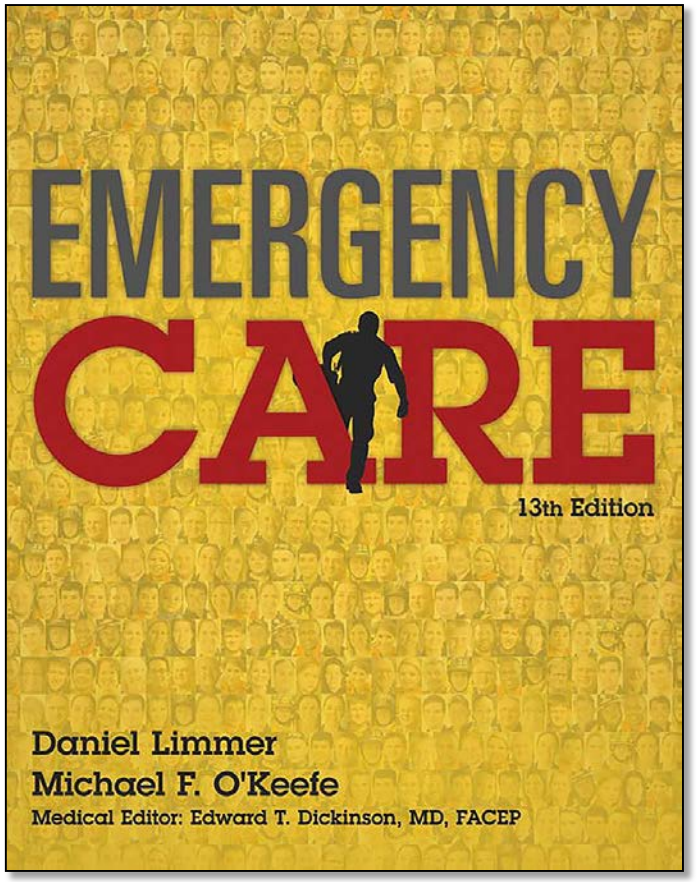
Emergency Care

THIRTEENTH EDITION



CHAPTER 37

Hazardous Materials, Multiple-Casualty Incidents, and Incident Management

Topics

- Hazardous Materials
- Multiple-Casualty Incidents

Hazardous Materials

Hazardous Materials

- "Any substance or material in a form which poses an unreasonable risk to health, safety, and property when transported in commerce."—U.S. Department of Transportation (DOT)

Training Required by Law

- First Responder Awareness
  - No minimum
- First Responder Operations
  - 8 hours
- Hazardous Materials Technician
  - 24 hours
- Hazardous Materials Specialist
  - 24 additional hours

Responsibilities of the EMT

- Recognize a hazmat incident
  - Incidents involving common carriers, trucking terminals, chemical plants or places where chemicals are used, delivery trucks, agriculture and garden centers, railway incidents, and laboratories.
  - All patients leaving the site should be considered contaminated until proven otherwise.

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Responsibilities of the EMT

- Control the scene
  - Establish the danger zone.
    - Hot zone
      - Area of contamination or danger
    - Warm zone
      - Area immediately adjacent to hot zone

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Responsibilities of the EMT

- Control the scene
  - Establish the danger zone.
    - Cold zone
      - Area immediately adjacent to warm zone
      - Where equipment and emergency rescuers are staged

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Responsibilities of the EMT

- Control the scene
  - Establish the safe zone.
- Identify the substance
  - You must make an attempt to assess the material and severity.

Identify Hazardous Material

- Identify the substance
  - Ways to obtain information safely
    - Use binoculars to look for identifying signs, labels, or placards from a safe distance.
    - Search for placards.
    - Look for labels.
    - Check invoices, bills of lading (trucks), and shipping manifests (trains).

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Identify Hazardous Material

- Identify the substance
  - Ways to obtain information safely
    - Review safety data sheets (SDS).
    - Interview workers or others leaving the hot zone.
  - Get expert advice about next actions
    - Emergency Response Guidebook
    - Chemical Transportation Emergency Center (CHEMTREC)

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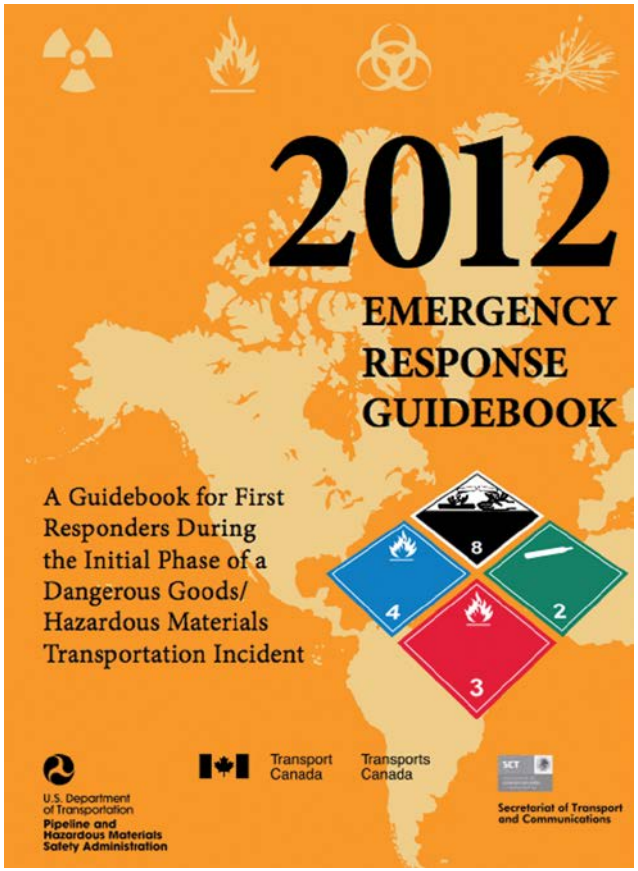
Identify Hazardous Material

- Identify the substance
  - Get expert advice about next actions
    - CHEM-TEL, Inc.
    - A current list of state and federal radiation authorities
    - Regional poison control centers
    - Be sure to leave thorough information about the scene, call-back, container, conditions, location, quantity, and injuries and exposures.

Identify Hazardous Material



Have the latest edition of the Emergency Response Guidebook in your vehicle at all times.

Establish a Treatment Area

- Rehabilitation operations
  - Located in the cold zone
  - Protected from weather
  - Large enough to accommodate multiple rescue crews
  - Easily accessible to EMS units
  - Free from exhaust fumes
  - Allows for rapid reentry into the emergency operation

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Establish a Treatment Area

- Care of injured and contaminated patients
  - Decontaminate in warm zone
  - Treat in cold zone
  - Field-decontaminated patients are not completely "clean."
  - Personal protective equipment or clothing (PPE/PPC) is needed to prevent secondary contamination of rescuers.

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Establish a Treatment Area

- Care of injured and contaminated patients
  - Protect vehicles from contamination.
  - Consider used equipment as disposable.
  - Structural firefighting clothing is not designed or recommended for use when working in hazardous material environments.

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Establish a Treatment Area

- Care of injured and contaminated patients
  - Four types of patients
    - Uninjured and not contaminated
    - Injured and not contaminated
    - Uninjured and contaminated
    - Injured and contaminated

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Establish a Treatment Area

- Care of injured and contaminated patients
  - Take precautions appropriate to the substance as listed in the *Emergency Response Guidebook*.
  - Follow the first-aid measures listed in the *Emergency Response Guidebook*.
  - Manage the patient's critical needs.
    - Do not forget to manage the ABCs.

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Establish a Treatment Area

- Care of injured and contaminated patients
  - If treatment calls for irrigation with water, remember that water only dilutes most substances; it does not neutralize them.
  - After treating the patient, decontaminate yourself.
    - Your clothing may need disposal.

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Establish a Treatment Area

- Phases of decontamination
  - Gross decontamination
    - Chemical or majority of contaminant
  - Secondary decontamination
    - Residual product contamination
    - More thorough

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Establish a Treatment Area

- Mechanisms for decontamination
  - Emulsification
  - Chemical reaction
  - Disinfection
  - Dilution
  - Absorption or adsorption
  - Removal
  - Disposal

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Establish a Treatment Area

- Decontamination procedures
  - Objectives
    - Determine the appropriate level of protective equipment based on materials and associated hazards
    - Properly wear and operate in PPE
    - Establish operating time log
    - Set up, operate decontamination line
    - Prioritize the decontamination of patients according to a triage system

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Establish a Treatment Area

- Decontamination procedures
  - Objectives
    - Perform triage in PPE
    - Be able to communicate while in PPE
  - Basic list of equipment
    - Buckets
    - Brushes
    - Decontamination solution
    - Decontamination tubs

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Establish a Treatment Area

- Decontamination procedures
  - Basic list of equipment
    - Dedicated water supply
    - Tarps or plastic sheeting
    - Containment vessel for water runoff
    - Pump to transfer wastewater from decontamination tubs to a containment vessel

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Establish a Treatment Area

- Decontamination procedures
  - Basic list of equipment
    - A-frame ladder
    - Appropriate-level PPE for responders performing decontamination
  - Decontamination for patients wearing PPE
    - Rinse, starting at head and working down.

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Establish a Treatment Area

- Decontamination procedures
  - Decontamination for patients wearing PPE
    - Scrub suit with brush, starting at head and working down.
    - Rinse again, starting at head and working down.
    - Assist responder in removing PPE.
    - Contain runoff of hazardous wastewater.

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Establish a Treatment Area

- Decontamination procedures
  - Decontamination for patients not wearing PPE
    - First consideration is for responder safety.
    - Use public address system to direct ambulatory patient to decontamination line.
    - Patients remove clothes and contact lenses.

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Establish a Treatment Area

- Decontamination procedures
  - Decontamination for patients not wearing PPE
    - Double-bag clothing.
    - Receive 2- to 5-minute water rinse, starting at the head.
    - Provide patient cover for modesty.

Multiple-Casualty Incidents

Multiple-Casualty Incidents

Multiple-casualty incidents may range from small to large. In this bus crash, all passengers were triaged and forty-four patients were transported to area hospitals.
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Multiple-Casualty-Incident Operations

- Know local disaster plan
  - Written to address events conceivable for particular location
  - Well publicized
  - Realistic
  - Rehearsed

Incident Command System

- National Incident Management System (NIMS)
- Command
  - Operations
  - Logistics
  - Planning
  - Finance
  - Single incident or unified

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Incident Command System

- Command functions
  - Incident Command assumed by most senior member of first service on scene
    - Options once reinforcements arrive
      - Continue to be in Command
      - Transfer Command to someone of higher rank
  - Modes of action
    - Scene size-up/triage
    - Organization/delegation

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Incident Command System

- Scene size-up
  - Arrive at scene and establish Incident Command.
  - Do a quick walk through the scene to assess number of patients, hazards, and degree of entrapment.
  - Get as calm and composed as possible to radio in an initial scene report and call for additional resources.

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Incident Command System

- Communications
  - On arrival, give brief report and request necessary resources.
  - Incident Commander only person to converse with communications center, disseminates information to others
  - Have face-to-face conversations among command staff whenever possible.

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Incident Command System

- Organization
  - Early and aggressive organization vital
  - Have a plan to deploy resources.
  - Think about supply and staging areas.
  - Think big. Order big.
  - Prevent "freelancing."
  - Have some personal tools, such as a "tactical worksheet."

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Incident Command System

- EMS branch functions
  - Mobile command center
  - Extrication
  - Staging area
  - Triage area
  - Treatment area
  - Transportation area
  - Rehabilitation area

Triage

- Goal
  - Afford greatest number of people greatest chance of survival
- Most knowledgeable EMS provider becomes the triage supervisor.

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Primary Triage

- Priority 1
  - Treatable life-threatening illnesses or injuries
- Priority 2
  - Serious but not life-threatening illnesses or injuries

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Primary Triage

- Priority 3
  - "Walking wounded"
- Priority 4 (sometimes called Priority 0)
  - Dead or fatally injured

START Triage: A National Standard for Rapid Primary Triage

- Simple triage and rapid treatment
- Foundation of system is speed, simplicity, consistency of application
- Simple commands to patients
- Patient evaluation based on RPM
  - Respiration
  - Pulse
  - Mental status

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START Triage: A National Standard for Rapid Primary Triage

- Able to walk?
  - Yes
    - Priority 3
  - No
    - Check respirations

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START Triage: A National Standard for Rapid Primary Triage

- Only three treatments provided during START triage
  - Open an airway and insert an oropharyngeal airway.
  - Apply pressure to bleeding.
  - Elevate an extremity.

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START Triage: A National Standard for Rapid Primary Triage

- Assess respiration (breathing status) first.
  - Yes and >30/minute
    - Priority 1
  - Yes and <30/minute
    - Check pulse

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START Triage: A National Standard for Rapid Primary Triage

- Assess respiration (breathing status) first.
  - No
    - Position airway; recheck respirations
  - Not breathing and attempts to open airway do not start breathing
    - Priority 0

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START Triage: A National Standard for Rapid Primary Triage

- Assess radial pulse second.
  - Unresponsive, not breathing, no pulse
    - Priority 0
  - Breathing, no apparent pulse
    - Priority 1
  - Breathing, pulse, good skin signs, capillary refill
    - Check mental status

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START Triage: A National Standard for Rapid Primary Triage

- Assess level of consciousness (mental status) third.
  - Alert
    - Priority 2
  - Altered mental status
    - Priority 1

START Triage: A National Standard for Rapid Primary Triage

- Now retriage the Priority 3 “walking wounded” patients.
  - Respiration
  - Pulse
  - Mental status

Patient Identification

- Color code patients with a triage tag.
  - Priority 1
    - Red
  - Priority 2
    - Yellow
  - Priority 3
    - Green
  - Priority 4
    - Black

Secondary Triage and Treatment

- Secondary triage is performed at a patient collection point or triage area.
- Patients are separated into treatment groups based on their priority level.
  - Each treatment area should have its own treatment supervisor.
- It may be necessary to recategorize a patient whose condition has deteriorated or improved.

Transportation and Staging Logistics

- Once assessed, triaged, and treated, patients are transported according to priority.
- Ambulances in staging area in designated area to await direction and patients

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Transportation and Staging Logistics

- Staging supervisor
- Transportation supervisor
- Overwhelming a hospital's surge capacity could bring about poor outcomes.

Communicating with Hospitals

- Receiving facilities contacted early to determine capabilities and update on expected patient counts
- Transportation officer, not individual EMTs, should communicate.
- Generally too many patients to allow a good radio report
  - Only basic information given

Psychological Aspects of MCIs

- Caring, honest demeanor can reassure patient.
- Do not attempt to psychoanalyze a person's distress.
- "Psychological first aid" may be necessary on the scene of MCI.

Think About It

- If you are the first rescue vehicle to reach the scene of an MCI, what should you do?

Chapter Review

Chapter Review

- Maintain a high index of suspicion and awareness. Many hazmat incidents start out as routine EMS calls.
- The biggest problem in most hazmat incidents in identifying the offending substance. Look for the shopping placard and the SDS. Use the *Emergency Response Guide* to help determine your initial actions.

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Chapter Review

- Remember the hot zone—warm zone—cold zone. Once you realize it's a hazmat incident, get to the cold zone and call for help.
- Keep responders in rehab until they are rested, hydrated, and vitals return to normal.

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Chapter Review

- Patients who have been "decontaminated" almost always still have some contamination.
- Patients being transported must be cared for by competent EMS responders with Operations-level training and equipment.

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Chapter Review

- Use your MCI plan and procedure at small incidents, as this will make managing larger ones will be easier.
- NIMS and Incident Management are the national standard for incident management.

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Chapter Review

- Learn and practice START triage essentials.
- Be alert for signs of stress after incidents, and seek help as necessary.

Remember

- A hazardous materials response requires specialized training and resources. Common responsibilities of initial responders must be identification of the incident, scene control, and activation of appropriate resources.

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Remember

- Scene safety is highest priority; when possible, use scene clues, product information, and specific resources to identify hazardous materials.
- Decontamination prevents the spread of a hazardous material. EMTs are commonly involved in various levels of this process.

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Remember

- Multiple-casualty incident overwhelms resources of responding units. When this occurs, organization is the most important priority.
- NIMS and its incident command system provide organization resources and structure to improve management of large-scale incidents.

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Remember

- Triage allows EMTs to prioritize care and transport of patients when resources are limited.

Questions to Consider

- What is the hazardous substance? What risk does it pose?
- If a patient has some contamination, can we safely start decontamination?
- Should I start using triage tags?

Critical Thinking

- Your call is to a motor-vehicle collision with an unknown number of injuries. As your unit approaches the scene, you see that three cars and downed wires are involved. You get a whiff of gasoline as you pass by.

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Critical Thinking

- The drivers are visible in each vehicle—one appears to be conscious and the other two are bent forward or slumped back. There are passengers visible in two vehicles, one or more of whom may need extrication. How should you proceed?