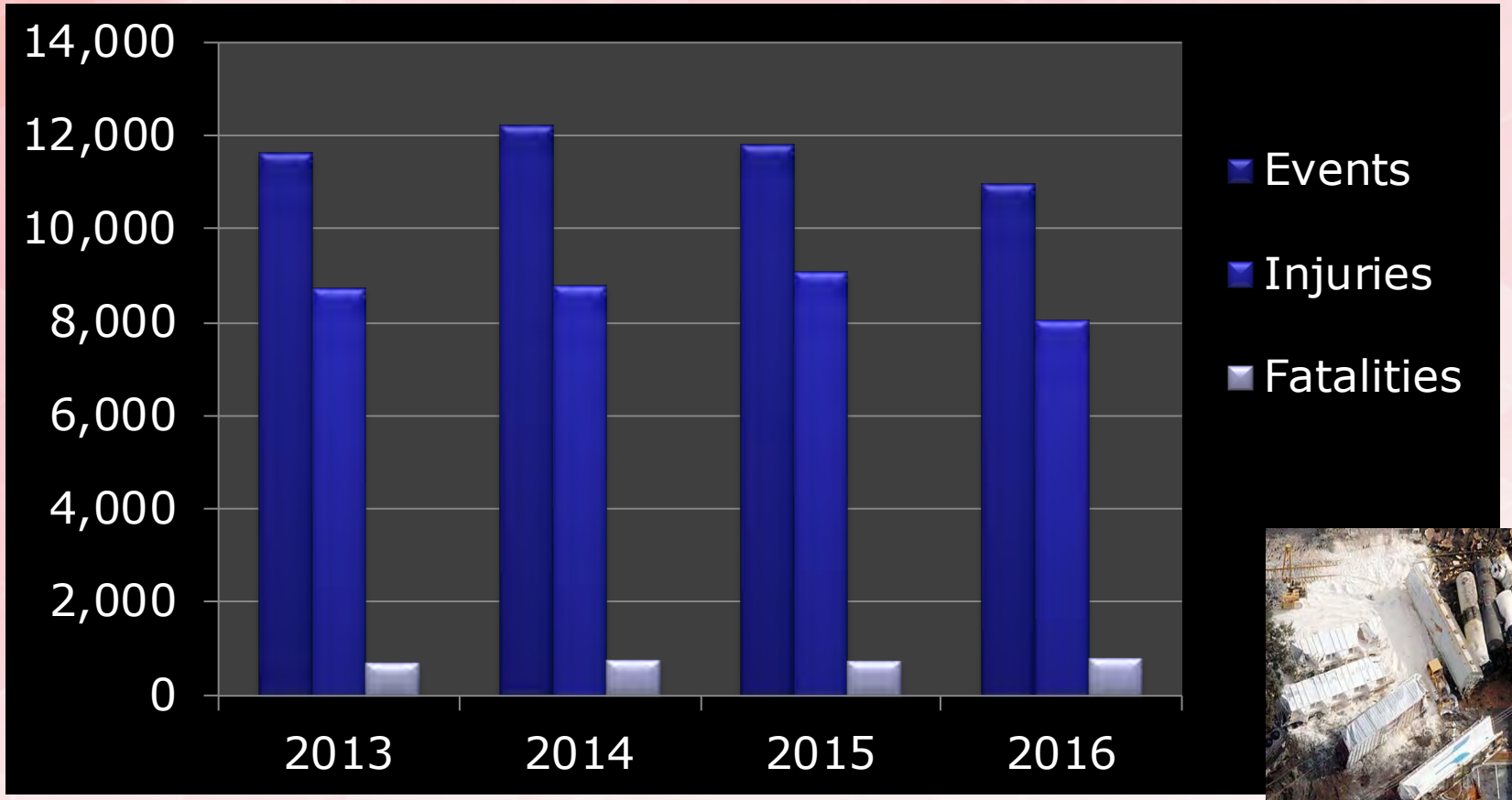
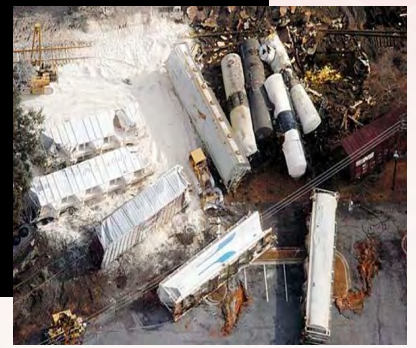
# Commercial Rail Events



(Statistica, 2018)

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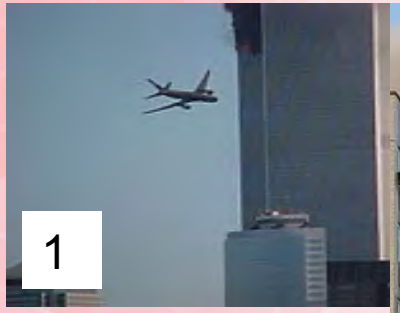
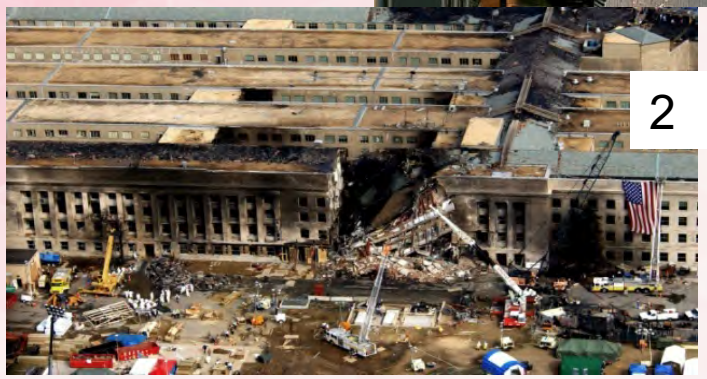
# Commercial Aircraft Events









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# Commercial Aircraft Events

- 2000 to 2011 – 209 Commercial aircraft crashes total
- 2000 to 2011 – 13 Commercial aircraft crashes in the United States ( 753 Fatalities, 97 Reported Injuries)
- 2001 – Planes used for terrorism
- 2015 – 2 Commercial plane events with 21 injuries and no fatalities
- 2016 – 2 Commercial plane event – 20 injuries and no fatalities
- 2017 – No events

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# Terrorist Events in the US

- Terrorist goal: instill fear and social disruption in society
- “No-Notice” events producing casualties in a short period of time with lethal injuries
- Require hospital planning and preparation to develop surge response capabilities and capacity
- Bombings and explosions
- Shootings
- Vehicle attacks

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# Terrorist Events in the US

| Event | | Event | |
|---|---|---|---|
| New York, NY | 9-11-2001 | Shooting | 7-27-2008 |
| Anthrax Letters | 9-18-2001 | Cyberattack | 4-8-2009 |
| Shoe Bomber | 12-22-2001 | Bombing | 5-25-2009 |
| Dirty Bomb | 5-8-2002 | Assassination | 5-31-2009 |
| Shooting LAX | 7-4-2002 | Shooting | 6-1-2009 |
| Beltway Sniper | 10-24-2002 | Shooting | 11-5-2009 |
| W. Virginia Sniper | 9-2003 | Suicide Attack | 2-18-2010 |
| South Carolina | 12-8-2003 | Shooting | 3-4-2010 |
| UNC Chapel Hill | 3-5-2006 | Shooting | 8-5-2012 |
| Seattle Shooting | 3-25-2006 | Shooting | 2-3-2013 |
| Seattle Hostage | 7-28-2006 | Bombing | 4-15-2013 |
| Bombing | 10-26-2007 | Bioterrorism | 4-16-2013 |
| Bombing | 5-4-2008 | Shooting | 11-1-2013 |

(United States Federal Emergency Management Agency, 2017)

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# Terrorist Events in the US

| Event | | Event | |
|---|---|---|---|
| Shooting | 4-13-2014 | Shooting | 12-15-2015 |
| Shooting | 4-27-2014 | Shooting | 1-7-2016 |
| Shooting | 6-8-2014 | Machete Attack | 2-11-2016 |
| Shooting | 9-12-2014 | Shooting | 6-12-2016 |
| Stabbing | 9-24-2014 | Shooting | 7-7-2016 |
| Melee Attack | 9-23-2014 | Shooting | 7-17-2016 |
| Cyberattack | 12-2014 | Stabbings | 9-17-2016 |
| Shooting | 5-3-2015 | Bombing | 9-17-2016 |
| Shooting | 6-2-2015 | Vehicle Attack | 11-28-2016 |
| Shooting | 7-17-2015 | Bombing | 8-5-2017 |
| Shooting | 7-16-2015 | Vehicle Attack | 8-12-2017 |
| Stabbing | 11-27-2015 | Shooting | 10-1-2017 |
| Shooting | 11-27-2015 | Vehicle Attack | 10-31-2017 |

(United States Federal Emergency Management Agency, 2017)

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# Active Shooter Incidents

- Active Shooter – Individual(s) engaged in killing or attempting to kill people in a confined and populated area
- 160 Active Shooter Events between 2000-2013
  - 486 Deaths; 557 Casualties
  - 60% Ended Before Law Enforcement Arrived
  - 64 Events 3 or More Killed
  - Highest Number Of Deaths – 32
  - 2 Events – More Than One Shooter
  - 2006 to 2013 Defined Increase From 6.4 to 16.4
  - 9 Officers Killed; 28 Wounded
  - Most Events Less Than 5 Minutes
- Natural reaction – Startled, feel fear
- No Profile
- Plain language warnings
- Train: Run, Hide, Fight

(United States Federal Bureau of Investigation, 2018)

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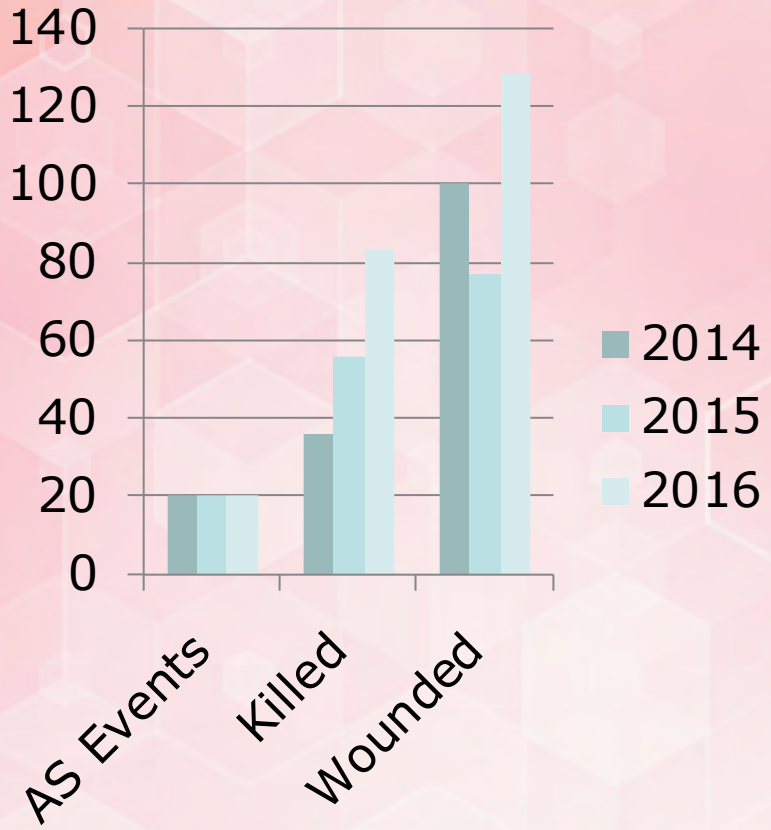
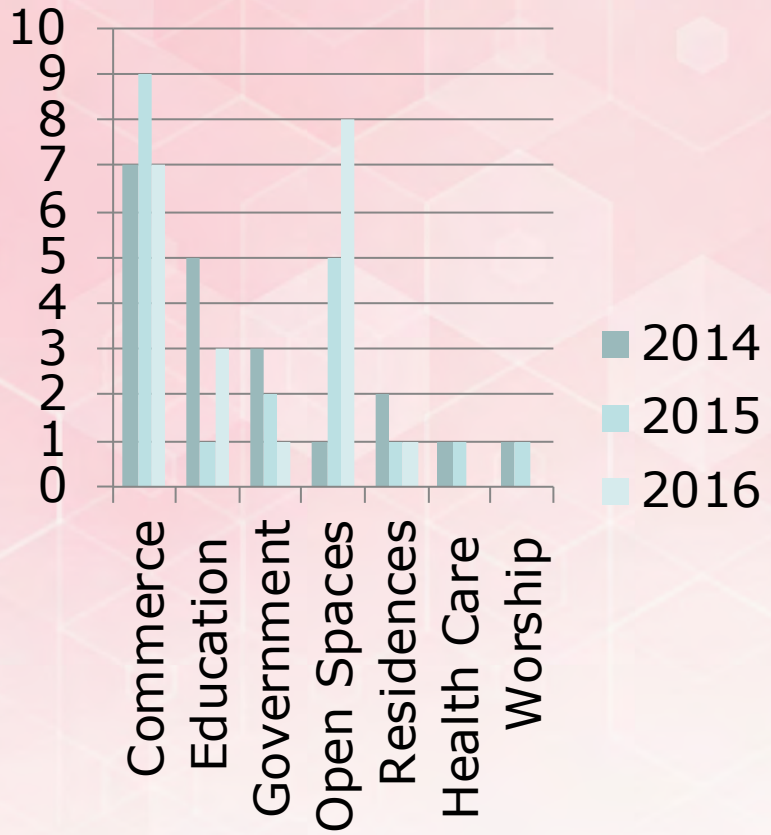
# Active Shooter Incidents – FBI




(Advanced Law Enforcement Rapid Response Training (ALERRT) Center at Texas State University and the Federal Bureau of Investigation, 2018)

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# Shooting in Hospitals

- Titusville, Florida, 2016
- Metairie, La. 2016
- San Francisco, CA, 2015
- Tampa, Florida, 2015
- Boston, Mass, 2015
- Reno, Nevada, 2013
- Baltimore, Maryland, 2010
- Active Shooter Training

Johns Hopkins Hospital: Gunman Shoots Doctor, Then Kills Self and Mother

(Hans & Eli, 2015; Kelen, Catlett, Kubit, & Hsieh, 2012; United States Department of Labor, Bureau of Labor Statistics, 2018)

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# National Response Framework 2016

- Blueprint for the Nation's response to all types of disasters
- Designed to be scalable, flexible, and adaptable
- Defines the National Incident Management System and key roles across the Nation
- Describes the principles, roles, responsibilities, and coordinating structure for response
- Mission: Ensuring effective national response

(Federal Emergency Management Agency, 2016)

# National Response Framework

- Objectives
  - Define capabilities necessary to save lives
  - Protect property
  - Protect the environment
  - Meet basic human needs
  - Stabilize the incident
  - Restore basic services and community functionality
  - Establish environment that facilitates recovery

(FEMA, 2016)

# National Response Framework - 2016

- Priorities for Response Mission
  - **Save lives**
  - **Protect property and environment**
  - **Stabilize the incident**
  - **Provide basic human needs**
- Principles
  - Engage partnerships
  - Tiered response
  - Scalable, flexible, adaptable operational capabilities
  - Unity of effort – unified command
  - Readiness to act

(FEMA, 2016)

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# National Response Framework - 2016

## Emergency Support Functions

- ESF #1 - Transportation
- ESF #2 - Communication
- ESF #3 - Public Works and Engineering
- ESF #4 – Firefighting
- ESF #5 – Information and Planning
- ESF #6 – Mass Care, Emergency Assistance, Temporary Housing, and Human Resources
- ESF #7 – Logistics

(FEMA, 2016)

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# National Response Framework

- Emergency Support Function #8
- Public Health and Medical Services
- Supplemental Assistance to State, Local and Tribal Government
  - Assess Public Health/Medical Needs
  - Public Health Surveillance
  - Medical Care and Personnel
  - Medical Equipment and Supplies
- Coordinator and Primary Agency is the Department of Health and Human Services
- NDMS

(FEMA, 2016)

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# National Response Framework - 2016

- ESF# 9 Search and Rescue
- ESF# 10 Oil and Hazardous Materials Response
- ESF#11 Agriculture and Natural Resources
- ESF#12 Energy
- ESF# 13 Public Safety and Security
- ESF# 14 National Disaster Recovery Framework
- ESF# 15 External Affairs

(FEMA, 2016)

# National Incident Management System 2017

- Comprehensive national approach to incident management
- Concepts and principles of response for all threats, hazards and events
- Scalable, flexible, and adaptable
- Standard resource management procedures that facilitate coordination
- Essential principles for communication

(FEMA, 2018)

# National Incident Management System Characteristics 2017

- Common Terminology
- Management by Objectives
- Manageable Span of Control
- Comprehensive Resource Management
- Establishment and Transfer of Command
- Chain of Command / Utility of Command
- Dispatch / Deploy
- Modular Organization
- Incident Action Planning
- Incident Facilities and Locations
- Integrated Communication
- Unified Command
- Accountability
- Information and Intelligence Management

(FEMA, 2018)

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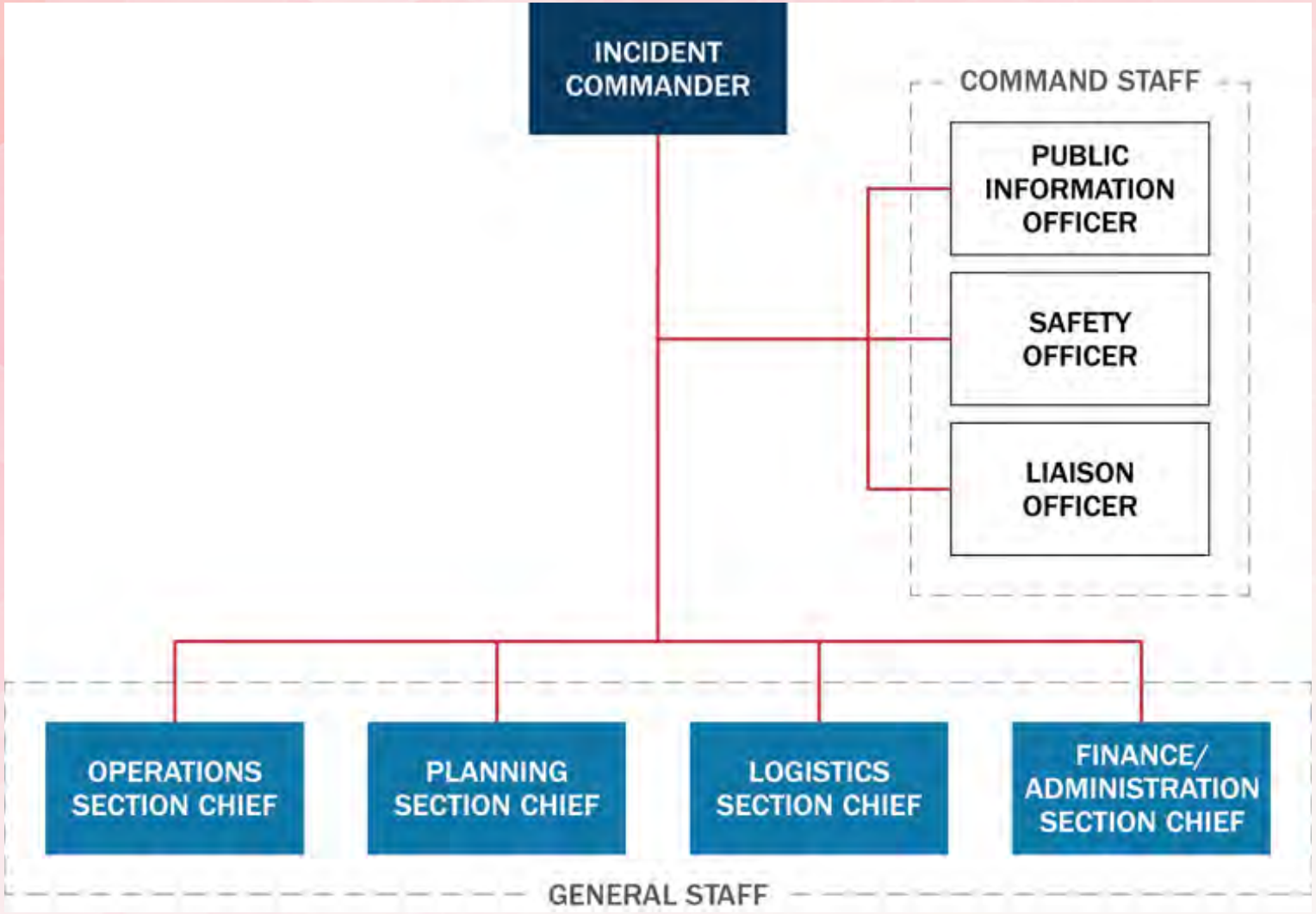
# Example of ICS Organization – Single IC




(FEMA, 2018)

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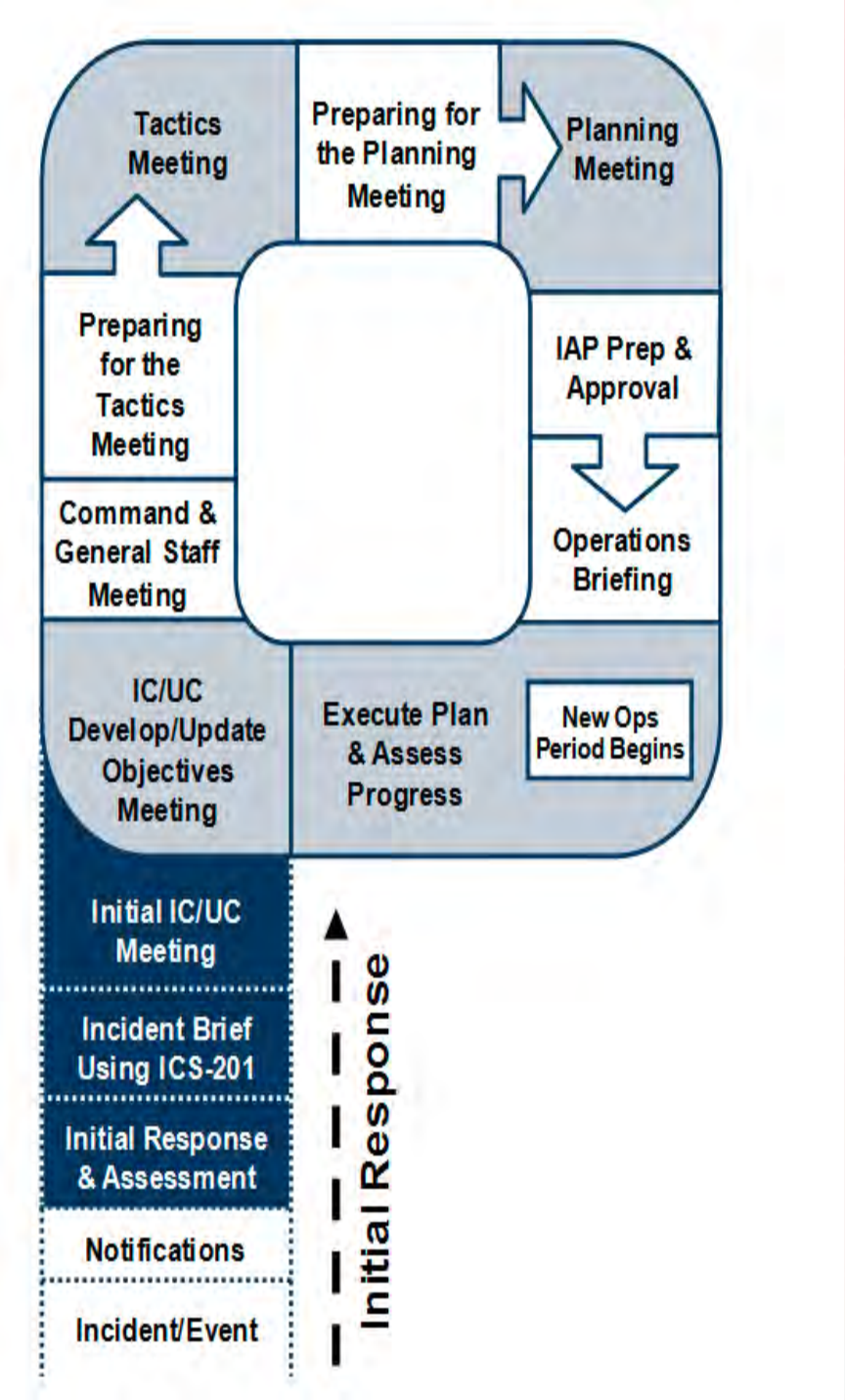
# Planning Cycle

- Sequence of Planning
- Leg of the “P” – Describes the initial stages of an incident
- Initial Response
  - First on scene
  - Conducts initial assessment
  - Takes immediate actions
  - Conducts rapid assessment
  - Situational awareness
- Planning Phase – Command & General Staff collaboration

(Image from:https:www.fema.gov.)

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# Disaster Policy

- First Response – Local Response
- Robert T. Stafford Disaster Relief and Emergency Assistance Act
- Emergency Declaration
- Major Disaster Declaration – Long-Term Federal Recovery For Disaster Victims, Businesses and Public Entities

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# Public Health Disaster Response Phases

# Hospital Response

- The 7 phases of Readiness:
  - Preparedness
  - Planning
  - Regional Integration
  - Integration with Pre-Hospital
  - Emergency Operations Response Plan
  - After Action Review
  - Plan Revisions

(U.S. Department of Health and Human Services,
Office of the Assistant Secretary for Preparedness and Response Hospital Preparedness Program 2012)

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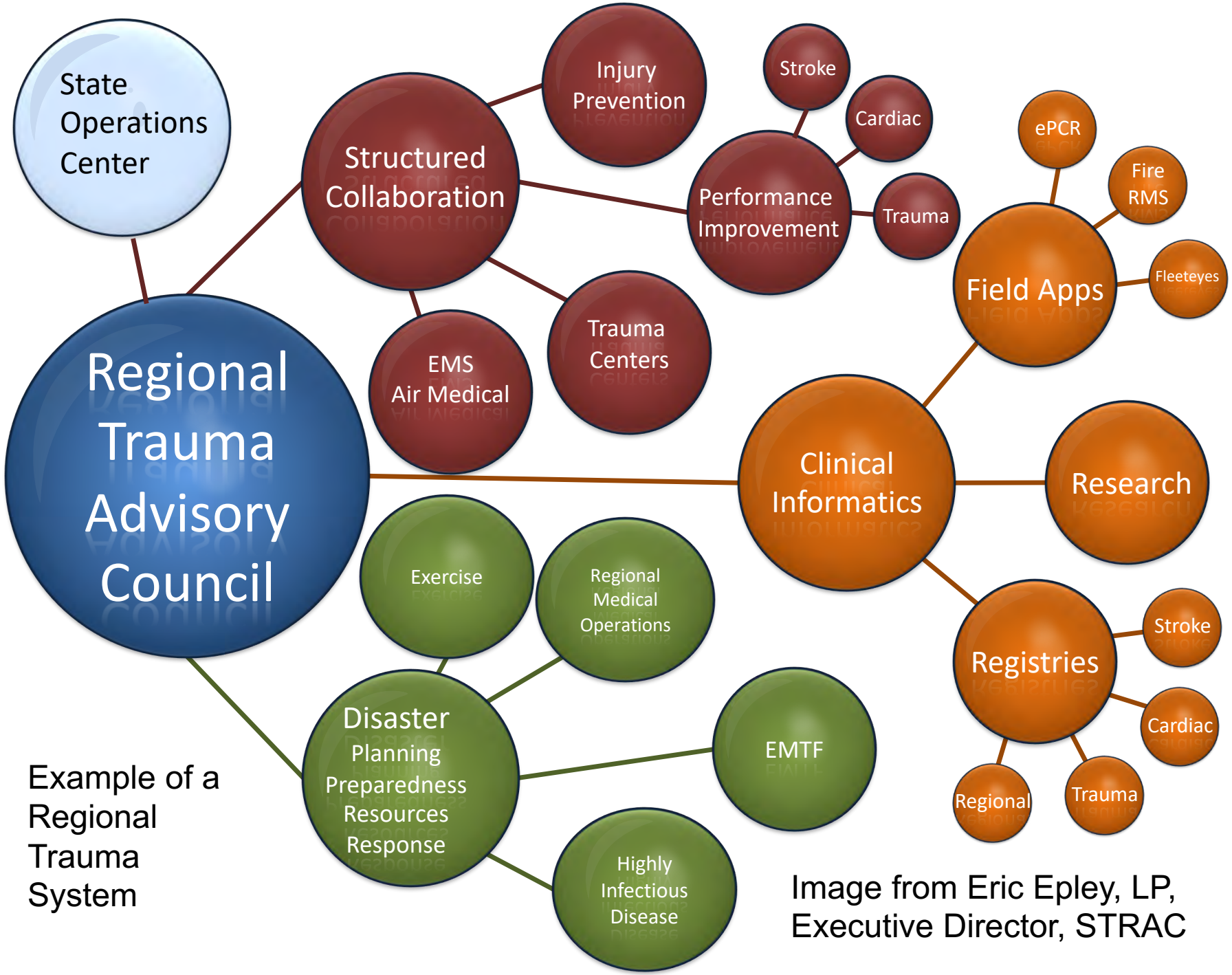


Example of a Regional Trauma System

Image from Eric Epley, LP, Executive Director, STRAC

# Regional Medical Operation Centers


Image provided by Eric Epley, LP, Executive Director of STRAC
(www.strac.og)

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# Hospital Preparedness

- Phase of Information Gathering
- Hospital Leaders Define Federal & Regulatory Requirements
- CMS Provisions of Participation Criteria
- Joint Commission Standards
- Review of Lessons Learned
- Organizational Structure

(FEMA, 2018)

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# Hospital All Hazards Self-Assessment

| Planning Framework | Sheltering-in-Place |
|---|---|
| Command and Control | Isolated or Out of Communication |
| Authorized Personnel | Visitors |
| Notification Systems | Communication and Media |
| Activation the Plan | Resources |
| Response Protocols | Allocating Pharmaceuticals |
| Communication Systems | Surveillance |
| Staffing Considerations | Infection Control |
| Security and Access | Staff Education & Training |
| Internal Traffic | Post Mortem Care |
| External Traffic | Recovery Protocols |
| Patient Reception | Exercising the Plan |
| Evacuation (Horizontal & Vertical) | Infrastructure |

(Centers for Disease Control and Prevention, 2018)

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# Planning

- Planning Phase Is a Critical Element
- Follows Review Of What As Happened
- Hazard Vulnerability Assessment
- Review Response Plans
- Define Resources Needed
- Community Integration
- Prioritize Exercise Events
- Special Populations
- Specific Risks: Chemical, Biological, Blast
- Planning For Staff Needs

# Planning Phase [cont'd]

- Hazard Vulnerability Assessment (HVA)



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# HVA

| Natural | Man Made |
|---|---|
| Tornado | Transportation |
| Flooding | Industrial Hazmat |
| Hurricane | Structure Collapse |
| Earthquake | Weapon Violence |
| Landslide | Fire |
| Mudslide | Explosion |
| Wildfire | Terrorist Chemical |
| Extreme Temp | Terrorist Biological |
| Volcano | Terrorist Radiation |

# Planning

- Just-In-Time Inventory
- Medication Distribution
- Infrastructure Contingency
- Business Continuity
- Casualty Tracking

Images from Parkland Hospital, 2017

# Planning

- ICS / Command Center
- Medical Decontamination Training
- EMS Traffic Routes / Triage
- Medical Care
  - Unidirectional Flow
  - Minimal Standards
  - Staffing Patterns
  - Evacuation of ED/Trauma Areas
  - Surge
- Staff Notification / Staff Traffic Routes
- Communication – Redundancy
- Security

Image from Parkland Hospital

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# New Disaster Alerts

| Facility / Disaster Alert | | |
|---|---|---|
| **EVENT** | **Old Code** | **Recommended Plain Language** |
| Bed Capacity | **Resource Alert – Bed Contingency Plan** | Facility Alert – Bed Capacity – Command Center Activated/Not Activated / Details |
| Utilities Downtime/Outage | **Code Yellow** | Facility Alert – Utility Descriptor – (Location) – Follow Downtime Procedures - Command Center Activated/Not Activated |
| Emergency Operations Response Plan Activation | **Code Yellow** | Disaster Alert – Descriptor - Command Center Activated/Not Activated - (Location) |
| Medical Decontamination Team Activation | **Code Yellow - Decon** | Facility Alert - Decon Team Activation- (Full / Partial) |
| Major Disaster in community | **Code Yellow Lvl I or II** | Disaster Alert- Command center activations/ details. |
| Evacuation | **Code Yellow Evacuation Lvl 1-5** | Disaster Alert- Evacuation – details. |
| Fire Alarm Activation | **Code Red** | Facility Alert – Fire Alarm Activation – (Location) |
| **Medical Alert** | | |
| **EVENT** | | **Recommended Plain Language** |
| Cardiac Arrest | **Code Blue** | Code Blue + Location |
| Medical Assist | Medical Assist | Medical Assist + Location |
| **Security Alert** | | |
| **EVENT** | | **Recommended Plain Language** |
| Security Watch | Security Watch | retire – not be used – see PHHS event notification |
| Active Shooter | **Code Silver** | Security Alert – Active Shooter – (Location) – (Protective Actions) |
| Lockdown | **Code Orange** | Security Alert – Facility Lockdown – (Partial / Full) - (Location) |
| Bomb Threat | **Code Brown** | Retire use Facility Alert / evacuation |
| Missing Infant | **Code Pink** | Missing Infant / Child Alert – (Location) – (Description) |
| Missing Patient | **Code Green** | Patient Alert – (Description)– (Location) |
| Police event / incident | **PHHS police event notification** | PHHS police event notification- same as current - |
| **Weather Alert** | | |
| **EVENT** | | **Recommended Plain Language** |
| Severe Weather | **Code Grey** | Weather Alert – (Description) – (Location) |
| Tornado | **Code Black** | Tornado Warning – (Description) – (Location) ( protective measures) |

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# Planning

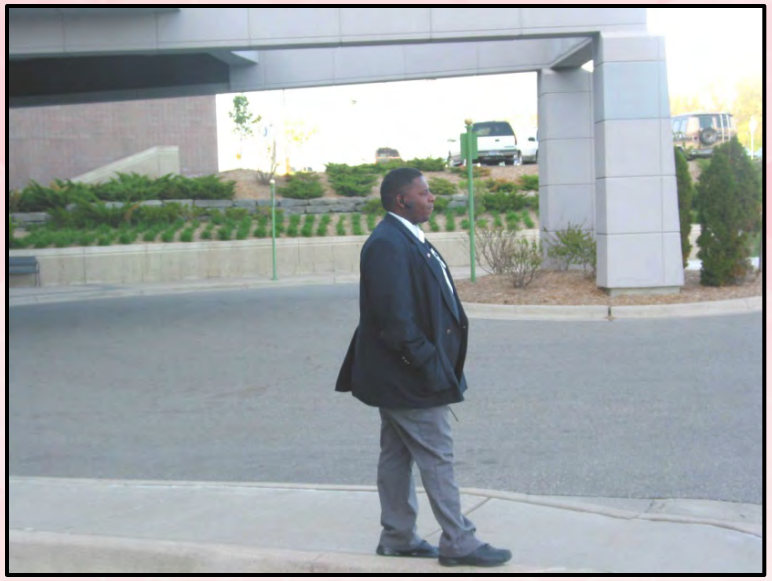
- Written Emergency Response Plan
  - Input of Medical Leaders, Administration, Nursing, Trauma Program, and Representatives From all Key Departments
  - All Hazard Response Plan
  - Job Action Sheets
- Leadership Training
- Departmental Training

# Hospital Response

- Event Recognition
- Situational Awareness
- Activation of Response – Level of Response
- Notification
- Establish the Command Center
- Incident Command System
  - Incident Command
  - Logistics Section
  - Operations Section
  - Planning Section
  - Finance Section
- Communication
- Incident Action Plan

# Hospital Response

- Initial Response Procedures
  - Security / Lockdown
  - Reorganization to ICS – Job Action Sheets
  - Unit Priorities
    - Emergency Department
    - Trauma
    - OR
    - ICU
    - General Units
    - Alternate Care Sites
    - Elective Procedures



(American College of Surgeons, 2016).

# Hospital Response

- Medical Decontamination
- Security / Access
- Triage
- Echelon of Triage
- Disaster Standards of Care
- Patient Tracking
  - Special Populations
  - Unresponsive Casualties
  - Morgue
- Casualties' Families
- Media

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# Exercise & Training

- HVA Utilized to Define Exercises
- Table Top, Specific Exercises – Communication, Medical Decontamination
- Full Function Exercises
- Exercise Controllers
- Regional Exercises
- After Action Reviews
- Emergency Operations Response Plan Revisions


Image of 9/11

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# Special Considerations

- Blast Injuries
- Chemical Exposure
- Radiation Exposure
- Biological Exposure
- HERT Course

(FEMA, 2018)

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# Blast Injuries

- Blast – High Speed Chemical Decomposition of Explosive Materials
  - Shrapnel Fragments
  - Incendiary Material
  - Surrounding Materials
- Conventional Materials
  - Ammonium Nitrate
  - Fuel Oils
  - Gun Powder
  - Plastics / Others
- Characteristics Dependent on Composition and Components

(American College of Surgeons, 2016)

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# Blast Effect

- Caused by High Pressure Shock Waves – Radiates Outward From Explosion
  - Size and Type of Explosive
  - Distance From Explosive
  - Transmittal Medium
- Reverberations of Blast and Negative Waves
- Followed by Shrapnel, Fragments, Heat, Smoke and Fire
- Concern for Toxic Fumes / Dust
- Potential Structural Collapse
- Primary, Secondary, Tertiary, and Quaternary Blast Injuries

(American College of Surgeons, 2016)

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# Chemical Exposure

| Agent | Effect | Onset | Treatment |
|---|---|---|---|
| Nerve Agents:<br>Vapor<br>Liquid<br>Both | Miosis (pinpoint pupils)<br>Rhinorrhea<br>SOB, LOC, Seizures<br>Excessive Sweating<br>GI Distress | Vapor – seconds to minutes<br>Liquid- minutes to hours | Atropine<br>Pralidoxime (2-PAMCI)<br>Benzodiazepines<br>ABC Support |
| Cyanide<br>(Smells like bitter almonds) | Cherry Red Skin<br>Nausea, LOC Dizziness<br>Metabolic Acidosis<br>Transient Rapid Breathing, LOC, Apnea, Cardiac Arrest | Seconds to minutes | Cyanide Kit<br>Amyl Nitrate<br>Sodium Nitrate<br>Sodium Thiosulfate<br>ABC Support |
| Blister Agents:<br>Mustard<br>Lewisite (Smell of mustard, onion or garlic) Nitrogen Mustard; Phosgene Oxime (CX) | Redness of skin. Blisters, Irritation of Eyes, Cough, SOB, Airway Injury<br>Pulmonary Edema<br>Mustard: Bone Marrow Suppression | Mustard: Hours<br>Lewisite: Minutes | Lewisite: British Anti-Lewisite antidote<br>Immediate decontamination, ocular irrigation, bronchodilators, airway assistance, fluid balance |

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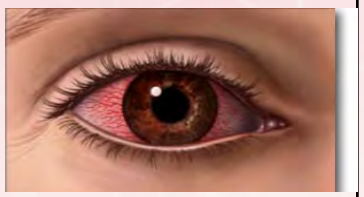
# Chemical Exposure

| Agent | Effect | Onset | Specific Treatment |
|---|---|---|---|
| Pulmonary Agents -<br>Phosgene<br>Chlorine (Smells like fresh cut grass or hay) | SOB, Coughing, Chest Tightness, Laryngeal Spasm, Delayed Non-Cardiac Pulmonary Edema<br>Urticaria or wheel skin Irritation | Symptoms Immediate<br><br>Delayed Pulmonary Edema | No Antidote<br>ABC Support |
| Riot Control Agents -<br>Pepper Spray<br>Tear Gas | Pain, Tearing, Redness of Eyes, Burning of Nose / Throat, Sneezing, Rhinorrhea<br>SOB, Bronchospasm, Respiratory Distress<br>Skin Erythema, Possible Conjunctivitis | Seconds<br>  | Irrigate Eyes Copiously With Water / NS<br><br>Wash Skin With Sodium Bicarbonate, Alkaline Soap, or Large Amounts of Cool Water<br>Bronchodilators |

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# Radiation Exposure

- Potential Terrorist Events
  - Nuclear Explosion
  - Meltdown of Nuclear Reactor
  - Dispersal of Material Through Conventional Explosives: Radiation Dispersal Device (RDD or Dirty Bomb)
  - Placing Radioactive Material In Public Areas

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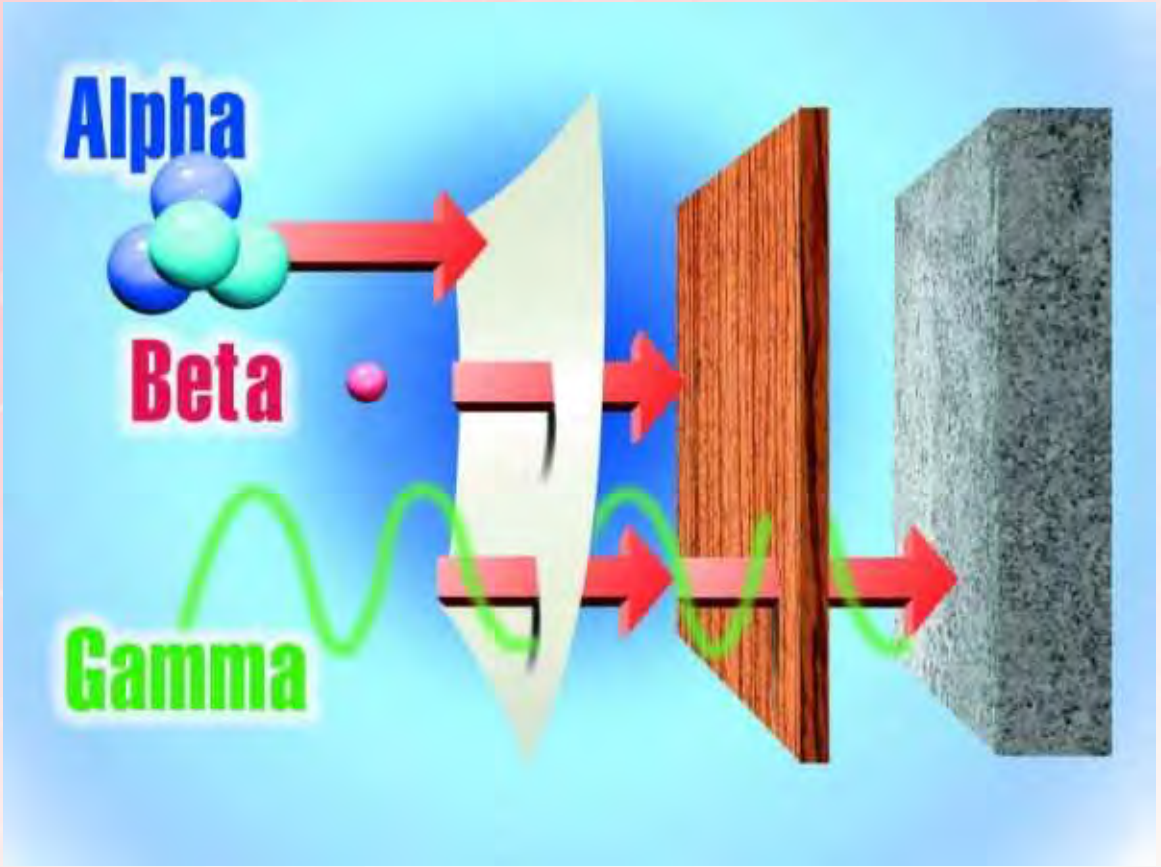
# Radiation Exposure

- Alpha Particles
- Beta Particles
- Gamma Rays
- Neutrons



# Radiation Exposure

- External Contamination
  - Radiation Debris Is On The Body and Clothing
  - Contamination Is Removed By Medical Decontamination
  - Prevent Internal Contamination By Inhaling, Swallowing or Through Open Wounds
- Internal Contamination Caused By Inhalation, Ingestion or Absorbed By Open Wounds
  - Potential Thyroid Gland Injury
  - Persistent levels of contamination after decontamination
- Unit Measures
  - 100 Rad = 1 Gray (Gy)
  - 100 Rem = 1 Sievert (Sv)
  - Amount of Radiation Human Absorbs Measured in RAD
  - Biological Effects of the RAD Exposure is Measured in REM
- Waster Water Disposal

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# Radiation Exposure: Prodromal Symptoms

| Symptoms | Time of Onset | Approximate Whole-Body Radiation Dose | Physiological Illness |
|---|---|---|---|
| Nausea, Vomiting | First 48 Hours | 1 Gray<br>100 Rad | Decrease In White Blood Cells and Platelets |
| Nausea, Vomiting | First 24 Hours | 2 Gray<br>200 Rad | Hematopoietic Syndrome<br>Marked Decrease in White Blood Cells and Platelets |
| Nausea, Vomiting, Diarrhea | First 12 Hours, 8 Hours for Diarrhea | 4 Gray<br>400 Rad | Gastrointestinal Damage<br>50% Mortality in Absence of Treatment |
| Nausea, Vomiting, Diarrhea | Within 5 Minutes | 10-30 Gray<br>1,000 – 3,000 Rad | Severe Gastrointestinal Damage<br>Very Poor Prognosis |
| CNS Impact, Mental Status Changes | Within Minutes | ➢30 Gray<br>➢3,000 Rad | Neurovascular Syndrome<br>Severe CNS Damage, Cardiovascular Collapse<br>Lethal |

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# Biological Exposure

- Biological Terrorism
- Epidemic / Pandemic
- Potential Biological Exposure
  - Disease Unusual Or Does Occur Naturally
  - Multiple Diseases
  - Large Numbers of Military and Civilian
  - Massive Point-Source
  - Aerosol Route
  - High Morbidity / Mortality
  - Disease Limited To Localized Geographic Area
  - Low Exposure in Air Filtered Locations
  - Dead Animals
  - Absence of Natural Vector

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# Biological Agents

| Agent | Impact |
|---|---|
| Anthrax | Bacterial Agent: Skin, Gastrointestinal, Respiratory- Produce septicemia and death if untreated; treatment early with Penicillin |
| Plague | Bacterial Agent: Inhaled as aerosol – Pneumonic Plague; Highly contagious; Untreated – Mortality up to 50% |
| Brucellosis | Bacterial Agent: Systemic infection impacting any organ system; Symptoms 2-3 weeks after exposure with acute febrile illness; Common lab exposure |
| Botulism | Bacterial Agent: Food Botulism, Wound Botulism; Spread through blood stream; Most potent toxin; Most likely exposure is food and water contamination |
| Variola Virus | Viral Agent: Smallpox virus; Highly contagious and very virulent; Incubation period is 12 days; Clinical presentation is fever and headache; Pus filled vesicles over the body; Mortality is 30% in nonimmunized and 3% in the immunized population; Can be used as an aerosol weapon |

# Active Shooter

- Sudden impact or no notice event
- Plan for penetrating GSWs surge (all ages)
- Mode of transport / Self referral
- Time sensitive
- Priorities: Mass care and hospital security
- Triage
- Quick Registration
- Focus on hemorrhage control
- Higher incidence of operative interventions
- OR Priority: Truncal injuries with shock
- Tourniquet availability
- Blood utilization
- Mental health
- Family care

**Rate of Fire** - 650 rounds/min (AK-74, AKS-74, AK-74M)

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# Ethical Considerations in Disaster Management

- Standard Ethical Principles
  - Autonomy
  - Nonmaleficence
  - Beneficence
  - Justice
- Disaster Events
  - Training & Readiness
  - Need-based Resource Management
  - Willingness of Workers
  - Media
  - Disaster Standards
    - World Medical Association on Medical Ethics in the Event of Disaster
    - Code of Conduct for the International Red Cross and Red Crescent  Movement
    - Sphere Project's Humanitarian Charter
    - Minimal Standards in Humanitarian Response

Image from google image

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# Building Resilience

- Resilience – Process of adapting in the face of adversity, trauma tragedy, or significant sources of threat
- Process of bouncing back from adversity
- History of stress management
- Active problem-focused coping
- Conscious effort to move forward in a positive manner
- Simple – Bouncing back from adversity

(Southwick, Pietrzak, Tsai, Krystal, 2015)

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# Psychological First Aid

- Organizational Structure
  - Limit shifts – no more than 12 hrs.
  - Rotation of staff
  - Mandate time off
  - Staff at all levels
  - Encourage peer partners
  - Monitor high risk providers
    - Survivors of disasters
    - Regular exposure to severely affected
    - Preexisting conditions
    - Multiple stressors

# Post Traumatic Stress Disorder (PTSD)

- Occurs months or years after exposure
- Diagnosis requires a persistence of reactions for months
- May include
  - Intrusive thoughts
  - Flashbacks
  - Avoidance of reminders
  - Negative thoughts and feelings
  - Reactive symptoms
- Psycho-education
- Mental Health Consultants

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# Summary

- Understanding the incidence of disaster declaration in the US the epidemiology of disasters facilitates planning and response.
- Hospitals need to understand the unique differences of the "Active Shooter" incidents and the potential of no-notice events.
- The National Response Framework establishes the national structure for disasters and its mission is to ensure an effective national response.
- Explore the National Incident Management System is the operational tool for implement the National Response Framework Doctrine.
- All agencies including hospitals utilize the Incident Command System and its planning cycle to manage an incident and fosters unified command and integration.
- Hospitals complete an HVA that defines their priorities for mitigation, preparedness, planning, education and response training annually.
- Hospital emergency response procedures define that an Incident Commander will at a minimum manage the incident and define the level of response and scope of response.
- Disaster ethical and psychosocial implications may pose additional challenges.

SOCIETY OF TRAUMA NURSES

# Chapter 1 - Trauma Team from Prehospital through the Emergency Department Test Questions

1. As the prehospital provider approaches the scene of a trauma call, they perform

    a. a radio transmission to the hospital
    b. a scene size up
    c. an estimate of neck size for c-collar
    d. an estimate of victim's height and weight

2. Field intubation has been proven to improve outcome in

    a. patients with BP less than 90 mm Hg
    b. patients with GCS less than 9
    c. patients with acute respiratory distress
    d. none of the above

3. A proven technique of hemorrhage control is

    a. Direct pressure
    b. Elevate above the heart
    c. Pressure points
    d. Cold application

4. Prehospital care for apparent pelvic fractures includes

    a. DO NOT ROCK or palpate the pelvis in the prehospital arena
    b. Avoid log rolling as much as possible
    c. Apply splint if in your area protocols
    d. All of the above

5. Most preventable deaths in trauma care are due to

    a. Delay in CPR
    b. Cardiac tamponade
    c. Airway obstruction
    d. Tension pneumothorax

6. For resuscitation to occur, there must be

    a. Cellular perfusion and tissue oxygenation
    b. Restoration of a blood pressure greater than 90mm Hg
    c. A hemoglobin greater than 9g/dL
    d. A PaO2 greater than 80 mm Hg

7. The Trauma Triad of Death is

    a. Hypotension, tachycardia and decreased urine output
    b. Infection, inadequate nutrition, DVT's
    c. Hypothermia, acidosis and coagulopathy
    d. Splenic, pelvic and head injuries.

8. A plain pelvic x-ray should be performed on all

    a. trauma patients
    b. patients with head injury
    c. patients with multiple injuries
    d. patients over 65 years old.

9. Primary screening for cervical spine injuries is
    a. CT scan
    b. Cross table lateral C-spine
    c. Swimmer's view C-spine
    d. MRI

10. Persistent metabolic acidosis in a trauma patient may indicate
    a. Hyperventilation
    b. Continued bleeding
    c. Severe head injury
    d. Hyperthermia

# Chapter 1 - Trauma Team from Prehospital Through the Emergency Department Answer Key

1. b
2. d
3. a
4. d
5. c
6. a
7. c
8. c
9. a
10. b

# Chapter 2 - Hospital Emergency Operations Response: Mass Casualty Response Test Questions

1. Which one of the following best explains the difference between a mass casualty disaster and the routine management of emergency/trauma patients:

    a. Number of causalities
    b. Overwhelmed resources
    c. Unusual injury patterns
    d. Surge capacity

2. Which one of the following statements about triage in mass casualty disasters is true:

    a. Overtriage is the assignment of critically injured casualties to delayed treatment.
    b. Only physicians are qualified to serve as triage officers.
    c. Radiologic studies are an essential element of triage.
    d. Overtriage of disaster victims decreases resources available for critically injured survivors.

3. Which **one** of the following factors minimizes health worker stress during and/or after a disaster:

    a. Threat to personal safety
    b. Responder personnel debriefing in operational units
    c. Uncertain duration of event
    d. Human error and/or malicious intent

4. Which **one** of the following is a common mistake that impedes the effectiveness of disaster responses:

    a. Rapid institution of search and rescue at the disaster scene
    b. Early hospital lockdown to prevent uncontrolled influx of casualties
    c. Immediate call for blood donor volunteers to come to the hospital
    d. Clear designation of authority among responders and limiting scope of responsibility

5. Which **one** of the following contributes to a successful disaster response:

    a. Designation of one sole communications methodology
    b. Uncertain delegation of authority and responsibility
    c. Overtriage
    d. All-hazards planning

6. What are the four public health disaster response phases?

   a. Preparation, planning, prehospital integration, response
   b. Mitigation & prevention, preparedness, planning, response
   c. Mitigation & prevention, preparedness, response, recovery

7. The Incident Command system provides a standardized approach to _____?

   a. Radio communications
   b. Natural Disasters Only
   c. Incident Management
   d. Internal (hospital) emergency incidents only

8. The National Incident Management System operationalizes the National Response Framework with concepts & _____.

   a. Principles of response for natural threats & hazards
   b. Principles of response for all threats, hazards, and events

9. Preparedness, Planning, and Regional Integration are the first 3 phases of Hospital Response and Readiness. The remaining 4 phases include:

   a. Integration with Prehospital, Emergency Operations Response Plan, After Action Review, Plan Revisions
   b. Integration with Prehospital, Integration with Hospital Officials, Emergency Operations Response Plan, Wrap-up of financial impact to hospital
   c. Integration with Hospital Officials, Emergency Operations Response Plan, After Action Review, Plan Revisions

10. True or False: Emergency Response Plans can only be developed for man-made disasters not natural disasters.

# Chapter 2 - Hospital Emergency Operations Response: Mass Casualty Response Answer Key

1. b
2. d
3. b
4. c
5. d
6. c
7. c
8. b
9. a
10. False