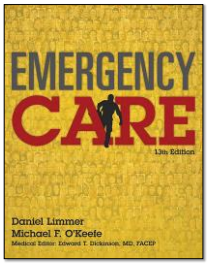
Emergency Care

THIRTEENTH EDITION



CHAPTER 39

EMS Response to Terrorism

Defining Terrorism

The bombing of the Boston Marathon in 2013 was perpetrated by two young men who may have become radicalized partly via the Internet.

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Defining Terrorism

- "The unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population or any segments thereof, in furtherance of political or social objectives"—The U.S. Department of Justice, Federal Bureau of Investigation

Domestic Terrorism

- Groups or individuals whose terrorist activities are directed at a government or population, without foreign direction
  - Environmental terrorists
  - Antigovernment militias
  - Racial-hate groups
  - Groups with extreme political, religious, or other philosophies or beliefs

International Terrorism

- Groups outside the targeted country or whose activities cross national borders.
- Growing trend toward loosely organized, international networks of terrorists

Types of Terrorism Incidents

- Incidents of terrorism may involve CBRNE agents.
  - Chemical
  - Biological
  - Radiological
  - Nuclear
  - Explosive
- Also called weapons of mass destruction (WMD)

Terrorism and EMS

The Twin Towers of the World Trade Center in New York City were destroyed and thousands were killed on September 11, 2001, when terrorists flew hijacked jetliners into the famous skyscrapers. © *AP Images/Shawn Baldwin*

Emergency Medical Responders as Targets

- Emergency Medical Responders are often principal targets of terrorist attacks.
- Safety of EMS provider is most important consideration when responding to potential terrorist incident.

Identify the Threat Posed by Event

- Incident that is a potential act of terrorism is also a crime scene.
- Recognizing OTTO signs may help protect against secondary attack.
  - Occupancy or location
  - Type of event
  - Timing of event
  - On-scene warning signs

Occupancy or Location

- Symbolic or historic targets
- Public buildings or assembly areas
- Controversial businesses
- Infrastructure systems

Type of Event

- Explosions and/or incendiaries
- Incidents involving firearms
- Nontrauma mass-casualty incidents

Timing of Event

- National holidays
- Anniversary dates of previous attacks
  - April 19 (Waco, TX & Oklahoma City)
- Incidents occurring in major public areas at busy points of business day

On-Scene Warning Signs

- Unexplained patterns of illness or death
- Unexplained signs and symptoms or skin, eye, or airway irritation
- Containers that appear out of place

Recognize the Harms Posed by the Threat

- TRACEM-P harms
  - Thermal – extreme heat
  - Radiological – alpha, beta, gamma rays
  - Asphyxiation – lack of O2 in the air
  - Chemical – toxic or corrosive materials
  - Etiological - disease
  - Mechanical – physical trauma (gunshot)
  - Psychological – fear or results from attack

Think About It

- How can I tell if I am responding to a terrorist incident?

Time/Distance/Shielding

Time/Distance/Shielding

- Time
  - Minimize time in dangerous area or exposed to hazardous material, biological agent, or radiation.
  - Execute rapid entries to perform reconnaissance or rescue.

Time/Distance/Shielding

- Distance
  - Maximize distance from hazard area or projected hazard area.
  - Follow recommended guidelines regarding hazardous materials in *Emergency Response Guidebook*.

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Time/Distance/Shielding

- Shielding
  - Use appropriate shielding for specific hazards.
    - Vehicles, buildings, fire-protection clothing, hazmat suits, positive-pressure self-contained breathing apparatus, PPE
  - Vaccinations against specific diseases

Responses to Terrorism

Responses to a Chemical Incident

- Includes many classes of hazardous materials
  - Can be inhaled, ingested, absorbed, injected
  - Can include industrial chemical or warfare-type agents

Types of Harm from Chemical Incidents

- Thermal harm
  - Reactions create heat
- Asphyxiation harm
  - Reactions deplete oxygen
- Chemical harm
  - Systemic effects
- Mechanical harm
  - Corrosive chemicals weaken structures
- Psychological harm
  - Emotional traumatic impact

Self-Protection Measures at a Chemical Incident

- Respiratory protection
- Protective clothing
- Be aware of possible contamination from patients.

Responses to a Biological Incident

- Presents as focused emergency or public health emergency
  - Focused emergency
    - Potential or actual point of origin located
    - Prevent or minimize damage and spread
  - Public health emergency
    - Sudden demand upon public health infrastructure with no apparent explanation

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Responses to a Biological Incident

- Causative agents
  - Bacteria (anthrax)
  - Viruses (grow inside living cells)
  - Toxins (ricin)

Critical Information about Biological Incidents

- What is an exposure?
  - Dose or the concentration of the agent multiplied by time
    - Chemical doses – mg/kg
    - Concentration – parts per million

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Critical Information about Biological Incidents

- Four major routes of entry
  - Absorption
    - Skin contact
  - Ingestion
    - By mouth
  - Injection
    - From needles or projectiles
  - Inhalation
    - By breathing

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Critical Information about Biological Incidents

- What is contamination?
  - Substance clings to surface areas of body or clothing.
  - Things that can be contaminated
    - Hard and soft surfaces
    - Skin and hair
    - Clothing

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Critical Information about Biological Incidents

- Exposure versus contamination
  - Exposure occurs when a substance is taken into the body through one of the routes of exposure.
  - Permeation
    - Spreading or movement of a substance through a surface or, on a molecular level, through intact materials.
  - Remove clothing but preserve dignity.

Types of Harm from Biological Incidents

- Chemical harm
  - Scene of clandestine laboratory
- Etiological harm
  - Agents classified as poisons
- Mechanical harm
  - Explosives used to disperse agents
- Psychological harm
  - Even the thought can cause distress.

Self-Protection Measures at a Biological Incident

- PPE and respiratory protection
- Get as much information as possible.
- Prioritize protective measures.
  - Self-protection
  - Buddy system
  - Availability of Rapid Intervention Teams
  - Civilian protection

Responses to a Radiological/Nuclear Incident

- Small nuclear devices ("suitcase bombs") stockpiled in foreign nations
- Radiologic dispersion more practical and difficult to detect as radiation symptoms are delayed for hours or days
  - Sickness treatable if detected early

Types of Harm from Radiological/Nuclear Incidents

- Thermal harm
  - Nuclear explosion
- Radiological harm
  - Radiological materials – ongoing hazard
  - Children, pregnant women, elderly
  - Nausea, vomiting, diarrhea
- Chemical harm
  - Radiological substances are also chemical hazards

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Types of Harm from Radiological/Nuclear Incidents

- Mechanical harm
  - Nuclear explosion
- Psychological harm
  - Immediate or delayed reaction

Self-Protection Measures at a Radiological/Nuclear Incident

- Time, distance, shielding
- Radiologic detecting equipment helps determine effectiveness of measures.
- Assume dissemination of radiological, biological, or chemical materials.
- Follow decontamination procedures.

Responses to an Explosive Incident

- Wide variety of devices from small pipe bombs to large vehicle bombs
- May involve attacks on a fixed target or group of people
- May be designed to disperse biological, chemical, or radiological materials

Types of Harm from Explosive Incidents

- Thermal harm - heat
- Asphyxiation harm – dusty conditions
- Chemical harm – explosive reaction
- Mechanical harm – blast overpressure, shock, waves, fragmentation
- Psychological – delayed "freeze" reaction

Dissemination and Weaponization

Respiratory Route

- Most effective, most common means
- Vast and delicate surface area
- Various levels, sizes of passageways into lungs

Other Routes

- Ingestion route
- Dermal route
- Human-to-human contact

Weaponization

- Most effective when targeted through inhalation route
- Particles in 3 to 5 microns in diameter
- Such airborne dissemination can be created by applying energy to material.
- Heat, explosives, and sprayers can aerosolize materials.

Characteristics of CBRNE Agents

Chemical Agents

- Chemical agent considerations
  - Physical
    - Can be gaseous, liquid, or solid
    - Vapor pressures and densities can vary across the spectrum.
  - Volatility
    - Low boiling point and high vapor pressure will evaporate more readily.
    - Allows agent to have greater airborne release potential

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Chemical Agents

- Chemical agent considerations
  - Chemical
    - Sufficiently stable to survive dissemination and transport to site of action
  - Toxicological
    - Not all individuals of a species react in the same way.
    - Route of entry can also influence.

Chemical Agents

Some emergency and rescue services carry detectors to help identify the presence of various CBRNE agents. Examples include this chemical agent monitor.

Chemical Agents

- Classifications of chemical agents
  - Choking agents
    - Predominately respiratory
  - Vesicating (blister) agents
    - Cause chemical changes in cells of exposed tissue
  - Cyanides
    - Prevent use of oxygen within cells

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Classification of Chemical Agents

- Nerve agents
  - Inhibit enzyme critical to proper nerve transmission, causing out of control parasympathetic nervous system
  - Signs and symptoms - SLUDGEM
    - Salivation
    - Lacrimation
    - Urination
    - Defecation
    - GI Upset
    - Emesis
    - Miosis

Biological Agents

- Microorganisms or toxins that can cause disease processes
  - Bacteria
    - Small, free-living microorganism
  - Viruses
    - Requires a host cell inside which to live
  - Toxins
    - Poisonous chemical compound that is produced by or derived from a living organism

Biological Agent Considerations

- Features of biological agents that influence their use as weapons
  - Infectivity
  - Virulence
  - Toxicity
  - Incubation period
  - Transmissibility
  - Lethality
  - Stability

Bacteria

- Like human body cells, they have an internal cytoplasm surrounded by a rigid cell wall; unlike human body cells, they lack an organized nucleus and other intracellular structures.
- Anthrax
- Plague
- Q fever
- Tularemia

Toxins

- Chemical compounds produced by living organisms
- Not volatile and do not replicate
  - Botulinum - deadliest
  - Ricin – altering RNA for proper proteins
  - Staphylococcal Enterotoxin B (SEB) – GI tract, food poisoning
  - Trichothecene Mycotoxins (T2) – molds, through the skin

Viruses

- Simplest microorganisms
- Obligatory intracellular parasites
  - Replicate only inside host cells
- Not easy to manufacture viruses in large quantities
- Smallpox
- Encephalitis
- The Viral Hemorrhagic Fevers (VHFs)

Radioactive/Nuclear Devices

- Potential scenarios
  - Military nuclear devices
  - Improvised nuclear devices
  - Radiological dispersal device (RDD) or "dirty bomb"
  - Sabotage

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Radioactive/Nuclear Devices

- Effects of radiation
  - Blood Forming System - Bone marrow
  - Gastrointestinal system
  - Central nervous system

Incendiary Devices

- Use more plausible than the use of nuclear devices
- Not hard to obtain or initiate items
- Specialized teams generally available to deal with incendiary devices

Blast Injury Patterns

- Lung injury
  - Bradycardia, apnea, and hypotension from blast wave
- Ear injury
  - Rupture of tympanic membrane

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Blast Injury Patterns

- Abdominal injury
  - Rupture of gas-containing section of intestine
- Brain injury
  - Concussion or mild traumatic brain injury (MTBI) from blast wave

Treatment for Blast Injuries

- No different from the treatment for patients of any other thermal or blast injury
- Follow local protocol.

Strategy and Tactics

Strategy and Tactics

- The DOT *Emergency Response Guidebook* provides information for the common terrorist weapons.
- Strategies
  - Broad general plans designed to achieve desired outcomes
- Tactics
  - Specific operational actions responders take to accomplish assigned tasks

Isolation

- Initial considerations
  - Controlling scene, isolating hazards, and attempting to conduct controlled evacuation is resource-intensive and requires law enforcement personnel.
- Establishing perimeter control
  - Law enforcement must establish and control perimeter throughout incident.

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Isolation

- Perimeter control factors
  - Amount and type of resources on hand
  - Capability of available resources
  - Ability of resources to self-protect
  - Size, configuration of incident

Notification

- Generally required by established directives, procedures, and statutes
- Request for additional specialized agencies carried out by communications center based upon early reports of EMTs on scene

Identification

- Observe indicators of particular agent or presence of chemical containers or lab materials
- Consult current edition of *Emergency Response Guidebook*

Protection

- People, vehicles, equipment/supplies
- Scene size-up, determine threats
- Establish vehicle staging and triage/treatment zones in protected areas
- Advise EMS Command about protection/security concerns.
- Immediately report suspicious people or activities.

Decontamination

- Gross decontamination by EMS personnel
  - Removing surface contamination via mechanical means and initial rinsing
  - Amount of surface contamination significantly reduced

Self-Protection at a Terrorist Incident

Protect Yourself First

- Scene size-up and situational awareness
  - Patients displaying signs of hazardous substance exposure?
  - Unconscious patients?
  - Patients exhibiting SLUDGEM signs?
  - Blistering, reddening of skin, discoloration or skin irritation?
  - Patients having difficulty breathing?

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Protect Yourself First

- Consider if there is evidence of the following:
  - Medical mass casualties or fatalities with minimal or no trauma
  - Responder casualties
  - Dead animals and vegetation
  - Unusual odors, color of smoke, vapor clouds

How to Protect Yourself

- Recognize a Possible Terrorist Event
  - Occupancy or location
  - Type of event
  - Timing
  - On-scene clues

How to Protect Yourself

- Don't rush in!
  - Wait until appropriate authority says scene is safe.
  - Follow Incident Command protocols.
  - Wear appropriate PPE.
  - Beware of possible secondary explosive devices or booby traps.
  - Search all patients for explosives or weapons.

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How to Protect Yourself

- Understand the TRACEM-P harms
- Time, distance, shielding
- At a chemical incident
  - Chemical harm primary
- At a biological incident
  - Etiological harm primary

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How to Protect Yourself

- At a radiological/nuclear incident
  - Radiological harm primary
- At an explosive incident
  - Thermal and mechanical harms primary

Protect Yourself

A specialized truck contains equipment for handling explosives.

Chapter Review

Chapter Review

- There have been terrorist attacks throughout history. However, since the events of September 11, 2001, the modern world has been a different place because of the threat of terrorism.

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Chapter Review

- There are many different types of agents and weapons that can be used by terrorists. CBRNE is used to remember the different types. TRACEM-P is used to remember the types of hazards posed by these agents.

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Chapter Review

- You must be sure to protect yourself from terrorist attacks as well as secondary attacks that are designed to injure or kill rescuers and further the physical and psychological impact of the attack.

Remember

- Responders often are targets of terrorists. Safety must be the highest priority. Use scene clues to identify potential terrorist incidents.
- Adapt protective measures to the specific threat. Know the protective principles of CBRNE events.

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Remember

- Important priorities for responders at a terrorist incident are life safety, incident stabilization, and protection of property.
- Isolation, perimeter control, and appropriate notifications are important priorities in managing a terrorist incident.

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Remember

- Force protection is an extension of general safety procedures. It refers to the safety and security of both providers and resources.

Questions to Consider

- How can I best protect myself from danger and hazards during a terrorist incident?
- What is my role in the incident response plan for a terrorist incident?

Critical Thinking

- You arrive at an office where multiple patients are complaining of the same symptoms. They state their office received several threats due to its role in a controversial foreign relations incident. You and your partner recognize the similar symptoms and decide these may be linked.

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Critical Thinking

- What is your best course of action next? Should you remove yourself from the scene at this point or remain with your patients?