FIREFIGHTERS

The First Hands in Trauma

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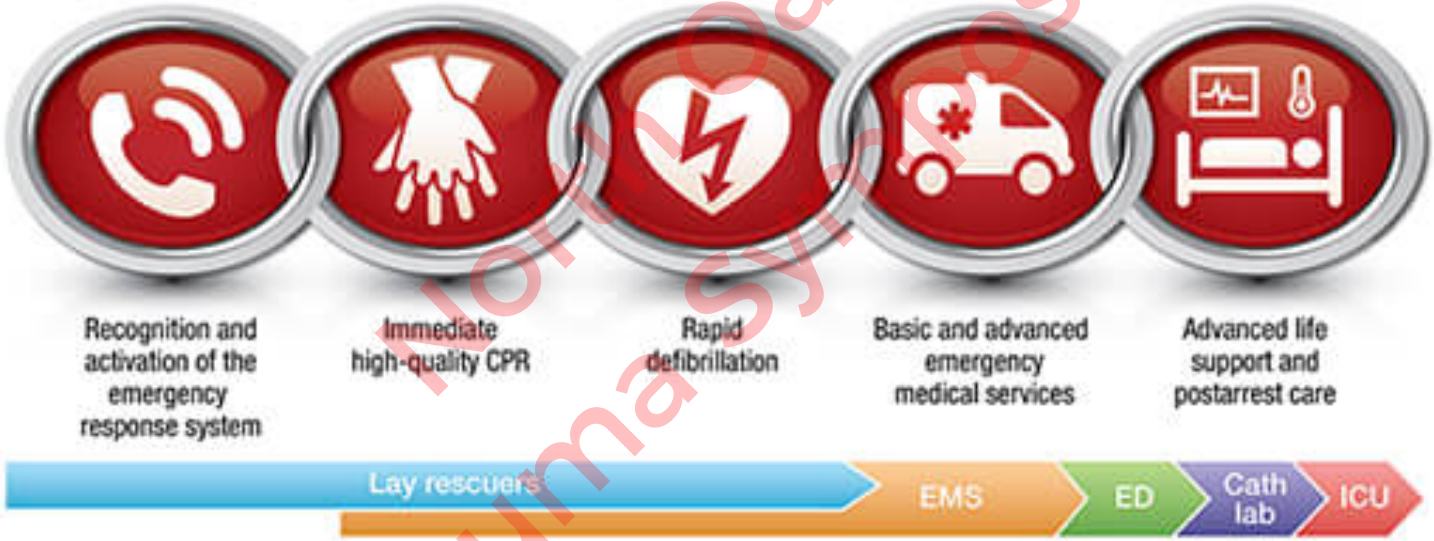
Chain of Survival



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Objectives!!!!

- Introduction to Fire Departments
- Emergency Medical Services
- PHTLS
- Prehospital Emergency Care
- Multicasuality Incidents

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Who Are Firefighters

Introduction

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Who are Firefighters

- Approximately 1,050,000 firefighters in the United States.
  - 70% of firefighters are volunteer.
- Approximately 29,800 fire departments
  - 85% of fire departments are all or mostly volunteer

National average and Louisiana average are nearly identical.

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Types of Departments

- Career Departments – 24 Hour Coverage
- Volunteer Departments – Likely not 24 hour manned
- Combination Departments – Some are 24 hour

Public and Private

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Standards

- Career and volunteer departments and firefighters are held to the same standards.
- Insurance is graded the same.
- Public has the same expectation when they call 911.

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Fire Service Mission

- The mission of the fire service is to save lives and to protect property and the environment from fires and other hazardous situations.
- Priorities:
  - Life Safety
  - Incident Stabilization
  - Property / Environmental Conservation

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Fire Service Services

- Community risk reduction
- Fire suppression
- Fire cause determination
- Emergency Medical Services (EMS)
- HAZMAT mitigation
- Airport / Seaport protection
- Emergency management services

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Technical Rescue Services

- Vehicle / Machine Extrication
- Confined Space Rescue
- Rope Rescue
- Trench Rescue
- Structural Collapse
- Water / Ice Rescue
- Wilderness Search and Rescue

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Multi-Vocational Responder

- Services we listed have individual specialties.
- Volunteer and small departments don't often have a lot of specialists.
- The public has the same expectation of response when they call 911 no matter where it is.

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Training

- Firefighters
  - 8 Hours of CPR
  - 60 Hours of EMR
  - 40 Hours of HAZMAT
  - 240 Hours of Firefighting
  - Continuing Education for FF is 180 Hours per year.

- Emergency Medical Services CEU's
  - EMR – 16 hrs, EMT - 40 hrs, Paramedic – 60 hrs

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Who are Your Firefighters

- Where do we come from?
- How many calls do we run?
- How to make the easy calls count?
  - On the job training.

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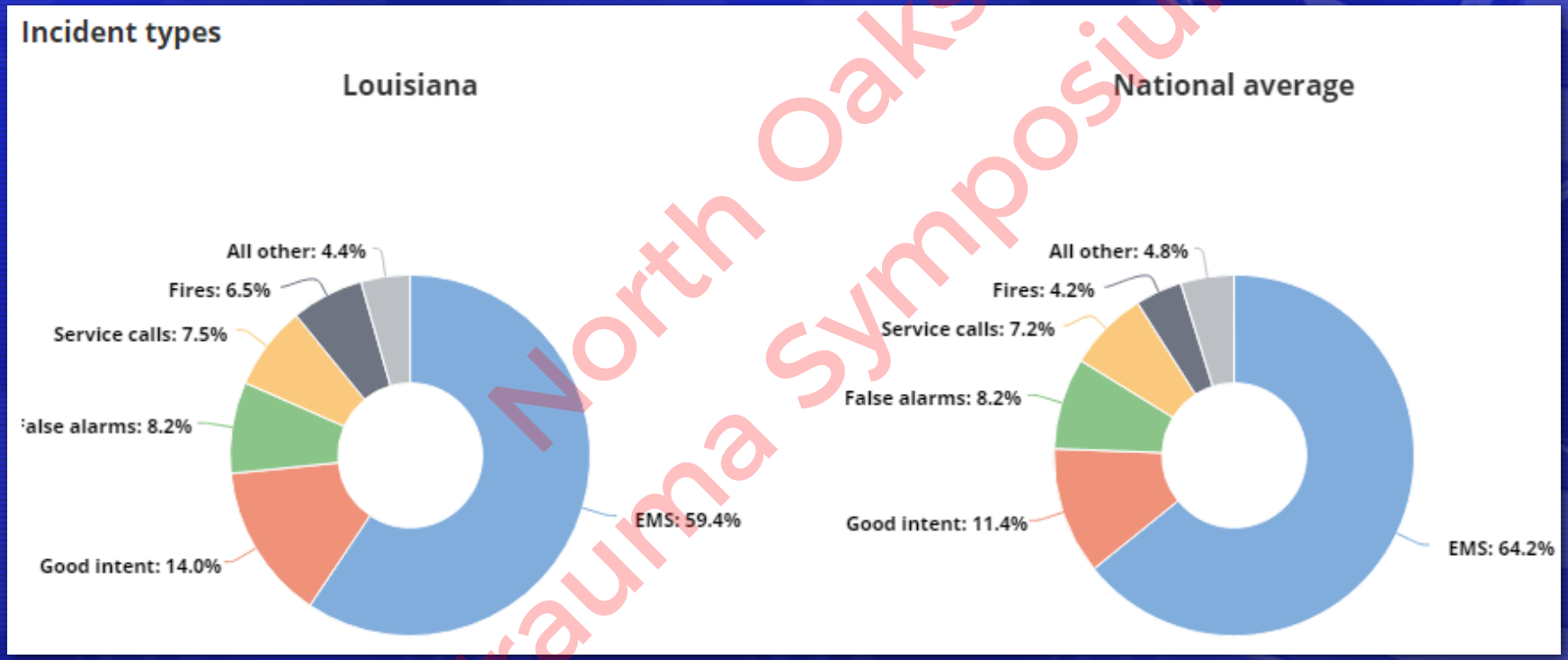
Incident Types



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Who is EMS

Prehospital Emergency Care

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Types of EMS

- Fire Department
- Municipal
- Hospital Based
- Law Enforcement
- Private

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Fire-Based EMS

- Strategically located.
- Of the 200 largest cities in the United States, 97% have fire-based EMS.
- Fire-based ALS services the 30 most populated U.S. jurisdictions (cities and counties).

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Levels of Care

Emergency Medical Responder (EMR)

- Formerly knows as First Responder
- Minimum of 48 hours of training
- Basic airway
- O_2 therapy
- Spinal stabilization
- Extremity injuries?????
- Bleeding control
- CPR / AED
- Limited PO meds
- Auto injectors
- IN Narcan

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Levels of Care

- **Emergency Medical Technician (EMT)**
  - Formerly EMT – Basic
  - Minimum of 120 hours of training
  - Provides care and transport
  - Nebulized bronchodilators
  - Seated spinal immobilization
  - Supraglottic airways
  - CPAP administration
  - Traction splints

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Levels of Care

- **Advanced EMT (AEMT)**
  - Formerly known as EMT-Intermediate
  - Minimum of 320 hours of training
  - Laryngoscopy for airway obstruction
  - IV, IO, and SUBQ medication
  - EKG interpretation
  - Manual defibrillation

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Levels of Care

- **Paramedic**
  - Minimum 1200 Hours
  - BiPAP adminstration
  - Endotracheal intubation
  - NG tube
  - Needle decompression
  - Needle/surgical cric
  - Ventilator
  - IV pump
  - EJ's and central lines
  - 12-lead EKG
  - Cardioversion
  - Pacing
  - Thoracotomy (tube, needle, finger)
  - Pericardiocentesis

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History of EMS

Development of Prehospital Emergency Care

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History of EMS

- Ancient Period
- Larrey Period
- Farrington Era
- Modern Era

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Ancient Period

- All medical care that was accomplished in Egypt, Greece ,Rome, and by the Israelites, up to the time of Napoleon.
- Most care was accomplished within some type of rudimentary medical facility. Little was performed prehospital.

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Knights of Malta

- Forerunners of the fire service.
- Took care of injured and sick travelers.
- Specifically burn victims from the Crusades and associated battles.
- Their order began as creators and care givers of a hospital in Jerusalem.
- Known as the Hospitallers of Jerusalem.

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Knights of Malta

- Knights became firefighters out of necessity.
- Conflicts often threatened the hospitals they established.

- Fire bombs

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Fire Bomb

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Fire Bomb

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Knights of Malta

- After rescuing a fellow knight and extinguishing the fire they were awarded a medal.

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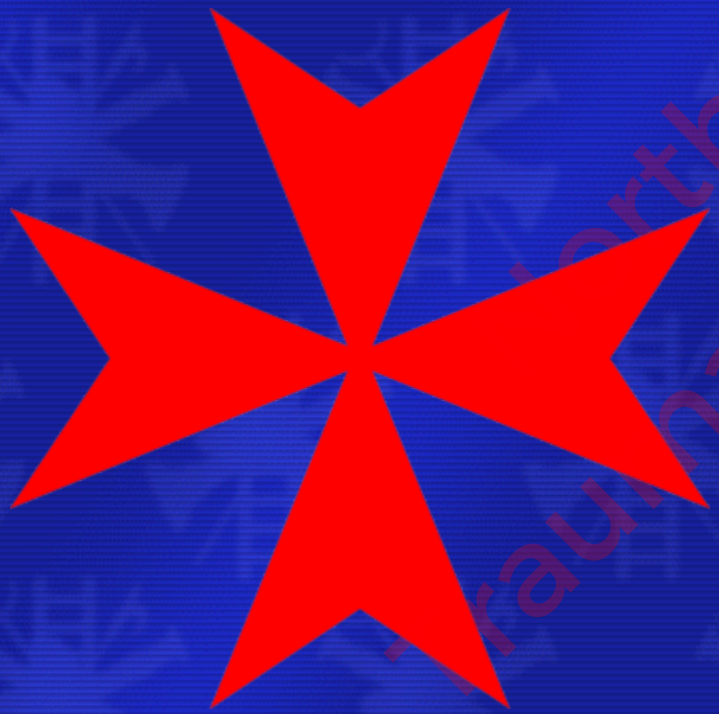
Identification

- Hospitallers needed an identifying mark to distinguish them in battle.



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Larrey Period

- Baron Dominique Jean Larrey, Napoleon's chief military physician recognized the need for prompt prehospital care.

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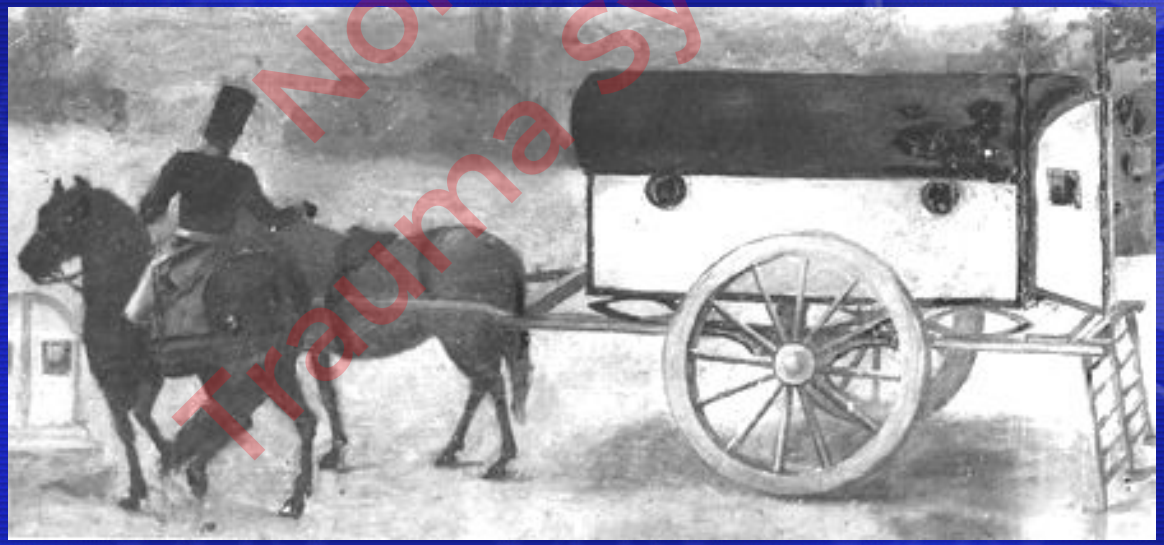
Flying Ambulance

- Dr. Larrey, developed a system of transportation of battle casualties.
- The “flying” ambulance.



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Flying Ambulance

- Napoleon's field hospitals were 1 league (about 3 miles) from the army and several hours from battle.
- During a retreat at one battle, Larrey marveled at how fast the “flying” horse drawn artillery could move from the battleground.

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Larrey Elements

- The “flying ambulance”.
- Proper training of medical personnel.
- Care and retrieval in the field of battle.
- Field control of hemorrhage.
- Transport to a nearby hospital.
- Provision of care en route.
- Development of frontline hospitals.

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History of EMS

- 1862
  - Dr. Jonathan Letterman, a medical director for the Union Army, introduced flying ambulances as part of the duties of the Quartermaster Corps.

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Private Ambulance Service

- 1865
  - Cincinnati General Hospital created to first private ambulance service.
  - Followed by Bellevue Hospital Ambulance in NY, Grady Hospital Ambulance Service in Atlanta, and Charity Hospital Ambulance Service in New Orleans.

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WWI First Aid

- In the trench warfare of WWI, the U.S. Army assigned nonphysicians for the treatment and on foot transport of casualties.
- Two enlisted men with first aid training were assigned to each company stationed along the French front line.

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City of Miami

- 1939
  - Miami Fire Rescue established the Rescue Division to give first aid to firefighters.
- 1941
  - The department's first rescue truck "Rescue One" used to treat citizens came online.
  - "Rescue One" services were limited to basic first aid with transportation usually performed by a funeral home.

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WWII First Aid

- WWII first aid men entered combat under exposed fire, becoming the corpsmen and combat medics in service today.

- port intro

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Helicopter Transport

- In Korea and Vietnam helicopter transport directly from the scene of injury to the hospital is introduced.

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Lessons Learned

- Mid 1950's
  - Physicians began to ask why lessons learned from emergency treatment and transport in military conflict could not be applied for civilian use.

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Farrington Era

- Approximately 1950-1970
- J.D. Farrington M.D. – Father of EMS
  - Stimulated the development of improved prehospital care with his landmark article, "Death in a Ditch."
  - 1957 – Taught the first prehospital training course to the Chicago FD.
  - Late 60's – Part of developing the standards for equipment on ambulances, the DOT curriculum, and the first EMT training program.

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End of the Farrington Era

- 1950’-1970’s
  - Veterans of combat and major emergencies began to influence the systematic approach public safety agencies used when working in hazardous or hostile environments.

- The “white paper”.

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“The White Paper”

- 1966
  - Lyndon B. Johnson received, “Accidental Death and Disability: The Neglected Disease of Modern Society” AKA “The White Paper”.
  - This identified accidental injuries as the “Leading cause of death in the first half of life span.”

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“The White Paper”

- “the White Paper” revealed that in 1965 alone, vehicle accidents killed more Americans than were lost in the Korean War.
- “if seriously wounded… chances of survival would be better in the zone of combat than on the average city street.”

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“The White Paper”

- “the White Paper” identified lack of regulation or standards for ambulance operations or provider training.
- Physicians became more involved in prehospital care.
  - A training program was developed for the Chicago Fire Department.
  - This developed into the EMT Ambulance course and the curriculum was published in 1970.

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Modern Era of EMS

- Approximately 1970 - present.

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Who you gonna call?

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Early Ambulance

- The funeral home was the ambulance provider in many communities in the United States and patient care did not begin until arrival at the hospital.

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First EMT's

- The American Academy of Orthopaedic Surgeons developed the first EMT program.
- This resulted in the 1971 publication of " Emergency Care of the Transportation of the Sick and Injured".

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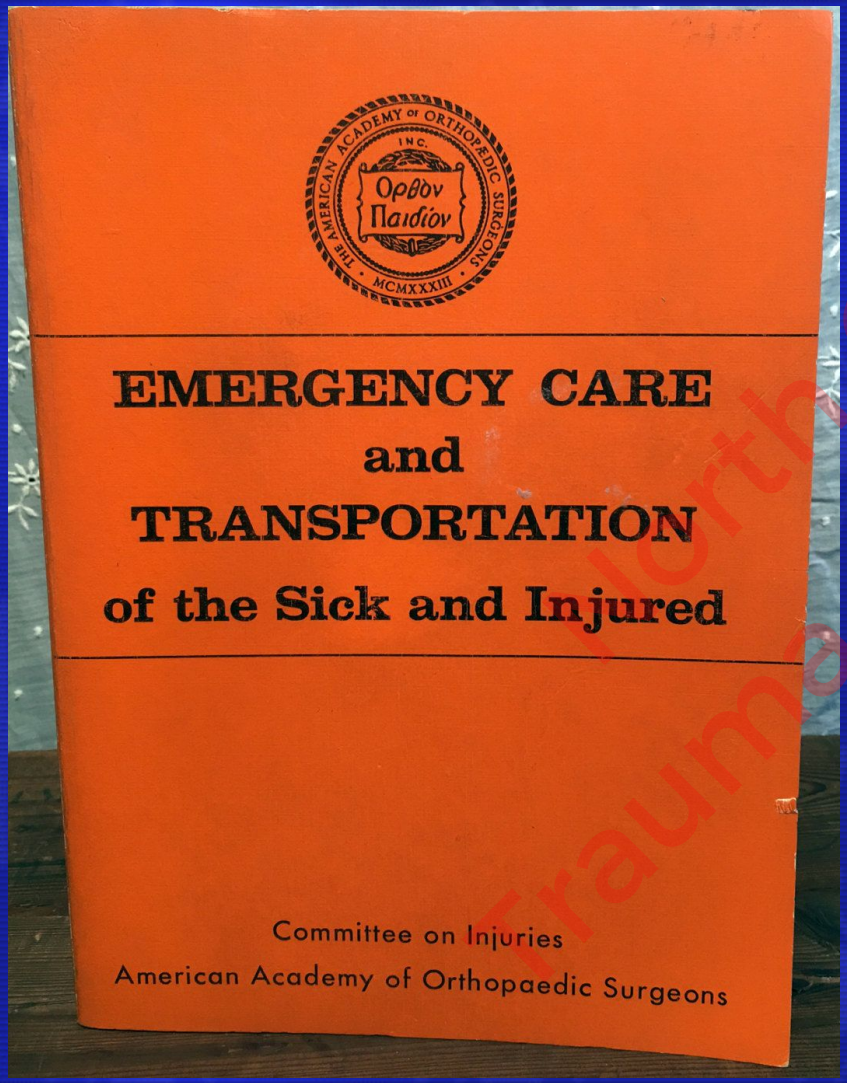
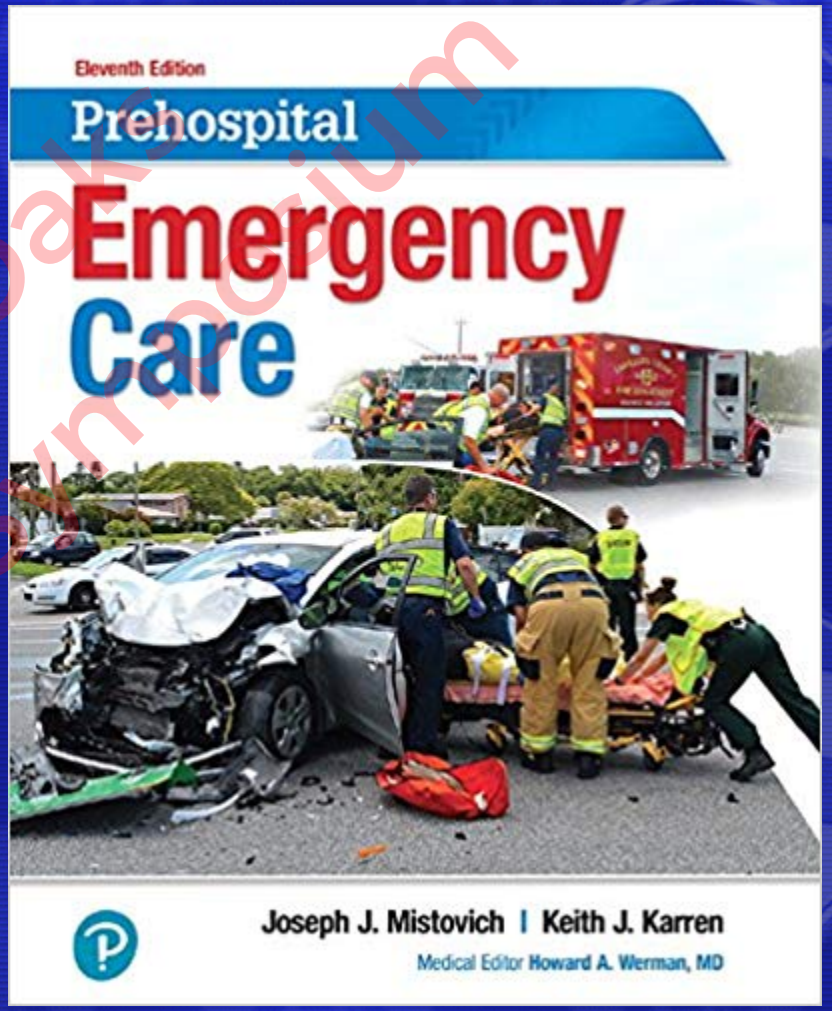
EMT Education





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Advanced Life Support

- Many believed more could be done in the out-of-hospital setting, including:
  - Advanced airway management
  - IV med administration
- This lead to the creation of the EMT-Paramedic.

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Early Paramedics

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Early Paramedics

- First Paramedic program included 400 hours of class and a 100 hour field internship.
- Prehospital advanced life support (ALS) gained favor in systems and communities.

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EMERGENCY!

- 1970's
  - The term "ambulance" no longer referred to a vehicle for transporting the sick and injured.
  - The TV series Emergency! Showed advances in prehospital care and life support.

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Lack of Mentors

- Initial paramedics did not have experienced staff to guide them.
- Emergency physicians as we know them today did not exist.
- 1972
  - University of Cincinnati established the first residency program to train physicians in emergency medicine.

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Results

- Patient outcomes drastically improve.
  - Spinal cord injuries change from predominantly complete lesion to predominantly incomplete lesion.
  - MI's change from the dying patients to a more routine medical call.

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Moving Forward

- Advancements continue in care and education.
- Offline medical direction.

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PHTLS

Prehospital Trauma Life Support

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History of PHTLS

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History of ATLS

- Advanced Trauma Life Support
  - 1976 Dr. Jim Styner, an orthopaedic surgeon, crashed his plane in rural Nebraska.
  - Wife was killed instantly, Dr. Styner sustained serious injuries, three children sustained critical injuries and one minor injuries.

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Inadequate Care

- The care they received was inadequate by the standards of the day.
- Dr. Styner, “When I can provide better care in the field with limited resources than what my children and I received at the primary care facility, there is something wrong with the system, and the system has to be changed.”

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First ATLS Course

- 1978 – The first ATLS course.
- ATLS has been taught in more than 80 countries and to more than 1 million doctors.
- ATLS has become the foundation of trauma care with a common language and common approach.

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History of PHTLS

- Dr. Norman E. McSwain knew that ATLS would have a profound effect on the outcome of trauma patients.
- He gained support from the National Association of EMT's to design a prehospital version of ATLS.

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PHTLS

- All EMS has benefited from PHTLS.

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History of PHTLS

- 1984 – The first national faculty ALS course is held at Tulane.
- 1986 – The first BLS course is developed.
- 1988 – The U.S. Military sets out to train all combat medics in PHTLS.
- 2010 – First TCCC Course for DOD.

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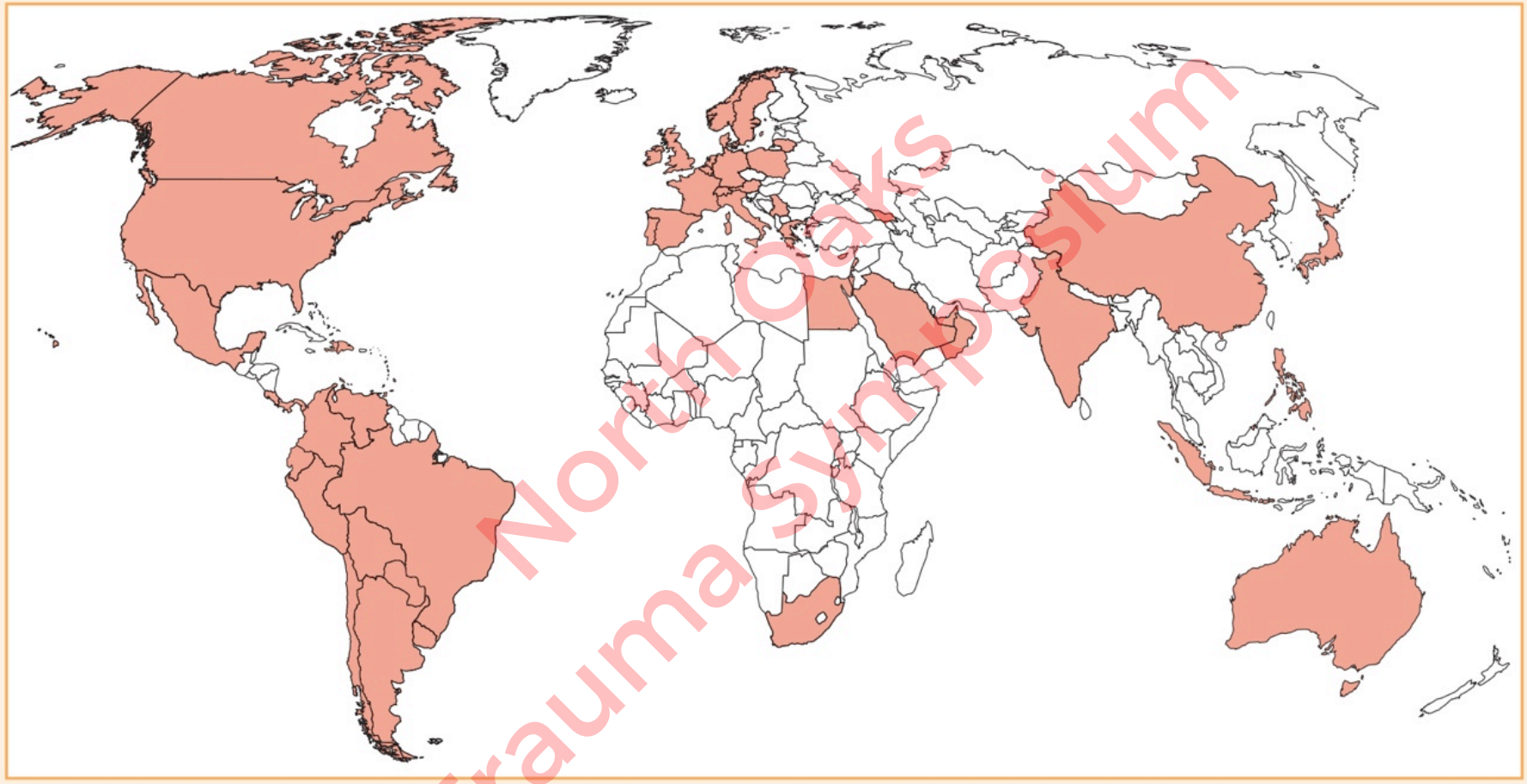
PHTLS Around the World



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Mission of PHTLS

- *To promote excellence in trauma patient management by all providers involved in the delivery of prehospital care.*
- Philosophy stresses the treatment of the multi-system trauma patient.

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PHTLS Goals

- Reduce mortality and morbidity from trauma
- Provide knowledge and skills for all prehospital trauma team members
- Deliver appropriate care to the trauma patient in the field in a timely fashion

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PHTLS Philosophy

- Trauma care should be based on research
- Interventions are based on the assessment of each trauma patient
- Deliver the trauma patient:
  - With the appropriate interventions
  - To the right facility
  - Utilizing the right mode of transport
  - In the right amount of time
  - As safely as possible

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PHTLS Philosophy

- Research provides us with the foundation for the best practices for trauma care
  - Research may:
    - Validate our current practices
    - Refute our current practices
    - Determine future practices
- Updated every 4 years as supported by new research

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PHTLS Course

- Teaches the *principles* of care rather than focusing on *preferences*

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Preferences and Principles

- JFK
  - “The great enemy of truth is very often not the lie--deliberate, contrived and dishonest--but the myth--persistent, persuasive and unrealistic. Too often we hold fast to the clichés of our forebears. We subject all facts to a prefabricated set of interpretations. We enjoy the comfort of opinion without the discomfort of thought. “

Trauma Symposium

Tactical Medicine

- Global War on Terror
  - Further defined and validated guidelines for TCCC(Tactical Combat Casualty Care)
    - Tourniquets
    - Hemostatic agents
    - Needle chest decompression
- Causes of combat fatalities
  - #1 Exsanguination
  - #2 Pneumothorax

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Tourniquets

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Hemostatic Agents

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Needle Chest Decompression

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PHTLS Course

- Builds upon each participant's current knowledge base and skills to enhance *critical thinking* and *problem-solving* abilities
- Stresses *teamwork* between providers with diverse levels of knowledge, skills, and resources
- Provides a structured environment to practice trauma assessment and treatment skills

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Curriculum

- Curriculum concentrates on:
  - Physiology of life and death
  - Scene Assessment
  - Patient Assessment
  - Airway
  - Breathing, Ventilation and Oxygenation
  - Circulation, Hemorrhage and Shock

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Team Approach

- A diverse team must work together in order to provide trauma patients with the best chance for a favorable outcome

© Dan Myers

Trauma Symposium North Dakota

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Team Approach

- This team includes:
  - Citizens, dispatch
    - System activation
  - Emergency medical responders
  - EMS
  - Transport services
  - Emergency department
  - Surgery
  - Other specialty services
  - Rehabilitation

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Communication and *Documentation*

- Clear, concise, accurate, and complete communication between the prehospital care provider and the receiving hospital facilitates optimal care.

Courtesy of Anthony Caliguire, NREMT-P.

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Impact of Trauma

Phases of Trauma

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Impact of Trauma

- Worldwide 14,000 will die daily as result of injury.
- Unintentional Trauma is the leading cause of death between ages 1-45. (9% of deaths)

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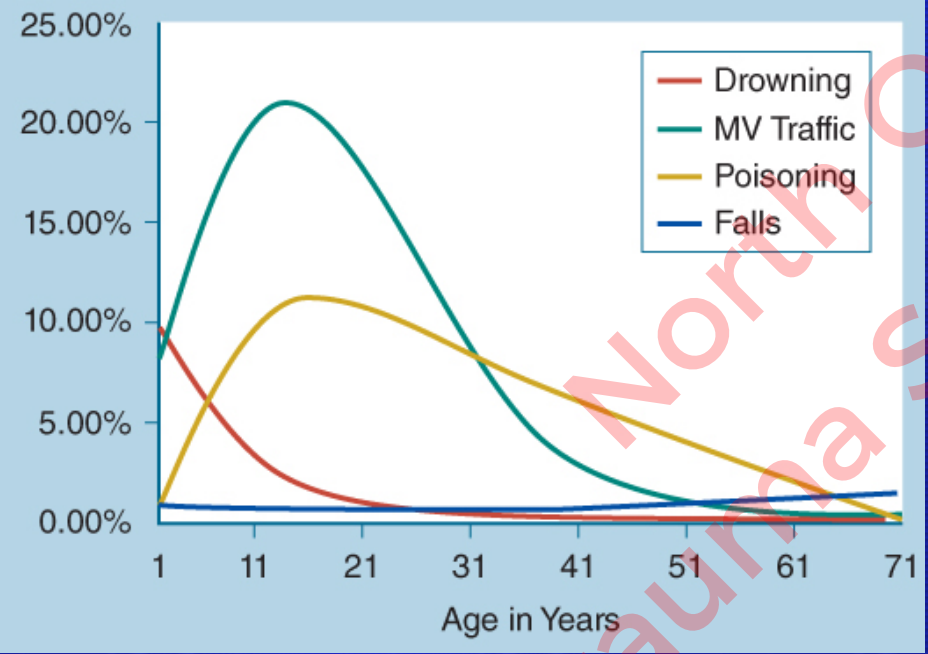
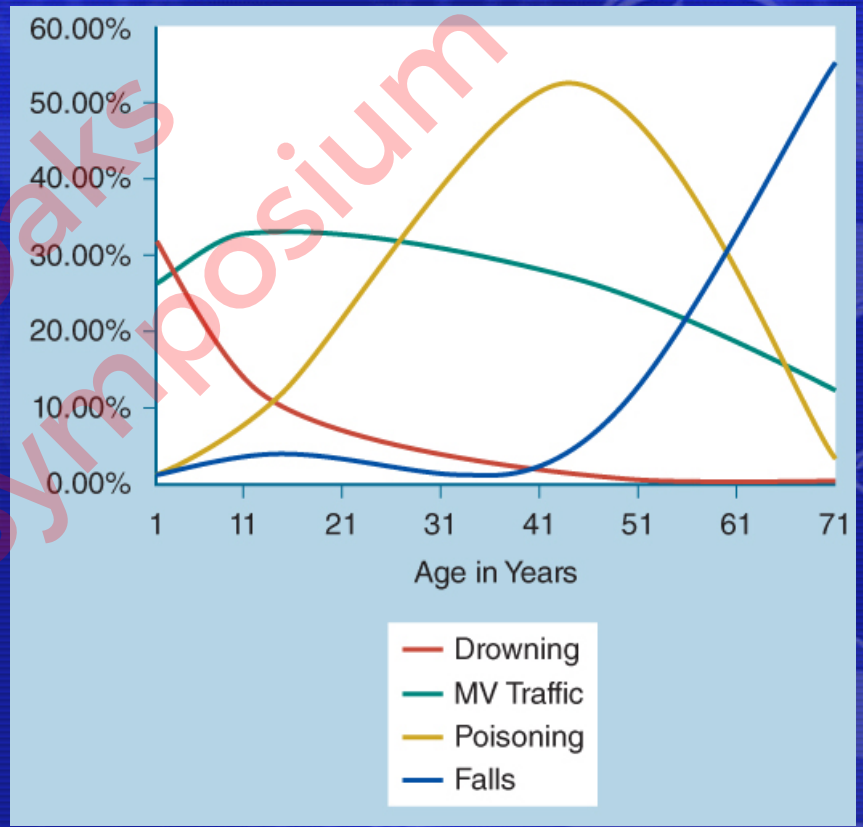
Societal Impacts of Trauma



Data from the National Center for Injury Prevention and Control: WISQARS. Leading Causes of Death Reports 1981-2015. Centers for Disease Control and Prevention. https://webappa.cdc.gov/sasweb/ncipc/leadcause.html."



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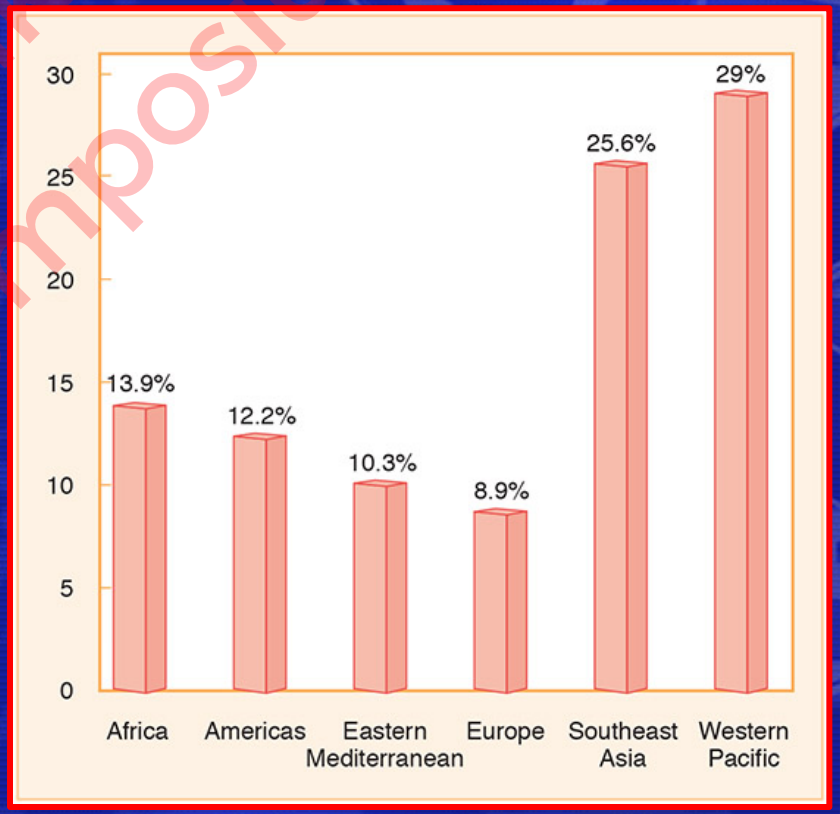
Trauma Overview

- Worldwide, more than 5.8 million people die from trauma annually
  - Motor vehicle-related injuries are the leading cause of trauma deaths
  - Ninety percent of the trauma deaths occur in low- and middle-income countries



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Trauma Overview

- In the United States, annually:
  - 60 million injuries
  - 40 million emergency department visits
  - 2.5 million hospitalized
  - 9 million disabled
    - 8.7 million — temporarily
    - 300,000 — permanently

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Trauma Overview

- In the United States, more than 179,000 people die from trauma annually
  - It is the leading cause of death in persons between 1 and 44 years of age
    - 80% of teenage deaths
    - 60% of childhood deaths

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Phases of Trauma Care

- Pre-event phase

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Prevention

- Trauma is preventable
- Prevention training is available for everyone
- PHTLS faculty and providers should be advocates for and active participants in trauma prevention programs
- Prehospital care providers are the “eyes” of the prevention effort

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Prevention

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Phases of Trauma Care

- Event phase

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Phases of Trauma Care

- Postevent phase

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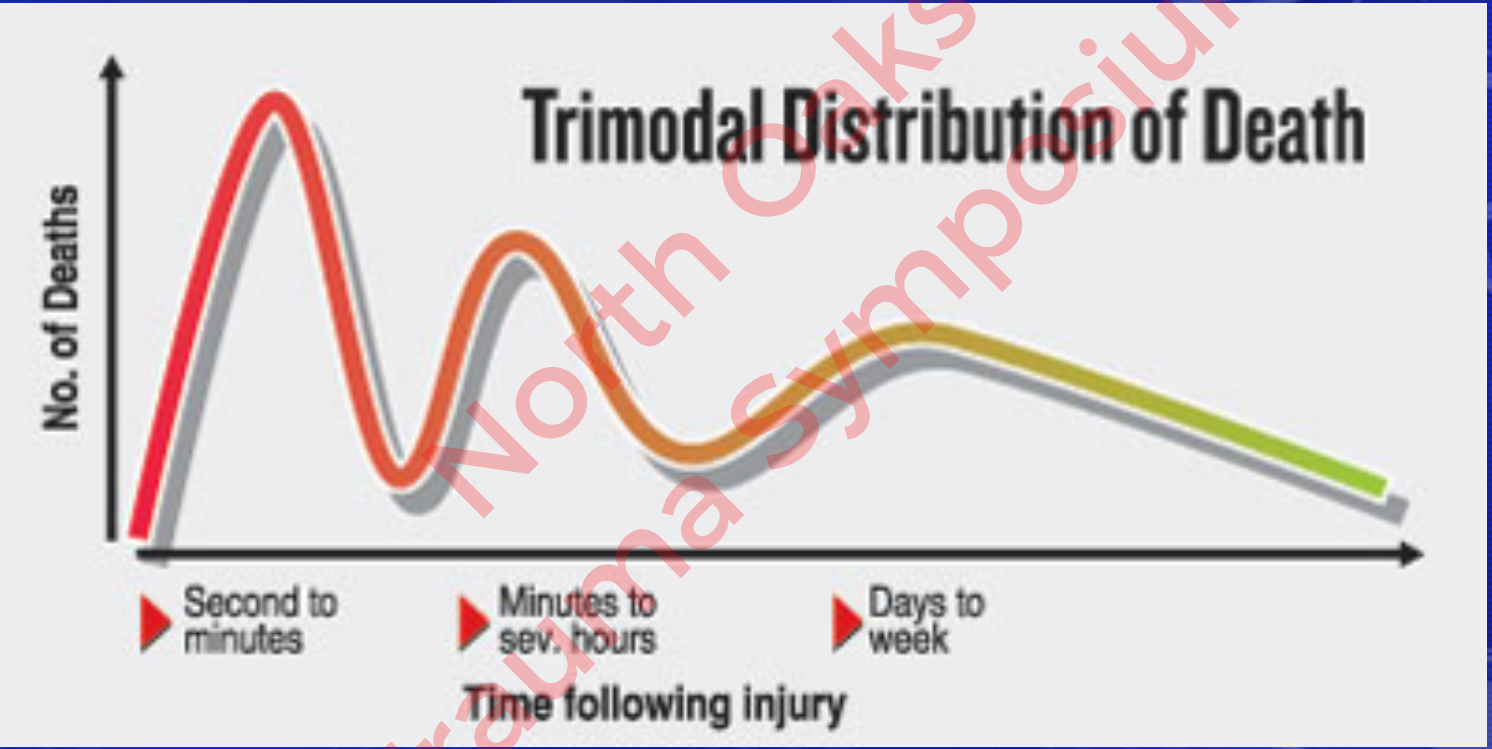
Trimodal Distribution



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Prehospital Trauma Care

PHTLS

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Trauma Care

- Principle is *what* needs to be done for a patient based upon the assessment
- Preference is *how* the principle is accomplished
  - This will change depending on the:
    - Situation at the scene
    - Severity of the patient
    - Knowledge and skills of the prehospital care provider
    - Resources available

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Trauma Care

- Based on assessment
  - Begins long before you reach the patient
    - Information provided from the call for help
  - Scene and situation
    - Safe
    - Available resources
    - Number of patients

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Trauma Care

- Mechanism of injury (kinematics)
- Patient
  - Primary assessment
  - Secondary assessment
  - Reassessment

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Patient Assessment

- Primary assessment
  - X-A-B-C-D-E approach
  - Taught sequentially, performed "simultaneously"
  - Assess for and correct immediate threats to life
- Secondary assessment
  - "Head-to-toe" assessment
  - Assess for all other injuries — usually non-life-threatening
  - Includes measurement of vital signs

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Patient Assessment

- Reassessment
  - Important to look for changes in the patient's condition
    - Response to treatment
  - Ongoing to determine any apparent change in patient status

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Critical Trauma Patient

- Primary assessment
  - Treat at the scene versus treat while en route
  - Knowing *when to do* something is important; knowing *when not to do* something is even more important
  - Reassessment
- Secondary assessment
  - Only when time and situation allow

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Critical Trauma Patient

- Transport
  - Ground versus air
  - Mode of transport
    - Emergent versus non-emergent
  - Appropriate destination

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Golden Period

- Often referred to as “The Golden Hour”
- Prehospital care provider responsibilities
  - Spend as little time on scene as possible.
  - Expedite field care and transport patient to definitive care.

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Potential Pitfalls of Assessment and Management

- Not establishing a safe scene
- Overlooking life threats by not adequately assessing or exposing the patient
- Focusing on distracting, non-life-threatening injuries
- Overlooking signs of deterioration in a patient who initially appeared noncritical

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Potential Pitfalls of Assessment and Management

- Performing “advanced” interventions before “basic” procedures
- Performing a secondary assessment prior to stabilizing all life threats
- Not performing a secondary assessment when appropriate
- Prolonged scene times

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Multicasuality Incident

MCI and Triage

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History of NIMS and ICS

- The Incident Command System (ICS) was formed in 1968 in a meeting of Fire Chiefs in southern California.
- The management hierarchy was modeled after the U.S. Military.
- ICS became the national model for command structures at fire, crime scenes and major incidents.

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History of NIMS and ICS

- In 2004 Homeland Security called for a standardized approach to incident management amongst all federal, state, and local agencies.
- The National Incident Management System was developed which incorporates ICS.

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Everyday MCI for Firefighters

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History of START Triage

- Dr. Larrey initiated and coined triage.
- Simple Triage and Rapid Treatment
  - Created by Hoag Hospital and Newport Beach Fire Department in the 1980's.

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START Triage

- S – Simple
- T – Triage
- A – And
- R – Rapid
- T – Treatment

- Assess RPMs – Respirations, Perfusion, Mental Status
- Immediate/delayed transport depends on assessment findings

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START Triage

Assess, *Treat*, (*use bystanders*)

When you have a color

STOP - TAG - MOVE ON

MINOR

-- ***Move Walking Wounded***

DECEASED

-- No RESPIRATIONS after *head tilt*

IMMEDIATE

-- **Breathing** but UNCONSCIOUS

-- **Respirations** - over 30

-- **Perfusion** Capillary refill > 2
or NO RADIAL PULSE
Control bleeding

-- **Mental Status** Unable to follow simple commands

DELAYED

-- Otherwise

REMEMBER:

Respirations - 30
Perfusion - 2
Mental Status - Can Do

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No. 239352 **TRIAGE TAG** No. 239352

PART I

No. 239352

CALIFORNIA FIRE CHIEFS ASSOCIATION©

Leave the correct Triage Category ON the end of the Triage Tag

Move the Walking Wounded	MINOR
No respirations after head tilt	DECEASED
☐ Respirations - Over 30	IMMEDIATE
☐ Perfusion - Capillary refill Over 2 seconds	IMMEDIATE
☐ Mental Status - Unable to follow simple commands	IMMEDIATE
Otherwise-	DELAYED

MAJOR INJURIES: _____

HOSPITAL DESTINATION:

ORIENTED X ☐ DISORIENTED ☐ UNCONSCIOUS ☐

TIME	PULSE	B/P	RESPIRATION

DECEASED

IMMEDIATE No. 239352

DELAYED No. 239352

MINOR No. 239352

TRIAGE TAG

PART II

MEDICAL COMPLAINTS/HISTORY

ALLERGIES:

PATIENT Rx:

TIME	DRUG SOLUTION			DOSE
	D_5W	R/L	NS	

NOTES:

PERSONAL INFORMATION

NAME:

ADDRESS:

CITY: TEL. NO.:

MALE ☐ FEMALE ☐ AGE: WEIGHT:

DECEASED

IMMEDIATE

DELAYED

MINOR

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START Triage

- Goal: afford greatest number of people greatest chance of survival
- Prioritizing patients
  - Priority 1: Treatable life-threatening illness or injury
  - Priority 2: Serious but not life-threatening illness or injury
  - Priority 3: Walking wounded
  - Priority 4: (sometimes called Priority 0) Dead or fatally injured

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Jump START Pediatric Triage

Pediatric MCI Triage Tool

- 1st – triage patients who do not walk independently (based on age)
- Assess during triage:
  - R – Respirations
  - P – Perfusion
  - M – Mental Status
- Determine immediate or delayed transport based on assessment findings

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WRAPPING IT UP

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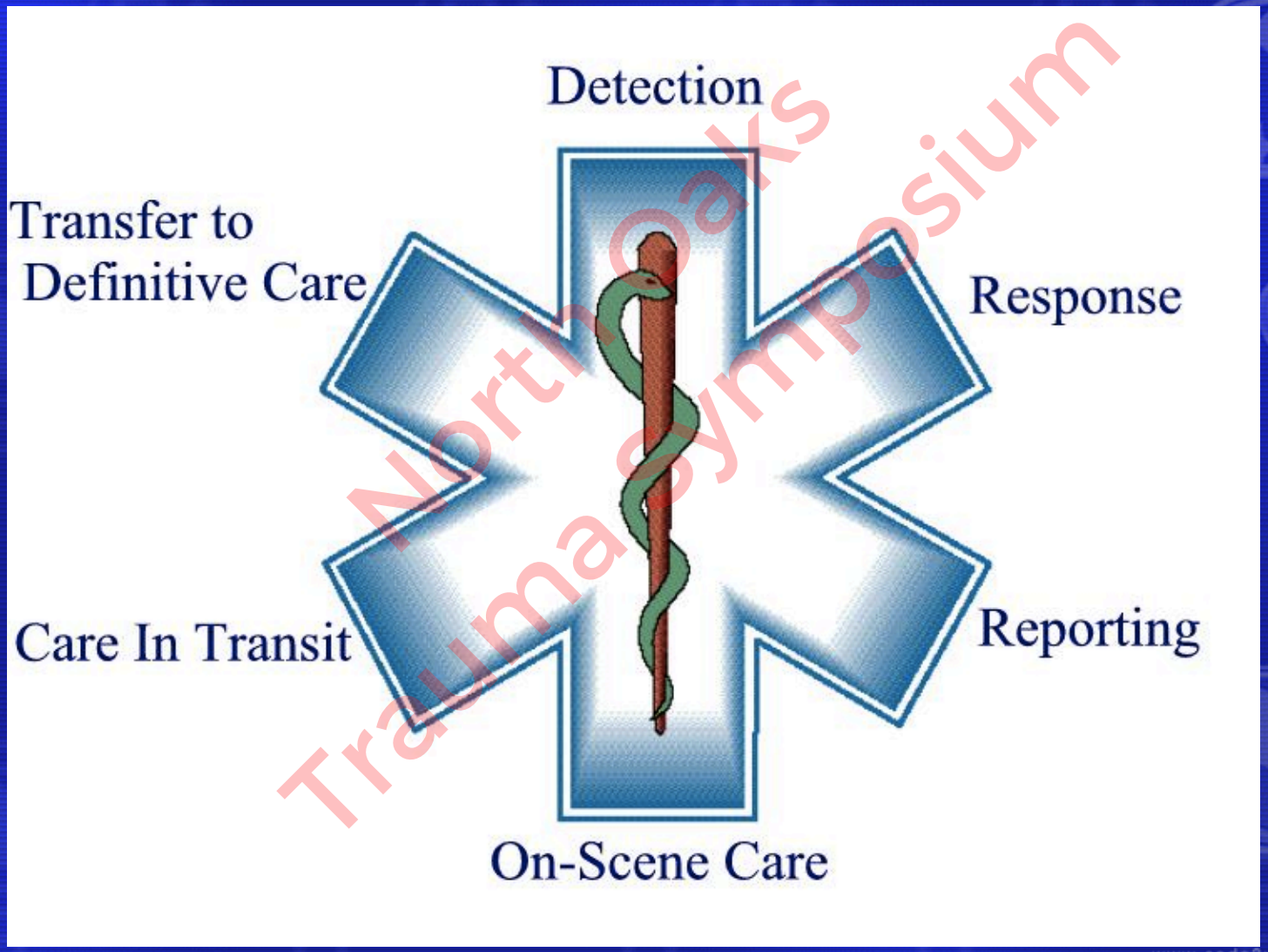
THANK YOU!!



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